## **PROJECT MANUAL**

## FOR

## Pasco School District Orion High School

1815 East Salt Lake Street Pasco, Washington

## **VOLUME 1:** DIVISION 00 – DIVISION 09



December 18, 2023

Design West Architects 830 N Columbia Center Blvd, Suite E Kennewick, WA 99336 509-783-2244



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## Pasco School District – Orion High School INVITATION TO BID

PASCO SCHOOL DISTRICT

1215 W. Lewis Street Pasco, WA 99301

## DESIGN WEST ARCHITECTS

830 N Columbia Center Blvd, Suite E Kennewick, WA 99336

You are invited to bid on a General Contract for construction in the City of Pasco for the Construction of Orion High School. A new 2 story building consisting of 65,000 square feet, including: Utilities, Site Work, Structures, Finishes, Fire Protection, Mechanical, and Electrical work.

## **Preliminary Estimate:**

Base Bid:	\$32,000,000
Alternates:	\$1,500,000

Proposals will be accepted by the District until 3:00pm (Base Bid) and 4:00pm (Alternates and Subcontractor List), prevailing time, on Tuesday, April \_\_, 2024 at the Pasco School District Booth Building at 1215 W. Lewis Street, Pasco, WA. Base Bid and Alternate proposals will be opened publicly and read aloud at 4:00pm. Interested parties are invited to attend.

A Pre-Bid Conference, **optional** for all General Contractor prospective bidders, will be held **Tuesday**, **March** \_\_, 2024 at 3:00pm at the project site, 1815 East Salk Lake Street, Pasco, WA.

Plans and Specifications are available, **beginning March**, through the Architect. Printed paper sets are available at \$200 per set (limit 2 sets to General Contractors and 1 set for subcontractors). The cost is refundable provided the documents are returned in good condition within 10 days after bid opening. Additional sets may be purchased at cost, non-refundable.

E-mailed PDF drawings and specifications are available at <u>no</u> cost. Contact Larissa Capuli, Office Manager with Design West Architects by e-mail at <u>lcapuli@designwestwa.com</u> to request documents.

Bid security amounting to five percent (5%) of the total Base Bid must accompany each Bidder's proposal in accordance with Instructions to Bidders.

Bid documents will be available for examination during the bidding period at the following locations:

Abadan Regional Plan Center –Spokane, WA Associated Builders & Contractors, Inc. – Spokane Valley, WA Associated General Contractors – Idaho Builders Exchange of Washington – Everett, WA Daily Journal of Commerce Plan Center – Seattle, WA Dodge Data and Analytics – Spokane, WA NW Contractors Network – Seattle, WA Southwest Washington Contractors Association – Vancouver, WA Spokane Regional Plan Center – Spokane, WA Tri-City Construction Council – Kennewick, WA Walla Walla Valley Plan Center – Walla Walla, WA Wenatchee Plan & Copy Center – Wenatchee, WA Yakima Plan Center – Yakima, WA

No bidder may withdraw his proposal after the date and time set for opening thereof or before Award of Contract, unless said award is delayed beyond 30 days. Substantial Completion shall be achieved in compliance with Section 01 10 00 of the project specifications.

The project requires compliance with prevailing wage under RCW 39.12 and apprenticeship participation of 15% under RCW 39.04.320.

The District reserves the right to accept or reject any or all proposals, and in particular, to reject a proposal not accompanied by the required bid security or data required. The process shall comply with WAC 180-29-105, RCW 28A.335.190 and RCW 43.19.1906.

## DOCUMENT 00 10 00 - INSTRUCTIONS TO BIDDERS

## ARTICLE 1 DEFINITIONS

- **1.1** All definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.
- **1.2** "Addenda" are written or graphic instruments issued by the Architect prior to the execution of the contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections. The contents of Addenda are issued in no particular order and therefore should be carefully and completely reviewed.
- **1.3** An "Alternate Bid" (or "Alternate") is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.
- **1.4** The "Base Bid" is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base to which work may be added or from which work may be deleted for sums stated in Alternate Bids.
- **1.5** A "Bid" is a complete and properly signed proposal to do the Work or designated portion thereof, submitted in accordance with the Bidding Documents, for the sums therein stipulated.
- **1.6** A "Bidder" is a person or entity who submits a Bid.
- **1.7** The "Bidding Documents" include the Advertisement or Invitation to bid, Instructions to Bidders, the bid form, other sample bidding and contract forms, the Bid Bond, any required Affidavit of Non-Collusion, and the proposed Contract Documents, including any Addenda issued prior to receipt of bids.
- **1.8** The "Contract Documents" proposed for the Work consist of the Agreement for the Work, the Agreement Between Owner and Contractor and the Revised General Conditions of the Contract as well as any Supplemental, Special, and other Conditions included in the Project Manual, the Drawings, the Specifications, and all Addenda issued prior to and all modifications issued after execution of the Contract.
- **1.9** Bidding and Contract Documents may be distributed in either printed paper format, or electronic media. In case of any discrepancies between formats, the final version of the printed paper format shall be the take precedence over electronic media formats.
- **1.10** A "Sub-bidder" is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.
- **1.11** A "Unit Price" is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services as described in the Bidding Documents or in the proposed Contract Documents.

## ARTICLE 2 BIDDER'S REPRESENTATIONS

- **2.1** By making it's Bid, each Bidder represents that:
  - **2.1.1** It has read and understands the Bidding Documents, and its Bid is made in accordance with them.
  - 2.1.2 It has attended the pre-bid meeting(s) as required by the Bidding Documents.
  - **2.1.3** Its Bid is based upon the materials, systems, and equipment required by the Bidding Documents and is made without exception.
  - **2.1.4** It will perform with its own forces at least the percentage of the Work required by the Bidding Documents.
  - **2.1.5** It has checked its copies of the Project Manual with the Table of Contents bound therein to ensure the Project Manual is complete.
  - **2.1.6** It has examined and coordinated all Drawings, Contract Documents, and Specifications for any other contracts to be awarded separately from, but in connection with, the Work

being bid upon, so that the Bidder is fully informed as to conditions affecting the Work under the contract being bid upon.

It has carefully examined the Bidding Documents, Contract Documents, and the Project 2.1.7 site, including any existing buildings, and it has satisfied itself as to the nature, location, character, guality and guantity of the Work, the labor, materials, equipment, goods. supplies, work, services and other items to be furnished, and all other requirements of the Contract Documents. The Bidder has also satisfied itself as to the conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof, including but not limited to those conditions and matters affecting: transportation, access, disposal, handling and storage of materials, equipment and other items; availability and quality of labor, water, electric power and utilities; availability and condition of roads, climatic conditions and seasons; physical conditions at the Project site and the surrounding locality; topography and ground surface conditions; and equipment and facilities needed preliminary to and at all times during the performance of the Work. The failure of the Bidder fully to acquaint itself with any applicable condition or matter shall not in any way relieve the Bidder from the responsibility for performing the Work in accordance with, and for the Contract Sum and within the Contract Time provided for in, the Contract Documents.

## ARTICLE 3 BIDDING DOCUMENTS

## 3.1 Copies

- **3.1.1** Bidders may obtain complete sets of the Bidding Documents by contacting the Architect and other locations designated in the Advertisement or Invitation to Bid in the number and for the deposit sum stated. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of any missing or damaged documents will be deducted from the deposit. A Bidder awarded a Contract may retain the Bidding Documents, and its deposit will be refunded.
- **3.1.2** Bidding Documents will not be issued directly to Sub-bidders or others unless specifically offered in the Advertisement or Invitation to Bid.
- **3.1.3** Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor the Architect assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- **3.1.4** The Owner and/or the Architect make copies of the Bidding Documents available on the above terms only for the purpose of obtaining Bids on the Work and do not confer a license or grant permission for any other use.

## 3.2 Interpretation or Correction of Bidding Documents

- **3.2.1** Bidders and Sub-bidders shall promptly notify the Architect of any ambiguity, inconsistency, or error which they may discover upon examination of the Bidding Documents or of the site and local conditions. All Bidders and Sub-bidders shall thoroughly familiarize themselves with specified products and installation procedures and submit to the Architect any objections (in writing) no later than 10 days prior to the Bid Date. The submittal of the Bid constitutes acceptance of products and procedures specified as sufficient, adequate, and satisfactory for completion of the Contract.
- **3.2.2** Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.
- **3.2.3** Any interpretation, correction or change of the Bidding Documents will be made by written Addendum. Interpretations, corrections or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections and changes.

- **3.2.4** Reference in the singular to an article, device or piece of equipment shall include as many of such articles as are indicated in the Contract Documents or as are required to compete the installation.
- **3.2.5** Bidders should assume that the exact locations of underground or hidden utilities may be somewhat different from any location indicated in the surveys or Contract Documents.

## 3.3 Substitutions

- **3.3.1** The materials, products, procedures and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality that must be met by any proposed substitution.
- No substitution will be considered prior to receipt of Bids unless a written request for 3.3.2 approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Each such request shall include the name of the material or equipment proposed to be replaced and a complete description of the proposed substitute, including drawings. cuts, performance and test data and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or other Work that incorporation of the substitute would require shall be included. The proposer has the burden to prove the merit of the proposed substitute; by proposing the substitution, the Bidder represents that it has personally investigated the proposed material or product and determined that it is equal or better in all respects to that specified, that the same or better warranty will be provided for the substitution, that complete cost data, including all direct and indirect costs of any kind, has been presented and that it will coordinate the installation of the substitute if accepted and make all associated changes in the Work. The Architect's decision of approval or disapproval of a proposed substitution shall be final. Written request for approval shall constitute a guarantee by the Bidder that the articles or materials are equal or superior to those specified, unless otherwise noted. To the extent the proposed substitution will require additional work by the Architect or its consultants, the Contractor will be required to pay the Architect or its consultants for this work at their customary hourly rates.
- **3.3.3** If the Architect approves a proposed substitution prior to receipt of Bids, the approval will be set forth in a written Addendum. Bidders shall not rely upon approvals made in any other manner.
- **3.3.4** After the Contract has been executed, the Owner and the Architect may consider a written request for the substitution of material or products in place of those specified in the Contract Document only under exceptional circumstances as specified.

## 3.4 Addenda

- **3.4.1** All Addenda will be written. They will be mailed, e-mailed, faxed or delivered to those known by the Architect to have received a complete set of Bidding Documents. E-mail is preferred.
- **3.4.2** Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.
- **3.4.3** No Addenda will be issued later than three days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or including postponement of the date for receipt of Bids.
- **3.4.4** Each Bidder shall ascertain prior to submitting its Bid that it has received all Addenda issued, and it shall acknowledge their receipt in its Bid.

## ARTICLE 4 BIDDING PROCEDURE

## 4.1 Forms and Style of Bids

**4.1.1** Bids shall be submitted on forms identical to the form included with the Bidding Documents.

**4.1.2** All blanks on the bid form shall be filled in by typewriter or manually in ink.

- **4.1.3** Where so indicated by the makeup of the bid form, sums shall be expressed in both words and figures; in case of discrepancy between the two, the amount written in words shall govern.
- **4.1.4** Any interlineation, alteration or erasure must be initialed by the signer of the Bid.
- **4.1.5** All requested Alternates should be bid. If no change in the Base Bid is required, enter *"No Change."* If there is no entry, it will be presumed that there is no change in the Base Bid.
- **4.1.6** Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of its bid security, state its refusal to accept award of less than the combination of Bids it so stipulates. The Bidder shall make no additional stipulations on the bid form nor qualify its Bid in any other manner.
- **4.1.7** Each copy of the Bid shall include the legal name of the Bidder and a statement describing the Bidder as a sole proprietor, a partnership, a joint venture, a corporation, or another described form of legal entity. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.
- **4.1.8** The Bid shall include in the sum stated all taxes imposed by law, <u>EXCEPT STATE AND</u> <u>LOCAL SALES TAX.</u>
- **4.1.9** The Form of Proposal may contain, for the Owner's accounting purposes only, a breakdown of some or all of the components included in the Base Bid.

## 4.2 Listing of Subcontractors

- **4.2.1** In the spaces provided on the Form of Proposal, the Bidder shall name the Subcontractors per State RCW. The Bidder, if awarded the Contract, will subcontract with the listed Subcontractor for performance of the portion of the Work designated on the Form of Proposal, subject to the provisions of the Contract for Construction. Should alternate bids require different named subcontractors, the Bidder shall identify the alternate subcontractors and the affected portion of the Work.
- **4.2.2** If a listed Subcontractor is unable to comply with the bondability requirements of the Bidding Documents or other requirements of the Contract Documents, the Owner may require the Bidder to replace the Subcontractor with a Subcontractor acceptable to the Owner at no change in the Contract Sum or Time.

## 4.3 Bid Security

- **4.3.1** Each Bid shall be accompanied by a bid security equal to five percent of the base bid. The bid security constitutes a pledge that the Bidder will enter into the Contract with the Owner in the form provided, in a timely manner, and on the terms stated in its Bid and will furnish in a timely manner the payment and performance bonds, certificates of insurance, Contractor's Construction Schedule, and all other documents required in the Contract Documents. Should the Bidder fail or refuse to enter into the Contract or fail to furnish such documents, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.
- **4.3.2** The bid security shall be in the form of a certified or bank cashier's check payable to the Owner or a bid bond executed by a bonding company licensed in the State of Washington on a Public Works Bond or equivalent form.
- **4.3.3** The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and payment and performance bonds have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn, or (c) all Bids have been rejected.

## 4.4 Submission of Bids

**4.4.1** The Bid, the bid security and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party specified in the Advertisement or Invitation to Bid as receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the

Orion High School Pasco, Washington

designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation *"SEALED BID ENCLOSED"* on the face thereof.

- **4.4.2** Bids shall be deposited at the designated location prior to the time and date for receipt of Bids indicated in the Advertisement or Invitation to Bid, or any extension thereof made by Addendum. Bids received after the time and date for receipt of Bids will be returned unopened.
- **4.4.3** The Bidder assumes full responsibility for timely delivery at the location designated for receipt of Bids.
- **4.4.4** Oral, telephonic or telegraphic Bids are invalid and will not receive consideration.

## 4.5 Modification or Withdrawal of Bid

- **4.5.1** By submitting its Bid, each Bidder agrees that its Bid may not be modified, withdrawn or canceled by the Bidder during a thirty-day period following the time and date designated for the receipt of Bids.
- **4.5.2** Prior to the time and date designated for receipt of Bids, any Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder or by E-mail or fax; if by E-mail or fax, written confirmation over the signature of the Bidder shall be mailed and postmarked on or before the date and time set for receipt of Bids. The notice shall be so worded as not to reveal the amount of the original Bid.
- **4.5.3** Withdrawn Bids may be resubmitted up to the time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.
- **4.5.4** Bid security shall be in an amount sufficient for the Bid as modified or resubmitted.

## ARTICLE 5 CONSIDERATION OF BIDS

## 5.1 Opening of Bids

**5.1.1** Unless stated otherwise in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be opened publicly and will be read aloud. An abstract of the Base Bids and Alternate Bids, if any, will be made available to Bidders.

## 5.2 Rejection of Bids

**5.2.1** The Owner shall have the right but not the obligation to reject any or all Bids for any reason or for no reason, to reject a Bid not accompanied by required bid security or by other data required by the Bidding Documents, or to reject a Bid which is in any way incomplete or irregular.

## 5.3 Acceptance of Bid (Award)

**5.3.1** The Owner intends (but is not bound) to award a Contract to the lowest responsible and responsive Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive any informality or irregularity in any Bid(s) received and to accept the Bid(s) which, in its judgment, is in its own best interests.

## 5.4 Bid Protest Procedures

**5.4.1** A Bidder protesting for any reason the Bidding Documents, a bidding procedure, the award of the Contract or any other aspect arising from or relating in any way to the bidding shall cause a written protest to be filed with the Owner within three business days of the event giving rise to the protest and, in any event, no later than three business days after the date upon which bids are opened. The written protest shall include the name of the protesting Bidder, a detailed description of the specific factual and legal grounds for the protest, copies of all supporting documents, and the specific relief requested. The written protest shall be delivered to the Superintendent of Schools.

- **5.4.2** Upon receipt of the written protest, the Owner will consider the protest. The Owner may provide any other affected Bidder(s) the opportunity to respond in writing to the protest within three business days of the Owner's receipt of the protest. If the protest is not resolved by mutual agreement of the protesting Bidder and the Owner, the Superintendent of the Owner will review the issues and promptly furnish a final and binding written decision to the protesting Bidder and any other affected Bidder(s) within six business days of the Owner's receipt of the protest (If more than one protest is filed, the Owner's decision will be provided within six business days of the Owner's receipt of the last protest).
- 5.4.3 Failure to comply with these protest procedures will render a protest waived.
- **5.4.4** Timely and proper compliance with and exhaustion of these protest procedures shall be a condition precedent to any permissible judicial consideration of protest.

## 5.5 Mandatory Bidder Responsibility Determination

- **5.5.1.** Mandatory Bidder responsibility shall be determined by the criteria set forth in <u>RCW 39.04.350</u>. There are six criteria upon which bidder responsibility is determined. It is the intent of Owner to award a contract to the low responsible bidder. Before award, the bidder must meet the following bidder responsibility criteria to be considered a responsible bidder. The bidder may be required by the Owner to submit documentation demonstrating compliance with the criteria. The bidder must:
- **5.5.2.** Have a current certificate of registration as a contractor in compliance with chapter 18.27 RCW, which must have been in effect at the time of bid submittal;
- 5.5.3. Have a current Washington Unified Business Identifier (UBI) number;
- **5.5.4.** If applicable:

Have Industrial Insurance (workers' compensation) coverage for the bidder's employees working in Washington, as required in Title 51 RCW;

Have a Washington Employment Security Department number, as required in Title 50 RCW;

Have a Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;

- **5.5.5.** Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3).
- **5.5.6.** For public works projects subject to the apprenticeship utilization requirements of RCW 3.0.04.320, not have been found out of compliance by the Washington state apprenticeship and training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the first date of advertising for the project.
- **5.5.7.** Until December 31, 2013, not have violated more than one time the offsite, prefabricated, non-standard, project specific items reporting requirements of RCW 39.04.370. Reference Articles 9.4.1 through 9.4.4 of this section for further information regarding off-site-items.

## 5.6 Supplementary Bidder Responsibility Determination

- 5.6.1. In addition to the bidder responsibility criteria above, the bidder must also meet the following relevant supplemental bidder responsibility criteria applicable to the project. Supplementary Bidder responsibility shall be determined by the criteria set forth in <u>RCW 39.04.350</u>. The specific supplementary bidder responsibility criteria and documentation required to determine bidder responsibility follow under items 5.6.4 through 5.6.7
- **5.6.2.** Documentation: As evidence that the bidder meets the bidder responsibility criteria, the apparent low bidder must submit the requested documentation to the Architect and Owner within 48 hours of the bid submittal deadline. The Owner reserves the right to request such documentation from other bidders also.
- **5.6.3.** Request to Change Criteria During Bidding: Bidders with concerns about the relevancy or restrictiveness of the Supplemental Bidder Responsibility Criteria required in these

bidding documents may make or submit requests to the Owner to modify the criteria. Such requests shall be in writing, describe the nature of the concerns, and propose specific modifications to the criteria that will make the criteria more relevant and/or less restrictive of competition. Bidders should submit such requests to the Owner no later than Ten (10) business days prior to the bid submittal deadline and address the request to the Architect.

## 5.6.4. Responsibility Criterion 1: Public Works Projects for School Districts

- **5.6.4.1.** Criterion: The Bidder shall have successfully completed projects for school districts of a similar size and scope as required by the contract documents for this project. In evaluating whether the projects were "successfully completed," the Owner may check owner references for the previous projects and may evaluate the owner's assessment of the Bidder performance, including but not limited to the following areas:
  - Quality of project and quality control;
  - Management of safety and safety record;
  - Timeliness of performance;
  - Management of subcontractors;
  - · Compliance with contract documents;
  - Management of schedule, submittals process, change orders, and closeout.
- **5.6.4.2.** Documentation: The Bidder shall submit a list of school district projects of similar size and scope to this project. For the purposes of meeting this criterion, the Owner has determined that "similar size and scope to this project" means projects that have the following characteristics: between \$1million and \$10 million in construction cost completed within the past five years. The information about each project shall include the following:
  - Owner's name and contact information for the owner's representative;
  - Awarded contract amount;
  - Final contract amount;
  - A description of the scope of the project and how the project is similar to this project;
- 5.6.5. Responsibility Criterion 2: Claims Against Retainage and Bonds
- **5.6.5.1.** Criterion: The Bidder shall not have a record of excessive claims filed against the retainage or payment bonds for public works projects during the previous five years, that demonstrate a lack of effective management by the Bidder of making timely and appropriate payments to its subcontractors, suppliers, and workers, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Owner.
- **5.6.5.2.** Documentation: The Bidder shall submit a list of all the public works projects completed within the previous five years that have had any claim filed against the retainage or payment bonds for the project. Include a brief description of the nature and resolution of each claim noted.
- 5.6.6. Responsibility Criterion 3: Termination for Cause / Termination for Default
- **5.6.6.1.** Criterion: The Bidder shall not have had any public works contract terminated for cause or terminated for default by a government agency during the five year period immediately preceding the bid submittal deadline for this project, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Owner.
- **5.6.6.2.** Documentation: The Bidder shall sign a statement (on a form to be provided by the Owner) that the Bidder has not had any public works contract terminated for cause by a government agency during the five year period immediately preceding the bid submittal deadline for this project. The Owner may also use independent sources of information to demonstrate whether the Bidder is in compliance with this criterion.

## 5.6.7. Responsibility Criterion 4: Lawsuits

- **5.6.7.1.** Criterion: The Bidder shall not have lawsuits with judgments entered against the Bidder within five years of the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Owner.
- **5.6.7.2.** Documentation: The Bidder shall submit a list of lawsuits with judgments entered against the Bidder within five years of the bid submittal date, along with a written explanation of the circumstances surrounding each such lawsuit. The Owner shall evaluate these

explanations to determine whether the lawsuits demonstrate a pattern of failing to meet of terms of construction related contracts. The Owner may also evaluate lawsuits within the time period specified that are not reported by the Bidder.

**5.6.8.** Appeals: If the Owner determines the bidder does not meet the bidder responsibility criteria in paragraph B above and is therefore not a responsible bidder, the Owner shall notify the bidder in writing with the reasons for its determination. If the bidder disagrees with this determination, it may appeal the determination within 24 hours of receipt of the Owner's determination by presenting additional information to the Owner. The Owner will consider the additional information before issuing its final determination. If the final determination affirms that the bidder is not responsible, the Owner will not execute a contract with any other bidder until two business days after the bidder determined to be not responsible has received the final determination.

## 5.7 Subcontractor Responsibility

- **5.7.1.** The Contractor shall include the language of this section in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. Upon request of the Owner, the Contractor shall promptly provide documentation to the Owner demonstrating that the subcontractor meets the subcontractor responsibility criteria below. The requirements of this section apply to all subcontractors regardless of tier.
- **5.7.2.** At the time of subcontract execution, the Contractor shall verify that each of its first tier subcontractors meets the following bidder responsibility criteria:
- **5.7.3.** Have a current certificate of registration in compliance with chapter 18.27 RCW, which must have been in effect at the time of subcontract bid submittal;
- 5.7.4. Have a current Washington Unified Business Identifier (UBI) number;
- **5.7.5.** If applicable, have:

Have Industrial Insurance (workers' compensation) coverage for the subcontractor's employees working in Washington, as required in Title 51 RCW;

A Washington Employment Security Department number, as required in Title 50 RCW; A Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;

An electrical contractor license, if required by Chapter 19.28 RCW;

- An elevator contractor license, if required by Chapter 70.87 RCW.
- **5.7.6.** Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065 (3).
- **5.7.7.** Until December 31, 2013, not have violated more than one time the offsite, prefabricated, non-standard, project specific items reporting requirements of RCW 39.04.370.
- **5.7.8.** For public works projects subject to the apprenticeship utilization requirements of RCW 3.0.04.320, not have been found out of compliance by the Washington state apprenticeship and training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the first date of advertising for the project.

## 5.8 Reciprocal Preference for Resident Contractors

- **5.8.1.** EXPLANATION TO PROSPECTIVE BIDDERS: In accordance with RCW 39.04.380 effective *March 30, 2012* the State of Washington is enforcing a **Reciprocal Preference for Resident Contractors**. Any public works bid received from a nonresident contractor from a state that provides an in-state percentage bidding preference, a comparable percentage disadvantage must be applied to the bid of that nonresident contractor.
- 5.8.2. A nonresident contractor from a state that provides a percentage bid preference means a contractor that
  a) is from a state that provides a percentage bid preference to its resident contractors bidding on public works contracts.

b) at the time of bidding on a public works project, does not have a physical office located

in Washington. The state of residence for a nonresident contractor is the state in which the contractor was incorporated or, if not a corporation, the state where the contractor's business entity was formed.

- **5.8.3.** All nonresident contractors will be evaluated for out of state bidder preference. If the state of the nonresident contractor provides an in-state contractor preference, a comparable percentage disadvantage will be applied to their bid prior to contract award.
- **5.8.4.** Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must submit a request in writing to the Architect/Engineer (A/E) seven (7) calendar days before the bid due date. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective bidder concerning a solicitation will be furnished promptly to all other prospective bidders by addendum to the solicitation, if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective bidders.

## ARTICLE 6 POST BID INFORMATION

## 6.1 Information From Apparent Low Bidder

- **6.1.1** Within five days of the Architect's request, the apparent low Bidder shall submit to the Architect and Owner: (1) complete documentation detailing the bidders compliance with the bidder responsibility criteria defined above; (2) a properly executed Contractor's Qualification Statement on the form provided; (3) a letter or form from the Bidder's insurance company stating that the insurance required by the Contract Documents will become effective upon execution of the Contract; (4) a detailed breakdown of the Bid in a form acceptable to the Owner; (5) the names of the persons or entities (including a designation of the Work to be performed with the Contractor's own forces, and the names of those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work; and (6) the proprietary names and the suppliers of the principal items or systems of materials and equipment proposed for the Work. Failure to provide such information in a timely manner may constitute an event or breach resulting in forfeiture of the Bid security.
- **6.1.2** The Bidder will be required to establish to the satisfaction of the Architect and the Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents. The responsibility of the Bidder may be judged in part by the responsibility of these proposed entities.
- **6.1.3** Prior to the award of the Contract, the Architect will notify the Bidder in writing if either the Owner or the Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at Bidder's option, (1) withdraw the Bid, or (2) submit an acceptable substitute person or entity with no adjustment in the Base Bid or Alternate Bid, even if there is a cost to the Bidder occasioned by the substitution. In the event of withdrawal, bid security will not be forfeited.
- **6.1.4** Persons and entities proposed by the Bidder and to whom the Owner and the Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and the Architect.

## 6.2 Information From Other Bidders

**6.2.1** All other Bidders designated by the Architect as under consideration for award of a Contract shall also provide a properly executed Contractor's Qualification Statement, if so requested by the Owner.

## 6.3 Bidding Mistakes

**6.3.1** The Owner will not be obligated to consider notice of claimed bidding mistakes received more than three business days after the bid opening.

Orion High School Pasco, Washington

## ARTICLE 7 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

## 7.1 Bond Requirements

- **7.1.1** Within five days after the issuance of the Notice of Intent to Award, and prior to the date of execution of the Contract, the Bidder shall furnish evidence satisfactory to the Owner of its ability to obtain statutory bonds pursuant to RCW 39.08 covering the faithful performance of the Contract and the payment of all obligations arising thereunder in the form and amount prescribed in the Contract Documents. The cost of such bond shall be included in the Base Bid and with each Alternate Bid.
- **7.1.2** Within five days after the issuance of the Notice of Intent to Award, and prior to the date of execution of the Contract, the Bidder shall furnish evidence satisfactory to the Owner of insurance coverage as prescribed in the Contract Documents. The cost of such insurance shall be included in the Base Bid and with each Alternate Bid.

## 7.2 Time of Delivery and Form of Bonds

- **7.2.1** The Bidder shall deliver the required bonds to the Owner within five days after the date of execution of the Contract and prior to commencing operations at the site.
- **7.2.2** The Bidder shall deliver the required certificates of insurance to the Owner within five days after the date of execution of the Contract and prior to commencing operations at the site.
- **7.2.3** Failure to provide such documents and information in a timely manner may constitute an event or breach resulting in forfeiture of the Bid security.

## ARTICLE 8

## FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

## 8.1 Form to be Used

**8.1.1** The Agreement for the Work will be written on Revised AIA Document A-101, "Revised Standard Form of Agreement Between Owner and Contractor, where the basis of payment is a Stipulated Sum," as modified and supplemented. The Agreement for the Work shall include the General Conditions (AIA Document A-201), along with any edits, and/or Supplemental or Special Conditions, and the other Contract Documents.

## 8.2 Conflicts

**8.2.1** In the case of conflict between the provisions of these Instructions and any of the Bidding Document, these Instructions shall govern. In case of conflict between the provisions of the Bidding Document and the Contract Documents, the Contract Documents shall govern.

#### ARTICLE 9 SUDDI EMENTARY IN

## SUPPLEMENTARY INSTRUCTIONS

## 9.1 Liquidated Damages

The Contract Documents specify liquidated damages for the Owner and the Contractor.

## 9.2 Retainage

The Contract Documents specify the statutory/retainage requirements of RCW 60.28 for this project.

## 9.3 Contract Time

The Contract Documents specify the Contract Time. TIMELY COMPLETION OF THIS PROJECT IS ESSENTIAL TO THE OWNER.

## 9.4 Prevailing Wages

The Contract Documents contain requirements regarding the payment of prevailing wages pursuant to RCW 39.12.

- 9.4.1 In compliance with WAC 296-127-320, the contractor and sub-contractors for this project shall be required to keep accurate payroll records for three years from the date of acceptance of the public works project by the contract awarding agency, showing the name, address, Social Security number, trade or occupation, straight time rate, hourly rate of usual benefits as defined by WAC <u>296-127-014</u>(1), and overtime hours worked each day and week, including any employee authorizations executed pursuant to WAC <u>296-127-022</u>, and the actual rate of wages paid, for each laborer, worker, and mechanic employed by the contractor for work performed on a public works project. A contractor shall, within ten days after it receives a written request, from the department or from any interested party as defined by RCW <u>39.12.010</u>(4), file a certified copy of the payroll records with the agency that awarded the public works contract and with the department.
- 9.4.2 Current Prevailing Wage Rates for Franklin County may be viewed at: <u>http://www.lni.wa.gov/TradesLicensing/PrevWage/WageRates/default.asp</u>. A copy is available for viewing in the office of the Architect and a hard copy can be mailed upon request

## 9.5 Written Notice

The Contract Documents contain a number of provisions that require the Contractor to make Claims in writing within a specified time in order to maintain the claim.

## 9.6 Changes in Contract Sum

The Contract Documents contain a number of provisions that require the Contractor to make Claims in writing within a specified time in order to maintain the claim.

## 9.7 Dispute Resolution

The Contract Documents contain provisions replacing the arbitration provisions of the form General Conditions with an alternative dispute resolution procedure which, among other things, requires non-binding mediation of all disputes.

## 9.8 Contractor Registration

Pursuant to RCW 39.06, the Bidder shall be registered or licensed as required by the laws of the State of Washington, including but not limited to RCW 18.27.

## 9.9 Apprenticeship Participation

In accordance with RCW 39.04.320 the state of Washington requires 15% **Apprenticeship Participation** for all projects estimated to cost one million dollars or more. On applicable projects the bid advertisement and Bid Proposal form shall establish a minimum required percentage of apprentice labor hours compared to the total labor hours. Bidders may contact the Department of Labor and Industries, Specialty Compliance Services Division, Apprenticeship Section, P.O. Box 44530, Olympia, WA 98504-4530, by phone (360) 902-5320, and e-mail at thum235@lni.wa.gov, to obtain information on available apprenticeship programs.

## 9.10 MWBE Participation

In accordance with the legislative findings and policies set forth in Chapter 39.19 RCW the state of Washington encourages participation in all of its contracts by MWBE firms certified by the Office of Minority and Women's Business Enterprises (OMWBE). Participation may be either on a direct basis in response to this invitation or as a subcontractor to a bidder. However, unless required by federal statutes, regulations, grants, or contract terms referenced in the contract documents, no preference will be included in the evaluation of bids, no minimum level of MWBE participation shall be required as a condition for receiving an award, and bids will not be rejected or considered non-responsive on that basis. Any affirmative action requirements set forth in federal regulations or statutes included or referenced in the contract documents will apply.

## 9.11 Permit Plan Check and Utility Fees

The Owner will pay plan check fees, building permit costs and permanent utility connection and area charges and these costs shall not be included in the bid amount. Owner shall pay an independent soils or testing laboratory for all testing and inspection as required by local and state agencies and these specifications.

The Contractor shall pay for costs for any other permits or inspection fees, temporary utility connections, and the cost of all utility use until substantial completion. Costs for other permits and inspection fees, temporary connections, and utility use shall be included in the bid amount. The Owner will pay all Ecology construction stormwater general permit fees from time of obtaining permit until project substantial completion. If the Contractor fails to successfully terminate coverage of the project with Ecology prior to substantial completion, any additional fees and/or penalties accrued after substantial completion will be the responsibility of the Contractor.

## 9.12 Trench Excavation Safety

General Contractors shall comply with Trench Excavation Safety Provision in compliance with Chapter 39.04.180 RCW and WAC 296-155-650 for any project trenching exceeding a depth of 4 feet.

## 9.13 Other Provisions

The above paragraphs contain descriptions of some <u>but not all</u> of the provisions of the Contract Documents. Bidders should review in detail the Contract Documents themselves and not rely upon the above paragraphs in this Article as complete, inclusive or accurate.

End of Document 00 10 00

## DOCUMENT 00 30 00 - BID PROPOSAL FORM A (Due at 3:00pm - will not be opened until 4:00pm)

BID TO:

Pasco School District 1215 W. Lewis Street Pasco, WA 99301

**BID FROM:** 

NAME:	
ADDRESS:	
PHONE:	

BID FOR:

Orion High School Pasco, WA

I have received the Drawings and Specifications for the construction of Orion High School.

I have also received Addenda listed below and have included these provisions in my bid:

Addendum No.	Dated	
Addendum No.	Dated	
Addendum No.	Dated	

Having examined the Drawings and Specifications and related documents and the site of the proposed work and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of labor, hereby propose to furnish all labor, materials and supplies as required for the work in accordance with the contract documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the work required under the Contract Documents of which this Proposal is a part.

In submitting this bid, I agree:

- 1. To hold bid open for a time of thirty (30) days from the date of bid opening.
- 2. To accept the provision of the Instruction to Bidders regarding disposition of Bid Security.
- The bid security attached, in the amount of 5% of the bid amount, is to become the property of the 3. Owner in accordance with the Instructions to Bidders.
- To furnish all bonds and insurance required by the bidding documents within five (05) days after 4. receipt of properly prepared Agreement Between Owner and Contractor.
- To accomplish the work in accordance with the bidding documents and commence work on or 5. before the date of Notice to Proceed.
- To complete the work by the Date of Substantial Completion, and achieve Final Completion not more 6. than 30 days later. See Section 01 10 00, 1.11 for Contractual Performance Schedule requirements.
- To enter into and execute a Contract containing Liquidated Damages Clause for each calendar day 7. delay beyond the interim deadlines contained in Section 01 10 00, 1.11 as well as the scheduled Substantial Completion and Final Completion dates if awarded on the basis of this bid.
- 8. By signing this Bid Form the bidder attests that within the three-year period immediately preceding the date of this bid solicitation, the bidder has not, by determined by a final and binding citation and notice of assessment issued by the department of labor and industries or through a civil judgment entered by a court of limited or general jurisdiction, to have willfully violated, as defined in RCW 49.48.082, any provision of chapter 49.46, 49.48, or 49.52 RCW.

Initials

Orion High School Pasco, Washington

## **BASE PROPOSAL:**

Bidder agrees to perform all of the base proposal work described in the specifications and shown on the plans for the sum of:

Dollars (\$\_\_\_\_\_) (Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern. Do <u>not</u> include Sales Tax.)

## TRENCH SAFETY:

Trench Excavation Safety Provision: If the project shall involve any work which requires trenching exceeding a depth of 4 feet, all costs for adequate trench safety systems in compliance with Chapter 39.04.180 RCW and WAC 296-155-650 shall be included in the Base Bid and a lump sum dollar amount for the work shall be entered in the blank below. In the event that there is no cost for trench safety systems, the bidder shall still enter a value of \$0.00 to be responsive.

Dollars (\$\_\_\_\_\_ \_). The above cost for Trench Safety is included in the Base Bid and is not an addition to the bid sum proposed.

I have attached the required Bid Security in the sum of five percent (5%) of my base bid sum. The undersigned notifies that he is of this date duly licensed as a Contractor in the State of Washington.

License No.		
Dated at	_ this	day of, 20
Respectfully submitted,		
Name of Bidder (Company)	_	(Seal, if bid is by a corporation)
Business Address	_	Signature of authorized representative
City, State, Zip Code	-	Title
Telephone	_	

END OF DOCUMENT 00 30 00 - FORM A

BID TO:

Pasco School District 1215 W. Lewis Street Pasco, WA 99301

BID FROM:

NAME: ADDRESS: PHONE:

BID FOR:

Orion High School Pasco, WA

I have received the Drawings and Specifications for the construction of Orion High School.

I have also received Addenda listed below and have included these provisions in my bid:

Addendum No.	Dated	
Addendum No.	Dated	
Addendum No.	Dated	

Having examined the Drawings and Specifications and related documents and the site of the proposed work and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of labor, hereby propose to furnish all labor, materials and supplies as required for the work in accordance with the contract documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the work required under the Contract Documents of which this Proposal is a part.

In submitting this bid, I agree:

- 1. To hold bid open for a time of thirty (30) days from the date of bid opening.
- 2. To accept the provision of the Instruction to Bidders regarding disposition of Bid Security.
- 3. The bid security attached, in the amount of 5% of the bid amount, is to become the property of the Owner in accordance with the Instructions to Bidders.
- 4. To furnish all bonds and insurance required by the bidding documents within five (05) days after receipt of properly prepared Agreement Between Owner and Contractor.
- 5. To accomplish the work in accordance with the bidding documents and commence work on or before the date of Notice to Proceed.
- 6. To complete the work by the Date of Substantial Completion, and achieve Final Completion not more than 30 days later. See Section 01 10 00, 1.11 for Contractual Performance Schedule requirements.
- 7. To enter into and execute a Contract containing Liquidated Damages Clause for each calendar day delay beyond the interim deadlines contained in Section 01 10 00, 1.11 as well as the scheduled Substantial Completion and Final Completion dates if awarded on the basis of this bid.
- 8. By signing this Bid Form the bidder attests that within the three-year period immediately preceding the date of this bid solicitation, the bidder has not, by determined by a final and binding citation and notice of assessment issued by the department of labor and industries or through a civil judgment entered by a court of limited or general jurisdiction, to have willfully violated, as defined in RCW 49.48.082, any provision of chapter 49.46, 49.48, or 49.52 RCW.

Initials

## **BID ALTERNATE #1 – HVAC Controls**

Bidder agrees to perform all of the work described as Bid Alternate #1 in the specifications and shown on plans for the sum of:

## 1A – Alerton

Dollars (\$\_\_\_\_\_) (Amount shall be shown in both words and figures. Do <u>not</u> include Sales Tax.)

1B – Automated Logic

Dollars (\$ ) (Amount shall be shown in both words and figures. Do not include Sales Tax.)

## BID ALTERNATE #2 – DAS Antenna System:

Bidder agrees to perform all of the work described as Bid Alternate #2 in the specifications and shown on plans for the sum of:

Dollars (\$ \_) (Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern. Do not include Sales Tax.)

## **BID ALTERNATE #3 – Maintenance Building**

Bidder agrees to perform all of the work described as Bid Alternate #3 in the specifications and shown on plans for the sum of:

Dollars (\$

\_) (Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern. Do not include Sales Tax.)

## **BID ALTERNATE #4 – Storage Building**

Bidder agrees to perform all of the work described as Bid Alternate #4 in the specifications and shown on plans for the sum of:

Dollars (\$\_\_\_\_\_) (Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern. Do not include Sales Tax.)

## BID ALTERNATE #5 – Commons TV Display Wall

Bidder agrees to perform all of the work described as Bid Alternate #5 in the specifications and shown on plans for the sum of:

Dollars (\$\_\_\_\_\_) (Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern. Do not include Sales Tax.)

## **BID ALTERNATE #6 – Pickle Ball Court and Equipment**

Bidder agrees to perform all of the work described as Bid Alternate #6 in the specifications and shown on plans for the sum of:

Dollars (\$\_\_\_\_\_) (Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern. Do not include Sales Tax.)

## **BID ALTERNATE #7 – South Parcel Soil Placement**

Bidder agrees to perform all of the work described as Bid Alternate #7 in the specifications and shown on plans for the sum of:

Dollars (\$

\_) (Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern. Do not include Sales Tax.)

## **BID ALTERNATE #8 – Synthetic Turf**

Bidder agrees to perform all of the work described as Bid Alternate #8 in the specifications and shown on plans for the sum of:

Dollars (\$\_\_\_\_\_) (Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern. Do not include Sales Tax.)

## SUBCONTRACTORS:

In accordance with RCW 39.30.060, provide the names and addresses of the entities who will perform the plumbing, heating and air conditioning, and electrical work, subject to approval of Owner and Architect, if undersigned is awarded the Contract, are as follows:

Plumbing (Name): (Address):					
Heating / Air Conditioning (Name (Address):	e):				
Electrical (Name): (Address):					
Fire Protection (Name): (Address):					
Structural Steel Installation (Nam (Address):	ie):				
Rebar Installation (Name): (Address):					
The undersigned notifies that he	is of thi	s date duly licensed as a Contra	actor in t	ne State o	f Washington.
License No					
Dated at	this	day of	_, 20		
Respectfully submitted,					
Name of Bidder (Company)		(Seal, if bid is by a corporation)	)		
Business Address		Signature of authorized represe	 entative		
City, State, Zip Code		Title		Telepho	ne
END OF DOCUMENT 00 30 00 -	- FORM	ИВ.			

# **AIA** Document A101° – 2017

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

**AGREEMENT** made as of the day of year two thousand twenty-four. (In words, indicate day, month and year.)

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

Pasco School District 1215 W. Lewis Street Pasco, WA 99301

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

TBD

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

Pasco School District College & Career High School #4 E. Salt Lake Street Pasco, WA 99301

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

Design West Architects, P.A. 830 N Columbia Center Boulevard, Suite E Kennewick, WA 99336

The Owner and Contractor agree as follows.

### ADDITIONS AND DELETIONS:

in the

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

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

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



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## EXHIBIT A INSURANCE AND BONDS

#### **ARTICLE 1** THE CONTRACT DOCUMENTS

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

#### THE WORK OF THIS CONTRACT ARTICLE 2

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

#### DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION ARTICLE 3

§ 3.1 The date of commencement of the Work shall be: (Check one of the following boxes.)

- [ ] The date of this Agreement.
- [X] A date set forth in a notice to proceed issued by the Owner.
- [] Established as follows:

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

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

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

## § 3.3 Substantial Completion

Init.

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

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

[X] Not later than Four Hundred and Sixty (460) calendar days from the date of commencement of the Work.

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#### [ ] By the following date:

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

Portion of Work	Substantial Completion Date

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

#### ARTICLE 4 CONTRACT SUM

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

## § 4.2 Alternates

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

Item

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

**Price** 

Item	Price	Conditions for Acceptance
§ 4.3 Allowances, if any, included in the formation of th	he Contract Sum:	
ltem	Price	

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

Item

Units and Limitations

Price per Unit (\$0.00)

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

The Owner will suffer financial loss if the project is not Substantially Complete on the date set forth in the Contract Documents. The Contractor (and his Surety) shall be liable for and shall pay to the Owner the sums hereinafter stipulated as liquidated damages for each calendar day of delay until the Work is substantially completed:

For Substantial Completion: Two Thousand Dollars (\$2,000.00)

For Final Completion: Two Thousand Dollars (\$2,000.00).

## § 4.6 Other:

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

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## ARTICLE 5 PAYMENTS

## § 5.1 Progress Payments

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

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

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the last day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the last day of the following month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than forty-five (45) days after the Architect receives the Application for Payment.

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

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

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

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

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

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

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

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

## § 5.1.7 Retainage

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

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

Retainage of 5% shall be withheld from each Application for Payment.

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User Notes:
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§ 5.1.7.1.1 The following items are not subject to retainage:

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

No reduction shall be permitted without written approval from the Owner.

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

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

N/A

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

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

The Contractor may submit a final Application for Payment that includes withheld retainage when all items noted on all punch lists have been corrected and confirmed by the Architect and accepted by the Owner.

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

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

## § 5.2 Final Payment

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

- the Contractor has fully performed the Contract except for the Contractor's responsibility to correct .1 Work as provided in AIA Document A201-2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.
- .3 resolution by the Board of Directors that the project is complete.

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

Final payment to the Contractor shall be due not later than 45 days after Contractor completes all obligations hereunder and provides all project closeout paperwork and certifications required by law and the Contract Documents. § 5.3 Interest

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

As outlined by the Owner OR At the legal rate prevailing in Pasco, WA at the time payment is due, 8% per annum.

#### **DISPUTE RESOLUTION** ARTICLE 6

## § 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to AIA Document A201-2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker. (If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

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## § 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to AIA Document A201-2017, the method of binding dispute resolution shall be as follows: (Check the appropriate box.)

Arbitration pursuant to Section 15.4 of AIA Document A201-2017 []

[X] Litigation in a court of competent jurisdiction

[] Other (Specify)

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

## ARTICLE 7 TERMINATION OR SUSPENSION

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

(Paragraphs deleted) § 7.2 The Work may be suspended by the Owner as provided in AIA Document A201–2017.

## ARTICLE 8 MISCELLANEOUS PROVISIONS

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

§ 8.2 The Owner's representative: (Name, address, email address, and other information) John Weatherby Pasco School District 1215 W. Lewis Street Pasco, WA 99301

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

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

## § 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A201-2017, General Conditions of the Contract for Construction as modified and included in the Project Manual dated TBD and elsewhere in the Contract Documents.

(Paragraphs deleted) § 8.7 Other provisions:

Init. 1

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#### **ARTICLE 9** ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

AIA Document A101<sup>TM</sup>–2017, Standard Form of Agreement Between Owner and Contractor .1 (Paragraph deleted)

AIA Document A201<sup>TM</sup>–2017, General Conditions of the Contract for Construction, as modified and .3 included in the Project Manual dated T.B.D.

(Paragraph deleted) .4

Drawing - TBD

(Paragraph deleted)

Specifications - TBD .5

### (Table deleted)

.6

(Table deleted)

.7 Addenda, if any:

Number

Date

Pages

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

.8 Other Exhibits:

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

## []

## (Paragraphs deleted)

Supplementary and other Conditions of the Contract:

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

.9 Other documents, if any, listed below:

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

Contractor shall comply fully with State of Washington, Department of Labor and Industries, Prevailing Wage Section specific to Franklin County, current effective requirements.

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

**OWNER** (Signature)

**CONTRACTOR** (Signature)

(Printed name and title)

(Printed name and title)

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# **AIA** Document A201° – 2017

## General Conditions of the Contract for Construction

## for the following PROJECT:

(Name and location or address)

Pasco School District College & Career High School #4 E. Salt Lake Street Pasco, Washington 99301

## THE OWNER:

(Name, legal status and address)

Pasco School District 1215 W. Lewis Street Pasco, WA 99301

THE ARCHITECT: (Name, legal status and address)

Design West Architects, P.A. 830 N Columbia Center Boulevard, Suite E Kennewick, WA 99336

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## ADDITIONS AND DELETIONS:

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

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

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

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#### **ARTICLE 1 GENERAL PROVISIONS**

#### § 1.1 Basic Definitions

#### § 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do include the bidding requirements, advertisement or invitation to bid, Instructions to Bidders, Supplementary Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid and proposal, or portions of Addenda relating to bidding or proposal requirements.

## § 1.1.2 The Contract

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

#### § 1.1.3 The Work

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

## § 1.1.4 The Project

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

§ 1.1.4.1 The entire Project shall be considered as one 'portion' unless separate areas or phases are designated for separate completion times or separate area of completion and occupancy. This definition is for use in determining release of retainage.

## § 1.1.5 The Drawings

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

#### § 1.1.6 The Specifications

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

#### § 1.1.7 Instruments of Service

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

#### § 1.1.8 Initial Decision Maker

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

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## § 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.

§ 1.2.1.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

- .1 Modifications, with those of later date have precedence over those of earlier date.
- .2 The Agreement
- .3 Addenda, with those of later date having precedence over those of earlier date.
- .4 General Conditions of the Contract for Construction.
- .5 Division 01 of the Specifications.
- .6 Drawings and Divisions 2 through 33 of the Specifications.
  - Inconsistencies within the drawings and specifications or within either document shall be a. brought to the attention of the Architect, the better quality or greater quantity of work shall be provided in accordance with the Architect's interpretation.
- .7 Other documents specifically enumerated in the agreement as part of the Contract Documents.

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

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

§ 1.2.4 If there is any inconsistency in the Contract Drawings, or between the Contract Drawings and the Specifications, unless otherwise ordered in writing by the Architect or the Owner, the Contractor shall provide the better quality of, or the greater quantity of, work or materials.

§ 1.2.5 Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of discrepancies in the figures, in the drawings, or in the specification, the matter shall be promptly submitted to the Architect for determination.

§ 1.2.6 The Specifications have been partially "streamlined" and some words and phrases have been intentionally omitted. Missing portions shall be supplied by inference as with notes on drawings.

§ 1.2.7 The words "approved", "directed", "selected" and similar words and phrases shall be presumed to be followed by "by Architect". The words "satisfactory", "submitted", "reported" and similar words and phrases shall be presumed to be followed by "to Architect". Words like "install", "provide", "furnish", and "supply" shall be construed to include complete furnishing and installing or construction. Words like "shown", "noted", and "scheduled" shall have the same meaning as indicated, and are used to assist the reader in locating particular items. Instructions, directions, and requirements as specified shall be considered to be followed by the phrase "unless otherwise specified or indicated".

**§1.2.8** A colon (:) following a material or item shall be used in place of the words "shall be".

# § 1.3 Capitalization

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

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# § 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 I.7 and I.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<sup>TM</sup>-2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

Contractor acknowledges that Instruments of Service or any other information of documentation Contractor receives in digital form may contain transmission or translation errors and are issued for convenience only, and Contractor shall be entitled to rely only on hard-copy Instruments of Service.

## § 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<sup>TM</sup>–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202TM-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

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

§ 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 claims pursuant to bonds.

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**§2.1.3** The Owner's Representative as designated in the Agreement shall be the Owner's principal contact with the Contractor, and all communications from the Contractor to the Owner shall be made to the Owner's Representative and to the Architect. The Owner shall promptly notify the Contractor in writing of any replacement of the Owner's Representative.

## § 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.

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

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

§ 2.3.3.1 The Contractor shall be responsible for performing all utilities investigation and location work to determine the precise location thereof. The Contractor shall exercise the greatest care reasonably possible not to damage or interrupt utilities services of any kind. The Contractor shall bear the risk of loss of any nature arising out of its Work which directly or indirectly damages or interrupts any utilities or utilities services, or causes or contributes to damages of any nature, including without limitation all special, incidental and consequential damages (such as lost profits and business interruption, for example) except in the case where the loss resulted because the utility location information provided by Owner or Utility Provider was inaccurate or incomplete, Such consequential damage shall not be deemed waived by operation of sub-section 15.1.6 hereof.

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

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

§ 2.3.6 The Contractor will be furnished, free of charge five (5) sets of Drawings and Project Manuals for use in construction of this Project. Additional sets may be purchased by the Contractor at the cost of reproduction, postage and handling.

## § 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. The Contractor shall not base any claim for additional time or money on any stop-work order issued under the provisions of Subparagraph 2.4.

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

#### **ARTICLE 3** CONTRACTOR

# § 3.1 General

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§ 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. The Contractor is an independent contractor and shall not for any purpose relating to or arising out of this Contract be an agent or employee of the Owner.

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

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

§ 3.1.4 The Contractor represents that they have examined the Drawings and Specifications and related documents and the site of the proposed work and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of labor, and therefore acknowledge and agree that the contract compensation and duration is adequate to fully complete the project as defined in the contract documents within the stated time period.

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## § 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, 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

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§ 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 written notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

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

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

§ 3.3.4 The Contractor has the responsibility to ensure that all of its employees, Subcontractors, suppliers 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 adhere to the Contract Documents, that they order materials on time, taking into account the current market and delivery conditions, and that they provide materials in sufficient time to comply with the Project Schedule. The Contractor shall coordinate its Work with that of all others on the Project including deliveries, storage, installations, and construction utilities. The Contractor shall be responsible for the space requirements,

locations and routing of its equipment. In areas and locations where the proper and most effective space requirements, locations, and routing cannot be made as indicated, the Contractor shall meet with the Architect and all others involved, before installation, to plan the most effective and efficient method of overall installation.

§3.3.5 Without the prior written consent of Owner, Contractor shall not (i) employ any person to perform work hereunder who is a Close Family Member; or (ii) subcontract Work to be performed hereunder to a Close Family Member or to any entity which is controlled by a Close Family Member. For the purposes of this Section, a Close Family Member means any of the parents, grandparents, children, grandchildren, spouses, brothers, sisters, or in-laws of any employee of Owner who is directly or indirectly involved in the administration, supervision or implementation of this Agreement or the Work to be performed hereunder.

**§3.3.6** The Contractor shall be responsible for performing all utilities investigation and location work to determine the precise locations thereof. The Contractor shall exercise the greatest care reasonably possible not to damage or interrupt utilities or utilities services of any kind. The Contractor shall bear the risk of loss of any nature arising out of its Work which directly or indirectly damages or interrupts any utilities or utilities services, or causes or contributes to damages of any nature, including without limitation all special, incidental and consequential damages (such as lost profits and business interruption, for example) except in the case where the loss resulted because the utility location information provided by Owner or Utility Provider was inaccurate or incomplete. Such consequential damages shall not be deemed waived by operation of sub-section 15.1.6 hereof

# § 3.4 Labor and Materials

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

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

§ 3.4.2.1 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for making agreed upon changes to the Drawings and Specifications, and for re-submittal and re-approval by authorities.

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

§ 3.4.3.1 Contractor shall use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the Work. Owner has the right to require Contractor to remove from its work force assigned to the Work any employees deemed incompetent, careless, or otherwise objectionable, or any personnel whose actions are deemed to be contrary to public interest or inconsistent with the best interest of the Project. Contractor shall promptly furnish qualified substitutes for any employees that, in the opinion of Owner are unsatisfactory.

§ 3.4.3.1.1 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work, Including observance of drug testing and all smoking, tobacco, alcohol, parking, safety, weapons, background checks, sexual harassment, and other rules governing the conduct of personnel at the Owner's property and the Project site. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. The Contractor shall ensure that all persons performing the Work comply with the Owner's tobacco-free policy, and will not and do not engage in inappropriate conduct or inappropriate contact with students or staff. Neither the Contractor nor any of its Subcontractors of any tier shall utilize any employee at the site or permit any contact between children at a public school and any employee who has pled guilty to or been convicted of any felony crime involving the physical neglect of a child under Chapter 9A.42 RCW, the physical injury or death of a child under Chapter 9A.32 RCW or Chapter 9A.36 RCW (except motor vehicle violations under Chapter 46.61 RCW), sexual exploitation of a child under Chapter 9A.68A RCW, sexual offenses under Chapter 9A.44 RCW

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where a minor is a victim, promoting prostitution of a minor under Chapter 9A.88 RCW, the sale or purchase of a minor child under Chapter 9A.64.030 RCW, or violation of similar laws of another jurisdiction. The Contractor shall remove from the Work and Work site any employee or other person who has engaged in such actions or who the Owner reasonably considers objectionable without change in the Contract Sum or Contract Time. Without limiting the generality of the foregoing, the Contractor shall ensure by appropriate provisions in each subcontract agreement that the Contractor may remove from the Work and Work site any Subcontractor or Subcontractor's employee who has engaged in such action. At no change to the Contract Sum or Contract Time, the Contractor shall remove from the Work and Work site any employee or other person pursuant to this Section 3.4.3. Failure to comply with these requirements is grounds for immediate termination of the Agreement for cause.

§ 3.4.3.2 Any employees of the Contractor and Subcontractors who will have regularly scheduled unsupervised access to children shall be subject to a record check through the Washington state patrol criminal identification system under RCW 43.43.830 through 834, RCW 10.97.030, and RCW 10.97.050 and through the Federal Bureau of Investigation before the Contractor permits them to have such access to children. The contractor, at their own expense and without change to the contract sum, shall be responsible for completing background checks on all employees and requiring all sub-contractors with on-site labor to do the same. The Owner shall also have the right to require such a record check of any employee of the Contractor or Subcontractor of any tier. The record check shall include a fingerprint check using a complete Washington state criminal identification fingerprint card. The Owner shall provide necessary cooperation associated with required record check. When necessary, applicants may be employed on a conditional basis pending completion of the investigation. If the applicant has had a record check within the previous two years, the Owner or the Contractor may waive the requirement. The Owner, pursuant to RCW 41.59 and RCW 41.56, shall pay costs associated with the record check as part of the Contract Sum.

§ 3.4.4 After the Contract has been executed, the Owner and the Architect will consider a formal request for the substitution of products in place of those specified only under the following conditions:

- .1 Required product cannot be supplied in time for compliance with Contract time requirements.
- .2 Required product is not acceptable to governing authority, or determined to be non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized liability as certified by Contractor.
- .3 Substantial advantage is offered Owner after deducting off-setting disadvantages including delays, additional compensation to Architect for redesign, investigation, evaluation, other necessary services, and/or similar considerations.

§ 3.4.5 By making requests for substitutions based on Clause 3.4.4 above, the Contractor:

- represents that he has personally investigated the proposed substitute product and determined that it is .1 equivalent or superior in all respects to that specified;
- .2 represents that he has submitted the proposed substitution to governing authority and has received approved for proposed substitution, if required;
- .3 represents that he will provide the same warranty for the substitution that he would for that specified;
- .4 certifies that the cost data presented is complete and includes all related costs under separate contracts, but excludes the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and
- .5 will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

# § 3.5 Warranty

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

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

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§ 3.5.3 The warranty shall continue for a period of 1 year from the date of Substantial Completion of the work unless otherwise specified, or as provided in 3.5.10.

§ 3.5.4 The Contractor shall remedy at the Contractor's expense any failure to conform or any defect. In addition, the Contractor shall remedy at the Contractor's expense damage to real or personal property when that damage is the result of:

- .1 The Contractor's failure to conform to Contract requirements; or
- .2 Any defect of equipment, material, or workmanship.

§ 3.5.5 The Contractor shall restore any work damaged in fulfilling the terms and conditions of this section. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

§ 3.5.6 The Owner shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

§ 3.5.7 If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the owner shall have the right to replace, repair, or otherwise remedy the failure, defect or damage at the Contractor's expense.

§ 3.5.8 With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this Contract, the Contractor shall:

- Obtain all warranties that would be given in normal commercial practice; .1
- .2 Require all warranties to be executed, in writing, for the benefit of the Owner, if directed by the Owner: and
- .3 Enforce all warranties for the benefit of the Owner, if directed by the Owner.

§ 3.5.9 The Contractor is responsible to enforce any subcontractor's, manufacturers, or supplier's warranty should they extend beyond the period specified.

§ 3.5.10 Unless a defect is caused by the negligence of the Contractor, the Contractor shall not be liable for the repair of any defects of material furnished by the Owner nor for the repair of any damage that results from any defect in Owner-furnished material.

§ 3.5.11 The owner's rights with respect to latent defects, gross mistakes, or fraud shall not be limited by the warranty provisions of these Contract Documents.

§ 3.5.12 In the event that the Contractor is required to make repairs during the warranty period, the provisions of Article 11, Insurance and Bonds, shall remain in effect at no additional cost to the Owner.

§ 3.5.13 Contractor hereby assigns to the Owner, effective upon Substantial Completion, all express and implied warranties made or assigned at any time to the Contractor by any Subcontractor, Sub-subcontractor or material supplier relating to any part of the Work or any product incorporated into the Work. Such warranties shall be in addition to and shall not diminish the warranties of the Contractor under Subparagraph 3.5.1 or other provisions of the Contract Documents.

# § 3.6 Taxes

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

## § 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 The Owner shall obtain and pay for plan check(s) as required by the State of Washington and Benton County and City of Kennewick, and building permit fees required. The Contractor shall pay for mechanical and electrical permits required by the State of Washington or local authority. The Contractor shall obtain and pay for all licenses and permits and shall pay all fees and charges for connections to outside resources for materials, parking, utility services,

temporary obstructions, enclosures, opening and patching of streets, etc. off of the property of the Owner arising from the construction and completion of the work.

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

§ 3.7.2.1 The Contractor shall comply with the EPA-1990 NESHAP Asbestos Regulation (40 CFR, Part 61), which requires that the following be completed before demolition and renovation projects occur:

- The Contractor shall be responsible to verify that a complete asbestos survey has been performed on 1. the facility in question, before renovation or demolition operations begin.
- The Contractor shall verify that all regulated asbestos containing materials have been removed from 2. the affected areas before renovation or demolition operations begin.
- 3. The Contractor shall be responsible to submit appropriate completed Notification of Demolition and Renovation Form (example form follows this section) to the USEPA ten (10) working days before demolition projects begin, or verify that a form was submitted prior to asbestos removal beginning. This includes the demolition of structures that contain no asbestos.
- 4. As of November 20, 1991, a NESHAP Certified Person must be on any job site where asbestos could be disturbed.

§3.7.2.2 The Owner has developed a SWPP plan for this project. The contractor shall review this plan and take measures to implement and maintain it through the entire project. The contractor shall also have certified personnel on site at all times. The Contractor shall submit a Notice of Intent to the EPA based on the SWPPP that the Owner currently has in place.

§ 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 conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which 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, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in compliance with section 15.1.2. The Architect will promptly investigate such conditions and, if 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 an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall so notify the Owner and Contractor in writing, stating the reasons. No adjustment in the Contract Time or Contract Sum shall be permitted, however, in connection with a concealed or unknown condition which does not differ materially from those conditions disclosed or which reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, reviews and preconstruction services for the Project, or (2) inspections, tests, reviews, and preconstruction services which the Contractor had the opportunity to make or should have performed in connection with the Project. If the conditions encountered are materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Article 15. Claims by either party in opposition to such determinations must be made in compliance with section 15.1.2.

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

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## § 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,

- allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all .1 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 in writing of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor in writing, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

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

§ 3.9.3.1 A list of telephone numbers for all key personnel of the Contractor and its principal subcontractors for purposes of contacting personnel after hours in the event of an emergency. The list shall be periodically updated as necessary to ensure the Owner has the most current information.

§ 3.9.4 The superintendent shall not be changed except with prior approval of the Architect, unless the superintendent ceases to be in the Contractor's employ. The replacement superintendent shall also be subject to these conditions.

§ 3.9.5 The superintendent's normal and customary duties may include labor related activities associated with installing components of the building.

§ 3.9.6 The superintendent's normal and customary duties shall encompass full-time QUALITY CONTROL, including but not limited to:

- .1 proper coordination and sequencing of the various trades, materials, personnel, testing and data during all phases of the project;
- .2 process schedule management including critical path analysis.
- .3 written confirmation of all important communications shall be kept in the daily construction log.

# § 3.10 Contractor's Construction and Submittal Schedules

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§ 3.10.1 The Contractor, within 7 days after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the

extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. Contractor shall prepare and submit all required data under the provisions of Specification Section 01 33 00 -Submittals.

§ 3.10.1.1 Contractor shall, within 7 days, notify the Owner and the Architect in writing of any proposed changes in the Project Schedule or the Contract Time or of any event which could delay performance of any item of the Work, stating the cause of the delay, expected duration of the delay, the anticipated effect of the delay on the Project Schedule and the action being taken to correct the delay. Notification of potential delay does NOT constitute a change in the Contract Time; only a Change Order signed by the Owner can amend the Contract Time.

§ 3.10.1.2 If any Project Schedule submitted sets forth a date for Substantial Completion for the Work or any phase of the Work beyond the Date(s) of Substantial Completion established in the Work Authorization (as the same may be extended as provided in the Contract Documents), the Contractor shall submit to the Architect and the Owner for their review and approval a narrative description of the means and methods which the Contractor proposes to use to expedite the progress of the Work to ensure timely completion of the various phases of the Work and Work as a whole. Regardless of the cause of any delay, the Contractor shall exercise all necessary efforts to bring the Project back into compliance with the Project Schedule.

§ 3.10.1.3 To the extent that the Contractor or any Subcontractor, Sub-subcontractor or material supplier is responsible for the delay, the Contractor shall take all necessary action to bring the Project back into compliance with the Project Schedule, including without limitation increasing the number of personnel on the Project and implementing overtime and double shifts, and in that event, the Contractor shall not be entitled to an adjustment in the Contract Sum, Contract Time or the Project Schedule.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals. Contractor shall prepare and submit all required data under the provisions of Specification Section 01 33 00 - Submittals.

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

# § 3.11 Documents and Samples at the Site

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

## § 3.12 Shop Drawings, Product Data and Samples

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

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

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

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

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

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

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

§ 3.12.7 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 by the Architect.

§ 3.12.8 The Work shall be in accordance with reviewed submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's review of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect in writing 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 review thereof.

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

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

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

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

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§ 3.12.11 Contractor shall submit a full submittal log and schedule for required submittals on the project within ten (10) calendar days from the Notice to Proceed. All submittals shall be received by the architect no later than one hundred (100) calendar days after Notice to Proceed for review and comment.

Failure to comply with these deadlines shall constitute breach of contract, and shall be subject to liquidated damages. All submittals shall be processed to allow timely completion of all work within the time limits and deadlines defined in the contract.

## § 3.13 Use of Site

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

## § 3.14 Cutting and Patching

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

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

## § 3.15 Cleaning Up

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

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

§ 3.15.3 The Contractor shall comply with cleaning instructions contained in the specifications. In absence of specific cleaning instructions, follow accepted cleaning practices or the recommendation of the manufacturer of the material to be cleaned.

## § 3.16 Access to Work

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

# § 3.17 Royalties, Patents and Copyrights

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

## § 3.18 Indemnification

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

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whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

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

## ARTICLE 4 ARCHITECT

## § 4.1 General

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

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

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall engage a successor architect whose status under the Contract Documents shall be of that Architect.

## § 4.2 Administration of the Contract

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

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

**§ 4.2.2.1** The Owner is entitled to receive reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

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

## § 4.2.4 Communications

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

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

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect shall review and take appropriate action on shop drawings, product data, samples, and other submittals required by the Contract Documents. Such review shall be only for general conformance with the design concept and general compliance with the information given in the Contract Documents. It shall not include review of quantities, dimension, weights or gauges, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor. The Architect's review shall be conducted with the reasonable promptness consistent with sound professional practice. Review of a specific item shall not indicate acceptance of an assembly of which the item(s) is a component. The Architect shall not be required and shall not be responsible for any deviations from the Contract Documents not clearly noted by the Contractor, nor shall the Architect be required to review partial submissions of those for which submission for correlated items have not been received. In no way does review of submittals relieve the contractor from providing products that meet the specified requirements and warranties set forth in the contract documents.

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

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

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

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

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

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

## (Paragraph deleted)

## ARTICLE 5 SUBCONTRACTORS

## § 5.1 Definitions

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

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

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§ 5.1.2.1 The term "Subcontractor" or "Sub-subcontractor" includes every person or entity who has a contract to perform a portion of the Work at the site, of every tier regardless of how remote. The term "supplier" includes every supplier of materials or equipment used in the Work, of every tier regardless of how remote.

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

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

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

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

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

## § 5.3 Subcontractual Relations

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

§ 5.3.1 The Contractor shall first pay out payments received under this Agreement to (and secure the discharge of any liens asserted by) all persons furnishing labor, equipment, materials or other items in connection with the performance of the Work (including, but not limited to, any Subcontractors, Sub-subcontractors and suppliers). The Contractor agrees that, provided the Owner has paid the Contractor in accordance with this Agreement, the Owner has the right to a lien-free Project. The Owner may, at its discretion, make joint payments to the Contractor and its creditors. The Owner reserves the right in event any claim is made against the Owner arising out of any obligation incurred by the Contractor under this Agreement or in connection with performance of Work, to withhold payments due or to become due, to the Contractor, in such amounts as are necessary to cover the claim(s) and any costs or expenses arising in connection with the legal settlement thereof. The Contractor further agrees that if any lien or claim is filed or made against the Project site, the Project or the Owner as a result of the Contractor's failure to meet its obligations, the

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Owner upon fourteen (14) days prior written notice shall have the right to settle said lien or claim directly and deduct the cost of the settlement from payments due the Contractor (and, if the amount still due the Contractor is insufficient to cover such costs, to recover the shortfall from the Contractor directly), provided that the Contractor within such fourteen (14) day period has not settled such lien or claim or provided a bond against such lien or claim in a manner satisfactory to the Owner.

## § 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

- 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 in writing; 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.

#### CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS **ARTICLE 6** § 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

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

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

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

## § 6.2 Mutual Responsibility

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

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§ 6.2.1.1 If the Contractor receives items from a separate contractor or from the Owner for storage, erection or installation, the Contractor shall acknowledge receipt for items delivered, and thereafter will be held responsible for the care, storage and any necessary replacement of items received.

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

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

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

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

## § 6.3 Owner's Right to Clean Up

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

#### CHANGES IN THE WORK **ARTICLE 7**

## § 7.1 General

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

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

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

# § 7.2 Change Orders

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

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

§ 7.2.2 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and the construction schedule. In the event a Change Order increases the Contract Sum, the Contractor shall include the work covered by such Change Order in Application for Payment as if such work were originally part of the Project and Contract Documents.

§ 7.2.3 The allowances outlined in 7.3.11 shall also apply to Change Orders.

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# § 7.3 Construction Change Directives

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

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

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

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

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an allowance for overhead and profit in accordance with clauses 7.3.11.1 through 7.3.11.7. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

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

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

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect in writing within 48 hours 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 incorporated into a Change Order.

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

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be

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reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.3.11 In Subparagraph 7.3.7, the allowance for the combined overhead, insurance, bonds, coordination, supervision and profit included in the total cost to the owner shall be based on the following schedule:

- .1 For the Contractor, for Work performed by the Contractor's own forces, 12 percent of the cost.
- .2 For the Contractor, for Work performed by the Contractor's Subcontractor, 6 percent of the amount due the Subcontractor.
- .3 For each Subcontractor or Sub-subcontractor involved, for work performed by that Subcontractor's or Sub-subcontractor's own forces, 12 percent of the cost.
- .4 For each Subcontractor, for Work performed by the Subcontractor's Sub-subcontractors, 6 percent of the amount due the Sub-subcontractor.
- .5 Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.7.
- .6 Overhead shall be considered to include hand tools, field office costs other than included in subparagraph 7.3.7.5, home office costs, and all other costs not specifically listed in paragraph 7.3.7.
- .7 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials, equipment and subcontracts. Labor, materials and equipment shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also. In no case will a change involving over \$1,000.00 be approved without such itemization.

## § 7.4 Minor Changes in the Work

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

#### **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. The time stated for completion shall include final cleanup of the premises and all documentation required by the Contract Documents.

**§8.1.1.1** The Contractor shall substantially complete the work as defined by Paragraph 9.8.1 no later than Five Hundred and Twenty (520) days from the issuance of the Notice to Proceed.

§ 8.1.2 The date of commencement of the Work is the date established in the Notice to Proceed. Within 5 days of contractor's notification of the intent to award via e-mail or other form of communication, the Contractor shall submit the executed contract, evidence of bondability, certificates of insurance, and all other documents required by the Contract Documents.

§ 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.

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**§8.1.4.1** When computing any period of time, the day of the event from which the period of time begins to run shall not be counted. The last day is counted unless it falls on a weekend or legal holiday, in which event the period runs until the end of the next day which is not a weekend or holiday. When the period of time allowed is less than seven days, intermediate Saturdays, Sundays, and legal holidays are excluded from the computation.

#### § 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. The date of commencement of the Work shall not be changed by the effective date of such insurance.

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

**§8.2.4** It is the Contractor's option to complete the project earlier than the date specified in the Contract Documents, thus any claim based on delay shall be evaluated based upon the dates specified in the Contract Documents, not an earlier projected completion that the Contractor may propose.

§ 8.2.4.1 THE TIMELY COMPLETION OF THIS PROJECT IS ESSENTIAL TO THE OWNER. The Owner will incur serious and substantial damages if Substantial Completion of the Work does not occur within the Contract Time; however, it would difficult if not impossible to determine the amount of such damages, which could include, for example, personnel and overtime costs, transportation costs, governmental fees, storage costs, portable rental costs, loss of use, and lost opportunities. Consequently, provisions for liquidated damages as a reasonable estimate of loss may be included in the Contract Documents. The Owner's right to liquidated damages is not affected by partial completion, occupancy, or beneficial occupancy. The Contractor shall furnish sufficient forces, construction plant and equipment, and shall work such hours, including night shifts, overtime operations and weekend and holiday work as may be necessary to insure the completion of the Work in accordance with the date of Substantial Completion and the approved Contractor's Construction Schedule. If the Contractor fails to perform in a timely manner in accordance with the Contract Documents and, through the fault of the Contractor or Subcontractor(s) of any tier fails to meet the Contractor's Construction Schedule, the Contractor shall take such steps as may be necessary to immediately improve its progress by increasing the number of workers, shifts, overtime operations or days of work or other means and methods, all without additional cost to the Owner.

## § 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work only to the extent reflected in approved Change Orders providing for specific extensions of the Contract Time; or (3) by unanticipated, abnormal weather (see Section 15.1.5.2); or (4) by unexpected industry-wide; (3) by labor disputes, fire, unusual delay in deliveries, governmental delays (including unanticipated permit delays not caused by the Contractor; delays caused by a local jurisdictions' scheduled days off shall not be considered an excusable delay), 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, litigation or binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended by Change Order 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 The Contractor agrees to make no claim for damages for delay in the performance of this contract occasioned by any act or omission to act of Owner, its Architect, its agents or employees or any other Contractor, and agrees that any such claim shall be fully compensated for by an extension of time to complete performance of the work. This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

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#### **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 Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment. The Schedule of Values shall include a separate and distinct line item for "Project Closeout" activities in the amount of 1% of the contract value or \$10,000 whichever is greater. This project closeout amount is different than project retainage, and shall cover expenses related to final corrections, cleaning, submittal of closeout documentation, and related work/value. Prepare and submit Schedule of Values under the provisions of Section 01 29 00 - Contract Considerations.

## § 9.3 Applications for Payment

§ 9.3.1 The Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the schedule of values by the 25<sup>th</sup> of the Month. Such application shall be notarized and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require; such as, copies of requisitions from subcontractors and material suppliers, and reflecting retainage of five percent (5%). Prepare and submit Application for Payment under the provisions of Section 011190/012900, Contract Considerations.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, and 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.

§ 9.3.1.3 The form of application for payment shall be AIA Form G702 - Application and Certificate for Payment, supported by AIA Form G703 - Application and Certification for Payment Continuation Sheet.

§ 9.3.1.4 The Contractor shall not withhold from a subcontractor or supplier more than the percentage of retainage held from processed payment certificates for their portion of the work.

§ 9.3.1.5 Until conditions set forth in Paragraph 9.10 are met, the Owner shall pay ninety-five (95) percent of the amount due the Contractor on account of progress payments.

§ 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. Off Site storage will not be approved at locations more than 10 miles from the project site. Off site storage will not be approved at locations more than 10 miles from the project site.

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

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

# § 9.5 Decisions to Withhold Certification

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

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor:
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.
- failure to submit intent to pay statements and affidavits pertaining to wages paid as required by .8 statute:
- .9 failure to submit a properly updated Construction Schedule
- .10 liquidated damages

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

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

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

#### § 9.6 Progress Payments

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

§ 9.6.1.1 Progress Payments shall fall due on or about the 30<sup>th</sup> of each month (30 days after receipt of the application for Payment by the Architect.)

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

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

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

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

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

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

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

## § 9.7 Failure of Payment

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If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within fourteen days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within fourteen days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding

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dispute resolution, then the Contractor may, upon fourteen additional days' written notice to the Owner 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

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§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. Obtain applicable occupancy permits, including fire/life safety systems and health department approval, pressure vessel permits, elevator permits, and similar approvals or certificates by governing authorities and franchised services, assuring the Owner's full access and use of completed Work.

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

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

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

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment as specified below 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. The payment shall be sufficient to increase the total payment to ninety-five (95) percent of the contract sum, less such amounts as the Architect shall determine for incomplete work and unsettled claims. The amount of retainage held for incomplete work and unsettled claims shall be double the value of the items remaining to facilitate completion of work and settlement of claims.

§ 9.8.6 The Contractor shall cause punch list items to be completed within thirty (30) days of Substantial Completion of each phase (or such other period of time as is specified in the Contract Documents) or within such reasonable period as may be required to correct the item (in the event that the punch list items are, because of their nature, incapable of correction during that period) provided that the Contractor commences to correct the item within that period and thereafter diligently and in good faith pursues the corrective action to completion. If, at twenty (20) days after the Date of Substantial Completion, the Owner considers that the punch list items are unlikely to be completed within thirty (30) days of the Date of Substantial Completion of each phase (or such other period of time as is specified in the Contract Documents), the Owner may issue written notice that the Owner will take over and perform some or all of the punch list corrections and deduct the cost of these corrections from the contract sum. If the contractor has not commenced work on all the punch list items within seven (7) days of the issuance of the written notice, the Owner may deduct the actual cost of performing this punch list work, including any design costs, plus 15% to account for the Owner's transaction costs from the Contract Sum.

§ 9.8.7 The Contractor shall provide a qualified employee to represent the Contractor and coordinate the work of all entities performing punch list corrections at the site. This staff person shall provide advance notification to the Owner of work occurring in the building, and shall document on a daily basis the activities and progress toward completion of the punch list.

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## § 9.9 Partial Occupancy or Use

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

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

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

## § 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable less retainage. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. The final retainage shall become due and payable to the Contractor the conditions of paragraph 9.10.2 are fully satisfied and upon occurrence of the following.

**§9.10.1.1** The expiration of forty-five days following the project's acceptance as substantially complete by the Owner's Board of Directors (note: this is not necessarily the same date as Substantial Completion as defined in Section 9.8).

**§9.10.1.2** The receipt by the Owner of the Washington State Department of Revenue certificate of payment of state taxes.

§9.10.1.3 Satisfaction of the Owner that the claims of materialmen, laborers and subcontractors who filed claims of liens have been paid.

§9.10.1.4 All requirements of RCW 39.12 relating to prevailing wage have been met.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (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,

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claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted less retainage. If bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

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

- liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled; .1
- .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.

§ 9.11.1 Liquidated Damages: The owner will suffer financial loss if the Project is not Substantially Complete on the date set forth in the Contract Documents. The Contractor (and his Surety) shall be liable for and shall pay to the Owner the sums hereinafter stipulated as liquidated damages for each calendar day of delay until the Work is substantially completed:

For Substantial Completion: Two Thousand Dollars-----(\$2,000.00)

# For Final Completion: Two Thousand Dollars-----(\$2,000.00)

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§ 9.11.2 The work of this Contract shall be commenced on a date to be specified in the Notice to Proceed and shall be completed within the time limits stipulated in the Contract Documents. Should the contractor fail to meet any of the contractual deadlines liquidated damages shall begin and accrue. The Owner will deduct the amount of liquidated damages from the current pay application and provide reduced payment accordingly.

§ 9.11.3 If an extension of Contract time is granted to the Contractor by Change Order, the Contractor shall indemnify and hold harmless the Owner and Architect from any loss to any other contractor or subcontractor caused by such extension of time. Liquidated damages will not be assessed for any days for which an extension of time is granted. No deduction or payment of liquidated damages will, in any degree, release the Contractor from further obligations and liabilities to complete the entire contract.

§ 9.11.4 It is further agreed that time is of the essence of each and every portion of this Contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act; and where under the Contract a time extension is allowed pursuant to Paragraph 8.3, Delays and Extensions of Time, the new time limit fixed by such extension shall be of the essence of this Contract.

§ 9.11.5 When the Contract work is substantially complete, the Architect will notify the Contractor in writing of the substantial completion date. If the Work is not substantially complete by the date established in the Contract Documents, the Contractor shall pay the dollar amount, as defined in the provisions of Paragraph 9.11.1, as liquidated damages for each and every calendar day that the Contractor is in default until the Work is substantially complete. Said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficult of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount shall be deducted from the Contract amount and not paid by the Owner.

§ 9.11.6 Project Final Completion shall be achieved within 30 consecutive calendar days following the issuance of

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Substantial Completion. Liquidated damages shall begin and accrue from the failure to meet the 30-day deadline defined in the contract. The Owner may offset these costs against any payment due to the Contractor. The Contractor shall complete any remaining work including punch list correction items within the allowed 30 consecutive calendar days. Upon request by the Architect, the Contractor shall furnish a written schedule for completing the contract.

#### PROTECTION OF PERSONS AND PROPERTY **ARTICLE 10**

#### § 10.1 Safety Precautions and Programs

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

## § 10.2 Safety of Persons and Property

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

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

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

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

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

§ 10.2.4.1 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary, the Contractor shall give the Owner reasonable advance notice.

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

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

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

## § 10.2.8 Injury or Damage to Person or Property

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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, written notice of the injury or damage, whether or not insured,

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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 and Substances

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

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

§ 10.3.3 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.

§ 10.3.4 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.

§ 10.3.5 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.

#### (Paragraph deleted)

#### § 10.4 Emergencies

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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 LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed including private entities performing Work at the site and exempt from the coverage on account of number of employees or occupation, which entities shall

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maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the Project.

- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees or persons entities excluded by statute from the requirements of Clause 11.1.1.1 but required by the Contract Documents to provide the insurance required by that Clause.
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees:
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.2.1 The insurance required by Subparagraph 11.1.1 shall be written for not less than the following limits and as follows:

- Workers' Compensation:
  - State: (a)

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(b) Employer's Liability:

#### Statutory

\$1,000,000 each Accident \$1,000,000 Disease, Each Employee \$1,000,000 Disease, Policy Limit

Contractor shall carry Commercial General Liability in ISO form CG 00 01 (or a substitute form providing 2. equivalent coverage) and shall be written on an occurrence basis including premises, operations; independent contractors, owners and contractors protective liability, products and completed operations, personal and advertising injury, liability assumed under contract and damage to premises rented to others. Contractor shall provide the owner with a Certificate of Liability Insurance and shall name the owner as Additional Insured. Additional Insured coverage shall apply as primary insurance with respect to any other insurance afforded the owner.

For any claim for bodily injury, property damage or due to a contractual liability, limits of not less (a) than \$1 million per occurrence with a per project aggregate limit of a least \$2,000,000.

For products and completed operations coverage, coverage is to be maintained for a period of two (b) (2) years following final payment.

For the hazards of explosion, collapse, and underground, commonly referred to as XCU, coverage (c) shall be required if the exposures exist.

- (d) For personal injury liability, limits of not less than \$1,000,000 per occurrence.
- For damage rented premises, limits of not less than \$100,000. (e)
- 3. Business auto liability (including owned, non-owned and hired vehicles) in an amount of not less than \$1 million combined single limit.
  - Umbrella Excess Liability: In addition, the Contractor shall maintain a true umbrella policy which provides excess liability limits over the primary layer in an amount of not less than \$4,000,000.

§ 11.1.2.2 The Contractor shall require all subcontractors of any tier to provide Commercial General Liability Insurance (or a substitute form providing equivalent coverage) with limits of not less than \$1 million per occurrence with an aggregate limit of a least \$2,000,000. Subcontractors of any tier shall also maintain Business Automobile Liability Insurance for all owned, non-owned and hired vehicles with combined single limits for bodily injury and property damage of at least \$500,000 per occurrence. The owner shall be named as an Additional Insured on all subcontractors of any tier's Commercial General Liability policies and owner shall receive a Certificate of Liability

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Insurance prior to any contractor, sub-contractor of any tier beginning work on site.

§ 11.1.2.3 The owner, owner's employees, architect, and their consultants shall be named as an Additional Insured on the insurance required in 11.1.2.1.2 and 11.1.2.2 above with a 30 days notice to cancel any coverage, and the insurance shall contain the severability of interest clause as follows: "The insurance afforded herein applies separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the company's 'liability'.

§ 11.1.2.4 All coverage shall be placed with an insurance company duly admitted in the State of Washington and shall be reasonable acceptable to Owner.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness. For insurance written on a Commercial General Liability policy form, an ACORD form 25S will be acceptable. All insurance Certificates of Liability Insurance must name Owner's Project Number, Project Title and Project Address.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

#### (Paragraphs deleted)

§ 11.1.5 Insurance During Warranty Period - In the event the Contractor is required to make corrections on the premises in accordance with the warranty provisions of this Contract, the above insurance requirements shall remain applicable at no additional cost to the Owner.

#### § 11.2 OWNER'S LIABILITY INSURANCE

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

#### § 11.3 PROPERTY INSURANCE

#### § 11.3.1

The Owner shall maintain an insurance program of property insurance supplemented by insurance policies sufficient to cover the total insurable value of this project. This insurance program shall cover the interests of the Owner, the contactor, subcontractors and sub-subcontractors in the project. Each loss may be subject to a \$5,000 deductible. Losses up to a \$5,000 deductible amount shall be the responsibility of the contractor.

Prior to commencing work, the Contractor agrees to obtain and continuously carry, during the period this Agreement remains in force, such insurance as the Owner considers necessary for the proper protection of the parties hereto and in forms approved by the Owner. Minimum amounts and units of insurance coverage are required as follows:

1) Commercial General Liability, written on an Occurrence Form, with Broad Form Property Damage, Broad Form Contractual, Personal Injury, including other coverage on Broadening Endorsement; Explosion, Collapse, and Underground (XCU) Coverage; Products and Completed Operations; and Owner's and Contractor's Protective.

Bodily Injury and Property Damage Liability: \$1,000,000 Combined Singe Limit

2) Automobile Liability. Owned Automobiles and automobiles under long-term lease, including Hired Automobiles and Non-Owned Automobiles.

#### Bodily Injury and Property Damage Liability: \$1,000,000 Combined Singe Limit

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3) Workman's compensation insurance, in statutory limits, covering all employees who perform any of the obligations assumed by the Bidder under the Contract.

4) The Contractor shall pay all premiums and costs in connection with all insurance that the Contractor shall be required to furnish or provide.

5) The Contractor shall require all insurance companies issuing any policies of insurance to the Contractor, which the Contractor is required to provide hereunder, to certify to the Owner in writing that such policies have been issued and are in force and will not be canceled for any reason (including non-payment of premium), annulled, materially altered, or reduced except upon thirty (30) days notice in writing to the Owner of cancellation or alteration. The Contractor shall not cancel policies of insurance required hereunder either before or after completion of the work without the written consent of the Owner.

6) The Contractor further agrees that, in the even of any work to be performed under the Agreement is further sublet, the subcontractor shall comply with the insurance requirements heretofore states.

#### (Paragraphs deleted)

§ 11.3.1.1 The contractor shall maintain insurance as deemed necessary by Contractor to protect the interests of himself, his subcontractors and the sub-subcontractors in the work, including property, materials, equipment, and tools. All contractor tools and equipment not intended as part of construction or installation will be the sole responsibility of the contractor. Materials incorporated into the Work and materials suitably stored at the site will be considered covered by the Owner's insurance program at 12:00 noon, on the date an application for payment for such materials is certified by the Architect.

§ 11.3.1.2 Not Used.

#### § 11.3.1.3

The Owner shall provide insurance coverage for portions of the Work stored off the site after written approval of the Owner at the value established in the approval, and also for portions of the Work in transit and all materials stored at the site and incorporated into the Work until covered by the Owner's insurance program as described in Subparagraph 11.3.1.1.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

#### § 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

#### § 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

#### § 11.3.7 WAIVERS OF SUBROGATION

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, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages to the work caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar

waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

Neither the Contractor nor any subcontractor shall enter into subcontracts for any of the work contemplated under this contract without obtaining prior written approval of the Owner. In no event shall the existence of the subcontract operate to release or reduce the liability of the Contractor to the Owner for any breach in the performance of the contractor's duties. This clause does not include contracts of employment between the Contractor and personnel assigned to work under this contract.

Additionally, the Contractor is responsible for ensuring that all terms, conditions, assurances and certifications set forth in this agreement are carried forward to any subcontracts. Contractor and its subcontractors agree not to release, divulge, publish, transfer, sell or otherwise make known to unauthorized persons personal information without the express written consent of the agency or as provided by law.

#### § 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents or by law on the date of execution of the Contract.

§ 11.4.2 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.

§ 11.4.3 The Bond shall include maintenance provisions covering workmanship and materials for a period of one year or for longer periods where so specified, from and after the Date of Substantial Completion. The Contractor shall include the cost of the Bond as part of the Contract Price.

§ 11.4.4 The Contractor shall promptly furnish additional security required to protect the Owner and persons supplying labor or materials under this Contract if:

- Any surety upon any bond furnished with this Contract becomes unacceptable to the owner;
- Any surety fails to furnish reports on its financial condition if requested by the Owner.

#### UNCOVERING AND CORRECTION OF WORK ARTICLE 12

#### § 12.1 Uncovering of Work

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

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

#### § 12.2 Correction of Work

#### § 12.2.1 Before Substantial Completion

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

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#### § 12.2.2 After Substantial Completion

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

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

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

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

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

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

#### § 12.3 Acceptance of Nonconforming Work

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

#### **ARTICLE 13 MISCELLANEOUS PROVISIONS**

#### § 13.1 Governing Law

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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, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

#### § 13.4 Tests and Inspections

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

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

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

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

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

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

#### § 13.5 Interest

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

§ 13.6 The work of this contract shall comply with the requirements of the State of Washington's requirements defined in RCW 39.04.320, for the inclusion of apprenticeship utilization and record keeping for this project. The requirements of this law as it applies to this School District project are summarized below. The contractor shall provide the required documentation with each pay request to verify compliance with this law.

This section applies to public works contracts awarded by the state and to the public works contracts awarded by school districts.

For all public works by a school district estimated to cost one million dollars or more all specifications shall require that no less than fifteen percent of the labor hours be performed by apprentices.

Awarding school districts may adjust the requirements of this section for a specific project for the following reasons:

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The demonstrated lack of availability of apprentices in specific geographic areas; A disproportionately high ratio of material costs to labor hours, which does not make feasible the required minimum levels of apprentice participation;

Participating contractors have demonstrated a good faith effort to comply with the requirements of RCW 39.04.300 and 39.04.310 and this section; or

Other criteria the awarding school district deems appropriate, which are subject to review By the office of the governor.

The department of general administration must provide information and technical assistance to Affected agencies and collect the following data from affected agencies for each project covered by this section:

The name of each apprentice and apprentice registration number;

The name of each project;

The dollar value of each project;

The date the of the contractor's notice to proceed;

The number of apprentices and labor hours worked by them, categorized by trade or craft:

The number of journey level workers and labor hours worked by them, categorized by trade or craft; and

The number, type, and rationale for the exceptions granted under subsection (3) of this section.

§ 13.7 Comply with applicable provisions of Revised Codes of Washington (RCW) and the Washington Administrative Code (WAC), including but not limited to the following (this listing is not intended to limit applicable RCWs and WACs but to emphasize the following):

.1 Prevailing Wage Rates, RCW 39.12 and Certified Payroll Records WAC 296-127-320

.2 Nondiscrimination, RCW 49.60

.3 Hours of Labor, RCW 49.28

.4 Contractor's Bond, RCW 39.08

.5 Contractor's Regulations, RCW 18.27

.6 Handicapped Provisions, RCW 70.92

#### **ARTICLE 14** TERMINATION OR SUSPENSION OF THE CONTRACT

#### § 14.1 Termination by the Contractor

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§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

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

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

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§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit attributed to the work executed only, and costs incurred by reason of such termination.

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

#### § 14.2 Termination by the Owner for Cause

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§ 14.2.1 The Owner may terminate the Contract if the Contractor

- repeatedly refuses or fails to supply enough properly skilled workers or proper materials; .1
  - .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.
  - .5 becomes insolvent or is declared bankrupt or commits any acts of bankruptcy or insolvency or makes an assignment for the benefit of creditors without the previous written consent of the Owner, except to a financial institutional authorized to do business in the State of Washington; then, the Owner may, after serving seven days notice to the Contractor and surety, either:
    - .1 Transfer the performance of work from the Contractor to the surety or;
    - .2 Terminate the Contract and, at the Owner's option, provide such labor or materials as required to complete the work or delete the remaining work. Any extra costs or damages to the owner shall be deducted from any money due or coming due to the Contractor under the Contract.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, 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' written 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 The Contractor and the surety shall bear any extra expenses incurred by the Owner in completing the work, including all increased costs for completing the work, and all damages sustained, or which may be sustained, by the Owner by reason of such refusal, neglect, failure, or discontinuance of work by the contractor. After all the work contemplated under the Contract has been completed, the Owner will calculate the total expenses and damages for the completed work. If the total expenses and damages are less than any unpaid balance to the Contractor, the excess will be paid by the Owner to the Contractor. If the total expenses and damages exceed the unpaid balance, the Contractor and the surety shall be jointly and severally liable to the Owner and pay the difference to the Owner on demand.

§ 14.2.5 Upon receipt of a notice that the work is being transferred to the surety, the surety shall enter upon the premises and take possession of all materials, tools, and appliances for the purpose of completing the work included under the Contract and employ by Contract or otherwise any person or persons satisfactory to the Owner to finish the work and provide the materials without termination of the Contract. Such employment shall not relieve the surety of its obligations under the Contract and the bond. If there is a transfer to the surety, payments on estimates covering work subsequent to the transfer shall be made to the extent permitted under law to the surety or its agents without any right of the Contractor to make any claim.

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§ 14.2.6 The Contractor and its surety shall be liable for any damage to the Owner resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Owner in the work.

§ 14.2.7 If the termination for default has been issued and it is later determined for any reason that the Contractor was not in default, the rights and obligations of the parties shall be the same as if the termination had been pursuant to Paragraph 14.3, Suspension by the Owner for Convenience and 14.4 Termination by owner for Convenience.

§ 14.2.8 The rights and remedies of the Owner in this clause are in addition to any other rights and remedies provided by law or under this Contract.

#### § 14.3 Suspension by the Owner for Convenience

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

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

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

#### § 14.4 Termination by the Owner for Convenience

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

§ 14.4.2 Upon receipt of written 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. The claimant shall submit with the claim a certification that 'the claim is made in good faith and that supportive data is accurate and complete'.

#### § 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.

Init. 1

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#### § 15.1.3 Notice of Claims

#### § 15.1.3.1

Notice of Claims. If the contractor asserts there is cause for a claim, the contractor shall:

- 1. Immediately give a signed written notice of claim to the Architect and the Owner before doing the Work:
- 2. Supplement the written claim notice within 7-calendar days with a written statement and supporting documents providing the following:
  - a. The date and nature of the claim;

b. A full discussion of the circumstances which caused the claim, including names of persons involved, time, duration and nature of the Work involved, and a review of the Plans and Contract Provisions referenced to support the claim;

c. The estimated dollar cost, if any, of the Work related to the claim and a detailed breakdown showing how that estimate was determined; and

d. An analysis of the progress schedule showing the schedule change or disruption if the Contractor is asserting a schedule change or disruption; and

e. If the claim is continuing, the information required above shall be supplemented upon request by the Architect until the claim is resolved.

Once such Claim is identified, the claimant shall cooperate with the Architect and the other party against whom the Claim is made in an effort to mitigate the alleged or potential damages, delay or other adverse consequences arising out of the condition which is the cause of such a Claim. The claim resolution procedure defined in section 15.2 shall be followed upon receipt of Contractor's claim.

Throughout any Work related to a claim, the Contractor shall keep complete records of extra costs and time incurred. The Contractor shall permit the Architect and Owner access to these and any other records related to the Work as determined by the Architect and Owner. The records for disputed work shall be in accordance with section 7.3.7. By failing to follow the procedures of this Section, the Contractor completely waives any right for compensation or extended duration claims for protested Work. An additional Claim made after the initial Claim has been implemented by Change Order will not be allowed.

§ 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

Init. 1

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written 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.

§ 15.1.5.1 No adjustment in the Contract Sum shall be permitted, however, in connection with a concealed or unknown condition which does not differ materially from those conditions disclosed or which reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, reviews and preconstruction services for the Project, or (2) inspections, tests, reviews, and preconstruction services which the Contractor had the opportunity to make or should have performed in connection with the Project. No adjustment in the Contract Time or Contract Sum shall be permitted, however, in connection with a concealed or unknown condition which does not differ materially from those conditions disclosed or which reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, reviews and preconstruction services for the Project, or (2) inspections, tests, reviews, and preconstruction services which the Contractor had the opportunity to make or should have performed in connection with the Project.

§ 15.1.5.2 The parties agree that an integral part of this agreement is the ability to resolve claims and disputes in a

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timely manner. To achieve this timely resolution, the parties agree to establish a set cost allowance for delays and time extensions. There will be no additional allowance for equitable adjustment for any general conditions, costs or mobilization, demobilization, layout, temporary facilities, equipment, home office, or field overhead costs (extended overhead) or other costs of supervision herein relating to change orders, time extensions, or delays, other than as set forth in this paragraph. The Owner will pay only for the following verifiable costs associated with the time extension or delay: 1) the actual labor costs, fringe benefits, employment taxes and insurance related to the Project Superintendent; 2) the cost associated with the fair rental value of the Project Superintendent's vehicle directly related to the time extension; 3) the direct costs attributable to the extension for the field office facility including telephone line, utilities, power, lights, water, and sewer (toilets). Mark-up on these costs will not be allowed.

#### § 15.1.6 Claims for Additional Time

#### § 15.1.6.1

If the Contractor wishes to make claim for an increase in the Contract time, as stated in the Contract Documents, written notice, as provided herein, shall be given. The Contractor's claim shall include an estimate of cost and of probable effect of delay on progress of the Work based on contract time as stated in the Contract Documents. In case of a continuing delay, only one claim is necessary. All claims for costs related to claims for additional time shall be pursuant to Paragraph 4.3.5. No adjustment in the Contract Time shall be permitted, however, in connection with a concealed or unknown condition which does not differ materially from those conditions disclosed or which reasonably should have been disclosed by the Contractor's (1) prior inspections, tests, reviews and preconstruction services for the Project, or (2) inspections, tests, reviews, and preconstruction services which the Contractor had the opportunity to make or should have performed in connection with the Project.

§ 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 critical path activities scheduled construction for that same time period of the year.

- .1 one day events shall not be considered abnormal, unless classified as hurricane or tornado force weather events, or if weather conditions exceed by 50% the historical average for that date; and
- 2. weather patterns shall not be considered abnormal unless the pattern persists for five (5) calendar days, and the pattern exceeds by 15% the historical average for that same annual period.
- 3. historical average weather to be considered for this definition shall include daily high and low temperature, and precipitation amount. Wind of any kind less than 90 MPH shall not be considered abnormal for this definition.
- 4. Data Station of record for this project - Tri-Cities Airport - Pasco, WA.

#### § 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

- damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, .1 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

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and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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

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

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

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

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

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

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

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

#### § 15.3 Mediation

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§ 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.

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§ 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

The Contractor and the Owner shall not be obligated to resolve any claim or dispute related to the contract by arbitration. Any reference herein to arbitration is deemed void and has no force or effect. (Paragraphs deleted)

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#### BIDDER RESPONSIBILITY QUESTIONAIRE

advertising for the project.

As evidence that the bidder meets the bidder responsibility criteria, the apparent low bidder must submit this documentation to the Architect and Owner within 48 hours of the bid submittal deadline. The Owner reserves the right to request such documentation from other bidders also.

BIDDER	
NAME:	
ADDRESS:	
CITY:	_ COUNTY:
STATE:	_ ZIP CODE
TELEPHONE NO.: ()	_ FAX NO.: ()
Mandatory Bidder Responsibility shall be determined by refers to Instruction to Bidders section.	y the criteria set forth in <u>RCW 39.04.350</u> . Numbering
5.5.1: WASHINGTON STATE CONTRACTOR'S LICENS	E NO
5.5.2: UBI NO	
5.5.3: If applicable: Do you have Industrial Insurance (workers' compens in Washington, as required in Title 51 RCW -	sation) coverage for the bidder's employees working YES / NO
Washington Employment Security Department num	per, (Title 50 RCW):
Washington Department of Revenue state excise ta	x registration number, (Title 82 RCW)
5.5.4: Has your company been disqualified from bidding or 39.12.065(3).	j on any public works contract under RCW 39.06.010 YES / NO
5.5.5: Has your company been found to be out of a apprenticeship utilization requirements of RCW 3.0.0 appropriate supervision, or outside their approved apprenticeship under chapter 49.04 RCW for the one	compliance for public works projects subject to the 4.320, for working apprentices out of ratio, without work processes as outlined in their standards of -year period immediately preceding the first date of

5.5.6: Until December 31, 2013, has your company violated more than one time the offsite, prefabricated, non-standard, project specific items reporting requirements of RCW 39.04.370. Reference Articles 9.4.1 through 9.4.4 of the instructions to bidders for further information regarding off-site-items. **YES / NO** 

<u>Supplementary Bidder Responsibility</u> shall be determined by the follow criteria as allowed for in <u>RCW 39.04.350</u>.

**5.6.4 Responsibility Criterion 1: Public Works Projects for School Districts:** To determine bidder responsibility the Owner will review for: Quality of project and quality control, Management of safety and safety record, Timeliness of performance, Management of subcontractors, Compliance with contract documents, Management of schedule, submittals process, change orders, and closeout. List all public works projects completed for School Districts by your company with a project value of between \$20 million and \$30 million dollars over the past five years.

YES / NO

Project Name:	
Dollar amount of Contract: \$	
Owner:	
Owner's Representative	Phone
Contractor's Superintendent on this project	
Brief Description of Project Scope:	
Ducie et Nove	
Project Name:	
Owner:	
Owner's Representative	Phone
Contractor's Superintendent on this project	
Brief Description of Project Scope:	
Project Name:	
	Disco
Owner's Representative	Phone
Contractor's Superintendent on this project	
Brief Description of Project Scope:	
Project Name:	
Dollar amount of Contract:\$	
Owner:	
Owner's Representative	Phone
Contractor's Superintendent on this project	
Brief Description of Project Scope:	
Project Name:	
Dollar amount of Contract:\$	
Owner:	
Owner's Representative	Phone
Contractor's Superintendent on this project	
Brief Description of Project Scope:	

## 5.6.5 Responsibility Criterion 2: Claims Against Retainage and Bonds: To determine bidder

responsibility the Owner will review for any projects where claims have been made against retainage and/or bonds for your companies projects. List all the projects completed within the previous five years that have had any claim filed against the retainage or payment bonds for the project. Include a brief description of the nature and resolution of each claim noted (use additional pages as necessary to list all projects).

- Project Name: \_\_\_\_\_\_
  Brief Description of claim made against Retainage or Bond: \_\_\_\_\_\_
  \_\_\_\_
- 2. Project Name: \_\_\_\_\_\_ Brief Description of claim made against Retainage or Bond: \_\_\_\_\_\_

#### 

**5.6.6 Responsibility Criterion 3: Termination for Cause / Termination for Default:** To determine bidder responsibility the Owner will review for any projects where the contractor has been terminated for cause or default. List all the projects completed within the previous five years that have resulted in your company being terminated for cause or default. Include a brief description of the nature of each termination noted, along with possible extenuating circumstances (use additional pages as necessary to list all projects).

1. Project Name: \_\_\_\_\_\_ Brief Description of Termination claim and surrounding circumstances: \_\_\_\_\_\_

\_\_\_\_\_

- 2. Project Name: \_\_\_\_\_\_\_ Brief Description of Termination claim and surrounding circumstances: \_\_\_\_\_\_
- 3. Project Name: \_\_\_\_\_\_ Brief Description of Termination claim and surrounding circumstances: \_\_\_\_\_\_

**5.6.7 Responsibility Criterion 4: Lawsuits:** To determine bidder responsibility the Owner will review for any projects where the contractor has lawsuits with judgments entered against the Bidder. List all the projects completed within the previous five years that have resulted in lawsuits with judgments entered against your company. Include a brief description of the nature of each lawsuit and judgment noted, along with possible extenuating circumstances (use additional pages as necessary to list all projects).

- 1. Project Name: \_\_\_\_\_\_ Brief Description of Lawsuit and surrounding circumstances: \_\_\_\_\_\_
- 2. Project Name: \_\_\_\_\_\_ Brief Description of Lawsuit and surrounding circumstances: \_\_\_\_\_\_
- 3. Project Name: \_\_\_\_\_\_ Brief Description of Lawsuit and surrounding circumstances: \_\_\_\_\_\_

**5.7.1 Subcontractor Responsibility** - Bidder certifies that at the time of sub-contract execution each subcontractor shall comply with the responsibility requirements defined in the <u>Instructions to Bidders</u>, sub-section 5.7. The Contractor shall include the language of that section in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. Upon request of the Owner, the Contractor shall promptly provide documentation to the Owner demonstrating that the subcontractor meets the subcontractor responsibility criteria. The requirements of this section apply to all subcontractors regardless of tier.

If the above contract is awarded to our company, the following persons will be authorized to sign change orders, progress payments and similar documents for the company: (names and positions)

The Contractor's superintendent at the job site will be (give full name)

Signature

Date

FORM

s.f. 352 (7/78)

See Instructions to Bidders	NOTE: Type or Print in Ink	
PRINCIPAL (Legal name and business address)	TYPE OF ORGANIZATION (Check one)	
	INDIVIDUAL  PARTNERSHI	
	JOINT VENTURE CORPORATIO	N
SURETY(IES) (Name(s) and business address(es))	CONTRACT DATE CONTRACT NO.	
	SUM AMOUNT OF BOND	
		DOLLARS

WE, the Principal and Surety(ies), in accordance with the Revised Code of Washington, are firmly bound and obligated to the State of Washington in the above sum amount on conditions set forth below, for the payment of which we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally.

THE CONDITION OF THIS OBLIGATION IS SUCH that the Principal entered into the contract identified above.

THE ABOVE OBLIGATION shall be void and of no effect if the Principal performs and fulfills all the provisions of such contract and any extentions or modifications thereof that may be made by the State of Washington, and faithfully pays all laborers, mechanics and subcontractors and materialmen, and all persons who shall supply such person or persons, or subcontractors, with materials and supplies for the carrying on of such work, and shall indemnify the State of Washington against any loss or damage directly due to the failure of the Principal to faithfully perform the contract identified above.

IN WITNESS WHEREOF, the Principal and Surety(ies) have executed this payment and performance bond and have affixed their signatures and seals on the date set forth above.

	PRINCIPAL						
1. NAME OF	PRINCIPAL AND TITLE	PHONE NO.	SIGNATURE		IS		
2.					(Corporate Seal)		
		SU	JRETY(IES)				
Surety A	<ul> <li>NAME AND ADDRESS</li> <li>1. NAME AND TITLE (Attorney in Fa</li> <li>2. NAME AND TITLE (Resident Agen</li> </ul>	ct) PHONI t) PHONI	E NO. SIGNATURE E NO. SIGNATURE	LIABILITY LIMIT	L.S. (Corporate Seal)		
	NAME AND ADDRESS			LIABILITY LIMIT			
Surety E	NAME AND TITLE (Attorney in Fa     NAME AND TITLE (Resident Agen	t) PHONI	E NO. SIGNATURE		L.S. (Corporate Seal)		



State of Washington

CERTIFICATE OF INSURANCE THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED (Legal name and business address)		C ST	CERTIFICATE HOLDER: STATE OF WASHINGTON		CONTR	ACT NUMBER	
			DEPT. OF GEN DIVISION OF E 206 GENERAL	ERAL ADMINIST & A SERVICES ADMINISTRATI	TRATION	DA	<u>TE ISSUED:</u>
			OLYMPIA, WA	SHINGTON 9850	04-1012		
PROJ	ECT DESCRIPTION / LOCATIONS / VEHI	CLES / RESTRICTIONS	/ SPECIAL ITEMS:			I	
This is	to certify that policies of Insurance listed be	low have been issued to th	e Insured named abo	ove for the policy p	eriod indicated.		
CO LTR	TYPE OF INSURANCE	POLICY NUMBER	Date Policy Effective (MM/DD/YY)	Date Policy Expires (MM/DD/YY)	ALL L	IMITS IN THOU	JSANDS
	GENERAL LIABILITY		( /	· · · · · · · · · · · · · · · · · · ·	General Aggregate	2	\$
	Commercial General Liability				Products Comp/Op	os Aggregate	\$
	Claims Made Occurrence				Personal & Advert	ising Injury	\$
-	Owner's & Contractors Protection				Each Occurrence	0 5	\$
¦ ┣	Deductible \$				Fire Damage (Any	One Fire)	\$ ) \$
	AUTOMOBILE LIABILITY				Wedical Expense (		<i>)</i> \$
	Any Auto				CSL	\$	
	All Owned Autos				Bodily Injury		
╎┣	Scheduled Autos				(per person)	\$	
-	Hired Autos				Bodily Injury (per accident)	\$	
F	Garage Liability				Property	· ·	
	Deductible \$				Damage	\$	
	EXCESS LIABILITY				Eac	ch Occurrence	Aggregate
┝	Other Than Umbrella Form				s		s
i	WORKERS COMPENSATION				STATUTORY		
					\$	(Each A	Accident)
	EMDI OVED'S I LADII ITV				\$	(Diseas	e Policy Limit)
	OTHER				\$	(Diseas	e-Each Employee)
	OTTER						
		ADDI	FIONAL PROVISIO	ONS			
The St Should to the	ate of Washington is included as additional in any of the above described policies be cancer above Certificate Holder, per RCW 48.18.290	nsured as related to the abo elled before the expiration	ove mentioned project date thereof, the issue	et. aing Company mus	t deliver or mail not	less than a 45 da	ays written notice
	COMPANIES AFFORDING COV	VERAGE	]	SSUING COMPA	NY, AGENT OR R	EPRESENTATI	VE
NOTE	: Attach a separate sheet to this certificate g all the company names and their percentag	iving ge of coverage, if		NAME:			
	A		AD	DRESS:			
otter	В		-				
Ľ			Authorized S	ignature			
any	С		1	Title			
3dr			Signati	ire Date			
)on	ע		Signe	e Name			
$\cup$	Е		Telenh	one No.			

#### SECTION 01 10 00 - SUMMARY

#### PART 1 - GENERAL

#### 1.1 SUMMARY

Α.

- A. This Section includes the following:
  - 1. Work covered by the Contract Documents.
    - 2. Type of the Contract.
    - 3. Work phases.
    - 4. Work under other contracts.
    - 5. Products ordered in advance for assignment.
    - 6. Owner-furnished products.
    - 7. Use of premises.
    - 8. Owner's occupancy requirements.
    - 9. Work restrictions.
  - 10. Specification formats and conventions.
- B. Related Sections include the following:
  - 1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
  - 2. Reference Document A201 for Project Closeout and Final Completion requirements.

#### 1.2 WORK COVERED BY CONTRACT DOCUMENTS

- Project Identification: Orion High School
- 1. Project Location: Pasco, Washington
- B. Owner: Pasco School District
  - 1. Owner's Representative: John Weatherby
- C. Architect: Design West Architects
- D. Owner's Construction Manager: TBD
- E. The Work consists of the following:
  - 1. The Work includes all labor and material to complete the work included in the Contract Documents for the project.
  - 2. SOILS REPORT: GN Northern Geotechnical Report (56 pages) dated July 14, 2023, is hereby included in the contract requirements and the requirements and recommendations contained within the Soil Report shall be binding on all portions of work. Information shown elsewhere in the drawings and specifications that contain a more stringent requirement than the referenced Soils Report shall take precedence.
  - 3. SOILS REPORT (for Bid Alternate #7): GN Northern Geotechnical Report (32 pages) dated September 13, 2023, is hereby included in the contract requirements and the requirements and recommendations contained within the Soil Report shall be binding on all portions of work. Information shown elsewhere in the drawings and specifications that contain a more stringent requirement than the referenced Soils Report shall take precedence.

#### 1.3 TYPE OF CONTRACT

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

#### 1.4 WORK PHASES

- A. The Work shall be conducted in phases as defined in the Contractual Performance Schedule in section below.
- B. Before commencing Work of each phase, submit a schedule showing the sequence, commencement and completion dates, and move-out and -in dates of Owner's personnel for all phases of the Work.

## 1.5 WORK UNDER OTHER CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.

#### 1.6 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated in the documents. The Work includes providing support systems to receive Owner's equipment and making plumbing, mechanical, and electrical connections as might be required for specific Owner furnished products.
  - 1. Owner will arrange for and deliver Shop Drawings, Product Data, and Samples to Contractor.
  - 2. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.
  - 3. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
  - 4. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
  - 5. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
  - 6. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
  - 7. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Architect noting discrepancies or anticipated problems in use of product.
  - 8. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.
  - 9. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
  - 10. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.
  - 11. Contractor shall install and otherwise incorporate Owner-furnished items into the Work.

#### 1.7 USE OF PREMISES

- A. General: Contractor shall have use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited by:
  - 1. Owner's right to perform work or to retain other contractors on portions of Project.
  - 2. Other limitations contained in articles below
  - 3. Contractual schedule restrictions for completion of portions of the work to allow Owner occupancy of portions of the project during the School Year.
- B. Use of Site: Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  - 1. Limits: Confine constructions operations to comply with the requirements of the Contractual Schedule defined in the article(s) below.
  - 2. Owner Occupancy: Allow for Owner occupancy of Project site as defined below.
  - 3. Driveways and Entrances: Promptly repair any damage. Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
    - a. Schedule deliveries to minimize use of driveways and entrances.
    - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
    - c. Schedule deliveries to minimize disruption to the Owner's operation of the surrounding school campus.

## 1.8 OWNER'S OCCUPANCY REQUIREMENTS

- A. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
  - 1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
  - 2. Contractor shall obtain a Certificates of Occupancy as required from authorities having jurisdiction before Owner occupancy.
  - 3. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of building.
  - 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

## 1.9 WORK RESTRICTIONS

- A. On-Site Work Hours: Work shall be generally performed during normal business working hours of 6:00 a.m. to 6:00 p.m., Monday through Friday, except as otherwise indicated.
  - 1. Early Morning and Late Evening Hours: restrictions in accordance with regulations by authorities having jurisdiction for restrictions on noisy work. Request permission from Owner and Authorities having Jurisdiction to work outside normal work hours
  - 2. Hours for Utility Shutdowns: Provide two weeks advance request and notice of intended utility shut downs during the time that the Owner is occupying the adjacent facilities. Minimize the duration of any utility outage that affects the Owner's facilities.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Architect and Owner not less than two weeks in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Owner's written permission.
  - 3. Reference Division 33 specifications for utility coordination and requirements.
- C. Smoking nor tobacco use is not permitted on School District's property at any time or place.
- D. Amplified music, such as radios, CD/MP3 players, is not permitted on the project site at any time.
- E. Any and all pets/animals are not permitted on the project site at any time.
- F. Drugs, alcohol, weapons are not permitted School District's property at any time or place.

## 1.10 DOCUMENTS AND SPECIFICATION FORMATS AND CONVENTIONS

- A. The Contract Documents, including the Drawings and Specifications, are complementary and what is required by one shall be binding as if required by all. Work shown or required by any portion of the contract documents shall be provided by the contractor.
- B. Organization of the Specifications and Drawing keynotes into divisions, sections and articles, and the arrangement and numbering of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by a trade. The General Contractor is solely responsible for assigning work among various subcontractors and trades; the General Contractor is ultimately responsible for all work under the contract.
- C. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format and CSI/CSC's "MasterFormat" numbering system.
  - 1. Section Identification: The Specifications use Section numbers and titles to help crossreferencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
  - 2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.

- D. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
  - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
    - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

#### 1.11 CONTRACTUAL PERFORMANCE SCHEDULE

- A. The contractor shall plan and execute the work, including any premium labor costs or special work scheduling, to comply with attaining substantial completion within:
  - 1. **460 total consecutive calendar days** (April 2024 to July 2025). Commencement Date to be set with Notice to Proceed.
  - 2. Initial and complete submittals shall be received no later than **100 days** after Notice to Proceed for review and comment. Failure to comply with this deadline shall constitute breach of contract, and shall be subject to liquidated damages. All closeout submittals shall be processed to allow timely Project Final Completion shall be achieved within 30 consecutive calendar days following the issuance of Substantial Completion. Reference specification 01 77 00 and Document A201 for Project Closeout and Final Completion requirements.
  - 3. All lawn turf seeding, specified irrigation, soil preparation, landscape grading shall be installed throughout entire project limits no later than July 1, 2025. The contractor shall maintain the lawn turf areas per specification 32 92 00 until 100 days after substantial completion demonstrating that the lawn turf is established per specification 32 92 00. The 1-year warranty period shall begin on the date of Substantial Completion.
  - 4. Project Final Completion shall be achieved within 30 consecutive calendar days following the issuance of Substantial Completion. Reference specification 01 77 00 and Document A201 for Project Closeout and Final Completion requirements. Failure to comply with this deadline shall constitute breach of contract, and shall be subject to liquidated damages.
  - B. Liquidated damages shall begin and accrue from the failure to meet any of the deadlines defined in items 1, 2, 3 and 4 as listed above in the project schedule.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00



# **GEOTECHNICAL SITE INVESTIGATION REPORT**

NEW INNOVATION HIGH SCHOOL SALT LAKE STREET & UTAH AVENUE PASCO, WA

GNN PROJECT NO. 223-1666

**JULY 2023** 

Prepared for

PASCO SCHOOL DISTRICT NO. 1 1215 W. LEWIS STREET PASCO, WASHINGTON 99301 1215 W. Lewis Street PASCO SCHOOL DISTRICT #1

Prepared by

GN NORTHERN, INC. CONSULTING GEOTECHNICAL ENGINEERS KENNEWICK, WASHINGTON (509) 734-9320

> Common Sense Approach to Earth and Engineering Since 1995

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Yakima • Kennewick • Spokane Valley • Hermiston, OR • Hood River, OR



At GN Northern our mission is to serve our clients in the most efficient, cost-effective way using the best resources and tools available while maintaining professionalism on every level. Our philosophy is to satisfy our clients through hard work, dedication, and extraordinary efforts from all of our valued employees working as an extension of the design and construction team. July 14, 2023

Pasco School District No. 1 1215 W. Lewis Street Pasco, WA 99301

Attn: Raul Sital, Asst. Superintendent of Operations & Supports

Doug Carl, Alliance - Management and Construction Solutions

# Subject:Geotechnical Site Investigation ReportNew Innovation High SchoolSalt Lake Street & Utah Avenue, Pasco, WA

## GNN Project No. 223-1666

Dear Mr. Carl,

As requested, GN Northern (GNN) has completed a geotechnical site investigation for the proposed New Innovation High School project planned on the approximately 10-acre site located northeast of Salt Lake Street and Utah Avenue in Pasco, Washington.

Based on the findings of our subsurface study, we conclude that the site is suitable for the proposed construction provided that our geotechnical recommendations presented in this report are followed during the design and construction phases of the project.

This report describes in detail the results of our investigation, summarizes our findings and presents our recommendations concerning earthwork and the design and construction of foundations, building pad, pavements and stormwater infrastructure for the proposed project. <u>It is important that GNN be retained by the Pasco School District to provide consultation during the design phase, as well as field compaction testing and geotechnical monitoring services during the construction phase, to review and monitor the implementation of our geotechnical recommendations.</u>

If you have any questions regarding this report, please contact us at 509-734-9320.

Respectfully submitted,

GN Northern, Inc.

Aaron B. Cleveland, GIT Staff Geologist

Imran Magsi, PE, GE Sr. Geotechnical Engineer



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Appendix  $VI-W\mbox{ashington}$  Department of Ecology Well Log

# 1.0 PURPOSE AND SCOPE OF SERVICES

This report has been prepared for the proposed Innovation High School project planned on the approximately 10-acre site located at northeast of Salt Lake Street and Utah Avenue, in the City of Pasco, Washington; site location is shown on the *Vicinity Map* (Figure 1, Appendix I). Our investigation was conducted to collect information regarding subsurface conditions and present recommendations for suitability of the subsurface materials to support the planned site development and allowable bearing capacity for the proposed construction.

GN Northern, Inc. has prepared this report for use by the client and their design consultants in the design of the proposed development. Do not use or rely upon this report for other locations or purposes without the written consent of GN Northern, Inc.

Our study was conducted in general accordance with our *Proposal for Geotechnical Investigation Report* dated June 7, 2023; notice to proceed was provided by Mr. Carl on June 15, 2023 via email in the form of a copy of our signed proposal, signed by Mr. Raul Sital, Assistant Superintendent of Operations and Supports, dated June 14, 2023. The District also provided a PURCHASE ORDER NO. P190444 dated 6/14/2023.

You provided us via email a site plan for the New Innovation High School, Option 1 (dated 5/19/2022) prepared by Knutzen Engineering, showing the proposed building and site layout. Field exploration consisting of eight (8) exploratory test-pits and 1 infiltration test was completed on June 28, 2023. The test-pit locations are shown on the *Site Exploration Map* (Figure 2, Appendix I). Detailed test pit logs are presented in Appendix II.

This report has been prepared to summarize the data obtained during this study and to present our recommendations based on the proposed construction and the subsurface conditions encountered at the site. Results of the field exploration and laboratory testing were analyzed to develop recommendations for site development, earthwork, foundation bearing capacity and pavements. Design parameters and a discussion of the geotechnical engineering considerations related to construction are included in this report.

# 2.0 PROPOSED CONSTRUCTION

Our understanding of the proposed development is based on a Site Plan (Option 1) prepared by Knutzen Engineering. No information regarding building type, loading and/or materials was provided at the time of this report. The Site Plan shows one building (could be one- or two- story) with a courtyard, paved parking consisting 241 stalls, drive lanes and stormwater in parking areas.

Structural loading information was not available at the time of this report. Based on our experience with similar projects, we anticipate maximum wall loads to be on the order of 3.0 to 4.0 klf and column loads to be less than 80 kips. It shall be noted that assumed loading is based on information provided at the time of this report. If loading conditions differ from those described herein, GNN should be given an opportunity to perform re-analysis. Settlement tolerances for the structures are assumed to be limited to 1 inch, with differential settlement limited to <sup>1</sup>/<sub>2</sub> inch.

# **3.0 FIELD EXPLORATION**

Our field exploration was completed on June 28, 2023. GNN personnel were on site on June 20, 2023, to mark the property boundaries with white paint. A local public utility clearance was obtained prior to the field exploration. Eight (8) test-pits and one (1) infiltration test were completed at locations shown on the *Site & Exploration Map* (Figure 2, Appendix I). Test-pits were excavated by DDB, LLC using an XCMG XE55U mini excavator depth of 10 feet below existing ground surface (BGS). The test-pits were logged by a GNN field geologist. Upon completion, the test-pits were loosely backfilled with excavation spoils.

The soils observed during our field exploration were classified according to the Unified Soil Classification System (USCS), utilizing the field classification procedures as outlined in ASTM D2488. A copy of the USCS Classification Chart is attached in Appendix II. Site and Exploration photographs are attached in Appendix IV. Depths referred to in this report are relative to the existing surface elevation at the time of our field investigation. The surface and subsurface conditions described in this report are as observed at the site at the time of our field investigation.

# 4.0 LABORATORY TESTING

Representative samples of the subsurface soils obtained from the test-pits were selected for testing to determine the index properties of the soils in general accordance with ASTM procedures. The following laboratory tests were performed:

Test	To determine
Particle Size Distribution	Soil classification based on proportion of
(ASTM D6913 & D422)	sand, silt, and clay-sized particles
Natural Moisture Content	Soil moisture content indicative of in-situ
(ASTM D2216)	condition at the time samples were taken

**Table 1: Laboratory Tests Performed** 

Results of the laboratory test are included on the test-pit logs and are also presented in graphic form in Appendix III attached to the end of the report.

# 5.0 SITE CONDITIONS

The approximately 10-acre site is located on the northeast corner of Salt Lake Street and Utah Avenue in the city of Pasco, Washington. The site is generally situated in the SE <sup>1</sup>/<sub>4</sub> of the NE <sup>1</sup>/<sub>4</sub> of the SE <sup>1</sup>/<sub>4</sub> and the NE <sup>1</sup>/<sub>4</sub> of the Se <sup>1</sup>/<sub>4</sub> of the SE <sup>1</sup>/<sub>4</sub> of Section 20, Township 9 North & Range 30 East, Willamette Meridian. Adjacent properties consist of a warehouse facility to the northwest, residential properties to the east, Capitol Concrete Pumping to the north and vacant land to the southeast and southwest. The site is covered with grass and sagebrush and occasional scattered trash and debris on the surface. The site is slightly hummocky, and the center portion is approximately 13 feet higher in elevation than the rest of the site with the steepest slope near the central portion of the site. Elevations within the project site range from 419 feet above mean sea level (MSL) on the northeast and southwest portions and approx. 432 feet MSL near the center of the site.

# 5.1 Regional Geology

The site is located in the Tri-Cities area of the Yakima Fold Belt region of the Columbia Basin Plateau. The subsurface stratigraphy of the region is comprised of a thick series of folded, Miocene-age flood basalt lava flows and interbedded sediments (collectively known as the Columbia River Basalt Group [CRBG]) overlain by unconsolidated deposits of late Miocene to recent age. In the Tri-Cities area, the uppermost layers of the CRBG are fractured basalt bedrock.

Regionally, the top surface of the local basalt is known to slope to the east toward the Columbia River, although local variations exist in the area. Based on the *Geologic Map of the Richland 1:100,000 Quadrangle, Washington* (Reidel, 1994), the site is mapped as Quaternary outburst flood deposits of glacial Lake Missoula, predominantly sand and silt [Qfs(4)]. The local bedrock in the area is comprised of the Miocene age Saddle Mountains Basalt of the CRBG.

## 5.2 Seismic Considerations

As per the 2018 International Building Code (IBC), a Site Class 'D' may be used for seismic design purposes. Site Class 'D' corresponds to 'stiff soil'.

We obtained the seismic parameter from the National Seismic Hazard Maps for Latitude 46.245085°N and Longitude 119.076670°W. Table 2 below presents the recommended seismic design parameters in accordance with ASCE 7-16 for a code-based response spectrum with a return period of 2,475 years.

Seismic Design Parameter	Value (unit)
Ss	0.396 (g)
$S_1$	0.151(g)
Fa	1.483(unitless)
$F_{v}$	2.299 (unitless)
S <sub>MS</sub>	0.588 (g)
S <sub>M1</sub>	0.346 (g)
S <sub>DS</sub>	0.392 (g)
$S_{D1}$	0.231 (g)
PGA	0.177 (g)
F <sub>PGA</sub>	1.445
PGA <sub>M</sub>	0.256 (g)

 Table 2: IBC Design Response Spectra Parameters

 $S_{S} = MCE$  spectral response acceleration at short periods

 $S_1$  = MCE spectral response acceleration at 1-second period

 $F_a$  = Site coefficient for short periods

 $F_v = Site \ coefficient \ for \ 1-second \ period$ 

 $S_{MS}$  = MCE spectral response acceleration at short periods as adjusted for site effects

 $S_{M1}$  = MCE spectral response acceleration at 1-second period as adjusted for site effects

 $S_{DS}$  = Design spectral response acceleration at short periods

 $S_{D1}$  = Design spectral response acceleration at 1-second period

PGA= MCE<sub>G</sub> peak ground acceleration

 $F_{PGA}$ = Site amplification factor at PGA

 $PGA_M$ = Site modified peak ground acceleration

# 6.0 SUBSURFACE CONDITIONS

Based on the findings of our field exploration, the subsurface soils encountered within the test-pits are generally uniform across the site and consist of Silty Sand (SM) overlying Poorly Graded Sand with Silt (SP-SM) and Poorly Graded Sand (SP). The upper silty sand unit exhibit 'loose' to 'medium dense' relative density and was 'dry to damp'. The native sands were observed to have a relative in-place density of 'medium dense' and were typically observed to be 'dry to damp'. Within test-pits TP-6 and TP-8, a 5 to 12 inches thick layer of white ash was encountered at depths of approx. 5 and 4.5 feet BGS, respectively. The sandy soils at the site are eolian deposits and may exhibit some degree of collapse potential upon wetting. Test-pits logs in Appendix II show detailed descriptions and stratification of the soils encountered.

# 6.1 NRCS Soil Survey

The soil survey map of the site prepared by the Natural Resources Conservation Service (NRCS) identifies the near surface site soil as *Quincy loamy fine sand*, *0 to 15 percent slopes*. The parent material for this soil unit is described as *mixed eolian sands*. The typical soil profile for this unit is described as *loamy fine sand* over *fine sand*. According to the NRCS soils map (Soil Survey, Appendix V), the natural drainage class for this unit is described as *excessively drained*. NRCS data indicates that the capacity of the most limiting layer in these soils to transmit water (Ksat) High to very high (6 to 20 in/hr).

# 6.2 Groundwater

Groundwater was not encountered in the exploratory test-pits at the time of our exploration. To further assist in our evaluation, we reviewed the Washington Department of Ecology Well Log database of nearby well logs (see Appendix VI) to estimate groundwater levels in the vicinity. Based on our review of selected well logs, we anticipate the groundwater level to be greater than 50 feet BGS in the project vicinity. Groundwater levels likely fluctuate throughout the year with irrigation, precipitation, drainage, and regional pumping from wells, typically highest during the irrigation season and decreasing thereafter. Groundwater is not a factor in design and construction at this site.

# 6.3 Soil Liquefaction

Liquefaction is the loss of soil strength from sudden shock or vibration (usually earthquake shaking), causing the soil to become a fluid mass. Liquefaction results in a loss of soil strength and

can cause structures to settle or even overturn, if it occurs in the bearing zone. Soil liquefaction is a natural phenomenon that occurs when saturated granular soils (below the water table) are subjected to vibratory motions, causing an increase in the water pressure within soil pores, as the soil tends to reduce in volume. When the pore water pressure reaches the vertical effective stress, the soil particles become suspended in water causing a complete loss in soil strength.

Based on the *Liquefaction Susceptibility Map of Benton County, Washington* prepared by the Washington State Department of Natural Resources (see image below), the project site is mapped with a 'very low' potential for liquefaction susceptibility. A detailed site-specific liquefaction analysis for the project sites was beyond the scope of this investigation.



# 7.0 SOIL INFILTRATION TESTING

Infiltration testing was performed in test-pit TP-1 (IT-1) at a depth of 4 feet BGS. The infiltration test was conducted using a single ring infiltrometer consisting of a 2-foot section of a 12-inch diameter PVC pipe driven into the ground 12 inches at the test depth of 4 feet below ground surface (BGS). After an initial pre-soak period, a constant water level was maintained in the ring with the use of a float valve, and timed intervals of the water demand volumes were recorded. Continuous readings of the water volumes required to maintain the constant head were recorded until a relatively constant rate was achieved.

The test results are indicative of the infiltration characteristics of the subsurface soils encountered at the test location/depth using the specific test method. Un-factored field infiltration rate is presented in the following table:

Test ID	Test Location (Approx. GPS Coordinates)	Test Depth, BGS	Soil Type	Percent Fines (passing #200 sieve size)	Field Measured Infiltration Rate
TP-1 (IT-1)	46.245844° N, -119.076398° W	4 feet	Silty Sand	17	9.3 inches/hr

Table 3: Results of Infiltration Testing

An appropriate factor of safety should be applied to the field infiltration rates to determine longterm design infiltration rates. We recommend using a factor of safety of 2.5 or 3 be applied to the un-factored field measured rate. Determination of safety factors for long-term infiltration design should consider the following: pretreatment, potential for bio-fouling, system maintainability, horizontal and vertical variability of soils.

# 8.0 SUMMARY OF FINDINGS & CONCLUSIONS

Conditions imposed by the proposed development have been evaluated on the basis of assumed elevations and engineering characteristics of the subsurface materials encountered in the exploratory test-pits and their anticipated behavior both during and after construction. The following is a summary of key geotechnical considerations and findings based on the data obtained from a review of selected technical literature and the site evaluation.

- Based on this geotechnical evaluation and our understanding of the proposed development, from a geotechnical perspective, it is our opinion that the site is suitable for the proposed construction, provided that best management construction practices and the recommendations of this report are followed in the design and construction of this project.
- Project plans, including foundation and grading plans, were not provided at the time of this report. GNN should be engaged to review approximately 90% completed plans and specifications to provide revised recommendations if/as necessary.
- Site soils are generally uniform across the site and consist of silty sand overlying poorly graded sand with silt and poorly graded sand. The onsite sandy soils are eolian deposits and may exhibit some degree of collapse potential upon wetting. Over-excavation, scarification, moisture conditioning and re-compaction of onsite sandy soils are required to mitigate the risk of collapse potential.

- Groundwater was not encountered in any of the exploratory test-pits at the time of our exploration. Groundwater is not a factor in design and construction at this site.
- In our opinion, the proposed building may be supported on conventional shallow foundations bearing on a layer of imported crushed rock placed atop recompacted native sandy subgrade in accordance with the recommendations of this report.
- The underlying geologic condition for seismic design is site class 'D'. The *minimum* seismic design should comply with the 2018 International Building Code (IBC) and ASCE 07-16, Minimum Design Loads for Buildings and Other Structures.
- Site grading shall incorporate the requirements of IBC 2018 Appendix J Grading as adopted by the City of Pasco.
- Upon completion, all test-pit excavations were loosely backfilled with excavation spoils. The contractor is responsible to locate the test-pits to re-excavate the loose soils and re-place as compacted engineered fill.
- The onsite sandy soils, free of deleterious materials including roots and organic matter, are generally suitable for reuse as general fill and engineered fill and utility trench backfill.
- At the start of site grading, existing vegetation, roots, any artificial fill, trash and debris, and any abandoned underground utilities shall be fully removed from the areas of proposed construction.
- Near-surface site soils can be readily cut by normal grading equipment. The native sandy soils could be prone to caving and sloughing in open excavations. We anticipate excavation bank stability problems in deeper excavations due to the non-cohesive granular nature of the on-site soils.
- The near-surface fine-grained soils are susceptible to wind and water erosion when exposed during grading operations. Preventative measures and appropriate BMPs to control runoff and reduce erosion shall be incorporated into site grading plans.

# 9.0 GEOTECHNICAL RECOMMENDATIONS

The following geotechnical recommendations are based on our current understanding of the proposed project as described in Section 2.0 of this report. Note that Soil Design Parameters and Recommendations presented in this report are predicated upon appropriate geotechnical monitoring and testing of the site preparation and foundation and building pad construction by a representative of GNN's **Geotechnical-Engineer-of-Record (GER)**. Any deviation and nonconformity from this requirement may invalidate, partially or in whole, the following recommendations.

GNN should be engaged to review the geotechnical aspects of the approximately 90 percent plans and specifications (grading and foundation plans) to confirm that our recommendations were properly understood and implemented, and if required, provide revised, augmented, and/or additional geotechnical recommendations. We can be available to discuss these issues with the design team as the design develops and as-needed.

Our geotechnical recommendations are contingent upon good construction practices and a prudent quality control testing and inspection program. Poor construction techniques may alter conditions from those on which our recommendations are based and, therefore, result in reduced foundation bearing capacity and additional settlement.

# 9.1 Site Grading

Initial site preparation and earthwork operations will include clearing and grubbing, stripping, and cut and fill grading to establish subgrade elevation for the new school. Site grading shall incorporate the requirements of IBC 2018 Appendix J as adopted by the City of Pasco. Do not commence site clearing and grading operations until temporary erosion and sedimentation control measures are in place. A representative of the GER should observe site clearing, grading, over excavation and the bottoms of excavations before placing fills. Local variations in soil conditions may warrant increasing the depth of over-excavation and recompaction.

Surface vegetation, topsoil, and any other deleterious materials must be stripped from within and extending a minimum 5 feet beyond proposed development footprint. Based on our explorations, we estimate approximately 9 to 12 inches of material must be stripped from most areas; deeper and
possibly shallower stripping depths may be necessary as identified by a representative of the GER during construction. The strippings are not suitable for use in engineered fill. Strippings may be used in landscaped areas or deposed of off-site.

Seasonal weather conditions may adversely affect grading operations. To improve compaction efforts and prevent potential pumping and unstable ground conditions, we suggest performing site grading during dryer periods of the year.

Moisture conditioning of sandy soils (subgrade and fill soils) will be required to facilitate and achieve the required compaction. Uniformly moisten subgrade and each subsequent fill or backfill soil layer before compaction. Samples of onsite soils should be collected for laboratory proctor test to determine optimum moisture content prior to field compaction testing. For fill soils assume a tolerance of approximately 2% to 3% above optimum value unless compaction efforts prove a wider tolerance from optimum moisture content is acceptable to meet compaction requirements. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that is too wet to compact to the specified dry density.

Place backfill evenly adjacent to structures, piping, or conduit to required elevations. Wedging action shall be prevented of backfill against structures or displacement of piping or conduits by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

Soil conditions shall be evaluated by in-place density testing, visual evaluation, probing, and proof-rolling of the fills and re-compacted on-site soil as it is prepared to check for compliance with recommendations of this report. A moisture-density curve shall be established in accordance with ASTM D1557 method (Laboratory Compaction Characteristics of Soil Using Modified Effort) for all onsite soils and imported fill materials used as structural fill.

Each test pit was loosely backfilled during our site investigation. During site development, the earthwork contractor is required to re-excavate the test pits and backfill the excavations with suitable fill material and compact as appropriate for the location within the building/structure pads.

#### 9.2 Clearing and Grubbing

At the start of site grading, existing vegetation, roots, any artificial fill, trash and debris, and any abandoned underground utilities shall be **fully** removed from the areas of proposed construction. The surface shall be stripped of all topsoil and/or organic growth that may exist within the proposed development areas. The topsoil and organic rich soils shall either be stockpiled on-site separately for future use or be removed from the construction area. Depth of stripping can be minimized with real-time onsite observation of sufficient removals. Areas disturbed during clearing shall be properly backfilled and compacted as described below.

#### 9.3 Temporary Open Cuts

It shall be the responsibility of the contractor to maintain safe temporary slope configurations since the contractor is at the job site, able to observe the nature and conditions of the slopes, and able to monitor the encountered subsurface conditions. All temporary soil cuts for site excavations that are more than 4 feet deep should be adequately sloped back or supported to prevent sloughing and collapse in accordance with Washington Department of Occupational Safety and Health guidelines. The contractor and subcontractors shall be aware of, and familiar with, applicable local, state and federal safety regulations including the current OSHA Excavation and Trench Safety Standards, and OSHA Health and Safety Standards for Excavations, 29 CFR Part 1929, or successor regulations.

According to chapter 296-155 of the Washington Administrative Code (WAC), it is our opinion that the soil encountered at the site is classified as Type C soils. For excavation planning purposes, we recommend that temporary, unsupported, open cut slopes shall be no steeper than 1.5 feet horizontal to 1.0 feet vertical (1.5H:1V) in Type C soils. No heavy equipment should be allowed near the top of temporary cut slopes unless the cut slopes are adequately braced. Final (permanent) fill slopes should be graded to an angle of 2H:1V or flatter. We recommend that permanent slopes be hydroseeded and/or planted with vegetation after construction.

The onsite sandy soils are prone to caving and sloughing in open excavations. Excavation stability may be achieved by sloping excavation banks or widening shallow excavations in the anticipation of caving. Deeper excavations may require external support such as shoring or bracing to provide excavation bank stability. We recommend protecting slopes with waterproof covering during periods of wet weather to reduce sloughing and erosion.

#### 9.4 Utility Excavation, Pipe Bedding and Trench Backfill

To provide suitable support and bedding for the pipe, we recommend the utilities be founded on suitable bedding material consisting of clean sand and/or sand & gravel mixture. To minimize trench subgrade disturbance during excavation, the excavator should use a smooth-edged bucket rather than a toothed bucket.

Pipe bedding and pipe zone materials shall conform to Section 9-03.12(3) of the Washington State Department of Transportation (WSDOT) 2018 Standard Specifications. Pipe bedding should provide a firm uniform cradle for support of the pipes. A minimum 4-inch thickness of bedding material beneath the pipe should be provided. Prior to installation of the pipe, the pipe bedding should be shaped to fit the lower part of the pipe exterior with reasonable closeness to provide uniform support along the pipe. Pipe bedding material should be used as pipe zone backfill and placed in layers and tamped around the pipes to obtain complete contact. To protect the pipe, bedding material should extend at least 6 inches above the top of the pipe.

Placement of bedding material is particularly critical where maintenance of precise grades is essential. Backfill placed within the first 12 inches above utility lines should be compacted to at least 90% of the maximum dry density (ASTM D1557), such that the utility lines are not damaged during backfill placement and compaction. In addition, rock fragments greater than 1 inch in maximum dimension should be excluded from this first lift. The remainder of the utility excavations should be backfilled and compacted to 95% of the maximum dry density as determined by ASTM D1557.

Compaction of backfill material should be accomplished with soils in the range of 2-3% above optimum moisture content in order to achieve the minimum specified compaction levels recommended in this report. Backfill operations shall be observed and tested to monitor compliance with these recommendations.

#### 9.5 Suitability of the Onsite Soils as Engineered Fill

The onsite sandy soil, free of deleterious materials including roots and organic matter, is generally suitable for use as general fill, engineered fill and backfill. The onsite soils should be placed in maximum 8-inch thick loose lifts and each lift compacted to at least 95% of the maximum dry

density as determined by ASTM D1557 at an effective and workable moisture content. We anticipate the onsite soils could require moisture range of 2 to 3% above the optimum value.

#### 9.6 Imported Fill Soils

If needed, imported fill soils should be non-expansive, granular soils meeting the USCS classifications of SM, SP-SM, or SW-SM with a maximum rock size of 4 inches, minimum 70% passing the No. 4 sieve size, and 5 to 15% passing the No. 200 sieve (fines shall be non-plastic). The GER should evaluate and approve the import fill soils before hauling to the site.

#### 9.7 Compaction Requirements for Engineered Structural Fill

All fill or backfill shall be approved by a representative of the GER, placed in uniform lifts, and compacted to a minimum 95% of the maximum dry density as determined by ASTM D1557. The compaction effort must be verified by a representative of the GER in the field using a nuclear density gauge in accordance with ASTM D6938. The thickness of the loose, non-compacted, lift of structural fill shall not exceed 8 inches for heavy-duty compactors or 4 inches for hand operated compactors.

### 9.8 Imported Crushed Rock Structural Fill

Imported crushed rock structural fill shall consist of well-graded, crushed aggregate material meeting the grading requirements of WSDOT 2018 Standard Specifications, Section 9-03.9(3) (1-1/4 inch minus Base Course Material) presented here:

Sieve Size	Percent Passing (by Weight)											
1 <sup>1</sup> /4 Inch Square	99 - 100											
1 Inch Square	80 - 100											
5/8 Inch Square	50 - 80											
U.S. No. 4	25 - 45											
U.S. No. 40	3 – 18											
U.S. No. 200	Less than 7.5											

 Table 4: WSDOT Standard Spec. 9-03.9(3)

A fifty (50) pound sample of each imported fill material shall be collected by GNN personnel prior to placement to ensure proper gradation and establish the moisture-density relationship (proctor curve).

#### 9.9 Building Pad and Foundation Subgrade Preparation

To reduce the potential for collapse and the risk of differential settlement, we recommend that the subgrade soils should be over-excavated, moisture conditioned, and re-compacted. Loose surficial and subgrade soils within the proposed building pad (building footprint) and foundation areas <u>must</u> be over-excavated to a minimum depth of two (2) feet below the bottom of the deepest proposed footings. The over-excavations should be uniform across the entire building pad footprint and extend a minimum lateral distance of five (5) feet beyond the outer edge of all footings/building pad.

Due to relatively loose and dry sandy soils encountered at the site, it is necessary that the entire building footprint overexcavation should receive sufficient moisture conditioning with the use of a temporary water sprinkler array or other mechanical means to provide appropriate moisture penetration. Moisture conditioning should be monitored by a representative of the Geotechnical Engineer. Following completion of moisture conditioning efforts, the exposed surface should be scarified to a depth of 12 inches and compacted with heavy vibratory compaction equipment to at least 95% relative dry density as determined by ASTM D1557 and to a dense and non-yielding surface prior to placement of engineered structural fill. Any soft area(s) encountered during compaction shall be over-excavated an additional 12 inches and replaced with engineered structural fill.

Following confirmation by a representative of the GER of a competent, moisture conditions, dense and non-yielding improved subgrade, the overexcavation shall be backfilled with onsite sourced sandy soils place as engineered structural fill as described in Section 9.7 above with each lift compacted to a minimum 95% of the maximum dry density as determined by ASTM D1557 method. Allowance shall be made for placement of a minimum 12-inch layer of compacted imported crushed rock beneath all footings and interior load bearing elements.

Prior to placing the crushed rock, the prepared subgrade surface shall be proof-rolled using a 30-ton tandem axle loaded dump truck in the presence of a representative of the GER to verify firm and unyielding conditions. Using a <sup>1</sup>/<sub>2</sub> inch diameter steel T-probe, the geotechnical inspector shall probe the surface. If the T-probe readily penetrates the subgrade fill material, it shall indicate unsatisfactory compaction. In addition, elastic movement in excess of <sup>3</sup>/<sub>4</sub>" inch with substantial

cracking or substantial lateral movement during proof-rolling should also be considered a sign of unsatisfactory compaction. Any areas displaying pumping or deflection during proof-rolling shall be over-excavated and recompacted.

#### 9.10 Foundation Bearing Support & Allowable Bearing Capacity

In our opinion, the proposed building may be supported on conventional shallow foundations bearing on a layer of imported crushed rock placed atop the improved recompacted/engineered fill subgrade as described above. The minimum footing depth shall be 24 inches below adjacent grades for frost protection and bearing capacity considerations. Foundations shall not be designed and constructed to straddle a cut-to-fill transition condition.

All foundations shall bear on a minimum of 12-inch compacted layer of 1<sup>1</sup>/<sub>4</sub>-inch minus imported crushed rock structural fill meeting the grading requirements of Section 9.8 above. The crushed rock shall be compacted to at least 95% of the maximum relative proctor dry density. Crushed rock shall be placed on an improved and stable subgrade that has been moisture-conditioned, densified and recompacted. The crushed rock shall extend horizontally minimum 24 inches beyond all sides of the foundations.

Footings constructed in accordance with the above recommendations may be designed for an allowable **2,000 pounds per square foot (psf)** bearing pressure. The allowable bearing pressure presented above may be increased by 1/3 for short-term, transient loading conditions.

Provided footing subgrades are prepared in accordance with the recommendations presented in this report, based on theory of elasticity using assumed structural loading, we estimate total foundation settlements of approximately 1-inch, with differential settlement less than half that magnitude between adjacent columns and along approximately 20 feet of continuous footings. We assume there is no stress overlap from adjacent footings. Footings located less than two times the footing width (2B) from each other will increase stresses beneath the adjacent footing, resulting in increased settlement. We expect elastic settlements to generally occur as loads are applied.

Lateral forces on foundations from short term wind and seismic loading would be resisted by friction at the base of foundations and passive earth pressure against the buried portions. We recommend an allowable passive earth pressure for compacted onsite fill of **225 psf per foot** of

embedment depth at depths greater than 2 feet below adjacent grades. We recommend a coefficient of friction of **0.45** be used between cast-in-place concrete and imported crushed rock.

The passive earth pressure and friction components may be combined, provided the passive component does not exceed two-thirds of the total. The lateral resistance values include a factor of safety of 1.5.

#### 9.11 Slab-on-Grade Floors

A minimum 6-inch layer of <sup>3</sup>/<sub>4</sub>" minus crushed aggregate fill shall be placed beneath the slabs. The crushed rock shall be placed on an improved recompacted/engineered fill subgrade as described in Section 9.9 above. The crushed aggregate material shall meet the WSDOT Specification section 9-03.9 (3), "Crushed Surfacing Top Course", with less than 5 percent passing the No. 200 sieve (fines). The crushed rock material shall be compacted to at least 95% of the maximum dry density as determined by the ASTM D1557 method. We recommend a modulus of subgrade reaction equal to **120 pounds per cubic inch (pci)** based on a value for gravel presented in the Portland Cement Association publication No. EB075.01D. Slab thickness, reinforcement and joint spacing shall be determined by a licensed engineer based on the intended use and loading.

An appropriate vapor retarder (15-mil polyethylene liner) shall be used (ASTM E1745/E1643) beneath areas receiving moisture sensitive resilient flooring/VCT where prevention of moisture migration through slab is essential. The slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder. The architect shall determine the need and use of a vapor retarder.

#### 9.12 Lateral Earth Pressure

We recommend the following lateral earth pressures, in terms of equivalent fluid pressure, for design of retaining walls or below-grade structures, these pressure values assume drained condition:

#### At-Rest = 60 psf/ft of embedment

#### Active = 40 psf/ft of embedment

We assume that the structural wall backfill is adequately drained to avoid saturation and introduction of hydrostatic pressures. For calculation of active pressures, we assume that the wall can deflect in order to develop an active condition. Use at-rest pressures for restrained or braced

walls. The horizontal resultant force (pressure x H/2 where H is height of buried wall) should be applied at an H/3 distance from the base of the wall.

If any surface, surcharge loads are closer than one-half of the wall height (horizontal distance) to the edge of the below-grade and/or retaining wall, increase the design wall pressure by q/2 over the whole area of the retaining wall. In this expression, q is the surface surcharge load in psf. GNN should review anticipated surcharge loading to confirm that the appropriate design values are considered. The horizontal surcharge resultant force (pressure x H where H is height of buried wall) should be applied at an H/2 distance from the base of the wall.

#### 9.13 Flexible Pavement

Pavement subgrade soils are generally expected to consist of the native silty sand or poorly graded sand. A California Bearing Ratio (CBR) value of 5 has been estimated for the onsite soils for use in the pavement analysis. Using an empirical relationship, this CBR value corresponds to a resilient modulus value of approximately 7,500 psi. Pavement analyses are based on *1993 AASHTO Guide for Design of Pavement Structures*. Table 5 presents recommended flexible pavement sections for this project:

Traffic Application	Asphalt Thickness (inches)	Crushed Aggregate Base Course (inches)	Subgrade
Heavy Duty <sup>†</sup>	4	12*	upper min. 12 inches scarified, moisture conditioned and re-compacted to at least
Standard Duty <sup>††</sup>	2.5	8*	95% of the maximum dry density as determined by ASTM D1557

 Table 5: Recommended Asphalt Concrete Paving Sections

<sup>†</sup>Heavy duty applies to pavement section for entrance drives, bus drop-off, and trash enclosure drive lanes <sup>†</sup>Standard duty applies to general parking areas

\*The upper 2" of crushed rock should be top course rock placed over the base course layer

Pavement design recommendations assume proper and positive drainage and construction monitoring and are based on AASHTO Design parameters for a 20-year design period. Asphalt pavements tend to develop thermal and fatigue cracking over time from environmental factors and traffic loads. Asphalt, being a viscoelastic material, weakens from temperature influx. Timely preventative measures for continual flexible maintenance such as crack filling and seal coating at 8-10 year intervals to control the progression of surface cracking and distress to prevent water from infiltrating into the base course and subgrade shall be considered. Performing this intermediate level of maintenance will net at least a 20-year service life/performance life

Soils containing roots or organic materials shall be completely removed from the proposed paved areas prior to subgrade construction. The upper 12 inches of subgrade soils beneath the pavement section shall be scarified, moisture conditioned and re-compacted to at least 95% of the maximum dry density as determined by ASTM D1557. All fills used to raise low areas must be compacted onsite soils or structural gravel fill and shall be placed under engineering control conditions. The finished surface shall be smooth, uniform and free of localized weak/soft spots. All subgrade deficiency corrections and drainage provisions shall be made prior to placing the aggregate base course. All underground utilities shall be protected prior to grading.

The HMAC utilized for the project should be designed and produced in accordance with Section 5-04 Hot Mix Asphalt of the WSDOT 2018 Standards Specifications. Aggregate Base material shall comply with Section 9-03.9(3) Crushed Surfacing of the *WSDOT 2018 Standards Specifications*. Aggregate base or pavement materials should not be placed when the surface is wet.

#### 9.14 Exterior Non-Structural Flatwork

The use of conventional design and construction techniques is expected to be feasible for general non-structural exterior site flatwork around the building. We recommend that the subgrade soils shall be scarified to a minimum depth of 12 inches, then moisture-conditioned to near optimum, and compacted to minimum 95% of the maximum dry density per D1557 and to a non-yielding surface. Any soft spots encountered during compaction shall be over-excavated an additional 12 inches and replaced with onsite sandy engineered structure fill.

For non-structural PCC flatwork (sidewalks/walkways) we recommend placing a minimum 4 inches of crushed aggregate base course over compacted subgrade. The thickness PCC shall be 4 inches.

#### 9.15 Subgrade Inspection and Compaction Verification

A representative of our Geotechnical engineer (soils inspector) shall be onsite during earthwork to inspect and test subgrade and each fill layer. Proceed with subsequent earthmoving only after

inspections confirm previously completed work complies with requirements of this report. Inspections and tests include:

- 1. Determine prior to placement of fill that subgrade has been prepared in compliance with requirements of this Geotechnical Report.
- 2. Determine that fill material and maximum lift thickness and moisture comply with requirements of this Geotechnical Report.
- 3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements of this Geotechnical Report.

When the soils inspector indicates that subgrades, and fills have not achieved subgrade acceptance criteria or degree of compaction specified, scarify, and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

#### 9.16 Subgrade Protection

The degree to which construction grading problems develop is expected to be dependent, in part, on the time of year that construction proceeds and the precautions which are taken by the contract to protect the subgrade. We recommend that the site shall be graded to prevent water from ponding within construction areas and/or flowing into excavations. Accumulated water must be removed immediately along with any unstable soil. Foundation concrete should be placed and excavations backfilled as soon as possible to protect the bearing grade.

#### 9.17 Wet Weather Conditions

The onsite soils may be susceptible to pumping during wet weather when excessively wet and disturbed by construction traffic. Soil disturbance will negatively impact the soil's performance below slabs, pavement, and hardscape. Fine silty sand and sandy soils are susceptible to erosion in the presence of moving water. During or subsequent to wet weather, compacting the on-site soils may be difficult. If earthwork takes place in wet weather or wet conditions, the following recommendations should be followed:

• Earthwork should be accomplished in small sections and carried through to completion to reduce exposure to wet weather. Soils that become too wet for compaction should be removed and replaced with clean, granular material.

- The construction area ground surface should be sloped and sealed to reduce water infiltration, to promote rapid runoff, and to prevent water ponding.
- To prevent soil disturbance, the size or type of equipment may have to be limited.
- Work areas and stockpiles should be covered with plastic. Straw bales, straw wattles, geotextile silt fences, and/or other measures should be used as appropriate to control soil erosion.

Excavation and structural fill placement should be observed on a full-time basis by a representative of our Geotechnical Engineer to determine that unsuitable materials are fully removed and that suitable compaction and site drainage is achieved.

#### 9.18 Surface Drainage

With respect to surface water drainage, we recommend that the ground surface be sloped to drain away from the structure. Final exterior site grades shall promote free and positive drainage from the building areas. Water shall not be allowed to pond or to collect adjacent to foundations or within the immediate building area. We recommend that a gradient of at least 5% for a minimum distance of 10 feet from the building perimeter be provided, except in paved locations. In paved areas, a minimum gradient of 1% should be provided unless provisions are included for collection/disposal of surface water adjacent to the structure. Catch basins, drainage swales, or other drainage facilities should be aptly located. All surface water such as that coming from roof downspouts and catch basins be collected in tight drain lines and carried to a suitable discharge point, such as a storm drain system. Surface water and downspout water should not discharge into a perforated or slotted subdrain, nor should such water discharge onto the ground surface adjacent to the building. Cleanouts should be provided at convenient locations along all drain lines.

#### **10.0 CONTINUING GEOTECHNICAL SERVICES**

GNN recommends that the Client should maintain an adequate program of geotechnical consultation, construction monitoring, and soils testing during the final design and construction phases to monitor compliance with GNN's geotechnical recommendations. <u>Maintaining GNN as</u> the geotechnical consultant from beginning to end of the project will provide continuity of <u>services</u>. If GN Northern, Inc. is not retained by the owner/developer and/or the contractor to provide the recommended geotechnical inspections/observations and testing services, the geotechnical engineering firm or testing/inspection firm providing tests and observations shall assume the role and responsibilities of Geotechnical Engineer-of-Record.

GNN can provide construction monitoring and testing as additional services. The costs of these services are not included in our present fee arrangement, but can be obtained from our office. The recommended construction monitoring and testing includes, but is not necessarily limited to, the following:

- > Consultation during the design stages of the project.
- Review of the grading and drainage plans to monitor compliance and proper implementation of the recommendations in GNN's Report.
- Observation and quality control testing during site preparation, grading, and placement of engineered fill as required by the local building ordinances.
- > Geotechnical engineering consultation as needed during construction.

#### 11.0 LIMITATIONS OF THE GEOTECHNICAL SITE INVESTIGATION REPORT

This GEOTECHNICAL SITE INVESTIGATION REPORT ("Report") was prepared for the exclusive use of the Client. GN Northern, Inc.'s (GNN) findings, conclusions and recommendations in this Report are based on selected points of field exploration, laboratory testing, and GNN's understanding of the proposed project at the time the Report was prepared. Furthermore, GNN's findings and recommendations are based on the assumption that soil, rock and/or groundwater conditions do not vary significantly from those found at specific exploratory locations. Variations in soil, bedrock and/or groundwater conditions may not become evident until during or after construction. Variations in soil, bedrock and groundwater may require additional studies, consultation, and revisions to GNN's recommendations in the Report.

In many cases the scope of geotechnical exploration and the test locations are selected by others without consultation from the geotechnical engineer/consultant. GNN assumes no responsibility and, by preparing this Report, does not impliedly or expressly validate the scope of exploration and the test locations selected by others.

This Report's findings are valid as of the issued date of this Report. However, changes in conditions of the subject property or adjoining properties can occur due to passage of time, natural processes, or works of man. In addition, applicable building standards/codes may change over time. Accordingly, findings, conclusions, and recommendations of this Report may be invalidated, wholly or partially, by changes outside of GNN's control. Provided that the site conditions are not disturbed or altered after the planned grading is completed, the report will be valid for a period of 3 years from the issued date of the Report.

In the event that any changes in the nature, design, or location of structures are planned, the findings, conclusions and recommendations contained in this Report shall not be considered valid unless the changes are reviewed by GNN and the findings, conclusions, and recommendations of this Report are modified or verified in writing.

This Report is issued with the understanding that the owner or the owner's representative has the responsibility to bring the findings, conclusions, and recommendations contained herein to the attention of the architect and design professional(s) for the project so that they are incorporated

into the plans and construction specifications, and any follow-up addendum for the project. The owner or the owner's representative also has the responsibility to verify that the general contractor and all subcontractors follow such recommendations during construction. It is further understood that the owner or the owner's representative is responsible for submittal of this Report to the appropriate governing agencies. The foregoing notwithstanding, no party other than the Client shall have any right to rely on this Report and GNN shall have no liability to any third party who claims injury due to reliance upon this Report, which is prepared exclusively for Client's use and reliance.

GNN has provided geotechnical services in accordance with generally accepted geotechnical engineering practices in this locality at this time. GNN expressly disclaims all warranties and guarantees, express or implied.

Client shall provide GNN an opportunity to review the final design and specifications so that earthwork, drainage, and foundation recommendations may be properly interpreted and implemented in the design and specifications. If GNN is not accorded the review opportunity, GNN shall have no responsibility for misinterpretation of GNN's recommendations.



## **APPENDICES**



## Appendix I

<u>Vicinity Map (Figure 1)</u> Site Exploration Map (Figure 2)



FIGURE 1: VICINITY MAP





## Appendix II

<u>Exploratory Test-Pit Logs</u> <u>Key Chart (for Soil Classification)</u>





₫	5	GN 722 Yak Tele	Northern, N. 16th A ima, WA 9 phone: (5	Inc Ave Suite 31 99802 509) 248-9798	TEST PIT NUMBER TP-3 PAGE 1 OF 1
CLIE	NT Pasco	o Scho	ol District		PROJECT NAME New Innovation High School
PRO.		BER	223-1666	6	PROJECT LOCATION Salt Lake Street & Utah Avenue, Pasco, WA
	E STARTE	<b>D</b> _6/2	28/23	COMPLETED _6/28/23	GROUND ELEVATION _433 ft TEST PIT SIZE _30 x 72 inches
		CONTI	RACTOR	DDB, LLC	GROUND WATER LEVELS:
		ИЕТН	DD XCM	IG XE55U Mini excavator	AT TIME OF EXCAVATION
	GED BY	ABC		CHECKED BY IM	AT END OF EXCAVATION
	<b>S</b> Approx	x. GPS	Coords.:	46.245085,-119.076670	AFTER EXCAVATION
DEPTH DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION
2.5	SM GB	SM SP- SM	2.5	SILTY SAND, (SM) gray brown, fin	e grained, damp, appears loose to medium dense SILT, (SP-SM) gray brown, fine grained, damp, appears medium dense
	1			)	425.0
				POORLY GRADED SAND, (SP) g	ray brown, fine grained, damp, appears medium dense
· _ز از	1				
<u>-</u>	1	SP			
- 1	SM				
10.0	تلا GB			.0	423.0
ואבואאב מרו / וד / אבבגב - פוואו סוט טס באם.סב				- Groundwater not encountered at - Referenced elevations are approx	imate and based on Google Earth topography Bottom of test pit at 10.0 feet.





¢	6	GN 722 Yak Tele	Northen N. 16th ima, WA	n, Inc h Ave Suite 31 A 99802 (509) 248-9798	TEST PIT NUMBER TP-6 PAGE 1 OF 1
	T <u>Pasco</u> ECT NUM	BER	ol Distrio 223-16	ct 666 COMPLETED 6/28/23	PROJECT NAME _ New Innovation High School     PROJECT LOCATION _ Salt Lake Street & Utah Avenue, Pasco, WA     CROUND ELEVATION _ 421 ft
					GROUND ELEVATION <u>421 it</u> TEST PIT SIZE <u>30 x 72 inches</u>
				MG XE5511 Mini excavator	
			Coords	s : 46 244628 -119 077130	
				3 40.244020,-110.077100	
o DEPTH o (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION
		SM SP- SM		SILTY SAND, (SM) gray brown, fin	e grained, damp, appears loose to medium dense 418.0 JILT, (SP-SM) light gray brown, fine grained, damp, appears medium dense
7.5			8	3.0	413.0
		SP		FOURLT GRADED SAND, (SP) gr	ay brown, nne grameu, uamp, appears meulum dense
10.0			1	10.0	411.0
				- Groundwater not encountered at t - Referenced elevations are approxi	imate and based on Google Earth topography Bottom of test pit at 10.0 feet.



7	Ţ.	GN 722 Vak	Northe N. 16th	rn, Inc n Ave Si	uite 31	TEST PIT NUMBER TP-8 PAGE 1 OF 1
-		Tele	ephone:	(509) (	2 248-9798	
CLIEN	IT Pasco	Scho	ol Distr	ict		PROJECT NAME New Innovation High School
		BER	223-16	666		PROJECT LOCATION Salt Lake Street & Utah Avenue, Pasco, WA
	STARTE	D <u>6/2</u>	28/23		COMPLETED	GROUND ELEVATION 419 ft TEST PIT SIZE 30 x 72 inches
					B, LLU	
	S Appro	x. GPS	S Coord	s.: 46.2	45690119.077051	AFTER EXCAVATION
DEPTH DEPTH DEPTH	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG			MATERIAL DESCRIPTION
		SM		4.5	SILTY SAND, (SM) gray brown, find	e grained, damp, appears loose to medium dense
		SP- SM		<u>1.5</u>	POORLY GRADED SAND WITH S	SILT, (SP-SM) gray brown, fine grained, damp, appears medium dense
5.0				<u>5.5                                   </u>	white ash layer ~8" to 12" thick	w brown to gray fing grained damp appage medium dappa with interbedded
					Poorly Graded Sand with Silt (SP-S	M)
		SP				
10.0				10.0	- Groundwater not encountered at t	ime of excavation 409.0
					- Referenced elevations are approxi	imate and based on Google Earth topography Bottom of test pit at 10.0 feet.



## **KEY CHART**

		<b>RELATIVE DENSITY OR CONSIS</b>	STENCY VERSU	S SPT N-VALU	E
	COARSE-0	GRAINED SOILS		FINE-GRAD	INED SOILS
DENSITY	N (BLOWS/FT)	FIELD TEST	CONSISTENCY	N (BLOWS/FT)	FIELD TEST
Very Loose	0-4	Easily penetrated with <sup>1</sup> / <sub>2</sub> -inch reinforcing rod pushed by hand	Very Soft	0 – 2	Easily penetrated several inches by thumb
Loose	4 - 10	Difficult to penetrate with <sup>1</sup> /2-inch reinforcing rod pushed by hand	Soft	2-4	Easily penetrated one inch by thumb
Medium -Dense	10 - 30	Easily penetrated with <sup>1</sup> / <sub>2</sub> -inch rod driven with a 5-lb hammer	Medium-Stiff	4 – 8	Penetrated over <sup>1</sup> / <sub>2</sub> -inch by thumb with moderate effort
Dense	30 - 50	Difficult to penetrate with ½-inch rod driven with a 5-lb hammer	Stiff	8 – 15	Indented about <sup>1</sup> /2-inch by thumb but penetrated with great effort
Varu Danca	> 50	penetrated only a few inches with 1/2-inch	Very Stiff	15 - 30	Readily indented by thumb
very Dense	> 50	rod driven with a 5-lb hammer	Hard	> 30	Indented with difficulty by thumbnail

		USCS SOIL C	LAS	SIFIC	ATION		LOGS	SYMBOLS
	MAJOR DIVIS	IONS			GROUP DESCRIPTION	X	2S	2" OD Split
	Gravel and	Gravel	62	GW	Well-graded Gravel			3" OD Split
MAJOE       MAJOE       Gravel     Gravel       Grained     Gravelly       Soils     4 siev       <50%	Gravelly Soils	(with little or no fines)	12	GP	Poorly Graded Gravel		3S	Spoon
Grained	< 50% coarse fraction passes	Gravel		GM	Silty Gravel		NS	Non-Standard
Soils	#4 sieve	(with >12% fines)		GC	Clayey Gravel			Spiit Spoon
<50%	Sand and	Sand		SW	Well-graded Sand		ST	Shelby Tube
passes #200	Sandy Soils	(with little or no fines)		SP	Poorly graded Sand		CR	Core Run
SIEVE	fraction passes	Sand		SM	Silty Sand		PC	Pag Sampla
	#4 sieve	(with >12% fines)	[]]	SC	Clayey Sand		bU	
Fine-	Silt	and Claw		ML	Silt		TV	Reading
Grained	Liquid	Limit < 50		CL	Lean Clay	Т	рр	Penetrometer
Solis	1			OL	Organic Silt and Clay (low plasticity)			Reading
>50%	Silts	and Clay		MH	Inorganic Silt		NR	No Recovery
passes #200 sieve	Liquid	Limit > 50		СН	Inorganic Clay	$\Box$		
51070				OH	Organic <b>Clay</b> and <b>Silt</b> (med. to high plasticity)		GW	Table
	Highly Organic	Soils	Ð	РТ	Peat Top Soil	Ţ		

Mod	IFIERS		MOISTURE CONTENT		
DESCRIPTION	RANGE	DESCRIPTION	FIELD OBSERVATION		CLA
Trace	<5%	Dry	Absence of moisture, dusty, dry to the touch		]
Little	5% - 12%	Moist	Damp but not visible water	1	Gro
Some	>12%	Wet	Visible free water	1.	010

	MAJOR DIVISIONS WITH GRAIN SIZE														
SIEVE SIZE															
1	2"	3" 3/4	4" 4	4 1	0	40	200								
			GRAIN	SIZE (INCH	ES)										
1	2	3 0.7	75 0.	19 0.0	079 0.0	171 0.	0029								
Pouldars	Cobblas	Gra	ivel		Sand		Silt and Clay								
Bounders	Cobbles	Coarse	Fine	Coarse	Medium	Fine	Sint and Cray								

#### SOIL SSIFICATION INCLUDES

- oup Name
- Group Symbol 2.
- Color 3.
- 4. Moisture content
- Density / consistency 5.
- 6. Cementation
- 7. Particle size (if applicable)
- 8. Odor (if present)
- 9. Comments

Conditions shown on boring and testpit logs represent our observations at the time and location of the fieldwork, modifications based on lab test, analysis, and geological and engineering judgment. These conditions may not exist at other times and locations, even in close proximity thereof. This information was gathered as part of our investigation, and we are not responsible for any use or interpretation of the information by others.



## **Appendix III**

Laboratory Testing Results

	N	5	GN 722 Yał	l North 2 N. 10 kima, '	hern 6th A WA	, Inc Ave 998	c Suite 802	e 31	08																		Ģ	ŝR	2A	IN	SI	Z	EI	DI	IS	TF	RIE	3UT	'IC	DN
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	TP-2	2		;	3.0			2			0.4	429	)			0.'	19			(	0.0	79				0.0	0			9	)1.1						8	.9		
*	TP-4	•			9.0		4	.75			0.1	154	1 1			0.0	99					45				0.0	0			3	57.9						12	<u>.1</u>		
╝	12-5	)			<b>5.</b> 0			2			υ.:	329	1			υ.2	19			(	1.1	45				<b>U</b> .(	U			ć	16.0						3	.9		



GN Northern, Inc 722 N. 16th Ave Suite 31 Yakima, WA 99802 Telephone: (509) 248-9798

#### **GRAIN SIZE DISTRIBUTION**





## **Appendix IV**

Site & Exploration Photographs



View of site conditions near test-pit TP-1 / IT-1looking south



Infiltration test performed within test-pit TP-1 / IT-1



View of site conditions near test-pit TP-2 looking southeast



Subsurface soil profile within test-pit TP-2



View of site conditions near test-pit TP-3 looking west

Subsurface soil profile within test-pit TP-3

PLATE 1: SITE & EXPLORATION PHOTOGRAPHS



View of site conditions looking west from test-pit TP-5

Subsurface soil profile within test-pit TP-5



PLATE 2: SITE & EXPLORATION PHOTOGRAPHS



View of site conditions looking east from test-pit TP-7



View of site conditions looking north from test-pit TP-7



Subsurface soil profile within test-pit TP-7



View of site conditions looking south from test-pit TP-8



View of site conditions near test-pit TP-8 looking north



Subsurface soil profile within test-pit TP-8

PLATE 3: SITE & EXPLORATION PHOTOGRAPHS



# Appendix V

NRCS Soil Survey


United States Department of Agriculture

NRCS

Natural Resources Conservation Service A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Franklin County, Washington

Pasco School District New Innovation High School Location Pasco, WA



### Custom Soil Resource Report Soil Map



### Franklin County, Washington

### 89—Quincy loamy fine sand, 0 to 15 percent slopes

### **Map Unit Setting**

National map unit symbol: 2dtt Elevation: 350 to 1,200 feet Mean annual precipitation: 6 to 12 inches Mean annual air temperature: 48 to 54 degrees F Frost-free period: 150 to 200 days Farmland classification: Farmland of statewide importance

### **Map Unit Composition**

*Quincy and similar soils:* 85 percent *Minor components:* 15 percent *Estimates are based on observations, descriptions, and transects of the mapunit.* 

### **Description of Quincy**

#### Setting

Landform: Terraces Parent material: Mixed eolian sands

### **Typical profile**

*H1 - 0 to 4 inches:* loamy fine sand *H2 - 4 to 60 inches:* fine sand

### **Properties and qualities**

Slope: 0 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 3 percent
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

#### Interpretive groups

Land capability classification (irrigated): 3e Land capability classification (nonirrigated): 7e Hydrologic Soil Group: A Ecological site: R007XY140WA - Sands Hydric soil rating: No

#### **Minor Components**

### Sagehill

Percent of map unit: 15 percent Landform: Dunes, terraces Hydric soil rating: No



# **Appendix VI**

Washington Department of Ecology Well Logs

File Depa	Original with artment of Ecology		WATER W	/ELL REP	OR	т		1045 AFH	19 010
Seco Third	ond Copy - Owner's Co d Copy - Dritler's Copy	ру	STATE C	F WASHINGTON		Water F	Right Permit No		
(1)	OWNER: Name	latheson	Paintin	1	Addr	ess_815	N Oregon	PUSCE	> W
(2)	LOCATION OF WEL	L: County Fran	nklin			1/4 56	1/4 Sec 20 T 9	N.R. 30	Э wм
(2a)	STREET ADDRESS	OF WELL: (or neare	st address)						
	TAX PARCEL NO.:								
(3)	PROPOSED USE:	Domestic Irrigation DeWater	<ul> <li>Industrial</li> <li>Test Well</li> </ul>	<ul> <li>Municipal</li> <li>Other</li> </ul>		(10) WELL I Formation: De the kind and r	OG or DECOMMISSIONING PP escribe by color, character, size of nature of the material in each stra	OCEDURE DE material and st tum penetrated.	SCRIPTION ructure, and with at leas
(4)	TYPE OF WORK:	Owner's number of	well (if more than or	19)	-	one entry for	each change of information. Indica	ate all water end	ountered.
		X New Well	Method:	Bored		<u></u>	MATERIAL	FROM	то
		Reconditioned     Decommission	Cable	Driven		Sidit	Tan		5
(5)		Dispeter of well	A Hotary		abaa				
,	Dritled 80	feet. Depth of com	pleted well 7	8	ft.	Send	Black	5	7
6)	CONSTRUCTION DE	TAILS							
	Casing Installed:	6.	Diam from	2" # to 73	t ft.	S4nd	Black groud	7	123
	Liner installed		Diam. from	ft. to	ft.	Soud	Black	22	44
	L Inreaded		Diam. from	ft. to	π.	Jana		$+\sim$	
	Perforatione.	T Vac (21 No				Gravel	1 Sund Bluck	44	78
	Type of perforator use	Lites Ng 140				water	Benny C 64 A		
	SIZE of perforations		in. by		in.		· · · · · · · · · · · · · · · · · · ·		
	·	perfora	itions from	ft. to	ft.	Sand T	the grand	78	80
	DiamS Gravel/Filter packed Material piaced fromS Surface seal: Material used in seal Did any strata contain Type of water? Method of sealing stra	Iot Size	from	ft. to	ft. ft. ft.				
7)	PUMP: Manufacturer	's Name							
	Туре:			Н.Р					
(8)	WATER LEVELS: La Static tevel Artesian pressure Artesian water is cont	nd-surface elevation	above mean sea eve _ft. below top of vell _lbs, per square nch	Date 5 - 20	0	Work Started_	<u>5-(, CO</u> . Complet	ed <u>5-2</u>	_00_
			(Cap, valve, etc	:.)		WELL CONST	<b>FRUCTION CERTIFICATION:</b>		
(9)	WELL TESTS: Drawn Was a pump test mac Yield:gal./m Yield:gal./m Yield:gal./m Recovery data (time t well top to water level Time Water L  Date of test Baller test	20wn is amount wate ie?YesNo in. with in. with in. with aken as zero when pro- evel Time  cal (min. with	r level is lowered belo If yes, by whom?ft, drawdown ft, drawdown ft, drawdown Jmp turned off) (wate Water Level 	n after n after n after n after r level measured from Time Water I	hrs. _hrs. _hrs. n Level	I constructe compliance and the info Type or Print Trainee Nam Drilling Com (Signed) Address Contractor's	d and/or accept responsibility for with all Washington well construct rmation reported above are true to the the state of the state of the state (Licensed Driller/Eng (Licensed Driller/Eng (Licensed Driller/Eng	construction of tion standards. o my best know License No. License No. License No. License No. License No.	this well, and Materials ledge and base $361$
	Airtest 34	gal./min. with	ft. draw g.p.m.	/down after	hrs.	Registration	USE ADDITIONAL SHEETS IF		<u>-д С</u>
	Temperature of water	Was a ch	iemical analysis made	e? TYes XNo		Ecology is an	Equal Opportunity and Affirmate		

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (360) 407 5026

	Third	Inductor and Copy – Owner's Copy 5 1000 STATE OF W	LL REPORI UNIQUE WELL I.D. #_ VASHINGTON Water Right Permit No 6-3-2-76	750	
Vell	41)	OWNER: Name Pasco School MET # ( Ado	1000 1215 Where Pasco Wot	9430	$\overline{\mathbf{x}}$
S S	(2)	LOCATION OF WELL: County Grank LL	NE 1/4 NE 1/4 Sec 29 T	, N., R.	DAW.M.
ţ,	<b>(2a)</b>	STREET ADDRESS OF WELL (or nearest address)			·
u (	(3)	PROPOSED USE:  Domestic Industrial Municipal	(10) WELL LOG or ABANDONMENT PROCEDURE	ESCRIPTI	ON
u S		DeWater Test Well Other Other	Formation: Describe by color, character, size of material and structure, and and the kind and nature of the material in each stratum penetrated, with change of information.	I show thickne at least one e	ss of aquifers entry for each
nati	(4)	Abandoned New well Method: Dug Bored D	MATERIAL	FROM	то
ř		Deepened Cable Driven Reconditioned Rotary	SAND TAM	O	4
, Info	(5)	DIMENSIONS: Diameter of well inches.	Sand Bluck	4	26
he .		Drilledfeet. Depth of completed wellGGft.	GTUDE YSAND	26	28
ř.	(6)	CONSTRUCTION DETAILS:		5.0	
d/d		Welded ft. to ft.	Sand Black	28	46
an -			Gravel + Sand	46	47
ata		Type of perforator used	Sand Bluck	47	66
D a		SIZE of perforations in. by in.           perforations from ft. to ft.	Atomal, Samo the	1	
Ē		perforations from ft. to ft.	Water @ 70 ft		82K_
- t		Screens: Yes 🕅 No 💭	(-TUVEL SUNCE THA SILLEY		
rra	_	Manufacturer's Name <u>ODNASCO</u>			
Wa	Þ.	Diam. 81 Slot size			
Ē	• •	DiamSlot sizefromft. toft.	E B B U B M		
ž		Gravel placed fromft. toft.			
Sec		Surface seal: Yes X No To what depth? 25 tt.	0CT 2 4 1991		
ğ		Did any strata contain unusable water? Yes No X	TARTMENT OF ECOLOGY		
(ĝo		Type of water?         Depth of strata           Method of sealing strata off	EASTERN REGIONAL OFFICE		
ō g	(7)	PUMP: Manufacturer's Name			
ш́ ч		Type:H.P	<u> </u>	<u> </u>	- <u>ĉ</u>
) is	(8)	WATER LEVELS: Land-surface elevation above mean sea levelft. Static levelft. below top of well Date 93590 <sup>th</sup>	Work Started 19. Completed	<u>لك</u>	
er L		Artesian pressure lbs. per square inch Date	WELL CONSTRUCTOR CERTIFICATION:	. of this we	and its
	(9)	(Cap, valve, etc.)	compliance with all Washington well construction standard the information reported above are true to my best knowled	s. Materials ge and belief	used and
) Depa	(3)	Was a pump test made? Yes X No If yes, by whom? (	NAME NELSON HUG (1) DILLING		<u></u>
- u		<sup>12</sup> 11 11 13	Address \$200 W Argent Pase	$\mathcal{I}$	12 7930
F -		Recovery data (time taken as zero when pump turned off) (water level measured from well	(Signed)	58 No. <u>36</u>	2
_	<b>.</b> آ	me Water Level Time Water Level Time Water Level	Contractor's		
			Nov Des Que 9-26		1997
		Date of test	(USE ADDITIONAL SHEETS IF NECESS	ARY) -	
		Bailer testgal./min. withft. drawdown after hrs. Airtestgal./min. with stem set atft. forhrs. Artesian flowg.p.m. Date Temperature of waterWas a chemical analysis made? Yes No	Ecology is an Equal Opportunity and Affirmative Action cial accommodation needs, contact the Water Resource 407-6600. The TDD number is (206) 407-6006.	employer. s Program	For spe- at (206)

ECY 050-1-20 (9/93) \*\* f

	Unique Ecology Well ID Tag No AK	N- 817.	)
Construction/Decommission (x in circle) / 3 0/ 27			
Construction	Water Right Permit No 03-0108	Middle	- S(40
of Intent Number	Property Owner Name Pasco Sch	001 D1	tr ct
ROPOSED USE Domestic Industrial Municipal	Well Street Address		
DeWater Ingation Test Well Other	City Pasco County	Frank	lin
CYPE OF WORK     Owner's number of well (if more than one)       With Decode to and the set of	Location NE1/4 1/4 SU 1/4 Sec 21	Twn 9 R	<u>3000000000000000000000000000000000000</u>
Deepened Cable Cable Letted	Lat/Long Lat Deg	Lat Mun/See	WWN
DIMENSIONS Drameter of well inches drilled ft. Depth of completed well ft	(s t,r still REQUIRED) Long Deg	Long Min/S	ec
CONSTRUCTION DETAILS	Tax Parcel No _112-550-015		
Casing Welded Diam fromft to <u>//5ft</u> Installed Diam fromft toft toft	CONSTRUCTION OR DECOMMISS Formation Describe by color character size of kind and nature of the material in each stratum p	SION PROCE material and stu enetrated with	DURE ucture and at least one
Threaded Diam fromft toft	entry for each change of information Indicate al	l water encount	ered
Perforations LI Yes LINO	USE ADDITIONAL SHEETS IF NECESSAR		TO
SIZE of perfsin byin and no of perfs fromft toft	Revise Sec. 1	FROM	2/1
Screens Yes Keac Location 103-118	Black Son I	24	76
Manufacturers Name Johnson	Sand & Gravel	76	118
TypeModel No Diam \$4 Slot Size 12 from 103 ft to 11\$ ft			
Diamft toft			
Gravel/Filter packed Tyes PNo Size of gravel/sand			
Materials placed fromft toft			
Surface Seal Pres No To what depth?			
Materials used in seal <u>Bentonite</u>			
Did any strata contain unusable water? Yes WNo	·		
Type of water <sup>2</sup> Depth of strata Method of sealing strata off			_
PUMP Manufacturer s Name			·
Туре Н Р			
WATER LEVELS Land surface elevation above mean sea levelft	1		_
WATER LEVELS Land surface elevation above mean sea levelft Static levelft below top of well Date6-3-03			
WATER LEVELS       Land surface elevation above rean sea levelft         Static levelft       below top of well         Pate       6-3-03         Artesian pressure       lbs per square inch         Date       Date         Artesian water is controlled by       by			
WATER LEVELS       Land surface elevation above riean sea levelft         Static levelft       below top of well         Date       6-3-03         Artesian pressure       lbs per square inch         Date       0         Artesian water is controlled by			
WATER LEVELS       Land surface elevation above riean sea levelft         Static levelft       ft below top of well         Pate       Artesian pressure         Ibs_per square inch       Date         Artesian water is controlled by       (cap valve etc.)         WELL TESTS       Drawdown is amount water level is lowered below static level			
WATER LEVELS       Land surface elevation above mean sea levelft         Static levelft       below top of well pate         Artesian pressure       lbs per square inch pate         Artesian water is controlled by			
WATER LEVELS       Land surface elevation above mean sea levelft         Static levelft       ft below top of well       pate6-3-03         Artesian pressure       lbs per square inch       pate         Artesian water is controlled by	in)ECEIN		
WATER LEVELS       Land surface elevation above mean sea levelft         Static levelft       ft below top of well       Date         Artesian pressure       lbs per square inch       Date         Artesian water is controlled by			
WATER LEVELS       Land surface elevation above mean sea levelft         Static levelft below top of well       Date			
WATER LEVELS       Land surface elevation above mean sea levelft         Static levelft below top of well       Date	IDECEI SEP - 2 2		
WATER LEVELS       Land surface elevation above mean sea levelft         Static levelft below top of well Date			
WATER LEVELS       Land surface elevation above mean sea levelft         Static levelft below top of well       Date			
WATER LEVELS       Land surface elevation above mean sea levelft         Static levelft below top of well Date			
WATER LEVELS       Land surface elevation above mean sea levelft         Static levelft below top of well Date			
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## **GEOTECHNICAL SITE INVESTIGATION REPORT**

## PASCO SCHOOL DISTRICT NO. 1 - SOUTH PROPERTY SE CORNER OF SALT LAKE STREET & UTAH AVENUE PASCO, WASHINGTON

**GNN PROJECT NO. 223-1666-1** 

**SEPTEMBER 2023** 

Prepared for

PASCO SCHOOL DISTRICT 1215 W. LEWIS STREET PASCO, WASHINGTON 99301



Prepared by

GN NORTHERN, INC. CONSULTING GEOTECHNICAL ENGINEERS KENNEWICK, WASHINGTON (509) 734-9320

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At GN Northern our mission is to serve our clients in the most efficient, cost-effective way using the best resources and tools available while maintaining professionalism on every level. Our philosophy is to satisfy our clients through hard work, dedication, and extraordinary efforts from all of our valued employees working as an extension of the design and construction team.



September 13, 2023

Pasco School District 1215 W. Lewis Street Pasco, WA 993010

### Attn: Doug Carl, Alliance – Management and Construction Solutions

Subject:Geotechnical Site Investigation ReportPasco School District No. 1 - South PropertySE Corner of Salt Lake Street & Utah Avenue, Pasco, WA

### GNN Project No. 223-1666-1

Dear Mr. Carl,

As requested, GN Northern (GNN) has completed a geotechnical site investigation for the property directly south of the new Innovative High School site on the approximately 3.6-acre site located southeast of Salt Lake Street and Utah Avenue in Pasco, Washington.

Based on the findings of our subsurface study, we conclude that the site can be suitable for future development provided that our geotechnical recommendations presented in this report and any subsequent design-level geotechnical report are followed during the design and construction phases of the project.

This report describes the results of our investigation, summarizes our findings and presents our recommendations concerning earthwork and site grading for future development. It is important that GN Northern be retained by the Pasco School District to provide consultation during the design phase, as well as field compaction testing and geotechnical monitoring services during the construction phase, to review and monitor the implementation of the geotechnical recommendations.

If you have any questions regarding this report, please contact us at 509-734-9320.

Respectfully submitted,

GN Northern, Inc.

Aaron B. Cleveland, GIT Staff Geologist

Imran Magsi, PE, GE Sr. Geotechnical Engineer





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### **1.0 PURPOSE AND SCOPE OF SERVICES**

This report has been prepared for the property directly south of the new Innovative High School site on the approximately 3.6-acre site located southeast of Salt Lake Street and Utah Avenue, in the City of Pasco, Washington; site location is shown on the Vicinity Map (Figure 1, Appendix I). Based on the information provided by Brandon Wilm, Design West Architects, the intent is to fill the south property with excess soil from the north property. No building is currently planned for the south property, but the parcel will likely be developed in the future. Our investigation was conducted to collect information regarding subsurface conditions and present recommendations for earthwork, grading and fill placement for future development.

Our study was conducted in general accordance with our Proposal for Geotechnical Site Investigation dated August 7, 2023; notice to proceed was provided by John Weatherby, Construction Projects Manager, Pasco School District, in the form of a copy of the signed proposal via email signed by the Assistant Superintendent of Operation and Support, on August 8, 2023.

### 2.0 PROPOSED CONSTRUCTION

No information regarding future development, type of building structure(s) and infrastructure is known at the time of this report.

### **3.0 FIELD EXPLORATION**

Our field exploration was completed on September 12, 2023. GNN personnel were on site on August 10, 2023, to mark the property boundaries. A local public utility clearance was obtained prior to the field exploration. Five (5) test-pits were completed at locations shown on the *Site & Exploration Map* (Figure 2, Appendix I). Test-pits were excavated by Big D's Construction using a Case excavator depth of approximately 10 feet below existing ground surface (BGS). The test-pits were logged by a GNN staff engineer. Upon completion, the test-pits were loosely backfilled with excavation spoils.

The soils observed during our field exploration were classified according to the Unified Soil Classification System (USCS), utilizing the field classification procedures as outlined in ASTM D2488. A copy of the USCS Classification Chart is attached. Depths referred to in this report are relative to the existing surface elevation at the time of our field investigation. The surface and



subsurface conditions described in this report are as observed at the site at the time of our field investigation.

### 4.0 SITE CONDITIONS

The approximately 3.6-acre site is located on the southeast corner of Salt Lake Street and Utah Avenue in the City of Pasco. The site is generally situated in the NE <sup>1</sup>/<sub>4</sub> of the SE <sup>1</sup>/<sub>4</sub> of the SE <sup>1</sup>/<sub>4</sub> Section 20, Township 9 North & Range 30 East, Willamette Meridian. Adjacent properties consist of a warehouse facility to the west, residential properties to the south and east, and the site of the New Innovative High School to the north across Salt Lake Street. The site is covered with grass and sagebrush and occasional scattered trash and debris on the surface. The site is slightly hummocky. Elevations within the project site range from 415 feet above mean sea level (MSL) on the northeast and southwest portions and approx. 422 feet MSL near the center of the site.

### 4.1 Regional Geology

The site is located in the Tri-Cities area of the Yakima Fold Belt region of the Columbia Basin Plateau. The subsurface stratigraphy of the region is comprised of a thick series of folded, Miocene-age flood basalt lava flows and interbedded sediments (collectively known as the Columbia River Basalt Group [CRBG]) overlain by unconsolidated deposits of late Miocene to recent age. In the Tri-Cities area, the uppermost layers of the CRBG are fractured basalt bedrock. Regionally, the top surface of the local basalt is known to slope to the east toward the Columbia River, although local variations exist in the area. Based on the *Geologic Map of the Richland 1:100,000 Quadrangle, Washington* (Reidel, 1994), the site is mapped as Quaternary outburst flood deposits of glacial Lake Missoula, predominantly sand and silt [Qfs(4)]. The local bedrock in the area is comprised of the Miocene age Saddle Mountains Basalt of the CRBG.

### 4.2 Seismic Considerations

As per the 2018 International Building Code (IBC), a Site Class 'D' may be used for seismic design purposes. Site Class 'D' corresponds to 'Stiff soil'. The following site-specific design values may be used:



Seismic Design Parameter	Value (unit)
Ss	0.397 (g)
$\mathbf{S}_1$	0.151 (g)
Fa	1.483 (unitless)
$F_{v}$	2.299 (unitless)
S <sub>MS</sub>	0.588 (g)
$S_{M1}$	0.346 (g)
$\mathbf{S}_{\mathrm{DS}}$	0.392 (g)
$S_{D1}$	0.231 (g)

### Table 1: IBC Design Response Spectra Parameters

 $S_S = MCE$  spectral response acceleration at short periods

 $S_1 = MCE$  spectral response acceleration at 1-second period

 $F_a$  = Site coefficient for short periods

 $F_v = Site \ coefficient \ for \ 1-second \ period$ 

 $S_{MS}$  = MCE spectral response acceleration at short periods as adjusted for site effects

S<sub>M1</sub> = MCE spectral response acceleration at 1-second period as adjusted for site effects

 $S_{DS}$  = Design spectral response acceleration at short periods

 $S_{D1}$  = Design spectral response acceleration at 1-second period

### 5.0 SUBSURFACE CONDITIONS

Based on the findings of our field exploration, the native subsurface soils encountered within the test-pits consisted primarily of Silty Sand (SM) with occasional interbedded Poorly Graded Sand (SP) and Poorly Graded Sand with Silt (SP-SM). The native sands were observed to have a relative in-place density of 'loose' and were typically observed to be 'dry.' to 'damp'. Test-pits TP-Test-pit logs in Appendix II show detailed descriptions and stratification of the soils encountered.

### 5.1 Groundwater

Groundwater was not encountered in the exploratory test-pits to the maximum depth explored at the time of our exploration.

### 6.0 SUMMARY OF FINDINGS & CONCLUSIONS

Conditions imposed by the proposed development have been evaluated on the basis of assumed elevations and engineering characteristics of the subsurface materials encountered in the exploratory test-pits and their anticipated behavior both during and after construction. The following is a summary of our findings and professional opinions based on the data obtained from a review of selected technical literature and the site evaluation.

Based on this preliminary geotechnical evaluation, it is our opinion that the site can be suitable for the future development, provided recommendations in this report regarding earthwork and



grading and any subsequent site- and structure-specific design level geotechnical report are followed during the design and construction phases of future project.

- GNN shall be provided an opportunity to review the site plan for future development to provide design level recommendations.
- Site soils generally consist of Silty Sand (SM) Poorly Graded Sand with Silt (SP-SM) and Poorly Graded Sand (SP).
- Groundwater was not encountered in any of the exploratory test-pits to maximum dept of 10 feet BGS at the time of our exploration.
- In our opinion, the future building(s) may be supported on conventional shallow foundations bearing on a layer of imported crushed rock placed atop improved and recompacted subgrade soils.
- The underlying geologic condition for seismic design is site class 'D'. The *minimum* seismic design should comply with the 2018 International Building Code (IBC) and ASCE 07-16, Minimum Design Loads for Buildings and Other Structures.
- Site grading shall incorporate the requirements of IBC 2018 Appendix J *Grading*.
- The onsite sandy soils, free of deleterious materials including roots and organic matter and oversized material greater than 4 inches in nominal diameter, are generally suitable for reuse as engineered fill and utility trench backfill.
- At the start of site grading, existing vegetation, large roots, any artificial fill, trash and debris, and any abandoned underground utilities shall be fully removed from the site.
- Upon completion, all test-pit excavations were loosely backfilled with excavation spoils. The contractor is responsible to locate the test-pits to re-excavate the loose soils and re-place as compacted engineered fill.
- The near-surface fine-grained soils are susceptible to wind and water erosion when exposed during grading operations. Preventative measures and appropriate BMPs to control runoff and reduce erosion shall be incorporated into site grading plans.



### 7.0 GEOTECHNICAL RECOMMENDATIONS

The following preliminary geotechnical recommendations are based on our current understanding of the proposed site Note that recommendations presented in this report are predicated upon appropriate geotechnical monitoring and testing of the site preparation by a representative of GNN's **Geotechnical-Engineer-of-Record (GER)**. Once future development site plan is available, a subsequent design-level site- and structure-specific geotechnical investigation must be performed. We recommend that we be engaged to review the site plan for future development in order to provide design-level geotechnical recommendations.

### 7.1 Site Grading

Site grading shall incorporate the requirements of IBC 2018 Appendix J. A representative of the GER should observe site clearing, grading, and the bottoms of excavations before placing fills. Local variations in soil conditions may warrant increasing the depth of over-excavation and recompaction. Do not place backfill or fill soil material on surfaces that are saturated, muddy, frozen, or contain frost, snow, or ice. To prevent potential pumping and unstable ground conditions and improve compaction efforts, we strongly recommend performing site grading during dryer periods of the year. Site grading and excavations should be avoided during winter and wet weather periods of the year.

Areas of loose soil conditions were encountered in exploratory test pits. The presence of onsite loose subgrade soils poses a risk of foundation/structure differential settlement if not properly mitigated in accordance with the recommendations of this report. Remedial efforts to improve foundation and building pad bearing support conditions including over-excavation, moisture conditioning, re-compaction and placement of structural engineered fill will be required to construct stable subgrades for the support of future building pad and foundations.

After stripping and grubbing, prior to placing new fill material, the native sandy subgrade shall be scarified to a minimum depth of 12 inches, then moisture conditioned to near-optimum and compacted to a minimum 95% of the maximum dry density as determined by the ASTM D1557 and to a dense and non-yielding surface. Any soft spots or pumping area(s) observed during compaction shall be over-excavated at least 12 inches and replaced with imported granular structural fill. A representative of our Geotechnical Engineer shall inspect the scarification process,



moisture conditioning and perform compaction testing of the subgrade soils and during placement of imported fill soils.

After placing the fill soils to the required elevation, the prepared grade shall be proof-rolled using a minimum 30-ton tandem axle loaded dump truck in the presence of a representative of our Geotechnical Engineer to verify firm and unyielding conditions. Using a <sup>1</sup>/<sub>2</sub> inch diameter steel T-probe, the geotechnical inspector shall probe the compacted fill layer across the surface. If the T-probe readily penetrates the placed fill material, it shall indicate unsatisfactory compaction. In addition, elastic movement in excess of <sup>3</sup>/<sub>4</sub>" inch with substantial cracking or substantial lateral movement during proof-rolling should also be considered a sign of unsatisfactory compaction. Adjust the lift thickness and moisture content, as recommended by the GER until the placed fill layer exhibits firm, unyielding conditions. Any areas displaying pumping conditions during proof-compacted and recompacted.

Soil conditions shall be evaluated by in-place density testing, visual evaluation, probing, and proof-rolling of the imported fill and re-compacted on-site soil as it is prepared to check for compliance with recommendations of this report. A moisture-density curve shall be established in accordance with the ASTM D1557 method for all onsite soils and imported fill materials used as structural fill.

Each test pit was loosely backfilled during our site investigation. During site development, the earthwork contractor is required to re-excavate the test pits and backfill the excavations with suitable fill material and compact as appropriate for the location within the building/structure pads.

### 7.2 Clearing and Grubbing

At the start of site grading, and prior to placing any new fills (import fill soils from the north property), existing vegetation, large roots, any artificial fill, trash and debris, and any abandoned underground utilities shall be fully removed from the site. The surface shall be stripped of all topsoil and/or organic growth that may exist at the time of grading. The topsoil and organic rich soils shall either be stockpiled on-site separately for future use or be removed from the construction area. Depth of stripping can be minimized with real-time onsite observation of sufficient removals. Areas disturbed during clearing shall be properly backfilled and compacted as described below.



### 7.3 Soil Moisture Conditioning

Appropriate moisture conditioning of import fill soils will be required to facilitate compaction and to achieve the required degree of compaction. Uniformly moisten subgrade and each subsequent fill or backfill soil layer before compaction to near optimum moisture content, unless indicated otherwise. A laboratory proctor test to determine optimum moisture content is required prior to field compaction testing. Maintain fills soils to near-optimum moisture content at time of compaction. Assume a plus/minus maximum tolerance of approximately 2% to 3% unless compaction requirements. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds near-optimum moisture content and is too wet to compact to specified dry density.

### 7.4 Subgrade Inspection and Compaction Verification

A representative of our Geotechnical engineer (soils inspector) shall be onsite during earthwork to inspect and test subgrade and each fill layer. Proceed with subsequent earthmoving only after inspections confirm previously completed work complies with requirements of this report. Inspections and tests include:

- 1. Determine prior to placement of fill that subgrade has been prepared in compliance with requirements of this Geotechnical Report.
- 2. Determine that fill material and maximum lift thickness and moisture comply with requirements of this Geotechnical Report.
- 3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements of this Geotechnical Report.

When the soils inspector indicates that subgrades, and fills have not achieved subgrade acceptance criteria or degree of compaction specified, scarify, and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

### 7.5 Temporary Excavations

It shall be the responsibility of the contractor to maintain safe temporary slope configurations since the contractor is at the job site, able to observe the nature and conditions of the slopes, and able to monitor the encountered subsurface conditions. Unsupported vertical cuts deeper than 4 feet are



not recommended if worker access is necessary. The cuts shall be adequately sloped, shored or supported to prevent injury to personnel from caving and sloughing. The contractor and subcontractors shall be aware of, and familiar with, applicable local, state and federal safety regulations including the current OSHA Excavation and Trench Safety Standards, and OSHA Health and Safety Standards for Excavations, 29 CFR Part 1929, or successor regulations.

According to chapter 296-155 of the Washington Administrative Code (WAC), it is our opinion that the soil encountered at the site is classified as Type C soils. For excavation planning purposes, we recommend that temporary, unsupported, open cut slopes shall be no steeper than 1.5 feet horizontal to 1.0 feet vertical (1.5H:1V) in Type C soils. No heavy equipment should be allowed near the top of temporary cut slopes unless the cut slopes are adequately braced. Final (permanent) fill slopes should be graded to an angle of 2H:1V or flatter. We recommend that permanent slopes be hydroseeded and/or planted with vegetation after construction. Where unstable soils are encountered, flatter slopes may be required. We recommend protecting slopes with waterproof covering during periods of wet weather to reduce sloughing and erosion.

### 7.6 Utility Excavation, Pipe Bedding and Trench Backfill

To provide suitable support and bedding for the pipe, we recommend the utilities be founded on suitable bedding material consisting of clean sand and/or sand & gravel mixture. To minimize trench subgrade disturbance during excavation, the excavator should use a smooth-edged bucket rather than a toothed bucket.

Pipe bedding and pipe zone materials shall conform to Section 9-03.12(3) of the Washington State Department of Transportation (WSDOT) 2018 Standard Specifications. Pipe bedding should provide a firm uniform cradle for support of the pipes. A minimum 4-inch thickness of bedding material beneath the pipe should be provided. Prior to installation of the pipe, the pipe bedding should be shaped to fit the lower part of the pipe exterior with reasonable closeness to provide uniform support along the pipe. Pipe bedding material should be used as pipe zone backfill and placed in layers and tamped around the pipes to obtain complete contact. To protect the pipe, bedding material should extend at least 6 inches above the top of the pipe.

Placement of bedding material is particularly critical where maintenance of precise grades is essential. Backfill placed within the first 12 inches above utility lines should be compacted to at



least 90% of the maximum dry density (ASTM D1557), such that the utility lines are not damaged during backfill placement and compaction. In addition, rock fragments greater than 1 inch in maximum dimension should be excluded from this first lift. The remainder of the utility excavations should be backfilled and compacted to 95% of the maximum dry density as determined by ASTM D1557.

Compaction of backfill material should be accomplished with soils within  $\pm 2\%$  of their optimum moisture content in order to achieve the minimum specified compaction levels recommended in this report. Backfill operations shall be observed and tested to monitor compliance with these recommendations.

### 7.7 Suitability of the Onsite Soils as Engineered Fill

The onsite sands, free of deleterious materials including roots and organic matter, and rocks greater than 4 inches in nominal diameter, are generally suitable for use as general fill/backfill. The native soil should be placed in maximum 8-inch lifts (loose) and compacted to at least 95% relative compaction (ASTM D1557) near its optimum moisture content. The onsite soils will require compaction to be performed within a range of  $\pm 2\%$  of optimum moisture to achieve the proper degree of compaction.

### 7.8 Imported Fill Soils

Imported fill soils should be non-expansive, granular soils meeting the USCS classifications of SM, SP-SM, or SW-SM with a maximum rock size of 4 inches, minimum 80% passing the No. 4 sieve, and 5 to 25% passing the No. 200 sieve (fines shall be non-plastic). The GER should review the import fill soils before hauling to the site.

### 7.9 Compaction Requirements for Imported Fill Soils

All imported fill soils from the north property shall be placed in uniform 8 inch thick loose lift and each lift shall be compacted to a minimum 95% of the maximum dry density as determined by ASTM D1557. The compaction effort must be verified by a representative of the GER in the field using a nuclear density gauge in accordance with ASTM D6938. The thickness of the loose, non-compacted, lift of structural fill shall not exceed 8 inches for heavy-duty compactors or 4 inches for hand operated compactors.



### 7.10 Imported Crushed Rock Structural Fill

Imported crushed rock structural fill shall consist of well-graded, crushed aggregate material meeting the grading requirements of WSDOT 2018 Standard Specifications, Section 9-03.9(3) (1-1/4 inch minus Base Course Material) presented here:

Table 2: WSDOT Standard Spec. 9-03.9(5)						
Sieve Size	Percent Passing (by Weight)					
1 <sup>1</sup> / <sub>4</sub> Inch Square	99 - 100					
1 Inch Square	80 - 100					
5/8 Inch Square	50 - 80					
U.S. No. 4	25 - 45					
U.S. No. 40	3 - 18					
U.S. No. 200	Less than 7.5					

 Table 2: WSDOT Standard Spec. 9-03.9(3)

A fifty (50) pound sample of each imported fill material shall be collected by GNN personnel prior to placement to ensure proper gradation and establish the moisture-density relationship (proctor curve).

### 7.11 Foundation Bearing Support & Allowable Bearing Capacity

In our opinion, future building structure may be supported on conventional shallow foundations bearing on a layer of imported crushed rock placed atop improved subgrade consist of newly placed engineered fill soils or recompacted sandy soils in accordance with the recommendations of this report. The minimum footing depth shall be 24 inches below adjacent grades for frost protection and bearing capacity considerations.

Dependent in part of the findings of a subsequent design-level site- and structure-specific geotechnical investigation, in order to provide a uniform bearing condition and minimize potential of differential settlement, all future foundations shall bear on a minimum of 12-inch compacted layer of 1<sup>1</sup>/<sub>4</sub>" minus imported crushed rock structural fill placed over newly placed engineered fill soils or re-compacted native underlying sandy unit. The crushed rock shall be compacted to at least 95% of the maximum relative modified proctor dry density. Prior to placement of the crushed rock layer, the native subgrade soils shall be scarified to a depth of 12 inches then moisture conditioned to near-optimum and compacted to at least 95% relative compaction per ASTM D1557 and to a dense and non-yielding condition. Any soft areas of deflection during compaction shall be overexcavated for an additional 12-inches and replaced with imported granular sstructural fill. The



crushed rock material and recompaction of the native subgrade soils shall extend horizontally minimum 12 inches beyond all sides of the foundations.

Based on the findings of this preliminary geotechnical investigation specifically related to the placement of fill soils from the north property and grading, future building foundations can likely be designed for an allowable bearing pressure of up to **2,000 pounds per square foot (psf)**. The allowable bearing pressure presented above may be increased by 1/3 for short-term, transient loading conditions. Based on assumed structural loading, we estimate total settlement for footings constructed in accordance with this recommendation to be less than 1-inch, with differential settlement less than half that magnitude.

Lateral forces on foundations from short term wind and seismic loading would be resisted by friction at the base of foundations and passive earth pressure against the buried portions. We recommend an allowable passive earth pressure for compacted imported fill of **220 pcf**. This lateral foundation resistance value includes a factor of safety of 1.5. We recommend a coefficient of friction of **0.45** be used between cast-in-place concrete and imported crushed rock. An appropriate factor of safety should be used to calculate sliding resistance at the base of footings.

### 7.12 Slab-on-Grade Floors

Place a minimum 6-inch layer of crushed aggregate fill beneath the slabs. The material shall meet the WSDOT Specification section 9-03.9 (3), "Crushed Surfacing Top Course", with less than 5 percent passing the No. 200 sieve (fines). The crushed rock material shall be compacted to at least 95% of the maximum dry density as determined by the ASTM D1557 method. Prior to placing the crushed rock levelling course, the subgrade soils shall be scarified, moisture-conditioned and recompacted to minimum 95% of the maximum dry density as determined by determined by ASTM D1557 for minimum depth of 12 inches. We recommend a modulus of subgrade reaction equal to **120 pounds per cubic inch (pci)** based on a value for gravel presented in the Portland Cement Association publication No. EB075.01D. Slab thickness, reinforcement and joint spacing shall be determined by a licensed engineer based on the intended use and loading.

An appropriate vapor retarder (10-mil polyethylene liner) shall be used (ASTM E1745/E1643) beneath areas receiving moisture sensitive resilient flooring/VCT where prevention of moisture migration through slab is essential. The slab designer should refer to ACI 302 and/or ACI 360 for



procedures and cautions regarding the use and placement of a vapor retarder. The architect shall determine the need and use of a vapor retarder.

### 7.13 Subgrade Protection

The degree to which construction grading problems develop is expected to be dependent, in part, on the time of year that construction proceeds and the precautions which are taken by the contract to protect the subgrade. We recommend that the site shall be graded to prevent water from ponding within construction areas and/or flowing into excavations. Accumulated water must be removed immediately along with any unstable soil. Foundation concrete should be placed and excavations backfilled as soon as possible to protect the bearing grade.



### 8.0 CONTINUING GEOTECHNICAL SERVICES

GNN recommends that the Client should maintain an adequate program of geotechnical consultation, construction monitoring, and soils testing during the final design and construction phases to monitor compliance with GNN's geotechnical recommendations. <u>Maintaining GNN as the geotechnical consultant from beginning to end of the project will provide continuity of services.</u> If GN Northern, Inc. is not retained by the owner/developer and/or the contractor to provide the recommended geotechnical inspections/observations and testing services, the geotechnical engineering firm or testing/inspection firm providing tests and observations shall assume the role and responsibilities of Geotechnical Engineer-of-Record.

GNN can provide construction monitoring and testing as additional services. The costs of these services are not included in our present fee arrangement, but can be obtained from our office. The recommended construction monitoring and testing includes, but is not necessarily limited to, the following:

- > Consultation during the design stages of the project.
- Review of the grading and drainage plans to monitor compliance and proper implementation of the recommendations in GNN's Report.
- Observation and quality control testing during site preparation, grading, and placement of engineered fill as required by the local building ordinances.
- > Geotechnical engineering consultation as needed during construction.



### 9.0 LIMITATIONS OF THE GEOTECHNICAL SITE INVESTIGATION REPORT

This GEOTECHNICAL SITE INVESTIGATION REPORT ("Report") was prepared for the exclusive use of the Client. GN Northern, Inc.'s (GNN) findings, conclusions and recommendations in this Report are based on selected points of field exploration, laboratory testing, and GNN's understanding of the proposed project at the time the Report was prepared. Furthermore, GNN's findings and recommendations are based on the assumption that soil, rock and/or groundwater conditions do not vary significantly from those found at specific exploratory locations. Variations in soil, bedrock and/or groundwater conditions could exist between and beyond the exploration points. The nature and extent of these variations may not become evident until during or after construction. Variations in soil, bedrock and groundwater may require additional studies, consultation, and revisions to GNN's recommendations in the Report.

This Report's findings are valid as of the issued date of this Report. However, changes in conditions of the subject property or adjoining properties can occur due to passage of time, natural processes, or works of man. In addition, applicable building standards/codes may change over time. Accordingly, findings, conclusions, and recommendations of this Report may be invalidated, wholly or partially, by changes outside of GNN's control. Provided that the site conditions are not disturbed or altered after the planned grading is completed, the report will be valid for a period of 3 to 5 years from the issued date of the Report.

In the event that any changes in the nature, design, or location of structures are planned, the findings, conclusions and recommendations contained in this Report shall not be considered valid unless the changes are reviewed by GNN and the findings, conclusions, and recommendations of this Report are modified or verified in writing.

This Report is issued with the understanding that the owner or the owner's representative has the responsibility to bring the findings, conclusions, and recommendations contained herein to the attention of the architect and design professional(s) for the project so that they are incorporated into the plans and construction specifications, and any follow-up addendum for the project. The owner or the owner's representative also has the responsibility to verify that the general contractor and all subcontractors follow such recommendations during construction. It is further understood that the owner or the owner's representative is responsible for submittal of this Report to the



appropriate governing agencies. The foregoing notwithstanding, no party other than the Client shall have any right to rely on this Report and GNN shall have no liability to any third party who claims injury due to reliance upon this Report, which is prepared exclusively for Client's use and reliance.

GNN has provided geotechnical services in accordance with generally accepted geotechnical engineering practices in this locality at this time. GNN expressly disclaims all warranties and guarantees, express or implied.

Client shall provide GNN an opportunity to review the final design and specifications so that earthwork, drainage, and foundation recommendations may be properly interpreted and implemented in the design and specifications. If GNN is not accorded the review opportunity, GNN shall have no responsibility for misinterpretation of GNN's recommendations.



## **APPENDICES**



# Appendix I

<u>Vicinity Map (Figure 1)</u> Site Exploration Map (Figure 2)



FIGURE 1: VICINITY MAP

PROJECT NO. 223-1666-1



FIGURE 2: SITE EXPLORATION MAP

PROJECT NO. 223-1666-1



# Appendix II

<u>Exploratory Test-Pit Logs</u> <u>Key Chart (for Soil Classification)</u>

₹	5	GN Nor 722 N. Yakima, Tolopha	thern, Inc 16th Ave \$ WA 9980	Suite 31 02	TEST PIT NUMBER TP-1 PAGE 1 OF 1
	NT <u>Pasco</u> ECT NUM STARTEI VATION C	School D           BER _223           D _9/12/2           CONTRAC           METHOD	istrict No. 3-1666-1 3 TOR _Big Case Ex	1 COMPLETED 9/12/23 g D's Construction cavator CHECKED BX	PROJECT NAME _South Property         PROJECT LOCATION _SECorner of Salt lake St & Utah Ave, Pasco, WA         GROUND ELEVATION _421 ft       TEST PIT SIZE _30 x 72 inches         GROUND WATER LEVELS:         AT TIME OF EXCAVATION
	S Approx	K. GPS Co	ords.: 46.	244006,-119.076109	AFTER EXCAVATION
PROPERTY, PASCO, WAZ O DEPTH O (ft)	SAMPLE TYPE NUMBER	U.S.C.S. GRAPHIC	LOG		MATERIAL DESCRIPTION
- 9/13/23 16:59 - C:/USERS/KHARMONEDRIVE/PUBLICACTIVE PROJECTS/1 - CURRENT PROJECTS/23-1666-1 PSD SOUTH		SM	<u>~</u> 0.5 	TOPSOIL with grass and roots SILTY SAND, (SM) brown, fine gra interbedded with black Poorly Grad - Groundwater not encountered at 1 - Referenced elevations are approx	led Sand (SP)
GENERAL BH / TP / WELL - GINT STD US LAB.GDT					bottom or test pit at 10.0 feet.

₫	5	GN 722 Yak Tele	Northern, Inc N. 16th Ave ima, WA 998 ephone: (509	: Suite 31 02 ) 248-9798	TEST PIT NUMBER TP-2 PAGE 1 OF 1					
CLIEI	NT Pasco	o Scho	ol District No.	. 1	PROJECT NAME South Property					
PROJ		BER	223-1666-1		PROJECT LOCATION SECorner of Salt lake St & Utah Ave, Pasco, WA					
	STARTE	<b>D</b> _9/	12/23	<b>COMPLETED</b> 9/12/23	GROUND ELEVATION _415 ft TEST PIT SIZE _30 x 72 inches					
EXCA		CONT	RACTOR Bi	g D's Construction	GROUND WATER LEVELS:					
<u>ق</u> EXCA		NETH	OD Case Ex	cavator	AT TIME OF EXCAVATION					
logo	GED BY _	GR		CHECKED BY IM	AT END OF EXCAVATION					
	S Appro	x. GPS	Coords.: 46	.243472,-119.076045	AFTER EXCAVATION					
PROPERTY, PASCO, WAV O DEPTH O (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION					
HLO			<u></u>	TOPSOIL with grass and roots	414 5					
5-1 PSD SO				SILTY SAND, (SM) brown, fine grain						
0.01 0.01 0.01 0.01 0.01		SM		interbedded with black Poorly Grade trace gravel, trace cobbles	d Sand with Silt (SP-SM) 405.0 me of excavation nate and based on Google Earth Topography					
GENERAL BH / TP / WELL - GINI SID US LAB.GUI - 9/				- Referenced elevations are approxir	nate and based on Google Earth Topography Bottom of test pit at 10.0 feet.					

	6	GN Nor 722 N. Yakima Telepho	thern, Inc 16th Ave , WA 998	: Suite 31 02 ) 248-9798	TEST PIT NUMBER TP-3 PAGE 1 OF 1
CLIEN PROJ DATE EXCA EXCA LOGG NOTE	NT <u>Pasco</u> ECT NUM STARTEL VATION C VATION M GED BY <u>(</u> S Appro)	BER 22 D 9/12/2 CONTRAC METHOD GR	District No 3-1666-1 23 CTOR _Bi _Case Ex 	. 1 COMPLETED _9/12/23 g D's Construction ccavator CHECKED BY _IM .243560,-119.076633	PROJECT NAME _South Property         PROJECT LOCATION _SECorner of Salt lake St & Utah Ave, Pasco, WA         GROUND ELEVATION _420 ft       TEST PIT SIZE _30 x 72 inches         GROUND WATER LEVELS:         AT TIME OF EXCAVATION         AT END OF EXCAVATION         AFTER EXCAVATION
PROPERTY, PASCO, WA O DEPTH O (ft)	SAMPLE TYPE NUMBER	U.S.C.S. GRAPHIC	LOG		MATERIAL DESCRIPTION
3 16:59 - C:\USERS\KHARMONEDRIVEPUBLICACTIVE PROJECTS\1 - CURRENT PROJECTS\223-1666-1 PSD SOUTH		SM	<u>0.5</u> 10.0	TOPSOIL with grass and roots SILTY SAND, (SM) brown, fine g	aded Sand (SP)
GENERAL BH / TP / WELL - GINT STD US LAB.GDT - 9/13/				- Groundwater not encountered a - Referenced elevations are appro	a time of excavation oximate and based on Google Earth Topography Bottom of test pit at 10.0 feet.

	5	GN 722 Yak	Northern, Inc N. 16th Ave S tima, WA 9980	Suite 31 )2 248-9798	TEST PIT NUMBER TP-4 PAGE 1 OF 1				
			epitorie: (309)	1 240-97 90					
				1	PROJECT   NAME _ South Property  PROJECT   OCATION _ SECorner of Salt lake St & Litab Ave _ Pasco _ WA				
DATE			<u>223-1000-1</u>		CPOLIND ELEVATION 422 ft TEST DIT SIZE 20 x 72 inches				
	JIARIE	D <u>9/</u>			GROUND ELEVATION 422 It TEST PIT SIZE 30 x 72 Inches				
			RACTOR BIO						
			OD Case Ex	cavator					
		GR							
	S Appro	x. GPS	S Coords.: 46.	243682,-119.077251	AFTER EXCAVATION				
DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION				
0.0			<u>x 1x</u> <u>x</u>	TOPSOIL with grass and roots					
				SILTY SAND, (SM) brown and bla with Silt (SP-SM)	ack, fine grained, damp, appears loose, interbedded with black Poorly Graded Sand				
7.5		SM							
			10.0	- Groundwater not encountered at - Referenced elevations are appro	412.0 t time of excavation xximate and based on Google Earth Topography Bottom of test pit at 10.0 feet.				

₫	5	GN 722 Yak	Northern, Ind N. 16th Ave ima, WA 998	5 Suite 31 302	TEST PIT NUMBER TP-5 PAGE 1 OF 1
CLIE PRO.	NT <u>Pasco</u> JECT NUM	Scho	phone: (509 ol District No <u>223-1666-1</u>	) 248-9798 b. 1	PROJECT NAME South Property     PROJECT LOCATION SECorner of Salt lake St & Utah Ave, Pasco, WA
		D <u>9/</u>	12/23	COMPLETED	GROUND ELEVATION 418 ft TEST PIT SIZE 30 x 72 inches
	GED BY	GR	<u>- 6466 E</u>	CHECKED BY IM	AT END OF EXCAVATION
	ES Approx	x. GPS	Coords.: 46	.243265,-119.077198	AFTER EXCAVATION
PROPERTY, PASCO, WA(2) O DEPTH O (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION
HLO			<u>, , , , , , , , 0.5</u>	TOPSOIL with grass and roots	417.5
23-1666-1 PSD SO	-			SILTY SAND, (SM) brown, fine	grained, dry, appears loose
0.0		SM		- Groundwater not encountered - Referenced elevations are app	Sand (SP), trace gravel 408.0 at time of excavation roximate and based on Google Earth Topography
GENERAL BH / TP / WELL - GINT STD US LAB.GDT - !					Bottom of test pit at 10.0 feet.


## **KEY CHART**

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N-VALUE								
	COARSE-0	GRAINED SOILS	FINE-GRAINED SOILS					
DENSITY	N (BLOWS/FT)	FIELD TEST	CONSISTENCY	N (BLOWS/FT)	FIELD TEST			
Very Loose	0-4	Easily penetrated with <sup>1</sup> / <sub>2</sub> -inch reinforcing rod pushed by hand	Very Soft	0 – 2	Easily penetrated several inches by thumb			
Loose	4 - 10	Difficult to penetrate with <sup>1</sup> /2-inch reinforcing rod pushed by hand	Soft	2-4	Easily penetrated one inch by thumb			
Medium -Dense	10 - 30	Easily penetrated with <sup>1</sup> / <sub>2</sub> -inch rod driven with a 5-lb hammer	Medium-Stiff	4 – 8	Penetrated over <sup>1</sup> / <sub>2</sub> -inch by thumb with moderate effort			
Dense	30 - 50	Difficult to penetrate with ½-inch rod driven with a 5-lb hammer	Stiff	8 – 15	Indented about <sup>1</sup> /2-inch by thumb but penetrated with great effort			
N D	> 50	penetrated only a few inches with 1/2-inch	Very Stiff	15 - 30	Readily indented by thumb			
very Dense	> 50	rod driven with a 5-lb hammer	Hard	> 30	Indented with difficulty by thumbnail			

USCS SOIL CLASSIFICATION							LOG SYMBOLS		
MAJOR DIVISIONS				GROUP DESCRIPTION			2S	2" OD Split	
	Gravel and	Gravel	62	GW	Well-graded Gravel			3" OD Split	
Coarse-	Gravelly Soils	(with little or no fines)	12	GP	Poorly Graded Gravel		3S	Spoon	
Grained	< 50% coarse fraction passes	Gravel		GM	Silty Gravel		NS	Non-Standard	
Soils	#4 sieve	(with >12% fines)		GC	Clayey Gravel			Spiit Spoon	
<50%	Sand and	Sand		SW	Well-graded Sand		ST	Shelby Tube	
passes #200 sieve	Sandy Soils >50% coarse fraction passes	(with little or no fines)	th little or no fines) SP Poorly graded Sand		CR	Core Run			
		Sand Silty Sand		Silty Sand		PC	Pag Sampla		
	#4 sieve	(with >12% fines)	[]]	SC	Clayey Sand		bU		
Fine-	<b>Silt</b> and <b>Clay</b> Liquid Limit < 50			ML	Silt		TV	Reading	
Grained				CL	Lean Clay	I	рр	Penetrometer Reading	
Solis				OL	Organic Silt and Clay (low plasticity)				
>50% passes #200 sieve	Silt and Clay			MH	Inorganic Silt		NR	No Recovery	
	Liquid	Liquid Limit > 50		СН	Inorganic Clay	$\Box$			
	Equil 2 milt > 50			OH	OH Organic <b>Clay</b> and <b>Silt</b> (med. to high plasticity)		GW	Groundwater Table	
Highly Organic Soils			Ð	РТ	Peat Top Soil	Ţ			

MODIFIERS			MOISTURE CONTENT			
	DESCRIPTION	RANGE	DESCRIPTION FIELD OBSERVATION			CLA
	Trace	<5%	Dry	Absence of moisture, dusty, dry to the touch		]
	Little	5% - 12%	Moist	Damp but not visible water	1	Gro
	Some	>12%	Wet	Visible free water	1.	010

MAJOR DIVISIONS WITH GRAIN SIZE								
SIEVE SIZE								
1	12" 3" 3/4" 4 10 40 200							
GRAIN SIZE (INCHES)								
12 3 0.75 0.19 0.079 0.0171 0.0029								
Pouldars	Cobblas	Gra	ivel		Sand		Silt and Clay	
Bounders	Jers Cobbles	Coarse	Fine	Coarse	Medium	Fine	Sint and Cray	

#### SOIL SSIFICATION INCLUDES

- oup Name
- Group Symbol 2.
- Color 3.
- 4. Moisture content
- Density / consistency 5.
- 6. Cementation
- 7. Particle size (if applicable)
- 8. Odor (if present)
- 9. Comments

Conditions shown on boring and testpit logs represent our observations at the time and location of the fieldwork, modifications based on lab test, analysis, and geological and engineering judgment. These conditions may not exist at other times and locations, even in close proximity thereof. This information was gathered as part of our investigation, and we are not responsible for any use or interpretation of the information by others.



# Appendix III

Site & Exploration Photographs



Subsurface soil profile within test-pit TP-1



View of site conditions near test-pit TP-4

Excavated spoils from ~9' BGS from test-pit TP-2



Subsurface soil profile within test-pit TP-5

PLATE 1: SITE & EXPLORATION PHOTOGRAPHS

PROJECT NO. 223-1666-1

#### SECTION 01 23 00 - ALTERNATES

#### PART 1 - GENERAL

#### 1.1 SUMMARY

A. This Section includes administrative and procedural requirements for alternates.

#### 1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

#### 1.3 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
- PART 2 PRODUCTS (Not Used)

#### PART 3 - EXECUTION

- 3.1 SCHEDULE OF ALTERNATES
  - A. **Bid Alternate #1A: HVAC Controls.** Add all materials and labor required to provide the work shown on drawings and associated specifications, as identified in the Contract Documents.
    - 1. Base Bid: No HVAC Controls.
    - 2. Bid Alternate #2A: Provide direct digital controls in accordance with Division 23 and the Contract Documents as manufactured by <u>Alerton</u>
  - B. **Bid Alternate #1B: HVAC Controls.** Add all materials and labor required to provide the work shown on drawings and associated specifications, as identified in the Contract Documents.
    - 1. Base Bid: No HVAC Controls.
    - 2. Bid Alternate #2B: Provide direct digital controls in accordance with Division 23 and the Contract Documents as manufactured by <u>Automated Logic</u>.

- C. **Bid Alternate #2: Distributed Antenna System.** Add all materials and labor required to provide the work shown on drawings and associated specifications, as identified in the Contract Documents.
  - 1. Base Bid: Provide testing of the radio frequency signal strength within the building once the building is totally enclosed including roof, exterior walls and exterior wall glazing installed, to determine if the Distributed Antenna System is necessary.
  - 2. Bid Alternate #2: Provide complete Distributed Antenna System in the building including antennas, coaxial cable, connectors, amplifiers, enclosures, conduit and wiring as described in Section 28 31 73.
    - a. Owner reserves the right to select this alternate until 45 days following the test to determine if the alternate is needed.
- D. **Bid Alternate #3: Maintenance Building.** Add all materials and labor required to provide the work shown on drawings and associated specifications, as identified in the Contract Documents.
  - 1. Base Bid: No Building
  - 2. Bid Alternate #3: Provide and construct stand-alone building. Reference sheet A3.30d and all drawings for additional requirements.
- E. **Bid Alternate #4: Storage Building.** Add all materials and labor required to provide the work shown on drawings and associated specifications, as identified in the Contract Documents.
  - 1. Base Bid: No Building
  - 2. Bid Alternate #4: Provide and construct stand-alone building. Reference sheet A3.30d and all drawings for additional requirements.
- F. **Bid Alternate #5: Commons TV Display Wall.** Add all materials and labor required to provide the work shown on drawings and associated specifications, as identified in the Contract Documents.
  - 1. Base Bid: No TV Display Wall, rough-in for power, data and support backing
  - 2. Bid Alternate #5: Provide and install TV Display Wall in Commons 134. Reference architectural and electrical drawings and specifications for additional requirements.
- G. **Bid Alternate #6: Pickle Ball Court and Equipment.** Add all materials and labor required to provide the work shown on drawings and associated specifications, as identified in the Contract Documents.
  - 1. Base Bid: No pickle ball court improvements
  - 2. Bid Alternate #6: Provide and install pickle ball court, acrylic surfacing, net and posts, striping and fencing. Reference architectural, civil, and landscape drawings. See the following specifications for additional requirements:
    - a. 32 17 24 Acrylic Surfacing for colored pickleball court surfacing and striping
    - b. 12 93 00 Site Furnishings for net and posts
    - c. 32 31 13 Chain Link Fencing and Gates for fence surrounding pickleball court and access gates.
    - d. See civil drawings and concrete specifications for the paving section and execution.
- H. **Bid Alternate #7: South Parcel Soil Placement** Add all materials and labor required to provide the work shown on drawings and associated specifications, as identified in the Contract Documents.
  - 1. Base Bid: No off-site soil hauling placement
  - 2. Bid Alternate #7: Include project scope to prepare south parcel for earthwork, then haul, place and compact excess soil to south property parcel. Reference architectural and civil drawings and Division 32 specifications for additional requirements.

- I. **Bid Alternate #8: Synthetic Turf** Add all materials and labor required to provide the work shown on drawings and associated specifications, as identified in the Contract Documents.
  - 1. Base Bid: No synthetic turf
  - 2. Bid Alternate #8: At select areas identified on the landscape drawings, omit natural sod and replace with a synthetic turf system, including delegated design requirements and shop drawings. Bid alternate 8 includes one volleyball court in synthetic turf. Reference architectural and landscape drawings. See the following specifications for additional requirements:
    - a. 32 18 13 Synthetic Turf for synthetic turf and volleyball court striping
    - b. 12 93 00 Site Furnishings for volleyball net and removeable posts

END OF SECTION 01 23 00

#### SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

- 1.1 SUMMARY
  - A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
  - B. Related Sections include the following:
    - 1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

#### 1.2 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

#### 1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
  - 2. Within 10 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
  - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Include costs of labor and supervision directly attributable to the change.
  - 5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - 6. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

- 1.4 CHANGE ORDER PROCEDURES
  - A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.
- 1.5 CONSTRUCTION CHANGE DIRECTIVE
  - A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
    - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
  - B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
    - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
- PART 2 PRODUCTS (Not Used)
- PART 3 EXECUTION (Not Used)

END OF SECTION 01 26 00

#### SECTION 01 29 00 - PAYMENT PROCEDURES

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
  - 1. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 2. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.
  - 3. Division 01 Section "Demonstration and Training" for invoicing approval regarding Schedule of Value line items for Owner's Training.

#### 1.2 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

#### 1.3 SCHEDULE OF VALUES A. Coordination: Coordinate

Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

- 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
  - a. Application for Payment forms with Continuation Sheets.
  - b. Submittals Schedule.
  - c. Contractor's Construction Schedule.
- 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- 3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
  - 1. Identification: Include the following Project identification on the Schedule of Values:
    - a. Project name and location.
    - b. Name of Architect.
    - c. Architect's project number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  - 2. Submit draft of Application and Certification for Payment with Continuation Sheets.
  - 3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
    - a. Related Specification Section or Division.
    - b. Description of the Work.
    - c. Name of subcontractor.
    - d. Name of manufacturer or fabricator.
    - e. Name of supplier.
    - f. Change Orders (numbers) that affect value.
    - g. Dollar value.
      - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
  - 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual

table of contents. Provide several line items for principal subcontract amounts, where appropriate. Include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training.

- 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
- 6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
  - a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
- 7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- 8. Provide separate line items in the Schedule of Values for each division of work, separating material and labor costs under each division.
- 9. Provide separate line item in the Schedule of Values for project closeout. Value of project closeout shall be 0.5% of the contract amount or \$10,000, whichever is greater.
- 10. Provide line items for both material and labor costs associated with the fabrication and installation of spandrel glazing.
- 11. Provide separate line items in the Schedule of Values for Owner's Training in the amount listed below each for:
  - a. Lighting Controls \$3,000
  - b. Automatic Temperature Controls \$3,000
  - c. Music Platform Lighting/Sound/Microphone Controls \$3,000
  - d. Boilers \$1,000
  - e. Water Heaters and Water Softener \$1,000
  - f. Chiller \$1,000
  - g. Fire Alarm \$1,000
  - h. Intercom Clock Training \$1,000
  - i. Intrusion and Access Control \$1,000
  - j. Irrigation Controls \$1,000
  - k. Athletic Equipment and Bleachers \$1,000
  - I. Operable Partition Doors \$1,000
  - m. Food Service Equipment \$1,000

Once training is complete and approved by Owner for each system, the above individual training line items in Schedule of Value can be invoiced. See specification 01 79 00.

- 12. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
- 13. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
- 14. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

#### 1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
  - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

- C. Payment Application Times: The Owner's payment process "cut off dates" will be provided to the contractor. The period covered by each Application for Payment is one month, ending on the last day of the month.
- D. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- E. Payment Application Forms: Use forms provided by Owner for Applications for Payment. Sample copies are included at end of this Section.
- F. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
  - 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
  - 2. Include amounts of Change Orders (and Construction Change Directives—if used) issued before last day of construction period covered by application.
- G. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
  - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
  - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit final or full waivers.
  - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  - 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- I. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
  - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit final or full waivers.
  - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  - 4. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  - 5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- J. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  - 1. List of subcontractors.
  - 2. Schedule of Values.
  - 3. Contractor's Construction Schedule (preliminary if not final).
  - 4. Products list.
  - 5. Schedule of unit prices.
  - 6. Submittals Schedule (preliminary if not final).
  - 7. List of Contractor's staff assignments.
  - 8. List of Contractor's principal consultants.
  - 9. Copies of building permits.
  - 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  - 11. Initial progress report.
  - 12. Report of preconstruction conference.
  - 13. Certificates of insurance and insurance policies.
  - 14. Performance and payment bonds.

- 15. Data needed to acquire Owner's insurance.
- 16. Initial settlement survey and damage report if required.
- 17. Labor and Industries required Intent to Pay Prevailing Wage statements.
- K. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 97 percent completion for portion of the Work claimed as substantially complete.
  - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  - 2. This application shall reflect Certificates of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- L. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
  - 1. Evidence of completion of Project closeout requirements.
  - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  - 3. Updated final statement, accounting for final changes to the Contract Sum.
  - 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
  - 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
  - 6. AIA Document G707, "Consent of Surety to Final Payment."
  - 7. Evidence that claims have been settled.
  - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
  - 9. Labor and Industries required Affidavit of Prevailing Wage Paid statements.
  - 10. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

#### SECTION 01 31 00 - PROJECT MANAGEMENT & COORDINATION

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. Coordination Drawings.
  - 2. Administrative and supervisory personnel.
  - 3. Project meetings.
  - 4. Requests for Interpretation (RFIs).
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.
- C. Related Sections include the following:
  - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
  - 2. Division 01 Section "Execution" for procedures for coordinating general installation and fieldengineering services, including establishment of benchmarks and control points.
  - 3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

#### 1.2 DEFINITIONS

A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

#### 1.3 COORDINATION

- A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different sections, that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
  - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
  - 5. Coordinate sequence and space requirements above the ceiling for lighting, power, telecommunications, fire alarm, fire sprinkler, plumbing and fire sprinkler lines. Provide all necessary support and coordination to allow installation of above ceiling utilities within the available space between structural members and the ceilings heights indicated in the drawings.
- B. Verify characteristics of elements of interrelated operating equipment are compatible; coordinate work of various contractors having interdependent responsibilities for installing, connection to, and providing service, for such equipment
- C. Coordinate space requirements and concealed installation of mechanical and electrical work which are indicated diagrammatically on drawings. Following routing shown for pipes, ducts, and conduits, as closely as practicable; make runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs
- D. In finished areas except as otherwise shown, conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements
- E. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

Orion High School Pasco, Washington

- F. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's Construction Schedule.
  - 2. Preparation of the Schedule of Values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Preinstallation conferences.
  - 7. Project closeout activities.
  - 8. Startup and adjustment of systems.
  - 9. Project closeout activities.
- G. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.
- 1.4 SUBMITTALS
  - A. Initial and complete submittals shall be received no later than **100 days** after the Notice to Proceed for review and comment. Failure to comply with this deadline shall constitute breach of contract, and shall be subject to liquidated damages.
  - B. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
    - 1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
      - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
      - b. Indicate required installation sequences.
      - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
    - 2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
    - 3. Number of Copies: Submit three copies of each submittal. Architect, will return one copy.
      - a. Electronic submittal copies to be considered. Final determination to be made at Pre-Construction meeting.
    - 4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
  - C. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
    - 1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

#### 1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. General: In addition to full-time project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

- 1. Include special personnel required for coordination of operations with other contractors.
- 2. General Superintendent this individual will represent the general contractor primarily, and will be responsible for coordination of contractors, safety, technical aspects of the construction, maintenance of the schedule, generation of Requests for Information and similar duties. This

individual will be responsible for pre-installation meetings, maintenance of as-built drawings, shop drawing and submittal coordination and distribution, monitoring and logging of site visits, and other functions typical of a Quality Control Officer. This position will also be responsible for coordination with subcontractors and vendors.

- 3. Contractor's staff shall be responsible for computer generated (e-mail), phone, and fax, messages, job-site filing, correspondence, distribution of minutes, drafts of pay applications and generally ensures that the job office is staffed during the normal work week hours of operation.
- 4. The contractor may distribute the duties among their personnel in any manner acceptable to the owner.
- 5. The contractor must provide the name and phone number of a designated local employee or resident who is generally available evenings and weekends to respond to emergencies on the job-site. This is not an on-call position, but the phone number must be provided with an answering machine / voicemail to ensure a timely response.
- 6. Inform Architect and Owner, in writing, of the name, address and telephone of the designated local employee.

#### 1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
  - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
  - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  - 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within five days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner, and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
  - 1. Architect/ Engineer will administer preconstruction conference for execution of Owner -Contractor Agreement, clarification of Owner and Contractor responsibilities in use of site, review of administrative procedures, and exchange of preliminary submittals
  - 2. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 3. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
      - b. Phasing.
      - c. Critical work sequencing and long-lead items.
      - d. Designation of key personnel and their duties.
      - e. Procedures for processing field decisions and Change Orders.
      - f. Procedures for RFIs.
      - g. Procedures for testing and inspecting.
      - h. Procedures for processing Applications for Payment.
      - i. Distribution of the Contract Documents.
      - j. Submittal procedures.
      - k. Preparation of Record Documents.
      - I. Use of the premises and existing building.
      - m. Work restrictions.
      - n. Owner's occupancy requirements.
      - o. Responsibility for temporary facilities and controls.
      - p. Construction waste management and recycling.
      - q. Parking availability.
      - r. Office, work, and storage areas.
      - s. Equipment deliveries and priorities.
      - t. First aid.

- u. Security.
- v. Progress cleaning.
- w. Working hours.
- 4. Minutes: Architect will record and distribute meeting minutes.
- C. Progress & Coordination Meetings: Conduct progress meetings at approximately weekly intervals. Coordinate dates of meetings with preparation of payment requests.
  - 1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site utilization.
      - 8) Temporary facilities and controls.
      - 9) Work hours.
      - 10) Hazards and risks.
      - 11) Progress cleaning.
      - 12) Quality and work standards.
      - 13) Status of correction of deficient items.
      - 14) Field observations.
      - 15) RFIs.
      - 16) Status of proposal requests.
      - 17) Pending changes.
      - 18) Status of Change Orders.
      - 19) Pending claims and disputes.
      - 20) Documentation of information for payment requests.
  - 3. Minutes: Contractor shall Record the meeting minutes.
  - 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
    - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

#### 1.7 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
  - 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.

- 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- 3. Submit each RFI with the cover tracking transmittal form provided at the end of this sectionB. Content of the RFI: Include a detailed, legible description of item needing interpretation and the
  - following:
    - 1. Project name.
    - 2. Date.
    - 3. Name of Contractor.
    - 4. Name of Architect.
    - 5. RFI number, numbered sequentially.
    - 6. Specification Section number and title and related paragraphs, as appropriate.
    - 7. Drawing number and detail references, as appropriate.
    - 8. Field dimensions and conditions, as appropriate.
    - 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
    - 10. Contractor's signature.
    - 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
      - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Hard-Copy RFIs: Cover transmittal form at end of this Section.
  - 1. Identify each page of attachments with the RFI number and sequential page number.
- D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
  - 1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- E. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow seven working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
  - 1. The following RFIs will be returned without action:
    - a. Requests for approval of submittals.
      - b. Requests for approval of substitutions.
      - c. Requests for coordination information already indicated in the Contract Documents.
      - d. Requests for adjustments in the Contract Time or the Contract Sum.
      - e. Requests for interpretation of Architect's actions on submittals.
      - f. Incomplete RFIs or RFIs with numerous errors.
  - 2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
  - Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 7 days of receipt of the RFI response.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
- G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly:
  - 1. Project name.
  - 2. Name and address of Contractor.
  - 3. Name and address of Architect.
  - 4. RFI number including RFIs that were dropped and not submitted.
  - 5. RFI description.
  - 6. Date the RFI was submitted.
  - 7. Date Architect's response was received.

- 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00



830 N. Columbia Center Blvd, Suite E Kennewick, WA 99336 509.783.2244

## **RFI TRANSMITTAL**

### Project: Orion High School

Contractor:	T.B.D.
Architect:	Design West Architects
Structural:	Meier Engineering
Mechanical:	MSI Engineers
Electrical:	Coffman Engineers
Civil:	Knutzen Engineering
Landscape:	MacKay+Sposito

Date:	RFI Number:
Specification/ Drawing Reference:	Description:

Company/Contact	Date Sent	Date Rec'd	Comments
From:			
То:			
From:			
То:			
From:			
То:			
From:			
То:			
From:			
То:			
From:			
То:			

Notes/Instructions/Routing (Date/Initial all Comments):

This Transmittal Shall Remain With RFI at All Times

#### SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Preliminary Construction Schedule.
  - 2. Contractor's Construction Schedule.
  - 3. Submittals Schedule.
  - 4. Daily construction reports.
  - 5. Material location reports.
  - 6. Field condition reports.
  - 7. Special reports.
  - 8. Permits and Fees
  - B. Related Sections include the following:
    - 1. Division 01 Section "Payment Procedures" for submitting the Schedule of Values.
    - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
    - 3. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
    - 4. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

#### 1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
  - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
  - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
  - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- H. Major Area: A story of construction, a separate building, or a similar significant construction element.
- I. Milestone: A key or critical point in time for reference or measurement.
- J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- K. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

- 1.3 SUBMITTALS
  - A. Qualification Data: For scheduling consultant.
  - B. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
    - 1. Scheduled date for first submittal.
    - 2. Specification Section number and title.
    - 3. Submittal category (action or informational).
    - 4. Name of subcontractor.
    - 5. Description of the Work covered.
    - 6. Scheduled date for Architect's final release or approval.
  - C. Preliminary Construction Schedule: Submit two opaque copies.
    - 1. Approval of cost-loaded preliminary construction schedule will not constitute approval of Schedule of Values for cost-loaded activities.
  - D. Preliminary Network Diagram: Submit two opaque copies, large enough to show entire network for entire construction period. Show logic ties for activities.
  - E. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
    - 1. Submit an electronic copy of schedule, using software indicated, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.
  - F. CPM Reports: Concurrent with CPM schedule, submit three copies of each of the following computergenerated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
    - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
    - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
    - 3. Total Float Report: List of all activities sorted in ascending order of total float.
    - 4. Earnings Report: Compilation of Contractor's total earnings from commencement of the Work until most recent Application for Payment.
  - G. Daily Construction Reports: Allow Owner and Architect to review Daily Construction reports upon request.

#### 1.4 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:
  - 1. Review software limitations and content and format for reports.
  - 2. Verify availability of qualified personnel needed to develop and update schedule.
  - 3. Discuss constraints, including phasing, area separations and partial Owner occupancy.
  - 4. Review delivery dates for Owner-furnished products.
  - 5. Review schedule for work of Owner's separate contracts.
  - 6. Review time required for review of submittals and resubmittals.
  - 7. Review requirements for tests and inspections by independent testing and inspecting agencies.
  - 8. Review time required for completion and startup procedures.
  - 9. Review and finalize list of construction activities to be included in schedule.
  - 10. Review submittal requirements and procedures.
  - 11. Review procedures for updating schedule.

#### 1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

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

#### PART 2 - PRODUCTS

#### 2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
  - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
  - 2. Initial Submittal: Submit concurrently with preliminary network diagram. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
    - a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.
  - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

#### 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
  - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  - 3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
  - 4. Startup and Testing Time: Include not less than 14 days for startup and testing.
  - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
  - 1. Phasing: Arrange list of activities on schedule by phase.
  - 2. Work under More Than One Contract: Include a separate activity for each contract.
  - 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  - 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  - 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  - 6. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.

- b. Limitations of continued occupancies.
- c. Uninterruptible services.
- d. Partial occupancy before Substantial Completion.
- e. Use of premises restrictions.
- f. Provisions for future construction.
- g. Seasonal variations.
- h. Environmental control.
- 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
  - a. Subcontract awards.
  - b. Submittals.
  - c. Purchases.
  - d. Mockups.
  - e. Fabrication.
  - f. Sample testing.
  - g. Deliveries.
  - h. Installation.
  - i. Tests and inspections.
  - j. Adjusting.
  - k. Curing.
  - I. Startup and placement into final use and operation.
- 8. Area Separations: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
  - a. Structural completion.
  - b. Permanent space enclosure.
  - c. Completion of mechanical installation.
  - d. Completion of electrical installation.
  - e. Substantial Completion.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion, and the interim milestones defined in Section 01 10 00.
- F. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
  - 1. Refer to Division 01 Section "Payment Procedures" for cost reporting and payment procedures.
  - 2. Contractor shall assign cost to construction activities on the CPM schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Architect's approval, be assigned to fabrication and delivery activities. Costs shall be under required principal subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
  - 3. Each activity cost shall reflect an accurate value subject to approval by Architect.
  - 4. Total cost assigned to activities shall equal the total Contract Sum.
- G. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.
- H. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

#### 2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Preliminary Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

- C. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized time-scaled CPM network analysis diagram for the Work.
  - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
    - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
  - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
  - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  - 4. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
  - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a. Preparation and processing of submittals.
    - b. Mobilization and demobilization.
    - c. Purchase of materials.
    - d. Delivery.
    - e. Fabrication.
    - f. Utility interruptions.
    - g. Installation.
    - h. Work by Owner that may affect or be affected by Contractor's activities.
    - i. Testing and commissioning.
  - 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
  - 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
  - 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
  - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float"
  - sort. Identify critical activities. Prepare tabulated reports showing the following:
    - 1. Contractor or subcontractor and the Work or activity.
    - 2. Description of activity.
    - 3. Principal events of activity.
    - 4. Immediate preceding and succeeding activities.
    - 5. Early and late start dates.
    - 6. Early and late finish dates.
    - 7. Activity duration in workdays.
    - 8. Total float or slack time.
    - 9. Average size of workforce.
    - 10. Dollar value of activity (coordinated with the Schedule of Values).
- F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
  - 1. Identification of activities that have changed.
  - 2. Changes in early and late start dates.
  - 3. Changes in early and late finish dates.
  - 4. Changes in activity durations in workdays.
  - 5. Changes in the critical path.
  - 6. Changes in total float or slack time.

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- 7. Changes in the Contract Time.
- G. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
  - 1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
  - 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
  - 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
  - 4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
    - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
    - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

#### 2.4 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

- 1. List of subcontractors at Project site.
- 2. List of separate contractors at Project site.
- 3. Approximate count of personnel at Project site.
- 4. Equipment at Project site.
- 5. Material deliveries.
- 6. High and low temperatures and general weather conditions.
- 7. Accidents.
- 8. Meetings and significant decisions.
- 9. Unusual events (refer to special reports).
- 10. Stoppages, delays, shortages, and losses.
- 11. Meter readings and similar recordings.
- 12. Emergency procedures.
- 13. Orders and requests of authorities having jurisdiction.
- 14. Change Orders received and implemented.
- 15. Construction Change Directives received and implemented.
- 16. Services connected and disconnected.
- 17. Equipment or system tests and startups.
- 18. Partial Completions and occupancies.
- 19. Substantial Completions authorized.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

#### 2.5 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

#### 2.6 PERMIT AND UTILITIES FEES

- A. The Owner will pay plan check fees, building permit costs and permanent utility connection and area charges and these costs shall not be included in the bid amount. Owner shall pay an independent soils or testing laboratory for all testing and inspection as required by local and state agencies and these specifications. These costs shall not be treated as an allowance amount.
- B. The Contractor shall pay for costs for any other permits or inspection fees, temporary utility connections, and the cost of all utility use until substantial completion. Costs for other permits and

inspection fees, temporary connections, and utility use shall be included in the bid amount. These costs shall not be treated as an allowance amount.

- C. All sub-trade plan review, permit, inspection, licensing, and related costs shall be included in the cost of the work, and shall not be treated as an allowance amount.
- D. Contractor shall provide a detail itemized cost estimate for all work associated with infrastructure and ROW Improvements that will be inspected and Owned by the City of Pasco to the Public Works Department. After the Public Works Department has reviewed the estimate, a Construction Inspection Fee invoice will be issued to the School District to cover all inspections performed by the City. This invoice must be paid prior to the start of construction.

#### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
  - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  - 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. Post copies in Project meeting rooms and temporary field offices.
  - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 32 00

#### SECTION 01 33 00 - SUBMITTAL PROCEDURES

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
  - 1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
  - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
  - 3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
  - 4. Division 01 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
  - 5. Division 01 Section "Closeout Procedures" for submitting warranties.
  - 6. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 7. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  - 8. Division 01 Section "Demonstration and Training" for submitting videotapes of demonstration of equipment and training of Owner's personnel.
  - 9. Divisions 02 through 33 Sections for specific requirements for submittals in those Sections.
- C. Initial and complete submittals shall be received no later than **120 days** after Notice to Proceed for review and comment. Failure to comply with this deadline shall constitute breach of contract, and shall be subject to liquidated damages. All submittals shall be processed to allow timely completion of all work within the time limits and deadlines defined in Section 01 10 00.

#### 1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

#### 1.3 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

- 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
- 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
- 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
- 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
- E. Identification: Transmit all submittals using the submittal transmittal tracking form provided following this specification section. Place a permanent label or title block on each submittal for identification.
  - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
  - 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
  - 3. Include the following information on label for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name and address of Architect.
    - d. Name and address of Contractor.
    - e. Name and address of subcontractor.
    - f. Name and address of supplier.
    - g. Name of manufacturer.
    - h. Submittal number or other unique identifier, including revision identifier.
      - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06 10 00.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06 10 00.01.A).
    - i. Number and title of appropriate Specification Section.
    - j. Drawing number and detail references, as appropriate.
    - k. Location(s) where product is to be installed, as appropriate.
    - I. Other necessary identification.
- F. Deviations: Encircle or otherwise specifically identify deviations from the Contract Documents on submittals.
- G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
  - 1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
  - 2. Additional copies submitted for maintenance manuals will be marked with action taken and will be returned.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form provided at the end of this section. Architect will return submittals, without review received from sources other than Contractor.
  - 1. Transmittal Form: Use facsimile of sample form at end of Section.
  - 2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
  - 1. Provide sign-off of each submittal by all affected sub-contractors

- 2. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions
- K. Use for Construction: Use only final submittals with mark indicating action taken by Architect.
- 1.4 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES
  - A. General: At Contractor's written request, copies of Architect's CAD files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
    - 1. The recipient agrees, to the fullest extent permitted by law, to indemnify and hold harmless the Design Team, its officers, directors, employees and sub-consultants against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising from any changes made by anyone or from any reuse of the electronic files.
    - 2. Under no circumstances shall delivery of electronic files for use by the recipient be deemed a sale by the Design Team, and the Design Team makes no warranties, either expressed or implied, of merchantability and fitness for any particular purpose. In no event shall the Design Team be liable for indirect or consequential damages as a result of the Contractor's use or reuse of the electronic files

#### PART 2 - PRODUCTS

- 2.1 SUBMITTALS
  - A. General: Prepare and submit Submittals required by individual Specification Sections.
  - B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
    - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
    - 2. Mark each copy of each submittal to show which products and options are applicable.
    - 3. Include the following information, as applicable:
      - a. Manufacturer's written recommendations.
        - b. Manufacturer's product specifications.
        - c. Manufacturer's installation instructions.
        - d. Standard color charts.
        - e. Manufacturer's catalog cuts.
        - f. Wiring diagrams showing factory-installed wiring.
        - g. Printed performance curves.
      - h. Operational range diagrams.
      - i. Mill reports.
      - j. Standard product operation and maintenance manuals.
      - k. Compliance with specified referenced standards.
      - I. Testing by recognized testing agency.
      - m. Application of testing agency labels and seals.
      - n. Notation of coordination requirements.
    - 4. Submit Product Data before or concurrent with Samples.
    - 5. Number of Copies: Submit five copies of Product Data, unless otherwise indicated. Architect will return three copies. Mark up and retain one returned copy as a Project Record Document.
  - C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
    - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
      - a. Dimensions.
      - b. Identification of products.
      - c. Fabrication and installation drawings.
      - d. Roughing-in and setting diagrams.
      - e. Wiring diagrams showing field-installed wiring, including power, signal, & control wiring.
      - f. Shopwork manufacturing instructions.
      - g. Templates and patterns.

- h. Schedules.
- i. Design calculations.
- j. Compliance with specified standards.
- k. Notation of coordination requirements.
- I. Notation of dimensions established by field measurement.
- m. Relationship to adjoining construction clearly indicated.
- n. Seal and signature of professional engineer if specified.
- o. Wiring Diagrams: Differentiate between manufacturer-installed & field-installed wiring.
- 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
- 3. Number of Copies: Submit three copies of each submittal, unless more copies are required for operation and maintenance manuals. Architect will retain one copy; one copy will be provided to the owner and the remainder copies will be returned to the Contractor. Mark up and retain returned copy as a Project Record Drawing.
  - a. Electronic submittal copies to be considered. Final determination to be made at Pre-Construction meeting.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
  - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  - 2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of appropriate Specification Section.
  - 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  - 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
  - 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
    - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
      - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
  - 1. Type of product. Include unique identifier for each product.
  - 2. Number and name of room or space.
  - 3. Location within room or space.
  - 4. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. Architect, will return two copies.
    - a. Mark up and retain one returned copy as a Project Record Document.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation" for Construction Manager's action.
- G. Submittals Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- H. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- I. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- J. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.
  - Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated.
    a. Mark up and retain one returned copy as a Project Record Document.
- 2.2 INFORMATIONAL SUBMITTALS

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- General: Prepare and submit Informational Submittals required by other Specification Sections.
  - 1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
  - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
  - 3. Test and Inspection Reports: Comply with requirements specified in Division 01 Section "Quality Requirements."
- B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- C. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

- J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - 1. Name of evaluation organization.
  - 2. Date of evaluation.
  - 3. Time period when report is in effect.
  - 4. Product and manufacturers' names.
  - 5. Description of product.
  - 6. Test procedures and results.
  - 7. Limitations of use.
- M. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."
- N. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- O. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- P. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- Q. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- R. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- S. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
  - 1. Preparation of substrates.
  - 2. Required substrate tolerances.
  - 3. Sequence of installation or erection.
  - 4. Required installation tolerances.
  - 5. Required adjustments.
  - 6. Recommendations for cleaning and protection.
- T. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
  - 1. Name, address, and telephone number of factory-authorized service representative making report.
  - 2. Statement on condition of substrates and their acceptability for installation of product.
  - 3. Statement that products at Project site comply with requirements.
  - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

- 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
- 6. Statement whether conditions, products, and installation will affect warranty.
- 7. Other required items indicated in individual Specification Sections.
- U. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- V. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.
  - 1. Architect will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

#### 2.3 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

#### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

#### 3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 33 00



830 N. Columbia Center Blvd, Suite E Kennewick, WA 99336 509.783.2244

## SUBMITTAL TRANSMITTAL Project: Orion High School

# Contractor:T.B.D.Architect:Design West ArchitectsStructural:Meier EngineeringMechanical:MSI EngineersElectrical:Coffman EngineersCivil:Knutzen EngineeringLandscape:MacKay+Sposito

Date:	Submittal Number:
Specification/ Drawing Reference:	Description:

Company/Contact	Date Sent	Date Rec'd	Comments
From:			
То:			
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Notes/Instructions/Routing (Date/Initial all Comments):

This Transmittal Shall Remain With SUBMITTAL at All Times

#### SECTION 01 40 00 - QUALITY REQUIREMENTS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other qualityassurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
  - 4. Contractor to confirm at completion of construction that no known asbestos material or product was installed during construction. Contractor to complete and submit the last page of this section Construction Material Asbestos Statement.

#### C. Building Envelope Mock-Up

- D. Related Sections include the following:
  - 1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
  - 2. Division 01 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
  - 3. Divisions 02 through 33 Sections for specific test and inspection requirements.

#### 1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.
- D. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- J. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

#### 1.3 CONFLICTING REQUIREMENTS

- A. In the event of a conflict or discrepancy among or in the Contract Documents, interpretation shall be governed in the following priority, with an Addendum or a revision to a Contract Document having precedence over the original document and later Addenda having precedence over earlier:
  - 1. Agreement (revised A101-2007) (written amendments having precedence)
  - 2. Any Supplementary Conditions
  - 3. These revised General Conditions (A201-2007)
  - 4. Addenda, with those of later date having precedence over those of earlier date
  - 5. Division 1 of the Specifications
  - 6. Drawings and Divisions 2 through 50 of the Specifications
  - 7. Material and systems schedules
  - 8. Other Documents specifically enumerated in the Agreement as part of the Contract Documents.
- B. General: If there is an inconsistency in the Contract Drawings, or between the Contract Drawings and the Specifications, unless otherwise ordered in writing by the Architect or the Owner, the Contractor shall provide the better quality of, or the greater quantity of, work or materials regardless of cost to the Contractor, with no delay to the project schedule. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- 1.4 SUBMITTALS
  - A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
  - B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
    - 1. Specification Section number and title.
    - 2. Description of test and inspection.
    - 3. Identification of applicable standards.
    - 4. Identification of test and inspection methods.
    - 5. Number of tests and inspections required.
    - 6. Time schedule or time span for tests and inspections.
    - 7. Entity responsible for performing tests and inspections.
    - 8. Requirements for obtaining samples.
    - 9. Unique characteristics of each quality-control service.
  - C. Reports: Prepare and submit certified written reports that include the following:
    - 1. Date of issue.
    - 2. Project title and number.
    - 3. Name, address, and telephone number of testing agency.
    - 4. Dates and locations of samples and tests or inspections.
    - 5. Names of individuals making tests and inspections.
    - 6. Description of the Work and test and inspection method.
    - 7. Identification of product and Specification Section.
    - 8. Complete test or inspection data.
- 9. Test and inspection results and an interpretation of test results.
- 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
- 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
- 12. Name and signature of laboratory inspector.
- 13. Recommendations on retesting and reinspecting.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

## 1.5 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.

- d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
- e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
- f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
- 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
  - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
  - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
  - Obtain Architect's approval of mockups before starting work, fabrication, or construction.
     a. Allow seven days for initial review and each re-review of each mockup.
  - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  - 6. Demolish and remove mockups when directed, unless otherwise indicated.
- K. Special Building Envelope Mockup: Before installing portions of the Work involving the exterior building wall the Contractor shall construct a mockup complying with the following requirements using materials accepted through the submittal process:
  - Construct a freestanding 8' wide x 12' long mockup representative of the finished building wall demonstrating the relationships and installation sequences of the various wall components. The mockup shall contain all of the building elements comprising the construction of the exterior building wall including, but not limited to, the following elements: weather barriers, air barrier, building finishes, windows, curtain wall, louvers, vents, wall panel system, electrical and plumbing penetrations, flashings and sealants. A portion of the mockup wall shall be constructed to show the interior wall insulation and vapor barrier installation.
  - 2. The mockup shall demonstrate the proposed range of aesthetic effects and workmanship.
  - 3. The mockup shall be located on site at a location determined by the Contractor to minimize disruption to other site activities. The mockup shall remain in place until the exterior building envelop work is reviewed and accepted (punch list completed). The mockup shall then be demolished and removed.
  - 4. The mockup shall be used as a standard for judging the completed work.
  - 5. In lieu of a free-standing mockup, at the Contractor's option, a portion of the building containing the required building elements may be designated as the mockup. If a portion of the building is designated as a mockup that area shall be maintained during construction in an undisturbed condition. The mockup shall remain in place until such time that the remainder of the building envelope is complete.
  - 6. The mockup shall be constructed to delineate the installation of the following three exterior phases of work:
    - A. Building sheathing installation (screw pattern attachment), weather barrier installation (including flashing of all typical wall penetrations) and installation of the work shown in the typical Exterior Openings Flashing detail shown in the drawings.
    - B. Installation of the masonry wall base flashing, mortar netting, weep holes, coursing/block types and metal flashing associated with wall openings.
    - C. Installation of windows, louvers, wall panel system and remaining flashings and sealants.

- 7. The mockup shall not be constructed until the submittals for each portion of the work have been submitted and reviewed. For portions of the work requiring Pre-Construction meetings the Pre-Construction meeting shall occur prior to the construction of the mockup.
- 8. Submitted and reviewed samples for portions of the work, window samples for example, may be used in the freestanding mockup upon request of the Contractor.

# L. Asbestos

- 1. The Contract Documents for this project have been prepared in accordance with generally accepted professional architectural and engineering practices. Accordingly, no asbestos or products containing asbestos have been knowingly specified for this project. Notify the Architect immediately for instruction if -
- 2. Materials containing asbestos are brought to the site for inclusion in the Work.
- 3. Asbestos materials are encountered in any existing structures upon which work is being performed.
- 4. At Architect's direction and with owner's approval, an independent testing laboratory will perform testing procedures on suspect materials.
- 5. Contractor shall certify that based upon his best knowledge, information, inspection and belief no building materials containing asbestos were used in the construction of the project. Submit certification on form provided by Owner. Sample form follows this section.

# 1.6 QUALITY CONTROL

- A. General Contractor Responsibilities:
  - 1. General Contractor shall maintain quality control over suppliers, manufacturers, products, services, site conditions and workmanship, to produce work of specified quality
  - 2. General Contractor shall provide certification that all construction is asbestos free at project closeout. Provide certification that all products and materials used are asbestos free.
  - 3. General Contractor and all Sub-Contractors shall comply with indicated tolerances except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship
  - 4. General Contractor and all subcontractors shall perform work by persons qualified to produce workmanship of specified quality. <u>Inability to perform such work is a demonstration of lack of qualification</u>
  - 5. Comply with manufacturer's instruction in full detail, including each step in sequence. Should instruction conflict with Contract Documents, request clarification from Manufacturer, and/or Architect/Engineer before proceeding
  - 6. When required by individual Specification Section, submit manufacturer's certificate, in duplicate, that products meet or exceed specified requirements
  - 7. When respective Specification Sections and/or plans require manufacturers to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, manufacturer shall make appropriate recommendations. Submit written report to Architect/Engineer listing observations and recommendations
- B. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
  - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  - 2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
  - 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- C. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities

having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

- 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
  - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
- 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
- 3. All testing shall be witnessed by Architect/Engineer and/or school district with 24-hour notification.
- 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service. Reports will be submitted to Architect/Engineer in duplicate or as required, non-conforming reports shall also be submitted to the school district.
- 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
- 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Architect/Engineer and/or school district may issue non-conformance reports to the contractor covering apparent non-conformance with the requirements of the contract documents
  - 1. Advise the Owner and/or Architect/Engineer when complete and ready for inspection:
    - a. Above ceiling
    - b. Finished areas
    - c. Finished exterior and sitework
    - d. Finished roof
- G. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
  - 1. Notify Architect, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  - 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar qualitycontrol service through Contractor.
  - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  - 6. Do not perform any duties of Contractor.
- H. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
  - 1. Contractor shall coordinate with Testing Laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested
    - a. Notify Architect/Engineer and Testing Laboratory 24 hours prior to expected time for operations requiring testing services
    - b. Make arraignments with Testing Laboratory and pay for additional samples and tests for Contractor's convenience
  - 2. Access to the Work.

- 3. Incidental labor and facilities necessary to facilitate tests and inspections.
- 4. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
- 5. Facilities for storage and field curing of test samples.
- 6. Delivery of samples to testing agencies.
- 7. Preliminary design mix proposed for use for material mixes that require control by testing agency.
- 8. Security and protection for samples and for testing and inspecting equipment at Project site.
- I. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- J. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar qualitycontrol services required by the Contract Documents. Submit schedule within 30 days of date established for the Notice to Proceed.
  - 1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

## 1.7 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency, and/or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
- B. Special Tests and Inspections: Conducted by a qualified testing agency, and/or special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
  - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
  - 2. Notifying Architect, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect, with copy to Contractor and to authorities having jurisdiction.
  - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  - 6. Retesting and reinspecting corrected work.
- PART 2 PRODUCTS (Not Used)

# PART 3 - EXECUTION

# 3.1 TEST AND INSPECTION LOG

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

## 3.2 CONSTRUCTION MATERIAL ASBESTOS STATEMENT

A. Upon completion of construction, contractor shall submit the Construction Material Asbestos Statement.

- 1. Complete and submit the last page of this section Construction Material Asbestos Statement.
- 3.3 REPAIR AND PROTECTION
  - A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
    - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
    - 2. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching."
  - B. Contractor shall respond to and/or correct apparent non-conformance with the contract documents as required within 48 hours or before work proceeds. Non-conformance affecting life or property shall be corrected immediately.
  - C. Contractor shall notify school district Representative 24 hours before arriving on site to perform any correction or remedial work. Failure to notify the school district may jeopardize acceptance of such work.
  - D. Protect construction exposed by or for quality-control service activities.
  - E. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

# CONSTRUCTION MATERIAL ASBESTOS STATEMENT

**Building Name:** 

Building Address:

**Building Owner:** 

Completion Date:

As GENERAL CONTRACTOR in charge of construction; based on my best knowledge, information, inspection and belief; I certify that on the above-referenced building no asbestos containing building materials were used in the construction.

Date

General Contractor in Charge

Company Name

END OF SECTION 01 40 00

## SECTION 01 42 00 - REFERENCES

## PART 1 - GENERAL

### 1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

## 1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.
- D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the organizations responsible for the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point	(215) 697-6257

		http://dodssp.daps.dla.mil	
	DSCC	Defense Supply Center Columbus (See FS)	
	FED-STD	Federal Standard (See FS)	
	FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-6257
		Available from Defense Standardization Program www.dps.dla.mil	
		Available from General Services Administration www.gsa.gov	(202) 619-8925
		Available from National Institute of Building Sciences www.nibs.org	(202) 289-7800
	FTMS	Federal Test Method Standard (See FS)	
	MIL	(See MILSPEC)	
	MIL-STD	(See MILSPEC)	
	MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-6257
	UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
1.3	<ul> <li>ABBREVIATIONS AND ACRONYMS</li> <li>Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Document they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" of Columbia Books' "National Trade &amp; Professional Associations of the U.S."</li> <li>Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Document they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.</li> </ul>		tions or other Contract Documents, 'Encyclopedia of Associations" or in tions or other Contract Documents, elephone numbers, and Web sites te of the Contract Documents.
	AA	Aluminum Association, Inc. (The) www.aluminum.org	(703) 358-2960
	AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	(216) 241-7333
	AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
	AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
	AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
	AATCC	American Association of Textile Chemists and Colorists (The) www.aatcc.org	(919) 549-8141

ABAA	Air Barrier Association of America www.airbarrier.org	(866) 956-5888
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	ACI International (American Concrete Institute) www.aci-int.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts, Inc. www.aosaseed.com	(505) 522-1437
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989

API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9585
AWCI	AWCI International (Association of the Wall and Ceiling Industry International) www.awci.org	(703) 534-8300
AWCMA	American Window Covering Manufacturers Association (Now WCSC)	
AWI	Architectural Woodwork Institute www.awinet.org	(800) 449-8811 (703) 733-0600
AWPA	American Wood-Preservers' Association www.awpa.com	(334) 874-9800
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
BICSI	BICSI www.bicsi.org	(800) 242-7405 (813) 979-1991
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International) www.bifma.com	(616) 285-3963
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772

CCC	Carpet Cushion Council www.carpetcushion.org	(203) 637-1312
CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CEA	Canadian Electricity Association www.canelect.ca	(613) 230-9263
CFFA	Chemical Fabrics & Film Association, Inc. www.chemicalfabricsandfilm.com	(216) 241-7333
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPA	Composite Panel Association www.pbmdf.com	(301) 670-0604
CPPA	Corrugated Polyethylene Pipe Association www.cppa-info.org	(800) 510-2772 (202) 462-9607
CRI	Carpet & Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-4000
CSI	Cast Stone Institute www.caststone.org	(770) 972-3011
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
СТІ	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500

EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee www.ejdc.org	(703) 295-5000
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
ESD	ESD Association www.esda.org	(315) 339-6937
FMG	FM Global (Formerly: FM - Factory Mutual System) www.fmglobal.com	(401) 275-3000
FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
FSC	Forest Stewardship Council www.fsc.org	49 228 367 66 0
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GS	Green Seal www.greenseal.org	(202) 872-6400
GSI	Geosynthetic Institute www.geosynthetic-institute.org	(610) 522-8440
н	Hydraulic Institute www.pumps.org	(888) 786-7744 (973) 267-9700
н	Hydronics Institute www.gamanet.org	(908) 464-8200
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IESNA	Illuminating Engineering Society of North America www.iesna.org	(212) 248-5000

IEST	Institute of Environmental Sciences and Technology www.iest.org	(847) 255-1561
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 646-2234
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
ISO	International Organization for Standardization	41 22 749 01 11
	Available from ANSI www.ansi.org	(202) 293-8020
ISSFA	International Solid Surface Fabricators Association www.issfa.net	(877) 464-7732 (702) 567-8150
ITS	Intertek www.intertek.com	(800) 345-3851 (713) 407-3500
ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LMA	Laminating Materials Association (Now part of CPA)	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864 (804) 314-8955
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	(847) 480-9138
MFMA	Metal Framing Manufacturers Association www.metalframingmfg.org	(312) 644-6610
MH	Material Handling (Now MHIA)	
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NACE	NACE International (National Association of Corrosion Engineers International)	(800) 797-6623 (281) 228-6200
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	www.nace.org	
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926
NAGWS	National Association for Girls and Women in Sport	(800) 213-7193, ext.
	www.aahperd.org/nagws/	400
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCAA	National Collegiate Athletic Association (The) www.ncaa.org	(317) 917-6222
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(262) 248-9094
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 775-3550
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (303) 697-8441
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NGA	National Glass Association www.glass.org	(866) 342-5642 (703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	NOFMA: The Wood Flooring Manufacturers Association	(901) 526-5016

	(Formerly: National Oak Flooring Manufacturers Association) www.nofma.org	
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The) www.ntma.com	(800) 323-9736 (540) 751-0930
NTRMA	National Tile Roofing Manufacturers Association (Now TRI)	
NWWDA	National Wood Window and Door Association (Now WDMA)	
OPL	Omega Point Laboratories, Inc. (Acquired by ITS - Intertek) www.opl.com	(800) 966-5253 (210) 635-8100
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDCA	Painting & Decorating Contractors of America www.pdca.com	(800) 332-7322 (314) 514-7322
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PGI	PVC Geomembrane Institute http://pgi-tp.ce.uiuc.edu	(217) 333-3929
PLANET	Professional Landcare Network (Formerly: ACLA - Associated Landscape Contractors of America) www.landcarenetwork.org	(800) 395-2522 (703) 736-9666
PTI	Post-Tensioning Institute www.post-tensioning.org	(602) 870-7540
RCSC	Research Council on Structural Connections www.boltcouncil.org	(800) 644-2400 (312) 670-2400
RFCI	Resilient Floor Covering Institute www.rfci.com	(301) 340-8580
RIS	Redwood Inspection Service www.calredwood.org	(888) 225-7339 (415) 382-0662
SAE	SAE International www.sae.org	(877) 606-7323 (724) 776-4841
SDI	Steel Deck Institute www.sdi.org	(847) 458-4647

SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	(516) 294-5424
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SIA	Security Industry Association www.siaonline.org	(703) 683-2075
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMA	Screen Manufacturers Association www.smacentral.org	(561) 533-0991
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SMPTE	Society of Motion Picture and Television Engineers www.smpte.org	(914) 761-1100
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974
TCA	Tile Council of America, Inc. www.tileusa.com	(864) 646-8453
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute, Inc.	(703) 683-1010

	www.tpinst.org	
TPI	Turfgrass Producers International www.turfgrasssod.org	(847) 649-5555
TRI	Tile Roofing Institute (Formerly: RTI - Roof Tile Institute) www.tileroofing.org	(312) 670-4177
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USAV	USA Volleyball www.usavolleyball.org	(888) 786-5539 (719) 228-6800
USGBC	U.S. Green Building Council www.usgbc.org	(202) 828-7422
USITT	United States Institute for Theatre Technology, Inc. www.usitt.org	(800) 938-7488 (315) 463-6463
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association (Now WCSC)	
WCSC	Window Covering Safety Council (Formerly: WCMA - Window Covering Manufacturers Association) www.windowcoverings.org	(800) 506-4636 (212) 297-2109
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California) www.wicnet.org	(916) 372-9943
WIC	Woodwork Institute of California (Now WI)	
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 570-5441
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICBO	International Conference of Building Officials (See ICC)	
ICBO ES	S ICBO Evaluation Service, Inc. (See ICC-ES)	
ICC	International Code Council www.iccsafe.org	(888) 422-7233 (703) 931-4533
ICC-ES D. F C V C	ICC Evaluation Service, Inc. www.icc-es.org ederal Government Agencies: Where abbreviations and acronyms are used in Spe occuments, they shall mean the recognized name of the entities in the following list. Veb sites are subject to change and are believed to be accurate and up-to-date as c occuments.	(800) 423-6587 (562) 699-0543 cifications or other Contract Names, telephone numbers, and f the date of the Contract
CE	Army Corps of Engineers www.usace.army.mil	
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce www.commerce.gov	(202) 482-2000
DOD	Department of Defense http://.dodssp.daps.dla.mil	(215) 697-6257
DOE	Department of Energy www.energy.gov	(202) 586-9220
EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FAA	Federal Aviation Administration www.faa.gov	(866) 835-5322
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration www.gsa.gov	(800) 488-3111
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration	(800) 321-6742
on Hiah	School	01 42 00 - 12

	www.osha.gov	(202) 693-1999
PBS	Public Building Service (See GSA)	
PHS	Office of Public Health and Science www.osophs.dhhs.gov/ophs	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
SD	State Department www.state.gov	(202) 647-4000
TRB	Transportation Research Board www.nas.edu/trb	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USPS	Postal Service www.usps.com	(202) 268-2000

# PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

# SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections include the following:
  - 1. Division 01 Section "Summary" for limitations on utility interruptions and other work restrictions.
  - 2. Division 01 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
  - 3. Division 01 Section "Execution" for progress cleaning requirements.
  - 4. Divisions 02 through 33 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

## 1.2 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

## 1.3 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Portable Sewer Service: Pay portable sewer service use charges for sewer usage by all entities for construction operations.
- C. Electric Power Service: Contractor shall pay electric power service use charges for electricity used by all entities for construction operations. Provide connections and extensions of services as required for construction operations.
- D. Water Service: Contractor shall pay water service use charges for water used by all entities for construction operations. Provide connections and extensions of services as required for construction operations.

### 1.4 QUALITY ASSURANCE

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

# 1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for protection of each permanent service before Owner's acceptance, regardless of previously assigned responsibilities. Permanent equipment and systems shall not be used during the construction period.

# PART 2 - PRODUCTS

#### 2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 9 gauge (0.148-inch) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top rails.

Orion High School Pasco, Washington

- B. Portable Chain-Link Fencing: Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide concrete or galvanized steel bases for supporting posts.
- C. Lumber and Plywood: Comply with requirements in Division 06 Section "Rough Carpentry."
- D. Gypsum Board: Minimum 1/2 inch thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36/C 36M.
- E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- F. Paint: Comply with requirements in Division 09 painting Sections.

# 2.2 TEMPORARY FACILITIES

- A. <u>Field Office, Contractor</u>: Contractor shall provide prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading. Maintain field office until final project acceptance.
- A. <u>Field Office, Owner</u>: Contractor shall provide for the **owner representative** a prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading. Maintain field office until substantial completion of project is awarded. The second field office is solely for school district use. Mobile unit shall have two separated rooms and not be less than 250 square feet. Contractor shall provide utilities connection and on-going service. Owner field office shall sit adjacent to contractor field office.
- B. Field Office Requirements: Of sufficient size to accommodate needs of district and construction personnel. Keep office clean and orderly. Furnish and equip offices as follows:
  - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
  - 2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- square tack board.
  - 3. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
  - 4. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

# 2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.

# 2.4 PROJECT SIGN

- A. Owner to furnish graphic for 4'x8' plywood project sign. Contractor shall have sign printed and install on-site using 4x4 pressure treated wood posts for secure and stable installation. Contractor and Owner to coordinate sign location for good public visibility and coordinating minimal construction disruption.
  - 1. General contractor to provide jpeg files of company logo and company title and contract information for Owner use on project sign.
  - 2. Contractor to pick-up completed sign from local sign shop and erect on-site. Contractor shall dispose of sign at construction completion.

# PART 3 - EXECUTION

# 3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
  - 1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

# 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Coordinate with serving utility to provide water for construction purposes. At Substantial Completion, restore these facilities to condition existing before initial use.
  - 1. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Permanent equipment may not be used for temporary construction period heating or cooling; except where specifically allowed for in individual specifications sections.
- E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- F. Electric Power Service: Provide extensions to electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
- G. Lighting: Provide temporary lighting with local switching that provides 25 foot candle minimum lighting or additional lighting for adequate illumination for construction operations, observations, inspections, and traffic conditions.
  - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install two telephone line(s) for each field office.
  - 1. Provide additional telephone lines for the following:
    - a. Provide a dedicated telephone line for each facsimile machine and computer in each field office.
  - 2. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Architect's office.
    - e. Engineers' offices.
    - f. Owner's office.
    - g. Principal subcontractors' field and home offices.
  - 3. Provide superintendent with cellular telephone for use when away from field office.
- I. Electronic Communication Service: Provide temporary electronic communication service, including electronic mail, in common-use facilities.

- 1. Provide DSL in primary field office and minimum of one computer with e-mail and internet access in the job-site office.
- 2. In addition to computer connections provide two phone lines and one fax machine in the job-site office.
- 3. Contractor personnel must have expertise in e-mail correspondence to maintain team coordination. The Contractor will provide all computer equipment (hardware) necessary to accomplish this.
- 4. The contractor must have the capability to provide electronic transfer of documents such as minutes and spreadsheets through one of the job-site positions
- 5. The contractor shall provide the owner with e-mail and document transfer capability with the Project Manager at the home office of the company, if the Project Manager is not located at the job-site office

# 3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

- 1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241.
- 2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Parking: The school district will allow parking in the areas designated in the drawings. These parking areas are for the use of construction personnel on a first-come, first-served basis. Additional, parking will only be allowed in areas that the City allows parking on streets.
- D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction.
   Maintain Project site, excavations, and construction free of water.
  - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
  - 2. Remove snow and ice as required to minimize accumulations.
- E. Project Identification and Temporary Signs: Provide Project identification signs as indicated. Install signs as directed by Owner to inform public and individuals seeking entrance to Project. Any other or Unauthorized signs are not permitted.
- F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.
- G. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
  - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- H. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
- I. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects, and storage. Repair any damage to Owner's satisfaction.
- J. Prohibit traffic and storage on waterproofed and roofed surfaces, and on lawn and landscaped areas.
- K. Temporary Use of Permanent Stairs: Cover finished, permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.

# 3.4 CONTROL, SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
  - 1. Comply with work restrictions specified in Division 01 Section "Summary."
- B. Temporary Erosion and Sedimentation Control: Comply with requirements of the City of Pasco and others as indicated in the drawings.

- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
  - 1. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Dust Control:
  - 1. Contractor shall provide site watering as required to prevent wind driven dust per the **City** of Pasco and the Franklin County Air Pollution authority requirements and to prevent citizen complaints both during construction and during all non-construction periods such as nights, weekends, and/or holidays.
  - 2. Contractor may use separate metered city water for both mobile and temporary fixed or portable sprinkler systems. Such systems shall not be operated without a contractor representative being on site full-time to verify operation, effectiveness and to prevent flooding or run-off damage
  - 3. A 24-hour phone number will be provide by the contractor for the police, Owner, Architect/Engineer, or other concerned agency to contact or notify as to dust conditions. Person responsible for shall have full authority, equipment, and manpower to take action to manage the impact of dust pollution within 30 minutes of notification
  - 4. If investigation of dust pollution is not accomplished by the contractor within 30 minutes of notification, the Owner and/or Architect/Engineer shall have full authority to hire/employ/or in any manner required provide for dust control and all costs of labor, material, and equipment shall be deducted from compensation due the contractor by uncontested change order
  - 5. The contractor shall pay for temporary connection all City water use needed and related to the construction of the new school including water used for dust control and irrigation until substantial completion has been issued for the project
- F. Provide security program and facilities to protect work, existing facilities, and Owner's operations from unauthorized entry, vandalism, and theft. Coordinate with Owner's security program.
- G. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
  - 1. Extent of Fence: Entire Perimeter of Project Area. See Drawings.
  - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys.
- H. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
  - 1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
- K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
  - 1. Prohibit smoking in all project areas.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.

- 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
- L. The entire site is a non-smoking area. No drugs, tobacco, alcohol, or weapons of any kind shall be allowed on the site.
- M. No animals, radios or attire with inappropriate or vulgar graphics are allowed on-site.

# 3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.
- D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  - 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
  - 3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 01 50 00

# SECTION 01 60 00 - PRODUCT REQUIREMENTS

## PART 1 - GENERAL

#### 1.1 SUMMARY

- This Section includes administrative and procedural requirements for selection of products for use in Α. Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- Related Sections include the following: Β.
  - Division 01 Section "Alternates" for products selected under an alternate. 1.
  - Division 01 Section "References" for applicable industry standards for products specified. 2.
  - Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout. 3.
  - 4. Divisions 02 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.

#### 1.2 DEFINITIONS

- Products: Items purchased for incorporating into the Work, whether purchased for Project or taken Α. from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - Named Products: Items identified by manufacturer's product name, including make or model 1. number or other designation shown or listed in manufacturer's published product literature; that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - Comparable Product: Product that is demonstrated and approved through submittal process, 3. or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
  - 4. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
    - The date of the standard is that in effect as of the Bid date, or date of Owner -Contractor a. Agreement when there are not bids, except when a specific date is specified
    - Obtain copies of standards when required by Contract Documents. Maintain copy at job b. site during progress of the specific work
  - Substitutions: Changes in products, materials, equipment, and methods of construction from those Β. required by the Contract Documents and proposed by Contractor.
  - C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

#### 1.3 SUBMITTALS

- Product List: Submit a list, in tabular from, showing specified products. Include generic names of Α. products required. Include manufacturer's name and proprietary product names for each product.
  - Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule. 1. 2.
    - Form: Tabulate information for each product under the following column headings:
      - Specification Section number and title. a.
      - Generic name used in the Contract Documents. b.
      - Proprietary name, model number, and similar designations. C.
      - d. Manufacturer's name and address.
      - Supplier's name and address. e.
      - f. Installer's name and address.
      - Projected delivery date or time span of delivery period. g.
      - Identification of items that require early submittal approval for scheduled delivery date. h.

- 3. Initial Submittal: Within 30 days after date of commencement of the Work, submit 3 copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
  - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
- 4. Completed List: Within 60 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
- 5. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use facsimile of standard CSI substitution request form.
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified material or product cannot be provided.
    - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors; that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    - e. Samples, where applicable or requested.
    - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
    - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
    - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
    - j. Cost information, including a proposal of change, if any, in the Contract Sum.
    - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
    - I. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
  - 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
    - a. Form of Acceptance: Change Order.
    - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- C. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify

Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

- a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
- b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

## 1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
  - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

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

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Off-site storage within in 10 miles of the project site, complying with the requirements of the Supplementary Conditions of the Contract is allowed. Contractor may apply for payment on materials complying with these requirements.
  - 3. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 4. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 5. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

## C. Storage:

- 1. Store products to allow for inspection and measurement of quantity or counting of units.
- 2. Store materials in a manner that will not endanger Project structure.
- 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
- 4. Store cementitious products and materials on elevated platforms.
- 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
- 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
- 7. Protect stored products from damage and liquids from freezing.
- 8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

### 1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  - 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

- 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
  - 3. Refer to Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

# PART 2 - PRODUCTS

# 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. All products shall be <u>new.</u>
  - 3. Products include material, equipment, and systems.
  - 4. Specifications and referenced standards are minimum requirements.
  - 5. Components required to be supplied in quantity within a specification section shall be the same, and shall be interchangeable.
  - 6. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 7. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  - 8. Where products are accompanied by the term "as selected," Architect will make selection.
  - 9. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
  - 10. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
  - 11. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.
  - B. Product Selection Procedures:
    - 1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
    - 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
    - 3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
    - 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
    - 5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
    - 6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.

- 7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
- 8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
- 9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
  - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
- 10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
  - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
  - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

# 2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution if received within 30 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
   B. Substitutions:
  - 1. Products specified by Reference Standards or by Description Only: Any product meeting those standards.
  - 2. Products specified by Naming One or More Manufactures: Submit a Request for Substitution for any manufacturer not specifically named.
  - 3. Products Specified by Naming Only One Manufacturer and a statement of No Substitution: No options, no substitutions allowed.
  - C. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - 1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    - 2. Requested substitution will be considered only when a product becomes unavailable due to no fault of Contractor.
    - 3. Requested substitution does not require extensive revisions to the Contract Documents.
    - 4. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - 5. Substitution request is fully documented and properly submitted.
    - 6. Requested substitution will not adversely affect Contractor's Construction Schedule.
    - 7. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - 8. Requested substitution is compatible with other portions of the Work.
    - 9. Requested substitution has been coordinated with other portions of the Work.
    - 10. Requested substitution provides specified warranty.

- 11. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- 12. Substitutions will not be considered or allowed when they are indicated or implied on shop drawing or product data submittals without separate written request, or when acceptance will require substantial revision of Contract Documents.
- **13.** Architect/Engineer and Owner will determine acceptability of proposed substitution, and will notify Contractor of acceptance or rejection in writing within a reasonable time.

# 2.3 COMPARABLE PRODUCTS

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

PART 3 - EXECUTION (Not Used)

#### **Substitution Request**

то							
PROJECT							
SPECIFIED ITEM							
Section	Page	Paragraph	Description				
The undersigned requests consideration of the following:							
PROPOSED	SUBSTITUTION						

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

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

The undersigned states that he following paragraphs, unless modified on attachments, are correct.

- 1. The Proposed Substitution does not affect dimensions shown on Drawings.
- 2. The undersigned will pay for changes to the building design, including engineering design, detailing and construction costs caused by the requested substitution.
- 3. The Proposed Substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
- 4. Maintenance and service parts will be locally available for the Proposed Substitution.

The undersigned further states that the function, appearance and quality of the Proposed Substitution are equivalent or superior to the Specified Item. Submitted By Attachments:

J		
Signature	_	
Firm	For use by Design Consultant:	
Address	AcceptedAccepted as noted	
	Not AcceptedReceived too late	
Date	Ву	
Telephone	Date	
Fax	Remarks	
Email		

END OF SECTION 01 60 00

## SECTION 01 73 00 - EXECUTION

### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
    - 1. Construction layout.
    - 2. Field engineering and surveying.
    - 3. General installation of products.
    - 4. Coordination of Owner-installed products.
    - 5. Progress cleaning.
    - 6. Starting and adjusting.
    - 7. Protection of installed construction.
    - 8. Correction of the Work.
    - B. Related Sections include the following:
      - 1. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
      - 2. Division 01 Section "Submittal Procedures" for submitting surveys.
      - 3. Division 01 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
      - 4. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
- 1.2 SUBMITTALS
  - A. Qualification Data: For professional engineer.
  - B. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.
  - C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- PART 2 PRODUCTS (Not Used)

#### PART 3 - EXECUTION

- 3.1 EXAMINATION
  - A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
    - 1. Before construction, verify the location and points of connection of utility services.
  - B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
    - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
    - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
  - C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

- 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - a. Description of the Work.
  - b. List of detrimental conditions, including substrates.
  - c. List of unacceptable installation tolerances.
  - d. Recommended corrections.
- 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
- 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
- 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

## 3.2 PREPARATION

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

## 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 3. Inform installers of lines and levels to which they must comply.
  - 4. Check the location, level and plumb, of every major element as the Work progresses.
  - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
  - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- C. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

## 3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
  - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
  - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
  - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- 3.5 INSTALLATION
  - A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
    - 1. Make vertical work plumb and make horizontal work level.
    - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
    - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
    - 4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
  - B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
  - C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
  - D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
  - E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
  - F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
  - G. Provide solid, fire-treated wood frame backing and blocking for all wall or ceiling surface mounted items, including but not limited to equipment, grab bars, door stops, partitions, railings, and other accessories. Contractor shall coordinate and verify the locations and installation of backing and blocking prior to the installation of gypsum board systems.
  - H. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
    - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
    - 2. Allow for building movement, including thermal expansion and contraction.
    - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
  - I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
  - J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

# 3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
  - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
  - 2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

## 3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

# 3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

# 3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

## 3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 73 00

## SECTION 01 73 29 - CUTTING AND PATCHING

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Execute cutting and patching to integrate elements of work, uncover ill-timed, defective, and non-conforming work, provide openings for penetrations of existing surfaces, and provided samples for testing. Seal and finish penetrations through floors, walls, and ceilings
- C. Patch locations where existing substrates and surfaces are damaged and deteriorated. Patch the surfaces to new quality work and complete the specified finish treatment of the areas.
- D. In all framed wall and ceilings areas that are a part of this project, remove existing surface mounted conduit, raceways, and boxes and recess these utilities into the framed construction. Cut and patch existing finishes as required to accommodate this work.
- E. In all locations where existing materials or improvements are removed from existing wall or ceiling construction, the finishes of the newly exposed wall or ceiling shall be patched and finished to match adjacent exposed surfaces in the room. This requirement shall include, but not be limited to, all masonry, concrete, plaster, and gypsum wallboard installations throughout the project area.
- F. Cut and patch existing concrete floor slab assemblies as required for installation of building utilities systems. Reference new construction drawing, including but not limited to mechanical and electrical work, for extent of work requiring cutting and patching.
- G. Related Sections include the following:
  - 1. Divisions 02 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

#### 1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work. Newly patched surfaces shall match existing adjacent finishes in alignment, appearance, quality and materials.

#### 1.3 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
  - 1. Primary operational systems and equipment.
  - 2. Fire-suppression systems.
  - 3. Mechanical systems piping and ducts.
  - 4. Control systems.
  - 5. Communication systems.
  - 6. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
  - 1. Water, moisture, or vapor barriers.
  - 2. Membranes and flashings.
  - 3. Exterior curtain-wall construction.
  - 4. Equipment supports.
  - 5. Piping, ductwork, vessels, and equipment.
  - 6. Noise- and vibration-control elements and systems.

- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

## 1.4 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

# PART 2 - PRODUCTS

- 2.1 MATERIALS
  - A. General: Comply with requirements specified in other Sections.
  - B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
    - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

- 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
- 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

# 3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

- 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
- 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
- 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
- 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
- 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
- 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  - 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an evenplane surface of uniform appearance.
  - 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 73 29

## SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

## PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous demolition and construction waste.
    - 2. Recycling nonhazardous demolition and construction waste.
    - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections include the following:
  - 1. Division 01 Section "Temporary Facilities and Controls" for environmental-protection measures during construction.
  - 2. Division 02 Section "Structure Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements, and for disposition of hazardous waste.
  - 3. Division 04 Section "Unit Masonry" for disposal requirements for masonry waste.
- 1.2 DEFINITIONS
  - A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
  - B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
  - C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
  - D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
  - E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
  - F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

#### 1.3 PERFORMANCE

- A. The contractor shall divert site generated waste from landfill disposal. Applicable diversion methods include recycling, compost, and/or salvage.
- B. Contractor shall provide continuous and up-to-date records to demonstrate compliance. Waste shall be separated to allow diversion, and record keeping shall indicate the weights of all waste materials diverted and disposed of in landfill to document compliance.
- C. Owner's goal is to salvage and recycle as much nonhazardous demolition and construction waste as possible. Demolition waste includes the following materials:
  - 1. Demolition Waste:
    - a. Asphaltic concrete paving.
    - b. Concrete.
    - c. Concrete reinforcing steel.
    - d. Concrete masonry units.
    - e. Wood studs.
    - f. Wood joists.
    - g. Plywood and oriented strand board.
    - h. Wood trim.
    - i. Structural and miscellaneous steel.
    - j. Rough hardware.
    - k. Roofing.
    - I. Insulation.
    - m. Doors and frames.
    - n. Door hardware.

- o. Windows.
- p. Glazing.
- q. Metal studs.
- r. Gypsum board.
- s. Acoustical tile and panels.
- t. Carpet.
- u. Equipment.
- v. Cabinets.
- w. Plumbing fixtures.
- x. Piping.
- y. Supports and hangers.
- z. Valves.
- aa. Sprinklers.
- bb. Mechanical equipment.
- cc. Refrigerants.
- dd. Electrical conduit.
- ee. Copper wiring.
- ff. Lighting fixtures.
- gg. Lamps.
- hh. Ballasts.
- ii. Electrical devices.
- jj. Switchgear and panelboards.
- kk. Transformers.
- 2. Construction Waste:
  - a. Site-clearing waste.
  - b. Masonry and CMU.
  - c. Lumber.
  - d. Wood sheet materials.
  - e. Wood trim.
  - f. Metals.
  - g. Roofing.
  - h. Insulation.
  - i. Carpet.
  - j. Gypsum board.
  - k. Piping.
  - I. Electrical conduit.
  - m. Packaging: Regardless of salvage/recycle goal indicated above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
    - 1) Paper.
    - 2) Cardboard.
    - 3) Boxes.
    - 4) Plastic sheet and film.
    - 5) Polystyrene packaging.
    - 6) Wood crates.
    - 7) Plastic pails.

#### 1.4 SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit three copies of report. Include the following information:

- 1. Material category.
- 2. Generation point of waste.
- 3. Total quantity of waste in tons.
- 4. Quantity of waste salvaged, both estimated and actual in tons.
- 5. Quantity of waste recycled, both estimated and actual in tons.
- 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
- 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

- B. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- C. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- D. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

## 1.5 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
  - 1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
  - 2. Review requirements for documenting quantities of each type of waste and its disposition.
  - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
  - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
  - 5. Review waste management requirements for each trade.

## 1.6 WASTE MANAGEMENT PLAN

- A. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation and disposal procedures.
  - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
  - 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
  - 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
  - 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
  - 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

# PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

## 3.1 PLAN IMPLEMENTATION

A. General: Implement waste management. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

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- 1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- Β. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.
- Training: Train workers, subcontractors, and suppliers on proper waste management C. procedures, as appropriate for the Work occurring at Project site.
  - Distribute waste management plan to everyone concerned within three days of submittal 1. return.
  - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- Site Access and Temporary Controls: Conduct waste management operations to ensure D. minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - Designate and label specific areas on Project site necessary for separating materials that 1. are to be salvaged, recycled, reused, donated, and sold.
  - 2 Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

#### 3.2 SALVAGING DEMOLITION WASTE

Salvaged Items for Reuse in the Work: Α.

- Clean salvaged items. 1.
- 2. Pack or crate items after cleaning. Identify contents of containers.
- Store items in a secure area until installation. 3.
- Protect items from damage during transport and storage. 4.
- Install salvaged items to comply with installation requirements for new materials and 5. equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- Salvaged Items for Sale and Donation: Not permitted on Project site. Β. C.
  - Salvaged Items for Owner's Use:
    - Clean salvaged items. 1.
    - 2. Pack or crate items after cleaning. Identify contents of containers.
    - 3. Store items in a secure area until delivery to Owner.
    - 4. Transport items to Owner's storage area designated by Owner.
    - 5. Protect items from damage during transport and storage.
- D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

#### 3.3 RECYCLING WASTE. GENERAL

- General: Recycle paper and beverage containers used by on-site workers. Δ
- Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for Β. recycling waste materials shall accrue to Contractor
- Procedures: Separate recyclable waste from other waste materials, trash, and debris. C. Separate recyclable waste by type at Project site to the maximum extent practical.
  - Provide appropriately marked containers or bins for controlling recyclable waste until they 1. are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - Inspect containers and bins for contamination and remove contaminated materials a. if found.
  - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - Stockpile materials away from construction area. Do not store within drip line of 3. remaining trees.
  - 4. Store components off the ground and protect from the weather.
  - Remove recyclable waste off Owner's property and transport to recycling receiver or 5. processor.

## 3.4 RECYCLING DEMOLITION WASTE

A. Not Used.

## 3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  - 1. Cardboard & Boxes: Break down packaging into flat sheets. Bundle & store in a dry location.
  - 2. Polystyrene Packaging: Separate and bag materials.
  - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
  - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
  - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
    - a. Comply with requirements in Division 32 Section "Plants." for use of clean sawdust as organic mulch.
- C. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.
  - 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.
    - a. Comply with requirements in Division 32 Section "Plants." for use of clean ground gypsum board as inorganic soil amendment.
- 3.6 DISPOSAL OF WASTE
  - A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
    - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
    - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - B. Burning: Do not burn waste materials.
  - C. Disposal: Transport waste materials off Owner's property and legally dispose of them at contractor's expense.

END OF SECTION 01 74 19

## SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

- 1.1 SUMMARY
  - A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
    - 1. Inspection procedures.
    - 2. Standard and Special Warranties.
    - 3. Final cleaning.
  - B. Related Sections include the following:
    - 1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
    - 2. Division 01 Section "Execution" for progress cleaning of Project site.
    - 3. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
    - 4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
    - 5. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
    - 6. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.
    - 7. Reference Document A201 for Project Closeout and Final Completion requirements.

#### 1.2 SUBSTANTIAL COMPLETION

- A. The requirements for Substantial Completion shall apply to each individual sub-portion of the project including each intermediate deadline. Reference section 01 10 00 for definition of the required project schedule.
- B. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
  - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  - 2. Advise Owner of pending insurance changeover requirements.
  - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include **City** issued permits, operating certificates, and similar releases.
  - 5. Prepare and submit Project Record Documents, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
  - 6. Terminate and remove temporary facilities from Project site.
- C. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
  - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  - 2. Results of completed inspection will form the basis of requirements for Final Completion.

#### 1.3 FINAL COMPLETION

A. When Contractor considers work has reached Final Completion, submit written certification that Contract Documents have been reviewed, work has been inspected, **City of Pasco** has deemed the project complete and that work is complete in accordance with Contract Documents and ready for Architect/Engineer inspection utilizing the completely updated as-built drawing set showing all changes.

- B. In addition to submittals required by the conditions of the Contract, provide submittals required by governing authorities, including Washington Department of Ecology, and submit a final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.
- C. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
  - 1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
  - 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  - 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
    - 4. General Information Provide copies of each of the following:
      - a. Local jurisdiction final inspection document
      - b. Lien Releases
      - c. Consent of Surety
      - d. Certificates of Insurance
      - e. Contractor's and Subcontractor's One-Year Warranty Letter
      - f. Photocopies of warranties and bonds
      - g. Labor and Industries required Affidavit of Prevailing Wage Paid statements.
      - h. Construction Material Asbestos Statement
      - i. Operations and Maintenance Manuals
      - j. Owner Equipment Training Completion summary with attendee signatures.

#### 1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit one copy of list in electronic format. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
  - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  - 3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Page number.

#### 1.5 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
  - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  - Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.
- E. Provide Special Warranties as noted in specifications. Special Warranties shall cover all replacement and materials costs for stated duration beyond substantial completion as noted. Special Warranty

shall include: labor, materials, freight, shipping, maintenance, equipment, tools on all failing parts. Special Warranty to be provided by manufacturer and installer.

## PART 2 - PRODUCTS

- 2.1 MATERIALS
  - A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

#### PART 3 - EXECUTION

#### 3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations. Clean all areas defined below, to Owner satisfaction.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - g. Sweep concrete floors broom clean.
    - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
    - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - j. Remove labels that are not permanent.
    - k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
      - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
    - I. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - m. Replace parts subject to unusual operating conditions.
    - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    - p. Clean ducts, blowers, and coils if units were operated without filters during construction.

- q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
- r. Re-clean as often as necessary as may be required by work performed after final cleaning and inspection.
- C. Pest Control: If pest problem exists, engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 77 00

## SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

## PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Operation manuals for systems, subsystems, and equipment.
  - 4. Maintenance manuals for the care and maintenance of products, materials, and finishes, systems and equipment.

#### B. Related Sections include the following:

- 1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
- 2. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
- 3. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
- 4. Divisions 02 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

#### 1.2 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

#### 1.3 SUBMITTALS

- A. Initial Submittal: Submit (1) draft copy of each manual at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.
- B. Final Submittal: Submit (2) paper copies of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.
  - 1. Correct or modify each manual to comply with Architect's comments. Submit (2) FINAL copies of each corrected manual within 15 days of receipt of Architect's comments.
  - 2. Provide complete pdf copy of each FINAL manual.

#### 1.4 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

# PART 2 - PRODUCTS

- 2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY
  - A. Organization: Include a section in the directory for each of the following:
    - 1. List of documents.
    - 2. List of systems.
    - 3. List of equipment.
    - 4. Table of contents.
  - B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
  - C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."
- 2.2 MANUALS, GENERAL
  - A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
    - 1. Title page.
    - 2. Table of contents.
    - 3. Manual contents.
  - B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
    - 1. Subject matter included in manual.
    - 2. Name and address of Project.
    - 3. Name and address of Owner.
    - 4. Date of submittal.
    - 5. Name, address, and telephone number of Contractor.
    - 6. Name and address of Architect.
    - 7. Cross-reference to related systems in other operation and maintenance manuals.
  - C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
    - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
  - D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
    - 1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf view binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
      - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
      - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
    - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
    - 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
    - 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
    - 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
      - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
      - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

- 6. Provide manual for Building Products, Applied Materials, and Finishes: include product data with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured products.
- 7. Provide instruction for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance
- 8. Include moisture-protection and Weather-exposed Products product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

## 2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  - 1. System, subsystem, and equipment descriptions.
  - 2. Performance and design criteria if Contractor is delegated design responsibility.
  - 3. Operating standards.
  - 4. Operating procedures.
  - 5. Operating logs.
  - 6. Wiring diagrams.
  - 7. Control diagrams.
  - 8. Piped system diagrams.
  - 9. Precautions against improper use.
  - 10. License requirements including inspection and renewal dates.
  - B. Descriptions: Include the following:
    - 1. Product name and model number.
    - 2. Manufacturer's name.
    - 3. Equipment identification with serial number of each component.
    - 4. Equipment function.
    - 5. Operating characteristics.
    - 6. Limiting conditions.
    - 7. Performance curves.
    - 8. Engineering data and tests.
    - 9. Complete nomenclature and number of replacement parts.
    - Operating Procedures: Include the following, as applicable:
    - 1. Startup procedures.
    - 2. Equipment or system break-in procedures.
    - 3. Routine and normal operating instructions.
    - 4. Regulation and control procedures.
    - 5. Instructions on stopping.
    - 6. Normal shutdown instructions.
    - 7. Seasonal and weekend operating instructions.
    - 8. Required sequences for electric or electronic systems.
    - 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding rivets where required for identification. Reference Division 22 specifications.

## 2.4 PRODUCT MAINTENANCE MANUAL

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C.

- C. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

## 2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - 1. Standard printed maintenance instructions and bulletins.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

## 2.6 WARRANTIES AND BONDS

- A. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Prepare and submit two identical sets of warranties and bonds.
  - 2. Bind in commercial quality (8-1/2 x 11-inch) three post binders, with hardback and engraved test on edge.
  - 3. Label edge of each binder with printed title "WARRANTIES AND BONDS", with title of project; name, address and telephone number of Contractor; and name of responsible principal.
  - 4. 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.
  - 5. 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 or responsible principal.
  - 6. Obtain full, one-year minimum warranties and bonds <u>and/or actual time required by</u> <u>specific specification sections</u>, executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten (10) days after substantial completion of the project. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the date of substantial completion and/or continued use by the Owner is determined.
  - 7. Verify that documents are in proper form, contain full information, and are notarized.
  - 8. Co-execute submittals when required.
  - 9. Retain warranties and bonds until time specified for submittal.
  - 10. Include procedures to follow and required notifications for warranty claims.

## PART 3 - EXECUTION

#### 3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

- 1. Do not use original Project Record Documents as part of operation and maintenance manuals.
- Comply with requirements of newly prepared Record Drawings in Division 01 Section 2. "Project Record Documents." Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation
- G. and maintenance documentation.

#### 3.2 MAINTENANCE INSTRUCTION

Α. Provide instruction of Owner's personnel in maintenance of products.

END OF SECTION 01 78 23

## SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

- 1.1 SUMMARY
  - This Section includes administrative and procedural requirements for Project Record Α. Documents, including the following:
    - 1. Record Drawings.
    - 2. Record Specifications.
    - Record Product Data. 3.
  - Β. Related Sections include the following:
    - Division 01 Section "Closeout Procedures" for general closeout procedures. 1.
    - Division 01 Section "Operation and Maintenance Data" for operation and maintenance 2. manual requirements.
    - Divisions 02 through 33 Sections for specific requirements for Project Record Documents 3. of the Work in those Sections.
- 1.2 SUBMITTALS
  - Α. Record Drawings: Comply with the following:
    - Number of Copies: Contractor to submit one set(s) of marked-up Record Prints. 1.
    - 2. Number of Copies: Contractor to submit copies of Record Drawings as follows:
      - Initial Submittal: Submit one set(s) of marked-up Record Prints. Architect will a. initial and date each plot and mark whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Architect will return plots and prints for organizing into sets, printing, binding, and final submittal.
      - Final Submittal: Submit one set(s) of marked-up Record Prints, and three copies b. printed. Print each Drawing, whether or not changes and additional information were recorded. 1)
        - Electronic Media: USB Thumb Drive.
  - Record Specifications: Submit one copy of Project's Specifications, including addenda and Β. contract modifications.
  - Record Product Data: Submit one copy of each Product Data submittal. C.
    - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.
  - Store Record Documents and Samples in Owner's Office apart from documents used for D. construction. Provide files, racks, and secure storage for Record Documents and Samples.

## PART 2 - PRODUCTS

#### **RECORD DRAWINGS** 2.1

- Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Α. Shop Drawings.
  - Preparation: Mark Record Prints to show the actual installation where installation varies 1. from that shown originally. Require individual or entity who obtained record data. whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
    - Record information concurrently with construction progress. Do not conceal any a. work until required information is recorded.
    - Give particular attention to information on concealed elements that would be b. difficult to identify or measure and record later.
    - Accurately record information in an understandable drawing technique. C.
    - Record data as soon as possible after obtaining it. Record and check the markup d. before enclosing concealed installations.

- 2. Content: Types of items requiring marking include, but are not limited to, the following:
  - a. Dimensional changes to Drawings.
  - b. Revisions to details shown on Drawings.
  - c. Depths of foundations below first floor.
  - d. Locations and depths of underground utilities.
  - e. Revisions to routing of piping and conduits.
  - f. Revisions to electrical circuitry.
  - g. Actual equipment locations.
  - h. Duct size and routing.
  - i. Locations of concealed internal utilities.
  - j. Changes made by Change Order or Construction Change Directive.
  - k. Changes made following Architect's written orders.
  - I. Details not on the original Contract Drawings.
  - m. Field records for variable and concealed conditions.
  - n. Record information on the Work that is shown only schematically.
- 3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
- 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
- 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Transparencies: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Architect. When authorized, prepare a full set of corrected transparencies of the Contract Drawings and Shop Drawings.
  - 1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.
  - 2. Refer instances of uncertainty to Architect for resolution.
  - 3. Owner will furnish Contractor one set of transparencies of the Contract Drawings for use in recording information.
  - 4. Print the Contract Drawings and Shop Drawings for use as Record Transparencies. Architect will make the Contract Drawings available to Contractor's print shop.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
  - 1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  - 2. Record Transparencies: Organize into unbound sets matching Record Prints. Place transparencies in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.
  - 3. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect.
    - e. Name of Contractor.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

- 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
- 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
- 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
- 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.
- 2.3 RECORD PRODUCT DATA
  - A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
    - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
    - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
    - 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

## 2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

## PART 3 - EXECUTION

## 3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
- C. At Contract closeout, deliver submittal Record Documents, and one (1) black line copy, edge bound in complete sets.
- D. Transmit submittals with cover letter, listing:
  - 1. Date
  - 2. Project title and number
  - 3. Contractor's name, address, and telephone number
  - 4. Number and title of each Record Document
  - 5. Signature of Contractor or authorized representative

END OF SECTION 01 78 39

## SECTION 01 79 00 - DEMONSTRATION AND TRAINING

#### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
    - 1. Demonstration of operation of systems, subsystems, and equipment.
    - 2. Training in operation and maintenance of systems, subsystems, and equipment.
    - 3. Demonstration and training manuals.
  - B. Related Sections include the following:
    - 1. Division 01 Section "Project Management and Coordination" for requirements for preinstruction conferences.
    - 2. Divisions 02 through 33 Sections for specific requirements for demonstration and training for products in those Sections.
  - C. Furnish demonstration and training instruction time as required to educate and train Owner personnel. No additional payment will be made for time spent for demonstration, training, assembling educational materials, setting up, or cleaning up. At completion of each training, submit list of Owner personnel who participated in the training.
  - D. Training shall be subject to Owner approval. Once approved by Owner, various MEP Training line items in Schedule of Value can be invoiced. See specification 01 29 00.

#### 1.2 SUBMITTALS

A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. At completion of training, submit one complete training manual(s) for Owner's use.

- B. Qualification Data: For instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

#### 1.3 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- B. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
  - 1. Inspect and discuss locations and other facilities required for instruction.
  - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
  - 3. Review required content of instruction.
  - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

#### 1.4 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.
- PART 2 PRODUCTS

## 2.1 INSTRUCTION PROGRAM

- A. Manufacturers' Instruction and O&M Manual Submit manufacturers' printed instructions /O&M manuals for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified. <u>Submit prior to equipment start up.</u>
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:
  - 1. Motorized doors, including overhead coiling doors overhead coiling grilles and automatic entrance doors.
  - 2. Equipment, including projection screens, food-service equipment.
  - 3. Fire-protection systems, including fire alarm and fire-extinguishing systems.
  - 4. Intrusion detection systems.
  - 5. HVAC systems, including air-handling equipment, air distribution systems, and terminal equipment and devices.
  - 6. HVAC instrumentation and controls.
  - 7. Electrical service and distribution, including transformers, switchboards, panelboards, and motor controls.
  - 8. Lighting equipment and controls.
  - 9. Communication systems, including intercommunication, surveillance, clocks and programming, voice and data, and, television] equipment.
- C. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
  - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  - 2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project Record Documents.
    - e. Identification systems.
    - f. Warranties and bonds.
    - g. Maintenance service agreements and similar continuing commitments.
  - 3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.
    - c. Shutdown instructions for each type of emergency.
    - d. Operating instructions for conditions outside of normal operating limits.
    - e. Sequences for electric or electronic systems.
    - f. Special operating instructions and procedures.
  - 4. Operations: Include the following, as applicable:
    - a. Startup procedures.
    - b. Equipment or system break-in procedures.
    - c. Routine and normal operating instructions.

- d. Regulation and control procedures.
- e. Control sequences.
- f. Safety procedures.
- g. Instructions on stopping.
- h. Normal shutdown instructions.
- i. Operating procedures for emergencies.
- j. Operating procedures for system, subsystem, or equipment failure.
- k. Seasonal and weekend operating instructions.
- I. Required sequences for electric or electronic systems.
- m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

# PART 3 - EXECUTION

- 3.1 PREPARATION
  - A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
  - B. Set up instructional equipment at instruction location.

## 3.2 INSTRUCTION

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
  - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
  - 3. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner with at least seven days' advance notice.
- C. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- D. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

# **OPERATION AND MAINTENANCE INSTRUCTION**

The Operation and Maintenance Procedures for the following list of systems has been demonstrated to the Owner's Representatives on the dates indicated below. This form is to be included in the Operation and Maintenance Manuals – Part 2.

INITIAL	SYSTEM DEMONSTRATED	DATE
	H.V.A.C.	
	PLUMBING	
	FIRE PROTECTION	
	ELECTRICAL	
	COMMUNICATIONS	
	FIRE SPRINKLER	
	OTHER	

Orion High School Pasco, Washington

## SECTION 01 80 01 - KEYNOTE SYSTEM

## PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Drawings and details in these documents have been annotated using a "Keynoting" system to improve drawing clarity and document coordination. The first six digits of the keynote indicate the specification section covering the referenced item. Following a decimal point is a two digit number which serves to make each keynote unique with architect's internal noting database.
  - B. As in other annotation systems, this system is not intended to remove the contractor's responsibility for submitting a complete and comprehensive bid that covers all work associated with the Work being bid. While every effort has been made to ensure that all work covered by keynotes is properly cross-referenced to a specification section and division, it is not represented to be a comprehensive list of all the work. All provisions of the Specifications are no less applicable than they would be in the absence of an integrated keynoting system.
  - C. Be aware that not all sections of work or portions of work occurring within the graphic portions of the Contract Documents may have been annotated using the keynoting system.

PART 2 - PRODUCTS - NOT USED.

PART 3 - EXECUTION - NOT USED.

END OF SECTION 01 80 01

## SECTION 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Commissioning is defined as the process of verifying and documenting that the installation and performance of selected building systems meet the specified design criteria and therefore satisfy the design intent and the Owner's operational needs.
- B. This Section includes general requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned.
- C. This specification applies to both the construction contractors and the owner employed commissioning agent, CA.
- D. Systems to be commissioned:
  - 1. Fire Protection
  - 2. Plumbing.
  - 3. HVAC
  - 4. HVAC Controls
  - 5. Electrical
  - 6. Communications (PA, Speakers, AV, Intercom)
  - 7. Fire Alarm
  - 8. Security
- E. The Contractor shall be responsible for participation in the commissioning process as outlined herein and in subsequent sectional references and attachments throughout the project documents.
- F. Commissioning procedures will be designed and conducted under direction of a Commissioning Authority (CA) and coordinated by a Commissioning Coordinator (CC). The CC shall be an employee of the Contractor or a subcontractor. The CA shall be directly responsible to the Owner and/or Owner's representative.
- G. Related Sections:
  - 1. Division 21:
    - a. Commissioning process activities for fire protection systems.
  - 2. Division 22:
    - a. Commissioning process activities for general plumbing provisions.
    - b. Commissioning process activities for common work results for plumbing.
    - c. Commissioning process activities for expansion fittings and loops for plumbing piping.
    - d. Commissioning process activities for meters and gages for plumbing piping
    - e. Commissioning process activities for general-duty valves for plumbing piping.
    - f. Commissioning process activities for hangers and supports for plumbing piping and equipment.
    - g. Commissioning process activities for plumbing seismic controls.
    - h. Commissioning process activities for identification for plumbing piping and equipment.
    - i. Commissioning process activities for plumbing installation
    - j. Commissioning process activities for domestic water piping.
    - k. Commissioning process activities for domestic water piping specialties.
    - I. Commissioning process activities for fuel gas piping.
    - m. Commissioning process activities for domestic water pumps.
    - n. Commissioning process activities for sanitary waste and vent piping.
    - o. Commissioning process activities for sanitary waste piping specialties.
    - p. Commissioning process activities for storm drainage piping.
    - q. Commissioning process activities for storm drainage piping specialties.
    - r. Commissioning process activities for general service compressed air piping.

- s. Commissioning process activities for plumbing equipment.
- t. Commissioning process activities for general service packaged air compressors and receivers.
- u. Commissioning process activities for water softeners.
- v. Commissioning process for fueled fired domestic water heaters.
- w. Commissioning process for plumbing fixtures.
- 3. Division 23
  - a. Commissioning process activities for HVAC general provisions.
  - b. Commissioning process activities for meters and gages for HVAC piping.
  - c. Commissioning process activities for valves.
  - d. Commissioning process activities for hangers and supports for HVAC Piping and fittings.
  - e. Commissioning process activities for vibration Isolation.
  - f. Commissioning process activities for mechanical seismic controls.
  - g. Commissioning process activities for Identification for HVAC Piping and Equipment.
  - h. Commissioning process activities for testing adjusting and balancing.
  - i. Commissioning process activities for mechanical insulation.
  - j. Commissioning process activities for controls and instrumentation.
  - k. Commissioning process activities for variable frequency drives.
  - I. Commissioning process activities for hydronic piping.
  - m. Commissioning process activities for hydronic piping specialties.
  - n. Commissioning process activities for hydronic pumps.
  - o. Commissioning process activities for refrigerant piping specialties.
  - p. Commissioning process activities for HVAC Water treatment.
  - q. Commissioning process activities for HVAC ducts and casings.
  - r. Commissioning process activities for air duct accessories.
  - s. Commissioning process activities for duct silencers.
  - t. Commissioning process activities for power ventilators.
  - u. Commissioning process activities for high volume low speed ceiling fans.
  - v. Commissioning process activities for fume extraction equipment.
  - w. Commissioning process activities for air outlets and hoods.
  - x. Commissioning process activities for air filters.
  - y. Commissioning process activities for breechings, chimneys and stacks.
  - z. Commissioning process activities for condensing boilers.
  - aa. Commissioning process activities for air cooled chillers.
  - bb. Commissioning process activities for heat recovery ventilator units.
  - cc. Commissioning process activities for modular air handling units.
  - dd. Commissioning process activities for split system air conditioners.
  - ee. Commissioning process activities for fan coil units.
  - ff. Commissioning process activities for electric heaters.
- 4. Division 26
  - a. Commissioning process activities for general provisions for electrical systems.
  - b. Commissioning process activities for common work results for electrical.
  - c. Commissioning process activities for low voltage electrical power conductors and cables.
  - d. Commissioning process activities for grounding and bonding.
  - e. Commissioning process activities for hangers and supports.
  - f. Commissioning process activities for raceway and boxes.
  - g. Commissioning process activities for electrical identification.
  - h. Commissioning process activities for power system study.
  - i. Commissioning process activities of electrical system.
  - j. Commissioning process activities for distributed lighting control.
  - k. Commissioning process activities for network lighting controls
  - I. Commissioning process activities for low voltage transformers

- m. Commissioning process activities for switchboards.
- n. Commissioning process activities for panelboards.
- o. Commissioning process activities for wiring devices.
- p. Commissioning process activities for fuses.
- q. Commissioning process activities for enclosed switches.
- r. Commissioning process activities for elevator power modules.
- s. Commissioning process activities for enclosed controllers.
- t. Commissioning process activities for mechanical held contractors
- u. Commissioning process activities for lighting fixtures
- 5. Division 27
  - a. Commissioning process activities for general provisions for communications systems.
  - b. Commissioning process activities for common results for communications.
  - c. Commissioning process activities for telecommunications.
  - d. Commissioning process activities for sound reinforcement systems.
  - e. Commissioning process activities for commons sound system.
  - f. Commissioning process activities for communication utility service.
  - g. Commissioning process activities for IP intercommunication clock system.
- 6. Division 28
  - a. Commissioning process activities for general provisions.
  - b. Commissioning process activities for common work.
  - c. Commissioning process activities for fire alarm system.
  - d. Commissioning process activities for intrusion alarm-access control systems.
  - e. Commissioning process activities for distributed antenna system.
- 1.2 DEFINITIONS
  - A. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.
  - B. TAB: Testing, Adjusting, and Balancing.

#### 1.3 COMMISSIONING TEAM

- A. Members Appointed by Contractor(s): Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the Commissioning Agent.
- B. Members Appointed by Owner:
  - 1. Commissioning Agent: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the Commissioning Agent under a separate contract.
  - 2. Representatives of the facility user and operation and maintenance personnel.
  - 3. Architect and engineering design professionals.

#### 1.4 OWNER'S RESPONSIBILITIES

- A. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:
  - 1. Training in operation and maintenance of systems, subsystems, and equipment.
  - 2. Demonstration of operation of systems, subsystems, and equipment.
- B. Provide utility services required for the commissioning process.
- C. Provide the Contract Documents, prepared by Architect and approved by Owner, to the Commissioning Authority and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

# 1.5 CONTRACTOR'S RESPONSIBILITIES

- A. Provide utility services required for the commissioning process.
- B. Contractor shall assign representatives with expertise and authority to act on behalf of the Contractor and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
  - 1. Participate in design and construction-phase coordination meetings.
  - 2. Prepare Project-specific test and inspection procedures and checklists.
  - 3. Participate in maintenance orientation and inspection.
  - 4. Participate in operation and maintenance training sessions.
  - 5. Participate in final review at acceptance meeting.
  - 6. Certify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
  - 7. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
- C. Subcontractors shall assign representatives with expertise and authority to act on behalf of subcontractors and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
  - 1. Participate in design and construction-phase coordination meetings.
  - 2. Prepare Project-specific test and inspection procedures and checklists.
  - 3. Participate in maintenance orientation and inspection.
  - 4. Participate in procedures meeting for testing.
  - 5. Participate in final review at acceptance meeting.
  - 6. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to Commissioning Agent for incorporation into the commissioning plan. Update schedule on a weekly basis throughout the construction period.
  - 7. Provide information to the Commissioning Agent for developing construction-phase commissioning plan.
  - 8. Participate in training sessions for Owner's operation and maintenance personnel.
  - 9. Provide updated Project Record Documents to the Commissioning Agent as requested.
  - 10. Gather and submit operation and maintenance data for systems, subsystems, and equipment to the Commissioning Agent, as specified in Division 23.
  - 11. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures and participate in testing of installed systems, subsystems, and equipment.
- D. Prepare operation and maintenance training program and provide qualified instructors to conduct operation and maintenance training. Operation and maintenance training is specified in Division 1 Section "Demonstration and Training."

## 1.6 COMMISSIONING AGENT'S RESPONSIBILITIES

- A. Organize and lead the commissioning team.
- B. Prepare a construction-phase commissioning plan. Include design changes and scheduled commissioning activities coordinated with overall Project schedule. Identify commissioning team member responsibilities, by name, firm, and trade specialty, for performance of each commissioning task.
- C. Conduct an initial construction-phase coordination meeting for the purpose of reviewing the commissioning activities and establishing tentative schedules for operation and maintenance submittals; operation and maintenance training sessions; TAB Work; and Project completion.
- D. Review and comment on submittals from Contractor for compliance with the Contract Documents and construction-phase commissioning plan. Review and comment on performance expectations of systems and equipment and interfaces between systems relating to the Contract Documents.
- E. Collaborate with Contractor and with subcontractors to develop test and inspection procedures.
- F. Convene commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss progress of the commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists, and notifying participants. The

Commissioning Agent shall prepare and distribute minutes to commissioning team members and attendees within five workdays of the commissioning meeting.

- G. Observe and inspect construction and report progress and deficiencies. In addition to compliance with the Contract Documents, inspect systems and equipment installation for adequate accessibility for maintenance and component replacement or repair.
- H. Schedule, direct, witness, and document tests, inspections, and systems startup.
- I. Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning report.
- J. Certify date of acceptance and startup for each item of equipment for start of warranty periods.
- K. Review Project Record Documents for accuracy. Request revisions from Contractor to achieve accuracy.
- L. Review and comment on Operation and Maintenance documentation and systems manual outline for compliance with the Contract Documents.
- M. Prepare commissioning reports.
- N. Assemble the final commissioning documentation, including the commissioning report and Project Record Documents.

#### 1.7 COMMISSIONING DOCUMENTATION

- A. Commissioning Plan: A document, prepared by Commissioning Agent, that outlines the schedule, allocation of resources, and documentation requirements of the commissioning process, and shall include, but is not limited to the following:
  - 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports. Identification of the relationship of these documents to other functions and a detailed description of submittals that are required to support the commissioning processes. Submittal dates shall include the latest date approved submittals must be received without adversely affecting commissioning plan.
  - 2. Description of the organization, layout, and content of commissioning documentation (including systems manual) and a detailed description of documents to be provided along with identification of responsible parties.
  - 3. Identification of systems and equipment to be commissioned.
  - 4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.
  - 5. Description of responsibilities of commissioning team members.
  - 6. Description of observations to be made.
  - 7. Description of requirements for operation and maintenance training.
  - 8. Description of expected performance for systems, subsystems, equipment, and controls.
  - 9. Schedule for commissioning activities with specific dates coordinated with overall construction schedule.
  - 10. Identification of installed systems, subsystems, and equipment, including design changes that occurred during the construction phase.
  - 11. Process and schedule for completing prestart and startup checklists for systems, subsystems, and equipment to be verified and tested.
  - 12. Step-by-step procedures for testing systems, subsystems, and equipment with descriptions for methods of verifying relevant data, recording the results obtained, and listing parties involved in performing and verifying tests.
- B. Test Checklists: Contractor and Subcontractor with collaboration from the Commissioning Agent shall develop test checklists for each system, subsystem, or equipment including interfaces and interlocks, and include a separate entry, with space for comments, for each item to be tested. Prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. Provide space for testing personnel to sign off on each checklist. Each checklist, regardless of system, subsystem, or equipment being tested, shall include, but not be limited to, the following:
  - 1. Name and identification code of tested item.
  - 2. Test number.
  - 3. Time and date of test.

- 4. Indication of whether the record is for a first test or retest following correction of a problem or issue.
- 5. Dated signatures of the person performing test and of the witness, if applicable.
- 6. Individuals present for test.
- 7. Deficiencies.
- 8. Issue number, if any, generated as the result of test.
- C. Certificate of Readiness: Certificate of Readiness shall be signed by Contractor, Subcontractor(s), Installer(s), and Commissioning Agent certifying that systems, subsystems, equipment, and associated controls have been tested and are ready for operation. Completed test checklists signed by the responsible parties shall accompany the Certificate's of Readiness.
- D. Test and Inspection Reports: Commissioning Agent shall record test data, observations, and measurements on test checklists. Photographs, forms, and other means appropriate for the application shall be included with data. Commissioning Agent shall compile test and inspection reports and test and inspection certificates and include them in systems manual and commissioning report.
- E. Corrective Action Documents: Commissioning Agent shall document corrective action taken for systems and equipment that fail tests. Include required modifications to systems and equipment and revisions to test procedures, if any. Retest systems and equipment requiring corrective action and document retest results.
- F. Issues Log: Commissioning Agent shall prepare and maintain an issues log that describes design, installation, and performance issues that are at variance with the Contract Documents. Identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.
  - 1. Creating an Issues Log Entry:
    - a. Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.
    - b. Assign a descriptive title of the issue.
    - c. Identify date and time of the issue.
    - d. Identify test number of test being performed at the time of the observation, if applicable, for cross-reference.
    - e. Identify system, subsystem, and equipment to which the issue applies.
    - f. Identify location of system, subsystem, and equipment.
    - g. Include information that may be helpful in diagnosing or evaluating the issue.
    - h. Note recommended corrective action.
    - i. Identify commissioning team member responsible for corrective action.
    - j. Identify expected date of correction.
    - k. Identify person documenting the issue.
  - 2. Documenting Issue Resolution:
    - a. Log date correction is completed or the issue is resolved.
    - b. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.
    - c. Identify changes to the Contract Documents that may require action.
    - d. State that correction was completed and system, subsystem, and equipment is ready for retest, if applicable.
    - e. Identify person(s) who corrected or resolved the issue.
    - f. Identify person(s) documenting the issue resolution.
  - 3. Issues Log Report: On a periodic basis, but not less than for each commissioning team meeting, Commissioning Agent shall prepare a written narrative for review of outstanding issues and a status update of the issues log. As a minimum, Commissioning Agent shall include the following information in the issues log and expand it in the narrative:
    - a. Issue number and title.
    - b. Date of the identification of the issue.
    - c. Name of the commissioning team member assigned responsibility for resolution.
    - d. Expected date of correction.
- G. Commissioning Report: Commissioning Agent shall document results of the commissioning process including unresolved issues and performance of systems, subsystems, and equipment.

The commissioning report shall indicate whether systems, subsystems, and equipment have been completed and are performing according to the Contract Documents. The commissioning report shall include, but is not limited to, the following:

- 1. Lists and explanations of substitutions; compromises; variances in the Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. This report shall be used to evaluate systems, subsystems, and equipment and shall serve as a future reference document during Owner occupancy and operation. It shall describe components and performance that exceed requirements of the Contract Documents and those that do not meet requirements of the Contract Documents. It may also include a recommendation for accepting or rejecting systems, subsystems, and equipment.
- 2. Commissioning plan.
- 3. Testing plans and reports.
- 4. Corrective modification documentation.
- 5. Issues log.
- 6. Completed test checklists.
- 7. Listing of off-season test(s) not performed and a schedule for their completion.

## 1.8 SUBMITTALS

- A. Commissioning Plan Prefinal Submittal: Commissioning Agent shall submit two hard copies of prefinal commissioning plan. Deliver one copy to Contractor, one to Owner, and one to Architect. Present submittal in sufficient detail to evaluate data collection and arrangement process. One copy, with review comments, will be returned to the Commissioning Agent for preparation of the final construction-phase commissioning plan.
- B. Commissioning Plan Final Submittal: Commissioning Agent shall submit two hard copies and two sets of electronically formatted information of final commissioning plan. Deliver one hard copy to Owner, and one copy to Architect. The final submittal must address previous review comments.
- C. Certificates of Readiness: Commissioning Agent shall submit Certificates of Readiness.
- D. Test and Inspection Reports: Commissioning Agent shall submit test and inspection reports.
- E. Corrective Action Documents: Commissioning Agent shall submit corrective action documents.
- F. Pre-final Commissioning Report Submittal: Commissioning Agent shall submit two hard copies of the pre-final commissioning report. Commissioning Agent shall deliver one copy to Owner and one copy to Architect. One copy, with review comments, will be returned to the Commissioning Agent for preparation of final submittal.
- G. Final Commissioning Report Submittal: Commissioning Agent shall submit two hard copies of the final commissioning report. The final submittal must address previous review comments and shall include a copy of the pre-final commissioning report submittal review comments along with a response to each item. Commissioning Agent shall deliver one hard copy to Owner, and one copy to Architect.

## 1.9 QUALITY ASSURANCE

- A. Instructor Qualifications: Factory-authorized service representatives, experienced in training, operation, and maintenance procedures for installed systems, subsystems, and equipment.
- B. Test Equipment Calibration: Comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following damage or dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated within six months prior to use.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

#### 3.1 COORDINATION

- A. Coordinating Meetings: Commissioning Agent shall conduct coordination meetings of the commissioning team to review progress on the commissioning plan, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities.
- B. Pretesting Meetings: Commissioning Agent shall conduct pretest meetings of the commissioning team to review startup reports, pretest inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested.

#### 3.2 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

A. Training Modules: Develop an instruction program that includes individual training modules for each system, subsystem, and equipment as specified in Division 1 Section "Demonstration and Training." END OF SECTION 01 91 13
# **DIVISION 03 – CONCRETE**

Section 03 30 00	Cast-In-Place Concrete	12
Section 03 35 19	Integrally Colored Concrete	5
Section 03 45 00	Precast Architectural Concrete	9

# SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

# PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
  - 1. Concrete foundations and floor slab.
  - 2. Underslab Vapor Retarders
- B. Related Sections include the following:
  - 1. Division 07 Section "Bituminous Dampproofing" for concrete foundation walls.
  - 2. Division 07 Section "Board Insulation" for perimeter foundation insulation board.
  - 3. Division 09 Section "Painting" for solid color coating and transparent sealer finishes.
  - 4. Division 31 Section "Earth Moving" for drainage fill under slab on grade.
  - 5. Division 32 Section "Concrete Paving" for concrete pavement and walks.

#### 1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

# 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
  - 3. Curing compounds.
  - 4. Bonding agents.
  - 5. Adhesives.
  - 6. Semirigid joint filler.
  - 7. Repair materials.
  - 8. Vapor retarders.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- D. Source limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301, "Specification for Structural Concrete,"
  - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- 1.5 DELIVERY, STORAGE, AND HANDLING
  - A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

# PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Products: Subject to compliance with requirements, contractor shall submit necessary products for review.
  - 2. Manufacturers: Subject to compliance with requirements, contractor shall submit necessary products for review.

#### 2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  1. Plywood, metal, or other approved panel materials.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material.
  Provide lumber dressed on at least two edges and one side for tight fit.
- C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- D. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
  - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
  - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

# 2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Welded Reinforcement Bars: ASTM A 706/A 706M, Grade 60, deformed

# 2.4 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
  - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
- 2.5 CONCRETE MATERIALS
  - A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
    - 1. Portland Cement: ASTM C 150/C 150M, Type I/II, gray.

- a. Fly Ash: ASTM C 618, Class F.
- B. Normal-Weight Aggregates: ASTM C 33, Class 4S coarse aggregate or better, graded. Provide aggregates from a single source.
  - 1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.

# 2.6 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  - 5. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.

# 2.7 VAPOR RETARDERS

- A. Plastic Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
  - 1. Available Products:
    - a. Stego Industries, LLC; Stego Wrap, 15 mils.
    - b. Fortifiers Corporation; Moistop Ultra A.
    - c. Raven Industries Inc.; Vapor Block 15.
    - d. Reef Industries, Inc.; Griffolyn Type-105.
    - e. W.R. Meadows, 15mils
    - f. Viper Vapor Check II, 15 mils
- B. Maintain permeance of less than 0.01 Perms as tested in accordance with mandatory conditioning tests per ASTM E1745 (field condition permeance rating).
- C. Granular Fill: All below slab gravel fill is to meet the requirements stated in Section 9-03.9(3)-Crushed Surfacing in the WSDOT Standards. Comply and verify with the requirements of the structural engineering documents. Reference requirements of the geotechnical investigation report.

# 2.8 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating. Dayton Superior Corporation; Safe Cure and Seal (J-19), Euclid Super Diamond Clear VOX, or equal. Certified by curing compound manufacturer to not interfere with bonding of floor covering or coatings.
  - 1. Approved Manufacturer: W.R. Meadows
  - 2. See Division 09 "Painting" for Aquapon Polymide clear epoxy coating at exposed concrete slab locations.
- 2.9 RELATED MATERIALS
  - A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

### 2.10 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
  - 4. Compressive Strength: Not less than 4000 psi at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
  - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

#### 2.11 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement which would otherwise be used, by not less than 40 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
  - 1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
  - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

# 2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Foundations: Proportion normal-weight concrete mixture as follows:
  - 1. Minimum Compressive Strength: As Indicated on plans.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
  - 3. Slump Limit: 7 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
  - 4. Air Content: 5 percent, plus or minus 1 percent at point of delivery.
- B. Interior Slabs: Proportion normal-weight concrete mixture as follows:
  - 1. Minimum Compressive Strength: As Indicated on plans.
  - 2. Minimum Cementitious Materials Content: 540 lb/cu. yd.
  - 3. Slump Limit: 4 inches, plus or minus 1 inch.
  - 4. Air Content: 3.5 percent, plus or minus 1 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

- 5. Air Content: Do not allow air content of troweled interior finished floors to exceed 3 percent. Eliminate air for polished and exposed floor areas.
- 6. Maximum Water-Cementitious Materials Ratio: 0.42
- 2.13 FABRICATING REINFORCEMENT
  - A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."
- 2.14 CONCRETE MIXING
  - A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
    - When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

# PART 3 - EXECUTION

# 3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
  - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
  - 2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 1. Install keyways, reglets, recesses, and the like, for easy removal.
  - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

# 3.2 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

- A. On vertical surfaces, set insulation units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.
  - 1. If not otherwise indicated, extend insulation vertically a minimum of 24 inches below exterior grade line behind face of the foundation wall.
  - 2. Reference Division 07sections for manufacturer requirements and insulation value.
- B. Protect insulation from displacement during follow-on construction activities, such as but not limited to, floor slab placement.

# 3.3 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

# 3.4 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

# 3.5 VAPOR RETARDERS

- A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
  - 1. Lap joints 6 inches and seal with the manufacturer's recommended tape.
  - 2. Do not use stakes to hold retarder in place.
  - 3. Use manufacturer's mastic sealant at locations difficult to seam tape for full seal. Do not install mastic in the rain.
  - 4. Repair/patch all punctures with additional layer of vapor retarder. Tape entire perimeter of patch with the manufacturer's recommended tape.
  - 5. Seal entire perimeter of vapor retarder at backside of perimeter stem wall assembly.

# 3.6 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing or 6" minimum. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

# 3.7 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 3. Joints shall be at least 25 percent of the slab thickness or at one inch deep minimum.

- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
  - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Re-saw all joints with beveled edge blade to ease edges at all saw-cut joints.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated. Reference civil for additional isolation joint requirements.
  - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
  - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
  - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Exposed Concrete Saw Cut Joint: Reference drawings for saw cut locations and saw blade profile and contractor submitted layout drawings.

# 3.8 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

- 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
- 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
- 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301, 305R and as follows:
  - 1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

# 3.9 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces exposed to public view.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete on architectural columns:
  - 1. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

# 3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
  - 1. Apply float finish to surfaces to receive trowel finish.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Apply a trowel finish to surfaces indicated.
  - 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
    - a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.

- b. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.
- D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
  - 1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- F. Slab Finish at locations to receive Sealed or Painted Finish: Apply towel finish as specified above. After concrete has completely cured, apply sealer or paint floor finish. Patch or prepare the substrate as required by sealer and/or floor paint product requirements.

# 3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with inplace construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

#### 3.12 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

- c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
- 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
  - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
- 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.
- 3.13 JOINT FILLING
  - A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
    - 1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.
  - B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
  - C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

# 3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  - 2. After concrete has cured at least 14 days, correct high areas by grinding.

- 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
- 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
- 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
- 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

# 3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports. Reference structural drawings for additional inspections and test report information.
  - 1. Foundation concrete, except at brace frame locations, does not require special inspection, but all other concrete shall be special inspected. Although foundation concrete is not special inspected, concrete testing as outlined below is required.
- B. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
  - 2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
  - 5. Compression Test Specimens: ASTM C 31.
    - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    - b. Cast and field cure two sets of two standard cylinder specimens for each composite sample for cold weather conditions as indicated on structural drawings.
  - 6. Compressive-Strength Tests: ASTM C 39; test one cylinder of the laboratory-cured specimens at 7 days and two cylinder specimens at 28 days. The remaining test cylinder

is to be held pending review of the 28 day samples. When field cured specimens are required, the same procedures for laboratory-cured specimens is to be followed.

- a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
- 7. When strength of field-cured cylinders is less than 85 percent of companion laboratorycured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- 8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- 9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- 10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- 11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.
- 12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 13. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.
- C. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION 03 30 00

# SECTION 03 45 00 - PRECAST ARCHITECTURAL CONCRETE

# PART 1 - GENERAL

### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Architectural precast concrete units, copings, and wall cap units as defined in the drawings.
  - 2. Supports, anchors, and attachments; including all required internal steel reinforcement, embeds, weld-plates, inserts, anchors, bracing, and attachments back to the primary structure of the building.
  - 3. Perimeter and intermediate joint seals.
  - 4. Grouting under panels.
- B. Related Sections include the following:
  - 1. Division 03 Section "Cast-In-Place Concrete" for installing connection anchors in concrete.
  - 2. Division 04 Section "Unit Masonry" for setting materials and installation after precast concrete panel production.
  - 3. Division 09 Section "Painting" for water-repellent finish treatments.
- 1.2 DEFINITION
  - A. Design Reference Sample: Sample of approved architectural precast concrete color, finish and texture, preapproved by Architect.

#### 1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide architectural precast concrete units and connections capable of withstanding the following design loads within limits and under conditions indicated:

- 1. Dead Loads: as determined by the specific construction detail
- 2. Live Loads: 100 psf
- 3. Seismic Loads: to comply with the project location's requirements
- B. Design Requirements:
  - 1. The products of this section shall be specifically designed by a registered structural engineer licensed in the State of Washington.
  - 2. Design units to withstand actual loads such as impact, wind, suction, deflection, and thermal movement loads.
  - 3. Design and size components to withstand seismic loads and sway displacement as calculated in accordance with the current edition of the International Building Code.
  - 4. Design units to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
  - 5. Design component connections to accommodate building movement and thermal movement. Provide adjustment to accommodate misalignment of structure without unit distortion or damage.
  - 6. Design units to accept loads from materials that will contact, connect, or rest upon the units.
  - 7. Design lifting points and coordinate with erection sequence.

# 1.4 SUBMITTALS

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

- B. Design Mixtures: For each precast concrete mixture. Include compressive strength and waterabsorption tests.
- C. Shop Drawings: Detail fabrication and installation of architectural precast concrete units. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit. Indicate joints, reveals, and extent and location of each surface finish. Indicate details at building corners.
  - 1. Indicate separate face and backup mixture locations and thicknesses.
  - 2. Indicate welded connections by AWS standard symbols. Detail loose and cast-in hardware and connections.
  - 3. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
  - 4. Indicate locations, extent, and treatment of dry joints if two-stage casting is proposed.
  - 5. Include plans and elevations showing unit location and sequence of erection for special conditions.

- 6. Indicate location of each architectural precast concrete unit by same identification mark placed on panel.
- 7. Indicate relationship of architectural precast concrete units to adjacent materials.
- 8. Design Modifications: If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.
- D. Samples: For each type of finish indicated on exposed surfaces of architectural precast concrete units, in sets of 3, illustrating full range of finish, color, and texture variations expected; approximately 8 by 8 by 2 inches.
  - When other faces of precast concrete unit are exposed, include Samples illustrating 1. workmanship, color, and texture of backup concrete as well as facing concrete.
  - Samples for each unit required, showing full range of color and texture expected. Include 2. Sample showing color and texture of joint treatment. Finished units shall match existing surrounding precast units.
    - Grout Samples for Initial Selection: Color charts consisting of actual sections of grout a. showing manufacturer's full range of colors.
    - b. Grout Samples for Verification: Showing color and texture of joint treatment.
- Ε. Welding certificates.
- F. Qualification Data: For fabricator.
- G. Material Test Reports: For aggregates.
- Material Certificates: For the following items, signed by manufacturers: Η.
  - Cementitious materials. 1.
  - 2. Reinforcing materials and prestressing tendons.
  - 3. Admixtures.
  - Bearing pads. 4.
  - Structural-steel shapes and hollow structural sections. 5.
  - Brick units and accessories. 6.
  - Stone anchors. 7.
  - Source quality-control test reports.
- I. Field quality-control test reports. J.

#### 1.5 QUALITY ASSURANCE

- Α. Fabricator Qualifications: A firm that assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings.
- Design Standards: Comply with ACI 318 and design recommendations of PCI MNL 120, "PCI Design Β. Handbook - Precast and Prestressed Concrete," applicable to types of architectural precast concrete units indicated.
- Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control C. recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."
- Welding: Qualify procedures and personnel according to AWS D1.1/D.1.1M, "Structural Welding D. Code - Steel"; and AWS D1.4, "Structural Welding Code - Reinforcing Steel."
- Mockups: After sample panel approval but before production of architectural precast concrete units, E. construct full-sized mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockup as indicated on Drawings including sealants and architectural precast concrete complete with anchors, connections, flashings, and joint fillers.
  - Approved mockups may become part of the completed Work if undamaged at time of 2. Substantial Completion.
  - Approval of mockups does not constitute approval of deviations from the Contract Documents 3. unless such deviations are specifically approved by Architect in writing.

# 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver architectural precast concrete units in such quantities and at such times to limit unloading units temporarily on the ground.
- B. Support units during shipment on non-staining shock-absorbing material.
- C. Store units with adequate dunnage and bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.
- D. Place stored units so identification marks are clearly visible, and units can be inspected.
- E. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses which would cause cracking or damage.
- F. Lift and support units only at designated points shown on Shop Drawings.

# 1.7 SEQUENCING

A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

# PART 2 - PRODUCTS

# 2.1 MOLD MATERIALS

- A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that will provide continuous and true precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.
  - 1. Mold-Release Agent: Commercially produced liquid-release agent that will not bond with, stain or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.
- B. Form Liners: Units of face design, texture, arrangement, and configuration to match those used for precast concrete design reference sample. Furnish with manufacturer's recommended liquid-release agent that will not bond with, stain, or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.
- C. Surface Retarder: Chemical set retarder, capable of temporarily delaying final hardening of newly placed concrete mixture to depth of reveal specified.

# 2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706, deformed.
- C. Steel Bar Mats: ASTM A 184, fabricated from ASTM A 615, Grade 60, deformed bars, assembled with clips.
- D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- E. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
- F. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 117.

# 2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type III, gray, unless otherwise indicated.
  - 1. For surfaces exposed to view in finished structure, mix gray with white cement, of same type, brand, and mill source.
- B. Supplementary Cementitious Materials:
  - 1. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.
  - 2. Metakaolin Admixture: ASTM C 618, Class N.
  - 3. Silica Fume Admixture: ASTM C 1240, with optional chemical and physical requirement.
  - 4. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- C. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C 33, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

- 1. Face-Mixture-Coarse Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match selected finish sample.
  - a. Gradation: To match design reference sample.
- 2. Face-Mixture-Fine Aggregates: Selected, natural or manufactured sand of same material as coarse aggregate, unless otherwise approved by Architect.
- D. Lightweight Aggregates: Except as modified by PCI MNL 117, ASTM C 330, with absorption less than 11 percent.
- E. Coloring Admixture: ASTM C 979, synthetic or natural mineral-oxide pigments or colored waterreducing admixtures, temperature stable, and nonfading. Color shall match existing adjacent surrounding precast units.
- F. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117.
- G. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
- H. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.
  - 1. Water-Reducing Admixtures: ASTM C 494/, Type A.
  - 2. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
  - 3. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
- 2.4 STEEL CONNECTION MATERIALS
  - A. Carbon-Steel Shapes and Plates: ASTM A 36.
  - B. Carbon-Steel-Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished, AWS D1.1/D1.1M, Type A or B, with arc shields and with minimum mechanical properties of PCI MNL 117, Table 3.2.3.
  - C. Carbon-Steel Plate: ASTM A 283.
  - D. Carbon-Steel Castings: ASTM A 27, Grade 60-30.
  - E. High-Strength, Low-Alloy Structural Steel: ASTM A 572.
  - F. Carbon-Steel Structural Tubing: ASTM A 500, Grade B.
  - G. Wrought Carbon-Steel Bars: ASTM A 675/, Grade 65.
  - H. Deformed-Steel Wire or Bar Anchors: ASTM A 496 or ASTM A 706.
  - I. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A; carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A 563; and flat, unhardened steel washers, ASTM F 844.
  - J. High-Strength Bolts and Nuts: ASTM A 325, Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A 563; and hardened carbon-steel washers, ASTM F 436.
  - K. Zinc-Coated Finish: For exterior steel items, steel in exterior walls, and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A 123 or ASTM A 153.
    - 1. For steel shapes, plates, and tubing to be galvanized, limit silicon content of steel to less than 0.03 percent or to between 0.15 and 0.25 percent or limit sum of silicon and 2.5 times phosphorous content to 0.09 percent.
    - 2. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035A or SSPC-Paint 20.
  - L. Shop-Primed Finish: Prepare surfaces of nongalvanized steel items, except those surfaces to be embedded in concrete, according to requirements in SSPC-SP 3 and shop-apply lead- and chromate-free, rust-inhibitive primer, complying with performance requirements in MPI 79 according to SSPC-PA 1.
  - M. Welding Electrodes: Comply with AWS standards.

# 2.5 ACCESSORIES

- A. Precast Accessories: Provide clips, hangers, plastic or steel shims, and other accessories required to install architectural precast concrete units.
- B. Approved Sealers: Fabrishield 761 Silane/Siloxane Water Repellent, Grace Transeal penetrating siloxane sealer, or other as recommended by Architectural Precast Concrete product supplier
- C. Provide any required or recommended primer to allow proper seal at all caulked panel joints.

# 2.6 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144 or ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

# 2.7 CONCRETE MIXTURES

- A. Prepare design mixtures for each type of precast concrete required.
  - 1. Limit use of fly ash and silica fume to 20 percent of portland cement by weight; limit metakaolin and silica fume to 10 percent of portland cement by weight.
- B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at architectural precast concrete fabricator's option.
- C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 117 when tested according to ASTM C 1218/C 1218M.
- D. Normal-Weight Concrete Mixtures: Proportion by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
  - 1. Compressive Strength (28 Days): 4000 psi minimum.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
- E. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL 117.
- F. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117.
- G. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

# 2.8 MOLD FABRICATION

- A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement by release agent.
- B. Maintain molds to provide completed architectural precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.
  - 1. Form joints are not permitted on faces exposed to view in the finished work.
  - 2. Edge and Corner Treatment: Uniformly chamfered.

# 2.9 FABRICATION

- A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.
  - Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."
- B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing architectural precast concrete units to supporting and adjacent construction.
- C. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.
  - 1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete. When damage to epoxy-coated reinforcing exceeds limits specified in ASTM A 775/A 775M, repair with patching material compatible with coating material and epoxy coat bar ends after cutting.
  - 2. Accurately position, support, and secure reinforcement against displacement during concreteplacement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
  - 3. Place reinforcement to maintain at least 3/4-inch minimum coverage. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.

- 4. Place reinforcing steel and prestressing strand to maintain at least 3/4-inch minimum concrete cover. Increase cover requirements for reinforcing steel to 1-1/2 inches when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
- 5. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.
- D. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses.
- E. Comply with requirements in PCI MNL 117 and requirements in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.
- F. Place face mixture to a minimum thickness after consolidation of the greater of 1 inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.
- G. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.
  - Place backup concrete mixture to ensure bond with face-mixture concrete.
- H. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air on surfaces. Use equipment and procedures complying with PCI MNL 117.
  - 1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."
- I. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.
- J. Identify pickup points of architectural precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each architectural precast concrete unit on a surface that will not show in finished structure.
- K. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.
- L. Discard and replace architectural precast concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Architect's approval.

# 2.10 FABRICATION TOLERANCES

1.

- A. Fabricate architectural precast concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished panel complies with the following product tolerances:
  - 1. Overall Height and Width of Units, Measured at the Face Exposed to View: As follows:
    - a. 10 feet or under, plus or minus 1/8 inch.
    - b. 10 to 20 feet plus 1/8 inch, minus 3/16 inch.
    - c. 20 to 40 feet, plus or minus 1/4 inch.
    - d. Each additional 10 feet, plus or minus 1/16 inch.
  - 2. Overall Height and Width of Units, Measured at the Face Not Exposed to View: As follows:
    - a. 10 feet or under, plus or minus 1/4 inch.
    - b. 10 to 20 feet, plus 1/4 inch, minus 3/8 inch.
    - c. 20 to 40 feet, plus or minus 3/8 inch.
    - d. Each additional 10 feet, plus or minus 1/8 inch.
  - 3. Total Thickness or Flange Thickness: Plus 1/4 inch, minus 1/8 inch.
  - 4. Variation from Square or Designated Skew (Difference in Length of the Two Diagonal
  - Measurements): Plus or minus 1/8 inch per 72 inches or 1/2 inch total, whichever is greater.
  - 5. Bowing: Plus or minus L/360, maximum 1 inch.
  - 6. Local Smoothness: 1/4 inch per 10 feet.
  - 7. Warping: 1/16 inch per 12 inches of distance from nearest adjacent corner.
  - 8. Tipping and Flushness of Plates: Plus or minus 1/4 inch
  - 9. Dimensions of Architectural Features and Rustications: Plus or minus 1/8 inch.
- B. Position Tolerances: For cast-in items measured from datum line location, as indicated on Shop Drawings.

- 1. Weld Plates: Plus or minus 1 inch.
- 2. Inserts: Plus or minus 1/2 inch.
- 3. Handling Devices: Plus or minus 3 inches.
- 4. Reinforcing Steel and Welded Wire Fabric: Plus or minus 1/4 inch where position has structural implications or affects concrete cover; otherwise, plus or minus 1/2 inch.
- 5. Reinforcing Steel Extending out of Member: Plus or minus 1/2 inch of plan dimensions.
- 6. Tendons: Plus or minus 1/4 inch, vertical; plus or minus 1 inch, horizontal.
- 7. Location of Rustication Joints: Plus or minus 1/8 inch.
- 8. Location of Opening within Panel: Plus or minus 1/4 inch.
- 9. Location of Bearing Surface from End of Member: Plus or minus 1/4 inch.
- 10. Allowable Rotation of Plate, Channel Inserts, and Electrical Boxes: 2-degree rotation or 1/4 inch maximum over the full dimension of unit.
- 11. Position of Sleeve: Plus or minus 1/2 inch.
- 12. Location of Window Washer Track or Buttons: Plus or minus 1/8 inch.

# 2.11 FINISHES

- A. Panel faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of architectural precast concrete units to match approved sample panels and as follows:
  - 1. PCI's "Architectural Precast Concrete Color and Texture Selection Guide," of plate numbers selected by submittal process.
  - 2. Acid-Etched Finish: Use acid and hot-water solution, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces. Protect hardware, connections, and insulation from acid attach.
- B. Finish exposed surfaces of architectural precast concrete units to match face-surface finish.
- C. Finish unexposed surfaces of architectural precast concrete units by float finish.

# 2.12 SOURCE QUALITY CONTROL

- A. Strength of precast concrete units will be considered deficient if units fail to comply with ACI 318 requirements for concrete strength.
- B. Testing: If there is evidence that strength of precast concrete units may be deficient or may not comply with ACI 318 requirements, precaster will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42/C 42M.
  - 1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Architect.
  - 2. Cores will be tested in an air-dry condition.
  - 3. Strength of concrete for each series of 3 cores will be considered satisfactory if average compressive strength is equal to at least 85 percent of 28-day design compressive strength and no single core is less than 75 percent of 28-day design compressive strength.
  - 4. Test results will be made in writing on same day that tests are performed, with copies to Architect, Contractor, and precast concrete fabricator. Test reports will include the following:
    - a. Project identification name and number.
    - b. Date when tests were performed.
    - c. Name of precast concrete fabricator.
    - d. Name of concrete testing agency.
    - e. Identification letter, name, and type of precast concrete unit(s) represented by core tests; design compressive strength; type of break; compressive strength at breaks, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.
- C. Patching: If core test results are satisfactory and precast concrete units comply with requirements, clean and dampen core holes and solidly fill with precast concrete mixture that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine supporting structural substrate and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Do not install precast concrete units until supporting cast-in-place building structural framing has attained minimum allowable design compressive strength or supporting steel or other structure is complete.

# 3.2 INSTALLATION

- A. Install clips, hangers, bearing pads, and other accessories required for connecting architectural precast concrete units to supporting members and backup materials.
- B. Erect architectural precast concrete level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment as units are being permanently connected.
  - 1. Install temporary steel or plastic spacing shims or bearing pads as precast concrete units are being erected. Tack weld steel shims to each other to prevent shims from separating.
  - 2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
  - 3. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
  - 4. Unless otherwise indicated, maintain uniform joint widths of 3/4 inch.
- C. Connect architectural precast concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.
  - 1. Do not permit connections to disrupt continuity of roof flashing.
- D. Welding: Comply with applicable AWS D1.1/D1.1M and AWS D1.4 for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.
  - 1. Protect architectural precast concrete units and bearing pads from damage by field welding or cutting operations, and provide noncombustible shields as required.
  - 2. Welds not specified shall be continuous fillet welds, using no less than the minimum fillet as specified by AWS.
  - 3. Clean weld-affected metal surfaces with chipping hammer followed by brushing, and reprime damaged painted surfaces.
  - 4. Remove, reweld, or repair incomplete and defective welds.
- E. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.
  - 1. Where slotted connections are used, verify bolt position and tightness. For sliding connections, properly secure bolt but allow bolt to move within connection slot. For friction connections, apply specified bolt torque and check 25 percent of bolts at random by calibrated torque wrench.
- F. Grouting Connections: Grout connections where required or indicated. Retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.

# 3.3 ERECTION TOLERANCES

- A. Erect architectural precast concrete units level, plumb, square, true, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.
- B. Erect architectural precast concrete units level, plumb, square, and true, without exceeding the following noncumulative erection tolerances:
  - 1. Plan Location from Building Grid Datum: Plus or minus 1/2 inch.
  - 2. Top Elevation from Nominal Top Elevation: As follows:
    - a. Exposed Individual Panel: Plus or minus 1/4 inch
      - b. Non-Exposed Individual Panel: Plus or minus 1/2 inch.
      - c. Exposed Panel Relative to Adjacent Panel: 1/4 inch.

- d. Non-Exposed Panel Relative to Adjacent Panel: 1/2 inch.
- 3. Support Elevation from Nominal Support Elevation: As follows:
  - a. Maximum Low: 1/2 inch.
  - b. Maximum High: 1/4 inch.
- 4. Maximum Jog in Alignment of Matching Edges: 1/4 inch.
- 5. Joint Width (Governs over Joint Taper): Plus or minus 1/4 inch.
- 6. Maximum Joint Taper: 3/8 inch.
- 7. Maximum Jog in Alignment of Matching Faces: 1/4 inch.
- 8. Differential Bowing or Camber, as Erected, between Adjacent Members of Same Design: 1/4 inch

# 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Field welds will be subject to visual inspections and nondestructive testing according to ASTM E 165 or ASTM E 709. High-strength bolted connections will be subject to inspections.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

# 3.5 REPAIRS

- A. Repair architectural precast concrete units if permitted by Architect. The Architect reserves the right to reject repaired units that do not comply with requirements.
- B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 10 feet.
- C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A 780.
- D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.
- E. Remove and replace damaged architectural precast concrete units when repairs do not comply with requirements.

# 3.6 CLEANING

- A. Clean surfaces of precast concrete units exposed to view.
- B. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.
- C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.
  - 1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Clean soiled precast concrete surfaces with detergent and water, using stiff fiber brushes and sponges, and rinse with clean water. Protect other work from staining or damage due to cleaning operations.
  - 2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 03 45 00

# **DIVISION 04 – MASONRY**

Section 04 21 00	Brick Masonry Veneer System
Section 04 22 00	Unit Masonry Assemblies 12

# SECTION 04 21 00 - BRICK MASONRY VENEER SYSTEM

PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Section Includes
    - 1. Face Brick Veneer System on Metal Stud Walls.
    - 2. Slim Brick accent areas.
    - 3. Reinforcement, anchorage, and accessories.
    - 4. Embeded Flashing Materials
    - 5. Siloxane Sealer
  - B. Related Sections
  - C. Section 01 40 00 Quality Control: Testing laboratory services.
  - D. Section 04 22 00 Unit Masonry Assemblies.
  - E. Section 05 12 00 Structural Steel: Placement of steel lintels, bolts, and bearing plates.
  - F. Section 06 10 00 Rough Carpentry: Structural wall backing.
  - G. Section 07 26 10 Vapor Retarders
  - H. Section 07 90 00 Joint Sealers: Rod and sealant at masonry joints.
- 1.2 REFERENCES
  - A. ANSI / ASTM C216 Facing Brick (Solid Masonry Units Made from Clay or Shale).
  - B. ACI 530.1 Specifications for Masonry Structures.
  - C. ASTM E 514 Test Method for Water Penetration and Leakage through Mason- ry.
  - D. ASTM C 140 Test Methods of Sampling and Testing Concrete Masonry Units.
  - E. ASTM A 641 Zinc-coated (Galvanized) Carbon Steel Wire.
  - F. IMIAC International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.
  - G. IMIAC International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Hot Weather Masonry Construction.
  - H. 2018 IBC, Chapter 21, "Masonry".
  - I. ASTM A123
  - J. ASTM B117
- 1.3 SUBMITTALS

Α.

- A. Submit samples under provisions of Section 01 33 00.
- B. Submit four samples of each and all specified face brick units to illustrate color, texture, and extremes of color range.
- C. Submit manufacturer's certificate under provisions of Section 014000 that products meet or exceed specified requirements.

# 1.4 QUALITY ASSURANCE

- Qualifications
  - 1. Installer: Company specializing in performing the work of this Section with minimum 3 years documented experience.
- B. Mock-Ups
  - 1. Erect face brick to 4'-0" x 6'-0" panel size; include specified mortar, characteristic bond patterns, and accessories.
- C. Locate where directed, panel shall be part of a composite Mock-up including work provided under Aluminum storefront window systems provided under section 08 41 13. Coordinate as necessary.
- D. When accepted, mock-up will demonstrate minimum standard for the Work. Mock-up may remain as part of the Work.
- E. Testing: Independent testing laboratory, under provisions of Section 01 40 00.

#### DELIVERY, STORAGE, AND HANDLING 1.5

- Deliver products to site under provisions of Section 01 60 00. Α.
- Store and protect products under provisions of Section 01 60 00. Β.

#### **PROJECT/SITE CONDITIONS** 1.6

- Cold Weather Requirements: IMIAC Recommended Practices and Guide Α. Specifications for Cold Weather Masonry Construction.
- Β. Hot Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Hot Weather Construction.
- 1.7 SEQUENCING AND SCHEDULING
  - Coordinate work under provisions of Section 01 31 00. Α.

# PART 2PART 2 - PRODUCTS

Α.

- 2.1 MANUFACTURERS
  - Mutual Materials Products: See section 2.2 below
    - 1. Robinson Brick Company Products: Equal to above, as accepted by submittal
    - 2. Old Castle Brick Company Products: Equal to above, as accepted by submittal
    - Products: Equal to above, as accepted by submittal Western Materials 3.
    - Substitutions: Under provisions of Section 016000. 4.
- 2.2 MATERIALS
  - Α. Face Brick: ANSI / ASTM C216, Type FBX, Grade SW;
    - Colors: 1.
      - **Redondo Gray** a
      - 2. Texture: Mission
      - Size & Shape: 3.
        - Modular Face Brick 3 5/8" x 2 1/4" x 7 5/8" а
  - Sizes & Shapes as required by building configuration for complete system. b. Β. Slim Brick: ANSI / ASTM C1088, Type TBX, Grade Exterior;
    - 1. Colors:
      - **Redondo Gray** a.
      - Texture: Mission
    - 2. 3. Size & Shape:
      - Flats 1/2" x 2 1/4" x 7 5/8" a.
      - b. Corners 1/2" x 3 5/8" x 2 1/4" x 7 5/8"
      - C. Sizes & Shapes as required by building configuration for complete system.
    - 4. Installation:
      - LATICRETE Masonry Veneer Installation System (MVIS). Install а complete system per manufacturer's instructions. Apply cement backer board over wood studs. Adhere Thin Brick to cement backer board with LATICRETE MVIS Thin Brick Mortar. Apply LATICRETE Masonry Pointing Mortar to all joints. Pointing Mortar color to be selected by architect from manufacturer's full standard range.
- 2.3 Bond Pattern:
  - Running bond, recessed sections and soldier course accent bands as noted in the Α. drawings. Install control joints as noted.
- MANUFACTURED UNITS not used 2.4
- 2.5 EQUIPMENT - not used
- 2.6 COMPONENTS
  - Α. Adjustable Veneer Anchors

- 1. Type: Two piece adjustable consisting of a minimum 11 gauge plate pintel or 1/4" diameter double leg wire pintle and a minimum 12 gauge anchor plate. The extended leg of the pintle shall have a lip or hook that will engage or enclose a horizontal 9 gauge joint reinforcement wire.
- Size: as required to extend to within 3/4" of outside face of masonry veneer. 2.
- Fasteners: Minimum of two fasteners per anchor plate. 3.
- Sleeve anchors: At concrete and CMU sleeve anchors shall be stainless 4. steel 1/4" diameter with a minimum of 1-1/8" embedment. Acceptable sleeve anchor:
  - Phillips Drill Co., Inc., Red Head Sleeve Anchor a.
- 5. Finish: All material, pintle, and anchor plate shall be hot dipped galvanized with a minimum of 1.5 oz. of zinc per square foot of surface area per ASTM A 123. Fasteners shall be organic polymer coated with saltspray resistance to red rust of more than 800 hours per ASTM B117. Approved coating shall be "Stalgard".
- 6. Structural Performance: provide test date certifying that the veneeranchors meet or exceed the following service criteria.
  - Minimum Tension/Compression a.
    - Minimum Axial Stiffness
- 175 lbs. 2,000 lbs. per inch
- b. Maximum Axial Deflection C.
- 0.09 inch 0.05 inch
- Maximum Axial Mechanical Play
- Minimum Lateral Mechanical Play 0.25 inch e.
- 7. Test shall include a minimum of 5 samples and be conducted by an approved independent testing agency.
- 8. The testing apparatus shall simulate, as closely as possible, the loading of the veneer anchor under service conditions, and shall include all components, including all adjustment eccentricities.
- 9. Tension/compression tests shall be conducted to failure and when divided by a factor of safety of 4 shall meet or exceed the specified service minimum force.
- 10. Measurements for specified deformation maximums shall be made under service loads.
- 11. Acceptable Products:

d.

- Thermal Concrete 2-Seal Tie with Byna-Lok Wire Tie and 9 gauge a. continuous wire as manufactured by Hohman & Barnard, Inc.
- HB-213S Seismic Plate Pintle w/ HB-213 (T-LOK TIE) and 9 gauge b. continuous wire as manufactured by Hohman & Barnard, Inc.
- C. X-Seal S.I.S. and 9 gauge continuous wire as manufactured by Hohman & Barnard, Inc.
- 12. Substitutions: Under provisions of Section 01 60 00.
- 2.7 ACCESSORIES
  - Joint Filler: Closed cell polyethylene; oversized 50 percent joint width; Α. self- expanding; 1 inch wide by maximum lengths.
  - Β. Building Wrap: 30 pound asphalt saturated felt. Install (2) layers over rigid insulation wall board.
  - Weep Holes: vertical joint blockout at 24" on center. C.
  - Cleaning Solution: Fabrikleen Masonry Cleaner Type R, or as recommended D. by selected Masonry product supplier.
  - Flashing: Copper flashing with caulked sealed lap joints. E.
  - Flexible Base Flashing: 3 ounce copper sheet laminated with bituminous F. impregnated Kraft paper or saturated fabric flashing with caulked sealed lapjoints.
  - Approved Masonry Sealers: Fabrishield 761 Silane/Siloxane Water Repellent, or G. other previously approved as recommended by selected Masonry product supplier. Apply two (2) coats per mfr., each coat saturated to refusal.
  - Η. Provide and install mortar net with pre-formed weep holes and weep screed.

# 2.8 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
  - 2. Limit cementitious materials in mortar to portland cement and lime.
  - 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
  - 1. For masonry, use Type S.
  - 2. Mortar Mixing
    - a. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270
    - b. Do not use antifreeze compounds to lower the freezing point of mortar or groutC. Grout for Masonry: Comply with ASTM C 476
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
  - 2. Bond beams and lintels: 2000 psi strength at 28 days; 7-8 inches slump, premixed type in accordance with ASTM C94
  - 3. Provide grout with a slump of 8 inches as measured according to ASTM C 143.

# 2.9 EMBEDDED FLASHING MATERIALS

- D. Metal Flashing: Provide metal flashing complying with Division 07 Section "Sheet Metal Flashing and Trim" and as follows:
  - 1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch (0.40 mm) thick.
  - Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. weight or 0.0216 inch (0.55 mm) thick or ASTM B 370, Temper H01, high-yield copper sheet, 12oz./sq. ft. weight or 0.0162 inch (0.41 mm) thick.
  - 3. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
  - 4. Fabricate through-wall metal flashing embedded in masonry from stainless steel or copper, with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
    - a. Products: Subject to compliance with requirements, available products that may be
      - incorporated into the Work include, but are not limited to, the following:
      - 1) Cheney Flashing Company; Cheney 3-Way Flashing (Sawtooth).
      - 2) Keystone Flashing Company, Inc.; Keystone 3-Way Interlocking Thruwall Flashing.
      - 3) Sandell Manufacturing Co., Inc.; Mechanically Keyed Flashing.
  - 5. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
  - 6. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
  - 7. Fabricate through-wall flashing with sealant stop unless otherwise indicated. Fabricate by bending metal back on itself 3/4 inch at exterior face of wall and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
  - 8. Fabricate metal drip edges and sealant stops for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam will shed water.

- 9. Metal Drip Edge: Fabricate from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
- 10. Metal Sealant Stop: Fabricate from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
- 11. Metal Expansion-Joint Strips: Fabricate from stainless steel or copper to shapes indicated.
- E. Flexible Flashing: Use one of the following unless otherwise indicated:
  - 1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded between 2 layers of glassfiber cloth. Use only where flashing is fully concealed in masonry.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Advanced Building Products Inc.; Copper Fabric Flashing or Copper Sealtite 2000.
      - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Fabric Thru-Wall Flashing.
      - 3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
      - 4) Phoenix Building Products; Type FCC-Fabric Covered Copper.
      - 5) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
      - 6) York Manufacturing, Inc.; Multi-Flash 500.
  - 2. Asphalt-Coated Copper Flashing: 5-oz./sq. ft. copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Advanced Building Products Inc.; Cop-R-Cote.
      - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Coated Thru-Wall Flashing.
      - 3) Hohmann & Barnard, Inc.; H & B C-Coat Flashing.
      - 4) Phoenix Building Products; Type ACC-Asphalt Bituminous Coated.
      - 5) Sandell Manufacturing Co., Inc.; Coated Copper Flashing.
  - 3. Stainless Steel Flexible Self-Adhering Flashing: 2 mil sheet of Type 304 self-adhering stainless steel and butyl adhesive. Use only where flashing is fully concealed in masonry.

a. Products: Subject to compliance with requirements, provide one of the following:

- 1) York Manufacturing, Inc.; York 304 SA SS
- 2) GE Silicones, Inc.; GE Elemax SS Flashing
- 3) Vapro Shield, Inc.; Vapro Thru-Wall Flashing SA
- b. Accessories:
  - 1) Polyether sealant:
    - a) York Manufacturing, Inc.; UniverSeal US-100
    - b) STS Coatings; GreatSeal LT-100
    - c) Prosoco, Inc.; R-Guard Joint Seam Sealer
- 2) Splice Tape:
  - a) York Manufacturing, Inc.; York 304 SA
  - b) GE Silicones, Inc.; GE Elemax SS Flashing
  - c) VaproShield, Inc.; Vapro Thru-Wall Flashing SA
- 3) Corner and End Dams: form the stainless stell flashing in the field or us 26 gauge stainless steel pre-manufactured corners.
- 4) Mortar deflection: polyester strands that will not degrade and keep the weep vents from clogging with mortar.
  - a) York Manufacturing; Weep-Armor
- 5) Termination bar: rigid PVC or stainless steel termination bar with sealant catch lip.
  - a) York Manufacturing, Inc.; T-96 termination bar
  - b) York Manufacturing, Inc.; SS Term Bar
- F. Application: Unless otherwise indicated, use the following:
  - 1. Where flashing is indicated to receive counterflashing, use metal flashing.
  - 2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.

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- 3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge with a sealant stop or flexible flashing with a metal drip edge.
- 4. Where flashing is fully concealed, use metal flashing or flexible flashing.
- G. Solder and Sealants for Sheet Metal Flashings:
  - 1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
  - 2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
  - 3. Elastomeric Sealant: ASTM C 920, chemically curing urethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- H. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- 2.9 FABRICATION not used
- 2.10 SOURCE QUALITY CONTROL
  - A. Testing: Independent testing laboratory, under provisions of Section 01 40 00.

#### PART 3 - EXECUTION

- 3.1 EXAMINATION
  - A. Verify that field conditions are acceptable and are ready to receive work.
  - B. Verify items provided by other Sections of work are properly sized and located.
  - C. Verify that built-in items are in proper location, and ready for roughing into masonry work.
  - D. Beginning of installation indicates installer accepts existing conditions.
- 3.2 PREPARATION
  - A. Direct and coordinate placement of anchors supplied to other Sections.
  - B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
- 3.3 EXECUTION
  - A. Installation
    - 1. Establish lines, levels, and coursing as indicated in drawings. Protect from displacement.
    - 2. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
    - 3. Provide veneer ties as required by structural and 2018 International Building Code requirements. At a minimum space ties at 16" o.c. vertically and 16" o.c. horizontally. Stagger placement.
    - 4. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
    - 5. Remove excess mortar as Work progresses.
    - 6. Interlock intersections and external corners.
    - 7. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
  - B. Perform job site cutting or masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
  - C. Masonry control joints to be a maximum of 20 feet o.c., unless indicated otherwise on the drawings. All joints to be sanded. Contractor to submit layout for approval.

- D. Interface with Other Products
  - 1. As work progresses, build in fabricated metal frames, anchor bolts and other items furnished by other Sections.
  - 2. Build in items plumb and level.
  - 3. Bed anchors of metal door and glazed frames in adjacent mortarjoints. Fill frame voids solid with grout.
  - 4. Do not build in organic materials subject to deterioration.
- E. Tolerances
  - 1. Maximum Variation from Alignment of Columns: 1/4 inch.
  - 2. Maximum Variation from Unit to Adjacent Unit: 1/32 inch.
  - 3. Maximum Variation from Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.
  - 4. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
  - 5. Maximum Variation from Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet.
  - 6. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.
  - 7. Maximum Variation From Cross Sectional Thickness of Walls: 1/4 inch.
- F. Cutting and Fitting
  - 1. Cut and fit for pipes and conduit. Coordinate with other Sections of work to provide correct size, shape, and location.
  - 2. Obtain Architect / Engineer approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.
- 3.4 FIELD QUALITY CONTROL not used
- 3.5 ADJUSTING not used
- 3.6 CLEANING
  - A. Remove excess mortar and mortar smears.
  - B. On exterior of building clean masonry daily to remove mortar on surface.
  - C. Replace defective mortar. Match adjacent work.
  - D. Clean soiled surfaces with cleaning solution.
  - E. Use non-metallic tools in cleaning operations.
  - F. Upon completion of masonry cleaning apply specified masonry sealer in accordance with manufacturer's written recommendations.
- 3.7 DEMONSTRATION not used
- 3.8 PROTECTION
  - A. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

END OF SECTION 04 21 00.

### SECTION 04 22 00 - UNIT MASONRY ASSEMBLIES

### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. This Section includes unit masonry assemblies consisting of the following:
    - 1. Concrete masonry units (CMUs).
      - 2. Mortar and grout.
      - 3. Reinforcing steel.
      - 4. Ties and anchors.
      - 5. Embeded Flashing Materials
      - 6. Sound rated concrete masonry units with battens.
      - 7. Miscellaneous masonry accessories.
    - B. Related Sections include the following:
      - 1. Division 01 Section "Quality Requirements" for special building envelope mock-up.
      - 2. Division 03 Section "PreCast Architectural Concrete" for unit and anti-skate stop coordination.
      - 3. Division 05 Section "Metal Fabrications" for weld and bearing plates.
      - 4. Division 07 Section "Spray Insulation" for masonry unit insulation.
      - 5. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing.
      - 6. Division 07 Section "Joint Sealants" for sealing control and expansion joints in unit masonry.
      - 7. Division 09 Section "Painting" for clear sealer finish.

#### 1.2 SUBMITTALS

C.

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For the following:
  - 1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
  - 2. Elevation drawings for each face of masonry on the project indicating patterning, bond type, control joints and block type and size for each area. Include notations for special shapes or cutting required.
  - Samples for Final Selection in the form of small-scale units: For the following:
    - 1. Concrete masonry units showing match to pre-selected colors
- D. Material Certificates: For each type of product indicated. Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards.
  - 1. For masonry units include material test reports substantiating compliance with requirements.
- E. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

# 1.3 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths (f<sup>\*</sup><sub>m</sub>) at 28 days. Determine net-area compressive strength (f<sup>\*</sup><sub>m</sub>) of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

# 1.4 QUALITY ASSURANCE

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required. Acceptable concrete masonry unit manufacturers must have five years minimum experience.

- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.
- C. Conform to International Masonry Industry All Weather Council (IMIAC) when placing masonry in cold weather.
  - 1. Maintain mortar temperatures between 40°F and 120°F at the time of mixing.
  - 2. Produce grout temperatures between 70°F and 120°F at the time of mixing.
  - 3. Protect materials from moisture and freezing.
  - 4. Eliminate installation of frozen units (those with temperatures 20°F and below).
  - 5. Protect the completed, or partially completed, masonry for the prescribed period of time to prevent freezing of mortar and grout, and the intrusion of excess water from rain or snow.
  - Conform to International Masonry Industry All Weather Council (IMIAC) when placing masonry in hot weather.
- E. Mock-up:

D.

- 1. Erect sample mock-up installation for masonry types to be installed on the project:
  - a. Custom block type and coursing.
- 2. Do not proceed with purchase, fabrication or installation of multiple items until mock-up has been accepted.
- 3. Locate where directed. Coordinate as necessary.
- 4. When accepted, mock-up will demonstrate minimum standard for the Work. Mock-up may remain as part of the Work.

# 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

# 1.6 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
- B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with industry standards cold-weather construction requirements.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

# PART 2 - PRODUCTS

# 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to:
  - 1. Western Materials (Basis of Design for integral color units)
  - 2. Oldcastle Premix
  - 3. Mutual Materials Co.
  - 4. White Block
  - 5. Builders Masonry Products
  - 6. Amcor
  - 7. Substitutions: Under provisions of Division 01
- 2.2 MASONRY UNITS, GENERAL
  - A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

#### 2.3 CONCRETE MASONRY UNITS (CMUs)

- A. Concrete Masonry Units: ASTM C 90.
  - 1. Provide special shapes for sill, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  - 2. Provide square-edged units for outside corners, unless otherwise indicated in the construction documents.
  - 3. All Interior walls corners (and jambs) shall be bullnosed units.
  - 4. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi or as indicated on structural drawings.
  - 5. Weight Classification: Medium weight or as indicated on structural drawings.
  - 6. All exterior CMU walls to be integral colored and painted with water-proof sealer.
  - 7. All interior CMU walls to be integral colored units or standard gray sealed and painted with color as selected by Architect except at architectural integral color unit features as noted. Reference interior elevations.
- B. CMU Schedule: Refers to typical sizes, face pattern and color only. Refer to plans, sections, and wall types to determine depth, type, and any special required shapes or configurations.
  - 1. For various type CMU blocks reference specification Division 09 Material Legend.
  - 2. CMU Schedule (dimensions and sizes are nominal):
    - a. Type 1 Integral Color, Smooth Face
      - Type 2 Integral Color, Ground Face
      - Type 1a Integral Color, Acoustical (Soundblox), Smooth Face
      - Type 2a Integral Color, Acoustical (Soundblox), Ground Face
      - Misc Standard Grey Units
    - b. Basis of Design: Designated on Division 09 Material Legend

#### 2.4 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.
- D. Mortar Cement: ASTM C 1329.
- E. Mortar Pigments: None.
- F. Aggregate for Mortar: ASTM C 144.
- G. Aggregate for Grout: ASTM C 404.
- H. Water: Clean and Potable.

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# 2.5 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615 or ASTM A 996, Grade 60, deformed.

### 2.6 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with subparagraphs below, unless otherwise indicated.
  - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.
  - 2. Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 zinc coating.
  - 3. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008/M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.
- B. Adjustable Veneer Anchors coordinate installation with continuous wall insulation and weather barrier specified in Division 07.
  - 1. Type: Two piece adjustable consisting of a minimum 11 gauge plate pintel or 1/4" diameter double leg wire pintel and a minimum 12 gauge anchor plate. The extended leg of the pintel shall have a lip or hook that can engage or enclose a horizontal 9 gauge joint reinforcement wire.
  - 2. Size: as required to extend to within 3/4" of outside face of masonry veneer.
  - 3. Minimum of two fasteners per anchor plate. Screws at metal studs shall be self tapping and a minimum 1/4" diameter, with hardened tips (Rc = 50 min.) and ductile shank (Rc = 34 max). Screw heads shall seal with a water resistant gasket. Fasteners shall penetrate steel stud flange by not less than three exposed threads. Acceptable screws.
    - a. Elco, Dril-Flex
    - b. Flo-Seal, Kwik-Pro
    - c. Hilti, Stalgard
  - 4. Sleeve anchors: At concrete and CMU sleeve anchors shall be stainless steel 1/4" diameter with a minimum of 1-1/8" embedment. Acceptable sleeve anchor: Phillips Drill Co., Inc., Red Head Sleeve Anchor
  - 5. Finish: All material, pintel, and anchor plate shallbe hot dipped galvanized with a minimum of 1.5 oz. of zinc per square foot of surface area per ASTM A 123. Fasteners shall be organic polymer coated with salt-spray resistance to red rust of more than 800 hours per ASTM B 117. Approved coating shall be "Stalgard".
  - 6. Structural Performance: provide test date certifying that the veneer anchors meet or exceed the following service criteria:
    - a. Minimum Tension/Compression 175 lbs.
    - b. Minimum Axial Stiffness 2,000 lbs per inch
    - c. Maximum Axial Deflection 0.09 inch
    - d. Maximum Axial Mechanical Play 0.05 inch
    - e. Minimum Lateral Mechanical Play 0.25 inch
  - 7. Test shall include a minimum of 5 samples and be conducted by an approved independent testing agency
  - 8. The testing apparatus shall simulate, as closely as possible, the loading of the veneer anchor under service conditions, and shall include all components, including all adjustment eccentricities
  - 9. Tension/compression tests shall be conducted to failure and when divided by a factor of safety of 4 shall meet or exceed the specified service minimum force
  - 10. Measurements for specified deformation maximums shall be made under service loads
  - 11. Acceptable Products:
    - a. D/A 213S Heavy duty adjustable seismic anchor as manufactured by Dur-O-Wall, Inc.
    - b. X-Seal Anchor as manufactured by Hohman and Barnard, Inc.
- C. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

# 2.7 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing complying with Division 07 Section "Sheet Metal Flashing and Trim" and as follows:

- 1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch (0.40 mm) thick.
- 2. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. weight or 0.0216 inch (0.55 mm) thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. weight or 0.0162 inch (0.41 mm) thick.
- 3. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
- 4. Fabricate through-wall metal flashing embedded in masonry from stainless steel or copper, with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
  - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - 1) Cheney Flashing Company; Cheney 3-Way Flashing (Sawtooth).
    - 2) Keystone Flashing Company, Inc.; Keystone 3-Way Interlocking Thruwall Flashing.
    - 3) Sandell Manufacturing Co., Inc.; Mechanically Keyed Flashing.
- 5. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
- 6. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
- 7. Fabricate through-wall flashing with sealant stop unless otherwise indicated. Fabricate by bending metal back on itself 3/4 inch at exterior face of wall and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
- 8. Fabricate metal drip edges and sealant stops for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam will shed water.
- 9. Metal Drip Edge: Fabricate from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
- 10. Metal Sealant Stop: Fabricate from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
- 11. Metal Expansion-Joint Strips: Fabricate from stainless steel or copper to shapes indicated.
- B. Flexible Flashing: Use one of the following unless otherwise indicated:

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- 1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
  - Products: Subject to compliance with requirements, provide one of the following:
    - 1) Advanced Building Products Inc.; Copper Fabric Flashing or Copper Sealtite 2000.
    - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Fabric Thru-Wall Flashing.
    - 3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
    - 4) Phoenix Building Products; Type FCC-Fabric Covered Copper.
    - 5) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
    - 6) York Manufacturing, Inc.; Multi-Flash 500.
- 2. Asphalt-Coated Copper Flashing: 5-oz./sq. ft. copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
  - Products: Subject to compliance with requirements, provide one of the following:
    - 1) Advanced Building Products Inc.; Cop-R-Cote.
    - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Coated Thru-Wall Flashing.
    - 3) Hohmann & Barnard, Inc.; H & B C-Coat Flashing.
    - 4) Phoenix Building Products; Type ACC-Asphalt Bituminous Coated.
    - 5) Sandell Manufacturing Co., Inc.; Coated Copper Flashing.
- 3. Stainless Steel Flexible Self-Adhering Flashing: 2 mil sheet of Type 304 self-adhering stainless steel and butyl adhesive. Use only where flashing is fully concealed in masonry.
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) York Manufacturing, Inc.; York 304 SA SS
    - 2) GE Silicones, Inc.; GE Elemax SS Flashing

- 3) Vapro Shield, Inc.; Vapro Thru-Wall Flashing SA
- b. Accessories:
  - 1) Polyether sealant:
    - a) York Manufacturing, Inc.; UniverSeal US-100
    - b) STS Coatings; GreatSeal LT-100
    - c) Prosoco, Inc.; R-Guard Joint Seam Sealer
  - 2) Splice Tape:
    - a) York Manufacturing, Inc.; York 304 SA
    - b) GE Silicones, Inc.; GE Elemax SS Flashing
    - c) VaproShield, Inc.; Vapro Thru-Wall Flashing SA
  - 3) Corner and End Dams: form the stainless stell flashing in the field or us 26 gauge stainless steel pre-manufactured corners.
  - 4) Mortar deflection: polyester strands that will not degrade and keep the weep vents from clogging with mortar.
    - a) York Manufacturing; Weep-Armor
  - 5) Termination bar: rigid PVC or stainless steel termination bar with sealant catch lip.
    - a) York Manufacturing, Inc.; T-96 termination bar
    - b) York Manufacturing, Inc.; SS Term Bar
- C. Application: Unless otherwise indicated, use the following:
  - 1. Where flashing is indicated to receive counterflashing, use metal flashing.
  - 2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
  - 3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge with a sealant stop or flexible flashing with a metal drip edge.
  - 4. Where flashing is fully concealed, use metal flashing or flexible flashing.
- D. Solder and Sealants for Sheet Metal Flashings:
  - 1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainlesssteel sheet manufacturer.
  - 2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
  - 3. Elastomeric Sealant: ASTM C 920, chemically curing urethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- 2.8 MISCELLANEOUS ANCHORS
  - A. Anchor Bolts: steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C.

# 2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane.
- B. Preformed Control-Joint Gaskets: Designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.
  - 1. Available Products:
    - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
    - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
- c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
- 2. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.
- E. Cleaning Solutions: Non-acidic, not harmful to masonry work or adjacent materials
- F. Provide and install mortar net with pre-formed weep holes.
- G. Weep/Vent Products: Use the following, unless otherwise indicated:
  - 1. Round Plastic Weep/Vent Tubing: Medium-density polyethylene, 3/8-inch OD by 4 inches long.
- H. Provide thru-wall termination bar flashing at wall substrate transitions, stainless steel or copper.
  - Seal weather barrier at metal termination bars with Kraft Paper flashing 3 oz/sq ft sheet copper bonded to fiber reinforced asphalt treated Kraft paper. Lap butyl sealant as specified in Division 07.
- I. Cleaning Solution: Fabrikleen Masonry Cleaner Type R, or as recommended by selected Masonry product supplier
- J. Approved Masonry Sealers: Water Repellent, or other previously approved product as recommended by selected Masonry product supplier. Apply two coats by tank sprayer. Apply to 4" run-down each coat. Reference Division 09 Painting for products.
- K. At acoustical block locations, provide rigid insulation insert at each acoustical cell, black in color and rated for exterior use. Provide STC of 53 (minimum).

#### 2.10 MORTAR AND GROUT MIXES

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- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, waterrepellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
  - 2. Limit cementitious materials in mortar to portland cement and lime.
  - 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
  - 1. For masonry, use Type S.
  - 2. Mortar Mixing
    - a. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270
    - b. Do not use antifreeze compounds to lower the freezing point of mortar or grout
- C. Grout for Unit Masonry: Comply with ASTM C 476
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
  - 2. Bond beams and lintels: 2000 psi strength at 28 days; 7-8 inches slump, premixed type in accordance with ASTM C94
  - 3. Provide grout with a slump of 8 inches as measured according to ASTM C 143

## PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
  - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
  - 2. Verify that foundations are within tolerances specified.
  - 3. Verify that reinforcing dowels are properly placed.

- C. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.
- E. Preparation
  - 1. Supply metal anchors for placement. Direct correct placement
    - 2. Obtain door frames and related embedded anchors. Verify items provided by other sections of work are properly sized and located
    - 3. Establish lines, levels, and coursing. Protect from disturbance
    - 4. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent bracing

## 3.2 INSTALLATION, GENERAL

- A. Install all masonry material in compliance with Industry Standards and as indicated and shown in the construction documents.
- B. Install all masonry material in compliance with weather conditions.
- C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
  - 1. Mix units from several pallets or cubes as they are placed.
- D. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build singlewythe walls to actual widths of masonry units, using units of widths indicated.
- E. Build chases and recesses to accommodate items specified in this and other Sections.
- F. Coordinate masonry installation with exterior continuous wall insulation and water-resistive barrier. Reference Division 07 specifications and drawings.
- G. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- H. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- I. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
  - 1. Mix units from several pallets or cubes as they are placed.
  - Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
    - 1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
    - 2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
    - 3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
    - 4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
    - 5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
    - 6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/32 inch except due to warpage of masonry units within tolerances specified for warpage of units.
- K. Cold-Weather Construction:
  - General: All materials shall be delivered in a usable condition and stored to prevent wetting by capillary action, rain and snow. The tops of all walls not enclosed or sheltered shall be covered with a strong weather-resistive material at the end of each day or shutdown. Partially completed walls shall be covered at all times when work is not in progress. Covers shall be draped over the wall and extend a minimum of 2 feet

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both sides and shall be securely held in place, except when additional protection is required.

- 2. Preparation: If ice or snow has inadvertently formed on a masonry bed, it shall be thawed by application of heat carefully applied until top surface of masonry is dry to the touch. A section of masonry deemed frozen and damaged shall be removed before continuing construction of that section.
- 3. Construction: Masonry units shall be dry at time of placement. Wet or frozen masonry units shall not be laid. Special requirements for various temperature ranges are as follows:
  - a. Air temperature 40 deg F to 32 deg F: Sand or mixing water shall be heated to produce mortar temperature between 60 deg F and 120 deg F
  - b. Air temperature 32 deg F to 25 deg F: Sand and mixing water shall be heated to produce mortar temperatures between 60 deg F to 120 deg F. Maintain mortar temperatures on boards above freezing
  - c. Air temperature 25 deg F to 20 deg F: Sand and mixing water shall be heated to produce mortar temperatures between 60 deg F to 120 deg F. Maintain mortar temperatures on boards above freezing. Salamanders or other source of heat shall be used on both sides of walls under construction. Windbreaks shall be employed when wind is in excess of 15 miles per hour. Temperature of units when laid shall not be less than 40 deg F
  - d. Air temperature 20 deg F and below: Sand and mixing water shall be heated to produce mortar temperatures between 60 deg F to 120 deg F. Enclosure and auxiliary shall be provided to maintain air temperature above freezing. Temperature of unit when laid shall not be less than 40 deg F
- 4. Protection when the mean daily air temperature is 40 deg F to 32 deg F, masonry <u>shall be protected</u> from rain or snow for 24 hours by covering with a weather-resistive membrane.
- 5. When the mean daily air temperature 32 deg F to 25 deg F, masonry <u>shall be completely covered</u> with weather-resistive membrane for 24 hours
- 6. When the mean daily air temperature 25 deg F to 20 deg F, masonry shall be <u>completely covered</u> with insulating blankets or equally protected for 24 hours
- 7. When the mean daily air temperature is 20 deg F or below, masonry temperature shall be maintained above freezing for 24 hours by enclosure and supplementary heat, by electric heating blankets, infrared heat lamps or other approved methods
- 8. Placing grout and protection of grouted masonry. When air temperatures fall below 40 deg F, grout mixing water and aggregate shall be heated to produce grout temperatures between 60 deg F to 120 deg F. Masonry to be grouted shall be maintained above freezing during grout placement and for at least 24 hours after placement. When atmospheric temperatures fall below 40 deg F, enclosures shall be provided around the masonry during grout placement and for at least 24 hours after placement.
- 9. Any expert opinions regarding acceptability of the installed units and mortar required by the Architect/Engineer shall be at the Contractors cost

# 3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Masonry: Unless otherwise indicated, lay masonry in running bond or as indicated on Drawings.
- C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

- F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- G. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

## 3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow concrete masonry units as follows:
  - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
  - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
  - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
  - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

#### 3.5 MASONRY JOINT REINFORCEMENT

- A. Place reinforcement in accordance with ACI 315
- B. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
  - 1. Space reinforcement not more than 16 inches o.c.
- C. Place reinforcing bars supported and secured against displacement. Maintain position within 1/2 inch of true dimension
- D. Verify reinforcement is clean, free of scale, dirt, or other foreign coatings which would reduce bond to grout
- E. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- F. Provide continuity at wall intersections by using prefabricated T-shaped units.
- G. Provide continuity at corners by using prefabricated L-shaped units.

#### 3.6 ANCHORING MASONRY TO STRUCTURAL MEMBERS

- A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
  - 1. Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.
  - 2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
  - 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

#### 3.7 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement. Joint spacing shall be provided at 24 feet o.c. minimum. Reference architectural and structural drawing for additional locations as shown on drawings.

#### 3.8 WEEP HOLES, AND CAVITY DRAINAGE

- A. General: Install weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where
- B. Install weep holes in head joints in exterior wythes of first course of masonry.
  - 1. Space weep holes 24 inches o.c., unless otherwise indicated.

#### 3.9 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Protection
  - 1. Maintain protective boards at exposed external corners which may be damaged by construction activities
  - 2. Provide protection without damaging completed work
  - 3. At day's end, cover unfinished walls to prevent moisture infiltration
- E. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
    - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
    - 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
    - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
    - 5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

#### 3.10 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
  - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
  - 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  - 2. Limit height of vertical grout pours to not more than 60 inches.
  - 3. Place and consolidate grout fill without disturbing reinforcing
  - 4. Fill all reinforced cells with grout

## 3.11 FIELD QUALITY CONTROL

- A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.
  - 1. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.
  - 2. Allow and coordinate special inspections as defined in Structural drawings.
- B. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports:

- Payment for these services will be made by Owner. 1.
- C.
- D.
- Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof. Concrete Masonry Unit Test: For each type of unit provided, per ASTM C 140. Mortar Test (Property Specification): For each mix provided, per ASTM C780. Test mortar for compressive E. strength.
- F. Grout Test (Compressive Strength): For each mix provided, per ASTM 1019.

END OF SECTION 04 22 00

# **DIVISION 05 - METALS**

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#### SECTION 05 12 00 - STRUCTURAL STEEL

#### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. This Section includes the following:
    - 1. Structural steel
    - 2. Base plates, anchor bolts, and shims
    - 3. Grout

#### 1.2 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 2. Include embedment drawings.
  - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
  - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
- C. Welding certificates.
- D. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
  - 1. Structural steel including chemical and physical properties.
  - 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
  - 3. Shop primers.
  - 4. Nonshrink grout.

## 1.4 QUALITY ASSURANCE

#### A. Qualifications

- 1. Fabricator: Company specializing in performing the work of this Section with minimum 5 years documented experience
- 2. Erector: Company specializing in performing the work of this Section with minimum 5 years documented experience
- B. Fabricate structural steel members in accordance with AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings
- C. Perform work in accordance with AISC-Specification for Architecturally Exposed Structural Steel (AESS) where finished work will be exposed to view that are within 96 inches vertically and 36 inches horizontally of a walking surface.
- D. Welding:
  - 1. Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
  - 2. Welding for Main Force Resisting System (MFRS) shall also comply with AWS D1.8/D1.8M
- E. Acceptance: Metal fabrications exposed to view that are within 96 inches vertically and 36 inches horizontally of a walking surfaces shall be of the highest quality and in accordance with applicable portions of AISC (American Institute of Steel Construction) Specification for Architecturally Exposed Structural Steel (AESS). Quality of appearance shall be grounds for acceptance or rejection of the work of this section, decisions regarding appearance quality shall be at the discretion of the architect / engineer.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Load structural members or assembled units in such a manner that they may be transported and unloaded without being excessively stressed, deformed or otherwise damaged.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
  - 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
  - 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

## 1.6 COORDINATION

A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

# PART 2 - PRODUCTS

- 2.1 STRUCTURAL-STEEL MATERIALS
  - A. Channels, Angles, Plate and Bar: ASTM A 572/572M, Grade 50.
  - B. W Shapes: ASTM A992.
  - C. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade C, structural tubing.
  - D. Welding Electrodes: Comply with AWS requirements.

# 2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. Anchor Rods: ASTM F1554 Grade 36.
  - 1. Nuts: ASTM A 563 heavy hex carbon steel.
  - 2. Plate Washers: ASTM A 36 carbon steel.
  - 3. Washers: ASTM F 436 hardened carbon steel.
- B. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
  - 1. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with plain finish.
- C. Zinc-Coated High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.
  - 1. Finish: Hot-dip or mechanically deposited zinc coating.
  - 2. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with mechanically deposited zinc coating finish.

## 2.3 PRIMER

A. Primer: SSPC-Paint 25, iron oxide, zinc oxide, raw linseed oil, and alkyd.

## 2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

## 2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's Specification for Structural Steel Buildings--Allowable Stress Design.
  - 1. Camber structural-steel members where indicated.

- 2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
- 3. Mark and match-mark materials for field assembly.
- 4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Architecturally Exposed Structural Steel (AESS): Fabricate and assemble in shop to greatest extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection. In addition to special care used to handle and fabricate AESS, comply with the following:
  - 1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.
  - 2. Grind sheared, punched, and flame-cut edges to remove burrs and provide smooth surfaces and edges.
  - 3. Fabricate with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identifications.
  - 4. Fabricate with exposed surfaces free of seams to maximum extend possible.
  - 5. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.
  - 6. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.
  - 7. Seal-weld open ends of hollow structural sections with 3/16-inch closure plates.
- C. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
  - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- D. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- E. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- F. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.
- G. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

# 2.6 SHOP CONNECTIONS

A. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work. MFRS connections shall also comply with AWS D1.8/1.8M.

# 2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
  - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
  - 2. Surfaces to be field welded.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
  - 1. SSPC-SP 2, "Hand Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
- D. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Verify elevations of concrete-bearing surfaces and locations of anchor rods, bearing plates, and other embedment's, with steel erector present, for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

## 3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings."
- B. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- C. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
  - 1. Level and plumb individual members of structure.
- D. Splice members only where indicated.
- E. Do not use thermal cutting during erection.
- F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- G. Touch- up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of the shop paint. Apply paint to exposed areas with the same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 1.0 mils

## 3.4 FIELD CONNECTIONS

- A. Weld Connections: Comply with AWS D1.1 and AWS D1.8 at MRRS for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
  - 1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

## 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds.
  - 1. Allow and coordinate special inspections as defined in Structural drawings.
  - 2. Fabrication shop welds require inspection except where the shop is an AISC certified fabricator.
- B. Welded Connections: Field welds will be visually inspected according to AWS D1 and D1.8/D1.8M at MFRS.
- C. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

## 3.6 REPAIRS AND PROTECTION

A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories and abutting structural steel.

- Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning. Apply a compatible primer of same type as shop primer used on adjacent surfaces. 1.
- 2.

END OF SECTION 05 12 00

## SECTION 05 21 00 - STEEL JOIST FRAMING

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. K-series steel joists.
  - 2. LH and DLH Series long-span steel joists.
  - 3. Joist accessories.
  - 4. Delegated design of steel joist system.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of joist, accessory, and product indicated.
- B. Shop Drawings: Show layout, designation, number, type, location, and spacings of joists. Include joining and anchorage details, bracing, bridging, joist accessories; splice and connection locations and details; and attachments to other construction and coordinated with mechanical and electrical ceiling and attic equipment signed and sealed by a structural engineer registered in the state of Washington with supporting calculations.
- C. Delegated-Design Submittal: For steel joist systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified Washington State Structural engineer responsible for their preparation. Joist manufacturer and general contractor shall verify dimensions and elevations with construction documents, including architectural, structural, mechanical, electrical and plumbing documents.
- D. Welding certificates.
- E. Manufacturer certificates.
- F. Mill Certificates: For bolts.
- G. Field quality-control test and inspection reports.

## 1.3 QUALITY ASSURANCE

A. Manufacturer and Structural Engineer Qualifications:

- 1. A manufacturer certified by the Steel Joist Institute (SJI) to manufacture joists complying with SJI standard specifications and load tables.
- 2. Provide comprehensive structural engineering analysis of joists, connections, bracing and accessories, including those for stacked joist assemblies, signed and sealed by a structural engineer registered in the state of Washington.
- 3. Coordinate and verify joist layout with project conditions. Provide and install miscellaneous steel as required to complete installation, including: shims, struts, bracing, angle iron, wedges, hardware and spacers for erection, welding and bolting.
- B. SJI Specifications: Comply with SJI's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders" (hereafter, SJI's "Specifications") that are applicable to types of joists indicated.
- C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code Steel."
- D. Perform work in accordance with AISC-Specification for Architecturally Exposed Structural Steel (AESS) where finished work will be exposed to view that are within 96 inches vertically and 36 inches horizontally of a walking surface.
- E. Acceptance: Metal fabrications exposed to view shall be of the highest quality and in accordance with applicable portions of AISC (American Institute of Steel Construction) Specification for Architecturally Exposed Structural Steel (AESS). Quality of appearance shall be grounds for acceptance or rejection of the work of this section, decisions regarding appearance quality shall be at the discretion of the architect / engineer

#### 1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's "Specifications."

## PART 2 - PRODUCTS

## 2.1 MATERIALS

- A. Steel: Comply with SJI's "Specifications" for web and steel-angle chord members.
- B. Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A, carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.
  - 1. Finish: Plain, uncoated
- C. High Strength Bolts: ASTM A 325 or ASTM A 490 Bolts with ASTM A563 Hex headed nuts and ASTM F436 washers.
- D. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

#### 2.2 STEEL JOISTS

A. Manufacture and design steel joists of type indicated according to "Standard Specifications for Open Web Steel Joists in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, pitched or parallel top chords as indicated on plans.

#### 2.3 JOIST ACCESSORIES

- A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability. Coordinate bridging with mechanical and electrical ceiling equipment.
- B. Supply ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface, unless otherwise indicated.
- C. Supply miscellaneous accessories, including splice plates, attachments and bracing assemblies for stacked joists, and bolts required by joist manufacturer to complete joist installation.

## 2.4 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories. Apply 1 coat of shop primer - grey.

## PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.
  - 1. Before installation, splice joists delivered to Project site in more than one piece.
  - 2. Space, adjust, and align joists accurately in location before permanently fastening.
  - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
- C. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- D. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with Research Council on Structural Connections' "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.
- E. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams. Coordinate all required bridging with mechanical and electrical ceiling and attic equipment and devices.

# 3.2 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to inspect field welds and bolted connections and to perform field tests and inspections and prepare test and inspection reports.

END OF SECTION 05 21 00

#### SECTION 05 30 00 - STEEL DECKING

#### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. This Section includes the following:
    - 1. Standard roof deck.
    - 2. Acoustical roof deck.
    - 3. Composite floor deck.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.
- C. Product certificates.
- D. Welding certificates.
- E. Field quality-control test and inspection reports.
- F. Research/Evaluation Reports: For steel deck.

#### 1.3 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code Sheet Steel."
- B. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire-Resistance Ratings: Indicated by design designations of applicable testing and inspecting agency.
  - 2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.
- C. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Epic Metals Corporation
  - 2. New Millennium Building Systems: Metal Dek Group
  - 3. ASC Profiles, Inc.
  - 4. Canam Steel Corp.;The Canam Manac Group.
  - 5. Nucor Corp.; Vulcraft Division.
  - 6. Verco Manufacturing Co.

- 2.2 ROOF DECK
  - A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:
    - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 50, G60 zinc coating.
    - 2. Deck Profile: As indicated.
    - 3. Profile Depth: As indicated.
    - 4. Design Uncoated-Steel Thickness: As indicated.
  - B. Acoustical Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:
    - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40, G60 zinc coating.
    - 2. Deck Profile: As indicated.
    - 3. Profile Depth: As indicated.
    - 4. Design Uncoated-Steel Thickness: As indicated.
    - 5. Acoustical Perforations: Deck units with manufacturer's standard perforated vertical webs.
    - 6. Sound-Absorbing Insulation: Manufacturer's standard premolded roll or strip of glass or mineral fiber.
      - a. Factory install sound-absorbing insulation into cells of cellular deck.
      - b. Acoustical elements shall be provided for installation above perforated holes in the bottom flat area between the dovetail-shaped ribs to provide an NRC rating of 0.95. To facilitate field painting of the perforated surfaces, the sound absorbing elements shall be supported above the surface. Provide spacers to support elevation of acoustical elements to maintain specified NRC rating.
    - 7. Acoustical Performance: NRC 0.95, tested according to ASTM C 423.

# 2.3 COMPOSITE FLOOR DECK

- A. Composite Acoustical Steel Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Acoustical Steel Floor Deck," in SDI Publication No. 30, with the minimum section properties indicated, and with the following:
  - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 50, G60 zinc coating.
  - 2. Profile Depth: As indicated.
  - 3. Design Uncoated-Steel Thickness: As indicted.

## 2.4 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws where permitted on the structural drawings.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter where permitted on the structural drawings.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber, at all perimeter locations.
- E. Pour Stops: Unless noted otherwise provide bent sheet metal concrete pour stops at edge of framed openings.
- F. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- G. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

#### 2.5 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from decking and accessories. Apply 1 coat of shop primer - grey.

## PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, requirements in this Section, and as indicated.
- B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks. Deck panel lengths shall be a minimum of two spans.
- C. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- E. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- F. Mechanical fasteners shall be used to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.
- G. End Bearing: Install deck ends over supporting frame with a minimum end bearing as indicated.
- H. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Mechanically fasten to substrate to provide a complete deck installation.
- I. Pour Stops and Girder Fillers: Install steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.
- J. Floor-Deck Closures: Provide steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.
- K. Sound-Absorbing Insulation: Factory/Shop installation into topside ribs of deck to achieve NRC ratings indicated. Do not expose filler strips to moisture.

#### 3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Mechanical attachments will be subject to inspection.
- C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- D. Remove and replace work that does not comply with specified requirements.
- E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

#### 3.3 REPAIRS

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

END OF SECTION 05 30 00

## SECTION 05 40 00 - COLD-FORMED METAL FRAMING

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Exterior non-load-bearing wall framing.
  - 2. Exterior and Interior lateral wall framing.
  - 3. Exterior and Interior load-bearing wall framing.
  - 4. Interior wall framing, over 14'-0" tall of unsupported height.
  - 5. Solid wood backing and blocking. Division 06 Rough Carpentry
  - 6. Insulation of headers. Division 07 Thermal Insulation
- 1.2 SUBMITTALS
  - A. Product Data: For each type of product and accessory indicated.
  - B. Shop Drawings: Spacings, sizes, thicknesses, and types of cold-formed metal framing. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices and accessories.
  - C. Product Test Reports.
  - D. Research/evaluation reports.

#### 1.3 QUALITY ASSURANCE

- A. Fire-Resistance Rating: Where metal framed gypsum board or plaster assemblies with fire resistance ratings are required, provide materials and installations identical with applicable assemblies which have been tested and listed by recognized authorities, including Underwriter's Laboratories
- B. Installer Qualifications: An experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Perform work in accordance with ASTM C 754. Maintain one copy on site
- D. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements.
- E. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code--Sheet Steel."
- F. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing General Provisions."
  - 1. Comply with AISI's "Standard for Cold-Formed Steel Framing Header Design."

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

## PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
  - 1. Grade: ST33H.
  - 2. Coating: G60

#### 2.2 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, Α. with stiffened flanges, and as follows, unless otherwise indicated on plans:
  - Minimum Base-Metal Thickness: 43 mil/18 ga. 50 ksi, or thicker as required to control 1. deflection to less than L/600 requirement for finish materials including masonry veneer.
  - 2. Flange Width: 1-5/8 inches
- Β. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and same minimum base-metal thickness as steel studs.
- Vertical Deflection Clips: Manufacturer's standard bypass clips, capable of accommodating C. upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- D. Deflection Tracks: Manufacturers standard U-shaped steel track with vertical slots, of web depths indicated, un-punched with straight flanges and same minimum base metal thickness as structural studs.
- E. Steel Header: Install thermal batten insulation during erection to fill entire header cavity.

#### 2.3 LOAD-BEARING WALL FRAMING

- Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, Α. with stiffened flanges, and as follows, unless otherwise indicated on plans:
  - ASTM C 955, formed to channel shape, solid or punched web; 1-5/8 inch face, 1/2 inch 1. return and 6 inch or 3.5 inch depth, size and gage as indicated or required by the drawings. Design and installation of load bearing studs shall limit deflection to L/600 for each member.
  - Minimum Base-Metal Thickness: 43 mil/18 ga. 2.
  - Minimum Flange Width: 1-5/8 inches min. 3.
  - Section Properties: 50 ksi. 4.
- Β. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and same minimum base-metal thickness as steel studs. Minimum Flange Width: 1-5/8 inches min. 1.
- C. Vertical Deflection Clips: Manufacturer's standard bypass clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- D. Steel Header: Install thermal batten insulation during erection to fill entire header cavity.

#### 2.4 INTERIOR WALL FRAMING. OVER 14'-0" TALL

- Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, Α. with stiffened flanges, and as follows, unless otherwise indicated on plans: 1.
  - Minimum Base-Metal Thickness: 43 mil/18 ga. 50 ksi
- Manufacturer's standard U-shaped steel track, of web depths indicated, Β. Steel Track: unpunched, with straight flanges, and same minimum base-metal thickness as steel studs.
- C. Deflection Tracks: manufacturers standard U-shaped steel track with vertical slots, of web depths indicated, un-punched with straight flanges and same minimum base metal thickness as structural studs.
- Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header D. beams, of web depths indicated, punched, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: As indicated.
  - 2 Flange Width: As indicated.
- Steel Header: Install thermal batten insulation during erection to fill entire header cavity. E.

#### 2.5 FRAMING ACCESSORIES

- Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Α. Type H, metallic coated, of same grade and coating weight used for framing members, unless otherwise indicated.
- Β. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain. without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a gualified independent testing agency.

- C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- D. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
  - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

#### 2.6 MISCELLANEOUS MATERIALS

- A. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.
- B. Galvanizing Repair Paint: ASTM A 780

#### PART 3 - EXECUTION

#### 3.1 PREPARATION

A. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

#### 3.2 INSTALLATION, GENERAL

- A. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing -General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- B. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
- C. Install framing members in one-piece lengths.
- D. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- E. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
- F. Install insulation, specified in Division 07 Section "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- G. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- H. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

#### 3.3 EXTERIOR WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs as follows:
  - 1. Stud Spacing: 16 inches, unless noted otherwise.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
  - 1. Install slotted deflection tracks and anchor to building structure.
  - 2. Connect vertical deflection clips to infill studs and anchor to primary building structure.

E. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable curtain-wall-framing system.

# 3.4 LOAD BEARING WALL INSTALLATION

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing according to ASTM C 1007, unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
  - 1. Bolt or weld wall panels at horizontal and vertical junctures to produce flush, even, trueto-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/8 inch.
  - 2. Stud Spacing: 16 inches, unless noted otherwise.
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.
  - 1. Cut framing members by sawing or shearing; do not torch cut.
  - 2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
- E. Install framing members in one-piece lengths, unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- H. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

## 3.5 INTERIOR WALL INSTALLATION & INTERIOR WALLS OVER 14'-0" TALL

- A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
  - 1. Anchor Spacing: As indicated.
- B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch (3 mm) between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
  - 1. Stud Spacing: **16 inches**, Unless Noted Otherwise
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.
- E. Align floor and roof framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.
- F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

- G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
  - 1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
  - 2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- H. Install supplementary solid wood backing and blocking in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
  - 1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- I. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.
- 3.6 FIELD QUALITY CONTROL
  - A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
  - B. Testing agency will report test results promptly and in writing to Contractor and Architect.
  - C. Remove and replace work where test results indicate that it does not comply with specified requirements.
  - D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 3.7 REPAIRS AND PROTECTION
  - A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
  - B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00

## SECTION 05 50 00 - METAL FABRICATIONS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Steel supports for overhead supported doors.
    - 2. Steel supports for countertops.
    - 3. Steel framing and supports for mechanical and electrical equipment.
    - 4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
    - 5. Gutter support brackets.
    - 6. Stainless Steel and Aluminum Trim Members at Casework and Overhead Door jamb and head locations.
    - 7. Diamond plate countertops.
    - 8. Building Metal Signage Panel
    - 9. Lintels and shelves.
    - 10. Loose bearing and leveling plates.
    - 11. Miscellaneous steel trim including edge angles.
    - 12. Metal ladders.
    - 13. Metal grating for sump pit covers.
    - 14. Metal bollards.
- B. Products furnished, but not installed, under this Section include the following:
  - 1. Loose steel lintels.
  - 2. Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
- C. Related Sections include the following:
  - 1. Division 03 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, wedge-type inserts and other items indicated to be cast into concrete.
  - 2. Division 04 Section "Unit Masonry" for installing loose lintels, anchor bolts, and other items indicated to be built into unit masonry.
  - 3. Division 05 Section "Structural Steel Framing."
  - 4. Division 05 Section "Pipe and Tube Railings."
  - 5. Division 06 Section "Rough Carpentry" for metal framing anchors.
  - 6. Division 09 Section "Painting" for various metal finishes.
- 1.2 PERFORMANCE REQUIREMENTS
  - A. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
    - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

## 1.3 SUBMITTALS

- A. Product Data: For the following:
  - 1. Perforated Metal panel product.
  - 2. Paint products.
  - 3. Grout.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
  - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
  - 2. Provide templates for anchors and bolts specified for installation under other Sections.

- 3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Verification: For each type and finish of extruded nosing.
- D. Mill Certificates: Signed by manufacturers of stainless-steel sheet certifying that products furnished comply with requirements.
- E. Welding certificates.

# 1.4 QUALITY ASSURANCE

- A. Qualifications
  - 1. Fabricator: Company specializing in performing the work of this Section with minimum 5 years documented experience
  - 2. Erector: Company specializing in performing the work of this Section with minimum 5 years documented experience
- B. Fabricate structural steel members in accordance with AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings
- C. Perform work in accordance with AISC-Specification for Architecturally Exposed Structural Steel (AESS) where finished work will be exposed to view that is within 96 inches vertically and 36 inches horizontally of a walking surface.
- D. Welding: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1, "Structural Welding Code--Steel."
  - 2. AWS D1.2, "Structural Welding Code--Aluminum."
  - 3. AWS D1.3, "Structural Welding Code--Sheet Steel."
  - 4. AWS D1.6, "Structural Welding Code--Stainless Steel."
- E. Acceptance: Metal fabrications exposed to view shall be of the highest quality and in accordance with applicable portions of AISC (American Institute of Steel Construction) Specification for Architecturally Exposed Structural Steel (AESS). Quality of appearance shall be grounds for acceptance or rejection of the work of this section, decisions regarding appearance quality shall be at the discretion of the architect / engineer. Work that is rejected on the grounds of appearance shall be repaired or replaced with no additional cost to Owner.
- F. Mock-up:
  - 1. Erect sample mock-up installation for each fabrication type to be installed on the project, include supports, rails, panels, characteristic patterns, and accessories. provide the following:
    - a. Exterior canopy and entry assemblies
    - b. Gutter support bracket, coordinate with Division 07 Gutters
  - 2. Do not proceed with purchase, fabrication or installation of multiple items until mock-up has been accepted.
  - 3. Locate where directed. Coordinate as necessary
  - 4. When accepted, mock-up will demonstrate minimum standard for the Work. Mock-up may remain as part of the Work

# 1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
  - 2. Provide allowance for trimming and fitting at site.

## 1.6 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and

items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

#### PART 2 - PRODUCTS

- 2.1 METALS, GENERAL
  - A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

#### 2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36.
- B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304.
- C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- D. Rolled-Steel Floor Plate: ASTM A 786, rolled from plate complying with ASTM A 36 or ASTM A 283, Grade C or D.
- E. Rolled-Stainless-Steel Floor Plate: ASTM A 793.
- F. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- G. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- H. Cast Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.

#### 2.3 NONFERROUS METALS

- A. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6, schedule 40 minimum.
- C. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- 2.4 FASTENERS
  - A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at locations concealed inside of exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.
  - B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A with hex nuts, ASTM A 563; and, where indicated, flat washers.
  - C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts and, where indicated, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1.
  - D. Anchor Bolts: ASTM F 1554, Grade 36.
    - 1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.
  - E. Eyebolts: ASTM A 489.
  - F. Machine Screws: ASME B18.6.3.
  - G. Lag Bolts: ASME B18.2.1.
  - H. Wood Screws: Flat head, ASME B18.6.1.
  - I. Plain Washers: Round, ASME B18.22.1.
  - J. Lock Washers: Helical, spring type, ASME B18.21.1.
  - K. Cast-in-Place Anchors in Concrete: As indicated on drawings.
  - L. Expansion and Adhesive Anchors: As indicated on drawings.

#### 2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primers: Provide primers that comply with Division 09 painting Sections.
- C. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
  - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Available Products:
    - a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19.
    - b. Carboline Company; Carbozinc 621.
    - c. ICI Devoe Coatings; Catha-Coat 313.
    - d. International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer.
    - e. PPG Architectural Finishes, Inc.; Aquapon Zinc-Rich Primer 97-670.
    - f. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.
    - g. Tnemec Company, Inc.; Tneme-Zinc 90-97.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20. If painting work occurs within the interior of the building, paint shall comply with VOC limits stated in Section 01 81 14.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187. If painting work occurs within the interior of the building, paint shall comply with VOC limits stated in Section 01 81 14.
- F. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.
- G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- H. Concrete Materials and Properties: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

#### 2.6 FABRICATION, GENERAL

## A. Workmanship:

- 1. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components or work
- 2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 inch unless otherwise shown. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work
- B. Form exposed connection with hairline joints, flush and smooth, using concealed fasteners. Use exposed fasteners of type shown or, if not show, socket type flat-head (countersunk) screws or bolts. Provide sufficient backing at screw locations to cover at least three threads.
- C. Provide for anchorage of type suitable for use with supporting structure. Fabricate and space anchoring devices as shown and as required to provide adequate support for intended use
- D. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- E. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- F. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- G. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- H. Weld corners and seams continuously to comply with the following:

- 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
- 2. Obtain fusion without undercut or overlap.
- 3. Remove welding flux immediately.
- 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- I. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.
- J. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- K. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- L. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
  - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

# 2.7 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
  - 1. Fabricate units from slotted channel framing where indicated.
  - 2. Furnish inserts if units are installed after concrete is placed.
- C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
- D. Galvanize miscellaneous framing and supports where indicated.
- E. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

# 2.8 GUTTER SUPPORT STRAP BRACKETS

- A. Fabricate steel gutter support brackets from 3/16" x 1-1/2" x length required for gutter profile and attachment to building structure. Form bracket to match gutter shape.
- B. Place gutter support brackets at 34" on center at all gutters (align with standing seam at metal roof panels where used).
- C. Field weld to structural steel with 3/16" continuous fillet weld or bolt into wood sheathing with 3/16" diameter lag bolts (2 bolts per strap minimum).
- D. Finish shall be shop applied powder coat finish with rust inhibitor, color to match exact gutter finish.

# 2.9 SHELF ANGLES and LOOSE STEEL LINTELS

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete and steel framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated on drawings.
  - 1. Provide mitered and welded units at corners.
  - 2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- C. Galvanize shelf angles located in exterior walls.

- D. Prime shelf angles located in exterior walls with zinc-rich primer.
- E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-inplace concrete.
- 2.10 ALUMINUM DOOR TRIM MATERIAL AT OVERHEAD DOORS, CASEWORK and WALL
  - A. Fabricate aluminum door trim members from 1/16" thick x length required for profile. Form trim member to match required shape. Joints shall only be allowed at right angle corners of the frame.
  - B. Finish shall be clear anodized mill aluminum finish, color and texture to match architect's sample.
- 2.11 STAINLESS STEEL TRIM MATERIAL AT OVERHEAD DOORS, CASEWORK and WALL
  - A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices. Fabricate stainless steel door trim from 1/16" thick x length required for profile. Fully enclose jamb and head of rough opening for complete coverage.
    - B. Provide cutouts, fittings, and anchorages to coordinate assembly with adjacent equipment and finishes.
    - C. Provide sheet wall panels as noted in drawings. Prefinished material 1/32" thick minimum, verify overall width and height in drawings. Install using exposed SS edge and field fasteners are anchored into solid backing.
    - D. Finish shall be stainless steel, Bright Directional Satin Finish: No. 4. Match architect's sample.
- 2.12 MISCELLANEOUS STEEL TRIM
  - A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
  - B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
    - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
  - C. Galvanize exterior miscellaneous steel trim.
  - D. Prime interior miscellaneous steel trim, with zinc-rich primer.

## 2.13 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates after fabrication.
- C. Prime plates with zinc-rich primer.

## 2.14 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates, shims, spacers and angles not specified in other Sections, for items supported from concrete and/or steel construction as needed to complete the Work.

#### 2.15 VERTICAL METAL LADDERS

- A. General:
  - 1. Comply with ANSI A14.3, unless otherwise indicated.
  - 2. Comply with OSHA 3124-12R 2003. Provide all required safety devices and equipment for fixed ladders.
  - 3. Space side rails 24 inches apart, unless otherwise indicated.
  - 4. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted brackets, made from same metal as ladder.
- B. Steel Ladders:
  - 1. Siderails: Continuous, <u>3/8-by-2-1/2-inch</u> steel flat bars, with eased edges.
  - 2. Rungs: 1-inch- round steel bars.
  - 3. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
  - 4. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.

- 5. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung by a proprietary process. Nonlsip surface shall be full width of rung.
- 6. Galvanize exterior ladders, including brackets and fasteners.
- 7. Prime interior ladders, including brackets and fasteners, with zinc-rich primer.

# 2.16 METAL TREAD STAIRS (Ships Ladder)

A. Not Used.

# 2.17 METAL GRATINGS

A. Steel Metal Gratings

- 1. Bearing Bars: 1-3/4" x 3/16" on 1-3/16" centers, minimum.
- 2. Cross Bars: Electroforge welded at right angles to bearing bars at 4" centers maximum.
- 3. Surface: Plain
- 4. Loading: Grating to carry a pedestrian loading equal to a uniform load of 100# per square foot over the required clear span or a single 300# point load with a maximum deflection of 1/4 inch or L/360.
- 5. Finish: The gratings shall be provided with powder coated finish, black.
- 6. Fabrication and Tolerances shall be in accordance with ANSI/ NAAMM Metal Bar Grating Manual.
- 7. Anchor: H-3 Saddle clip with 1/4 inch diameter self-tapping bolt. Locate per structural.
- B. Aluminum Metal Gratings
  - 1. Style: Swaging Bar Grate, locking
  - 2. Size: 1-3/4" x 3/16" bearing bars at 1-3/16" on center, regular cross bar at 4" on center
  - 3. Standard width: 36" to 48", reference drawings.
  - 4. Alloy Temper: 6063-T6, Clear Anodized Finish
  - 5. Loading: Grating to carry a pedestrian loading equal to a uniform load of 100# per square foot over the required clear span or a single 300# point load with a maximum deflection of 1/4 inch or L/360.
  - 6. Fabrication and Tolerances shall be in accordance with ANSI/ NAAMM Metal Bar Grating Manual.
  - 7. Anchor: H-3 Saddle clip with 1/4 inch diameter self-tapping bolt. Locate per structural.
  - 8. Provide separation gasket at all dissimilar metal locations to prevent galvanic action.

# 2.18 DIAMOND PLATE COUNTERTOPS

- A. Aluminum Diamond Plate, coordinate with Division 06 "Interior Architectural Woodwork"
- B. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed surfaces complying with the following requirements:
  - 1. Aluminum Diamond Plate
    - a. Alloy: 6061
    - b. Temper: T6
    - c. Material: Aluminum
    - d. Patterns: Diamond
    - e. Size: 48 inch x 96 inch sheets
    - f. Thickness: 0.1875 inch
    - g. Weight: 2.65 pounds per linear foot
- C. Installation: Cut, roll and form sheets to fit countertop application. Utilize two layers of 3/4 inch MDF for countertop plate backing. Coordinate installation with metal storage lockers below.

# 2.19 ABRASIVE METAL NOSINGS

- A. Extruded Units: Aluminum, with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Fabricate units in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions. Install/recess abrasive metal stair nosing at all exposed concrete stairs exterior.
  - 1. Available Manufacturers:
    - a. Basis of Design: Wooster Products Inc.
      - 1) Product: Super Grit 241 or 242, full width of stair step

- b. ACL Industries, Inc.
- c. American Safety Tread Co., Inc.
- d. Amstep Products.
- e. Armstrong Products, Inc.
- f. Balco Inc.
- g. Granite State Casting Co.
- 2. Provide ribbed units, with abrasive filler strips projecting 1/16 inch above aluminum extrusion.
- 3. Provide solid-abrasive-type units without ribs.
- B. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
- C. Drill for mechanical anchors and countersink. Locate not more than 4 inches from ends and not more than 12 inches o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.
- D. Apply bituminous paint to concealed bottoms, sides, and edges of cast-metal units set into concrete.
- E. Apply clear lacquer to concealed bottoms, sides, and edges of extruded units set into concrete.
- F.

# 2.20 BUILDING METAL SIGNAGE PANEL

- A. Steel Metal Perforated Panel at Entry
  - 1. Product: Metal, Perforated Metal 3/4" round holes on 1" diagonal centers (51% Open Area) - 12 gauge galvanized.
  - 2. Provide 4 inch solid margin on all panel edges, see drawings.
  - 3. Loading: Panel to carry a pedestrian loading equal to a uniform load of 100# per square foot over the required clear span or a single 300# point load with a maximum deflection of 1/4 inch or L/360.
  - 4. Fabrication and Tolerances shall be in accordance with ANSI/ NAAMM Metal Bar Grating Manual.
  - 5. Material: Zinc-coated (galvanized) steel sheet, 10 gauge nominal thickness.
    - a. Finish: Factory prime for field paint, reference section 09 91 00.
      - b. Color: Reference finish materials legend.
  - 6. Coordinate metals letter placement by section 10 14 00 with spacer separation.
  - 7. See division 22 for signage lighting requirements.

## 2.21 METAL BOLLARDS

A. Fabricate metal bollards from 6" diameter, Schedule 40 steel pipe.

1. Fill bollards with concrete grout, with rounded top as indicated in the drawings.

B. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch- thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches deep and 3/4 inch larger than OD of bollard.

## 2.22 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.
- C. At all steel fabrications that will be exposed to the exterior upon completion of the project, steel fabrications shall be galvanized, and prepared for field painting
- D. At all steel fabrications that will be at interior locations, steel fabrications shall be shop primed.

## 2.23 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
  - 1. ASTM A 153, for galvanizing steel and iron hardware.

- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
  - 1. Exteriors (SPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- C. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
  - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

## 2.24 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend into finish.
- B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- C. Bright, Directional Satin Finish: No. 4. Verify with Architect.
- D. Dull Satin Finish: No. 6. Verify with Architect.
- E. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
- 2.12 GALVANIZATION
  - A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standards listed below:
    - 1. ASTM A 123, for galvanizing steel and iron made from rolled, pressed and forged shapes, castings, plates, bars, and strips.
    - 2. ASTM A 153, for galvanizing steel and iron hardware.
    - 3. Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

# PART 3 - EXECUTION

## 3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

## 3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
  - 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.
- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.
  - 1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

# 3.3 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
  - 1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.
  - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

## 3.4 INSTALLING METAL BOLLARDS

- A. Anchor bollards to existing construction with expansion anchors. Provide four 3/4-inch bolts at each bollard, unless otherwise indicated.
  - 1. Embed anchor bolts at least 4 inches in concrete.
- B. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete in formed or core-drilled holes not less than 8 inches deep and 3/4 inch larger than OD of bollard. Fill annular space around bollard solidly with nonshrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.
- C. Fill bollards solidly with concrete, mounding top surface to shed water.
  - 1. Do not fill removable bollards with concrete.

## 3.5 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09 painting Sections.
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 50 00

## PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Exterior steel pipe handrails, Schedule 40 minimum, Field Painted.
  - 2. Interior steel pipe handrails, Schedule 40 minimum, Field Painted.
  - 3. Perforated metal panel for guard rail system.
  - 4. Brackets for perforated metal panels.
- B. See Division 06 Section "Interior Finish Carpentry" for wood trim.
- C. See Division 09 Section "Painting" for exposed steel painting.

#### 1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: For all rails, provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Handrails:
    - a. Uniform load of 100 lbf/ ft. applied in any direction.
    - b. Concentrated load of 200 lbf applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
  - 2. Top Rails of Guards:
    - a. Uniform load of 100 lbf/ ft. applied in any direction.
    - b. Concentrated load of 200 lbf applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
  - 3. Infill of Guards:
    - a. Uniform load of 25 lbf/sq. ft. applied horizontally or 200 lbf/sq. ft. concentrated applied horizontal on 1 sq ft.
    - b. Infill load and other loads need not be assumed to act concurrently.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

## 1.3 SUBMITTALS

- A. Product Data: For grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples: For each exposed finish required.
- D. Welding certificates.

## 1.4 QUALITY ASSURANCE

- A. Perform work in accordance with the following requirements:
  - 1. ANSI A117.1 Accessible and Usable Buildings and Facilities. Comply with all requirements including, but not limited to, the following:
    - a. Location: Handrails shall be provided on both sides of stairs and ramps.
    - b. Continuity: Handrails shall be continuous within the full length of each stair flight or ramp run. Inside handrails on switchback or dogleg stairs or ramps shall be continuous between flights or runs. Other handrails shall comply with bottom and top extensions defined below.
    - c. Height: Top of gripping surfaces of handrails shall be 34 inches minimum and 38 inches maximum vertically above stair nosings, ramp surfaces and walking surfaces. Handrails shall be at a consistent height above stair nosings, ramp surfaces and walking surfaces.
    - d. Clearance: Clearance between handrail gripping surface and adjacent surfaces shall be 1-1/2 inches minimum.

- e. Gripping Surface: Gripping surfaces shall be continuous, without interruption by newel posts, other construction elements, or obstructions.
- f. Circular Cross Section: Handrails with a circular cross section shall have an outside diameter of 1-1/4 inches minimum and 2 inches maximum. See drawings and below for specific project requirements.
- g. Surfaces: Handrails, and any wall or other surfaces adjacent to them, shall be free of any sharp or abrasive elements. Edges shall be rounded.
- h. Fittings: Handrails shall not rotate within their fittings.
- i. Handrail Extensions: Handrails shall extend beyond and in the same direction of stair flights and ramp runs; with the exception of continuous handrails at the inside turn of stairs and ramps. Handrails shall extend horizontally above the landing 12 inches minimum beyond the top and bottom of ramp or stair runs. Extensions shall return to a wall, guard, or floor, or shall be continuous to the handrail of an adjacent ramp run.
- 2. ADA-AG American Disabilities Act Accessibility Guidelines
- B. Source Limitations: Obtain each type of railing through one source from a single manufacturer.
  C. Qualifications
  - 1. Fabricator: Company specializing in performing the work of this Section with minimum 5 years documented experience
  - 2. Erector: Company specializing in performing the work of this Section with minimum 5 years documented experience
- D. Fabricate structural steel members in accordance with AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings
- E. Perform work in accordance with AISC-Specification for Architecturally Exposed Structural Steel (AESS) where finished work will be exposed to view.
- F. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- G. Acceptance: Metal fabrications exposed to view shall be of the highest quality and in accordance with applicable portions of AISC (American Institute of Steel Construction) Specification for Architecturally Exposed Structural Steel (AESS). Quality of appearance shall be grounds for acceptance or rejection of the work of this section, decisions regarding appearance quality shall be at the sole discretion of the architect / engineer. Work that is rejected on the grounds of appearance shall be repaired or replaced with no additional cost to Owner.
- H. Mock-up:
  - 1. Erect sample mock-up installation for each fabrication type to be installed on the project to include supports, rails, panels, characteristic patterns, and accessories. Provide the following: Hand rail and guard rail assemblies as indicated in the drawings.
  - 2. Do not proceed with purchase, fabrication or installation of multiple items until mock-up has been accepted.
  - 3. Locate where directed. Coordinate as necessary
  - 4. When accepted, mock-up will demonstrate minimum standard for the Work. Mock-up may remain as part of the Work

## 1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
  - 2. Provide allowance for trimming and fitting at site.

## 1.6 COORDINATION AND SCHEDULING

A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

# PART 2 - PRODUCTS

- 2.1 METALS
  - A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
  - B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.
  - C. Steel and Iron:
    - 1. Tubing: ASTM A 500 (cold formed).
    - 2. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
    - 3. Plates, Shapes, and Bars: ASTM A 36/A 36M.

## 2.2 MANUFACTURERS

- A. Guardrails and hand railings: custom metal fabrication shop with demonstrated experience in similar type and scope of work.
- B. Interior Steel Pipe and Tube Railings:
  - 1. Shop primer and field paint all steel.
- C. Interior Steel Tube Guardrails, with perforated aluminum infill panels:
  - 1. Basis of Design: custom metal fabrication shop with demonstrated experience in similar type and scope of work.
  - 2. Pipe, tube, and plate steel sections as defined in the drawings.
  - 3. Perforated Metal In-Fill Panels Basis of Design: McNichols Perforated Metal Round
    - a. Fabricate perforated metal panels from .2500 thick (1/4" gauge) aluminum sheets.
      - b. Perforations shall be yield 48% open area. 1/2" round holes on 11/16" centers, staggered pattern.
      - c. Provide 2" tall solid margin minimum on panels —or as indicated in the drawings.
      - d. Alloy Temper: 3003-H14, Milled Face, Clear Anodized Finish
      - e. Shim panel thickness at clamp locations to securely anchor panels. Fully weld shims to panel.
      - f. Note: Approved mock-ups required for these products prior to order or fabrication of all materials under this sub-section.
  - 4. Aluminum mounting bracket at in-fill panels.
    - a. Install 2 inch x 2 inch x 1/4 inch brackets, bolted to steel post. At minimum, install four clips per panel. Reference drawings for clamp locations.
    - b. Shim to align bracket with adjacent rail or post vertical, horizontal or sloped application.
    - c. Style: Angle Bracket
    - d. Finish: Milled Face, Clear Anodized Finish
    - e. Note: Approved mock-ups required for these products prior to order or fabrication of all materials under this sub-section.

## 2.3 MISCELLANEOUS MATERIALS

- A. Fasteners: Provide concealed fasteners, unless unavoidable or standard for railings indicated.
  - 1. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
  - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
- 2. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post Installed Anchors: Unless specified otherwise, provide cast-in-place, chemical, or torquecontrolled expansion anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488.
- E. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- F. Shop Primers: Provide primers that comply with Division 9 painting Sections.
- G. Grout and Anchoring Cement: Factory-packaged, nonshrink, nonmetallic grout complying with ASTM C 1107; or water-resistant, nonshrink anchoring cement; recommended by manufacturer for exterior use.
- H. Closure Chain: heavy duty link chain to close off loading dock edge, reference drawings.

## 2.4 FABRICATION - GENERAL

- A. General: Fabricate railings to comply with design, dimensions, and details indicated, but not less than required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces
- C. Form work true to line and level with accurate angles and surfaces.
- D. Form changes in direction by bending or by inserting prefabricated elbow fittings.
- E. Form curves and bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- F. Close exposed ends of railing members with prefabricated end fittings.
- G. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, end caps and anchors to interconnect railing members to other work, unless otherwise indicated.
- I. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- J. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- K. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- L. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove flux immediately.
  - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- M. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

## 2.5 FABRICATION – GUARDRAILS AND HAND RAILS

- A. Provide steel pipe handrails at walls, ramps and stairs with radius corners. Railing components, handrails at walls: 1-1/2 inch outside diameter pipe, Schedule 40 minimum.
- B. Provide handrails designed to support minimum live loads required by applicable codes and the OSHA requirement of at least 200 pounds applied in any direction at any point.
- C. Butt railing splices and reinforce by a tight fitting interior sleeve not less than 6 inches long. Weld and grind smooth all joints.

- D. Bend railings at corners, uniformly form in jigs, with cylindrical cross-section of pipe maintained through the entire bend.
- E. Secure handrails to walls by means of ½ inch diameter solid bar wall brackets through hole in bottom of rail and plug welded to top of rail.

## 2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## D. Steel and Iron:

- 1. Shop-Primed Galvanized Railings (exterior railings and mezzanine):
  - a. Hot-dip galvanize exterior steel and iron railings, including hardware, after fabrication.
  - b. Comply with ASTM A 123/A 123M for hot-dip galvanized railings
  - c. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion
  - d. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth
  - e. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components
  - f. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner
  - g. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning
  - h. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.
- B. Fit exposed connections together to form tight, hairline joints.

## 3.2 INSTALLATION

A. For manufactured railing systems install according to the manufacturers requirements and recommendations.

- B. General: Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation.
  - 1. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
  - 2. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Anchor posts in concrete by manufacturer's standard steel flange with insert or by inserting into preset steel pipe sleeves, formed or core-drilled holes, or as shown and grouting annular space.
- D. Cover anchorage joint with flange of same metal as post and/or railings

- E. Anchor railing ends to concrete and masonry with round flanges connected to railing ends and anchored to wall construction with anchors and bolts.
- F. Continuous weld end cap with full coverage at each end of open rail. Grind smooth and remove all abrasive material.
- G. Attach handrails to wall with wall brackets.
  - 1. For steel-framed partitions, use hanger or lag bolts set into wood backing between studs.

## 3.3 ADJUSTING and CLEANING

- A. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.
- C. Clean stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.
- D. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces
  - 1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness
- E. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

## 3.4 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 05 52 00

# **DIVISION 06 – WOOD, PLASTICS & COMPOSITES**

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## SECTION 06 10 00 - ROUGH CARPENTRY

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Framing with treated and untreated dimensional lumber.
  - 2. Rooftop equipment bases and support curbs.
  - 3. Wood blocking, backing, furring, nailers and grounds in equipment bases, walls and ceiling for support of <u>all</u> wall and/or ceiling mounted equipment, fixtures, railings, grab bars, doorstops and miscellaneous surface mounted items.
  - 4. Plywood backing panels.
  - 5. Fire Treated and Preservative treatment of wood.
  - 6. Pre-fabricated connectors.

## 1.2 DEFINITIONS

- A. Exposed Framing: Framing not concealed by other construction.
- B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- C. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
  - 2. NLGA: National Lumber Grades Authority.
  - 3. RIS: Redwood Inspection Service.
  - 4. SPIB: The Southern Pine Inspection Bureau.
  - 5. WCLIB: West Coast Lumber Inspection Bureau.
  - 6. WWPA: Western Wood Products Association.
- 1.3 SUBMITTALS
  - A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
    - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
    - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
    - 3. For fire-retardant treatments specified to be High-Temperature (HT) type, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
    - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
    - 5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
    - B. Fastener Patterns: Full-size templates for fasteners in exposed framing.
    - C. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
    - D. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
      - 1. Wood-preservative-treated wood.
      - 2. Fire-retardant-treated wood.
      - 3. Engineered wood products.
      - 4. Power-driven fasteners.

- 5. Powder-actuated fasteners.
- 6. Expansion anchors.
- 7. Metal framing anchors.
- 1.4 QUALITY ASSURANCE
  - A. Source Limitations for Engineered Wood Products: Obtain each type of engineered wood product through one source from a single manufacturer.
- 1.5 DELIVERY, STORAGE, AND HANDLING
  - A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

## PART 2 - PRODUCTS

## 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
  - 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  - 4. Provide dressed lumber, S4S, unless otherwise indicated.
  - 5. Lumber products included in the finished project, shall comply with the VOC requirements stated in section 01 81 14.

## 2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
  - 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
  - 1. For exposed lumber indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat items indicated on Drawings, and the following:
  - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
  - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
  - 4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
  - 5. Wood floor plates that are installed over concrete slabs-on-grade.

## 2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).
  - 1. Use Exterior type for exterior locations and where indicated.
  - 2. Use Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
  - 3. Use Interior Type A, unless otherwise indicated.
- B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
- C. For exposed items indicated to receive a finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- D. Application: Treat items indicated on Drawings.

## 2.4 DIMENSION LUMBER FRAMING

- A. Maximum Moisture Content: 19 percent
- B. Interior framing: see structural drawings.
  - 1. Hem-fir (north); NLGA.
  - 2. Spruce-pine-fir; NLGA.
  - 3. Hem-fir; WCLIB, or WWPA.
  - 4. Northern species; NLGA.
  - 5. Western woods; WCLIB or WWPA.
- C. Joists, Rafters, and Other Framing Not Listed Above: see structural drawings:
  - 1. Hem-fir (north); NLGA.
  - 2. Douglas fir-larch; WCLIB or WWPA.
  - 3. Spruce-pine-fir; NLGA.
  - 4. Hem-fir; WCLIB or WWPA.
  - 5. Douglas fir-larch (north); NLGA.

## 2.5 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  - 1. Blocking.
  - 2. Nailers.
  - 3. Rooftop equipment bases and support curbs.
  - 4. Cants.
  - 5. Furring.
  - 6. Grounds.
- B. For items of dimension lumber size, see structural drawings.
  - 1. Hem-fir (north); NLGA.
  - 2. Spruce-pine-fir; NLGA.
  - 3. Hem-fir; WCLIB, or WWPA.
  - 4. Western woods; WCLIB or WWPA.
  - 5. Northern species; NLGA.
- C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.6 PLYWOOD BACKING PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.
- B. Wall backing for future wall mounted installations: DOC PS 1, Exposure 1, C-D Plugged, fireretardant treated, 3/8-inch nominal thickness.

- C. Plywood and sheathing products included in the finished project, shall comply with the VOC requirements stated in section 01 81 14
- 2.7 FASTENERS
  - A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
    - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
  - B. Nails, Brads, and Staples: ASTM F 1667.
  - C. Power-Driven Fasteners: NES NER-272.
  - D. Wood Screws: ASME B18.6.1.
  - E. Lag Bolts: ASME B18.2.1.
  - F. Bolts: Steel bolts complying with ASTM A 307, Grade A with ASTM A 563 hex nuts and, where indicated, flat washers.
  - G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
    - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
    - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

## 2.8 METAL FRAMING ANCHORS

- A. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
  - 1. Reference Structural drawings for: size, locations, and anchoring requirements.
- 2.9 MISCELLANEOUS MATERIALS
  - A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
  - B. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
    - 1. Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - C. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

## PART 3 - EXECUTION

- 3.1 INSTALLATION, GENERAL
  - A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
  - B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
  - C. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.
  - D. Do not splice members between supports, unless otherwise indicated.
  - E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

- 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c
- 2. Coordinate installation of Concealed Backing, Flooring, Grounds and Cants with other work.
- F. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
  - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
  - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal- thickness.
- G. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
  - 1. Use inorganic boron for items that are continuously protected from liquid water.
  - 2. Use copper naphthenate for items not continuously protected from liquid water.
- I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. NES NER-272 for power-driven fasteners.
  - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
- J. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.
- K. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
  - 1. Comply with approved fastener patterns where applicable
  - 2. Use finishing nails, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

## 3.2 WOOD SLEEPER, BLOCKING, AND NAILER INSTALLATION

- A. Provide solid wood blocking, backing, furring, nailers and grounds in equipment bases, walls and ceiling for support of <u>all</u> wall and/or ceiling mounted equipment, fixtures, railings, grab bars, doorstops and miscellaneous surface mounted items.
- B. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- C. Provide solid fire treated wood blocking or sheathing backing for all wall mounted equipment, chalkboards, tackboards, shelf standards, wall cabinets, mirrors, toilet accessories, partitions, panels shelving, casework, fixtures, door stops, etc.
- D. At existing framed wall and ceiling construction, install solid fire treated wood blocking for all equipment, chalkboards, tackboards, shelf standards, wall cabinets, mirrors, toilet accessories, partitions, panels shelving, casework, fixtures, door stops, etc. Remove existing finishes as necessary to install solid blocking and/or backing. Patch back finishes to match existing adjacent surfaces.
- E. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
- F. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

## 3.3 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 10 00

### SECTION 06 16 43 - SHEATHING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Exterior gypsum board.
  - 2. Roof parapet sheathing.
  - 3. Wall equipment support sheathing.
  - 4. Miscellaneous framing sheathing.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.
  - Evaluation Reports: For following products, from ICC-ES:
    - 1. Fire-retardant-treated plywood.

#### PART 2 - PRODUCTS

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#### 2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

#### 2.2 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Certified Wood: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- C. Plywood: DOC PS 1.
- D. Oriented Strand Board: DOC PS 2.

#### 2.3 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
  - 1. Exterior Type: Treated materials shall comply with requirements specified above for fireretardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
  - 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
  - 3. Design Value Adjustment Factors: Treated lumber plywood shall be tested according ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent.

- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings.
- 2.4 WALL SHEATHING
  - A. Plywood Wall Sheathing: Exterior, Structural I sheathing.
  - B. Glass-Mat Gypsum Sheathing Board: ASTM C 1177.
    - 1. Product: Subject to compliance, provide "Dens-Glass Gold" by G-P Gypsum rated for exterior use.
    - 2. Core: 1/2 inch, Type X.
    - 3. At roof parapet wall conditions (where required by roofing manufacture not to void warranty), provide "Dens-Deck Prime" by G-P Gypsum—1/2 inch, Type X, in-lieu of Dens-Glass Gold.
  - C. Substitutions: Under provisions of Division 01.
- 2.5 ROOF SHEATHING
  - A. Not Used
- 2.6 FLOOR SHEATHING A. Not Used
- 2.7 FASTENERS
  - A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

## PART 3 - EXECUTION

- 3.1 INSTALLATION, GENERAL
  - A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
  - B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
  - C. Securely attach to substrate by fastening as indicated, complying with the following:
    - 1. NES NER-272 for power-driven fasteners.
    - 2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
  - D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
  - E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

## 3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Wall Sheathing:
    - a. Screw to cold-formed metal framing.
    - b. Space panels 1/8 inch apart at edges and ends.

## 3.3 GYPSUM SHEATHING INSTALLATION

- Comply with GA-253 and with manufacturer's written instructions.
- 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
  - 2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
  - 3. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

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- B. Seal sheathing joints according to sheathing manufacturer's written instructions.
  - 1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
  - 2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.
- C. Prior to installation, verify if gypsum wall sheathing product voids any weather tight or fire rated warranted assemblies from fastened or adhere dissimilar materials. Provide proprietary products to ensure warranty requirements are met.

END OF SECTION 06 16 43

## SECTION 06 20 00 - INTERIOR FINISH CARPENTRY

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Providing and installing finish carpentry items, other than custom casework.
    - 2. Items include, but are not limited to Interior standing trim, running trim, and other items noted on the drawings.
    - 3. Interior ornamental work.
    - 4. Hardware and attachment accessories.
    - 5. Chair rails.
- B. Related Sections include the following:
  - 1. Division 05 Section "Metal Fabrications" handrail, guardrail and aluminum base coordination.
  - 2. Division 05 Section "Pipe and Tube Railing" for guardrail and performance coordination.
  - 3. Division 06 Section "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
  - 4. Division 06 Section "Interior Architectural Woodwork" for shop-fabricated interior woodwork and interior woodwork not specified in this Section.
  - 5. Division 08 Section "Flush Plastic Faced Doors" for finish requirements and matching stain.
  - 6. Division 09 Section "Interior Painting" for priming, back priming and sealing of interior finish carpentry.
- 1.2 DEFINITIONS
  - A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
    - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
    - 2. NHLA: National Hardwood Lumber Association.
    - 3. NLGA: National Lumber Grades Authority.
    - 4. WCLIB: West Coast Lumber Inspection Bureau.
    - 5. WWPA: Western Wood Products Association.
    - MDF: Medium-density fiberboard.
  - C. MDO Plywood: Plywood with a medium-density overlay on the face.

## 1.3 SUBMITTALS

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- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical treatment manufacturer's written instructions for finishing treated material.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
  - 3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
  - 4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- B. Samples for Initial Selection: For each type of paneling indicated.
- C. Samples for Verification:
  - 1. For each species and cut of lumber and panel products with non-factory-applied finish, with 1/2 of exposed surface finished, 50 sq. in. for lumber and 8 by 10 inches for panels.
  - 2. For each finish system and color of lumber and panel products with factory-applied finish, 50 sq. in. for lumber and 8 by 10 inches for panels.

- D. Research/Evaluation Reports: Showing that fire-retardant-treated wood complies with building code in effect for Project.
- E. Warranty: Special warranty specified in this Section.
- F. Mock-Ups
  - 1. Erect mock-ups of each specific installation type for review and approval of the architect. Mock-ups shall include the specified materials, joinery, characteristic patterns, and accessories
  - 2. Locate where directed. Coordinate as necessary
  - 3. When accepted, mock-up will demonstrate minimum standard for the Work. Mock-up may remain as part of the Work

## 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials against weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation within and around stacks and under temporary coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

## 1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
  - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.
- C. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
  - 1. Perform work in accordance with AWI Custom Grade standards, as a minimum requirement
  - 2. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with such selections and requirements in addition to the quality standard.

## PART 2 - PRODUCTS

## 2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by ALSC's Board of Review.
  - 1. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
  - 2. For exposed lumber, mark grade stamp on end or back of each piece
- B. Softwood Plywood: DOC PS 1.
- C. Hardboard: AHA A135.4.
- D. MDF: ANSI A208.2, Grade 130 made with binder containing no urea-formaldehyde resin.
- E. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea-formaldehyde resin.

- F. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
- G. Finishes: Reference Finish Schedule, Finish Material Designations

## 2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. Lumber: Comply with performance requirements in AWPA C20, Interior Type A. Kiln dry after treatment to a maximum moisture content of 19 percent.
- B. Plywood: Comply with performance requirements in AWPA C27, Interior Type A. Kiln dry after treatment to a maximum moisture content of 15 percent.
- C. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not contain colorants and provide materials that do not have marks from spacer sticks on the exposed face.
- D. Do not use material that does not comply with requirements for untreated material or is warped or discolored.
- E. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
  - 2. For exposed plywood indicated to receive a stained or natural finish, mark back of each piece.

## 2.3 STANDING AND RUNNING TRIM

- A. AWI Grade: Custom
- B. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish), at all locations unless noted otherwise:
  - 1. Species and Grade: White Maple; transparent stain finish to match architect's sample and cabinet veneer and laminate door finish; NHLA. Match species and cut indicated for other types of transparent-finished architectural woodwork located in same area of building, unless otherwise indicated.
  - 2. Maximum Moisture Content: 9 percent.
  - 3. Finger Jointing: Not allowed.
  - 4. Gluing for Width: Not allowed
  - 5. Veneered Material: Not allowed.
  - 6. Face Surface: Surfaced (smooth).
  - 7. Matching: Selected for compatible grain and color.
  - 8. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work
  - 9. Assemble casings in plant except where limitations of access to place of installation require field assembly
  - 10. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together
- C. Lumber Trim for Opaque Finish (Painted):
  - 1. Species and Grade: Douglas fir-larch or Douglas fir south, Superior or C & Btr finish; NLGA, WCLIB, or WWPA.
  - 2. Species and Grade: Alder, aspen, basswood, cottonwood, gum, magnolia, soft maple, sycamore, tupelo, or yellow poplar; A finish; NHLA.
  - 3. Maximum Moisture Content: 15 percent.
  - 4. Finger Jointing: Allowed.
  - 5. Face Surface: Surfaced (smooth).
  - 6. Optional Material: Primed MDF of same actual dimensions as lumber indicated may be used in lieu of lumber.

## 2.4 BUTCHER BLOCK BENCH TOP A. NOT USED

#### 2.5 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
  - 1. Where galvanized finish is indicated, provide fasteners and anchorages with hot-dip galvanized coating complying with ASTM A 153/A 153M.
- B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
  - 1. Use wood glue that has a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Paneling Adhesive: Comply with paneling manufacturer's written recommendations for adhesives.
  - 1. Use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturer.
  - 1. Use adhesive that has a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

#### 2.6 FABRICATION

- A. Back out or kerf backs of Interior standing and running trim except shoe and crown molds except those with ends exposed in finished work:
- B. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 48 hours unless longer conditioning is recommended by manufacturer.

#### 3.3 INSTALLATION, GENERAL

- A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
- B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.
- C. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
  - 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- D. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
  - 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer. Carefully scribe cabinetwork which is against other building materials, leaving gaps of 1/32 inch maximum. Do not use additional overlay trim for this purpose

- 2. When necessary to cut and fit on site, make material with ample allowance for cutting. Provide trim for scribing and site cutting.
- 3. Countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.
- 4. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
- 5. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts (not applicable to casework).
- 6. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated (not applicable to casework).
- 7. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.
- 8. Paneling: Anchor paneling to supporting substrate with concealed panel-hanger clips. Do not use face fastening, unless covered by trim.
  - a. Install flush paneling with no more than 1/16" in 96" vertical cup or bow and 1/8" in 96" horizontal variation from a true plane.

## 3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with minimum number of joints possible, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 36 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members, standing and running trim. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
  - 1. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
  - 2. Install trim after gypsum board joint finishing operations are completed.
  - 3. Drill pilot holes in hardwood before fastening to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.
  - 4. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.
  - 5. Install handrails on metal brackets specified securely, fastened to wall framing.
  - 6. Install standing & running trim with no more variation from a straight line than 1/8" in 96".

## 3.5 ADJUSTING

A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

## 3.6 CLEANING

A. Clean interior finish carpentry on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

## 3.7 PROTECTION

- A. Protect installed products from damage from weather and other causes during remainder of the construction period.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

- 1. Indications that materials are wet or moisture damaged include, but are not limited to,
- discoloration, sagging, or irregular shape. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration. 2.

END OF SECTION 06 20 00

## SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Plastic-laminate cabinets.
  - 2. Plastic-laminate countertops.
  - 3. Plastic-laminate window sills.
  - 4. Casework accessories, and cabinet hardware.
  - 5. Utility shelving.
  - 6. Preparation for installing utilities.
  - 7. Shop finishing of interior woodwork.
  - 8. Sliding white board track.
  - 9. US flag and trim.
  - 10. Solid surfacing counter tops.
  - 11. Cash drawers.
  - 12. Diamond plate countertop assembly.
  - 13. Stainless steel countertops and wall protection.
  - 14. Slat wall and accessories.
  - 15. Laboratory epoxy resin countertops.
- B. Related Sections include the following:
  - 1. Division 06 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
  - 2. Division 06 Section "Finish Carpentry" for interior carpentry exposed to view that is not specified in this Section.
  - 3. Division 09 Section "Vinyl Wall Coverings" for millwork coordination in areas where vinyl wall covering shall be installed prior to millwork installation.
  - 4. Division 10 Section "Visual Display Surfaces" for sliding marker and tackboard applications.
  - 5. Division 10 Section "Toilet, Bath and Health Care" for equipment coordination.
  - 6. Division 22 Section "Plumbing" for rough-in and coordination of sinks, service fixtures and fittings, supply and waste lines, connections and vents incorporated into casework.
  - 7. Division 23 Section "HVAC" for coordination of ductwork and vents incorporated into casework.
  - 8. Division 26 Section "Electrical" for rough-in and coordination of electrical, phone, data outlets, J-boxes, conduit, fittings and cabinet lighting and controls incorporated into casework.

#### 1.2 REFERENCES

- A. ANSI A135.4 Basic Hardboard
- B. ANSI A208.1 Mat Formed Wood Particle Board
- C. ANSI A208.2 Medium Density Fiberboard
- D. BHMA A156.9 Cabinet Hardware
- E. AWI (Architectural Woodwork Institute) Quality Standards
- F. NEMA (National Electric Manufacturers Association) LD3 High Pressure Decorative Laminates
- G. PS 20 American Softwood Lumber Standard
- H. PS 1 Construction and Industrial Plywood
- I. ALA American Laminators Association
- J. NHLA National Hardwood Lumber Association
- K. AHA American Hardboard Association
- L. HPVA Hardwood Plywood & Veneer Association
- M. ASTM American Society for Testing and Materials

- N. LMA Laminated Materials Association
- O. ASTM G-22 Compliance for product 390 (60 finish)
- 1.3 DEFINITIONS
  - A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.
  - B. EXPOSED PORTIONS
    - 1. All surfaces visible when doors and drawers are closed.
    - 2. Cabinet tops 80" and under above finish floor or over 80" above finish floor if visible from an upper building level.
    - 3. Visible edges of cabinet ends, doors and drawer fronts.
    - 4. Sloping tops of cabinets that are visible.
    - 5. The underside bottoms of wall hung cabinets that are visible.
  - C. SEMI-EXPOSED PORTIONS
    - 1. All surfaces visible when doors and drawers are open including interior faces of hinged doors to include back panel of sink cabinets.
    - 2. Visible surfaces in open cabinets or behind glass doors.
    - 3. Visible portions of bottoms, tops and ends in front of sliding doors in closed position.
    - CONCEALED PORTIONS
      - 1. Toe space unless otherwise specified.
      - 2. Sleepers.
      - 3. Web frames, stretchers.
      - 4. Security panels.
      - 5. Underside of bottoms of cabinets less than 30" above the finished floor.
      - 6. Flat tops of cabinets above 80" or more from the finished floor, except if visible from an upper building level.
      - 7. The three non-visible edges of adjustable shelves.
      - 8. The underside of countertops, knee spaces and drawer aprons.
      - 9. The faces of cabinet ends of adjoining units that butt together.
- 1.4 SUBMITTALS

D.

- A. Product Data: For Panel products, high-pressure decorative laminate, adhesive for bonding plastic laminate, solid-surfacing material, cabinet hardware and accessories and finishing materials and processes.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
  - 1. Show details full size.
  - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
  - 3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, electrical devices and other items installed in architectural woodwork.
  - 4. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf. (Required where hardwood veneer panel products are indicated).
- C. Samples for Initial Selection:
  - 1. Shop-applied transparent finishes.
  - 2. Shop-applied opaque finishes.
  - 3. Plastic laminates.
  - 4. PVC edge material.
  - 5. Thermoset decorative panels.
- D. Samples for Verification:
  - 1. Lumber and moldings with or for transparent finish, not less than 50 sq. in., 5 inches wide by 24 inches, for each species and cut, finished on 1 side and 1 edge.
  - 2. Veneer-faced panel products with or for transparent finish, 8" 10" for each species and cut. Include at least one face-veneer seam and finish as specified.

- 3. Lumber, moldings and panel products for opaque finish, 50 sq. in. for lumber and 8 by 10 inches for panels, for each finish system and color, with 1/2 of exposed surface finished.
- 4. Plastic laminates, 8" x 10" for each type, color, pattern, and surface finish, with 1 sample applied to core material and specified edge material applied to 1 edge.
- 5. Thermoset decorative-panels, 8" x 10", for each type, color, pattern, and surface finish, with edge banding on 1 edge.
- 6. Solid-surfacing materials, 6" square.
- 7. Exposed cabinet hardware and accessories, one unit for each type and finish.
- E. Qualification Data: For Installer and fabricator.
  - WSSP Submittal:

F.

1. NOT USED.

## 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful inservice performance for a minimum of 5 years.
- B. Installer Qualifications: Fabricator of products.
- C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork
- D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
  - 1. Perform work in accordance with AWI Custom Grade standards, as a minimum requirement
  - 2. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with such selections and requirements in addition to the quality standard.
  - 3. Stainless Steel Counter Top Industry Standards: All materials entering into the Work of this Section shall conform with the "National Sanitation Foundation Standards", established by the National Sanitation Foundation, Ann Arbor, Michigan.
  - 4. Stainless Steel Counter Top SMACNA (Sheet Metal and Air Conditioning Contractor's National Association) Kitchen Equipment Fabrication Guidelines.
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Provide mockup of full size base cabinet and upper cabinet, provide units with specified countertop; with hardware installed
  - 2. Units will be examined to ascertain quality and conformity to AWI quality level standards and specification requirements
  - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Coordination and Meetings", one month prior to installation.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.
- B. Due to the accelerated time constraints of the phasing of the project, the contractor shall provide adequate off site storage within 10 miles of the project site for storage and stocking of the casework. Such storage shall be available to the Owner and Architect to review stored material.

## 1.7 PROJECT CONDITIONS

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

- B. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.
- C. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
  - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

## 1.8 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.
- B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)" to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.
- C. Coordinate the work with plumbing and electrical rough-in and wall finish.

## 1.9 WARRANTY

A. Provide two year defect-free specialty warranty. Warranty period commences on the date of substantial completion.

## PART 2 - PRODUCTS

- 2.1 MANUFACTURERS:
  - A. Basis of Design: Pacific Cabinets Institutional Laminate series
  - B. Simonet, equivalent to basis of design
  - C. Beck, equivalent to basis of design
  - D. AAA Cabinets, equivalent to basis of design
  - E. Genothen, equivalent to basis of design
  - F. Substitutions under the provision of Division 01.

## 2.2 MATERIALS:

- A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork, casework and quality grade specified, unless otherwise indicated.
- B. Wood Species and Cut for Transparent Finish: White Birch, plain sawn or sliced.
- C. Wood Species for Opaque Finish: Poplar
- D. Wood Products: Comply with the following:
  - 1. Hardboard: AHA A135.4.
  - 2. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with low urea formaldehyde formulations. 3/4" panel thickness, unless otherwise indicated.
  - 3. Particleboard: ANSI A208.1, Grade M-2, 45lb density, industrial grade pine-based particle board, 3/4" panel thickness unless otherwise indicated (42lb density and/or fir based particle board products are not acceptable).
  - 4. Softwood Plywood: DOC PS 1, Medium Density Overlay.
  - 5. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing low urea formaldehyde resins.
- E. Thermoset Decorative Panels:

- 1. Particleboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1. Provide in panel thicknesses indicated.
- 2. Medium density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1 for all drawer fronts, doors and shelving. Provide in panel thicknesses indicated
- 3. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semi exposed edges. Match panel color unless otherwise indicated.
- 4. Up to two colors of thermoset decorative overlay panels may be selected by Architect from manufacturer's standard and premium colors.
- F. Standard Casework, not specified elsewhere: High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.
  - 1. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
    - a. Formica Corporation.
    - b. Nevamar Company, LLC; Decorative Products Div.
    - c. Wilsonart International; Div. of Premark International, Inc.
    - d. Pionite Corporation
  - 2. High Pressure Decorative Laminate (HPDL), NEMA LD 3, Grade Standards:
    - a. Horizontal Grade .050" = GP50
    - b. Postforming Grade .042" = PF42
    - c. Cabinet Liner Grade .020" = CL20
    - d. Chemical Resistant Grade .36" = CR36
  - 3. Provide white board writing surface, premium high-pressure laminate with high-gloss finish at select vertical cabinets face. See drawing for specific cabinet locations with writing surface. Compact HPL with minimum thickness of 2mm. Product shall comply with EN 438 standards.
- G. Stainless Steel Countertops and related work in food service area:
  - 1. Stainless Steel: Armco or approved, U.S. Standard gauges, 18-8, Type 304, with No. 4 mill finish, ASTM 240, ASTM 480.
  - 2. Galvanized Steel: Armco or approved equal, conforming to ASTM Standard A-93-59-T, Class C.
  - 3. Reinforcing as detailed or specified herein.
  - 4. Gussets: Stainless Steel gussets.
  - 5. Fastenings: Stainless steel or chrome-plated brass. All exposed bolt heads or nuts shall have cap type heads
- H. Tempered Float Glass for Cabinet Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3, with exposed edges seamed before tempering, 6 mm thick, unless otherwise indicated.
- I. PVC edge trim molding: Provide PVC edge trim molding to match selected plastic laminate colors and MDL/thermoset decorative overlay panel colors. Where wood grain laminate is selected, matching wood grain PVC edge trim is required.
  - 1. Edge trim thickness:
    - a. Door and drawer edging 3mm
    - b. Body front edging 3mm
    - c. Cabinet shelf edges 3mm
    - d. All other misc. shelf edges 3mm
- J. Finishes: Reference Finish Schedule, Finish Material Legend for manufacturer, product and color selections.
- K. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following: a. ABA Industries.
    - b. Avonite. Inc.
    - c. DuPont; Corian.
    - d. Formica Corporation.
    - e. LG Chemical, Ltd.

- f. Meganite Inc.; a division of the Pyrochem Group.
- g. Nevamar Company, LLC; Decorative Products Div.
- h. Wilsonart International; Div. of Premark International, Inc.
- 2. Type: Standard type, unless Special Purpose type is indicated.
- 3. Colors and Patterns: As selected by Architect from manufacturer's full range.
- L. Diamond Plate Countertop: Install within shop spaces over top of base cabinets. Reference division 05 "Metal Fabrications" for material coordination.

## 2.3 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."
  - 1. Reference Standards: Hardware, BHMA A156.9 "American National Standards for Cabinet Hardware"
  - 2. Manufacturers: Subject to compliance with requirements and specific manufacturers product and model no. references, provide products by the following manufacturers:
    - a. Blum, Hafele, Grass, Stanley, Knape and Vogt, Doug Mockett & Co., CompX National and equivalent products from the other manufacturers, subject to review and approval by Architect.
  - 3. Hardware Finishes: Exposed hardware finishes: Brushed Chrome BHMA 626 finish or 630. For concealed hardware, provide manufacturers standard finish.
- B. Butt Hinges: Five knuckle, epoxy powder coated, institutional grade, 2-3/4" overlay type with hospital tip. 0.095" thick. ANSI-BIFMA standard A156.9, Grade 1, 270 degree opening standard. Brushed chrome finish or BHMA 626 finish.
  - 1. Semiconcealed Hinges for Overlay Doors: BHMA A156.9, B01521.
  - 2. Doors 36" high and under shall have two (2) hinges per door. Doors over 37" and under 60" high shall have three (3) hinges per door. Doors over 60" high shall have four (4) per door.
- C. Wire Pulls: Back mounted, solid metal, 4" long, 5/16" in diameter for doors and drawers. 'U' shaped pulls, satin chrome, BHMA 630 or BHMA 626 finish.
- D. Catches: Magnetic catches, BHMA A156.9, B03141 and/or push-in magnetic catches.
- E. Lock hasps: Pad lock loop fabricated from 0.090-inch nominal-thickness stainless steel metal.
- F. Catches: Magnetic catches, BHMA A156.9, B03141 and/or push-in magnetic catches. Magnetic door catch with maximum 5 to 7 pound, heavy duty, pull provided, attached with screws and slotted for adjustment.
- G. Adjustable Shelf Support System: Standard adjustable shelf support system shall be provided by inserting polycarbonate double-pin locking shelf clips into predrilled 5mm diameter holes 32mm (1-1/4") on centers. Color Clear. Shelves may be fixed using a retaining screw.
- H. Upswing cabinet/shelf unit door: Blum 270E series Retractable casework door hardware set, sized to accommodate horizontal flipper doors indicated in the drawings, including but not limited to guide roller, carriage plate, hinges mounting plates, flipper door rollers, and related anchors.
- I. Drawer Slides: BHMA A156.9, B05091: Side or bottom mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, BHMA A156.9, B05091 and rated for the following loads:
  - 1. Box Drawer Slides: 100 lbf (440N)
  - 2. File Drawer Slides : 200 lbf (890N)
  - 3. Pencil Drawer Slides: 45 lbf (200N)
  - 4. Keyboard Slide: 75 lbf (330N)
  - 5. Trash Bin Slides: 200 lb (890N)
- J. Chain Bolt: Where indicated, "Stanley" model CD1055 or equivalent.
- K. Mirror: Not Used.
- L. Locks: Key using a single master for the entire project. One lock per panel door or drawer where indicated and all locks in each individual room shall be keyed alike. Each room shall be keyed differently from all other rooms in the building. Provide 3 keys per room, properly tagged

and identified upon delivery. Where noted on the drawing, key lock individually (personal storage area) and provide 3 keys.

- 1. Doors Olympus Lock, 100DR Deadbolt, N Series: National Keyway
- 2. Drawers Olympus Locks, 200DW Deadbolt, N Series: National Keyway
- 3. Master Keying National D4291 Cylinder with 5-pin keying, coordinate with owner for keying and master keying. Provide 3 master keys in addition to individual keys.

## M. Butcher Paper Wall Rack: Not Used.

- N. Nurse/Health Rooms: Provide cabinet locks at all Nurse/Health area drawers, casework doors, and cabinet doors. Reference drawings.
- O. Door/drawer silencers: minimum of 2 per door and drawer, with 4 on doors larger than 36" high.
- P. Closet Hanger Bar and Supports: Telescoping steel or brass tubing, with forged end brackets; size and wall-thickness to support hanging of clothing full length.
- Q. Grommets for Cable Passage through Countertops: 3-1/8" OD, molded-plastic grommets with lid flap for wire passage. Spring clip, lever hinge style grommet.
  - 1. Metallic silver or charcoal grey as selected by Architect.
  - 2. Product: Subject to compliance with requirements, provide XG3 series Pass Through Grommet by Doug Mockett & Company, Inc. 3-inch OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.
  - 3. Provide (2) round penetrations with PVC grommet at all counter tops with open knee space shown below, work stations (computer) and desk countertops. Coordinate locations with Architect.
  - 4. Show proposed locations in shop drawings to be verified by Architect. Provide (18) grommets as minimum quantity allowance.
- R. Keyboard Trays: Not Used.
- S. Drawer Accessories:
  - 1. Standard lateral hanging files 1" x 1/8" zinc plated steel flat bars adjustable for both letter and legal size files.
  - 2. Provide for all indicated file drawers based on cabinet type.
- T. Cash Drawer (undermount): Basis of Design Volcora 14" Mini Cash Drawer
  - 1. Two under counter mounting brackets for each drawer
  - 2. White, auto open with Cat 6 connectivity, (2) tier four bill and five coin tray
  - 3. SKU: 500028-N (two units in student store)
- U. Robe Hook:
  - 1. Basis-of-Design Product: Ives, 582 A92
    - a. Provide two on inside of each locker/wardrobe type casework compartment.
- V. Student Cubbie Hooks:
  - a. Not Used.
- W. Mobile Cabinet Frames:
  - 1. 1-1/2" Tube steel, 15 gauge frame at bottom of mobile units with 1/4" steel plates welded at corners of lower frame for caster to mount. Frames are powder coated to match cabinet interior color.
- X. Casters:
  - 1. Casters have grey rubber tires with a lock mechanism that locks both the swivel and the tire rotation. Casters are bolted to a steel frame or on small cabinets bolted through the bottom.
  - 2. 3" swivel with brake 130 lb rating
  - 3. 3" swivel without brake 130 lb rating
- Y. Support Brackets:
  - 1. Countertop support and brackets equal to Hafele Hebgo Bracket, 287.45.468, with 1,100 lb per pair load capacity.
  - 2. Provide and locate where indicated on drawings for open countertop support at work station and knee space open countertop spans. Support brackets shall occur at 30" o.c. maximum spacing.
- Z. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
  - 1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.

- 2. Satin Stainless Steel: BHMA 630.
- AA. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.
- BB. Horizontal Metal Track Slide for white board and tack board assemblies
  - 1. Not Used.
- CC. Wall Mount USA Flag and related trim/anchors and backing:
  - 1. Flag basis of design: G-Spec Large Cotton American Flag 5" x 9'-6" size, poly-cotton material, sewn stripes and bright white embroidered stars on an Old Glory field. Constructed with heavy heading material and 2 brass grommets, and 4 rows of stitching at the fly end.
  - 2. Backing material equal to 5/8" MDF sheathing, all joints splined and covered to avoid joint show-through on flag.
  - 3. Trim Material: <sup>3</sup>/<sub>4</sub>"x <sup>3</sup>/<sub>4</sub>" aluminum "L" trim, picture framed around assembly to conceal all edges.
  - 4. Custom Mounting clips and anchors as necessary to support wall mounted flag assembly.
  - 5. Iron flag flat to remove wrinkles and fully adhere to MDF sheathing backer board.
  - 6. Substitutions under provisions of Division 01

#### 2.4 LABORATORY COUNTERS AND ACCESSORIES

- A. Laboratory Counters & Worksurfaces:
  - 1. Materials and Fabrication:
    - a. General: Material shall be a monolithic, filled epoxy resin product and shall consist of a polymerized cast resin material formulated to provide a work surface with high chemical resistance characteristics. The combination of epoxy resin and asbestos free inert materials shall be oven-cured in molds to obtain maximum chemical resistance, then removed from the molds and oven tempered to achieve maximum physical strength and stability. Surfaces shall have a uniform low-sheen surface and the finished material shall be extremely hard and resistant to scratches and abrasion.
    - b. Thickness: 1" thick
    - c. Edges and Corners: Exposed work surface edges and corners, except as indicated, shall be furnished with a 1/4" machined radius top edge with blended radius corners
    - d. Surface: Worksurfaces shall be furnished as Flat
    - e. Backsplashes: Supplied loose for field application in the same material and thickness as countertops. Curbs as installed shall be 4" high, unless otherwise indicated on drawings. Curbs will be bonded to the tops at the jobsite. Include top mounted end curb where worksurfaces abut walls, fume hoods, and locations detailed on drawings
    - f. Color: <u>Charcoal</u> submit sample for review during submittals
    - g. Warpage: Check work surface for warpage before fabrication. Measure in unrestrained condition. Work surface will be accepted for use if there is no gap exceeding 1/16" in a 36" span.
    - h. Fabrication: Provide in longest practical lengths. All joints shall be bonded with a highly chemical and corrosion resistant epoxy grout. Provide 1/8" drip groove on underside of exposed edges set back 1/2" from edge at all sink areas and where shown on drawings. All exposed edges to be molded or finished.
    - i. Thickness Tolerances: Each corner of top shall not deviate more than plus or minus 1/16" from nominal.
    - j. Size Tolerances: Length, plus or minus 1/8". Width, plus or minus 1/16".
    - k. Squareness: Compare the diagonal corner-to-corner measurements across the width of each work surface. The diagonal measurements must be within 1/16".
    - I. Penetrations: Location of cutouts and drillings: Plus or minus 1/8". Sizes of cutout and drillings: Plus or minus 1/16".
  - 2. Material Properties: Provide independent testing laboratory report certifying that the epoxy work surface meets or exceeds the following test criteria:
    - m. Chemical Resistance:
      - Test Methods:

Volatile chemicals (organic solvents): A cotton ball, saturated with the test chemical (reagent) is placed in a one-ounce bottle ( $10 \times 75$ mm test tube or similar container) with a reservoir of liquid above the ball. The container is inverted on the test material for a period of 24 hours at a standard temperature of 23° plus or minus 2°C. ( $73^{\circ}$  plus or minus 4°F).

Non-Volatile Chemicals: Five drops (1/4cc) of the test chemical are placed on the test material surface. The chemical is covered with a watch glass (25mm) for a period of no less than 24 hours at a standard temperature of 23° plus or minus  $2^{\circ}$ C. (73° plus or minus  $4^{\circ}$ F).

Evaluation Ratings:

After 24 hour exposure, surfaces are washed with water, then a detergent solution, finally with naphtha, then rinsed with distilled water and dried with a cloth. Change in surface finish and function shall be described by the following (1-5) ratings:

- 1) No Effect: No detectable change in the material surface.
- 2) Excellent: Slight detectable change in color or gloss, but no change to the function or life of the work surface material.
- 3) Good: Clearly discernible change in color or gloss, but no significant impairment of surface life or function.
- 4) Fair: Objectionable change in appearance due to surface discoloration or etch, possibly resulting in deterioration of function over an extended period.
- 5) Failure: Pitting, cratering or erosion of work surface material; obvious and significant deterioration.

Chemicals	Min. Acceptable Results	Chemicals	Min. Acceptable Results	
Inorganic Acids – Corrosive		Organic Solvents		
Chromic Acid 40%	4	Acetone	2	
Hydrochloric Acid 10%	1	Benzene	2	
Hydrochloric Acid 37%	1	Carbon Tetrachloride	2	
Nitric Acid 40%	1	Dimethyl Ether	1	
Nitric Acid 70%	1	Dimethyl Formamide	1	
Sulfuric Acid 60%	1	Ethyl Acetate	1	
Sulfuric Acid 96%	5	Ethyl Alcohol 95%	1	
Organic Acids – Corrosive		Ethylene Dichloride	1	
Acetic Acid 5%	1	Heptane	1	
Acetic Acid, Glacial	1	Isooctane	1	
Citric Acid 1%	1	Kerosene	1	
Oleic Acid	1	Methyl Alcohol	1	
Phenol Solution 5%	1	Toluene	1	
Alkaline Solutions – Corrosive		Organic Compounds		
Ammonium Hydroxide 10%	1	Aniline	1	
Sodium Carbonate Sol 20%	1	Mineral Oil	1	
Sodium Hydroxide 60%	1	Olive Oil	1	
Sodium Hypochlorite Sol 4%	1	Soap Solution 1%	1	
Potassium Hydroxide 15%	1	Transformer Oil	1	

Minimum acceptable test results shall be equal to or better than the following rating:

				Turpentine	1				
b.	Hardness (ASTM D785):								
	<u>Test Method:</u> Hardness, R Minimum Acceptable Test		ale va	, average of five readings.					
С	Within Acceptable Test Results. Average value of 100 over the five samples. Water Absorption (ASTM D570):								
	Test Method: Specimens measuring 3" in length by 1" in width by the thickne								
	material should be used. At least three specimens should be tested. After weighin								
	specimens should be entir	pecimens should be entirely immersed in distilled water maintained at a temperature of							
	23° plus or minus 1°C. (73.4° plus or minus 1.8°F) for a period of 24 hours. The samples								
	should then be removed, dried and weighed to the nearest 0.001g. The percentage of								
	Increase in weight calculat		0.0	1% should then be calculate	a. <u>Minimum</u>				
Ь	Elammability or Rate of Bu	J.U1% Jrning (ASTM D79	۷۰.						
u.	Flammability of Rate of Burning (ASTM D794): Test Method: Measure "Average Time of Burning (ATB)" as described in test. At least 5								
	samples (125mm +/- 5mm in length by 12 5mm +/- 0 2mm in width) should be tested								
	Minimum Acceptable Test	Results: ATB sho	ulc	equal zero.					
e.	Porcelain Crucible - Test A	A (Non-Standard T	es	t)					
	Test Method: a high-form	porcelain crucible,	siz	ze D, 15ml capacity, shall be	heated over				
	a Bunsen burner until the	crucible bottom at	tair	is an incipient red heat. Imm	ediately, the				
	hot crucible shall be transi	ferred to the top su	urte te	ace and allowed to cool to roo	) M				
	there shall be no blisters of	vr cracke. Slight du	ullin Illin	<u>s.</u> Opon removal of the coole	d crucible,				
f	Heat Deflection @ 264 ps	i (ASTM 648)		ig of color change is accepta	DIE.				
	Minimum Acceptable Test	Results: 193°C (3	80	°F)					
g.	Falling Ball Impact Resista	ance (ERF 23-69):		,					
	Test Method: Careful atter	ntion to details of t	est	procedure should be followe	ed. A wooden				
	supporting frame must be	used with the test	. S	ize of samples: 12" x 12" by t	the thickness of				
	the material. 2lb steel ball	should be used. Three or more samples should be tested.							
h	Thermal Shock Pesistance	e (Non Standard T		SI Result: NO fracture to a ne	signt of 7.				
	Test Method: Two cubes (	2" x 2" by thicknes	s o	of material) are immersed in :	a drv				
	ice/acetone bath maintained at minus 78°C. The cubes are allowed to remain in the								
	for 15 minutes. Each cube	is removed and ir	nm	ediately placed in a containe	er of boiling				
	water at 100°C. The proce	edure is repeated u	Inti	I failure occurs (i.e., cracking	j, warpage,				
	distortion) for a series of fi	ve repetitions.							
	Minimum Acceptable Test	<u>Results:</u> No visibl		hanges should be observed.					
Ι.	Flexural Strength and Moo	and should be pro	45	IM D790): red from 1" thick production r	motorial with				
	a support span 16 times th	ens should be pre	pai s) (	of the beam. The original sur	face of the				
	sample should be unaltered	ed. Recommended	l sa	ample size is $19.5" \times 1.0" \times 1.0"$	.0" (length x				
	width x depth). A minimum	n of five samples a	re	to be tested. Testing should	be carried				
	out to failure of the test sa	mple. Modulus of	rup	ture should be measured as	described in				
	the ASTM method. Minimu	um Acceptable Te	st F	Result: Flexural Strength: 1	0,000 psi -				
	Modulus of Rupture: 1,000	),000psi							
Labor	ratory Sinks - Epoxy Sinks (	Undermount):	the	rmonotting anover racin and	d over ourod				
1.	Nominal wall thickness of 1	/2" with all interior		ernoseuing epoxy resin, and orners coved to 1-1/2" radius	and bottoms				
2.	Undermount: Durcon Mode	t 16" long x 12" wide x 8" c	leep I.D. and						
-	Durcon Model U25 corner	outlet 18" long x	15	" side x 8" deep. Provide	as shown on				
	drawings:								
	a. Sink shall be installed fr	om underside of c	ou	ntertop.					
	i. Joint between top and	I sink to be joined	wit	h a lab grade silicone					
	II. SINK supports to be p	rovided by others.							

Β.

- 3. Sink Color: Black Onyx, Graphite, Gray, Forest Green, Steel Blue, Tan or White as specified.
- 4. Sink Outlets: Polypropylene (industry standard)
  - b. Sink outlets shall accommodate a plastic disc strainer. Provide outlet with 1.42" outlet opening and 1.5" NPSM threads.
  - c. Outlet Color: Black Onyx
- 5. Sink Overflows: Polypropylene (industry standard)
  - d. Sink overflows shall have an open intake located at least 2" lower than the sink rim when installed. The overflow base shall taper to fit all 1.42" outlet openings.e. Overflow Color: Black Onyx.
- C. Laboratory Glassware Drying Racks: Science Lab Drying Rack 60-189280024 HDPE Drying Rack with 18 pegs, 24" wide x 24" high x 4-7/8" deep.
  - 1. Provide four units total. Coordinate location of drying racks during submittal review process within science classrooms and prep area.
- D. Laboratory Upright Rod Assembly Racks: Carolina Scientific Item #705402 and (2) #705410; two <sup>3</sup>/<sub>4</sub>" diameter x 36" tall upright rods with one <sup>1</sup>/<sub>2</sub>" diameter x 40" long crossbar rod and two <sup>3</sup>/<sub>4</sub>"x <sup>1</sup>/<sub>2</sub>" rod clamps, assembly sets in two rod sockets 1" diameter with 1-7//8" L threaded shank.
  - 1. Provide six sets total. Two complete units per science classroom, for (3) classrooms. Coordinate location of sockets and rods during submittal review process.
- E. Substitutions under provisions of Division 01.
- MISCELLANEOUS MATERIALS Custom grade is standard spec unless noted different in plans. 2.5 Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less Α. than 15 percent moisture content. Steel studs, straps and accessories as detailed.Bolts, nuts, washers, lags, pins and screws of size and type to suit application and in compliance for type permitted by AWI Standards - Custom Grade for concealed and semi-exposed portions of architectural woodwork and cabinets/casework. No exposed fasteners or trim cap covered fasteners permitted on exposed casework surfaces.Concealed joint fasteners: in compliance with AWI Standards, table 400B-T-10 "Joinery of Case Body Members" for Custom Grade. Provide dowels, splines, biscuits or dado joinery. European assembly screws may be used to join panels from the outside on concealed side or back panel faces only (fasteners and/or plastic trim caps not visible on exposed surfaces). Trim caps permitted on semi-exposed surfaces for attachment to walls only Anchors for securing casework to walls and support framing: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.Adhesives, General: Do not use adhesives that contain urea formaldehyde. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):Wood Glues: 30 g/L.
  - 2. Contact Adhesive: 250 g/L.
  - G. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement, contact cement or PVA.Adhesive for Bonding Edges: Hot-melt adhesive.

## 2.6 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Unless otherwise indicated, provide Custom-Grade interior woodwork complying with referenced quality standard (AWI).
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- C. Fabricate finished hardwood for transparent finish to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
  - 1. Corners and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
  - 2. Edges of Rails and Similar Members More Than 3/4" Thick: 1/8".
- D. Complete fabrication, including assembly, finishing and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for

shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

- 1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
- 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.
- E. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
  - 1. Seal edges of openings in countertops with a clear sealer.
- F. Install glass to comply with applicable requirements in Division 08 Section "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.
- G. Install Diamond Plate countertops per Division 05 Section "Metal Fabrications". Soften all exposed edges removing burrs and sharp surfaces.
- H. Pocket screws will only be allowed in concealed areas.

## 2.7 PLASTIC-LAMINATE CABINETS

- A. Grade: Custom.
- B. AWI Type of Cabinet Construction: Flush overlay on type 'A' frameless construction
- C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
  - 1. Horizontal Surfaces Other Than Tops: Grade GP50
  - 2. Postformed Surfaces: Grade PF42
  - 3. Vertical Surfaces: Grade VG28
  - 4. Edges: PVC edge banding 3mm thick, matching laminate in color, pattern and finish.
  - 5. Exposed material shall be pattern(s) and color(s) as specified or selected. For exposed vertical surfaces of cabinet and both faces of drawer and door panels laminated with adhesive and pressure bonded to 3/4" minimum furniture grade MDF core stock
- D. Materials for Semiexposed Surfaces:
  - 1. Thermoset Decorative Panels: ALA, polyester or melamine resin impregnated web, pressure bonded and thermally fused to a core of 45 lb industrial grade pine particle board or furniture grade MDF core stock panels in thicknesses indicated. All interior semiexposed surfaces included: Drawer Construction; Gables and Backs, Shelving. Unless Noted Otherwise, the interiors and the shelves in the open shelving units shall be thermoset decorative panels. Adjustable shelves shall have the same lamination on both faces.
    - a. Edges of shelves and divider panels: PVC edge banding 3mm thick, matching laminate in color, pattern and finish.
    - b. All shelving shall be MDF.
- E. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
  - 1. As selected by Architect from laminate manufacturer's full range in the following categories:
    - a. Solid colors, matte finish.
    - b. Wood grains, matte finish
    - c. Patterns, matte finish.
  - 2. Up to five (5) colors of plastic laminate for cabinets may be selected by Architect from manufacturer's standard and premium colors. Wood grains and patterned laminate may be selected.
  - 3. Up to two (2) colors of thermoset decorative panel laminate may be selected by architect from manufacturer's available colors.

### 2.8 FABRICATION OF PLASTIC LAMINATE CASEWORK

- A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- B. Fit shelves, doors, drawer fronts and exposed edges with edge trim. Use one piece for full length only.
- C. Cap exposed plastic laminate finish edges with Edge Trim. Use one piece of full length.
- D. Coordinate millwork fabrication with return air grille and metal ductwork shown in the plans concealed by casework. Reference mechanical drawings and specification section Division 23.

### E. Drawers as follows:

- 1. Drawer fronts: Minimum 3/4" thick; overlay style except match door thickness.
- 2. Drawer Sides and Back: Minimum 1/2" thick thermoset decorative panel with lock shoulder joint and glued.
- 3. Drawer Bottom: Minimum 1/4" thick thermoset decorative panel dadoed into front and sides and glued.
- 4. Keyboard trays: Keyboard trays shall be as specified and located as shown on drawings.
- 5. File Drawers: The width of file drawers and depth of lateral file drawers shall be sized to accommodate legal and letter size folders with the installation of hanging rails. The height and placement of rails shall be sized to accommodate hanging files (11" I.D. Clear)
- F. Doors
  - 1. Doors under 30" wide and/or 80" high: Minimum 3/4" thick particle board panel, identical laminate applied to both faces; overlay style
  - 2. Doors over 30" wide and/or 80" high: Shell be 1-3/8" or 1-3/4" hollow or solid core doors. Identical laminate applied to both faces overlay style.
  - 3. If hinge screws enter only the edge of a door, 3/4" lumber edges shall be glued to the core prior to laminating.
  - 4. Drilling of pilot holes and use of full-threaded screws is required in hanging fiber board and particle board core doors.
  - 5. Coordinate premium laminate locations for white board high-gloss writing surfaces. See interior elevations.
- G. Shelves
  - 1. Shelves under 30" wide: Minimum 3/4" thermoset decorative panel with edge trim at exposed edges.
  - 2. Shelves 30" wide to 42" wide: Minimum 1" thermoset decorative panel with edge trim at exposed edges.
  - 3. Identical laminate at underside bottom of wall hung cabinets where underside is visible.
  - 4. Shelves wider than 42" shall have intermediate center back edge support with 2" x 3/4" edge trim at front edge. Shelves to be 1" thick.
  - 5. When necessary to cut and fit on site, provide material with ample allowance for cutting. Provide trim for scribing and site cutting.
  - 6. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints tight; secure with concealed fasteners. Locate counter butt joints minimum 2' from sink cut-outs.
  - 7. Provide cutouts for plumbing and light fixtures, inserts, appliances, outlet box, light fixtures and fittings. Verify locations of cutouts from on-site dimensions. Prime paint contact surfaces of cut edges. Field laminate as needed to conceal separations.
  - 8. Unless otherwise noted, all shelves are to be adjustable.
  - 9. Provide 1" tall continuous lip at the face edge of all science areas in classrooms and storage area casework.
  - 10. <u>Balanced construction of all laminated panels is mandatory</u>. Unfinished core stock surfaces, even on concealed surfaces (excluding edges) are not permitted.
  - 11. Provide recessed toe-kick construction at the front side of all base cabinets. Recess to be 4" high and 2" deep measured in from the finish face of the cabinet. 3/4" thick toe-kick face panel to be shop applied and must recess flush or miter back on exposed finished end panel cabinet configurations.

## 2.9 PLASTIC-LAMINATE COUNTERTOPS

- A. Grade: Custom
- B. High-Pressure Decorative Laminate Grade: GP50 (General Purpose Grade) Typical. Provide chemical resistant grade CR36 where indicated.
- C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
  - 1. As selected by Architect from manufacturer's full range in the following categories:
    - a. Solid colors, gloss finish.
    - b. Patterns, gloss finish
  - 2. Up to five (5) color/patterns of plastic laminate for countertops may be selected by Architect from manufacturer's full range of available products. Reference finish schedule.
- D. Grain Direction: Parallel to cabinet fronts.
- E. Edge Treatment: Same as laminate cladding on horizontal surfaces.
- F. Core Material: 3/4" 45lb density industrial grade pine particle board or furniture grade medium density fiberboard (MDF) for a total of 1-1/2" countertop.
- G. Core Material at Sinks: Particleboard made with exterior glue or medium density fiberboard made with exterior glue of the type and grade indicated above.
- H. Backer Sheet: Provide continuous full width plastic-laminate backer sheet, Grade BKL, on underside of all countertop substrates. 3/4" thick backer sheet, glued to countertop substrate for balanced 1-1/2" laminated thickness for all countertop construction.
- I. Backsplashes: 3/4" thick and 4" high unless otherwise indicated. Material and color to be same as countertop. Where countertops abut walls or cabinet provide a backsplash to face of countertop.

## 2.10 SOLID-SURFACING-MATERIAL COUNTERTOPS

- A. Grade: Custom
- B. Solid-Surfacing-Material Thickness: 1/2 inch (19 mm)
- C. Backing: Fully supported by 3/4 inch plywood entire area of solid surfacing.
- D. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solidsurfacing material complying with the following requirements:
  - 1. As selected by Architect from manufacturer's full range.
- E. Fabricate tops in one piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.
  - 1. Fabricate tops with shop-applied edges of materials and configuration indicated.
  - 2. Fabricate tops with loose backsplashes for field application.
- F. Install integral sink bowls in countertops in shop.
- G. Drill holes in countertops for plumbing fittings and soap dispensers in shop.

## 2.11 STAINLESS STEEL COUNTERTOPS and WALL PROTECTION

- A. Grade: Custom.
- B. Welding: Unless otherwise specified herein, all welded corners, joints and connections shall be electrically welded, seamless, with joints invisible. All welds must be thorough, free from pits, cracks, discolorations and other mechanical imperfections, ground smooth and polished to match the rest of the finish. Joints where required by sheet size, shall be butt welded with joint ground smooth, presenting a uniform one-piece construction. Butt joints by spot welding or riveting straps under seams and then filling with solder and then grinding will not be acceptable. All welds shall be passivated to prevent possibility of corrosion. No raw or sharp edges shall be left on any part of work or equipment. Wherever framing is specified to be of galvanized angle or channel construction, the welded joint shall be treated by means of a suitable metallic coating to cover all surfaces marred by welding and grinding operations.
- C. Tops and Shelving: Shall be 14 gauge stainless steel. All tops shall be turned up against walls, shall have horizontal and vertical corners coved on a 5/8" radius, shall have tops folded down-attached and sealed to walls. Serving table top edges shall be turned down 1-1/2" with edge folded or turned back. Soiled dish-table, drainboard, dish-washing top edges shall be finished with a 1-1/2" formed rolled edge. Rolled edges shall have corners rounded to 1-1/4" radius. Top

shall be prepared for and join dishwasher and other fittings specified. Shelves shall have back edges turned up and front edges turned down at least 1-1/2", folded and reinforced for stability.

- D. Sound Deadening: All tops, drainboards, shelves, backsplashes shall receive a sprayed-on acoustic sound deadening undercoating 1/8" thick. All fixtures shall be properly masked and undercoating cut to a sharp line 1" from front edge of bracing channels. Finish sound deadening with sprayed-on coating of aluminum paint. Where sound deadening is applied after fixture is installed, it shall be brush applied to same thickness as sprayed-on application and painted.
- E. Core Material: Particleboard made with exterior glue
- F. Cross Bracing Under Metal Tops: All cross bracing shall be 14 gauge galvanized steel except where otherwise noted. Bracing shall be formed into channel section 8" wide with1-1/2" web welded together under tops, or as detailed on the drawings. Bracing shall be approximately 2'-0" on center line of fixture. Corners shall be braced diagonally. Anchor bracing to wall.
- G. Inverted Channel Bracing: Shall have ends closed tightly and welded. Where bracing channels are exposed as at fixtures with curb-type edges, bracing shall have stainless steel ends or side. Bracing shall be tack welded or stud welded to underside of tops, and shall be bonded to tops with cohesive mastic
- H. Install protective stainless steel wall covering in custodial areas four feet tall -- see drawings for length and locations. Securely fasten s.s. sheet protection to wall. Coordinate exact location with owner.

## 2.12 DIAMOND PLATE COUNTERTOPS

- A. Aluminum Diamond Plate per Division 05 "Metal Fabrications"
- B. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed surfaces complying with the following requirements:
  - 1. As selected by Architect from manufacturer's full range in the following categories:
    - a. Alloy: 6061
    - b. Temper: T6
    - c. Material: Aluminum
    - d. Patterns: Diamond
    - e. Size: 96 inch in length, full depth of counter coverage
    - f. Thickness: 0.1875 inch
- C. Edge Treatment: Roll face of counter top, soften all exposed edges
- D. Core Material: 3/4" 45lb density industrial grade pine particle board or furniture grade medium density fiberboard (MDF) for a total of 1-1/2" countertop.
- E. Backsplashes: 4" tall diamond plate splash, soften all exposed edges
- 2.13 SLAT WALL A. Provide slat v
  - Provide slat wall system and accessories at rear of student store.
    - 1. Panel: Full size panels, 4'-0" x 8'-0" with 3 inch on center slats. Panel shall cover full width and height of wall as noted in drawings.
    - 2. One inch thick, LPM panel with grey laminate finish.
    - 3. Provide slat wall hooks:
      - a. 2 inch hooks (chrome) 20 units
      - b. 4 inch hooks (chrome) 10 units
    - 4. Basis of Design: displaywarehouse.com

### 2.14 PRE-FABRICATED METAL UTILTY STORAGE SHELVING UNITS

- A. Basis of Design: Penco Product: Clipper Shelving System (800) 562-1000.
  - B. Materials:
    - 1. Posts: All posts shall be punched for clip or nut and bolt construction. Shelves and accessories are to be vertically adjustable on 1" centers. Side sway braces or side panels to be attached to side flange of the posts
    - 2. Box Post: High strength role formed tubular steel box section
    - 3. Offset Angle Post: High strength role formed steel section
    - 4. Shelf Clip: One piece 14-gauge steel, zinc plated

- 5. Shelves: To be 18-gauge steel min. with vertical turn down face and 90 degree return on all four sides and spot welded at laps. All shelves to have 800 pound load capacity
- 6. Base Strip: To be 20-gauge steel
- 7. Bin Fronts: To be 18-gauge steel 1" high
- 8. Sway Braces: To be 12-gauge steel x 3/4"
- 9. Wall Support Brackets: To be 12-gauge steel
- 10. Overhead Braces: To be 12-gauge steel
- C. Fabrication / Installation
  - 1. Install shelving systems in accordance with manufacturer's instructions
  - 2. Attach shelving posts to wall with wall attachment brackets and overhead bracing. Bracing to be continuous from wall shelving to freestanding shelving to wall or wall shelving. Bracing to comply with IBC requirements for seismic design.
  - 3. Align and level shelves and posts. Maintain dimensional tolerance with adjacent work.
  - 4. Start bottom shelf at 12 inches above finished floor and evenly space shelves above.
- 2.15 CLOSET SHELVING
  - A. Not Used.
- 2.16 SHOP FINISHING
  - A. Grade: Provide finishes of same grades as items to be finished, unless otherwise indicated.
  - B. General: Shop finish transparent-finished interior architectural woodwork at fabrication shop as specified in this Section. Refer to Division 09 painting Sections for finishing opaque-finished architectural woodwork.
  - C. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
  - D. Transparent finish for stained architectural woodwork and veneer panels:
    - 1. Grade: Premium.
    - 2. AWI Finish System: Catalyzed polyurethane.
    - 3. Staining: Match Architect's sample.
    - 4. Wash Coat for Stained Finish: Apply wash-coat sealer to woodwork made from closedgrain wood before staining and finishing.
    - 5. Filled Finish for Open-Grain Woods: After staining (if any), apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.
      - a. Apply wash-coat sealer after staining and before filling.
    - 6. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.

## PART 3 - EXECUTION

## 3.1 PREPARATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.
- C. Ensure that mechanical and electrical items affecting this Section of work are properly placed, complete, and have been inspected by the Architect/Engineer prior to commencement of installation.
- 3.2 INSTALLATION
  - A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
  - B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.
  - C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, & repair damaged finish at cuts.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
  - 1. Install cabinets with no more than 1/8" in 96" sag, bow, or other variation from a straight line. Set and secure casework in place; rigid, plumb and level.
  - 2. Maintain veneer sequence matching of cabinets with transparent finish.
  - 3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
  - 4. Use fixture attachments in concealed locations for wall mounted components. Secure to backing concealed behind finish wall surface.
  - 5. Use concealed joint fasteners to align and secure adjoining cabinet units and countertops.
  - 6. Carefully scribe casework abutting other components, with maximum gaps of 1/32". Do not use additional overlay trim for this purpose.
  - 7. Countersink anchorage devices at semi-exposed locations. Conceal with caps to match surrounding surfaces.
  - 8. Coordinate installation of conduit, outlets and coverplates for electrical, phone and data devices installed in casework.
  - 9. Anchor butcher paper rack to solid wood blocking within wall cavity. Fit/align rack units with adjacent wall equipment and cabinets.
- G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
  - 1. Align adjacent solid-surfacing-material and laboratory epoxy resin countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
  - 2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
  - 3. Secure backsplashes to walls with adhesive.
  - 4. Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."
  - 5. Install metal knee braces for countertop support in locations indicated.
  - 6. Install cable grommets in locations shown and as directed by Architect.
  - 7. Seal-caulk all joints that can be considered a possible sanitation problem. Seal-caulk material Rubber Caulk 5000; applied with power-operated handgun and by qualified operator. Joint size shall not exceed 3/32 inches in width.
- H. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.
- I. Install slat wall panel at rear of student store. Conceal all cut edges. Coordinate slat wall with adjacent wall equipment.
- J. Refer to Division 09 Sections for final finishing of installed architectural woodwork not indicated to be shop finished.

## 3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean casework, counters, shelves, hardware, fittings and fixtures.
D. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

# 3.1 PROTECTION

Protect finishes until Substantial Completion.

END OF SECTION 06 40 23

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# **DIVISION 07 – THERMAL & MOISTURE PROTECTION**

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## SECTION 07 08 00 - TESTING OF AIR BARRIER AND BUILDING ENVELOPE

PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes, Contractor's requirements for testing of the air barrier and building envelope:
  - 1. References
  - 2. Air Barrier Code Requirements
  - 3. Air Barrier System Characteristics
  - 4. Quality Assurance
  - 5. Qualifications
  - 6. Responsibilities of Parties for Testing
  - 7. Execution of testing procedures
  - 8. Reporting

## 1.2 REFERENCES

- A. WAC 51-11C-040240 Air Leakage
  - 1. IECC with Washington State Amendments, 2018, Sections C402.4, Air Leakage (Mandatory).
- B. National Environmental Balancing Bureau (NEBB):
  - 1. NEBB Procedural Standards for Building Enclosure Testing.

# C. ASTM International:

- 1. ASTM E1186 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.
- 2. ASTM E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.
- 3. ASTM E1827 Standard Test Method for Determining Airtightness of Buildings Using an Orifice Blower Door.
- D. International Organization for Standardization (ISO):
  - 1. ISO 6781 Qualitative Detection of Thermal Irregularities in Building Envelopes Infrared Method.

## 1.3 AIR BARRIER CODE REQUIREMENTS

- A. A continuous air barrier shall be provided throughout the building thermal envelope. The air barriers shall be permitted to be located on the inside or outside of the building envelope, located within the assemblies composing the envelope or any combination thereof. The air barrier shall comply with WAC 51-11C-402.1.1 and C402.1.2.
- B. The continuous air barrier shall be constructed to comply with the following:
  - 1. The air barrier shall be continuous for all assemblies that are in the thermal envelope of the building and across joints and assemblies.
  - 2. Air barrier joints and seams shall be sealed, including sealing transitions in places and changes in materials. Air barrier penetrations shall be sealed in accordance with code Section C402.4.2. The joints and seals shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to resist positive and negative pressure from wind, stack effect, and mechanical ventilation.
  - 3. Recessed lighting fixtures shall comply with code section C402.2.8. Where similar objects are installed which penetrate the air barrier, provisions shall be made to maintain the integrity of the air barrier.
- C. Air Barrier Penetrations:
  - 1. Penetrations of the air barrier and paths of air leakage shall be caulked, gasketed, or otherwise sealed in a manner compatible with the construction materials or location. Joints and seals shall be sealed in the same manner or taped with a moisture vapor-permeable wrapping material. Sealing materials shall be appropriate to the construction materials being sealed.
- D. Building Test IAW Section C402.1.2.3

The completed building shall be tested and the air leakage rate of the building envelope shall not exceed 0.25 CFM/ft<sup>2</sup> at a pressure differential of 0.3 inches water gauge in accordance with ASTM E779 or an equivalent method approved by the code official. If the test result is greater than 0.25 CFM/ft<sup>2</sup>, the contractor shall conduct visual inspections. The contractor will be responsible for sealing the identified leaks and providing documentation of the corrective actions taken. If the test results exceed 0.40 CFM/ft<sup>2</sup>, the contractor will be responsible for taking all corrective actions and testing again. Further remedial work and retesting will be required until a leakage rate below 0.40 CFM/ft<sup>2</sup> is achieved. Results over 0.40 CFM/ft<sup>2</sup> will not be accepted. A report that includes the tested surface area, floor area, air by volume, stories above grade and leakage rates shall be submitted to the building owner and code official by the contractor at their own cost. An additional report identifying the corrective actions taken to seal air leaks shall be submitted to the building owner and code official.

## 1.4 AIR BARRIER CHARACTERSTICS

- A. The airtight components of the building enclosure and the joints, junctures and transitions between materials, products and assemblies forming the building enclosure are called the air barrier system. These are typically, but not limited to the following joints or assemblies where connections are made:
  - 1. Foundation and walls
  - 2. Walls and windows
  - 3. Walls and doors
  - 4. Different wall systems
  - 5. Walls and roof
  - 6. Walls and roof over unconditioned spaces
  - 7. Walls, floors, and roofs across construction, control and expansion joints
  - 8. Walls, floors and roofs to utility, pipe and duct penetrations through the air barrier

# 1.5 QUALITY ASSURANCE

- A. The contractor must engage the services of a qualified air barrier inspector to oversee the sequencing and installation of the air barrier component materials and assemblies, to oversee the proper joining and sealing of the materials and assemblies, and to oversee the sealing of penetrations of the air barrier materials and assemblies.
- B. The contractor will provide a Building Envelope technician, who shall prepare report forms in accordance with the requirements of the NEBB Procedural Standards for Building Envelope Testing.

## 1.6 QUALIFICATIONS

- A. The Air Barrier Testing agency shall be certified by one of the following organizations to perform inspections and testing:
  - 1. National Environmental Balancing Bureau (NEBB)
  - 2. American Air Barrier Association (AABA)
- B. Air barrier inspector duties on this project shall be conducted in conjunction with the commissioning process. Air barrier inspection and testing are to be provided by the contractor. Commissioning services will be provided by the owner group. The Contractor shall employ a an air barrier inspector that is certified as NEBB BET CP or AABA Air Barrier Specialist, by the organizations defined above.

# 1.7 RESPONSIBILITIES

- A. Responsibilities indicated for Architect/Engineer, General Contractor and Air Barrier Inspector/testing technician are provided only to clarify the process.
- B. Architect/Engineer Responsibilities:

- 1. Furnish design narratives and plan sheet details or other documentation, including Owner Project Requirements and Basis of Design documentation, to outline the air barrier system, components, and construction thereof.
- 2. Provide a conformed set of contract documents pertaining to the air barrier, including but not limited to, drawings, specifications, approved submittals, current approved change orders and any contract modifications affecting the air barrier.
- 3. In the construction documents, clearly define the building enclosure boundary and indicate the location of the air barrier throughout the building including floors, walls and ceiling or roof area, square footage of areas to be tested within the air barrier boundaries, type and construction of assemblies within the air barrier and method of testing to be performed (Blower door or Building Air Moving Equipment Test Method).
- 4. Coordinate resolution of system deficiencies identified during testing, according to contract documents.
- C. Contractor Responsibilities:
  - 1. Construction Coordination and Testing: The contractor will provide the services of an approved air barrier testing consultant as defined above and a Building Envelope technician to provide the required reports during commissioning.
  - 2. Coordination of Sub-Contractors: Provide coordination between the sub-contractors involved in the construction of the air barrier system; coordinate the sequence of construction to ensure the continuity of the air barrier system joints, junctures, penetrations, and transitions between materials and assemblies of materials and products from the substructure to walls to roof. Provide quality assurance procedures and verification as specified. Provide and facilitate inspections, tests and other quality control services specified or requested by the BE Technician.
  - 3. Organize pre-construction conferences between the subcontractors involved in the construction or penetration of the air barrier system and the air barrier testing technician to discuss each sub-contractor's responsibilities to ensure air tight barrier in the different sections to be installed by the different sub-contractors.
  - 4. Construct mock-up demonstrating each joint, juncture and transition between materials, products and assemblies of products specified in different specification sections and plan sheets to be installed. Mock up shall be reviewed and approved by the Owner, Architect and building envelope inspector/technician.
  - 5. Develop a project schedule with input from the building envelope inspection firm that coordinates the work of their disciplines and provides adequate time in the construction process to allow for successful completion of building envelope testing and any remedial work.
  - 6. Ensure the building enclosure is complete, including but not limited to, all structural components, the air and vapor barriers complete, door sweeps and weather stripping complete, floors and ceilings complete.
  - 7. Provide all project preparation and setup for BE testing, including but not limited to, temporary sealing of intentional openings, removing ceiling tiles, opening access doors, opening interior doors and securing them so they do not close during testing. This may include preparation of adjoining spaces and staging the building so no people will be opening doors or windows during the envelope testing. A guide checklist is provided at the end of this specification.
  - 8. Provide either temporary or permanent power for BE testing equipment.
  - 9. Remove sufficient ceiling tiles for lay in ceilings, or open sufficient access panels for hard ceilings to equalize the pressure between the ceiling cavity and space being tested. Replace tiles at the conclusion of testing.
  - 10. If the building equipment is to be utilized for testing, provide the following:
    - a) Ensure that all necessary building systems are complete and operating in a safe manner.
    - b) Complete the installation of permanent power systems serving the equipment to be used for the BE testing. Electrical systems shall be properly installed in accordance with all applicable codes to ensure the safety of personnel involved in the testing.

- c) Perform startup of all building systems in accordance with manufacturer's recommendations.
- d) Complete the installation, programming, calibration and startup of all building control systems.
- 11. Upon completion of inspection, testing or similar services, it is the contractors responsibility to repair any deficiencies identified in the testing, repair damaged construction and restore substrates and finishes, protect construction exposed by or for quality control activities and protect repaired construction until the air barrier enclosure passes the requirements stated above.
- D. Building Envelope Inspector/Testing Technician
  - 1. Provide necessary equipment and technical expertise to inspect building envelop and air barrier components, render opinion as to the quality of construction and adherence to applicable codes, and provide observation/testing reports to the building owner and code official as applicable upon completion of each inspection.
  - 2. Provide necessary equipment and conduct air barrier testing in accordance with applicable codes and guidelines. Upon completion of air barrier testing, provide the building owner and code official with a comprehensive report of findings.
  - 3. Assist the Architect/Consultant and Contractors in identifying issues with the construction team with recommended resolution of issues discovered during inspections and testing.
  - 4. Examine construction documents to become familiar with project requirements and discover conditions in systems/design that may preclude proper testing of the building envelope systems and equipment. Report deficiencies to the Architect for resolution.

## E. Reports

- 1. During construction of the building envelope, the inspector/technician shall inspect and document conditions at various stages and prepare a report citing the date, weather conditions, and observations as to the quality of work and pictures supporting the observations.
- 2. Upon completion of testing, the building envelop test technician shall provide a report to the building owner and code official outlining the details of the test procedures, test results, any deficiencies discovered and recommended measures to correct the deficiencies.

#### PART 2 - PRODUCTS

#### 2.1 TEST EQUIPMENT

A. The building envelope testing technician or firm is responsible for providing equipment to be used in the testing of the air barrier. This includes, but is not limited to, blower door test apparatus, infrared camera, digital camera, and air pressurization measurement equipment.

## PART 3 - EXECUTION

#### 3.1 AIR BARRIER PRE-TEST READINESS CHECKLIST

- A. Prior to starting the air barrier testing, the contractor shall make the building ready for testing, utilizing the following checklist for guidance. Notify the building envelop testing agency or technician of any issues with items noted on the checklist. Completed checklist shall be submitted to the testing agency/technician prior to testing and verified prior to beginning the air barrier testing.
- B. Air Barrier Pre-Test Checklist Form See form on the following page.

#### 3.2 HVAC PREPARATION FOR BUILDING ENVELOPE TESTING

- A. Refer to Division 01 section "Testing and Inspection Services" for air leakage testing requirements and additional information required to complete the testing.
- B. HVAC Preparation: As specified in NEBB BET Procedural Standards Table 8.1.
  - 1. Seal exhaust fans with back draft dampers.

- 2. Seal supply fans with back draft dampers.
- 3. Close furnace room door (for furnace locations outside the test zone).
- 4. Close combustion air intake dampers for boilers.
- 5. Turn off recirculating air handlers, make-up air units, energy recovery units, supply fans, furnaces, fan coil units, boilers, gas hot water heaters and exhaust fans All equipment requiring combustion air (including kitchen equipment).
- 6. Seal outdoor air inlets and exhaust outlets (by dampers and/or masking) inside the test zone.
- 7. Close and mask motorized dampers.
- 8. Mask undampered HVAC openings.
- 9. Seal ventilators designed for continuous use.
- 10. Seal supply and exhaust ventilator dampers.
- 11. Seal off ventilation to other zones.
- 12. Seal window air conditioners and through wall air conditioners to outside air vent.
- 13. Fill floor drains and plumbing traps.
- 14. Seal all HVAC ducts going from inside the test zone to outside the test zone and back into the test zone.
- 15. Isolate movement and mask gravity dampers.
- C. Contractor to provide a responsible HVAC technician with the authority to place the HVAC system in the correct mode for the pressure test. Allow the testing agency unhindered access to mechanical rooms, air handlers, exhaust fans, and outdoor air and exhaust dampers.
- D. Contractor to provide a responsible technician with access to and the authority to reset circuit breakers.
- E. Close and latch all windows and doors and allow no access in the test envelope during the test.
- F. Assist the testing agency representative in removing all door hardware and other objects that interfere with test equipment set-up
- G. No work shall be performed in the test area while the test is in progress. Comply with ASTM E779-10, 7.0, to ensure any occupational hazards associated with operating test fans are eliminated.

## 3.3 BUILDING AIR BARRIER TEST

- A. The building air barrier test shall follow the guidelines outlined in one or more references in paragraph 1.2 of this section. If the air barrier cannot be tested by pressurization and depressurization, then the building may be tested in the positive (pressurization) mode only.
- B. The fan pressurization test to determine final compliance with the air barrier requirements shall be conducted with all components of the air barrier system have been installed and inspected, and have passed any intermediate inspections or procedures as outlined in the construction documents. The test may be conducted before finishes that are not part of the air barrier system have been installed. For example, if suspended ceiling tile, interior gypsum board or cladding systems are not part of the air barrier system, the test may be conducted before they are installed. Also, any interior doors or pass through spaces and finishes that are not part of the air barrier test is conducted.
- C. Completed test results shall be reported to the building Owner and code official. If there are any remedial actions required to achieve a successful test, the Building Envelope Technician shall report them to the General Contractor for necessary action at the contractor's expense. The air barrier enclosure will be tested again until the air barrier passes at the required rate of leakage as required by the current edition of the energy code.

# 3.4 BLOWER DOOR TESTING GENERAL PROCEDURES

- A. The blower door shall be installed in an appropriate entry door, window or vent opening. The openings must be sealed or taped to avoid any air leakage at these points. Orient the blower door appropriately for pressurization or depressurization as required. Installation should have minimum of obstructions to airflow in and out of the building.
- B. Install the pressure measuring instrument across the building envelope. It is recommended that more than one location be utilized for the pressure measurement, being careful to avoid

extremes in outside pressure (wind, architectural features that may interfere with accuracy of readings, etc.).

- C. Measure and record wind velocity, indoor and outdoor temperatures at the beginning of the test so that average values can be calculated.
- D. Before beginning test, zero the pressure sensor, then measure and record the baseline building differential pressure across the airflow measurement device with the blower off.
- E. Start the blower door fans and pressurize/depressurize the building to the highest induced pressure differential. Measure and record the building envelope pressure differential. If there are fluctuations in pressure due to wind, take pressure measurements on the windward and leeward sides of the building and average the readings. If the buildings height or building configuration causes internal building pressure fluctuations, then take multiple readings and average.
- F. Perform a minimum of 10 building envelop pressure differentials and corresponding airflow measurements in both the pressurization and de-pressurization modes (a total of 20 readings). Measurements shall be taken over a minimum of 10 seconds.
- G. Measure and record wind velocity, indoor and outdoor temperatures at the end of the test so that their average values can be calculated.
- H. Phased projects, or areas under renovation with new exterior envelops may be tested separately in lieu of a whole building test.

## 3.5 BUILDING AIR MOVING EQUIPMENT SYSTEM TEST GENERAL PROCEDURES

- A. If permitted by local code official, and approved by the Mechanical Engineer, building air movement equipment may be utilized to pressurize the building. If building equipment cannot achieve the required pressures as determined by traversing ductwork or by using airflow monitoring stations associated with the equipment, the blower door method must be used for the testing.
- B. Measure and record exterior wind velocity, indoor and outdoor temperature, and other pertinent data for the building size, area to be measured, etc.
- C. Two sets of data shall be taken, one identified as the higher differential pressure and the other as the lower differential value. A minimum of five measurements of the building envelope differential are to be taken for each value until a total of 10 airflow measurements are taken.
- D. At the end of testing, measure and record baseline data, indoor and outdoor temperatures and other pertinent data so measurement calculations can be performed.

#### 3.6 THERMOGRAPHY TEST GENERAL PROCEDURES

- A. Test the building using infrared thermography technology in accordance with ASTM C1060 or ISA 6781. Take thermal images before the air barrier testing and again during the air barrier test so areas where there are envelope leaks are detected.
- B. If the building air barrier test fails, perform the thermography procedures before and during subsequent tests to document repairs or areas where deficiencies still exist.
- C. Provide a report including thermographic images in color and a color temperature scale for comparison. The report should identify the high temperature reading, outdoor air temperature and building indoor temperature in addition to the exterior wind speed and direction. Note any areas of deficiency in the building envelope, any recommended actions to remedy deficiencies, and note all actions taken to remedy deficiencies. The final report shall note that all deficiencies have been corrected or what areas could not be practicably repaired. Copies of the report shall be included in the O&M and Commissioning records.

END OF SECTION 07 08 00

## **AIR BARRIER PRE-TEST CHECKLIST**

BUILDING COMPONENT	ENVELOPE	GC INTIAL	
	CLOSED	OPEN	
Exhaust fans with back draft dampers	Sealed	No Preparation	
Supply fans with backdraft dampers	Sealed	No Preparation	
Mechanical Room doors if outside test zone	Closed	Closed	
Combustion air intake dampers for boilers	Closed	Closed	
Outside air damper for air handler inside test	Sealed	Closed	
area	Ocaled	Olosed	
Outside air intake for air handler inside test area without damper	Sealed	No Preparation	
Exhaust, Air Handling Units, Make Up Air Units,			
Energy Recovery Units, Supply Fans, Furnaces,			
Fan Coil Units, Boilers, Gas Hot Water Heaters,	Off	Off	
All equipment requiring combustion air (including			
kitchen equipment, HVAC, etc.)			
Fan inlet grilles with motorized damper	Closed	Closed	
Fan inlet grilles without motorized damper	Sealed	No Preparation	
Ventilators designed for continuous use	Sealed	Sealed	
Supply and Exhaust ventilation dampers	Sealed	Held Closed	
Clothes Dryer	Off	Off	
Clothes Dryer if connected to dryer vent	No Preparation	No Preparation	
Vented combustion appliance	Off	Off	
Ventilation to other zones	Sealed	Sealed	
Windows	Closed and Latched	Closed and Latched	
Exterior Doors	Closed and Latched	Closed and Latched	
Window Air Conditioners	Sealed	No Preparation	
I nrough the wall AC outside air vent	Sealed	No Preparation	
outside test area or outside into the test area	Sealed	Sealed	
All electrical conduits going form inside the test area to outside the test area or outside into the test area	Sealed	Sealed	
Openings within the test area (doors, windows, etc.)	Open	Open	
Floor drains and drain traps	Filled	Filled	
Elevator Pressure relief openings	Closed	Closed	
Elevator doors	Closed	Closed	
Elevator door frame spacing between the			
elevator door and frame if elevator connects an	Sealed	Open	
area outside the air barrier			
Elevator door frame spacing between the			
elevator door and frame if the elevator connects	Open	Open	
an area within the air barrier			
Rooms with exterior, non-ducted louvers (interior	Closed	Closed	
doors)	Ciosed	Ologed	
Loading Dock Doors (interior doors)	Closed	Closed	
Other openings between test area and exterior	Closed or Sealed	Closed or Sealed	

The above items have been completed and checked prior to air barrier testing

Contractor: \_\_\_\_\_ Test Technician: \_\_\_\_\_ Date: \_\_\_\_\_

## SECTION 07 11 13 - BITUMINOUS DAMPPROOFING

## PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Cold-applied, emulsified-asphalt dampproofing. Install at sub-grade side of retaining walls and the exterior side of all foundation walls and footings. Do not expose above finish grade.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include recommendations for method of application, primer, number of coats, coverage or thickness, and protection course.
- B. Material Certificates: For each product, signed by manufacturers.

#### 1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain primary dampproofing materials and primers through one source from a single manufacturer. Provide secondary materials recommended by manufacturer of primary materials.

#### 1.4 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.
- B. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has cured.

#### PART 2 - PRODUCTS

#### 2.1 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. ChemMasters Corp.
  - 2. Degussa Building Systems; Sonneborn Brand Products.
  - 3. Gardner Gibson, Inc.
  - 4. Henry Company.
  - 5. Karnak Corporation.
  - 6. Koppers Inc.
  - 7. Malarkey Roofing Products.
  - 8. Meadows, W. R., Inc.
  - 9. Tamms Industries, Inc.
- C. Trowel Coats: ASTM D 1227, Type II, Class 1.
- D. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
- E. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.
- F. VOC Content: 0.25 lb/gal. or less.

#### 2.2 PROTECTION COURSE

A. Protection Course: Unfaced, fan-folded, extruded-polystyrene board insulation, nominal thickness 1/4 inch with compressive strength of not less than 8 psi per ASTM D 1621.

#### 2.3 MISCELLANEOUS MATERIALS

- A. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.
- B. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.

C. Patching Compound: Epoxy or latex-modified repair mortar of type recommended by dampproofing manufacturer.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.
  - 1. Proceed with dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.
  - 2. Test for surface moisture according to ASTM D 4263.

## 3.2 PREPARATION

- A. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- B. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.
- C. Apply patching compound for filling and patching tie holes, honeycombs, reveals, and other imperfections; cover with asphalt-coated glass fabric.

## 3.3 APPLICATION, GENERAL

- A. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.
  - 1. Apply additional coats if recommended by manufacturer or if required to achieve coverages indicated.
  - 2. Allow each coat of dampproofing to cure 24 hours before applying subsequent coats.
  - 3. Allow 48 hours drying time prior to backfilling.
- B. Apply dampproofing to footings and foundation walls where opposite side of wall faces building interior.
  - 1. Apply from finished-grade line to top of footing, extend over top of footing, and down a minimum of 6 inches over outside face of footing.
  - 2. Extend 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
  - 3. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch- wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.
  - 4. Remove all dampproofing that is exposed after adjacent finish grade is achieved.

## 3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. On Concrete Foundations Foundation Walls: Apply 2 brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat, or 1 trowel coat at not less than 4 gal./100 sq. ft.
- B. On Unexposed Face of Concrete Retaining Walls: Apply 1 brush or spray coat at not less than 1.25 gal./100 sq. ft..
- C. Apply from finish grade elevation to bottom of footings
- D. Seal items projecting through dampproofing surface with mastic. Seal watertight

## 3.5 INSTALLATION OF PROTECTION COURSE

- A. Install protection course over completed-and-cured dampproofing. Comply with dampproofing material manufacturer's written recommendations for attaching protection course.
  - 1. Support protection course with spot application of adhesive of type recommended by protection board manufacturer over cured coating.

- 2. Install protection course within 24 hours of installation of dampproofing (while coating is tacky) to ensure adhesion.
- 3.6 CLEANING
  - A. Remove dampproofing materials from surfaces not intended to receive dampproofing. Applied dampproofing shall not be visible once final finish grade is achieved or adjacent building element is set.
  - B. Remove dampproofing materials, including protection board from surfaces exposed to view after finish grading is complete.

END OF SECTION 07 11 13

## SECTION 07 21 13 - BOARD INSULATION

#### PART 1 - GENERAL

#### 1.1 SUMMARY

Α.

C.

- Section Includes
  - 1. Board insulated wall sheathing at exterior walls.
  - 2. Board insulation at perimeter foundation walls.
- B. Related Sections:
  - 1. Division 01: Administrative, procedural, and temporary work requirements.
  - 2. Division 01 Section "Quality Requirements" for special building envelope mock-up.
    - a. Division 07 Section Roofing Insulation for insulation specified as part of roofing construction.
    - b. Division 09 Section "Gypsum Board" for installation in metal-framed assemblies of insulation specified by referencing this Section.
  - 3. Division 07: "Testing of Air Barrier" for testing air-barrier and building envelope compliance. Performance Requirements
  - 1. Materials of this Section shall provide continuity of thermal barrier at building enclosure elements in conjunction with thermal insulating materials in this Section.

## 1.2 REFERENCES

- A. Comply with all References in effect, most active, or latest version as of the date of the Contract Documents.
- B. ASTM International (ASTM) (www.astm.org):
  - 1. C177 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
  - 2. C203 Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
  - 3. C209 Standard Test Method for Cellulosic Fiber Insulating Board.
  - 4. C578 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
  - 5. C612 Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
  - 6. E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 7. E96 Standard Test Method for Water Vapor Transmission of Materials.
  - 8. E136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
  - 9. E2357 Air Barrier Testing.
- C. NFPA 285 Fire Rating for Wall Sheathing
- D. NFPA 268 Fire Ignition and Sustained Flaming
- Ε.
- F. Current International Building Code.

## 1.3 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Product Data: Provide data on product characteristics, performance criteria, and limitations.
- C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Compliance with NFPA and ASTM Standards.
- F. Samples: 12 by 12 inch samples of each insulation.
- G. WSSP Requirements: Not Used.

## 1.4 QUALITY ASSURANCE

- A. Qualifications
  - 1. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three (3) years experience.

- 2. Applicator: Company specializing in performing the work of this section with minimum three years experience, approved/certified by manufacturer.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-testresponse 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. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - a. Retain subparagraph below if test results are indicated with other product requirements in Part 2. Retain only test methods applicable to types of characteristics specified.
  - b. Surface-Burning Characteristics: ASTM E 84.
  - c. Retain subparagraph below only if products specified in Part 2 are part of a fireresistance-rated assembly.
  - d. Fire-Resistance Ratings: ASTM E 119.
  - e. Pass-fail test in subparagraph below is for measuring combustibility and is referenced in codes to determine if elementary products are noncombustible. Only selected unfaced mineral-fiber insulation and unfaced cellular-glass insulation pass this test. Delete if not required. See Evaluations.
  - f. Combustion Characteristics: ASTM E 136.
- 1.5 DELIVERY, STORAGE, AND HANDLING
  - A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
    - 1. Protect plastic insulation as follows:
      - a. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
      - b. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
      - c. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.
  - B. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation
- 1.6 PROJECT/SITE CONDITIONS
  - A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

# 1.7 SEQUENCING AND SCHEDULING

- A. Coordinate Work under provisions of Instructions to Bidders.
- B. Sequence work to ensure timely placement of insulation within construction spaces.

# PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - C. Acceptable Manufacturers Extruded Polystyrene Board Insulation XPS
    - 1. Dow Chemical. (www.building.dow.com)
    - 2. CertainTeed. (www.certainteed.com)
    - 3. Owens-Corning. (www.owenscorning.com)
    - 4. Substitutions of equivalent products under specification 01 60 00
  - D. FOAM-PLASTIC FOUNDATION WALL BOARD INSULATION
    - 1. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:
      - a. Available Manufacturers:
        - 1. DiversiFoam Products.
        - 2. Dow Chemical Company.

- 3. Owens Corning.
- 4. Pactiv Building Products Division.
- b. Type IV, 1.60 lb/cu. ft., unless otherwise indicated.
- c. Two inches thick, R-10
- E. FOAM-PLASTIC WALL SHEATHING RIGID INSULATION BOARD
  - 1. Extruded-Polystyrene Continuous Insulated Sheathing: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively with taped seams:
    - a. Available Manufacturers:
      - 1. Owens Corning FOAMULAR 250 XPS Commercial Complete Wall System
        - a. Two inches thick, R-10
        - b. Edge Type: Tongue and Groove
        - c. Size: 4' x 8' panels (stagger vertical joints)
        - d. Tape and seal all penetrations using JointSealR tape system
        - e. Fire Resistance Rating: meet ASTME119/UL 263
        - f. Compressive Strength: 25 psi
        - g. Water Vapor Permeance: Max 1.0 perm, tested to ASTM E96
        - h. <u>Cover wall board within 60 days of installation.</u> If not covered within 60 days of installation, contractor shall remove wall sheathing and replace with new wall sheathing.
        - i. Wrap end panel transitions at all openings with flexible membrane flashing—see 07 27 00.

## 2.2 INSULATION FASTNERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:
  - 1. Available Products:
    - a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
    - b. Eckel Industries of Canada; Stic-Klip Type N Fasteners.
    - c. Gemco; Spindle Type.
  - 2. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of 1 inch between face of insulation and substrate to which anchor is attached.
    - a. Available Products:
      - 1. Gemco; Clutch Clip
  - 3. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
    - a. Available Products:
      - 1. AGM Industries, Inc.; TACTOO Adhesive.
      - 2. Eckel Industries of Canada; Stic-Klip Type S Adhesive.
      - 3. Gemco: Tuff Bond Hanger Adhesive.

## 2.3 ACCESSORIES

- A. Tape: Minimum 3 inches wide, pressure sensitive, waterproof, as recommended by Manufacturer.
- B. Liquid spray flashing: Provide insulation Manufacturer's recommended board joint commercial liquid spray flashing and sealant for sealing joints, seams, openings, counter-flashing and penetrations through the insulation layer

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Verify site conditions under provisions of Division 01.
- B. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation.

Orion High School Pasco, Washington C. Verify substrate surface is flat, free of honeycomb, fins, irregularities, materials or substances that may impede installation. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Substrate:
  - 1. Remove protrusions flush with adjacent surface.
  - 2. Remove dirt, dust, oil, grease, and other materials that could impair adhesion.

## 3.3 INSTALLATION

- A. General:
  - 1. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
  - 2. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
  - 3. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
  - 4. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

## B. Foundation:

- 1. Apply adhesive in continuous beads per board length at 1 bead per vertical foot minimum.
- 2. Adhere boards to foundation wall perimeter, horizontally. Place boards in a method to maximize contact bedding. Butt ends tight to adjacent board and to protrusions.
- 3. Install on inside face of wall from top of footing to top of concrete slab elevation.
- 4. Butt edges and ends tight to adjacent boards, at perimeter, and around penetrations.
- 5. Cut and fit insulation tight at perimeter and around penetrations.
- 6. Tape seal to perimeter and at joints between insulation pieces.
- 7. If not otherwise indicated, extend insulation vertically a minimum of 24 inches below exterior grade line behind face of the foundation wall.

## C. Walls:

- 1. Adhere or fasten boards to wall with veneer ties. Apply adhesive in continuous beads per board length at one bead per vertical foot minimum.
- 2. Butt edges and ends tight to adjacent boards, at perimeter, and around penetrations.
- 3. Cut and fit insulation tight at perimeter and around penetrations.
- 4. Seal to perimeter, joints, seams, openings, counter-flashing and penetrations through the insulation layer using Manufacturers documented approved tape or liquid spray sealant.
- 5. Install board insulation in curtain-wall construction where indicated on Drawings according to curtain-wall manufacturer's written instructions.
  - a. Retain insulation in place by metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated between insulation and glass.
  - b. Install insulation where it contacts perimeter fire-containment system to prevent insulation from bowing under pressure from perimeter fire-containment system
- 6. Wall board shall be covered within 60 days of installation to avoid UV damage to weather barrier face. All board left exposed for greater than 60 days shall be removed and replaced with new wall board.

## 3.4 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Division 01.

## 3.5 PROTECTION

- A. Protect finished Work under provisions of Instructions to Bidders.
- B. Do not permit Work to be damaged prior to covering insulation.

Orion High School Pasco, Washington C. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 13

## SECTION 07 21 16 - BLANKET INSULATION

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Blanket insulation in exterior wall, floor, ceiling, and roof assemblies.
  - 2. Acoustical blanket insulation in interior walls where shown on Drawings.
  - 3. Blanket insulation for filling window/door shim spaces, crevices in exterior wall and roof.
  - 4. Acoustical/Sound attenuation batt insulation in interior walls where shown on Drawings.
  - 5. Acoustical/Sound absorbing insulation in custom constructed sound absorbing panel walls, reference Division 07 for related material for corrugated perforated panel facing system.
  - 6. Installation of vapor retarders specified in Division 07.
- B. Related Sections:
  - 1. Division 01 Section "Quality Requirements" for special building envelope mock-up.
    - a. Division 07 Section Roofing Insulation for insulation specified as part of roofing construction.
    - b. Division 07: "Testing of Air Barrier" for testing air-barrier and building envelope compliance.
    - c. Division 09 Section "Gypsum Board" for installation in metal-framed assemblies of insulation specified by referencing this Section.
    - d. Division 22 Section "Plumbing Insulation."
    - e. Division 23 Section "HVAC Insulation."
- C. Performance Requirements:
  - 1. Materials of this Section shall provide continuity of thermal barrier at building enclosure elements in conjunction with thermal insulating materials in this Section.
  - 2. Materials of this Section shall provide continuity of vapor and air barrier at building enclosure elements in conjunction with vapor retarders and air barriers.

#### 1.2 REFERENCES

- A. Comply with all References in effect, most active, or latest version as of the date of the Contract Documents.
- B. ASTM International American Society for Testing and Materials. (ASTM) (www.astm.org):
  - 1. C177 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot-Plate Apparatus.
  - 2. C578 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
  - 3. C665 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  - 4. C1029 Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.
  - 5. C1289- Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
  - 6. D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
  - 7. D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.
  - 8. D2842 Standard Test Method for Water Absorption of Rigid Cellular Plastics
  - 9. E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 10. E96 Standard Test Methods for Water Vapor Transmission of Materials.
  - 11. E136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C.
  - 12. E2357 Air Barrier Testing.
- C. Current International Building Code.
- 1.3 SUBMITTALS
  - A. Submit under provisions of Division 01.
  - B. Product Data: Provide data on product characteristics, performance criteria, and limitations.

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- C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Quality Control Submittals:
  - 1. Certificates of Compliance: Certification from an independent testing laboratory that insulation meets fire hazard classification requirements.
- F. WSSP Requirements: Not Used.

## 1.4 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years' experience.
  - 2. Applicator: Company specializing in performing the work of this section with minimum three (3) years' experience, approved/certified by Manufacturer.
- B. Fire Hazard Classification:
  - 1. Noncombustible, tested to ASTM E136.
  - 2. Flame spread/smoke developed rating of 25/50 or less, tested to ASTM E84.
- C. Pre-Installation Conference
  - 1. Convene one week prior to commencing work of this section, under provisions of Division 01.
- 1.5 DELIVERY, STORAGE, AND HANDLING NOT USED.
- 1.6 PROJECT/SITE CONDITIONS
  - A. Store insulation in clean, dry, sheltered area, off ground or floor, until used. Protect against wetting and moisture absorption
- 1.7 SEQUENCING AND SCHEDULING
  - A. Coordinate the Work with Division 07 Vapor Retarder and Division 07 Air Barrier.
  - B. Coordinate Work under provisions of Division 01.
  - C. Sequence work to ensure timely placement of insulation within construction spaces.

# PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - A. Batt and Blanket Insulation:
    - 1. Knauf Insulation. (www.knaufinsulation.us)
      - Product: Faced and unfaced fiberglass batt and blanket insulation.
    - 2. Owens-Corning. (www.owenscorning.com)
    - 3. Substitutions: Under provisions of Division 01.
  - B. Sound Insulation:
    - 1. Knauf Insulation. (www.knaufinsulation.us)
      - Product: Unfaced fiberglass batt sound attenuation insulation.
    - 2. Owens-Corning. (www.owenscorning.com)
    - 3. Substitutions: Under provisions of Division 01.
- 2.2 MATERIALS
  - A. Exterior Stud Walls: Unfaced pre-formed glass mineral fiber batt, friction fit (where interior vapor barrier and wall finish is indicated).
    - 1. Thermal Insulation
      - a. Thermal resistance: R of 13 (4 inch nominal walls), R of 21 (6 inch nominal walls) and R of 25 (8 inch nominal walls).
      - b. Batt width: Match framing spacing for friction fit.
  - B. Miscellaneous wall infill framing (above finish): Faced pre-formed glass mineral fiber batt.
    - 1. Thermal Insulation
      - a. Thermal Resistance: R of 21 (6 inch nominal walls)

- b. Batt width: Match framing spacing and provide extra wide stapling flanges as required for installation shown.
- c. Facing FSK (Foil-Scrim-Kraft) vapor retarder facing.
- C. Interior stud walls: Unfaced pre-formed glass mineral fiber sound attenuation batt insulation, friction fit.
  - 1. Acoustic insulation, ASTM C665 Type I, ASTM E136
    - a. Minimum of 10 STC improvement.
    - b. Thickness as required to fill nominal stud cavity (3.5 or 5.5 inch)
    - c. Batt width (5-1/4 inch, 22 inch as required for friction fit).

## 2.3 INSULATION FASTNERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:
  - 1. Available Products:
    - a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
    - b. Eckel Industries of Canada; Stic-Klip Type N Fasteners.
    - c. Gemco; Spindle Type.
  - 2. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of 1 inch between face of insulation and substrate to which anchor is attached.
    - a. Available Products:
      - 1. Gemco; Clutch Clip
  - 3. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
    - a. Available Products:
      - 1. AGM Industries, Inc.; TACTOO Adhesive.
      - 2. Eckel Industries of Canada; Stic-Klip Type S Adhesive.
      - 3. Gemco: Tuff Bond Hanger Adhesive.

# 2.4 ACCESSORIES AND MATERIALS

- A. Include insulation baffles where required for continuous ventilation. Include dimensional lumber furring strips as staple flanges to span truss webs where insulation is indicated at margin below top chord of trusses.
- B. Tape: Minimum 4 inches wide, pressure sensitive, foil faced, waterproof.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Verify site conditions under provisions of Division 01.
- B. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation.
- C. Verify substrate surface is flat, free of honeycomb, fins, irregularities, materials or substances that may impede installation.

## 3.2 PREPARATION

- A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.
- 3.3 INSTALLATION
  - A. Install in accordance with NAIMA "Recommendations for Installation in Residential and Other Light-Frame Construction Fiber Glass Building Insulation" and manufacturer's instructions.
  - B. Surface Application: Apply insulation directly to surface with appropriate spindle or prong-type anchors.
    - 1. Fasten anchors to steel surfaces by welding the pin to metal or by using pre-attached heads and welded through the insulation.

- 2. Fasten anchors to other substrates with adhesive. Follow manufacturer's recommendations for surface preparation and adhesive pattern.
- 3. Impale insulation on anchor and secure with washer.
- 4. Select pin lengths to ensure tight fit. Protect pin tips where subject to human contact
- 5. See manufacturer's diagram for impaling pin pattern.
- C. Between Studs, Rafters, and Joists:
  - 1. Unfaced Insulation: Friction fit insulation between framing members after cover material has been installed on one side of cavity. In applications without a cover material, use wire or metal straps to hold insulation in place.
  - 2. Faced Insulation: Staple attachment flanges to face or side of framing member every 8 to 12 inches (200 to 305 mm) on verticals, every 6 to 8 inches (150 to 200 mm) on horizontals and slopes.
  - 3. Faced Insulation: Friction fit insulation between framing members after cover material has been installed on one side of cavity. In applications without a cover material, use wire or metal straps to hold insulation in place.
- D. Between open web roof trusses:
  - 1. Provide supplemental furring strips each side of each truss to provide a staple flange and/or wire support attachment points. Margin furring down from roof sheathing to provide for thickness of insulation plus the air gap space indicated between top of insulation and underside of roof sheathing where wire is used.
  - 2. Provide 16 or 18 gage wire running diagonally or perpendicular to insulation spaced at 18 to 24 inches.
- E. Between Open Web Bar Joists:
  - 1. Secure with 16 or 18 gage wire running diagonally or perpendicular to insulation, spaced at 18 to 24 inches (460 to 610mm).
- F. Over Suspended Ceilings:
  - 1. Install insulation with face contacting back of ceiling panels; butt insulation tightly together at edges to prevent thermal leaks.
- G. Maintain vapor retarder integrity by tightly abutting adjacent insulation.
- H. Install insulation that is undamaged, dry, and unsolled and that has not been left exposed at any time to ice, rain, and snow.
- I. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- J. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- K. Install 3-inch- thick or 5-inch thick, unfaced sound attenuation blanket insulation in walls indicated and over suspended ceilings at partitions in a width that extends insulation 48 inches on either side of partition.
- L. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.
- M. Insulation Tape:
  - 1. Repair punctures or tears in vapor retarder facing by taping.
  - 2. Follow tape Manufacture's application recommendations.
  - 3. Apply with vapor barrier facing towards interior of structure.
  - 4. Tape seal lapped flanges, butt ends, and tears and holes in facings.

## 3.4 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Division 01.

#### 3.5 PROTECTION

- A. Protect finished Work under provisions of Division 01.
- B. Do not permit Work to be damaged prior to covering insulation.

## END OF SECTION 07 21 16

Orion High School Pasco, Washington

## SECTION 07 21 29 - SPRAYED INSULATION

## PART 1 – GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Insulation Spray applied to achieve a thermal and air seal.
  - 2. Foam-in-place masonry insulation, placed in all open cells of new concrete masonry walls.
  - 3. Spray polyurethane foam insulation at all exterior wall and roof envelope voids and crevices including but not limited to: walls, door frames, window frames, skylights, roof deck, deck flutes, roof curbs and storefront conditions. Do not overfill void.
  - 4. Spray polyurethane foam insulation at all interior sound rated wall voids and crevices including but not limited to: walls, door frames, relite frames, and roof/ceiling deck. Note: filling voids shall occur at any wall shown to include acoustical insulation in the wall type. Do not overfill void.
- B. Performance Requirements:
  - 1. Materials of this Section shall provide continuity of thermal barrier at building enclosure elements in conjunction with thermal insulating materials in this Section.
  - 2. Materials of this Section shall provide continuity of vapor and air barrier at building enclosure elements in conjunction with vapor retarders and air barriers.

## C. Related Sections:

- 1. Division 01: Administrative, procedural, and temporary work requirements.
- 2. Division 01 Section "Quality Requirements" for special building envelope mock-up.
  - a. Division 04 Section "Masonry" for block unit insulation.
  - b. Division 09 Section "Gypsum Board" for installation in metal-framed assemblies of insulation specified by referencing this Section.
- 3. Division 07: "Testing of Air Barrier" for testing air-barrier and building envelope compliance.
- 4. Division 22 Section "Plumbing Insulation."
- 5. Division 23 Section "HVAC Insulation."

## 1.2 REFERENCES

- A. ASTM International (ASTM):
  - 1. C177 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
  - 2. C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  - 3. C1029 Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.
  - 4. C1338 Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facing.
  - 5. D1621 Standard Test Method of Compressive Properties of Rigid Cellular Plastics.
  - 6. D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.
  - 7. D2126 Standard Test Method for Response for Rigid Cellular Plastics to Thermal and Humid Aging.
  - 8. D2842 Standard Test Method for Water Absorption of Rigid Cellular Plastics
  - 9. D5116 Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.
  - 10. E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 11. E96 Standard Test Methods for Water Vapor Transmission of Materials
  - 12. E283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - 13. E1623 Standard Test Method for Determination of Fire and Thermal Parameters of Materials, Products, and Systems Using and Intermediate Scale Calorimeter (ICAL)
  - 14. E2357 Air Barrier Testing.

- B. Current International Building Code.
- 1.3 SUBMITTALS
  - A. Submit under provisions of Division 01.
  - B. Product Data: Provide data on product characteristics, performance criteria, and limitations.
  - C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
  - D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
  - E. Quality Control Submittals
    - 1. Certificates of Compliance: Certification from an independent testing laboratory that insulation meets fire hazard classification requirements.
    - 2. Provide certificates that products comply with building construction type for ignition, flame spread and smoke development.
  - F. WSSP Requirements: Not Required.

## 1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Minimum five (5) years documented experience in work of this Section.
- B. Fire Hazard Classification: Maximum flame spread/smoke developed rating of 25/450, tested to ASTM E84.
- C. Qualifications
  - 1. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.
  - 2. Applicator: Company specializing in performing the work of this section with minimum three years experience, approved/certified by manufacturer.
- D. Pre-Installation Conference
  - 1. Convene one week prior to commencing work of this section, under provisions of Instructions to Bidders.

#### 1.5 PROJECT CONDITIONS

- A. Do not apply insulation when air or surface temperature is less than 50 degrees F, nor when such temperatures are anticipated within 24 hours after application.
- B. Consult Manufacturer for application procedures during excessively humid or other adverse weather conditions.
- C. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

## 1.6 SEQUENCING AND SCHEDULING

- A. Coordinate the Work with Division 07 for installation of weather barrier and vapor retarders.
- B. Do not position ducts, piping, conduit, and other suspended equipment that will interfere with uniform application until after application.
- C. Place conduit, boxes, wiring, plumbing lines, and other components prior to application of insulation where these can be anticipated in advance.

## PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - A. CertainTeed Corp. (www.certainteed.com)
    - 1. Product: Closed Cell Certa-Spray Foam
  - B. BASF Corporation (<u>www.basf.com</u>) 1. Product: Spravtight
  - C. BaySystems North America, LLC. (<u>www.baysystems-northamerica.com</u>) 1. Product: Ecobay
  - D. Dow Chemical Company (<u>www.dow.com</u>)
  - 1. Product: Froth-Pak
  - E. Icynene (<u>www.icynene.com</u>)
    - 1. Product MD-C-200

- F. Substitutions: Under provisions of Division 01.
- 2.2 MATERIALS
  - Closed Cell Polyurethane Foam Insulation: Α.
    - ASTM C1029. Type II, with maximum flame-spread and smoke-developed indexes of 25 1. and 450, respectively, per ASTM E84.
    - 2. Thermal Performance (aged): Tested in accordance with ASTM C518 and/or ASTM C177 at 75 degrees F mean temperature.
      - Thickness 1 inch, R-Value 5.8 (h-ft2-degreedF)/Btu. a.
      - Thickness 6 inches, R-Value 38.4 (h-ft2-degreesF)/Btu. b.
    - Apply to a thickness to achieve a minimum R rating of 38. (Approximately 6 inches thick). 3.
    - Physical and Mechanical Properties: 4.
      - Core Density: 1.9-2.4 pcf when tested in accordance with ASTM D1622. a.
      - Thermal Resistance (Initial): 6.4 when tested in accordance with ASTM C518 at 75 b. degrees F, (h-ft2 – degrees F)/Btu.
      - Closed Cell Content: 88-95 percent when tested in accordance with ASTM D2842. C.
      - d. Compressive Strength: Greater than 25 psi when tested in accordance with ASTM D1621.
      - e. Tensile Strength: 23 psi when tested in accordance with ASTM E1623.
      - Water Absorption: Less than 2 percent by volume when tested in accordance with f ASTM D2842.
      - Dimensional Stability: Less than 9 percent by volume when tested in accordance g. with ASTM D2126 at 75 degrees F/95 percent RH, 28 Day.
      - Water Vapor Transmission: 1.3 perm/inch when tested in accordance with ASTM h. E96.
      - Air Permeability: 0.013 when tested in accordance with ASTM E283 at 1 inch i. thickness. L/s/m2.
      - Fungi Resistance: Pass, with no growth when tested in accordance with ASTM j. C1338.
    - 5. Fire performance:
      - Flame Spread: Less than 25 when tested in accordance with ASTM E84. а
      - Smoke: Less than 450 when tested in accordance with ASTM E84. b.
    - 6. Products used within the building shell shall comply with the VOC limit requirements stated in section 01 81 14.

#### Β. FOAM-IN-PLACE MASONRY INSULATION

- 1. Available Manufacturers:
  - Tailored Chemical Products, Inc. a.
    - Product: Core-Fill 500 Product: CoreFoam

- b. CoreFoam Inc.
  - Substitution Requests under provisions of Division 01
- C. ASTM E-84: Flame spread less than 25, Smoke developed less than 450. 2.
- 3. Thermal Conductivity: R-value 4.6 per inch minimum

#### 2.3 ACCESSORIES, MATERIALS AND FASTENERS

Adhesive and anchoring attachment method as recommended by Manufacturer. Provide all Α. materials required for complete and proper installation of insulation.

## PART 3 - EXECUTION

#### **EXAMINATION** 3.1

- Verify site conditions under provisions of Division 01. Α.
- Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive Β. insulation.
- C. Verify substrate surface is flat, free of honeycomb, fins, irregularities, materials or substances that may impede installation.

## 3.2 PREPARATION

- A. Clean surfaces to remove oil, grease, dirt, and other materials that could impair bond.
- B. Test painted steel surfaces to verify that paint will not impair bond.
- C. Protect adjacent surfaces from accidental application.
- D. Coordinate foam-in-place injection holes with masonry bond beams.

## 3.3 APPLICATION

- A. Install in strict accordance with Manufacturer's published instructions.
- B. Product must be installed according to local code, and must be applied by a qualified applicator.
- C. Fill all open cells of exterior masonry walls not grouted-solid. Reference drawings for locations. Patch masonry injection holes for smooth surface.
- D. Apply insulation by spray method, to uniform monolithic density without voids.
- E. Apply to achieve thermal resistance R-Value of 38 minimum.
- F. Apply insulation to seal voids at truss ends to prevent wind scouring of ceiling insulation.
- G. Seal plumbing stacks, electrical wiring and other penetrations into attic to control air leakage.
- H. Do not install spray foam insulation in areas where it will be in contact with equipment or materials with operating temperatures of 180 degrees F or greater.
- I. Apply insulation in unvented roof spaces and cathedral ceiling areas.
- J. Fill all perimeter building envelope voids for air tightness standards of the Energy Star Program. In-fill all voids with spray insulation for complete thermal and air seal.
- K. Apply sealant to joints between structural assemblies as specified in 07 92 00 Joint Sealants.
- L. Inspection will include verification of insulation and density.

## 3.4 ADJUSTING

- A. Inspect areas for complete coverage; correct unacceptable work and patch.
- B. Patch damaged and cut areas.
- C. Replace areas where excessive shrinkage or cracking is evident.
- 3.5 PROTECTION
  - A. Protect finished Work under provisions of Instructions to Bidders.
  - B. Do not permit Work to be damaged prior to covering insulation.

END OF SECTION 07 21 29

#### SECTION 07 26 00 - VAPOR RETARDERS

#### PART 1 – GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Sheet and sealant materials for controlling vapor diffusion at exterior walls.
  - 2. Sheet and sealant materials for controlling vapor diffusion at floors.
  - 3. Sheet and sealant materials for controlling vapor diffusion at roof deck.
- B. Performance Requirements
  - 1. Materials of this Section shall provide continuity of vapor at building enclosure elements, in conjunction with air barrier materials in Division 07.
- C. Related Sections:
  - 1. Division 01 Section "Quality Requirements" for special building envelope mock-up.
  - 2. Division 05 Section "Cold Formed Metal Framing" requirements.
  - 3. Division 07: "Testing of Air Barrier" for testing air-barrier and building envelope compliance.
  - 4. Division 07 Section "Weather Barrier" for building envelope coordination.
  - 5. Division 07 Sections "Blanket and Board Insulation" for thermal insulation.
  - 6. Division 07 Sections "Roofing" for roof vapor retarder coordination.
  - 7. Division 09 Section "Non-Structural Metal Framing" for requirements.
  - 8. Division 09 Section "Gypsum Board" for installation in metal-framed assemblies.

#### 1.2 REFERENCES

Β.

- A. Comply with all References in effect, most active, or latest version as of the date of the Contract Documents.
  - ASTM International (ASTM):
    - 1. D882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
    - 2. D1709 Standard Test Method for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
    - 3. D4397 Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
    - 4. E96 Standard Test Method for Water Vapor Transmission of Materials.
    - 5. E154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
    - 6. E1249 Standard Practice for Minimizing Dosimetry Errors in Radiation Hardness Testing of Silicon Electronic Devices Using Co-60 Sources.
    - 7. E1643 Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
    - 8. E1745 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
    - 9. E2357 Air Barrier Testing.
- C. 2018 International Building Code.

#### 1.3 SUBMITTALS

- A. Submittals for Review:
  - 1. Product Data: Include product description and performance characteristics.
  - 2. Samples: 12 by 12 inch vapor retarder samples.
  - 3. Independent laboratory test results showing compliance with ASTM standards.
  - 4. All mandatory ASTM testing must be performed on a single product roll.
  - 5. Manufacturer's installation instructions.
- 1.4 QUALITY ASSURANCE
  - A. Permeance of less than 0.01 perms per ASTM E96 or ASTM E1249 as tested in accordance with mandatory conditioning tests per ASTM E1745.

#### PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - A. Wall, Roof and Floor Vapor Retarder Manufacturers:
    - 1. Reinforced -Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/1000 sq. ft. with maximum permeance rating of 0.0507 perm.
      - a. Available Products
        - 1. Raven Industries Inc.; DURA-SKRIM 6WW.
        - 2. Reef Industries, Inc.; Griffolyn T-65.
        - 3. Exceed requirements of ASTM D4397 and E154.
      - b. Substitutions: Under provisions of Division 01.
- 2.2 ACCESSORIES
  - A. Adhesive:
    - 1. Compatible with vapor retarder and substrate, permanently non hardening.
  - B. Joint Tape:
    - 1. Minimum 3 inches wide, pressure sensitive, waterproof, and documented compatible with vapor retarder.
    - 2. Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
  - C. Vapor Proofing Mastic:
    - 1. Waterproof and documented compatible with vapor retarder.
  - D. Perimeter Seal Accessories.
    - 1. Tack tape and termination bar documented compatible with vapor retarder.
    - 2. Single- Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.

#### PART 3 - EXECUTION

#### 3.1 INSTALLATION – WALLS, ROOF AND FLOOR

- A. Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Provide complete and continuous vapor retarder at exterior walls except where interrupted by glazing or other openings.
- C. Locate wall vapor retarder on interior side of wall framing and insulation.
- D. Install vapor retarder on metal roof deck under insulation.
- E. Install wood floor vapor retarder in two (2) layers.
- F. Apply adhesive to substrate in accordance with Manufacturer's instructions for application and coverage.
- G. Install vapor retarder without tears, voids, and holes.
- H. Lap ends and edges minimum 4 inches over adjacent sheets. Seal laps with tape.
- I. Extend vapor retarder to full perimeter of adjacent door frames, window frames, openings, and to utility and other penetrations interrupting plane of membrane.
- J. Tape seal lapped joints, tears, holes, perimeter, and penetrations through vapor retarder. Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs. Fasten vapor retarders to framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c.
- K. Before installing vapor retarder, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.

- L. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- 3.2 REPAIR
  - A. Inspect vapor retarder for damage just prior to covering.
  - B. Clean damaged areas and cover with additional vapor retarder material cut minimum 6 inches larger than damaged area on all sides. Seal to main vapor retarder with continuous tape.

END OF SECTION 07 26 00

#### SECTION 07 27 00 - WEATHER BARRIERS

#### PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes
  - 1. Sheet and sealant materials to provide a continuous weather barrier throughout the building envelope.
  - 2. Materials and installation methods of the primary vapor permeable air barrier membrane system and accessories.
  - 3. Materials and installation methods of through-wall flashing membranes.
  - 4. Supply labor, materials and equipment to complete the Work as shown on the Drawings and as specified herein to bridge and seal the following air leakage pathways and gaps:
    - a. Connections of the walls to the roof air barrier.
    - b. Connections of the walls to the foundations.
    - c. Seismic and expansion joints.
    - d. Openings and penetrations of window and door frames, store front, curtain wall.
    - e. Piping, conduit, duct and similar penetrations.
    - f. Masonry ties, screws, bolts and similar penetrations.
    - g. All other air leakage pathways in the building envelope.
- B. Performance Requirements
  - 1. Materials of this Section shall provide continuity of building enclosure vapor and weather/air barrier:
    - a. In conjunction with materials described in Section 03 30 00 Concrete, Division 07 Building Insulation and Vapor Barriers, and 07 92 00 Joint Sealants.
    - b. To seal gaps between building enclosure components and wall and roof opening frames.
- C. Reference Division 01 Section "Quality Requirements" for special building envelope mock-up requirements.
- D. Reference Division 07: "Testing of Air Barrier" for testing air-barrier and building envelope compliance.
- E. PERFORMANCE REQUIREMENTS: Provide an air barrier membrane system constructed to perform as a continuous air barrier, and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Membrane system shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air sealant materials at such locations, changes in substrate, perimeter conditions and penetrations.

#### 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM E 84 Test Method for Surface-burning characteristics of Building Materials.
  - 2. ASTM E 96-90, "Standard Test Methods for Water Transmission of Materials".
  - 3. ASTM E 96-95 Standard Test Methods for Water Vapor Transmission of Materials
  - 4. ASTM E 154-88 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs
  - 5. ASTM C 920 Specification for Elastomeric Joint Sealants.
  - 6. ASTM E 1643-04 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
  - 7. ASTM E-1677-95 "Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Framed Building Walls".
  - 8. ASTM E 1745-04 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
  - 9. ASTM E 2357 Air Barrier Testing.
- B. American Concrete Institute (ACI)

- 1. ACI 302.1R-96 Vapor Barrier Component (plastic membrane) is not less than 10 mils thick
- C. FS TT-S-001657 Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.
- D. FS TT-S-00230 Sealing Compounds, Synthetic-Rubber Base, Single Component, Chemically Curing.
- E. Sealant and Waterproofer's Institute Sealant and Caulking Guide Specification.
- F. AATCC-127 "Hydrostatic Head Test".

## 1.3 SUBMITTALS

A. Submit under provisions of Division 01.

- B. Product Data: Provide data indicating material characteristics, performance criteria, and limitations.
  - 1. Manufacturer's Installation Instructions: Indicate preparation and installation requirements, techniques and seaming and pipe boot installation.
- C. Manufacturer's samples.
- D. Submit documentation from an approved independent testing laboratory certifying compliance with a) the air leakage rates of the air barrier membrane assembly, including primary membrane, primer and sealants have been tested to meet ASTM E2357, b) ICC-AC 38, c) Peel adhesion to unprimed plywood and cyclic and elongation per ICC-AC 48, d) Class A flame spread index and smoke development per ASTM E-84.
- E. Submit documentation from an approved independent testing laboratory certifying the air leakage and vapor permeance rates of the air barrier membrane, including primary membrane and transition sheets, in accordance with ASTM E2178.
- F. Test report submittals shall include test results of sustained wind loads and gust load air leakage results.
- G. Submit manufacturers' current product data sheets for the air barrier membrane system.

## 1.4 QUALITY ASSURANCE

- A. Submit document stating the applicator of the primary air barrier membranes specified in this section is authorized by the manufacturer as suitable for the execution of the Work.
- B. Perform Work in accordance with manufacturer's written instructions and this specification.
- C. Maintain one copy of manufacturer's written instructions on site.
- D. Allow access to Work site by the air barrier membrane manufacturer's representatives.
- E. Components used shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, flashings and adhesives.
- F. Single-Source Responsibility:
  - 1. Obtain air barrier materials from a single manufacturer regularly engaged in manufacturing the product.
  - 2. Provide products which comply with all federal, state and local regulations controlling use of volatile organic compounds (VOCs).
- G. Independent laboratory test results showing compliance with ASTM & ACI Standards.
- H. Perform Work in accordance with Sealant and Waterproofer's Institute Sealant and Caulking Guide Specification requirements for materials and installation.
- I. Submit copies of test results showing performance characteristics equaling or exceeding those specified.
- J. Maintain one copy of document on site.
- K. Pre-Installation Conference.
  - 1. Convene one week prior to commencing work of this Section, under provisions of Division 01.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Refer to current Product MSDS for proper storage and handling.
- B. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.

- C. Store roll materials on end in original packaging. Protect rolls from direct sunlight and weather until ready for use.
- Store air barrier membranes, adhesives and primers at temperatures of 40 degrees F and D. risina.
- Keep solvent away from open flame or excessive heat. E.
- F. Contractor to verify compliance for Volatile Organic Compounds (VOC) limitations of products to comply with all federal, state and local regulations controlling use of volatile organic compounds (VOCs).

#### **PROJECT / SITE CONDITIONS** 1.6 Α.

**Environmental Requirements** 

- Do not install solvent curing sealants in enclosed building spaces without ventilation. 1.
- Maintain temperature and humidity recommended by the materials manufacturers before. 2. during, and after installation.

#### SEQUENCING AND SCHEDULING 1.7

- Α. Sequence Work to permit installation of materials in conjunction with other retardant materials and seals.
- Β. Ensure continuity of the specified membranes throughout the scope of this section.
  - 1. Air barrier membrane to include self-adhered air barrier, transition membranes and sealant at penetrations.
  - Drainage plane to include water resistive barrier and flexible flashings to exterior. 2.

#### 1.8 WARRANTY

Provide manufacturer's standard 12-year material warranty for air barrier membrane materials, Α. sealant and flashing membrane.

## PART 2 - PRODUCTS

#### 2.1 MATERIALS

- Air barrier membrane components and accessories must be obtained as a single-source from Α. the membrane manufacturer to ensure total system compatibility and integrity.
  - 1. Acceptable Manufacturer:
    - a. Henry Company, Blueskin VP
    - b. 3M 3015 VP
    - c. SIGA Maivest 500 SA
    - d. Substitutions under the provision of Division 01.

#### 2.2 MEMBRANES (Basis-of-Design)

- Primary water resistive air barrier membrane shall be BlueskinVP<sup>™</sup> 160 manufactured by Α. Henry; a self-adhering air barrier membrane with an engineered film specifically designed to be water resistant and vapor permeable. Membrane shall have the following physical properties:
  - Air leakage: <0.004 CFM/ft2 @ 1.57 lbs/ft2 [<0.02L/s/m2 @ 75Pa] when tested in 2. accordance with ASTM E2178
  - 3. Water Vapor Permeance: 29 perms to ASTM E96, Method B
  - Tested to ASTM E2357 for Air Leakage of Air Barrier Assemblies 4.
  - Resistance to Water Penetration: Pass ICC-ES AC 38 5.
  - Water Penetration Resistance around Nails: Pass when tested to AAMA 711-05 & ASTM 6. D 1970 modified
  - Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84: 7. Flame Spread Rating of 0 and Smoke Development Classification of 105
  - Basis Weight: Minimum 160 gm/m2, when tested in accordance with TAPPI Test Method 8. T-410
  - 9. Tensile Strength: 40 lbF MD and 29 lbF CD per ASTM D828.
  - Average Dry Breaking Force: 127 lbF MD, and 91 lbF CD per ASTM D 5034 10.

- 11. Cyclic and Elongation: Pass at 100 cycles, -29 degrees C (-20 degrees F) per ICC-ES AC 48
- B. Self-adhering membrane for window sill pan flashings shall be Blueskin<sup>®</sup> SA, LT, or HT manufactured by Henry; an SBS modified bitumen, self-adhering sheet membrane which is integrally laminated to a blue polyethylene film. Membrane shall have the following physical properties:
  - 1. Membrane Thickness: 0.040 inches (40 mils)
  - 2. Low temperature flexibility: -30 degrees F to ASTM D146
  - 3. Elongation: 200% minimum to ASTM D412-modifed
  - 4. Minimum Puncture Resistance 40lbf to ASTM E154
  - 5. Lap Peel Strength 10 lbf/in width to ASTM D903 180° bend
  - 6. Auxiliary tested component of ASTM E2357 for Air Leakage of Air Barrier Assemblies
- C. Self-adhering membrane for all window jambs, headers, door openings, inside and outside corners, and other transitions shall be pre-cut BlueskinVP<sup>™</sup> 160 manufactured by Henry; a self-adhering sheet air barrier membrane with an engineered film specifically designed to be water resistant and vapor permeable. Membrane shall have the following physical properties:
  - 1. Air leakage: <0.004 CFM/ft<sup>2</sup> @ 1.57 lbs/ft<sup>2</sup> when tested in accordance with ASTM E2178
  - 2. Water Vapor Permeance: 29 perms to ASTM E96, Method B
  - 3. Tested to ASTM E2357 for Air Leakage of Air Barrier Assemblies
  - 4. Resistance to Water Penetration: Pass ICC-ES AC 38
  - 5. Water Penetration Resistance around Nails: Pass when tested to AAMA 711-05 & ASTM D 1970 modified
  - 6. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84: Flame Spread Rating of 0 and Smoke Development Classification of 105
  - 7. Basis Weight: Minimum 160 gm/m<sup>2</sup>, when tested in accordance with TAPPI Test Method T-410
  - 8. Tensile Strength: 40 lbF MD and 29 lbF CD per ASTM D828
  - 9. Average Dry Breaking Force: 127 lbF MD, and 91 lbF CD per ASTM D 5034
  - 10. Cyclic and Elongation: Pass at 100 cycles, -29 degrees C (-20 degrees F) per ICC-ES AC 48

#### 2.3 ADHESIVE PRIMERS

- A. Low VOC adhesive primer for primary self-adhering water resistive air barrier membrane, selfadhering transition membrane and SBS modified bitumen membranes at all temperatures shall be Blueskin<sup>®</sup> LVC Adhesive as supplied by Henry; a low V.O.C. quick setting rubber based adhesive. Adhesive Primer shall have the following physical properties:
  - 1. Colour: Blue
  - 2. Weight: 7.68 lbs/gal
  - 3. Solids by weight: 40%
  - 4. Max. V.O.C. <240 grams/liter
  - 5. Drying time (initial set): 30 minutes at 50% RH and 70 degrees F
- B. Adhesive Primer for primary self-adhering water resistive air barrier membrane, self-adhering transition membrane and SBS modified bitumen membranes in non-regulated VOC areas, at all temperatures shall be Blueskin<sup>®</sup> Adhesive manufactured by Henry, a synthetic rubber based adhesive, quick setting, having the following physical properties:
  - 1. Color: Blue
  - 2. Weight: 6 lbs/gal
  - 3. Solids by weight: 35%
  - 4. Drying time (initial set): 30 minutes

# 2.4 PENETRATION & TERMINATION SEALANT

- A. Termination Sealant shall be HE925 BES Sealant manufactured by Henry; a moisture cure, medium modulus polymer modified sealing compound having the following physical properties:
  - 1. Compatible with sheet air barrier, roofing and waterproofing membranes and substrate,
  - 2. Complies with Fed. Spec. TT-S-00230C, Type II, Class A
  - 3. Complies with ASTM C 920, Type S, Grade NS, Class 25

- 4. Elongation: 450 550%
- 5. Remains flexible with aging
- 6. Seals construction joints up to 1 inch wide
- 7. Auxiliary tested component of ASTM E2357 for Air Leakage of Air Barrier Assemblies

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify architect in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.
- B. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the membranes. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints full-flush.
- C. Curing compounds or release agents used in concrete construction must be resin based without oil, wax or pigments.
- D. Condition materials to room temperature prior to application to facilitate handling.

## 3.2 SURFACE PREPARATION

- A. Surfaces must be sound, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane.
- B. New concrete should be cured for a minimum of 14 days and must be dry before primer for air barrier membranes are applied.
- C. Ensure all preparatory Work is complete prior to applying primary air barrier membrane.
- D. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.
- E. Pre-cast and concrete block substrates are required to be primed prior to application of selfadhering water resistive air barrier membrane.

## 3.3 APPLICATION OF ADHESIVE PRIMER

A. Required ADHESIVE Primer for SBS Modified Self-adhering Membranes.

- 1. For the application of SBS modified self-adhering window sill pan flashings, through-wall flashings and other applications of SBS modified self-adhering transition membranes, the substrate needs to be conditioned with applicable adhesive primer.
- 2. Apply adhesive primer at rate recommended by manufacturer to all areas to receive SBS modified self-adhering sheet membrane as indicated on drawings by roller or spray and allow to dry.
- 3. For applications of SBS modified self-adhered membranes installed over the primary selfadhered water resistive air barrier membrane, the surface of the primary self-adhered water resistive air barrier membrane must be primed and allowed to cure prior to the placement of the SBS modified self-adhered membrane.
- B. Adhesive Primer for Primary Water Resistive Air Barrier Membrane.
  - 1. Apply adhesive primer as required depending on substrate type and condition of substrate
  - 2. Where appropriate surface adhesion can not be achieved, prime substrate with specified primer, at a rate of 200-250 sq ft/gal as per Technical Data Sheet.
  - 3. All pre-cast concrete and concrete block substrates are required to be primed prior to application of self-adhering water resistive air barrier membrane.
  - 4. Apply adhesive primer as required on surface of Blueskin VP160 where subsequent Blueskin VP160 membrane will overlap such as selvage edge and end laps

## 3.4 INSTALLTION OF AIR BARRIER SYSTEM

## A. INSIDE AND OUTSIDE CORNERS

1. Seal inside and outside corners of sheathing boards with a strip of self-adhering vapor permeable membrane extending a minimum of 3 inches on either side of the corner detail.

- a. For inside corners, pre-treat the corner with a continuous  $\frac{1}{2}$  inch bead of termination sealant.
- b. Prime surfaces in an intermittent pattern, at a rate of 200-250 sq ft/gal where appropriate to achieve surface adhesion as per manufacturers' instructions and allow to dry.
- c. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.
- d. Roll all laps and membrane with a counter top roller to ensure seal.
- B. TRANSITION AREAS
  - 1. Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials as indicated in drawings with self-adhering water resistive air barrier transition membrane.
    - a. Prime surfaces in an intermittent pattern, at a rate of 200-250 sq ft/gal where appropriate to achieve surface adhesion as per manufacturers' instructions and allow to dry.
    - b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Provide minimum 3 inch lap to all substrates.
    - c. Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.
    - d. Roll all laps and membrane with a counter top roller to ensure seal.
- C. WINDOWS AND ROUGH OPENINGS
  - 1. Place specified SBS modified self-adhering window sill pan flashing membrane across window sills. Pre-treat inside corners with a bead of termination sealant. Install window sill pan membrane and end dam terminations, seal cuts and terminations with termination sealant.
  - 2. Wrap jamb of rough openings with specified self-adhering water resistive air barrier transition membrane as detailed.
  - 3. Extend specified self-adhering water resistive air barrier membrane into rough window openings sufficient to provide a connection to interior vapor retarder.
    - a. Prime surfaces in an intermittent pattern, at a rate of 200-250 sq ft/gal where appropriate to achieve surface adhesion as per manufacturers' instructions and allow to dry.
    - b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.
    - c. Roll all laps and membrane with a counter top roller to ensure seal.

#### D. THROUGH-WALL FLASHING MEMBRANE

- 1. Apply through-wall flashing membrane along the base of masonry veneer walls and over shelf angles as detailed.
  - a. Prime surfaces and allow to dry, press membrane firmly into place, over lap minimum 2 inches at all end and side laps. Promptly roll all laps and membrane to ensure the seal.
  - b. Applications shall form a continuous flashing membrane and shall extend up a minimum of 8 inches up the back-up wall.
  - c. Seal the top edge of the membrane where it meets the substrate using termination sealant. Trowel-apply a feathered edge to seal termination to shed water.
  - d. Install through-wall flashing membrane 1/2 inch from outside edge of veneer. Provide "end dam" flashing as detailed.

## E. PRIMARY WATER RESISTIVE AIR BARRIER

1. Apply self-adhering water resistive air barrier membrane complete and continuous to substrate in a sequential overlapping weatherboard method starting at bottom or base of

wall and working up in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.

- a. Cut to manageable sections, align and position self-adhering membrane to substrate, remove top panel of protective release film and press firmly into place.
- b. Ensure alignment, hold membrane in place to avoid wrinkles and sequentially remove remaining panels of protective film and press firmly into place.
- c. Ensure minimum 3 inch overlap at all ends and 2 inch side laps of subsequent membrane applications.
- c. Pressure roll all membrane surfaces, laps and flashings with a counter top roller or 'J-roller' to ensure appropriate surface adhesion.
- d. At the end of each days work seal the top edge of the membrane where it meets the substrate with termination sealant. Trowel apply a feathered edge to seal termination and shed water.

#### 3.5 APPLICATION OF TERMINATION SEALANT

- A. Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the primary water resistive air barrier membrane and around the perimeter edge of membrane terminations at window and door frames with specified termination sealant.
- B. Seal the leading edge of membrane terminations and reverse laps.

#### 3.6 FIELD QUALITY CONTROL

A. Make notification when sections of Work are complete to allow review prior to covering air barrier system.

#### 3.7 PROTECTION

- A. Damp substrates must not be inhibited from drying out. Drying time varies depending on temperature and relative humidity. Do not expose the backside of the substrate to moisture or rain.
- B. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane, including wall openings and construction activity above completed air barrier installations. Protect air barrier membrane from damage and inclement weather during the construction phase.
- C. Water resistive air barrier membrane is not designed for permanent exposure. Good practice calls for covering as soon as possible, not to exceed 150 days.
- D. Regional weather conditions and daytime sunlight temperatures may require the membrane to be protected under the 150 day exposure limit.

END OF SECTION 07 27 00

## SECTION 07 42 13 – METAL WALL PANELS

#### PART 1 – GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Preformed metal panel system for walls, with related anchorage cleats, flashings, trim, furring channels and accessory components.
  - 2. Standing seam metal wall panel system.
  - 3. Smooth metal wall panels.
  - 4. Composite aluminum faced insulated insert panels at curtain wall.
  - 5. Building wrap back-up over sheathed walls.
- B. Design Requirements
  - 1. System to accommodate, without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.
  - 2. Accommodate positive drainage for moisture entering or condensation occurring within panel system, to exterior. Provide vented/punched furring channels (vertical and horizontal) at all rain screen wall assemblies.
- C. Related Sections:
  - 1. Division 01 Section "Quality Requirements" for special building envelope mock-up.
  - 2. Division 05 Section "Cold-Formed Metal Framing" for support framing, including girts, studs, and bracing
  - 3. Division 07 Section "Thermal Insulation" for continuous insulated wall sheathing.
  - 4. Division 07 Section "Air Barriers" for continuous air barrier systems
  - 5. Division 07 Section "Sheet Metal Flashing and Trim" for flashing and other sheet metal work that is not part of metal wall panel assemblies
  - 6. Division 07 Joint Sealers
  - 7. Division 07 Aluminum Framed Storefronts
  - 8. Division 09 Gypsum Board Systems
  - 9. Division 09 Non-Structural Metal Framing
- 1.2 REFERENCES
  - A. American Society for Testing and Materials.
    - B117: Method of Salt Spray Testing.
    - D822: Practice for operating light and water exposure apparatus (carbon arc type) for testing paint.
    - D1735: Method for water for testing of organic coatings.
  - B. Federal Test Method Standards (FSC 8010).

141A/6152: Accelerated weathering (enclosed arc apparatus).

141A/6160: Conducting exterior exposure tests of paints on metals.

C. National Coil Coaters Association.

NCCA II-6: Test method for measurement of impact resistance of painted aluminum or steel. NCCA II-12: Specification for determination of relative pencil hardness.

NCCA II-16: Test method for determination of film adhesion by "cross hatch" tape test after reverse impact.

- 1.3 SUBMITTALS
  - A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of wall panel and accessory.
  - B. Shop Drawings: Show fabrication and installation layouts of metal wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, furring channels, attachment system,
trim, flashings, closures, and accessories; and special details. Distinguish between factory-, shop- and field-assembled work.

- 1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches:
  - a. Flashing and trim.
  - b. Anchorage systems.
- C. Samples for Initial Selection: For each type of metal wall panel indicated with factory-applied color finishes.
  - 1. Include similar Samples of trim and accessories involving color selection.
  - 2. Include manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each sealant exposed to view.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
  - 1. Metal Wall Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal wall panel accessories.
  - 2. Trim and Closures: 12 inches long. Include fasteners and other exposed accessories.
  - 3. Accessories: 12-inch- long Samples for each type of accessory.
- E. Qualification Data: For Installer.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product. Test reports from certified lab on ASTM E-84
- G. Maintenance Data: For metal wall panels to include in maintenance manuals.

### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain each type of metal wall panel from single source from single manufacturer.
- C. Fire-Resistance Ratings: Where indicated, provide metal wall panels identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockup of typical wall panel, including soffit, as shown on Drawings, including insulation, supports, attachments, and accessories.
  - 2. Conduct water spray test of mockup of metal wall panel assembly, testing for water penetration according to AAMA 501.2.
  - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conference:
  - 1. Meet with Owner, Architect, metal wall panel Installer, metal wall panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal wall panels, including installers of doors, windows, and louvers.
  - 2. Review methods and procedures related to metal wall panel installation, including manufacturer's written instructions.
  - 3. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
  - 4. Review temporary protection requirements for metal wall panel assembly during and after installation.
  - 5. Review wall panel observation and repair procedures after metal wall panel installation.

## 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver components, sheets, metal wall panels, and other manufactured items so as not to be damaged or deformed. Package metal wall panels for protection during transportation and handling.
- B. Unload, store, and erect metal wall panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal wall panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal wall panels to ensure dryness, with positive slope for drainage of water. Do not store metal wall panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal wall panel for period of metal wall panel installation.
- E. Protect foam-plastic insulation as follows:
  - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
  - 2. Protect against ignition at all times. Do not deliver foam-plastic insulation materials to Project site before installation time.
  - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## 1.6 PROJECT / SITE CONDITIONS

A. Field Measurements, verify that field measurements are as indicated on shop drawings.

### 1.7 EXTENDED WARRANTY

- A. Provide under provisions of Division 01
- B. Finish Warranty: Furnish panel manufacturer's written warranty covering failure of the factory applied exterior finish on metal wall panel within the warranty period of 20 years after the date of substantial completion of the project.

### PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - A. Metal Panel System (reference drawings):
    - 1. See sub-sections below
  - B. Substitutions: Under provisions of Division 01 60 00.

### 2.2 METAL WALL PANELS

- A. General: Provide factory-formed metal panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight or rain screen installation as specified.
  - 1. Wall Panel System "Type A"
    - a. Basis of Design: AEP Span, Design Span hp Series Concealed Fastened Series
    - b. Metallic-Coated Steel Sheet: Restricted flatness steel sheet metallic coated by the hot-dip process & prepainted by the coil-coating process to comply with ASTM A-792.
    - c. Wall Panel Coverage: 12 inch, smooth panel with wide batten cap of 1-7/8"
    - d. Panel Height: 1 3/4" (plus wide batten cap)
    - e. Wall Panels 22 gauge, lengths vary
    - f. Panel Orientation Run panels vertical. Refer to Exterior Elevations.
    - g. Profile: Smooth Panel (no striations).
    - h. Clip: Panel clip with spring tab at one end and hold-down clamp at other end, sized to fit panels.
      - 1. Product: AEP Span; Design Span hp Series clip.

2. Material: 16 gauge formed steel, galvanized in conformance with ASTM A-653 Class G90.

i. Color: Kynar 500 finish, standard colors

a. See 09 Material Legend for color selection.

- j. End Closure: Mechanically attach sheet metal closures to trim with color matched rivets. Color of sheet metal closure shall match wall panel. Minimum sheet metal closure thickness of 22 gauge. Manufacturer's standard neoprene closure at all locations where panel ribs are oriented vertically. Provide custom fabricated sheet metal closure at all locations where panel ribs are oriented horizontally. Water jet cut to follow profile of panel. Mechanically attach sheet metal closures to vertical J-metal trim with color matched rivets. Color of sheet metal closure shall match wall panel. Minimum sheet metal closure thickness of 22 gauge.
- 2. Smooth Wall Panel System **"Type B"**, formed aluminum composite material, phenolic based thermoset polymer core. (three colors: B1, B2 and B3)
  - A. Basis of Design: Basis of Design: Citadel Architectural Products, Envelope 2000 RS, Dry Joint Rain Screen system
    - 2. Panel Thickness: 5/32 inch
    - 3. Panel Weight: 1.33 pounds per square foot
    - 4. Exposed finish shall be custom color anodized aluminum CCAA Exterior Standard 1.
    - 5. Composition: Two sheets of aluminum bonded to a .105" nominal, rigid, thermoset phenolic core.
    - 6. Aluminum face sheet: 0.024" nominal, painted to match architect's selection.
    - 7. Aluminum back sheet: 0.010" nominal, factory primed
    - 8. Tolerances:
      - a. Bow no more than 0.6% of dimension
      - b. Panel line, breaks and angles shall be sharp and true.
      - c. Surfaces shall be free from warp and buckle
    - 9. Provide standard profile aluminum extrusions and break formed flashings compatible with panel edges, by panel system fabricator.
    - 10. Fasteners, as recommended by panel system's design, by panel fabricator. Fasteners to be concealed.
    - 11. Wall Panel Coverage: height x length vary with staggered reveals (see drawings).
    - 12. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant; color as selected.
    - 13. Sealants: Manufacturer's standard type suitable for use with installation of system; non-shrinking and non-sagging; ultra-violet and ozone resistant; color as selected.
    - 14. Weather seals shall be as follows (apply per sealant manufacturers instruction):a. Polyurethane sealants: Tremco Dymonic®, Sonneborn Sonolastic® NP1.
      - b. Silicone sealants: General Electric Silpruf®, Dow Corning 795.
    - 15. Rain Screen reveal with color match strip and concealed aluminum extrusion. See drawings for reveal sizes patterns and locations.
    - 16. Reveal: 1/2 inch standard, see drawings.
    - 17. Colors: Three (3) colors to me chosen by Architect from manufacturer's standard and premium colors. Anodized, Kynar 500 Solid and Metallic finishes.a. See 09 Material Legend for color selection.
    - If any additional moisture resistant membrane other than that specified in Division 07 – Weather Barriers is required by wall panel manufacture, membrane shall be provided and installed by erector.
- 2.3 METAL WALL INSERT PANELS
  - A. General: Provide factory-formed flat smooth metal wall panels to be installed at select entry and window locations within the aluminum storefront system using concealed fasteners. Include accessories required for weathertight installation.
    - 1. Smooth Prefinished <u>Insulated Metal Wall Insert Panels</u> Shop fabricated flat panels with resin core and smooth prefinished aluminum face.

- a. Basis-of-Design Product: Subject to compliance with requirements, provide: Citadel – Glazeguard 1000, MCM (smooth flat panel both sides) or comparable product by one of the following:
  - 1. CENTRIA Architectural Systems.
  - 2. Engineered Systems.
  - 3. Metal Sales Manufacturing Corporation.
- b. Material: Metal composite with phenolic resin core with aluminum bonded face sheets, 0.024-inch nominal thickness. Provide composite panel, one inch thick assembly with poly-styrene core.
- c. Exterior Finish: Smooth aluminum factory finish (both sides of panel).
- d. Color: Two (2) colors to be chosen by Architect from manufacturer's standard and premium colors. Anodized, Kynar 500 Solid and Metallic finishes.
  i. See 09 Material Legend for color selection.
  - I. See 09 Material Legend for color selection.
- e. Insert into aluminum curtain wall or storefront system.
- f. Panel Size: Varies—See Drawings.
- g. Panel Weight: 1.33 pounds per square foot
- h. Core Density: 89.0 pounds per square foot
- i. Sealant: Factory applied within interlocking joint.
- j. Coordinate panel installation with Division 08 "Aluminum-Framed Storefronts".

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrate surfaces to receive metal panel system and associated work and condition which work will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer.
- B. Verify that building framing members are ready to receive panel system.
- C. Beginning installation indicated acceptance of substrate conditions
- 3.2 PREPARATION
  - A. Prepare substrate surfaces to insure proper and adequate installation in accordance with the contract document sand approved shop drawings, or manufacturer's requirements.
  - B. Field measure and verify dimensions as required.
  - C. Protect adjacent areas or surfaces from damage as a result of the work in this section.

#### 3.3 INSTALLATION

- A. Fasten panels to structural supports; erect panels plumb, level and true to intended plane.
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.
- C. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- D. Anchor panels securely in accordance with manufacturer's approved submission drawings.
- E. Conform to manufacturer's instructions for installation attachment systems.
- F. If panel is a rain screen assembly, installed vented or punched framing member for moisture migration and air movement at rear face of panel.
- G. Surfaces to receive panels shall be even, smooth, sound, clean and free from defects detrimental to panel installation. Needed correction of these surfaces shall be the responsibility of someone other than the panel manufacturer or the installer.
- H. Weatherseal all joints as required using methods and materials as recommended by the manufacturer. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

1. Provide complete gasket at steel awning penetrations for tube steel and plate steel profiles.

2. Coordinate steel awning installation and sequencing with Division 05 Metal Fabrications.

- I. Locate joints over supports. End lap minimum 2 inches.
- J. Use concealed fasteners, clips, and cleats for wall panels and trims.
- K. In addition to complying with requirements in "Metal Roof Panel Installation, General" Article, install metal panels to comply with requirements in this article.

- L. Flash and seal panels with weather closures where metal panels meet walls, soffit and at perimeter of all openings.
- M. Metal Fascia Panels: Align bottom of panels and fasten with blind rivets, bolts, or self-tapping screws. Flash and seal panels with weather closures where fascia meet soffits, along lower panel edges, and at perimeter of all openings.

# 3.4 CLEANING

- A. Clean work under provisions of Division 01.
- B. Remove site cuttings from finish surfaces.
- C. Clean and wash pre-finished surfaces with mild soap and water, rinse with clean water.

END OF SECTION 07 42 13

### SECTION 07 42 93 – METAL SOFFIT PANELS

PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Preformed metal panel system for soffits, with related anchorage cleats, flashings, trim and accessory components.
  - 2. Perforated metal soffit panels.
- B. Design Requirements
  - 1. System to accommodate, without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.
  - 2. Accommodate positive drainage for moisture entering or condensation occurring within panel system, to exterior.
- C. Related Sections:
  - 1. Division 01 Section "Quality Requirements" for special building envelope mock-up.
  - 2. Division 05 Section "Cold-Formed Metal Framing" for support framing, including girts, studs, and bracing
  - 3. Division 07 Section "Thermal Insulation" for continuous insulated wall sheathing.
  - 4. Division 07 Section "Air Barriers" for continuous air barrier systems
  - 5. Division 07 Section "Sheet Metal Flashing and Trim" for flashing and other sheet metal work that is not part of metal wall panel assemblies
  - 6. Division 07 Joint Sealers
  - 7. Division 07 Aluminum Framed Storefronts
  - 8. Division 09 Gypsum Board Systems
  - 9. Division 09 Non-Structural Metal Framing
- 1.2 REFERENCES
  - A. American Society for Testing and Materials.
    - B117: Method of Salt Spray Testing.
    - D822: Practice for operating light and water exposure apparatus (carbon arc type) for testing paint.
    - D1735: Method for water for testing of organic coatings.
  - B. Federal Test Method Standards (FSC 8010).
    - 141A/6152: Accelerated weathering (enclosed arc apparatus).
    - 141A/6160: Conducting exterior exposure tests of paints on metals.
  - C. National Coil Coaters Association.

NCCA II-6: Test method for measurement of impact resistance of painted aluminum or steel.

NCCA II-12: Specification for determination of relative pencil hardness.

NCCA II-16: Test method for determination of film adhesion by "cross hatch" tape test after reverse impact.

### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish between factory-, shop- and field-assembled work.
  - 1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches:
    - a. Flashing and trim.

- b. Anchorage systems.
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
  - 1. Include similar Samples of trim and accessories involving color selection.
  - 2. Include manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each sealant exposed to view.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
  - 1. Metal Soffit Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.
  - 2. Trim and Closures: 12 inches long. Include fasteners and other exposed accessories.
  - 3. Accessories: 12-inch- long Samples for each type of accessory.
- E. Qualification Data: For Installer.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product. Test reports from certified lab on ASTM E-84
- G. Maintenance Data: For metal panels to include in maintenance manuals.

### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain each type of metal soffit panel from single source from single manufacturer.
- C. Fire-Resistance Ratings: Where indicated, provide metal panels identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockup of typical soffit panel as shown on Drawings, including insulation, supports, attachments, and accessories.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conference:
  - 1. Meet with Owner, Architect, soffit panel Installer, metal wall panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal wall panels, including installers of doors, windows, and louvers.
  - 2. Review methods and procedures related to installation, including manufacturer's written instructions.
  - 3. Review flashings, special siding details, penetrations, openings, and condition of other construction that will affect metal soffit panels.
  - 4. Review temporary protection requirements for assembly during and after installation.

### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver components, sheets, soffit panels, and other manufactured items so as not to be damaged or deformed. Package panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal soffit panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Protect foam-plastic insulation as follows:

- 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
- 2. Protect against ignition at all times. Do not deliver foam-plastic insulation materials to Project site before installation time.
- 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.
- 1.6 PROJECT / SITE CONDITIONS
  - A. Field Measurements, verify that field measurements are as indicated on shop drawings.
- 1.7 EXTENDED WARRANTY
  - A. Provide under provisions of Division 01
  - B. Finish Warranty: Furnish panel manufacturer's written warranty covering failure of the factory applied exterior finish on metal soffit panel within the warranty period of 20 years after the date of substantial completion of the project.
- PART 2 PRODUCTS
- 2.1 MANUFACTURERS
  - A. Metal Panel System (reference drawings):
    - 1. See sub-sections below
  - B. Substitutions: Under provisions of Division 01 60 00.

### 2.2 METAL SOFFIT PANELS

- A. General: Provide factory-formed metal panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight or rain screen installation as specified.
- B. Flush Profile <u>Perforated Metal Soffit Panel</u> Fully perforated panels (full width and length hole punched perforation) formed with vertical panel edges; with flush joint between panels.
  - 1. Basis of Product: AEP-Span Prestige Series (Full 12" flat panel fully perforated from edge to edge) or comparable product by one of the following:
    - a. CENTRIA Architectural Systems.
    - b. Fabral
    - c. Talyor Metals
    - d. MBCI.
    - e. Metal Sales Manufacturing Corporation
  - 2. Material: Zinc-coated (galvanized) steel sheet, 0.034-inch nominal thickness.
    - a. Exterior Finish: 2-coat fluoropolmer.
    - b. Color: Off-White. Final color to be slected from full standard color range.
    - c. Perforation: Staggered circle pattern, roughly 15% open area.
  - 3. Panel Style: Flat panel, no pencil rib.
  - 4. Panel Coverage: 12 inches
  - 5. Panel Height: 1-1/2 inch tall
  - 6. Sealant: Factory applied with interlocking joint.

#### PART 3 - EXECUTION

- 3.1 EXAMINATION
  - A. Examine substrate surfaces to receive metal panel system and associated work and condition which work will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer.
  - B. Verify that building framing members are ready to receive panel system.
  - C. Beginning installation indicated acceptance of substrate conditions

## 3.2 PREPARATION

- A. Prepare substrate surfaces to insure proper and adequate installation in accordance with the contract document sand approved shop drawings, or manufacturer's requirements.
- B. Field measure and verify dimensions as required.
- C. Protect adjacent areas or surfaces from damage as a result of the work in this section.

# 3.3 INSTALLATION

- A. Fasten panels to structural supports; erect panels plumb, level and true to intended plane.
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.
- C. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- D. Anchor panels securely in place in accordance with manufacturer's approved submission drawings.
- E. Conform to manufacturer's instructions for installation attachment systems.
- F. Surfaces to receive panels shall be even, smooth, sound, clean and free from defects detrimental to panel installation. Needed correction of these surfaces shall be the responsibility of someone other than the panel manufacturer or the installer.
- G. Weatherseal all joints as required using methods and materials as recommended by the manufacturer. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.
- H. Locate joints over supports. End lap minimum 2 inches.
- I. Use concealed fasteners, clips, and cleats for soffit panels and trims.
- J. In addition to complying with requirements in "Metal Roof Panel Installation, General" Article, install metal soffit panels to comply with requirements in this article.
- K. Metal Soffit Panels: Provide metal soffit panels full width of soffits. Install panels perpendicular to support framing.
- L. Flash and seal panels with weather closures where metal soffit panels meet walls and at perimeter of all openings.
- M. Metal Fascia Panels: Align bottom of panels and fasten with blind rivets, bolts, or self-tapping screws. Flash and seal panels with weather closures where fascia meet soffits, along lower panel edges, and at perimeter of all openings.

# 3.4 CLEANING

- A. Clean work under provisions of Division 01.
- B. Remove site cuttings from finish surfaces.
- C. Clean and wash pre-finished surfaces with mild soap and water, rinse with clean water.

END OF SECTION 07 42 93

### PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. Work Includes:
  - 1. Mechanically fastened membrane roofing system including membrane, flashings, including tapered insulation and cricket assembly, accessories, and flashings.
  - 2. PVC coated metal flashings.
  - 3. Walkway Protection.
  - Vapor retarder.
  - 5. Roof insulation.
  - 6. Liquid Flashing.
  - 7. Lightweight roof equipment pad.
  - 8. Coverboard only if required to achieve IBC Class B rating.
- B. System Description:
  - 1. PVC sheet membrane roof assembly to conform to UL, IBC requirements for a Class "B" fire classification assembly.
- C. Related Sections:
  - 1. Division 01: Administrative, procedural, and temporary work requirements.
  - 2. Division 05 Metal Decking
  - 3. Section 06 10 00 Rough Carpentry
  - 4. Section 07 22 16 Roof Board Insulation
  - 5. Section 07 62 00 Sheet Metal Flashing and Trim
  - 6. Section 07 92 00 Joint Sealants
  - 7. Division 22: Piping for roof drains.
- 1.3 REFERENCES
  - A. Comply with all References in effect, most active, or latest version as of the date of the Contract Documents.
  - B. American Society of Civil Engineers (ASCE) 7 Minimum Design Loads for Buildings and Other Structures.
  - C. ASTM International (ASTM):
    - 1. C1549 Standard Test Method for Determination of Solar Reflectance near Ambient Temperature Using a Portable Solar Reflectometer.
    - 2. D751 Standard Test Methods for Coated Fabrics
    - 3. D 4397 Standard specification for Polyethylene sheeting for construction, industrial and agricultural applications.
    - 4. D4434 Standard Specification for Poly (Vinyl Chloride) Sheet Roofing.
    - 5. E108 Standard Test Methods for Fire Tests of Roof Coverings.
    - 6. E1980 Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
  - D. Energy Star Qualified Products.
  - E. Factory Mutual Insurance Co. (FM):
    - 1. 4470 Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for Use in Class 1 and Noncombustible Roof Deck Construction.
    - 2. Property Loss Prevention Data Sheet 1-28 Design Wind Loads.
    - 3. Property Loss Prevention Data Sheet 1-49 Perimeter Flashing.
  - F. National Roofing Contractors Association (NRCA) Roofing and waterproofing manual.
  - G. NSF/ANSI 347 Sustainability Assessment for Single Ply Membranes.
  - H. Single Ply Roofing Institute. (SPRI).
  - I. 2018 International Building Code. (2018 IBC).
- 1.4 SYSTEM DESCRIPTION

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- A. Design Requirements:
  - 1. Design roofing system to resist minimum wind loads in accordance with FM 1-28.
  - 2. Class: 1-90.
  - 3. UL 790 Class "B".
- 1.5 SUBMITTALS
  - A. Submit shop drawings and product data under provisions of Division 01.
  - B. Submit Manufacturer's installation instructions under provisions of Division 01.
  - C. Literature: Copies of current relevant information pertaining to the primary components to be used in the roof system including but not limited to:
    - 1. Specifications
    - 2. Manufacturer's Roofing's Warranty
    - 3. Applicator's Warranty
    - 4. Product Data Sheets
    - 5. Material Safety Data Sheets
    - 6. Submit support data and test results showing that roofing system and accessories comply with FM I-28, Class I-90, and UL 790 Class A.
  - D. Samples for Verification: Representative samples of primary components to be used in the roof system.
  - E. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work, including:
    - 1. Base flashings and membrane terminations.
    - 2. Tapered insulation, including slopes.
    - 3. Roof plan showing orientation of roof deck, orientation of roofing membrane, pattern for insulation attachment, and membrane fastening spacing.
    - 4. Fastening patterns for corner, perimeter, and field-of-roof locations.
    - 5. Special joint or termination conditions and conditions of interface with other materials.
  - F. Maintenance data under provisions of Division 01.
- 1.6 QUALITY ASSURANCE
  - A. Qualifications:
    - Membrane Manufacturer: Company specializing in sheet roof membranes with five (5) years experience. Installer shall be approved by Manufacturer to install Manufacturer's product.
    - Applicator: Company specializing in installation of sheet roof membranes with five (5) years experience, has completed five (5) projects totaling 50,000 square feet in the last year, and approved by membrane Manufacturer.
    - 3. Source limitations: Obtain all components for membrane roofing system from a single roofing membrane Manufacturer.
  - B. Regulatory Requirements
    - 1. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction.
    - 2. Exterior Fire-Test Exposure: Class B, ASTM E108, for application and roof slopes indicated.
    - 3. Life Cycle (LCA) and Sustainability Requirements: Provide membrane certified by independent third party testing/evaluation that roof membrane satisfies the following criteria:
      - a. 10% recycled content as certified by Underwriters Environment
      - b. Satisfy NSF/ANSI 347 Platinum Sustainability level.
- 1.7 DELIVERY, STORAGE, AND HANDLING
  - A. Store materials, other than membrane, in protected, dry area, until used; provide proper ventilation.
  - B. Protect sheet goods from damage and wetting.
- 1.8 PROJECT/SITE CONDITIONS

- A. Roofing installed during inclement weather conditions shall satisfy Owner and Roofing Manufacturer's requirements.
- B. Moisture shall not be allowed into roofing assembly during installation.
- 1.9 SEQUENCING AND SCHEDULING

Α.

- Pre-Installation Conference:
  - 1. Roofing Manufacturer's representative, Owner, Architect, Roofing Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
  - 2. Review methods and procedures related to roofing installation, including Manufacturer's most current requirements.
  - 3. Review base flashings, special roofing details and transitions, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
  - 4. Review temporary protection requirements for roofing system during and after installation.
  - 5. Deviations from the Contract Documents or the approved shop drawings are not permitted without prior written approval by the roofing Manufacturer, the Owner, and the Architect.
- 1.10 EXTENDED WARRANTY
  - A. Under provisions of Division 01.
  - B. Provide Manufacturer's Twenty (20) year water tightness warranty for water penetration and integrity of seals from date of substantial completion.
  - C. Warranty: Include coverage of materials and installation for repairs resulting from failure of roofing system to resist penetration of moisture and to resist 90 M.P.H. winds.
  - D. A roofing membrane manufacturer's representative shall inspect the installation of the Roofing System upon completion when presented for system warranty consideration.
  - E. Provide Installer's extended warranty for a period of five (5) years from date of substantial completion.
  - F. Warranty shall be no dollar limit (NDL). Manufacturer's standard without monetary limitations. Warranty shall state that ponding conditions will not void warranty.
- 1.11 MAINTENANCE NOT USED.

# PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - A. Contract Documents are based on products by:
    - 1. Carlisle Syntec (<u>www.carlislesyntec.com</u>).
      - Product: 60 mil VersiFlex PVC KEE, Inseam Mechanically Fastened.
  - B. Products by following Manufacturers are acceptable:
    - 1. Versico. (<u>www.versico.com</u>).
      - Product: 60 mil SureFlex PVC KEE, Inseam Mechanically Fastened.
    - 2. Johns Manville. (<u>www.johnsmanville.com</u>).
    - Product: 60 mil PVC/ES KEE, Inseam Mechanically Fastened.
      3. Sika Sarnafil. (www.sika.com).
      - Product: 60 mil S327 PVC, Inseam Mechanically Fastened.
    - 4. Substitutions: Under provisions of Division 01.
- 2.2 MATERIALS

Α.

- PVC Roofing Membrane:.
  - 1. PVC Sheet: ASTM D 4434, Type III, polyester reinforced.
  - 2. Color: As selected by Architect from manufacturer's color offerings.
  - 3. Thickness: 60 mils minimum thickness with published, manufacturing variance no greater than +/- .02 mils. ASTM nominal +/- 10% thickness variation is not acceptable.
  - 4. Membrane thickness over reinforcement shall by a minimum of .028 mils. Membrane

reinforcement shall be balance within the membrane thickness.

- 2.3 AUXILIARY MATERIALS
  - A. General: Auxiliary materials supplied by roofing system Manufacturer for intended use and compatible with membrane roofing.
  - B. Sheet Flashing: Manufacturer's standard sheet flashing of thickness, and color as sheet membrane.
  - C. Pre-formed or field formed boots, collars and miscellaneous accessories supplied by roofing system manufacturer.
    - 1. PVC membrane requires chemically resistant reinforced membrane sheet flashing when used over contaminated surfaces such as curbs, walls, penetrations and roof equipment. Also used as a separation layer over membrane when non compatible substances will come in contact with primary membrane. Substance such as oils, processed animal fats etc.
    - 2. Reinforced standard membrane sheet flashing.
  - D. Bonding Adhesive: Manufacturer's standard solvent-based bonding adhesive for bonding membrane to substrate.
  - E. Termination Bars and accessories: Manufacturer's standard predrilled stainless-steel, galvanized or aluminum bars, approximately 1 by 1/8 inch thick; with bumper cord and anchors.
  - F. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
  - G. PVC-coated metal flashing: Heat weldable sheet metal capable of being formed into a variety of shapes and profiles. 24 gauge, G90 galvanized metal sheet with a 20 mil unsupported PVC membrane laminated on one side. 4 by 8 foot or 4 by 10 foot.
  - H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed corner sheet flashings, T-joint covers, termination reglets, cover strips, slip sheet, CSPE reactivation solution cut edge sealant and other accessories.
  - I. Liquid Flashing: Clean, prime and seal irregular roof penetrations as noted in drawing. Utilize two-component polyurethane system compatible with PVC roofing system.
- 2.3 VAPOR RETARDER
  - A. Reference Division 07 Section "Vapor Retarders" for requirements.
    - 1. Inform Architect (in advance of installation) if roof vapor retarder will not be installed by roofing sub-contractor and submit installer qualifications. Roofing sub-contractor must inspect and accept installation of vapor retarder if installed by others.
- 2.4 ROOF BOARD INSULATION
  - A. General: Preformed roof insulation boards manufactured or approved by membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Approvals-approved roof insulation.
  - B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, glass-fiber mat facer on both major surfaces. Install 6 inch thickness (2 layers minimum) for R-38 thermal value.
  - C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches and 1/2 inch per 12 inches as indicated on drawings.
  - D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
- 2.5 COVER BOARD
  - A. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch thick, factory primed. <u>Only provide coverboard if required by roofing manufacturer to meet IBC Section 2603.4 requirements for a Class B classification.</u>
    - 1. Products: Subject to compliance with requirements, provide the following:
      - a. Georgia-Pacific Corporation; Dens Deck Prime
      - b. Substitution Request by provisions in Div 01.
    - 2. Board size shall be 4-foot by 4-foot, unless otherwise authorized in writing by the

#### adhesive manufacturer.

- 2.6 INSULATION ACCESSORIES
  - A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.
  - B. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system Manufacturer.
  - C. Parapet Wall Sheathing ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch thick, factory primed.
    - 1. Products: Subject to compliance with requirements, provide the following:
      - a. Georgia-Pacific Corporation; Dens Deck Prime
        - b. Substitution Request by provisions in Div 01.
- 2.7 WALKWAYS

Α.

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, textured surface walkway rolls, approximately 3/16 inch thick and 30 inch wide, and acceptable to membrane roofing system Manufacturer.
  - 1. Gray embossed walkway rolls with textured surface.

## 2.8 LIGHTWEIGHT EQUIPMENT PAD

- Lightweight cement based equipment pad two inches thick minimum. Locate pad under food service roof top equipment on built-up curb allowing for continuous water tight single ply membrane underneath equipment pad. Reference drawings for equipment pad locations.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. DiversiTech UltraLite Concrete Equipment Pad
    - b. Substitution Request by provisions in Div 01.

### PART 3 - EXECUTION

- 3.1 EXAMINATION
  - A. Verify deck is clean and smooth, free of depressions, waves, or projections and properly sloped to drain.
  - B. Verify roof openings and penetrating elements through roof are solidly set.
  - C. Verify existing adjoining membrane surface has been properly prepared for watertight attachment of new membrane.
  - D. Do not apply roofing materials to damp, frozen, dirty, dusty, or deck surfaces unacceptable to manufacturer or applicator.
  - E. Verify deck surfaces are dry and free of snow or ice. Confirm dry deck by moisture meter with 12 percent moisture maximum.
  - F. Ensure flatness and verify tight joints of deck, seal joints of decking with tape.
  - G. Beginning installation means acceptance of existing surfaces and substrate.

### 3.2 PREPARATION

Α.

- Field membrane preparation for roofing recover of existing roof system.
  - a. Relief cut all field membrane four (4) feet on-center from seam to seam prior to installation of new roofing materials. Cut membrane is to remain in place.
  - b. Flashing removal: All wall, curb, and penetration flashing is to be removed as required to demo existing membrane. New membrane and clad metal is to be installed as per the drawings and the manufacturer's recommended installation instructions to preserve specified warranty. Re-use existing sheet metal flashing where possible.
- B. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- C. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

- D. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- 3.3 VAPOR-RETARDER INSTALLATION
  - A. Apply vapor retarder to substrate surface with adhesive in accordance with manufacturer's instructions.
  - B. Extend vapor retarder under blocking to deck edge.
- 3.4 INSULATION INSTALLATION
- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (68 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
  - 1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
  - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- G. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
  - 1. Fasten insulation according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
  - 2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
- H. Mechanically Fastened and Adhered Insulation: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
  - 1. Fasten first layer of insulation according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
  - 2. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
  - 3. Set each subsequent layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
  - 4. Set each subsequent layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- I. Loosely Laid Insulation: Loosely lay insulation units over substrate.
- J. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together and fasten to roof deck.
  - 1. Fasten cover boards according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
  - 2. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.

### 3.5 MECHANICALLY FASTENED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to roofing system Manufacturer's written instructions and wind uplift requirements.
  - 1. Unroll roofing membrane and allow to relax before installing.
  - 2. Overlap edges and ends ad required by Manufacturer.
  - 3. Install mechanical fasteners in accordance with Manufacturer's instructions.
  - 4. Shingle joints on sloped substrate in direction of drainage.
  - 5. Seal adjoining surfaces.

- 6. Continue membrane or coated metal up vertical surfaces minimum 8 inches unless otherwise noted. Terminate per Manufacturers requirements. Fully adhere vertical wall flashings.
- 7. Seal items penetrating membrane with counterflashing membrane material. Install flashing. Seal watertight to membrane.
- 8. Do not expose material vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
- 9. Install protection board where required or indicated.

## 3.6 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply solvent-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with sheet flashing.
- D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings then mechanically anchor sheet to substrate through termination bars.
- F. Where noted, provide liquid applied flashing at roof penetrations. Install two-component polyurethane-based system allowing for reinforced cold-applied liquid flashing. Extend liquid flashing 12 inches vertically up surface. Prepare and clean roof surface and penetration surface to accept liquid sealer. Applied liquid product must be compatible with manufacturer's roofing system and warranty.

### 3.7 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated on documents. Adhere walkway products to membrane then hot air weld perimeter of walkway to membrane according to roofing system manufacturer's written instructions.

# 3.8 LIGHTWEIGHT EQUIPMENT PAD INSTALLATION

A. Cement based Equipment Pad: Install roof top equipment pad in locations indicated. Adhere product to substrate with compatible adhesive according to roofing system manufacturer's written instructions. Anchor condenser equipment to roof curb and seal all penetration for water tight assembly.

### 3.9 FIELD QUALITY CONTROL

- A. Pre-job start and final roof inspection. Membrane Manufacturer shall supply and pay for a technical representative to meet for a pre-job discussion involving expectations and requirements for roof installation and upon completion to review compliant roof application. All roof assembly conditions shall be observed and approved prior to roof installation. Arrange for roofing system Manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
- B. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- C. Field inspection will be performed under provisions of Division 01.
- D. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.
- E. A representative of the roofing Manufacturer is to perform an on-site inspection of the completed system and certify, in writing, that the system has been installed per manufacturer's requirements and as required for the specified warranty.
- F. Contractor shall immediately correct identified defects or irregularities.

# 3.10 PROTECTION

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for

deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.
- D. After installation, close off area to prevent unauthorized traffic.

### **ROOFING WARRANTY**

WHEREAS	
of (Address)	
herein called the "Roofing Contractor", has performed roofing and associated ("work	(") on following project:
Owner:	
Address:	
Name and Type of Building:	
Address:	
Area of Work: Date of Acceptance:	
Warranty Period: Five (5) years Date of Expiration:	

AND WHEREAS Roofing Contractor has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period.

NOW THEREFORE Roofing Contractor hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work, and as are necessary to maintain said work in watertight condition. In addition to making the work watertight, the Roofing Contractor shall remove and/or repair blisters, ridges, flashings, splits and other irregularities which in the opinion of the Roofing Manufacturer's technical representative do not conform to acceptable roofing practices and conditions. These repairs shall be made prior to expiration of the five (5) year Warranty Period and to the satisfaction of the Roofing Manufacturer's technical representative.

This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by: a) lightning, windstorm; b) fire; c) failure of roofing system substrate including cracking, settlement, excessive deflection, deterioration, and decomposition; d) faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work; and e) activity on roofing by others including construction contractors, maintenance personnel, other persons, and animals whether authorized or unauthorized by Owner.

When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Contractor, and until cost and expense thereof has been paid by Owner or by another

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07 54 01 - 8 12/18/2023 responsible party so designated.

2. The Roofing Contractor is responsible for damage to work covered by this Warranty, but is not liable for consequential damages to building or building contents, resulting from leaks or faults or defects of work.

3. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Contractor, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void upon date of said alterations, but only to extent said alterations affect work covered by this Warranty. If Owner engages Roofing Contractor to perform said alterations, Warranty shall not become null and void, unless Roofing Contractor, prior to proceeding with said work, shall claim that said alterations would like damage or deteriorate work, thereby reasonably justifying a limitation or termination of this warranty.

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

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

6. This Warranty is recognized to be the only Warranty of Roofing Contractor on said work, and is in addition to the Roofing Guarantee furnished by the Roofing Manufacturer, and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to him in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Contractor of responsibility for performance of original work in accordance with requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

IN WITNESS THEREOF, this instrument has been dully executed this

day of	, <u>20</u>
Cosigned by General Contractor by:	
(General Contractor)	(Roofing Contractor)
(Business Address)	(Business Address)
(Signature)	(Signature)
(Title)	(Title)
END OF SECTION 07 54 01	

Orion High School Pasco, Washington

# SECTION 07 61 13 - STANDING SEAM METAL ROOFING

### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Section Includes
    - 1. Pre-coated standing-seamed steel roofing system and associated flashings.
    - 2. Counterflashings for roof-mounted equipment.
    - 3. Field installed thermal insulation.
    - 4. Snow guard roof perimeter rails.
    - 5. Full roof area Self-Adhering Underlayment.
    - 6. Energy Performance: Provide roof panels with solar reflectance index not less than **29** when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency
    - Energy Performance: Provide roof panels that are listed on the U.S. Department of Energy's ENERGY STAR Roof Products Qualified Product List for steep-slope roof products
  - B. Related Sections include the following:
    - 1. Division 06 Section Sheathing for roofing system substrate and anchoring calculations.
    - 2. Division 07 Section Roofing Insulation for insulation specified as part of roofing construction.
    - 3. Division 07 Section Vapor Retarders roofing underlayment.
    - 4. Division 07 Section Pre-formed Metal Siding and Soffit installation at eaves and fascia.
    - 5. Division 07 Section Sheet Metal Flashing and Trim coordination with roofing assembly.
    - 6. Division 07 Section Roof Accessories for roof equipment.
- 1.2 REFERENCES
  - A. ASTM A 792 Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process for Roofing and Siding.
  - B. ASTM A 446 Specification for Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
  - C. ASTM D1970 Roofing Underlayment.
  - D. NAAMM Metal Finish Handbook.
  - E. SMACNA Architectural Sheet Metal Manual. "Fourth Edition".
  - F. ASTM D 4397 Polyethylene Vapor Retarders

#### 1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Division 01.
- B. WSSP Submittals
  - 1. Not Used.
- C. Indicate on shop drawings, material profile, jointing pattern, jointing details, fastening methods, sealants, underlayment, and installation details.
- D. Shop drawings are to be approved by manufacturer.
- E. Wind-Uplift Resistance: Submit engineering data, prepared by a licensed engineer, showing all conditions to meet a UL 90 rating. Reference Section Division 06 Sheathing and drawings.
- E. Hydrostaic-Head Resistance: Submit engineering data for no water penetration when tested according to ASTM E 2140.
- F. Fire Rating: Submit engineering data for Underwriters' Laboratories, Inc., (UL) Class A roofing material acceptable for use in an approved Class A fire rating per UL 790
- F. Qualification Data: For qualified installer.
- G. Provide engineering data, prepared by a licensed engineer, showing layout and spacing of snow guards.

#### 1.4 QUALITY ASSURANCE

A. Installer: Company specializing in sheet metal roof installations with three years documented experience.

- B. Perform work in accordance with SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics.
- 1.5 DELIVERY, STORAGE, AND HANDLING
  - A. Deliver products to site, store and protect under provisions of Division 01.
  - B. Stack preformed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
  - C. Prevent contact with materials during storage which may cause discoloration or staining.
- **1.6 SPECIAL WARRANTY** 
  - A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
    - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
      - Finish Warranty Period: 20 years from date of Substantial Completion
  - B. Upon acceptance through on-site inspection, the manufacturer and installer shall execute the special warranties following this section. Refer to Roofing Warranty, following this specification section.

#### PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - A. Basis of design AEP Span (BHP), Product Design Span hp (manufactured in Tacoma, Washington) AEP Span (BHP) – Design Span hp
    - 2141 Milwaukee Way. Tacoma, WA. 98421 Phone: 1-800-733-4933
    - B. Subject to compliance with the requirements, including regional manufacturing, products that may provide equivalent products are:

Fabral

3449 Hempland Rd / P.O. Box 4608 Lancaster, Pennsylvania 17604-4608 Phone: 1-800-477-2741

MBCI PO Box 16027 Salt Lake City, UT 84116 Phone: 801-530-4975 Metal Sales Manufacturing 7800 State Rd. 60 Sellersburg, Indiana 47172 Phone: 1-812-246-1935

Taylor Metals 710 A Street NW Auburn, WA 98002 Phone: 1-800-574-1388

#### 2.2 MATERIALS

- A. Metallic-Coated Steel Sheet: Restricted flatness steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755
- B. Recycled Content: Provide steel sheet with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than **25** percent.
- C. Roof Panel Coverage: 17 inches.
- D. Standing Seam: 1 3/4"
- E. Roofing Panels 24 gauge

### 2.3 ACCESSORIES

- A. Fasteners: Galvanized steel with neoprene washers. Finish exposed fasteners same as flashing metal. Engineer fastener layout and spacing requirements with roof wood sheathing substrate as specified.
- B. Sealant: As recommended by manufacturer.
- C. Bedding Compound: As recommended by manufacturer.
- D. Reglets: Recessed type and surface mounted, pre-finished steel.
- E. Sub-framing and Blocking: As required by manufacturer.
- G. Underlayment: Ice and Water Shield membrane.
- H. Ice Shield Membrane: Equal to Ice and Water Shield as manufactured by Grace Construction Products, .040 mil thickness. Provide at metal roofing locations, entire roof area.
- I. Flexible Pipe flashings; Neoprene type, as manufactured by Dek Tite or equivalent.
- J. Plate Washers: Provide minimum 3"x3" spacer/plate washer at each roof clip/anchor location to avoid crushing rigid insulation below.
- K. Flashing and Trim: Coordinate with Division 07 "Sheet Metal Flashing and Trim." Formed from same material as roof panels, prepainted with coil coating, minimum 0.018 inch thick. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal roof panels.
- L. Gutters: Coordinate with Division 07 "Sheet Metal Flashing and Trim."
- M. Downspouts: Coordinate with Division 07 "Sheet Metal Flashing and Trim."
- N. Roof Curbs: Coordinate with Division 07 "Sheet Metal Flashing and Trim." Fabricated from same material as roof panels, minimum 0.048 inch thick; with bottom of skirt profiled to match roof panel profiles, and welded top box and integral full-length cricket. Fabricate curb subframing of minimum 0.0598-inch-thick, angle-, C-, or Z-shaped steel sheet. Fabricate curb and subframing to withstand indicated loads, of size and height indicated. Finish roof curbs to match metal roof panels.

#### 2.4 FIELD-INSTALLED THERMAL INSULATION

- A. Polyethylene Vapor Retarders: ASTM D 4397, 6 mils thick, with maximum permeance rating of 0.13 perm.
- B. Insulation
  - Insulation: Closed cell Polyisocyanurate board with fiber reinforced facers uniforming to FS-HH-I-1972/GEN with minimum aged R-Value listed per drawings, as required to satisfy Class B fire hazard classification. Minimum thickness: as required to provide listed R-Valuve over any occupied, heated spaces. Stagger overlapping rigid insulation seams.
  - Tapered Insulation for crickets: Closed cell Polyisocyanurate board with fiber reinforced facers uniforming to FS-HH-I-1972/GEN with minimum aged R-Value listed per drawings, as required to satisfy Class B fire hazard classification. Taper as required to provide ½" per foot slope as finished in the field. Apply all tapered insulation between layers of required insulation.
  - 3. Separation Sheet: As required by manufacturer.
  - 4. Insulation or protection board must be accepted in writing by the membrane manufacturer. All insulations must be approved by their manufacturer for mechanically attached installations.
  - 5. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated. Fabricate all saddles, crickets, tapered edge strips, cants and other insulation shapes in polyisocyanurate to match board insulation.
- C. Fasteners:
  - 1. Corrosion resistant screw fastener as recommended by roof membrane manufacturer.
  - 2. Factory Mutual Tested and Approved with three (3) inches coated disc for 1-90 rating, length required to penetrate metal deck one inch.

## 2.5 SNOW GUARD

- A. General: Provide snow guard rail system to control snow migration.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Alpine Snow Guards, S-5 with ColorGard
    - b. Snojax Inc.
    - c. Polar Blox
  - 2. System Requirements:
    - a. Horizontal rail (8 feet in length) to match color of metal roof panels. Reference drawings for locations and spacing requirements.
    - b. Stainless steel mounting bracket and stainless steel set screws installed at every other standing seam rib (minimum). Brackets shall fasten (or clamp) to standing seam rib and not create any penetrations in the metal roof system. Aluminum mounting brackets are allowed.

### 2.6 UNDERLAYMENT MATERIALS

- A. Self-Adhering Sheet Underlayment (full coverage of roof area), High-tensile-strength rubberized asphalt underlayment; glass-fiber-mat-reinforced, SBS-modified asphalt; mineral-granule surfaced; with release paper backing; cold applied.
- 3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Carlisle Coatings & Waterproofing, Inc.
  - b. CertainTeed Corporation.
  - c. Henry Company.
  - d. Grace
  - e. Johns Manville.
  - f. Owens Corning.
  - g. Substitutions under provisions of Division 01.
- 4. Underlayment Requirements
  - a. ASTM D1970, minimum 40 mil thick polymer modified asphalt laminated to slipresistant polyethylene film, self-adhering with release paper facing.
  - b. Elongation: Minimum 250 percent, tested to ASTM D412.
  - c. Tensile strength: Minimum 250 PSI, tested to ASTM D412.
  - d. Permeance: 0.05 perms, tested to ASTM E96

# 2.6 FABRICATION

- A. Shop Assembly
  - 1. Form sections true to shape, accurate in size, square, and free from distortion or defects.
  - 2. Fabricate cleats of same material as sheet, inter-lockable with sheet.
  - 3. Fabricate starter strips of same material as sheet, continuous, inter-lockable with sheet.
  - 4. Form pieces in longest practical lengths.
  - 5. Hem exposed edges on underside 1/2 inch; miter and seam corners.
  - 6. Form material with locking standing seams.
- B. Shop Finishing
  - 1. All roofing, flashings, curbs and accessories are to be pre-coated with Kynar 500 finish.
  - Color: As selected by Architect, from entire range of Kynar 500 finishes, color to be similar to Kynar 500/Duratech 5000 color: "Cool" Roof Color, confirm color selection prior to final material order.
  - 3. Galvanized Steel: 0.022 inch thick minimum 24 gauge continuous extruded.
- C. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
  - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

- 2. End Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
- 3. End Seams for Other Than Aluminum: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- 4. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
- 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
- 6. Fabricate cleats and attachment devices of size and metal thickness recommended by SMACNA's "Architectural Sheet Metal Manual" or by metal roof panel manufacturer for application, but not less than thickness of metal being secured.

### PART 3 - EXECUTION

- 3.1 EXAMINATION
  - A. Inspect roof deck to verify deck or substrate is clean and smooth, free of depressions, waves, or projections, properly sloped to valley and eaves.
  - B. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, and reglets are in place.
  - C. Beginning of installation indicates acceptance of existing conditions.

### 3.2 PREPARATION

- A. Field measure site conditions prior to fabricating work.
- B. Install starter and edge strips, and cleats before starting installation.
- C. Install reglets true to lines and levels.
- D. Protect elements surrounding work of this Section from damage or disfigurement.

### 3.3 THERMAL INSULATION INSTALLATION

- 1. Polyethylene Vapor Retarder: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Repair tears or punctures immediately before concealment by other work.
- Board Insulation: Extend insulation in thickness as indicated to cover entire roof, stagger seams. Comply with installation requirements of insulation and roofing systems manufacturers. Install 6 inch thickness (2 layers minimum) for R-35 thermal value.
  - a. Erect insulation and hold in place with furring members spaced 24 inches o.c. Securely attach narrow flanges of furring members to roof deck with screws spaced 24 inches o.c. Over first layer to fill space between purlins formed by thermal spacer blocks. Hold in place with bands and crossbands below insulation.
  - b. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
  - c. As applicable, use adhesive to install and attach roof insulation to the indicated substrate
  - d. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.

### 3.4 UNDERLAYMENT

- A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
- B. Apply self-adhering underlayment to entire roof area.
- C. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck. Comply with lowtemperature installation restrictions of underlayment manufacturer if applicable. Install at entire asphalt roof area (complete coverage), lapped in direction to shed water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment within seven days.
  - 1. Prime concrete and masonry surfaces to receive self-adhering sheet underlayment.

- 2. Complete coverage of entire roof including: eaves, rakes, valley, hip, and ridges.
- 3. Sidewalls: Extend beyond sidewall 18 inches, and return vertically against sidewall not less than 4 inches.
- 4. Dormers, Chimneys, Skylights, and Other Roof-Penetrating Elements: Extend beyond penetrating element 18 inches, and return vertically against penetrating element not less than 4 inches.
- 5. Roof Slope Transitions: Extend 18 inches on each roof slope.
- D. Concealed, Closed-Cut Valley Lining: Comply with NRCA's recommendations. Install a 36-inch- self-adhering underlayment valley lining centered in valley. Lap ends of strips at least 12 inches in direction to shed water, and seal with roofing cement. Fasten to roof deck.
- E. Temperature Restrictions self-adhesive sheets: The minimum required substrate temperature at point of application is 40°F (4°C). Maintain a minimum roof membrane material temperature above 60° F (16° C). In low temperature conditions, keep materials warm prior to application. Consider using the specified tacky primer, required for vertical applications, in temperatures below 60° F (16° C) to facilitate proper bonding of self-adhered membrane for horizontal applications. The minimum ambient temperature range at the time of tacky primer application is 45°F to 105°F (7°C 40°C). Suspend application in situations where the self-adhered base ply cannot be kept at temperatures allowing for proper adhesion.

### 3.5 INSTALLATION

- A. Conform to drawings and shop drawings.
- B. Provide Ice Shield Membrane above all roof overhangs, and in 48" from face of building wall below. Provide additional ice shield membrane protection in all roof valleys for a distance 48" out from the centerline of the valley.
- D. Apply vapor retarder underlayment over entire roof deck, under thermal insulation board.
- E. Apply general underlayment over entire roof deck, including areas protected by ice shield membrane. Provide minimum 6" minimum end and side laps.
- E. Standing Seam Roofing
  - 1. Installation is to be in strict compliance with manufacturer's requirements and details to achieve the attached warranty.
  - 2. Any deviation from published manufacturer's installation must be approved in writing from the manufacturer's representative and received by Architect prior to work proceeding.
  - 3. All components of the roofing system are to be modified as required to accommodate insulation thickness.
- F. Snow Guards:
  - 1. Snow guards are to be installed in areas shown on drawings.
  - 2. Install as indicated on engineered shop drawings.
  - 3. Anchor to standing seam sheet metal roofing and do not damage or penetrate the primary roofing system as recommended by manufacturer.

### 3.6 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Division 01.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.
- C. A representative of the roofing manufacturer is to perform an on-site inspection of the completed system and certify, in writing, that the system has been installed per manufacturer's requirements and as required to achieve the attached warranty.
- D. Field inspection to be performed by SMACNA representative for standing seam roof assembly to be in accordance with the SMACNA Architectural Sheet Metal Manual.
- E. Contractor shall correct identified defects or irregularities.

### 3.7 CLEANING

A. Under provisions of Division 01.

Orion High School Pasco, Washington

- B. In areas where finished surfaces are soiled by Work of this section, consult manufacturer of surfaces for cleaning advice and conform to their instructions.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

# 3.8 PROTECTION OF FINISHED WORK

- A. Under provisions of Division 01.
- B. Protect building surfaces against damage from roofing work.

#### **ROOFING WARRANTY**

WHEREAS		
of (Address)		
herein called the "Roofing Contractor", has p	performed roofing and associated ("wo	ork") on following project:
Owner:		
Address:		
Name and Type of Building:		
Address:		
Area of Work:	Date of Acceptance:	_
Warranty Period: <u>Three (3) years</u>	Date of Expiration:	-

AND WHEREAS Roofing Contractor has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period.

NOW THEREFORE Roofing Contractor hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work, and as are necessary to maintain said work in watertight condition. In addition to making the work watertight, the Roofing Contractor shall remove and/or repair blisters, ridges, flashings, splits and other irregularities which in the opinion of the Roofing Manufacturer's technical representative do not conform to acceptable roofing practices and conditions. These repairs shall be made prior to expiration of the three (3) year Warranty Period and to the satisfaction of the Roofing Manufacturer's technical representative.

This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by: a) lightning, windstorm; b) fire; c) failure of roofing system substrate including cracking, settlement, excessive deflection, deterioration, and decomposition; d) faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work; and e) activity on roofing by others including construction contractors, maintenance personnel, other persons, and animals whether authorized or unauthorized by Owner.

When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Contractor, and until cost and expense thereof has been paid by Owner or by another responsible party so designated.

2. The Roofing Contractor is responsible for damage to work covered by this Warranty, but is not liable for consequential damages to building or building contents, resulting from leaks or faults or defects of work.

3. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Contractor, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void upon date of said alterations, but only to extent said alterations affect work covered by this Warranty. If Owner engages Roofing Contractor to perform said alterations, Warranty shall not become null and void, unless Roofing Contrac

tor, prior to proceeding with said work, shall claim that said alterations would like damage or deteriorate work, thereby reasonably justifying a limitation or termination of this warranty.

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

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

6. This Warranty is recognized to be the only Warranty of Roofing Contractor on said work, and is in addition to the Roofing Guarantee furnished by the Roofing Manufacturer, and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to him in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Contractor of responsibility for performance of original work in accordance with requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

IN WITNESS THEREOF, this instrument has been dully executed this

day of	, <u>20</u>
Cosigned by General Contractor by:	
(Conoral Contractor)	(Poofing Contractor)
(General Contractor)	(Rooning Contractor)
(Business Address)	(Business Address)
(Signature)	(Signature)
(Title)	(Title)

END OF SECTION 07 61 13

## SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Section Includes:
    - 1. Products:
      - a. Formed roof drainage and sheet metal fabrications.
      - b. Formed sloped roof sheet metal fabrications.
      - c. Formed wall sheet metal fabrications.
      - d. Flexible self-adhered flashing.
      - e. Formed equipment support flashing.
      - f. Formed sheet metal soffit enclosure.
      - g. Pre-cast or pre-formed splash block assembly for roof to roof drainage conditions.
  - B. Related Sections:
    - 1. Division 01 Section "Quality Requirements" for special building envelope mock-up.
    - 2. Division 05 Section "Metal Fabrications" for gutter support brackets and steel tubes.
    - 3. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
    - 4. Division 07 Section "Roofing" for installing sheet metal flashing and trim integral with membrane roofing.
    - 5. Division 07 Section "Metal Siding and Soffit" for sheet metal flashing and trim integral with metal wall panels.
    - 6. Division 07 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
    - 7. Division 07 Section "Joint Sealants" for sealants applied at metal flashing.
    - 8. Division 07 Section "Composite Trim" for sheet metal flashing and trim requirements.
    - 9. Division 08 Section "Aluminum-Framed Storefronts" for sheet metal flashing and trim integral with the storefront system.

#### 1.2 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
  - 1. Identification of material, thickness, weight, and finish for each item and location in Project.
  - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
  - 3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
  - 4. Details of termination points and assemblies, including fixed points.
  - 5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.

- 6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
- 7. Details of special conditions.
- 8. Details of connections to adjoining work.
- 9. Detail formed flashing and trim at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples: For each type of exposed finish required, prepared on Samples of size indicated below:
  - 1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
  - Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
  - 3. Accessories and Miscellaneous Materials: Full-size Sample.
- D. Qualification Data: For qualified fabricator.
- E. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.
- F. Warranty: Sample of special warranty.

### 1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockup of typical roof eave, approximately 10 feet long, including supporting construction cleats, seams, attachments, underlayment, and accessories.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at Project site.
  - 1. Meet with Owner, Architect, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
  - 2. Review methods and procedures related to sheet metal flashing and trim.
  - 3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
  - 4. Review special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect sheet metal flashing.
  - 5. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

### 1.6 WARRANTY

A. Provide Owner with a warranty stating that metal flashings and Associated sealants will properly shed water and protect building from physical damage for a minimum period of two years from date of substantial performance of work, as certified by Architect/Engineer, and that damage

Orion High School Pasco, Washington resulting from failure to provide above stated performances will be repaired to satisfaction of Owner at no additional cost

- B. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

# PART 2 - PRODUCTS

# 2.1 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
  - 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.
  - 2. Surface: Smooth, flat.
  - 3. Exposed Coil-Coated Finish:
    - a. Two-coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 4. Color: Shall be approved by Architect and match adjacent material being flashing.
  - 5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

# 2.2 ADDITIONAL UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- B. Slip Sheet: Building paper, 3-lb/100 sq. ft. minimum, rosin sized.

### 2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
  - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
    - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
    - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
  - 2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.
- C. Solder:
  - 1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.

- 2. For Zinc: ASTM B 32, 40 percent tin and 60 percent lead with low antimony, as recommended by manufacturer.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- H. Pre-cast concrete splash blocks provide at all locations where roof scupper drainage discharges onto a lower level roof.
  - 1. Basis of Design: Modern Pre-Cast, 30 inch splash block gray.
  - 2. Quantity: Provide (10) Units. Reference drawings for locations.
  - 3. Product substitution for equivalent under 01 60 00.

### 2.4 MANUFACTURED SHEET METAL FLASHING AND TRIM

- A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Cheney Flashing Company.
    - b. Fry Reglet Corporation.
    - c. Heckmann Building Products Inc.
    - d. Hickman, W. P. Company.
    - e. Hohmann & Barnard, Inc.; STF Sawtooth Flashing.
    - f. Keystone Flashing Company, Inc.
    - g. National Sheet Metal Systems, Inc.
    - h. Sandell Manufacturing Company, Inc.
  - 2. Material: Galvanized steel, 0.022 inch thick.
  - 3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
  - 4. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
  - 5. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
  - 6. Accessories:
    - a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
    - b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.
  - 7. Finish: With manufacturer's standard color coating.

# 2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
  - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  - 2. Obtain field measurements for accurate fit before shop fabrication.

- 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
- 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" and by FMG Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- H. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- I. Do not use graphite pencils to mark metal surfaces.

### 2.6 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters.
- B. Reference associated gutter support brackets under Division 05 "Metal Fabrications". Steel fabricated gutter supports are in addition to the concealed strap supports specified herein.
  - 1. Gutter Style: reference drawings for profile and sizes. Comply with SMACNA requirements.
  - 2. Expansion Joints: Built in.
  - 3. Gutters with Girth up to 15 Inches: Fabricate from the following materials:
    - a. Galvanized Steel: 0.022 inch thick.
    - b. Concealed Gutter support straps: 0.022 inch thick, 24" on center.
- C. Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors. Lower portion of each downspout and custom down spouts at building perimeter shall be tube steel, 6'-0" in height. Reference drawings for locations and details.
  - 1. Fabricated Hanger Style: reference drawings for profile and sizes. Comply with SMACNA requirements.
  - 2. Fabricate from the following materials:
    - a. Galvanized Steel: 18 gauge.
    - b. Tube Steel: 1/8" thick square profile. Reference drawings for size.

### 2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

Roof-Edge Flashing and Fascia Cap: Fabricate in minimum <u>96-inch-</u> long, but not exceeding <u>10-foot-</u> long, sections. Furnish with <u>6-inch-</u> wide, joint cover plates.

- 1. Joint Style: Lap, 4 inches wide.
- 2. Fabricate from the following materials:
  - a. Galvanized Steel: 0.028 inch thick.

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- B. Copings: Fabricate in minimum 96-inch- (long, but not exceeding 10-foot- long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and[ drill elongated holes for fasteners on] interior leg. Miter corners, seal, and solder or weld watertight.
  - 1. Coping Profile: reference drawings for profile and sizes. Comply with SMACNA requirements.
  - 2. Joint Style: Butt, with 12-inch- wide, concealed backup plate
  - 3. Fabricate from the following materials:
    - a. Galvanized Steel: 0.040 inch thick.
- C. Roof and Roof to Wall Transition, Roof to Roof Edge Flashing Transition and Fascia Cap Transition Expansion-Joint Cover: Fabricate from the following materials:
  - 1. Galvanized Steel: 0.034 inch thick.
- D. Base Flashing: Fabricate from the following materials:
  - 1. Galvanized Steel: 0.028 inch thick.
- E. Counterflashing: Fabricate from the following materials:1. Galvanized Steel: 0.022 inch thick.
- F. Flashing Receivers: Fabricate from the following materials:1. Galvanized Steel: .022 inch thick.
- G. Roof-Penetration Flashing: Fabricate from the following materials:
  1. Galvanized Steel: 0.028 inch thick.
- H. Roof-Drain Flashing: Fabricate from the following materials:
  - 1. Zinc-Tin Alloy-Coated Stainless Steel: 0.015 inch thick.
- 2.8 WALL SHEET METAL FABRICATIONS
  - A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch long, but not exceeding 12-foot long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch- high, end dams where flashing is discontinuous. Fabricate from the following materials:
    - 1. Zinc-Tin Alloy-Coated Stainless Steel: 0.015 inch thick.
  - B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch- high, end dams. Fabricate from the following materials:
  - C. Wall Expansion-Joint Cover: Fabricate from the following materials:
    - 1. Galvanized Steel: 0.028 inch thick.
  - D. Stainless Steel Flexible Self-Adhering Flashing: 2 mil sheet of Type 304 self-adhering stainless steel and butyl adhesive. Use only where flashing is fully concealed.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) York Manufacturing, Inc.; York 304 SA SS
      - 2) GE Silicones, Inc.; GE Elemax SS Flashing
      - 3) Vapro Shield, Inc.; Vapro Thru-Wall Flashing SA
    - b. Accessories:
      - 1) Polyether sealant:
        - a) York Manufacturing, Inc.; UniverSeal US-100
        - b) STS Coatings; GreatSeal LT-100
        - c) Prosoco, Inc.; R-Guard Joint Seam Sealer
      - 2) Splice Tape:
        - a) York Manufacturing, Inc.; York 304 SA
        - b) GE Silicones, Inc.; GE Elemax SS Flashing
        - c) VaproShield, Inc.; Vapro Thru-Wall Flashing SA
      - 3) Corner and End Dams: form the stainless stell flashing in the field or us 26 gauge stainless steel pre-manufactured corners.
      - 4) Mortar deflection: polyester strands that will not degrade and keep the weep vents from clogging with mortar.
        - a) York Manufacturing; Weep-Armor

- 5) Termination bar: rigid PVC or stainless steel termination bar with sealant catch lip.
  - a) York Manufacturing, Inc.; T-96 termination bar
  - b) York Manufacturing, Inc.; SS Term Bar
- 2.9 MISCELLANEOUS SHEET METAL FABRICATIONS
  - A. Equipment Support Flashing: Fabricate from the following materials:
     1. Galvanized Steel: 0.028 inch thick.

### PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
  - 1. Verify compliance with requirements for installation tolerances of substrates.
  - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 UNDERLAYMENT INSTALLATION

- A. General: Install underlayment as indicated on Drawings.
- B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days. Coordinate work with other roofing trades.

### 3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  - 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  - 3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
  - 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
  - 5. Install sealant tape where indicated.
  - 6. Torch cutting of sheet metal flashing and trim is not permitted.
  - 7. Do not use graphite pencils to mark metal surfaces.
  - B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
    - 1. Coat back side of steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
    - 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
  - C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or

intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

- D. Beam End Cap: provide Kynar Finish sheet cap with drip edge at all exposed end grain glu-lam beam locations. Coordinate finish color and fastener details with Architect.
- E. Fastener Sizes: Use fasteners of sizes that will penetrate metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- F. Seal joints as shown and as required for watertight construction.
  - Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
  - 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.
  - 1. Pre-tinning is not required for zinc-tin alloy-coated stainless steel.
  - 2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

## 3.4 ROOF DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
- B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with sealant. Provide for thermal expansion. Set gutters in gutter support brackets (reference Division 05 "Metal Fabrications") aligned at every-other standing metal roof seam. Attach gutters at eave or fascia to firmly anchored concealed straps spaced not more than 24 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts.
  - 1. Fasten gutter spacers to front and back of gutter.
  - 2. Loosely lock straps to front gutter bead and anchor to roof deck.
  - 3. Anchor and loosely lock back edge of gutter to continuous cleat.
  - 4. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches apart.
  - 5. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart. Install expansion-joint caps.
- C. Downspouts: Join sections with 1-1/2-inch telescoping joints.
  - 1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 48 inches o.c. in between.
  - 2. Connect downspouts to underground drainage system indicated with base boot connection to tightline.
- D. Parapet Scuppers: Install scuppers where indicated through parapet. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
  - 1. Anchor scupper closure trim flange to exterior wall and seal with elastomeric sealant to scupper.
  - 2. Loosely lock front edge of scupper with conductor head.
- E. Conductor Heads: Anchor securely to wall with elevation of conductor head rim 1 inch below scupper discharge.
- F. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints a minimum of 4 inches in direction of water flow.

## 3.5 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
- C. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at 24-inch centers.
- D. Copings: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated.
  - 1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch centers.
  - 2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.
- E. Insert metal flashings into reglets to form tight fit. Secure in place with plastic wedges at maximum 12 inches on center. Seal flashing into reglets with sealant
- F. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- G. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of anchor and washer at 36inch centers.
- H. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.
- I. Counterflash mechanical and electrical items projecting through roofing
- J. Provide colored sheetmetal sleeves over mechanical and electrical items projecting through the roof.

# 3.6 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of through-wall flashing is specified in Division 04 Section "Unit Masonry."
- C. Reglets: Installation of reglets as indicated."
- D. Opening Flashings in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 inches beyond wall openings.

### 3.7 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

### 3.8 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- 3.9 CLEANING AND PROTECTION
  - A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
  - B. Clean and neutralize flux materials. Clean off excess solder.
  - C. Clean off excess sealants.
  - D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
  - E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 62 00

## SECTION 07 72 00 - ROOF ACCESSORIES

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Exterior Roof Hatch.
- B. Related Sections include the following:
  - 1. Division 05 Section "Metal Fabrications" for metal vertical ladders, for access to roof hatches.
  - 2. Division 06 Section "Rough Carpentry" for wood cants, and wood nailers.
  - 3. Division 07 low-slope roofing Sections for roofing accessories.
  - 4. Division 07 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated metal flashing and counterflashing, and miscellaneous sheet metal trim and accessories.

## 1.2 SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work.
- C. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roofmounted items. Show the following:
  - 1. Size and location of roof accessories specified in this Section.
  - 2. Method of attaching roof accessories to roof or building structure.
  - 3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
- D. Samples: For each type of exposed factory-applied finish required and for each type of roof accessory indicated, prepared on Samples of size to adequately show color.
- E. Warranty: Special warranty specified in this Section.

# 1.3 QUALITY ASSURANCE

A. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

## 1.4 DELIVERY, STORAGE, AND HANDLING

A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

## 1.5 PROJECT CONDITIONS

A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.

## 1.6 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

## 1.7 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.

- b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
- c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
- 2. Finish Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

## 2.1 METAL MATERIALS

- A. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by hot-dip process and prepainted by coil-coating process to comply with ASTM A 755/A 755M.
  - 1. Galvanized Steel Sheet: ASTM A 653, G90 coated.
  - 2. Exposed Finishes: High-Performance Organic Finish (2-Coat Fluoropolymer): Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
    - a. Fluoropolymer 3-Coat System: Manufacturer's standard 3-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements in AAMA 2604, except as modified below:
      - 1) Humidity Resistance: 1000 hours.
      - 2) Salt-Spray Resistance: 1000 hours.
- B. Stainless-Steel Shapes or Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304 or Type 316, No. 2D finish.
- C. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized to comply with ASTM A 123/A 123M, unless otherwise indicated.
- D. Steel Tube: ASTM A 500, round tube, baked-enamel finished.
- E. Galvanized Steel Tube: ASTM A 500, round tube, hot-dip galvanized to comply with ASTM A 123/A 123M.
- F. Galvanized Steel Pipe: ASTM A 53/A 53M.

# 2.2 MISCELLANEOUS MATERIALS

- A. Cellulosic-Fiber Board Insulation: ASTM C 208, Type II, Grade 1, 1 inch thick.
- B. Glass-Fiber Board Insulation: ASTM C 726, 1 inch thick.
- C. Polyisocyanurate Board Insulation: ASTM C 1289, 1 inch thick.
- D. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for above ground use, complying with AWPA C2; not less than 1-1/2 inches thick.
- E. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- F. Polyethylene Sheet: 6-mil- thick, polyethylene sheet complying with ASTM D 4397.
- G. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
  - 1. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft.
- H. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.
- I. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.
- J. Elastomeric Sealant: ASTM C 920, silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- K. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, and heavy bodied for hooked-type expansion joints with limited movement.
- L. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

## 2.3 ROOF HATCHES

- A. Roof Hatches: Fabricate roof hatches with insulated double-wall lids and insulated double-wall curb frame with integral deck mounting flange and lid frame counterflashing. Fabricate with welded or mechanically fastened and sealed corner joints. Provide continuous weathertight perimeter gasketing and equip with corrosion-resistant or hot-dip galvanized hardware.
  - 1. Available Manufacturers:
    - a. Babcock-Davis; a Cierra Products Inc. Company.
    - b. Bilco Company (The).
    - c. Custom Curb, Inc.
    - d. Milcor Inc.; a Gibraltar Company.
    - e. Precision Ladders, LLC.
    - f. Wasco Products, Inc.
  - 2. Loads: Fabricate roof hatches to withstand 40-lbf/sq. ft. external and 20-lbf/sq. ft. internal loads.
  - 3. Exterior Type and Size: Single-leaf lid, **30 by 36 inches**. Verify hinge location for access per WISHA. Locate above wall ladder in Mechanical Room.
  - 4. Curb and Lid Material: Galvanized steel sheet, 0.079 inch thick.
  - 5. Insulation: Polyisocyanurate board.
  - 6. Interior Lid Liner: Manufacturer's standard metal liner of same material and finish as outer metal lid.
  - 7. Exterior Curb Liner: Manufacturer's standard metal liner of same material and finish as metal curb.
  - 8. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
  - 9. Fabricate units to minimum height of 12 inches, unless otherwise indicated.
  - 10. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate hatch curbs with height constant.
  - 11. Hardware: Stainless-steel spring latch with turn handles, pintle-type hinge system, and padlock hasps inside and outside.
    - a. Provide gasketing and equip with corrosion-resistant or hot-dip galvanized hardware including pintle hinges, hold-open devices, interior padlock hasps, and both interior and exterior latch handles.
    - b. Provide remote-control operation.
    - c. Verify hinge location for access per WISHA
  - 12. Ladder Safety Post: Manufacturer's standard ladder safety post. Post to lock in place on full extension. Provide release mechanism to return post to closed position.
    - a. Height: 42 inches above finished roof and floor deck.
    - b. Material and Finish: Steel tube, galvanized.
    - c. Diameter: Pipe with 1-5/8-inch OD tube.
  - 13. Safety railing for floor hatch, side exit, 4 sided aluminum, aluminum gate and yellow paint.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
  - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.
  - 2. Verify dimensions of roof openings for roof accessories.
  - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory

Orion High School Pasco, Washington installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.

- B. Install roof accessories to fit substrates and to result in watertight performance.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
  - 1. Coat concealed side of stainless-steel roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  - 2. Underlayment: Where installing exposed-to-view components of roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.
  - 3. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.
- D. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
- E. Roof Curb Installation:
  - 1. Set roof curb so top surface of roof curb and hatch assembly is parallel with roof slope.
- F. Roof Hatch Installation:
  - 1. Check roof hatch for proper operation. Adjust operating mechanism as required. Clean and lubricate joints and hardware.
  - 2. Attach safety railing system to roof hatch curb.
  - 3. Attach ladder safety post according to manufacturer's written instructions.
- G. Seal joints with butyl sealant as required by manufacturer of roof accessories.
- 3.3 TOUCH UP
  - A. Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Division 09 painting Sections.
  - B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.
- 3.4 CLEANING
  - A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION 07 72 00

## SECTION 07 84 00 - FIRESTOPPING

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through fireresistance-rated constructions, including both empty openings and openings containing penetrating items.
- B. All individual trades shall provide and install <u>all</u> firestopping and smoke seal materials, assemblies, systems, and accessories at <u>all</u> penetrations of fire or smoke rated building elements or assemblies
- C. All firestopping in the project shall be installed in compliance with this section, firestopping shall be installed by the trade making the penetration using a single firestopping manufacturer's products.
- D. Label all rated penetrations per IFC 703, NFPA 80 and NFPA 5000.
- E. Reference Drawings, including but not limited to the Code Summary Plan and typical assembly details for additional information regarding fire rating requirements.
- F. Comply with all local jurisdictional requirements. Install firestopping at all locations requested by fire marshal.
- G. Related Sections include the following:
  - 1. Division 21 Sections specifying fire-suppression piping penetrations.
  - 2. Division 22 and 23 Sections specifying duct and piping penetrations.
  - 3. Division 26, 27, and 28 Sections specifying cable and conduit penetrations.

## 1.2 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
  - 1. Fire-resistance-rated walls including fire walls, fire partitions, fire barriers, and smoke barriers.
  - 2. Fire-resistance-rated horizontal assemblies including floor/ceiling assemblies and ceiling membranes of roof/ceiling assemblies.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814 or UL 1479:
  - 1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
  - 2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
    - a. Penetrations located outside wall cavities.
    - b. Penetrations located outside fire-resistance-rated shaft enclosures.
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
  - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moistureresistant through-penetration firestop systems.
  - 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
  - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

- D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- 1.3 SUBMITTALS
  - A. Product Data: For each type of product indicated.
  - B. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.
    - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
    - 2. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
    - 3. Document all fire penetration locations and provide to local inspector for use and approval during inspections. Comply with city and county regulations for documentation of penetration locations.
  - C. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
    - 1. Types of penetrating items.
    - 2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
    - 3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.
  - D. Provide submittal of all penetration firestopping information to local jurisdiction for review and comment prior to any on-site application.
  - E. Product data confirming compliance with VOC limit requirements contained in section 01 81 14.
  - F. Qualification Data: For Installer.
  - G. Product Certificates: For through-penetration firestop system products, signed by product manufacturer.
  - H. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

## 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
  - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
  - 2. Through-penetration firestop systems are identical to those tested per testing standard referenced in "Part 1 Performance Requirements" Article. Provide rated systems complying with the following requirements:

- a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
- b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
  - 1. UL in its "Fire Resistance Directory."
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

## 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

## 1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by building inspector, if required by authorities having jurisdiction.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, through-penetration firestop systems that may be incorporated into the Work include, but are not limited to, those systems indicated that are produced by one of the following manufacturers:
  - 1. A/D Fire Protection Systems Inc.
  - 2. Grace, W. R. & Co. Conn.
  - 3. Hilti, Inc.
  - 4. Johns Manville.
  - 5. Nelson Firestop Products.
  - 6. NUCO Inc.
  - 7. RectorSeal Corporation (The).
  - 8. Specified Technologies Inc.
  - 9. 3M; Fire Protection Products Division.
  - 10. Tremco; Sealant/Weatherproofing Division.
  - 11. USG Corporation.

## 2.2 FIRESTOPPING, GENERAL

A. Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
  - 1. Permanent forming/damming/backing materials, including the following:
    - a. Slag-/rock-wool-fiber insulation.
      - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    - c. Fillers for sealants.
  - 2. Temporary forming materials.
  - 3. Substrate primers.
  - 4. Collars.
  - 5. Steel sleeves.

## 2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by referencing the types of materials described in this Article. Fill materials are those referred to in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives.
- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- K. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
  - 1. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
  - 2. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

## 2.4 MIXING

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

## PART 3 - EXECUTION

## 3.1 EXAMINATION

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

## 3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

## 3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
- D. Remove excess firestop material at all exposed conditions. Clean, brush and wash excess firestop material for clean appearance. Cover or conceal excess exposed material with stainless steel escutcheon as needed if cleaning is not satisfactory to Architect and Owner.

## 3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified, independent inspecting agency to inspect through-penetration firestops. Independent inspecting agency shall comply with ASTM E 2174 requirements including those related to qualifications, conducting inspections, and preparing test reports.
- B. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

- C. Proceed with enclosing through-penetration firestop systems with other construction only after Owner agrees and/or inspection reports are issued and firestop installations comply with requirements.
- D. Contractor to comply with authorities having jurisdiction and work with inspectors as required to complete inspection and verification of each sealed penetration location. Provide all documentation as requested by inspector.

#### 3.5 CLEANING AND PROTECTING

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

#### THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE 3.6

- Α. Where UL-classified systems are indicated, they refer to alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.
- Β. Firestopping materials shall be free of asbestos and PCB's
- Materials, assemblies, products and accessories used shall be appropriate for the following C. parameters: 1.
  - Fire-rated Building Element or Assembly Penetrated:
    - Floor/ceiling, wall, roof, roof/ceiling.
      - Rating: 1 hour, and 2 hour. 1.
      - Materials: masonry, concrete, gypsum wallboard, concrete, metal decking. 2.
      - Thickness as required or detailed 3.
    - Item(s) Penetrating Fire-Rated Building Element or Assembly: pipe(s), conduit(s), b. Cable(s), etc.
      - 1. Material: steel, cast iron, copper, plastic, etc.
      - 2. Size: diameter, dimensions, thickness: e.g. '4" schedule 40 steel pipe, 4"x4" opening
      - 3. Insulation: material and thickness
    - Size of annulus between Item Penetrating and Building Element Penetrated C.
    - Include all Joints, voids, abandoned openings, and openings for future use d.

END OF SECTION 07 84 00

a.

## SECTION 07 92 00 - JOINT SEALANTS

## PART 1 - GENERAL

- 1.1 SUMMARY
  - A. This Section includes joint sealants for the following applications, including preparing sealant substrate surfaces, sealant and expandable backing. This work includes those installations specified by reference to this Section:
    - 1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:
      - a. Construction joints in cast-in-place concrete.
        - b. Joints between plant-precast architectural concrete units.
        - c. Control and expansion joints in unit masonry.
        - d. Joints in exterior insulation and finish systems.
        - e. Joints between metal panels.
        - f. Joints between different materials listed above.
        - g. Perimeter joints between materials listed above and frames of doors windows and louvers
        - h. Control and expansion joints in ceilings and other overhead surfaces.
        - i. Other joints as indicated.
    - 2. Exterior joints in the following horizontal traffic surfaces:
      - a. Isolation and contraction joints in cast-in-place concrete slabs.
      - b. Other joints as indicated.
    - 3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
      - a. Control and expansion joints on exposed interior surfaces of exterior walls.
        - b. Perimeter joints of exterior openings where indicated.
        - c. Tile control and expansion joints.
        - d. Vertical joints on exposed surfaces of partitions.
        - e. Perimeter joints between interior wall surfaces and frames of interior doors, and windows.
        - f. Joints between plumbing fixtures and adjoining walls, floors, and counters.
        - g. Other joints as indicated.
    - 4. Interior joints in the following horizontal traffic surfaces:
      - a. Isolation joints in cast-in-place concrete slabs.
      - b. Other joints as indicated.
    - B. Related Sections include the following:
      - 1. Division 01 Section "Quality Requirements" for special building envelope mock-up.
      - 2. Division 04 Section "Unit Masonry" for masonry control and expansion joint fillers and gaskets.
      - 3. Division 07 Section "Composite Metal Wall Panels" for panel sealants
      - 4. Division 07 Section "Sheet Metal Flashing and Trim" for joint sealants
      - 5. Division 08 Section "Glazing" for glazing sealants.
      - 6. Division 09 Section "Gypsum Board" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
      - 7. Division 09 Section "Tiling" for sealing tile joints.
      - 8. Division 09 Section "Acoustical Panel Ceilings" and "Acoustical Tile Ceilings" for sealing edge moldings at perimeters of acoustical ceilings.
      - 9. Division 32 Section "Concrete Paving Joint Sealants" for sealing joints in pavements, walkways, and curbing.

#### 1.2 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and waterresistant continuous joint seals without staining or deteriorating joint substrates.

## 1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

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- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.
- F. Qualification Data: For Installer.
- G. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
   1. Materials forming joint substrates and joint-sealant backings have been tested for
  - compatibility and adhesion with joint sealants.
  - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- H. Field Test Report Log: For each elastomeric sealant application.
- I. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.
- J. Warranties: Special warranties specified in this Section.
- K. WSSP Compliance Submittals: Not Used.

## 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- B. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
  - 1. Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
  - 2. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
  - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
  - 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
  - 5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- C. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36month period preceding the commencement of the Work.
  - Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
  - 2. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.
- D. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to Project joint substrates as follows:
  - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
  - 2. Conduct field tests for each application indicated below:
    - a. Each type of elastomeric sealant and joint substrate indicated.
    - b. Each type of nonelastomeric sealant and joint substrate indicated.
  - 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
    - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant
      - Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193.
        - 1. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

- 4. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
- 5. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

# 1.5 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by jointsealant manufacturer or are below 40 deg F.
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## 1.6 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: 5 years from date of Substantial Completion.
- C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
  - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
  - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
  - 3. Mechanical damage caused by individuals, tools, or other outside agents.
  - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

## 2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Acoustical Sealant: 250 g/L
  - 2. Architectural Sealants: 250 g/L.
  - 3. Nonmembrane Roof Sealants: 300 g/L.
  - 4. Single-Ply Roof Membrane Sealants: 450 g/L.

- 5. Sealant Primers for Nonporous Substrates: 250 g/L.
- 6. Sealant Primers for Porous Substrates: 775 g/L.
- 7. Modified Bituminous Sealant Primers: 500 g/L.
- C. Colors of Exposed Joint Sealants: Integrally colored sealants, as selected by Architect to match adjacent materials.

## 2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- D. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600. Provide products and installations that comply with this requirement in Food Preparation and Food Serving Areas of the project.
- E. Sealant Type #1: Single-Component Silicone Sealant:
  - 1. Available Products:
    - a. Basis of Design: Dow Corning Corporation; 795
    - b. GE Silicones; SilPruf NB SCS9000.
    - c. GE Silicones; UltraPruf II SCS2900.
    - d. Pecora Corporation; 865.
    - e. Pecora Corporation; 895.
    - f. Pecora Corporation; 898.
  - 2. Type and Grade: S (single component) and NS (nonsag).
  - 3. Class: 50.
  - 4. Use Related to Exposure: NT (nontraffic).
  - 5. Uses Related to Joint Substrates: Coated glass, anodic aluminum, aluminum coated with a high-performance coating, galvanized steel.
  - 6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.
- F. Sealant Type #2: Single-Component Mildew-Resistant Acid-Curing Silicone Sealant:
  - 1. Available Products:
    - a. Basis of Design: Dow Corning Corporation; 786 Mildew Resistant.
    - b. GE Silicones; Sanitary SCS1700.
    - c. Tremco; Tremsil 200 [White] [Clear].
  - 2. Type and Grade: S (single component) and NS (nonsag).
  - 3. Class: 25.
  - 4. Use Related to Exposure: NT (nontraffic).
  - 5. Uses Related to Joint Substrates: Coated glass, anodic aluminum, aluminum coated with a high-performance coating, galvanized steel, ceramic tile.

## G. Sealant Type #3: Multicomponent Nonsag Urethane Sealant:

- 1. Available Products:
  - a. Basis of Design: Sonneborn, Division of ChemRex Inc.; NP 2.
  - b. Schnee-Morehead, Inc.; Permathane SM 7200.
  - c. Sika Corporation, Inc.; Sikaflex 2c NS TG.
  - d. Tremco; Vulkem 227.
- 2. Type and Grade: M (multicomponent) and NS (nonsag).
- 3. Class: 25.
- 4. Uses Related to Exposure: T (traffic) and NT (nontraffic).

- H. Sealant Type #4: Single-Component Self Leveling Urethane Sealant:
  - 1. Available Products:
    - a. Basis of Design: ChemRex Sonnneborn SL-1
    - b. Schnee-Morehead, Inc.; equivalent product to basis of design.
    - c. Sika Corporation, Inc.; equivalent product to basis of design.
    - d. Tremco; equivalent product to basis of design.
  - 2. Type and Grade: S (single component) and SL (self leveling).
  - 3. Class: 25.

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- 4. Use Related to Exposure: T (traffic).
- Sealant Type #5: Single-Component Nonsag Urethane Sealant:
- 1. Available Products:
  - a. Basis of Design: ChemRex Sonnneborn NP-1
  - b. Bostik Findley; Chem-Calk 900.
  - c. Pecora Corporation; Dynatrol I-XL.
  - d. Polymeric Systems Inc.; Flexiprene 1000.
  - e. Polymeric Systems Inc.; PSI-901.
  - f. Schnee-Morehead, Inc.; Permathane SM7100.
  - g. Sika Corporation, Inc.; Sikaflex 15LM.
  - h. Tremco; DyMonic.
- 2. Type and Grade: S (single component) and NS (nonsag).
- 3. Class: 25.
- 4. Use Related to Exposure: NT (nontraffic).
- 2.4 LATEX JOINT SEALANTS
  - A. **Sealant Type #6:** Latex Sealant: Comply with ASTM C 834, Type P, Grade NF, for field applied paint finish.
  - B. Available Products:
    - 1. Bostik Findley; Chem-Calk 600.
    - 2. Pecora Corporation; AC-20+.
    - 3. Schnee-Morehead, Inc.; SM 8200.
    - 4. Sonneborn, Division of ChemRex Inc.; Sonolac.
    - 5. Tremco; Tremflex 834.
- 2.5 ACOUSTICAL JOINT SEALANTS
  - A. **Sealant Type #7:** Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following:
    - 1. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
    - 2. Available Products:
      - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
      - b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.
  - B. Acoustical Sealant for Concealed Joints: Manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.
    - 1. Available Products:
      - a. Pecora Corporation; BA-98.
      - b. Tremco; Tremco Acoustical Sealant.
- 2.6 PREFORMED TAPE SEALANTS
  - A. Back-Bedding Mastic Tape Sealant: Preformed, butyl-based elastomeric tape sealant with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

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- 1. AAMA 807.3 tape, for applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Tape Sealant: Closed-cell, PVC foam tape sealant; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
  - 1. Type 1, for applications in which tape acts as the primary sealant.
  - 2. Type 2, for applications in which tape is used in combination with a full bead of liquid sealant.

## 2.7 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
- C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

# 2.8 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

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

- a. Concrete.
- b. Masonry.
- c. Unglazed surfaces of ceramic tile.
- 3. Remove laitance and form-release agents from concrete.
- 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
  - a. Metal.
  - b. Glass.
  - c. Porcelain enamel.
  - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
  - 1. Mask all locations where silicone based sealants are installed. No silicone based sealant shall be allowed to migrate onto adjacent finished surfaces.

# 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
  - 4. Installed sealant shall provide leak-proof joint between adjacent materials.
- G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
    - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

- 4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
- H. Installation of Preformed Tapes: Install according to manufacturer's written instructions.

## 3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
  - 1. Extent of Testing: Test completed elastomeric sealant joints as follows:
    - a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and joint substrate.
    - b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.
  - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab in Appendix X1 in ASTM C 1193, as appropriate for type of joint-sealant application indicated.
    - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
  - 3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
  - 4. Inspect tested joints and report on the following:
    - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
    - b. Whether sealants filled joint cavities and are free of voids.
    - c. Whether sealant dimensions and configurations comply with specified requirements.
  - 5. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
  - 6. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
  - 7. Remove, clean surfaces and reinstall sealant if final joint is not leak-proof.
- B. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

## 3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- B. Remove any and all sealant material outside of the joint area. Fully remove the sealant material to allow for a complete and satisfactory installation of other finishes including paint.

## 3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

## 3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior butt joints between metal panels.

- 1. Joint Sealant: Sealant Type #1 or as recommended by the metal wall panel manufacturer.
- 2. Joint-Sealant Color: To match adjacent material color, as selected by Architect from manufacturer's full and complete range.
- Joint-Sealant Application: Exterior perimeter joints at frames of doors, windows, and louvers.
  - 1. Joint Sealant: Sealant Type #1.

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- 2. Joint-Sealant Color: To match adjacent material color, as selected by Architect from manufacturer's full and complete range.
- C. Joint-Sealant Application: Interior joints in High Moisture and Mildew Areas, between plumbing fixtures and adjoining walls, floors, and counters.
  - 1. Joint Sealant: Sealant Type #2.
  - 2. Joint-Sealant Color: To match adjacent material color, as selected by Architect from manufacturer's full and complete range.
- D. Joint-Sealant Application: Exterior vertical and horizontal nontraffic construction joints in castin-place concrete.
  - 1. Joint Sealant: Sealant Type #3 or #5.
  - 2. Joint-Sealant Color: To match adjacent material color, as selected by Architect from manufacturer's full and complete range.
- E. Joint-Sealant Application: Exterior horizontal traffic isolation and contraction joints in cast-inplace concrete slabs.
  - 1. Joint Sealant: Sealant Type #4.
  - 2. Joint-Sealant Color: To match adjacent material color, as selected by Architect from manufacturer's full and complete range.
- F. Joint-Sealant Application: Exterior vertical and horizontal nontraffic joints between plant-precast architectural concrete units, exterior vertical control and expansion joints in unit masonry, exterior vertical joints between differing materials.
  - 1. Joint Sealant: Sealant Type #5.
  - 2. Joint-Sealant Color: To match adjacent material color, as selected by Architect from manufacturer's full and complete range.
- G. Joint-Sealant Application: Interior perimeter joints of exterior openings, perimeter joints between interior ceiling surfaces, interior wall surfaces, trim components, and frames of interior doors, and windows, interior and exterior sealant-pointed mortar joints in glass unit masonry assemblies.
  - 1. Joint Sealant: Sealant Type #6.
  - 2. Joint-Sealant Color: To match adjacent material color, as selected by Architect from manufacturer's full and complete range.
- H. Joint-Sealant Application: Acoustical perimeter joints between interior ceiling surfaces, interior wall surfaces and frames of interior doors, and windows. Install on all walls indicated to receive acoustical wall insulation (indicated by wall type reference in the drawings)
  - 1. Joint Sealant: Sealant Type #7.
  - 2. Joint-Sealant Color: To match adjacent material color, as selected by Architect from manufacturer's full and complete range.
- I. Joint-Sealants used in food service areas of the building will be specifically approved by governing authorities for use in such locations.

END OF SECTION 07 92 00

# **DIVISION 08 – OPENINGS**

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MARK	LOCATION	DOOR				FRAME			DETAILS	ASSEM HW		REMARKS	
		Size	Туре	Matl	Finish	Туре	Material	Finish	Head	Jamb	RATING	GROUP	
First Floor	·								•	•			
100	Vestibule	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	E	ALUM	FF	C9/A6.10 SIM	C11/A6.10	-	01	Lock-down, panic, removable mullion, electronic hardware, insulated door, weather strip
100A	Vestibule	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	E	ALUM	FF	C9/A6.10 SIM	C11/A6.10	-	02	Access Control, ADA opener, panic, removable mullion, lock down, electronic hardware, insulated door, weather strip
100B	Vestibule	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	F	ALUM	FF	E3/A6.10	E1/A6.10	-	03	Access Control, ADA opener, lock-down, panic, removable mullion, projectile resistant glazing, buzz-thru by Secretary, projectile resistant glazing, electronic hardware
100C	Vestibule	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	F	ALUM	FF	E3/A6.10	E1/A6.10	-	04	Lock-down, panic, removable mullion, projectile resistant glazing, buzz-thru by Secretary, projectile resistant glazing, electronic hardware
101	Secretary (no door)												
102	Waiting	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	G	ALUM	FF	E3/A6.10	E1/A6.10	-	05	Access Control, lock set, no mullion, ovhd closer with stops, south leaf 180° swing
103	Health	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	12	Lock set
103A	Office	3'-0" x 7'-0"	HG	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set
103B	Unisex	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	07	Privacy lock set, closer
104	Storage	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set
105	Work Room (no door)	1				1	1				1		
106	Unisex	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	07	Privacy lock set, closer
107	Unisex	3'-0" x 7'-0"	F	WD	WD	01	НМ	PT-7	E7/A6.10	E7/A6.10	-	07	Privacy lock set, closer
108	Coordior	3'-0" x 7'-0"	HG	WD	WD	04	НМ	PT-7	E7/A6.10	E7/A6.10	-	08	Access Control, lock set
109	Office	3'-0" x 7'-0"	F	WD	WD	04	НМ	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set
110	Office	3'-0" x 7'-0"	F	WD	WD	04	НМ	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set
111	Office	3'-0" x 7'-0"	F	WD	WD	04	НМ	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set
112	Conference Room	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	_	06	Lock set
113	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
113A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
114	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	F7/A6 10	E7/A6 10	<u>-</u>	09	Classroom lock set panic ovhd closer with stop
114A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	НМ	PT-7	E7/A6 10	E7/A6 10	-	09	Classroom lock set, panic, ovhd closer with stop
114B	Learning Center	16'-0"x8'-6" FV	SGW	ALUM	FF	-	ALUM	FF	C1/A6.10	A1/A6.10		10	Mnfr locking hardware, recess door in pocket
115	Student Collaborate (no door)	1				1	1				1		······································
116	Storage	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	11	Lock set
117	Teachers	3'-0" x 7'-0"	F	WD	WD	05	HM	PT-7	E7/A6.10	E7/A6.10	-	12	Lock set
117A	Office	3'-0" x 7'-0"	HG	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set
117B	Unisex	3'-0" x 7'-0"	F	WD	WD	01	НМ	PT-7	E7/A6.10	E7/A6.10	-	07	Privacy lock set. closer
118	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	НМ	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
118A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	НМ	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
119	Manufacture Lab	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
119A	Manufacture Lab	3'-0" x 7'-0"	F	WD	WD	04	НМ	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
119B	Manufacture Lab	8'-0" x 9'-4" FV	OHD	STL	FF	-	STL	FF	G3/A6.11 SIM	E1/A6.11	-	13	Key Switch, power operated, SS trim, insulated
120	CPU Lab	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
120A	CPU Lab	3'-0" x 7'-0"	FG	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	14	Classroom lock set
120B	CPU Lab	3'-0" x 7'-0"	FG	WD	WD	01	НМ	PT-7	E7/A6.10	E7/A6.10	-	14	Classroom lock set
121	Manufacture Lab	3'-0" x 7'-0"	F	WD	WD	04	НМ	PT-7	E7/A6.10	E7/A6.10	-	9	Classroom lock set, panic, ovhd closer with stop
121A	Print	PR 3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	15	Lock set, no center mullion
121B	Storage	PR 3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	15	Lock set, no center mullion
121C	Manufacture Lab	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
121D	Manufacture Lab	8'-0" x 9'-4" FV	OHD	STL	FF	-	STL	FF	G3/A6.11 SIM	E1/A6.11	-	13	Key Switch, power operated, SS trim, insulated
122	Custodial	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	16	Kickplates, lock set, kick stop
123	Girls (no door)						1				1		
124	Boys (no door)	1				1	1			:	1		
125	Elevator Equipment	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	60	17	Kickplates, lock set, gasket, ovhd closer
126	Compressor Room	3'-0" x 7'-0"	F	WD	WD	01	НМ	PT-7	E7/A6.10	E7/A6.10	-	17	Kickplates, lock set, gasket/sweep (for sound), ovhd closer

MARK	LOCATION	DOOR				FRAME	DETAILS				ASSEM	HW	REMARKS	
		Size	Туре	Matl	Finish	Туре	Material	Finish	Head	Jamb	RATING	GROUP		
127	Electrical Room	3'-0" x 7'-0"	F	MTL	PT-5	03	ΗМ	PT-7	G5/A6.11	A7/A6.10	-	18	Panic, aluminum drip cap, weather strip, insulated door, label door: ELECTRICAL ROOM	
127A	Electrical Room	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	19	Panic, label door: ELECTRICAL ROOM	
128	Fire Riser	3'-0" x 7'-0"	F	MTL	PT-5	03	HM	PT-7	G5/A6.11	A7/A6.10	-	20	Lock set, aluminum drip cap, weather strip, insulated door, label: FIRE RISER	
129	Mech/Cust	PR* 5'-0" x 7'-0"	F	MTL	PT-5	01	HM	PT-7	E7/A6.10	E7/A6.10	-	21	Custom pair, no center mullion, kickplates	
129A	Mech/Cust	3'-0" x 7'-0"	F	MTL	PT-5	01	HM	PT-7	E7/A6.10	E7/A6.10	-	16	Lock set, kickplates	
130	Storage	3'-0" x 7'-0"	F	MTL	PT-5	01	HM	PT-7	E7/A6.10	E7/A6.10	-	16	Lock set, kickplates	
130A	Storage	8'-0" x 9'-0"	OHD	STL	FF	-	STL	FF	E7/A6.11	E9/A6.11	-	13	Double Key Switch, power operated, SS trim, insulated	
131	Kitchen	PR 6'-0" x 7'-0"	F	MTL	PT-5	01	HM	PT-7	E7/A6.10	E7/A6.10	-	22	Lock set, kickplates, no center mullion	
131A	Office	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set	
131B	Unisex	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10		07	Privacy lock set, closer	
131C	Scullery	3'-0" x 7'-0"	HG	WD	WD	01	НМ	PT-7	E7/A6.10	E7/A6.10		23	Lock set	
131D	Serving	8'-0" x 10'-0" FV	ORG	ALUM	ALUM		ALUM	FF	A3/A6.11	E5/A6.11		13	Key Switch, power operated, Alum trim	
131E	Freezer (walk-in)	3'-0" x 7'-0"	·····-	·····	······	÷						24	Food Service Equipment, wrap wall opening with FRP	
131F	Cooler (walk-in)	3'-0" X 7'-0"	-	-	- 	01	-		E7/A6 10	E7/A6 10		24	Look set kickpletes	
1316	Serving	3-0 X 7-0				01			E7/A0.10	E7/A0.10		20 13	Key Switch power operated Alum trim	
1310	Serving	8' 0" x 10' 0" EV	ORG			÷			A3/A0.11	E5/A6.11		13	Key Switch, power operated, Alum trim	
132	Vestibule	PR 3'-0" x 7'-0"	FG			ĸ		FF	C9/A6 10 SIM	A9/A6 10 SIM		01	Access Control panic removable mullion lock down electronic	
						ļ							hardware, insulated door, weather strip	
132A	Vestibule	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	K	ALUM	FF	E3/A6.10	E1/A6.10 SIM	-	26	Push/Pull, ovhd closer, no center mullion, insulated	
133	Career Center	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	J	ALUM	FF	E3/A6.10	E1/A6.10 SIM	-	27	Panic, ovhd closer with stop, 130° swing, no center mullion	
133A	Office	3'-0" x 7'-0"	F	WD	WD	04	HM	PI-7	E7/A6.10	E7/A6.10		06	Lock set	
133B	Office	3'-0" x 7'-0"	<u>F</u>	WD	WD	04	HM	PI-7	E7/A6.10	E7/A6.10		06	Lock set	
133C	Office	3'-0" X 7'-0"	F	WD	WD	04	НМ	PI-/	E7/A6.10	E7/A6.10		06	Lock set	
133D		PR 3'-0" x 7'-0"	F	WD		01	нм	P1-7	E7/A6.10	E7/A6.10	-	28	LOCK SET, KICK STOP, 180° SWING, IADEI GOOT FIRE ALARM PANEL	
133E	Career Center	3'-0" x 7'-0"	F	MTL	PT-5	03	HM	PT-7	G5/A6.11	A7/A6.10	-	29	Panic, lock down, electronic hardware, insulated door, drip cap, weather strip	
134	Commons	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	L	ALUM	FF	C9/A6.10 SIM	C11/A6.10	-	01	Card Access, panic, lock down, electronic hardware, insulated door, weather strip	
134A	Commons	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	L	ALUM	FF	C9/A6.10 SIM	C11/A6.10	-	01	Panic, lock down, electronic hardware, insulated door, weather strip	
134B	Commons	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	L	ALUM	FF	C9/A6.10 SIM	C11/A6.10	-	01	Panic, lock down, electronic hardware, insulated door, weather strip	
135	Unisex	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	07	Privacy lock set, closer	
136	Office	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	07	Lock set	
137	Security	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	07	Lock set	
138	Student Store	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	30	Lock set, kick plates	
138A	Student Store	8'-0" x 6'-6" FV	OCD	STL	SS	-	STL	SS	E7/A6.11	E9/A6.11	-	13	Key Switch, power operated, SS Trim	
139	Credit Union	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set	
139A	Credit Union	5'-0" x 9'-0" FV	ORG	ALUM	ALUM		ALUM	FF	A3/A6.11 SIM	E5/A6.11 SIM		13	Key Switch, power operated, Alum trim	
140	Unisex	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	07	Privacy lock set, closer	
141	Custodial	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10		16	Kickplates, lock set, kick stop, 180° swing	
142	Boys (no door)													
143	Girls (no door)	01.011.71.011							57/40.40	57/40.40				
144	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	НМ	PI-/	E7/A6.10	E7/A6.10		09	Classroom lock set, panic, ovhd closer with stop	
144A	Surage	3'-U" X /'-U" 3' 0" y 7' 0"	F			01		۲۱- <i>۲</i>	E7/A0.10	E7/A6.10		31	Lock set	
144D	Learning Center	3-0 X / -0 16'-0"⊻8'-6" EV	SGW/			- 04		FI-/	C1/A6 10	Δ1/Δ6 10		10	Mofr locking bardware, recess door in pocket	
145	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop	
145A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	НМ	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop	
146	Teachers	3'-0" x 7'-0"	F	WD	WD	05	НМ	PT-7	E7/A6.10	E7/A6.10	-	12	Lock set	
146A	Office	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set	

MARK	LOCATION	DOOR				FRAME DETAILS					ASSEM HW		REMARKS
		Size	Туре	Matl	Finish	Туре	Material	Finish	Head	Jamb	RATING	GROUP	
146B	Unisex	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	07	Privacy lock set, closer
147	Storage	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	11	Lock set
148	Student Collaborate (no door)												
149	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
149A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
150	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
150A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
151	Tech Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
151A	Office	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	31	Lock set
151B	Tech Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
152	Office	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set
153	Office	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set
			[			1	[				1	-	
CR-2	Coordior	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	V	ALUM	FF	C5/A6.11	A5/A6.11	-	01	Access Control, panic, removable mullion, lock down, electronic hardware, insulated door, weather strip
CR-2A	Coordior	PR 4'-0" x 8'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	32	Panic, lockset, overhead closure with stop, no center mullion
CR-3	Coordior	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	1	ALUM	FF	E11/A6.10	C11/A6.10	-	01	Access Control, panic, removable mullion, lock down, electronic
													hardware, insulated door, weather strip
CR-4	Coordior	PR 3'-0" x 7'-0"	FG	ALUM	ALUM	V	ALUM	FF	C5/A6.11	A5/A6.11	-	01	Access Control, panic, removable mullion, lock down, electronic hardware, insulated door, weather strip
CR-4A	Coordior	PR 4'-0" x 8'-0"	F	WD	WD	01	НМ	PT-7	E7/A6 10	E7/A6 10		32	Panic, lockset, overhead closure with stop, no center mullion
CR-5	Coordior	PR* 5'-0" x 7'-0"	F	MTL	PT-5	03	HM	PT-7	G5/A6.11	A7/A6.10		33	Custom Pair, access control, lock-down, electronic hardware.
													no center mullion, switched to air curtain, weather strip, operable window with insert screen, insulated door, door bell
CR-5A	Coordior	PR* 5'-0" x 7'-0"	F	MTL	PT-5	01	HM	PT-7	E7/A6.10	E7/A6.10	-	34	Custom pair, lock set, no center mullion, kickplates, kick stops
0044	Maintenana Dida Did Alt 40	01.01	<u>-</u>	MTL	DT 6			DT 7	04/40.40	00/40.40			
301A	Maintenance Bidg - Bid Alt #3	3'-0" x 7'-0"	F	MIL	P1-5	03	HIM	P1-/	G1/A6.10	G3/A6.10		35	Lock set, drip cap, weather strip, insulated door
3016	Maintenance Bldg - Bld Alt #3	10-0 X 9-4		MIL	FF	÷			G3/A0.11	E3/A0.11		10	Key Switch, power operated, Steel Trim, insulated
3010	Maintenance Blug - Blu Alt #3	10-0 X 9-4		MIL	FF	÷	SIL	FF	G3/A0.11	E3/A0.11		13	Key Switch, power operated, Steer Thin, insulated
4014	Starage Didg. Did Alt #4	21.01 x 71.01	÷	MTI	DT 6	+		DT 7	01/08 10	02/46 40	÷	25	Look oot drin oon woother strin insulated deer
401A	Storage Bldg - Bid Alt #4	10' 0" x 0' 4"			F1-5	03			G1/A0.10	E2/A6 11		12	Lock set, dip cap, weather strip, insulated dool
4016	Storage Bldg - Bid Alt #4	10-0 X 9-4			FF	÷	SIL OTI		G3/A0.11	E3/A0.11		13	Key Switch, power operated, Steel Trim, insulated
4010	Storage Blug - Blu Alt #4	10-0 x 9-4			FF		SIL	FF	G3/A0.11	E3/A0.11	-	13	Ney Switch, power operated, Steer Him, Insulated
Second Floor			1	i		1	i		.i	<u>.</u>	1	1	i
200	Mechanical Mezz	PR 3'-0" x 7'-0"	F	MTL	PT-5	01	НМ	PT-7	E7/A6.10	E7/A6.10		36	Lock set, kickplates, no center mullion
201	IDF	PR 3'-0" x 7'-0"	F	MTL	PT-5	01	HM	PT-7	E7/A6.10	E7/A6.10	60	37	Kickplates, lock set, gasket, ovhd closer, 180° swing, no center mullion
202	Custodial	3'-0" x 7'-0"	F	WD	WD	01	НМ	PT-7	E7/A6.10	E7/A6.10	-	16	Kickplates, lock set, kick stop
203	Boys (no door)		1			1	1				1		
204	Girls (no door)		<u> </u>			<u>†</u>	1		1	*	1	<u></u>	•
205	Teachers	3'-0" x 7'-0"	F	WD	WD	05	НМ	PT-7	F7/A6 10	F7/A6 10	-	12	l ock set
205A	Office	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set
205B	Unisex	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6 10	E7/A6 10		07	Privacy lock set closer
206	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	НМ	PT-7	E7/A6 10	F7/A6 10	-	09	Classroom lock set panic ovhd closer with stop
206A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6 10	E7/A6 10	-	09	Classroom lock set, panic, ovhd closer with stop
2007	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6 10	E7/A6 10	-	09	Classroom lock set, panic, ovhd closer with stop
207A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6 10	E7/A6 10	-	09	Classroom lock set, panic, ovhd closer with stop
207B	Learning Center	16'-0"x8'-6" FV	SGW	ALUM	FF		ALUM	FF	C1/A6.10	A1/A6.10	·	10	Mnfr locking hardware, recess door in pocket
208	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
208A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
209	Office	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	12	Lock set

MARK	LOCATION	DOOR				FRAME			DETAILS		ASSEM HW		REMARKS
		Size	Type	Matl	Finish	Туре	Material	Finish	Head	Jamb	RATING	GROUP	
210	Unisex	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	07	Privacy lock set, closer
211	Custodial	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	16	Kickplates, lock set, kick stop
212	Student Collaborate (no door)												
213	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
213A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
214	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
214A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	НМ	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
215	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
215A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
216	Mechanical Mezz	PR 3'-0" x 7'-0"	F	MTL	PT-5	01	НМ	PT-7	E7/A6.10	E7/A6.10	-	38	Kickplates, lock set, gasket, 180° swing, no center mullion, kick stops
217	Esport	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
217A	Esport	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
218	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
218A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
218B	Learning Center	16'-0"x8'-6" FV	SGW	ALUM	FF	-	ALUM	FF	C1/A6.10	A1/A6.10	]	10	Mnfr locking hardware, recess door in pocket
219	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, ovhd closer with stop
219A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, ovhd closer with stop
219B	Learning Center	16'-0"x8'-6" FV	SGW	ALUM	FF	-	ALUM	FF	C1/A6.10	A1/A6.10		10	Mnfr locking hardware, recess door in pocket
220	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10		09	Classroom lock set, panic, ovhd closer with stop
220A	Learning Center	3'-0" x 7'-0"	F.	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10		09	Classroom lock set, panic, ovhd closer with stop
221	Student Collaborate (no door)		ļ			<u>.</u>						<u>.</u>	
222	Teachers	3'-0" x 7'-0"	F	WD	WD	05	HM	PT-7	E7/A6.10	E7/A6.10		12	Lock set
222A	Office	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	06	Lock set
222B	Unisex	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10		07	Privacy lock set, closer
223	Unisex	3'-0" x 7'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10		07	Privacy lock set, closer
224	Mechanical Mezz	PR 3'-0" x 7'-0"	+	MIL	PI-5	01	нм	PI-7	E7/A6.10	E7/A6.10	-	38	Kickplates, lock set, gasket, 180° swing, no center mullion, kick stops
225	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10		09	Classroom lock set, panic, ovhd closer with stop
225A	Learning Center	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10	-	09	Classroom lock set, panic, ovhd closer with stop
226	Health Lab	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10		09	Classroom lock set, panic, ovhd closer with stop
226A	Health Lab	3'-0" x 7'-0"	; F	WD	WD	04	; HM	PT-7	E7/A6.10	E7/A6.10		09	Classroom lock set, panic, ovhd closer with stop
227	Health Lab	3'-0" x 7'-0"	F	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10		09	Classroom lock set, panic, ovhd closer with stop
227A	Health Lab	3'-0" x 7'-0"	F.	WD	WD	04	HM	PT-7	E7/A6.10	E7/A6.10		09	Classroom lock set, panic, ovhd closer with stop
227B	Health Lab	16'-0"x8'-6" FV	SGW	ALUM	FF.		ALUM		C1/A6.10	A1/A6.10		10	Mnfr locking hardware, recess door in pocket
228	Chem Prep	3'-0" X 7'-0"	F	WD	WD	01	HM	PI-/	E7/A6.10	E7/A6.10		09	Classroom lock set, panic, ovnd closer with stop
220A	Chem Storage	3-0 X7-0	пG	WD	VVD	01		P1-7	E7/A0.10	E7/A0.10		12	
2288		3'-0" X 7'-0"	HG	VD	WD	01	HIM	P1-/	E7/A6.10	E77A6.10	-	12	LOCK Set
CR-7	Coordior	PR 4'-0" x 8'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	32	Panic, lockset, overhead closure with stop, no center mullion
CR-8	Coordior	PR 4'-0" x 8'-0"	F	WD	WD	01	HM	PT-7	E7/A6.10	E7/A6.10	-	32	Panic, lockset, overhead closure with stop, no center mullion
ABBREVIATI	ONS KEY												
ALUM	Aluminum	FRP	Plastic La	aminate Fac	ed	NG	Narrow G	lass		PLAM	Plastic La	minate	
СА	Clear Anodized	FGLS	Fiberglas	s		PT	Paint Cold	or		PD	Partition [	Door	
CL	Clear Finish	FV	Field Ver	ifv Conditio	n	PR	Pair	Pair Orion FD Francisco FD					
DG	Door Grille	НМ	Hollow Metal Relite w/ Frame ORG Overhead Rolling Grille					Grille					
FG	Full Glazing	мот	Motorized	3		RF	Refinish D	Door		OCD	OVHD Counter Door		
F	Flush	FB	Fabric Faced SS Stainless Steel OHC OVHD Coiling Door					4					
FF	Factory Finish	NA	Not Applicable WD Wood					v	Vinyl Face	ed	<u>.</u>		
	· · ·												
		General Notes:	1.	Reference	sheet A6.01	for door a	nd frames t	ypes.		1	1	1	•
[			2	Rekey an	d exchange fa	ctory lock	cylinders in	all overhe	ad doors and acce	ess panels to ma	tch School	District st	andard.
[			1				1				1	1	

## SECTION 08 11 13 - HOLLOW METAL DOORS & FRAMES

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Standard hollow metal doors and frames.
- B. Related Sections:
  - 1. Division 08 Section "Flush Wood Faced Doors" for hardware and frame coordination.
  - 2. Division 08 Section "Glazing" for base bid glass view panels in relites and side lites.
  - 3. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
  - 4. Division 09 Sections "Painting" for field painting hollow metal doors and frames.

## 1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.
- 1.3 SUBMITTALS
  - A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.
  - B. Shop Drawings: Include the following:
    - 1. Elevations of each door design.
    - 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
    - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
    - 4. Locations of reinforcement and preparations for hardware.
    - 5. Details of each different wall opening condition.
    - 6. Details of anchorages, joints, field splices, and connections.
    - 7. Details of accessories.
    - 8. Details of moldings, removable stops, and glazing.
    - 9. Details of conduit and preparations for power, signal, and control systems.
  - C. Samples for Verification:
    - 1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
    - 2. For the following items, prepared on Samples about 12 by 12 to demonstrate compliance with requirements for quality of materials and construction:
      - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
      - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow metal panels and glazing if applicable.
  - D. Other Action Submittals:
    - 1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.
  - E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  - Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

- C. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.
- D. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784
- E. Install doors in accordance with SDI-100 and building code standards for labeled doors

## 1.5 DELIVERY, STORAGE, AND HANDLING

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

## 1.6 PROJECT CONDITIONS

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

## 1.7 COORDINATION

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

## PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
  - A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1. Basis of Design: Ceco Door Products; an Assa Abloy Group company.; Product Imperial Series Doors, Maxim Series Doors, and CF Series Frames
    - 2. Amweld Building Products, LLC.
    - 3. Curries Company; an Assa Abloy Group company.
    - 4. Steelcraft; an Ingersoll-Rand company.
    - 5. Approved equal substitution in accordance with Division 01 procedures and requirements.

## 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.
- F. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum

flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

- G. Glazing: Comply with requirements in Division 08 Section "Glazing."
- H. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.3 STANDARD HOLLOW METAL DOORS

- A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
  - 1. Design: Flush panel.
  - 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
    - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
    - b. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
      1) Locations: Exterior doors.
  - 3. Vertical Edges for Single-Acting Doors: Manufacturer's standard.
    - a. Beveled Edge: 1/8 inch in 2 inches.
  - 4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.
  - 5. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick, end closures or channels of same material as face sheets.
  - 6. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
  - 1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush).
    - a. Width: 1-3/4 inches.
    - b. 14 gauge construction.
- C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
  - 1. Level 2 and Physical Performance Level B (Heavy Duty), Model 1 (Full Flush).
    - a. Width: 1-3/4 inches.
    - b. 18 gauge construction.
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

## 2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Exterior Frames: Fabricated from metallic-coated steel sheet.
  - 1. Fabricate frames with mitered or coped corners.
  - 2. Fabricate frames as full profile welded unless otherwise indicated.
  - 3. Frames for Level 3 Steel Doors: 12 gauge- (thick steel sheet.
- C. Interior Frames: Fabricated from cold-rolled steel sheet.
  - 1. Fabricate frames with mitered or coped corners.
    - 2. Fabricate frames as full profile welded unless otherwise indicated.
    - 3. Frames for Level 2 Steel Doors: 16 gauge- thick steel sheet.
    - 4. Frames for Wood Doors: 16 gauge- thick steel sheet.
    - 5. Frames for Borrowed Lights: 16 gauge- thick steel sheet.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

## 2.5 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  - 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
  - 3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inchdiameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (thick, and as follows:
  - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
  - 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

## 2.6 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

## 2.7 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch- wide steel.
- C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.
- D. Lite Frames and Glazing
  - 1. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated.
  - 2. For base bid glazing condition reference specification section 08 80 00.

## 2.8 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- C. Hollow Metal Doors:
  - 1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
  - 2. Glazed Lites: Factory cut openings in doors.
  - 3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
- D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

- 2. Sidelight Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
- 3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
- 4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
- 5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
- 6. Jamb Anchors: Provide number and spacing of anchors as follows:
  - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
    - 1) Two anchors per jamb up to 60 inches high.
    - 2) Three anchors per jamb from 60 to 90 inches high.
    - 3) Four anchors per jamb from 90 to 120 inches high.
  - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
    - 1) Three anchors per jamb up to 60 inches high.
    - 2) Four anchors per jamb from 60 to 90 inches high.
    - 3) Five anchors per jamb from 90 to 96 inches high.
    - 4) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
  - c. Compression Type: Not less than two anchors in each jamb.
  - d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
- 7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
  - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
  - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
  - 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  - 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
  - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
- G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
  - 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
  - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
  - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  - 4. Provide loose stops and moldings on inside of hollow metal work.
  - 5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.
- 2.9 STEEL FINISHES
  - A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
    - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer

manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to
  - performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
  - 1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - 2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
  - 3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - 4. Plumbness: Plus or minus 1/16 inch measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

## 3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with SDI 100, Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
  - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-protection-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    - c. Install frames with removable glazing stops located on secure side of opening.
    - d. Install door silencers in frames before grouting.
    - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
  - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.

- 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
- 5. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
- 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
- 7. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
- 8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
- 9. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
  - a. Squareness: Plus or minus 1/16 inch measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - b. Alignment: Plus or minus 1/16 inch measured at jambs on a horizontal line parallel to plane of wall.
  - c. Twist: Plus or minus 1/16 inch measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - d. Plumbness: Plus or minus 1/16 inch measured at jambs at floor.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
  - 1. Non-Fire-Rated Standard Steel Doors:
    - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
    - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
    - Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
  - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

## 3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 08 11 13

2.

# SECTION 08 14 00 - FLUSH PLASTIC FACED DOORS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Interior solid-core doors with plastic-laminate faces.
  - 2. Factory fitting flush wood doors to frames and factory machining for hardware.
- B. Related Sections:
  - 1. Division 06 Section "Interior Finish Carpentry" for matching wood trim.
  - 2. Division 08 Section "Hollow Metal Doors & Frames" for glass with integral blinds view panels in relites and side lites.
  - 3. Division 08 Section "Glazing" for glass view panels in flush doors.
  - 4. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.

## 1.2 SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction, and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
  - 1. Indicate dimensions and locations of mortises and holes for hardware.
  - 2. Indicate dimensions and locations of cutouts.
  - 3. Indicate requirements for veneer matching.
  - 4. Indicate doors to be factory finished and finish requirements.
  - 5. Indicate fire-protection ratings for fire-rated doors.
- C. Samples:
  - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
  - 2. Plastic laminate, 6 inches square, for each color, texture, and pattern selected.
  - 3. Corner sections of doors, approximately 8 by 10 inches with door faces and edges representing actual materials to be used.
    - a. Provide samples for each species of veneer and solid lumber required.
    - b. Provide samples for each color, texture, and pattern of plastic laminate required.
    - c. Finish veneer-faced door samples with same materials proposed for factory-finished doors.
- D. Warranty: Sample of special warranty.

#### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors from single manufacturer.
- B. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated"
  - 1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10B.
  - 1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

## 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on bottom rail with opening number used on Shop Drawings.

# 1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

## 1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
  - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Lyden Doors.
  - 2. Marshfield Door Systems, Inc.
  - 3. Vancouver Door Company.
  - 4. VT Industries
- 2.2 DOOR CONSTRUCTION, GENERAL
  - A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
  - B. WDMA I.S.1-A Performance Grade:
    - 1. Heavy Duty unless otherwise indicated.
    - 2. Extra Heavy Duty: Restrooms, Mechanical
  - C. Structural-Composite-Lumber-Core Doors:
    - 1. Structural Composite Lumber: WDMA I.S.10.
      - a. Screw Withdrawal, Face: 700 lbf.
      - b. Screw Withdrawal, Edge: 400 lbf.
  - D. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fireprotection rating indicated.
    - 1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
    - 2. Pairs: Provide formed-steel edges and astragals with intumescent seals.
    - a. Finish steel edges and astragals to match door hardware (locksets or exit devices). Mineral-Core Doors:
      - 1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
      - 2. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

E.

## 2.3 PLASTIC-LAMINATE-FACED DOORS

- A. Interior Solid-Core Doors:
  - 1. Grade: Custom.
  - 2. Plastic-Laminate Faces: High-pressure decorative laminates complying with NEMA LD 3, Grade HGS. PLAM-1 per section 09 00 00 material legend.
  - 3. Colors, Patterns, and Finishes: Reference Finish Schedule and finish materials designations.
  - 4. Exposed Vertical Edges: Plastic laminate that matches faces, applied before faces.
  - 5. Core: Structural composite lumber.
  - 6. Construction: Three plies. Stiles and rails are bonded to core, then entire unit abrasive planed before faces are applied. Faces are bonded to core using a hot press.
  - 7. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

## 2.4 LIGHT FRAMES & GLAZING

- A. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated.
- B. For base bid glazing condition reference specification section 08 80 00.
- 2.5 FABRICATION
  - A. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
    - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
    - 2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
  - B. Openings: Cut and trim openings through doors in factory.
    - 1. Light Openings: Trim openings with moldings of material and profile indicated.
    - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."
    - 3. Louvers: Factory install louvers in prepared openings.

#### 2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Finish doors at factory.
  - 1. Color: Reference Finish Schedule, Finish Material Designations.
  - 2. Pattern: Reference Finish Schedule, Finish Material Designations

## PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
  - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. Hardware: For installation, see Division 08 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

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- 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
  - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
    - a. Comply with NFPA 80 for fire-rated doors.
  - 2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
  - 3. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

## 3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 00
# SECTION 08 31 13 - ACCESS DOORS AND FRAMES

#### PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes the following:
  - 1. In project areas where required for access to utilities: Non-rated and fire-rated wall and ceiling access doors and frame units. Furnish in quantities and sizes required for access purposes to utilities requiring service and general concealed space/attic access. Coordinate sizes, quantities, and locations with architectural drawings, as well as equipment access for Fire Protection, Mechanical and Electrical division. Fire ratings shall be as required to maintain the fire rating of the assembly in which it is mounted.
  - 2. In addition to the access doors required above: Provide an allowance for a total of four (4) additional 18"x18" non-rated access doors and four (4) additional 24"x24" non-rated access doors to be installed at locations directed by the owner and/or architect. Should less than (8) access doors be required for this purpose, the value of the unused portion of the allowance shall be credited to the Owner.
  - 3. Furnish inserts and anchoring devices that must be built into other work for installation of access doors
  - 4. See Code Plan for rating requirements
- B. Related Sections include the following:
  - 1. Division 08 Section "Overhead Doors" for motorized overhead doors requiring service access.
  - 2. Division 08 Section "Door Hardware" for mortise or rim cylinder locks and master keying.
  - 3. Division 09 Section "Gypsum Board" for wall and ceilings.
  - 4. Division 09 Section "Acoustical Tile Ceilings" for suspended acoustical tile ceilings.
  - 5. Divisions 21, 22, 23, 26, 27, and 28 for building systems trades.

## 1.2 SUBMITTALS

- A. Product Data: For each type of access door and frame indicated. Include construction details, materials, individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each door face material, at least 3 by 5 inches in size, in specified finish.
- D. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.
- E. Ceiling Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceilingmounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim are shown and coordinated with each other.

# 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of access door(s) and frame(s) through one source from a single manufacturer.
- B. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  - 1. NFPA 252 or UL 10B for vertical access doors and frames.
  - 2. ASTM E 119 or UL 263 for horizontal access doors and frames.
- C. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units.

- 1.4 COORDINATION
  - A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

# PART 2 - PRODUCTS

## 2.1 STEEL MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
  - 1. ASTM A 123/A 123M, for galvanizing steel and iron products.
  - 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
  - 1. ASTM A 123/A 123M, for galvanizing steel and iron products
  - 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- C. Steel Sheet: electrolytic zinc-coated, ASTM A 591 with cold-rolled steel sheet substrate complying with ASTM A 1008, Commercial Steel (CS), exposed.
- D. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
  - 1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
  - 2. Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating.
- E. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

#### 2.2 STAINLESS-STEEL MATERIALS

- A. Rolled-Stainless-Steel Floor Plate: ASTM A 793, manufacturer's standard finish.
- B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304. Remove tool and die marks and stretch lines or blend into finish.
  - 1. Finish: Directional Satin Finish, No. 4.

#### 2.3 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Acudor Products, Inc.
  - 2. Babcock-Davis; A Cierra Products Co.
  - 3. Bar-Co, Inc. Div.; Alfab, Inc.
  - 4. Cendrex Inc.
  - 5. Dur-Red Products.
  - 6. Elmdor/Stoneman; Div. of Acorn Engineering Co.
  - 7. Jensen Industries.
  - 8. J. L. Industries, Inc.
  - 9. Karp Associates, Inc.
  - 10. Larsen's Manufacturing Company.
  - 11. MIFAB, Inc.
  - 12. Milcor Inc.
  - 13. Nystrom, Inc.
  - 14. Williams Bros. Corporation of America (The).
  - B. Flush Access Doors and Frames with Exposed Trim: Fabricated from steel and stainless-steel sheet.
    - 1. Locations: Wall and ceiling surfaces.
      - a. Utilize Stainless steel access doors at Restrooms, Locker Rooms, Kitchens, and Janitors Closets.
      - b. Utilize Standard units at all other locations.

- 2. Door: Minimum 0.060-inch- thick sheet metal, set flush with exposed face flange of frame.
- 3. Frame: Minimum 0.060-inch- thick sheet metal with 1-inch- wide, surface-mounted trim.
- 4. Hinges: Spring-loaded, concealed-pin type.
- 5. Lock: Self-latching device with cylinder lock.

## 2.4 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
  - 1. Exposed Flanges: Nominal 1 to 1-1/2 inches wide around perimeter of frame.
  - 2. Provide mounting holes in frames for attachment of units to metal or wood framing.
  - 3. Provide mounting holes in frame for attachment of masonry anchors
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
  - 1. For cylinder lock, furnish two keys per lock and key all locks alike.
  - 2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

# PART 3 - EXECUTION

- 3.1 INSTALLATION
  - A. Comply with manufacturer's written instructions for installing access doors and frames.
  - B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
  - C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.
- 3.2 ADJUSTING AND CLEANING
  - A. Adjust doors and hardware after installation for proper operation.
  - B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08 31 13

# SECTION 08 32 13 - SLIDING ALUMINUM-FRAMED GLASS DOORS

# PART 1 - GENERAL

## 1.01 SUMMARY

- A. Section includes furnishing and installing a single track, sliding thermally broken aluminum framed glass door, wall or storefront panel system that includes:
  - 1. Aluminum frame
  - 2. Tracks
  - 3. Threshold
  - 4. Sliding panels with locking hardware
  - 5. Stacking bays
  - 6. Weatherstripping
  - 7. Glass and glazing
  - 8. Accessories as required for a complete working installation.
- B. Related Documents and Sections: Contractor to examine Contract Documents for requirements that directly affect or are affected by Work of this Section. A list of those Documents and Sections include, but is not limited to, the following:
  - 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 General Requirements, Specification Sections, apply to this Section.
  - 2. Section 06 10 00, Rough Carpentry: Wood framing and blocking.
  - 3. Section 07 62 00, Sheet Metal Flashing and Trim: Flashing and other sheet metal work.
  - 4. Section 07 92 00, Joint Protection
  - 5. Section 09 22 16, Non-Structural Metal Framing: Metal framing and reinforcement.

# 1.02 REFERENCES

A. Reference Standards in accordance with Division 01 and current editions from the following:

- 1. AAMA. American Architectural Manufacturers Association; www.aamanet.org
  - a. AAMA 503, Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls, and Sloped Glazing Systems
  - b. AAMA 611, Voluntary Specification for Anodized Architectural Aluminum
  - c. AAMA 920, Operation / Cycling Performance
  - d. AAMA 2604, Voluntary Specifications, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
  - e. AAMA/WDMA/CSA 101/I.S.2/A440, NAFS, North American Fenestration Standard - Specification for Windows, Doors and Skylights
- 2. ANSI. American National Standards Institute; www.ansi.org
  - a. ANSI Z97.1, Safety Performance Specifications and Methods of Test for Safety Glazing Material Used In Buildings
- 3. ASTM. ASTM International; www.astm.org
  - a. ASTM C1036, Standard Specification for Flat Glass
  - b. ASTM C1048, Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
  - c. ASTM E413, Classification for Rating Sound Insulation
  - d. ASTM E547, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
    - ASTM E1332, Standard Classification for Rating Outdoor-Indoor Sound Attenuation
  - f. ASTM F842, Standard Test Methods for Measuring the Forced Entry Resistance of Sliding Door Assemblies, Excluding Glazing Impact
- 4. CPSC. Consumer Product Safety Commission; www.cpsc.gov
  - a. CPSC 16CFR-1201, Safety Standard for Architectural Glazing Materials.
- 5. Energy Star, U.S. Environmental Protection Agency (EPA) Program; www.energystar.gov
- 6. FL. Florida Building Commission Product Approval; Https://floridabuilding.org/pr/pr app srch.aspx
- 7. NFRC. National Fenestration Rating Council; www.nfrc.org

e.

- a. NFRC 100, Procedure for Determining Fenestration Product U-factors
- b. NFRC 200, Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence
- c. NFRC 400, Procedure for Determining Fenestration Product Air Leakage
- d. NFRC 500, Procedure for Determining Fenestration Product Condensation Resistance Rating Values

## 1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate Sliding Glass Storefront system and framing rough opening.
- B. Preinstallation Meetings: See Division 01 specifications.

# 1.04 SUBMITTALS

- A. For Contractor submittal procedures see Division 01 specifications.
- B. Product Data: Submit manufacturer's printed product literature for each Sliding Glass Storefront system to be incorporated into the Work. Show performance test results and details of construction relative to materials, dimensions of individual components, profiles and colors.
- C. Shop Drawings: Indicate Sliding Glass Storefront system component sizes, dimensions and framing rough opening., configuration, sliding and swing panels, direction of swing, stacking layout, typical head jamb, side jambs and sill details, type of glazing material, handle height and field measurements.
- D. Delegated-Design Submittal: For structural performance of Folding Glass Storefront system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Manufacturers' Instructions: Submit manufacturer's installation instructions.
- F. Operation and Maintenance Data: Submit Owner's Manual from manufacturer. Identify with project name, location and completion date, and type and size of unit installed.

## 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer capable of providing complete, precision built, engineered, pre-fitted units with a minimum twenty-five (25) years' experience in the sale of folding-sliding door systems for large openings in the North American market.
  - 1. Manufacturer to have ISO 9001: 2008 quality management system registration.
  - 2. Manufacturer to have ISO 14001: 2005 environmental management system registration.
- B. Installer Qualifications: Installer experienced in the installation of manufacturer's products or other similar products for large openings. Installer to provide reference list of at least three (3) projects of similar scale and complexity successfully completed in the last three (3) years.
  Installer to be trained and certified by manufacturer.
- C. Single Source Responsibility: Furnish Sliding Glass Storefront system materials from one manufacturer for entire sliding assembly.

# 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's instructions and recommendations, Section 01 60 00 requirements, and as follows:
  - 1. Deliver materials to job site in sealed, unopened cartons or crates.
    - a. Upon receipt, inspect the shipment to ensure it is complete, in good condition and meets project requirements.
  - 2. Store material under cover in a clean and dry location, protecting units against weather and defacement or damage from construction activities, especially to the edges of panels.

#### 1.07 FIELD CONDITIONS

A. Field Measurements: Contractor to field verify dimensions of rough openings, stack storage area and threshold depressions to receive sill. Mark field measurements on shop drawing submittal.

- 1.08 WARRANTY
  - Α. Manufacturer Warranty: Provide Sliding Glass Storefront system manufacturer's standard limited warranty as per manufacturer's published warranty document in force at time of purchase, subject to change, against defects in materials and workmanship.
    - Warranty Period beginning with the earliest of 120 days from Date of Delivery or Date of 1. Substantial Completion:
      - Rollers and Glass Seal Failure: Ten (10) years a.
      - b. All Other Components Except Screens: Ten (10) years

## PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- Α. Basis-of-Design Product by Manufacturer: NanaWall HSW60 by NANA WALL SYSTEMS, INC. (www.nanawall.com)
  - Substitution Procedures: See Section 01 60 00; Submit completed and signed. 1.

#### 2.02 **PERFORMANCE / DESIGN CRITERIA**

- Delegated Design: Engage a gualified professional engineer, as defined in Section 01 40 00, Α. Quality Requirements, to design the Folding Glass Storefront system according to the following performance requirements:
  - Washington State, current edition of IBC. 1.
  - 2. Structural load testing results are only applicable for the test unit size and type of locking and rods.
  - Comparative analysis charts published by manufacturer shows which panel sizes, if any, 3. meets the structural loading design pressures specifically required for the project. Check for limitations on the use of these charts in the jurisdiction of the project.
  - 4. See manufacturer's latest published data regarding performance.
  - Β. Performance Criteria (Lab Tested): Low Profile Saddle Sill
    - 1. Air Infiltration (ASTM E283):
    - 0.3 cfm/ft2 (1.5 L/s/m2) at a static air pressure difference of 1.57 psf (75 Pa) а
    - Water Penetration (ASTM E331, ASTM E547): 2.
      - No uncontrolled water leakage at a static test pressure in:
        - Units with Weepholes from Middle Channel: 2.92 psf (140 Pa) 1).
      - 2). Units with Weepholes from Inner Channel: 6.0 psf (290 Pa)
    - 3. Structural Loading (ASTM E330):

#### Load Structure: At 1.5 times design wind pressure with no glass breakage or a. permanent damage to fasteners or storefront components.

Pass

- 1). Design Pressure Positive:
- 45 psf (2160 Pa) Design Pressure Negative: 45 psf (2160 Pa) 2).
- 4. Forced Entry (ASTM F842):
  - Meets Type A Grade 40 Swing Panel - Operation / Cycling Performance (AAMA 920):
- 5. 500,000 cycles Sliding Glass Storefront Units tested to AAMA/WDMA/CSA 101/I.S.2/A440. 6.
- 8. Thermal Performance (U-factor): NFRC 100 rated
- Solar Heat Gain Coefficient (SHGC) + Visible Light Transmission (VT): NFRC 200 rated 9. NFRC 400 rated
- 10. Air Leakage:
- 11. Condensation Resistance Factor (CRF): NFRC 500 rated
- C. Design Criteria:
  - Sizes and Configurations: As indicated by the drawings for selected number and size of 1. panels, location of swing panels, and location of tracks and stacking bays.
  - 2. Unit Operation: Adjustable sliding and swing hardware with top and bottom tracks;
  - Panel Configuration: 3. Straight
  - Stack Storage Configuration: Enclosed Jamb wall pocket(s) with enclosure door 4. Top hung
  - 5. Mounting Type: 6.
    - Panel Type: Multiple unattached, see drawings for configuration.

#### 2.03 MATERIALS

- Α. Sliding Glass Storefront Description: Standard top-hung, single-track, interlocking aluminumframed sliding class storefront system that can be pocketed when open and have a swing door hinged off a side jamb or within a sliding panel. Manufacturer's standard frame and panel profiles, with head track, stacking bays, side jambs, sliding panels, and swing panels with dimensions as shown on Drawings.
  - Provide clear anodized aluminum head track with aluminum covers on both sides that 1. match aluminum profile finish.
  - 2 Panels:
- Single lite with horizontal mullion.
- Panel Size (W x H): 3.
- Approx 9' tall by 3' wide. As indicated.
- 4. Head Rail Width x Depth: 4-5/16 x 2-5/16 inch (110 x 59 mm) 5.
  - 5-1/4 x 2-5/16 inch (134 x 59 mm) Jamb Rail Width x Depth:
- Bottom Rail Width: 6. 7.
- 2-3/8 inch (60 mm) AIMqSi0.5 allov. 6063-T5 (F-22 - European standard) Aluminum Extrusion:
  - Thickness: 0.078 inch (2.0 mm) nominal
- 8. Aluminum Finish (including head track covers): Anodized (AAMA 611): Clear
- Β. Glass and Glazing:

а

- 1. Safety Glazing: In compliance with ANSI Z97.1 and CPSC 16CFR 1201.
  - Glass Acoustical Performance (DIN 52210-3,4) а
    - 1). 15/16 inch (24 mm) double IGU, air filled, double-laminated glass
- 2. Manufacturer's laminated glass lites, dry glazed with glass stops on the inside.
  - Glass Lite / Insulated Glass Unit (IGU): a.
    - Double IGU: 1).
      - a. 15/16 inch (24 mm) thick.
      - b. Glass Spacers: Manufacturer's standard gray finish; without capillary tubes.
  - b. Glass Lite Type – Reference drawings
  - 1). Standard Clear, safety glazing
- C. Locking Hardware and Handles:
  - Main Entry Panel(s) for Models WITH Swing Panel(s): Provide manufacturer's standard 1 lever handles on the inside and outside, and a standard lockset with a lockable latch and multi-point locking with a dead bolt and rods at the top and bottom.
    - Rods to be concealed and not edge mounted. a.
    - After turn of key, depression of handles withdraws latch. b.
    - Lifting of handles engages rods and turn of key or thumb turn engages deadbolt C. and operates lock.
    - Lever Handles Finish: Brushed satin stainless steel d.
    - Locking: Standard profile cylinder to match district standard keyway. e.
  - 2. Sliding Panel to be Opened First for Models WITHOUT a Swing Panel: Provide manufacturer's standard L-shaped handle on the inside, flat handle on the outside and lock set with profile cylinder. Operation of lockset is by turn of key from the outside and with a thumbturn from the inside with a two point locking hardware operated by 180° turn of the handle.
    - L-Shaped Handles Finish: Brushed satin stainless steel a.
  - 3. Sliding Panel to be Opened First for Models WITHOUT a Swing Panel: Provide manufacturer's standard flat handle on the inside and on the outside and a lockset with a profile cylinder. Operation of lock set is by turn of key from the outside and from the inside with a two-point locking hardware operated by 180° turn of the handle.
  - Handle Height: 41-3/8 inch (105 cm) centered from bottom of panel or as otherwise indicated. 4.
  - Aluminum locking rods with standard fiberglass reinforced polyamide end caps at the 5. bottom (and top on certain panels). Rods to have a stroke of 15/16 inch (24 mm).
  - Additional profile cylinders to be keyed alike. 6.
  - Sill Type: Low profile saddle sill 7.
    - Finish: Aluminum with a clear anodized finish. а

D. Fasteners: Stainless steel machine screws for connecting frame components.

## 2.04 FABRICATION

- A. Extruded aluminum frame and panel profiles, corner connectors and hinges, sliding hardware, locking hardware and handles, glass and glazing and weatherstripping components to construct sliding glass wall with stacking bays.
  - 1. Each unit factory pre-assembled and shipped with all components and installation instructions.
  - 2. Exposed work to be carefully matched to produce continuity of line and design with all joints.
  - 3. No raw edges visible at joints.

#### 2.05 ACCESSORIES

A. Provide sidelights, transoms, corner posts, or single or double doors as indicated.

## PART 3 – EXECUTION

## 3.01 EXAMINATION

- A. Examination and Acceptance of Conditions per Section 01 60 00 and as follows:
  - 1. Carefully examine rough openings with Installer present, for compliance with requirements affecting Work performance.
    - a. Verify that field measurements, substrates, tolerances, levelness, plumbness, cleanliness and other conditions are as required by the manufacturer, and ready to receive Work.
    - b. Verify the structural integrity of the header for deflection with live and dead loads limited to the lesser of L/720 of the span or 1/4 inch (6 mm). Provide structural support for lateral loads, and both wind load and eccentric load when the panels are stacked open.
  - 2. Proceed with installation only after unsatisfactory conditions have been corrected.
- 3.02 INSTALLATION
  - A. General: Install Sliding Glass Storefront system in accordance with the Drawings, approved submittals, manufacturers' recommendations and installation instructions, and as follows:
    - 1. Properly flash, waterproof and seal around opening perimeter.
    - 2. Securely attach anchorage devices to rigidly fit frame in place, level, straight, plumb and square. Install frame in proper elevation, plane and location, and in proper alignment with other work
    - 3. When lower track is designed to drain, provide connections to allow for drainage.
    - 4. Install panels, handles, lock set, screens, weatherstripping and other accessories in accordance with manufacturer's recommendations and instructions.

#### 3.03 FIELD QUALITY CONTROL

- A. Field Tests and Inspections per Section 01 40 00 of the following:
  - 1. Verify the Sliding Glass Storefront system operates and functions properly. Adjust hardware for proper operation.
- B. Non-Conforming Work: Repair or replace non-conforming work as directed by the Architect; see General and Supplementary Conditions, and Division 01, General Requirements.

#### 3.04 CLEANING AND PROTECTION

- A. Keep units closed and protect Sliding Glass Storefront installation against damage from construction activities.
- B. Remove protective coatings and use manufacturer recommended methods to clean exposed surfaces.

#### END OF SECTION 08 32 13

# SECTION 08 33 13 - COILING COUNTER DOORS

# PART 1 - GENERAL

## 1.1 SUMMARY

Α.

- Section Includes:
  - 1. Motor Operated overhead rolling counter door.

## B. Related Sections:

- 1. Division 01 Section "Commissioning" for functional testing and demonstration of system
- 2. Division 05 Section "Metal Fabrications" and "Cold Formed Metal Framing" for miscellaneous steel supports and trim.
- 3. Division 08 Section "Door Hardware" for power operated door keyed switch.
- 4. Division 09 Section "Painting" for finish painting of factory-primed doors.
- 5. Division 26 Sections for electrical service and connections for powered operators and accessories.

## 1.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the emergency-egress-door component will be fully operational after the seismic event."
  - 2. Seismic Component Importance Factor: 1.0.
- B. Operation Cycles: Provide overhead door components and operators capable of operating for not less than number of cycles indicated for each door. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

# 1.3 SUBMITTALS

- A. Product Data: For each type and size of overhead door and accessory. Include the following:
  - 1. Construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
  - 2. Rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Show locations of replaceable fusible links.
  - 3. Wiring Diagrams: For power, signal, and control wiring.
- C. Samples for Verification: For each type of exposed finish required, provide samples of actual material with a minimum dimension of 6" in size.
- D. Qualification Data: For qualified Installer.
- E. Seismic Qualification Certificates: For overhead doors, accessories, and components, from manufacturer.
- F. Maintenance Data: For overhead doors to include in maintenance manuals.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain overhead doors from single source from single manufacturer.
  - 1. Obtain operators and controls from overhead door manufacturer.

- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

# PART 2 - PRODUCTS

# 2.1 DOOR MATERIALS AND CONSTRUCTION

- A. Door: Fabricate overhead-door curtain of interlocking metal slats, designed to withstand loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
  - 1. Motor Operated Overhead Coiling Counter Door:
    - A. The door curtain shall be constructed of interconnected strip stainless steel slats conforming to ASTM A-653. The curtain shall be constructed of 22 gauge No. 10 (1-1/4" high by 3/8" deep) slats.
    - B. The finish on the door curtain shall be #4 polish.
    - C. The bottom bar shall be constructed of tubular stainless steel measuring 2" high by 1-1/4" deep. The finish on the bottom bar shall be #4 polish.
    - D. The guides shall be constructed of box sections of stainless steel. The finish on the guides shall be #4.
    - E. The brackets shall be constructed of 11 gauge steel plate. The finish on the brackets shall be factory applied with a minimum thickness of 2 mils.
    - F. The barrel shall be steel tubing of not less than 4" in diameter. Oil tempered torsion springs shall be capable of correctly counter balancing the weight of the curtain and shall have both a main and an auxiliary spring. The barrel shall be designed to limit the maximum deflection to .03" per foot of opening width. The springs shall be adjusted by means of an exterior wheel. The barrel shall be unpainted.
    - G. The hood shall be fabricated from 24 gauge stainless steel and shall be formed to fit the curvature of the brackets. The finish on the hood shall be #4 polish.
    - F. The finish on all door curtain materials shall be: stainless steel.

# 2.2 LOCKING DEVICES & ACCESSORIES

- A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.
- C. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door. Provide pull-down straps or pole hooks for doors more than 84 inches high.

# 2.3 MANUAL DOOR OPERATORS

- A. Equip door with manufacturer's recommended manual door operator unless another type of door operator is indicated.
- B. Chain operated for emergency use. Design counterbalance mechanism so required lift or pull for door operation does not exceed 25 lbf.

# 2.4 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
  - 1. Comply with NFPA 70.

- 2. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24 V, ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. The door shall be operated at a speed of 2/3 foot per second by an open drip-proof electric motor with gear reducer in oil bath. The motor operator shall include a geared limit switch, and an electrically interlocked emergency chain operator. The motor starter shall be housed in a NEMA 1 housing and include a magnetic reversing starter size 0, a 24 volt control transformer, and complete terminal strip to facilitate field wiring. All motor operators shall be U.L. listed.
- D. Door Operator Location(s): Reference drawings and mounting condition for operator location indicated for each door.
  - 1. Provide one operator location per door one on interior area side with keyed switch. Verify switch location with Owner prior to installation. Keyed switch to match Owner's Schlage series keyway.
  - 2. Provide electrical switch controls to interface with owner's electrical security access control system.
- E. Electric Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Division 26 Section "Common Motor Requirements for Equipment" unless otherwise indicated.
  - 1. Electrical Characteristics:
    - a. Phase: Single phase.
    - b. Volts: 208 V.
    - c. Hertz: 60.
  - 2. Motor Type and Controller: Reversible motor and controller (disconnect switch) for motor exposure indicated.
  - 3. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed of 8 in./sec., without exceeding nameplate ratings or service factor.
  - 4. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated. Provide two operator locations for each door – one outside and one inside of the door with key switches at both locations
  - 5. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
- F. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- G. Safety Features:
  - 1. The service door shall have installed on the bottom bar a Phantom Featheredge wireless device that will automatically reverse the door if the device detects an obstruction in the downward travel of the door.
    - a. The Phantom Featheredge shall consist of a rubber boot attached below the bottom bar with a switch secured to the back of the bottom bar. The Phantom Featheredge shall operate with air wave technology and shall not rely on pneumatic pressure or electrical contacts to operate. The Phantom Featheredge shall create an air wave that shall be detected by the switch which reverses the downward direction of the rolling door.
    - b. The Phantom Featheredge shall not require a connection cord or any means of electrical connection to the motor control panel.
    - c. The Phantom Featheredge shall be of fail-safe construction, and on every cycle shall perform a self diagnostic test. If any part of the Phantom Featheredge fails, the door closing operation shall change from momentary pressure to constant pressure requiring constant pressure on the close control station to move the door in a downward motion. Repairing the Phantom Featheredge will automatically return the closing operation to momentary pressure.
    - d. The operation of the Phantom Featheredge shall not be subject to interferences by temperature, barometric pressure, water infiltration, or punctures and small tears.

- e. The Phantom Featheredge shall perform with an extremely small amount of impact pressure.
- f. The Phantom Featheredge shall be wireless with remote transmitters at the head and base of the door. Coordinate transmitters required clearances with ceiling, jamb and soffit finishes.
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

# 2.5 OVERHEAD SUPPORTED DOOR ASSEMBLIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Cookson Company systems for the work of this section or comparable product by one of the following:
  - 1. ACME Rolling Doors.
  - 2. Cornell Iron Works, Inc.
  - 3. Lawrence Roll-Up Doors, Inc.
  - 4. Mahon Door Corporation.
  - 5. McKeon Rolling Steel Door Company, Inc.
  - 6. Overhead Door Corporation.
  - 7. Raynor
  - 8. Windsor Door.
  - B. **Motor Operated Overhead Counter Door (School Store): OCD** Overhead coiling solid slat security door.
    - 1. Cookson Company, Product: Rolling Counter Door ESC10
    - 2. Door Curtain Material: Stainless Steel interlocking slats.
    - 3. Mounting: Between Jamb (jamb mounted-slip in)
    - 4. Frame: Integral frame with stainless steel jamb, sill and head enclosure
    - 5. Sill Configuration for Door: Stainless steel sill by Division 06 Architectural casework.
    - 6. Locking Devices: Equip door with hasp for padlock.
    - 7. Electric Door Operator:
      - a. Usage Classification: Heavy duty, 60 to 90 cycles per hour.
      - b. Operator Location: Interior of student store.
      - c. Motor Exposure: Interior.
      - d. Emergency Manual Operation: Chain type.
      - e. Provide electrical switch controls to interface with owner's electrical security access control system. Key switch to match Owner standard Schlage series keyway.
    - 8. Obstruction-Detection Device: Automatic electric sensor edge on bottom bar with wireless transmitter.
    - 9. Door Finish: Stainless Steel
    - 10. Trim: Provide all stainless steel trim profiles required to finish installation.

# 2.6 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 INSTALLATION

- A. Install overhead doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead doors, hoods, and operators at the mounting locations indicated for each door.
- C. Accessibility: Install overhead doors, and controls along accessible routes in compliance with regulatory requirements for accessibility.

# 3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
  - 1. Perform installation and startup checks according to manufacturer's written instructions.
    - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

# 3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.
- 3.5 DEMONSTRATION
  - A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead supported doors.

END OF SECTION 08 33 13

# SECTION 08 33 23 - COILING OVERHEAD DOORS

## PART 1 - GENERAL

# 1.1 SUMMARY

A. Section Includes:

1. Motor Operated overhead coiling door.

## B. Related Sections:

- 1. Division 01 Section "Commissioning" for functional testing and demonstration of system
- 2. Division 05 Section "Metal Fabrications" and "Cold Formed Metal Framing" for miscellaneous steel supports and trim.
- 3. Division 08 Section "Door Hardware" for power operated door keyed switch.
- 4. Division 09 Section "Painting" for finish painting of factory-primed doors.
- 5. Division 26 Sections for electrical service and connections for powered operators and accessories.

## 1.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the emergency-egress-door component will be fully operational after the seismic event."
  - 2. Seismic Component Importance Factor: 1.0.
- B. Operation Cycles: Provide overhead door components and operators capable of operating for not less than number of cycles indicated for each door. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

# 1.3 SUBMITTALS

- A. Product Data: For each type and size of overhead door and accessory. Include the following:
  - 1. Construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
  - 2. Rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Show locations of replaceable fusible links.
  - 3. Wiring Diagrams: For power, signal, and control wiring.
- C. Samples for Verification: For each type of exposed finish required, provide samples of actual material with a minimum dimension of 6" in size.
- D. Qualification Data: For qualified Installer.
- E. Seismic Qualification Certificates: For overhead doors, accessories, and components, from manufacturer.
- F. Maintenance Data: For overhead doors to include in maintenance manuals.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain overhead doors from single source from single manufacturer.
  - 1. Obtain operators and controls from overhead door manufacturer.

- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

# PART 2 - PRODUCTS

- 2.1 DOOR MATERIALS AND CONSTRUCTION
- A. Door: Fabricate overhead-door curtain of interlocking metal slats, designed to withstand loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
  - 1. Motor Operated Overhead Coiling service door:
    - a. Door Curtain Material: Hot dipped galvanized steel over rigid insulation core
    - b. Finish: Finalcote
    - c. Bottom Bar: Two 1/8" angles with (1) coat bronze rust-inhibiting prime paint.
    - d. Guides: (3) steel angles bolted with (1) coat bronze rust-inhibiting prime paint.
    - e. Hood: 24 gauge galvanized steel with Finalcote finish

# 2.2 LOCKING DEVICES & ACCESSORIES

- A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.
- C. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door. Provide pull-down straps or pole hooks for doors more than 84 inches high.

# 2.3 MANUAL DOOR OPERATORS

- A. Equip door with manufacturer's recommended manual door operator unless another type of door operator is indicated.
- B. Chain operated for emergency use. Design counterbalance mechanism so required lift or pull for door operation does not exceed 25 lbf.

# 2.4 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
  - 1. Comply with NFPA 70.
  - 2. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24 V, ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. The door shall be operated at a speed of 2/3 foot per second by an open drip-proof electric motor with gear reducer in oil bath. The motor operator shall include a geared limit switch, and an electrically interlocked emergency chain operator. The motor starter shall be housed in a NEMA 1 housing and include a magnetic reversing starter size 0, a 24 volt control transformer, and complete terminal strip to facilitate field wiring. All motor operators shall be U.L. listed.
- D. Door Operator Location(s): Reference drawings and mounting condition for operator location indicated for each door.

- 1. Provide one operator location per door one on interior area side with keyed switch. Verify switch location with Owner prior to installation. Keyed switch to match Owner's Schlage series keyway.
- 2. Provide electrical switch controls to interface with owner's electrical security access control system.
- E. Electric Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Division 26 Section "Common Motor Requirements for Equipment" unless otherwise indicated.
  - 1. Electrical Characteristics:
    - a. Phase: Single phase.
    - b. Volts: 208 V.
    - c. Hertz: 60.
  - 2. Motor Type and Controller: Reversible motor and controller (disconnect switch) for motor exposure indicated.
  - 3. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed of 8 in./sec., without exceeding nameplate ratings or service factor.
  - 4. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated. Provide two operator locations for each door – one outside and one inside of the door with key switches at both locations
  - 5. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
- F. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

# G. Safety Features:

- 1. The service door shall have installed on the bottom bar a Phantom Featheredge wireless device that will automatically reverse the door if the device detects an obstruction in the downward travel of the door.
  - a. The Phantom Featheredge shall consist of a rubber boot attached below the bottom bar with a switch secured to the back of the bottom bar. The Phantom Featheredge shall operate with air wave technology and shall not rely on pneumatic pressure or electrical contacts to operate. The Phantom Featheredge shall create an air wave that shall be detected by the switch which reverses the downward direction of the rolling door.
  - b. The Phantom Featheredge shall not require a connection cord or any means of electrical connection to the motor control panel.
  - c. The Phantom Featheredge shall be of fail-safe construction, and on every cycle shall perform a self diagnostic test. If any part of the Phantom Featheredge fails, the door closing operation shall change from momentary pressure to constant pressure requiring constant pressure on the close control station to move the door in a downward motion. Repairing the Phantom Featheredge will automatically return the closing operation to momentary pressure.
  - d. The operation of the Phantom Featheredge shall not be subject to interferences by temperature, barometric pressure, water infiltration, or punctures and small tears.
  - e. The Phantom Featheredge shall perform with an extremely small amount of impact pressure.
  - f. The Phantom Featheredge shall be wireless with remote transmitters at the head and base of the door. Coordinate transmitters required clearances with ceiling, jamb and soffit finishes.
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount

mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

## 2.5 OVERHEAD SUPPORTED DOOR ASSEMBLIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Cookson Company systems for the work of this section or comparable product by one of the following:
  - 1. ACME Rolling Doors.
  - 2. Cornell Iron Works, Inc.
  - 3. Lawrence Roll-Up Doors, Inc.
  - 4. Mahon Door Corporation.
  - 5. McKeon Rolling Steel Door Company, Inc.
  - 6. Overhead Door Corporation.
  - 7. Raynor
  - 8. Windsor Door.
  - B. **Power operated insulated service door (Storage Room, Manufacture Rooms & Bid Alt 3 and 4 Bldgs): OHD** Overhead coiling door formed with curtain of interlocking insulated metal slats.
    - 1. Cookson Company, Product: ESD30 face of wall mounted overhead coiling insulated service door.
    - 2. Door Curtain Material: Hot dipped galvanized steel over rigid insulation core (R-8 min.)
    - 3. Mounting: Face of Wall.
    - 4. Sill Configuration for Door: No sill, close to finish floor condition.
    - 5. Locking Devices: Equip door with chain lock.
    - 6. Exterior Slat Gauge: 20
    - 7. Interior Slat Gauge: 24
    - 8. Electric Door Operator:
      - a. Usage Classification: Heavy duty, 60 to 90 cycles per hour.
      - b. Operator Location: Interior of student store.
      - c. Motor Exposure: Interior.
      - d. Emergency Manual Operation: Chain type.
      - e. Provide electrical switch controls to interface with owner's electrical security access control system. Key switch to match Owner standard Schlage series keyway.
    - 9. Obstruction-Detection Device: Automatic electric sensor edge on bottom bar with wireless transmitter.
    - 10. Door Finish: Colorcoat Finish. GREY As selected by Architect for full standard color range.
    - 11. Trim: Provide all steel trim profiles in matching finish required to finish installation.

#### 2.6 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 INSTALLATION

- A. Install overhead doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead doors, hoods, and operators at the mounting locations indicated for each door.
- C. Accessibility: Install overhead doors, and controls along accessible routes in compliance with regulatory requirements for accessibility.

# 3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
  - 1. Perform installation and startup checks according to manufacturer's written instructions.
    - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

## 3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

## 3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead supported doors.

END OF SECTION 08 33 23

# SECTION 08 33 26 - OVERHEAD COILING GRILLES

## PART 1 - GENERAL

# 1.1 SUMMARY

Α.

- Section Includes:
  - 1. Motor Operated full-height overhead coiling security grille

## B. Related Sections:

- 1. Division 01 Section "Commissioning" for functional testing and demonstration of system
- 2. Division 05 Section "Metal Fabrications" and "Cold Formed Metal Framing" for miscellaneous steel supports and trim.
- 3. Division 08 Section "Door Hardware" for power operated door keyed switch.
- 4. Division 09 Section "Painting" for finish painting of factory-primed doors.
- 5. Division 26 Sections for electrical service and connections for powered operators and accessories.

## 1.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Overhead coiling doors shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the emergency-egress-door component will be fully operational after the seismic event."
  - 2. Seismic Component Importance Factor: 1.0.
- B. Operation Cycles: Provide overhead door components and operators capable of operating for not less than number of cycles indicated for each door. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

# 1.3 SUBMITTALS

- A. Product Data: For each type and size of overhead door and accessory. Include the following:
  - 1. Construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
  - 2. Rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Show locations of replaceable fusible links.
  - 3. Wiring Diagrams: For power, signal, and control wiring.
- C. Samples for Verification: For each type of exposed finish required, provide samples of actual material with a minimum dimension of 6" in size.
- D. Qualification Data: For qualified Installer.
- E. Seismic Qualification Certificates: For overhead doors, accessories, and components, from manufacturer.
- F. Maintenance Data: For overhead doors to include in maintenance manuals.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain overhead doors from single source from single manufacturer.
  - 1. Obtain operators and controls from overhead door manufacturer.

- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

# PART 2 - PRODUCTS

- 2.1 DOOR MATERIALS AND CONSTRUCTION
- A. Door: Fabricate overhead-door curtain of interlocking metal slats, designed to withstand loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
  - 1. Motor Operated Security Grille:
    - a. The grille curtain shall be Pattern 5014-M92 constructed of solid 5/16" diameter horizontal aluminum rods on 2" centers with 1/8" aluminum hinged vertical connecting links (5/8" deep by 3-3/4" high) 9" on center.
    - b. The bottom bar shall consist of an extruded aluminum tube measuring 4" high by 1-3/4" deep and shall include the Cookson Phantom Featheredge <u>cordless</u> safety edge system.
    - c. The guides shall be constructed of 1/4" thick continuous aluminum wall angles connected to 1-1/2" by 2-1/2" by 1/8" thick continuous extruded aluminum guide section. Continuous nylon wearstrips shall be inserted on both sides of the guide to eliminate metal-to-metal contact.
    - d. The brackets shall be constructed of steel not less than 1/4" thick. The finish on the brackets shall be one (1) coat of aluminum prime paint.
    - e. The barrel shall be steel tubing of not less than 6" in diameter. Oil tempered torsion springs shall be capable of correctly counter balancing the weight of the curtain. The barrel shall be designed to limit the maximum deflection to .03" per foot of opening width. The springs shall be adjusted by means of an exterior wheel. The finish on the barrel shall be one (1) coat of bronze rust-inhibiting paint.
    - f. The hood shall be fabricated from .040 aluminum sheet and shall be formed to fit the curvature of the brackets.
    - g. Locking mechanism: Motor operated grilles shall be secured by means of a cylinder lock in the bottom bar, electrically interlocked to prevent the motor from operating when the grille is locked.
    - h. The finish on all door curtain, bar, guides, brackets, fasteners and hood shall be color anodized aluminum.

# 2.2 LOCKING DEVICES & ACCESSORIES

- A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.
- C. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door. Provide pull-down straps or pole hooks for doors more than 84 inches high.

# 2.3 MANUAL DOOR OPERATORS

- A. Equip door with manufacturer's recommended manual door operator unless another type of door operator is indicated.
- B. Push-up Door Operation: Design counterbalance mechanism so required lift or pull for door operation does not exceed 25 lbf.
- C. Crank Operator: Consisting of crank and crank gearbox, steel crank drive shaft, and gearreduction unit, of type indicated. Size gears to require not more than 25 lbf force to turn crank.

Fabricate gearbox to be oil tight and to completely enclose operating mechanism. Provide manufacturer's standard crank-locking device.

# 2.4 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
  - 1. Comply with NFPA 70.
  - 2. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24 V, ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. The door shall be operated at a speed of 2/3 foot per second by an open drip-proof electric motor with gear reducer in oil bath. The motor operator shall include a geared limit switch, and an electrically interlocked emergency chain operator. The motor starter shall be housed in a NEMA 1 housing and include a magnetic reversing starter size 0, a 24 volt control transformer, and complete terminal strip to facilitate field wiring. All motor operators shall be U.L. listed.
- D. Door Operator Location(s): Reference drawings and mounting condition for operator location indicated for each door.
  - 1. Provide one operator location per door one on interior area side with keyed switch. Verify switch location with Owner prior to installation. Keyed switch to match Owner's Schlage series keyway.
  - 2. Provide electrical switch controls to interface with owner's electrical security access control system.
- E. Electric Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Division 26 Section "Common Motor Requirements for Equipment" unless otherwise indicated.
  - 1. Electrical Characteristics:
    - a. Phase: Single phase.
    - b. Volts: 208 V.
    - c. Hertz: 60.
  - 2. Motor Type and Controller: Reversible motor and controller (disconnect switch) for motor exposure indicated.
  - 3. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed of 8 in./sec., without exceeding nameplate ratings or service factor.
  - 4. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated. Provide two operator locations for each door – one outside and one inside of the door with key switches at both locations
  - 5. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
- F. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- G. Safety Features:
  - 1. The service door shall have installed on the bottom bar a Phantom Featheredge wireless device that will automatically reverse the door if the device detects an obstruction in the downward travel of the door.
    - a. The Phantom Featheredge shall consist of a rubber boot attached below the bottom bar with a switch secured to the back of the bottom bar. The Phantom Featheredge shall operate with air wave technology and shall not rely on pneumatic pressure or electrical contacts to operate. The Phantom Featheredge shall create an air wave that shall be detected by the switch which reverses the downward direction of the rolling door.

- b. The Phantom Featheredge shall not require a connection cord or any means of electrical connection to the motor control panel.
- c. The Phantom Featheredge shall be of fail-safe construction, and on every cycle shall perform a self diagnostic test. If any part of the Phantom Featheredge fails, the door closing operation shall change from momentary pressure to constant pressure requiring constant pressure on the close control station to move the door in a downward motion. Repairing the Phantom Featheredge will automatically return the closing operation to momentary pressure.
- d. The operation of the Phantom Featheredge shall not be subject to interferences by temperature, barometric pressure, water infiltration, or punctures and small tears.
- e. The Phantom Featheredge shall perform with an extremely small amount of impact pressure.
- f. The Phantom Featheredge shall be wireless with remote transmitters at the head and base of the door. Coordinate transmitter required clearances with ceiling, jamb and soffit finishes.
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

# 2.5 OVERHEAD SUPPORTED DOOR ASSEMBLIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Cookson Company systems for the work of this section or comparable product by one of the following:
  - 1. ACME Rolling Doors.
  - 2. Cornell Iron Works, Inc.
  - 3. Lawrence Roll-Up Doors, Inc.
  - 4. Mahon Door Corporation.
  - 5. McKeon Rolling Steel Door Company, Inc.
  - 6. Overhead Door Corporation.
  - 7. Raynor
  - 8. Windsor Door.
- B. **Motor operated overhead coiling security grilles (Serving and Credit Union)**: **ORG** Overhead security grille formed with curtain of interlocking metal rods and rungs.
  - 1. Cookson Company, Product: Heavy Duty Rolling Grille Model ESG12 tube steel mounted overhead with side motor mount.
  - 2. Door Curtain Material: Aluminum rods, plates and links.
  - 3. Mounting: Between Jamb.
  - 4. Guides: Steel guides with full height steel angle jamb support on both sides of door. Conceal jamb support steel in wall framing.
  - 5. Sill Configuration for Door: No sill, close to interior finish floor condition.
  - 6. Locking Devices: Equip door with hasp for padlock.
  - 7. Electric Door Operator:
    - a. Usage Classification: Heavy duty, 60 to 90 cycles per hour.
    - b. Operator Location: Front of hood.
    - c. Motor Exposure: Interior.
    - d. Emergency Manual Operation: Chain type.
    - e. Provide electrical switch controls to interface with owner's electrical security access control system. Key switch to match Owner standard series keyway.
  - 8. Obstruction-Detection Device: Wireless automatic electric sensor edge on bottom bar.
  - 9. Door Finish: Color Anodized Aluminum (match color of storefront system)

# 2.6 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 INSTALLATION

- A. Install overhead doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead doors, hoods, and operators at the mounting locations indicated for each door.
- C. Accessibility: Install overhead doors, and controls along accessible routes in compliance with regulatory requirements for accessibility.

# 3.3 STARTUP SERVICE

- Engage a factory-authorized service representative to perform startup service.
  - 1. Perform installation and startup checks according to manufacturer's written instructions.
  - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

# 3.4 ADJUSTING

Α.

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

# 3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead supported doors.

END OF SECTION 08 33 26

# SECTION 08 41 13 - ALUMINUM-FRAMED STOREFRONTS, ENTRIES AND WINDOW SYSTEMS

PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Section Includes:
    - 1. Exterior and interior storefront framing.
    - 2. Storefront framing for window walls, including Outswing Casement (For Installation into Storefront Systems).
    - 3. Curtain Wall system.
    - 4. Aluminum entry and vestibule doors.
    - 5. All anchors, bridging, brackets, and attachments.
    - 6. Hardware, not specified elsewhere.
    - 7. Aluminum Storefront mount Sunshades.
  - B. System Description
    - 1. System to perform as required below in Performance Requirements
    - 2. System to accommodate, without damage to system or components, or deterioration of perimeter seal: Movement within system; movement between system and perimeter framing components; dynamic loading and release of loads; and deflection of structural support framing.
    - 3. All required internal steel reinforcement, anchors, bracing, and attachments back to the primary structure of the building (defined as that structure that is shown in the "S" sheets of the drawings) shall be the responsibility of this specification section. Shop drawings shall be engineered and shall clearly indicate all required bracing, bridging, kickers, clips, etc. necessary for the proper installation of the window system.
  - C. Related Sections:
    - 1. Division 01 Section "Quality Requirements" for special building envelope mock-up.
    - 2. Division 07 Section "Metal Panels" for composite metal panel integration into storefront system at select entry locations.
    - 3. Division 08 Section "FRP Flush Doors" for doors to be installed in aluminum frame system.
    - 4. Division 08 Section "Glazing" for glazing to be installed in aluminum frame system.
- 1.2 DEFINITIONS
  - A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

# 1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
  - 1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
  - 2. Dimensional tolerances of building frame and other adjacent construction.
  - 3. Failure includes the following:
    - a. Deflection exceeding specified limits.
    - b. Thermal stresses transferring to building structure.
    - c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
    - d. Noise or vibration created by wind and by thermal and structural movements.
    - e. Loosening or weakening of fasteners, attachments, and other components.
    - f. Sealant failure.
    - g. Failure of operating units.
- B. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

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- C. Structural Loads:
  - 1. Wind Loads:
    - a. Basic Wind Speed: 90 mph.
    - b. Importance Factor: As determined by IBC.
    - c. Exposure Category: B
  - 2. Seismic Loads: As indicated on Drawings.
- D. Deflection of Framing Members:
  - 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
  - 2. Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch, whichever is smaller.
- E. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:
  - 1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
  - 2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
  - 3. Test Durations: As required by design wind velocity, but not fewer than 10 seconds.
- F. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft..
- G. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
- H. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
  - 2. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
    - a. High Exterior Ambient-Air Temperature: That which produces an exterior metalsurface temperature of 180 deg F.
    - b. Low Exterior Ambient-Air Temperature: 0 deg F.
  - 3. Interior Ambient-Air Temperature: 75 deg F.
- I. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 45 when tested according to AAMA 1503.
- J. Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.57 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.
- K. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by aluminumframed systems without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.
  - 1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
  - 2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

# 1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

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- B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.
  - 2. For entrance doors, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.
  - 3. Note outrigger mounting locations and any conflicts with compensating head or jamb conditions.
- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- D. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12-inch lengths of full-size components and showing details of the following:
  - 1. Joinery, including concealed welds.
  - 2. Anchorage.
  - 3. Expansion provisions.
  - 4. Glazing.
  - 5. Flashing and drainage (weep holes if required).
- E. Delegated-Design Submittal: For aluminum-framed systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional Washington State engineer responsible for their preparation.
  - 1. Detail fabrication and assembly of aluminum-framed systems.
  - 2. Include design calculations.
- F. Qualification Data: For qualified Installer and testing agency.
- G. Seismic Qualification Certificates: For aluminum-framed systems, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
- H. Welding certificates.
- I. Preconstruction Test Reports: For sealant.
- J. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.
- K. Source quality-control reports.
- L. Field quality-control reports.
- M. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.
- N. Warranties: Sample of special warranties.

# 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- C. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.
- D. Quality-Control Program for Structural-Sealant-Glazed System: Develop quality control program specifically for Project. Document quality-control procedures and verify results for aluminum-framed systems. Comply with ASTM C 1401 recommendations including, but not limited to, system material-qualification procedures, preconstruction sealant-testing program, procedures for system fabrication and installation, and intervals of reviews and checks.
- E. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
  - 1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

- F. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
- G. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.
- H. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code Aluminum."
- I. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Build mockup of typical wall area as shown on Drawings.
  - 2. Field testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
  - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- J. Preinstallation Conference: Conduct conference at Project site.
- 1.6 PROJECT CONDITIONS
  - A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

# 1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

- 1. Failures include, but are not limited to, the following:
  - a. Structural failures including, but not limited to, excessive deflection.
  - b. Noise or vibration caused by thermal movements.
  - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - d. Adhesive or cohesive sealant failures.
  - e. Water leakage through fixed glazing and framing areas.
  - f. Failure of operating components.
- 2. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

# PART 2 - PRODUCTS

# 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Aluminum Exterior Storefront, Entry, Curtain Wall and Window System, with 500T Insulpour Thermal doors as indicated in the drawings; internally steel reinforced, thermally broken, complete with deflection heads and base tracks with weep holes, for the work of this section. Fluropon aluminum finish to match architects approved sample.
  - 1. Basis of Design
    - a. Storefront: Kawneer Trifab VG 451T
    - b. Curtain Wall: Kawneer 1600 Wall System 1
    - c. Entry Doors: Kawneer Aluminum Entrances 500T Insulpour Thermal
    - d. Sunshade: Kawneer Versoleil
  - 2. EFCO Corporation, equal product lines to above.
  - 3. United States Aluminum, equal product lines to above.
  - 4. Old Castle Building Envelope; equal product lines to above.

# 2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
  - 1. Sheet and Plate: ASTM B 209.
  - 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
  - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
  - 4. Structural Profiles: ASTM B 308/B 308M.
  - 5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
- B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
  - 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
  - 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
  - 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

# 2.3 CURTAIN WALL FRAMING SYSTEMS

- A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
  - 1. Construction: Thermally broken with fiberglass pressure plate.
  - 2. Sizes:  $2\frac{1}{2}$  " x  $7\frac{1}{2}$ ", reference drawings for locations of each installation,
  - 3. Glazing System: Retained mechanically with gaskets on four sides.
  - 4. Glazing Plane: As indicated in drawings.
  - B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
  - C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
    - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
    - 2. Reinforce members as required to receive fastener threads.
    - 3. If necessary, use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
  - D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.
  - E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
  - F. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

# 2.4 STOREFRONT FRAMING SYSTEMS

- A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
  - 1. Construction: Thermally broken.
  - 2. Sizes: 2 " x 4<sup>1</sup>/<sub>2</sub>", reference drawings for locations of each installation,
  - 3. Glazing System: Retained mechanically with gaskets on four sides.
  - 4. Glazing Plane: As indicated in drawings.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 2. Reinforce members as required to receive fastener threads.

- 3. If necessary, use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.
- E. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- F. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.
  - 1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- 2.5 GLAZING SYSTEMS
  - A. Glazing: As specified in Division 08 Section "Glazing."
  - B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.
  - C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
  - D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- 2.6 WINDOW SYSTEMS
- A. Operable Windows Not Used.

# 2.7 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Basis of Design Kawneer Aluminum Entrances 500 Heavy Wall Door; Wide stile, 6" vertical face dimension, 2" depth, 3/16" wall thickness, high traffic application.
  - B. Aluminum (Entrances and Components):
    - 1. Material Standard: ASTM B 221; 6063-T6 alloy and temper
    - The door shall be 2-1/4" thick and stile and rail face dimensions of: Door Vertical Stile Top Rail Bottom Rail 500T Insulpour 6" 12" 12"
    - 3. Major portions of the door members to be 0.188" nominal in thickness and glazing molding to be 0.05" thick
    - 4. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of entrance members are nominal and in compliance with Aluminum Standards and Data, published by The Aluminum Association
    - 5. Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.
    - 6. Provide adjustable glass jacks to help center the glass in the door opening.
    - 7. Coordinate rail and stile depths with access control devices and electric strikes.
    - 8. Accessories
      - a. Fasteners: Where exposed, shall be aluminum, stainless steel or plated steel.
      - b. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
      - c. Weatherstripping:
        - 1) Meeting stiles on pairs of doors shall be equipped with an adjustable astragal utilizing wool pile with polymeric fin
        - 2) The door weathering on a single acting butt hung door and frame (single or pairs) shall be Kawneer Sealair<sup>®</sup> weathering. This is comprised of a thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing
        - 3) Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners.

# 2.8 ENTRANCE DOOR HARDWARE

A. General: Provide entrance door hardware, in addition to hardware sets called for in Section 08 71 00 each entrance door to comply with requirements in this Section.

- B. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- C. Weather Stripping: Manufacturer's standard replaceable components.
  - 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
  - 2. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylonfabric or aluminum-strip backing.
- D. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

# 2.9 OUTRIGGER SUNSHADE

- A. Outrigger SunShade System: An aluminum sunshade (consisting of outriggers, louvers, and fascia selected from standard configurations), that is anchored directly to the vertical mullions. Outriggers shall be finished to match the aluminum storefront and window system. Louvers and fascia shall be coated or anodized to match the aluminum storefront and window system.
  - 1. Provide Kawneer Versoleil sunshade system complete with all accessories at all windows units shown to receive steel louvered sunshades. Straight-Square Outriggers; Planar Louvers; Rectangular Fascia, 24 inch Projection; Color and Finish to match storefront system.
  - 2. Where mounting conflicts occur with compensating jambs channels, omit compensating channel member. Note locations in shop drawing for Architect review.

# 2.10 ACCESSORY MATERIALS

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."
  - 1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.

# 2.11 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
  - 4. Physical and thermal isolation of glazing from framing members.
  - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 6. Provisions for field replacement of glazing from interior for vision glass and exterior for spandrel glazing or metal panels.
  - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
  - 1. At exterior doors, provide compression weather stripping at fixed stops.
- G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

# 2.12 ALUMINUM FINISHES

- A. Permaflour High Performance Architectural Coating, AAMA 2605, 1.2 mils minimum.
- B. Color as noted in section 09 00 00 material legend.

## 2.13 SOURCE QUALITY CONTROL

A. Prepare test and inspection reports.

## PART 3 - EXECUTION

- 3.1 EXAMINATION
  - A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. General:
  - 1. Comply with manufacturer's written instructions.
  - 2. Do not install damaged components.
  - 3. Fit joints to produce hairline joints free of burrs and distortion.
  - 4. Rigidly secure nonmovement joints.
  - 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
  - 6. Seal joints watertight unless otherwise indicated. Finish installation shall be leak-proof.
- B. Metal Protection:
  - 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
  - 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- D. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.
- E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.
- F. Install glazing as specified in Division 08 Section "Glazing."
- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
  - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
    - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
- H. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

# 3.3 ERECTION TOLERANCES

- Install aluminum-framed systems to comply with the following maximum erection tolerances:
  - 1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
  - 2. Alignment:
    - a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
    - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
- B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

Α.

# 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified independent testing and inspecting agency to perform field tests and inspections.
- B. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements. All final installations shall be leak-proof under normal conditions.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- D. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

# 3.5 ADJUSTING

- A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.
  - 1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch, measured to the leading door edge.

END OF SECTION 08 41 13

PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Section Includes
    - 1. Hardware for Standard steel and solid core wood doors.
    - 2. Master steel key cabinet sized for growth.
  - B. Related Sections

2.

- 1. Section 08 11 13 Hollow Metal Doors & Frames
  - Section 08 14 00 Flush Wood and Plastic Faced Doors
- 3. Section 08 33 00 Overhead Doors
- 4. Section 28 13 00 Access Control
- 1.2 REFERENCES
  - A. ANSI A117.1 Accessible and Usable Buildings and Facilities.
  - B. ANSI A 156 Door Hardware (ANSI/BHMA Standards)
  - C. NFPA 80 Fire Doors and Windows.
  - D. AWI Architectural Woodwork Institute Architectural Wood Work Quality Standards.
  - E. NFPA 101 Code for Safety to Life from Fire in Buildings and Structures.
  - F. NFPA 252 Fire Tests of Door Assemblies.
  - G. UL 10B Safety Fire Tests of Door Assemblies.
  - H. American Disabilities Act Accessibility Guidelines.
  - I. BHMA Builders Hardware Manufacturers Association A156 Series.
  - J. UL 305 Safety Panic Hardware.
- 1.3 SUBMITTALS
  - A. Submit under provisions of Division 01.
  - B. Verification of Door and Hardware Schedule submit written confirmation that supplier has reviewed and verified the function and compatibility of the products furnished and installed under this section.
  - C. Keying Information sample submittal format follows this section
  - D. Key bitting schedule data sample format follows this section
  - E. Submittal Sequence: Submit verified schedule at earliest possible date, particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule.
  - F. Installation Meeting: Prior to installation of hardware, manufacturers' representatives along with the project architect shall arrange and hold a jobsite meeting to instruct the installing contractor's personnel on the proper installation of their respective products. Seminar shall be attended by installers of hardware (including electrical hardware) for aluminum, hollow metal, and wood doors. Training to include the use of installation manuals, hardware schedule, templates, and physical product samples.
  - G. Keying Meeting and Schedule: Arrange for a keying meeting with the Architect and Owner, hardware supplier, and other involved parties prior to return of the reviewed finish hardware schedule, to ensure all locksets are functionally correct and keying fulfill the project requirements. Initial keying meeting to occur within 60 days of Notice to Proceed. As soon as possible after the keying conference, typed copies of the keying schedule shall be furnished to the Owner and Architect for review.
  - H. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g. hollow metal frames) which is critical in the project construction schedule. Include

with schedule the product data, samples, shop drawings or other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule. Allow 30 days minimum for A/E and Owner to review the submittal

- I. Templates: Furnish hardware templates to each fabricator of door, frames and other work to be factory prepared for the installation of hardware. Check shop drawings of such other work to confirm that adequate provisions are made for proper location and installation of hardware.
- J. Contract Close-out Requirements.
  - 1. Project Record Documents.
    - a. Submit under provisions of Division 01.
    - b. Record actual locations of installed cylinders and their master key code.
  - 2. Operation and Maintenance Data
    - a. Submit under provisions of Division 01.
    - b. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- 1.4 QUALITY ASSURANCE
  - A. Perform work in accordance with the following requirements:
    - 1. ANSI A117.1
    - 2. NFPA 101.
    - 3. NFPA 80.
    - 4. NFPA 252.
    - 5. American Disabilities Act Accessibility Guidelines.
    - 6. BHMA A115 Series.
  - B. Qualifications
    - 1. Manufacturer: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.
    - 2. Hardware Supplier: Company specializing in supplying commercial door hardware with 5 years documented experience, approved by manufacturer, and located within 150 miles of the project
    - 3. Hardware Supplier Personnel: Employ a certified Architectural Hardware Consultant (AHC) to assist in the work of this section. AHC should review construction documents and verify hardware function for given location and base bid or requirements for a complete code complying, functioning installation.
  - C. Regulatory Requirements
    - 1. Conform to applicable code for requirements applicable to fire rated doors and frames.
    - 2. Fire Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and local building code requirements.
- 1.5 DELIVERY, STORAGE, AND HANDLING
  - A. Deliver, store, protect and handle products to site under provisions of Division 01.
  - B. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.
  - C. Deliver keys to Owner by security shipment direct from hardware supplier.
  - D. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
  - E. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control handling and installation of hardware items which are not immediately replaceable so that completion of the work will not be delayed by hardware losses, both before and after installation.

- 1.6 SEQUENCING AND SCHEDULING
  - A. Coordinate work under provisions of Division 01.
  - B. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.
- 1.7 EXTENDED WARRANTY
  - A. Under provisions of Division 01. Include coverage for all hardware.
  - B. Extended Warranty Manufacturer's standard for individual item.
- 1.8 MAINTENANCE
  - A. Provide under provisions of Division 01.
  - B. Provide special wrenches and tools applicable to each different or special hardware component.
  - C. Provide maintenance tools and accessories supplied by hardware component manufacturer.

## PART 2 - PRODUCTS

## 2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: The numbers shown for the hardware items are taken from the catalogs of the manufacturers indicated and are for the purpose of establishing quality, design, and function. Except as listed as approved substitutes by item basis, no other manufacturer substitutions will be allowed unless approved by the Architect ten (10) days <u>prior to</u> bid opening. No substitutions will be allowed after bid opening.
- B. The numbers shown in the hardware groups are taken from the catalogs of the following manufacturers and are for the purpose of establishing quality, design and function. Except as listed, no substitution will be allowed unless approved by the Architect.

ITEM	MANUFACTURER	APPROVED SUBSTITUTE
Butts	McKinney	lves
Continuous Hinges	Select	Pemko
Locksets, Latchsets	Schlage	None
Cylinders	Schlage	None
Exit Devices	Corbin Russwin	None
Removable Mullions	Corbin Russwin	None
Flushbolts	Rockwood	Ives, Trimco
Latch Guards	Rockwood	None
Push/Pull Plates Rockwo	ood	None
Closers	Norton	None
Auto Operators	Norton	None
Wall Stops	Rockwood	lves
Overhead Stops Rixson	Glynn Johnson	
Protection Plates	Rockwood	lves
Thresholds	Pemko	None
Door Bottoms	Pemko	None
Gasketing	Pemko	None
Door Drip Cap	Pemko	None

- 2.2 MATERIALS/PRODUCTS:
  - A. Provide end products of one manufacturer for each item specified.
  - B. Finishes: BHMA 1301 Standards.
    - 1. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce. Differences in color and textures as much as commercially possible where

the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lockset (or push-pull units) for color and texture.

- 2. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standard, but in no case less than specified for the applicable units of hardware by referenced standards.
- The designations used in schedules and elsewhere to indicate hardware 3. finishes are those listed in ANSI A156.18 "Materials and Finishes Standard" and Builders Hardware Manufacturer's Association (BHMA), including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
- Hardware in general to be BHMA 626 and /or 652, Satin Chromium Plated. 4. Applicable Stainless Steel hardware shall be BHMA 630, Satin Stainless Steel.
- 5. Door closers to be in plastic covers finished to match other hardware.
- C. Hardware shall meet NFPA-80 requirements for Fire Assembly Rating and be Underwriters Laboratories, Inc. approved for specific application: See Door Schedule.
- Fasteners: Provide hardware manufactured to conform to published templates. D. generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- E. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws, except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.
- F. Provide concealed fasteners for hardware units which are exposed when door is closed, except when no standard units of type specified are available with concealed fasteners. Do not use through-bolts for installation where bolt head or nut on opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each through-bolt or use hex screw fasteners.
- 2.3 **KEYING** 
  - Α. Review the keying system with the Owner and provide the type required (master, grandmaster, or great-grandmaster), integrated with the existing system
  - Β. Existing system is: Schlage large format interchangeable (LFIC). (No Substitution). Comply with Owner's instructions for master keying, and, except as otherwise indicated; provide individual change keys for each lock which is not designated to be keyed alike with a group of related locks. Provide temporary cylinders for use during the construction Period.
  - C. Provide construction cores and keys during the construction period. Permanent cores and keys prepared according to the accepted keying schedule will be furnished to the owner by the local factory representative prior to occupancy. The Owner will install permanent interchangeable cores and return the construction cores to the factory representative.
  - D. All cylinders shall be keyed into the existing masterkey system. E.
    - Furnish keys and related hardware in the following quantities:
      - 1. Key quantities to be determined at keying meeting.
- 2.4 HINGES
  - A. General
    - 1. ANSI A 156J
      - 2. Quantity per door leaf height (minimum):

1 pair	to 5'-0" high
1-1/2 pair	5'-I" to 7'-7"
2 pair	7'-7" to 10'-0'

- 3. Hinge height (minimum):
  - 4 1/2" to 3'-0" door width
    - 5" 3'-1" to 4'-0"
- 4. Hinge width (minimum): twice the door thickness, plus the jamb trim project at 180 degree swing.
- 5. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template produced units.
- 6. Screws: Furnish <u>Phillips</u> flat-head machine and/or wood screws for installation of units. Finish screw heads to match surface of hinges or pivots. Provide stainless steel fasteners on exterior doors.
- 7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
  - a. Steel Hinges Steel pins.
    - b. Non-Ferrous Hinges Stainless steel pins.
    - c. Out-Swinging Doors Non-removable Pins(NRP). Use set
  - screw in barrel type.
  - d. Tips Flat button and matching plug, finished to match leaves,
  - except where hospital tip (HT) indicated.
- B. Mortise Hinges / Continuous Hinges
  - Full Mortise Hinges, 5-knuckle, flat button tip, anti-friction bearing type. Use Brass/Bronze type hinges on all exterior exposed doors.
    - <u>Hinge A:</u> High frequency use , heavy weight (entry, class, restroom) McKinney: T4A3786 Steel (652)
      - T4A3386 Brass/Bronze (626)
  - <u>Hinge B:</u> Standard weight McKinney: TA2714 Steel (652)
    - Hinge B:

Select: SL27 Alum SL21 Alum

- 2.5 LOCKSETS AND LATCHES
  - General

2.

Α.

- 1. ANSI A156.13, Series 1000, Security Grade 1 ANSI A117.1, Accessibility Code
  - Features:

1.

- a. Lockset and Trim: BHMA 630 Finished.
- 2) Trim: NSA (mortise)
- b. Backset: 2-3/4 inch.

c. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended <u>to protect</u> frame, finished to match hardware.

d. Latchbolt: 9/16" minimum throw, 3/4" on Fire Door pairs, and Auxiliary Deadlocking Latchbolt feature.

- A. Mortise
- \_\_\_\_Lockset x ANSI No.
- 2. ANSI No.
- F01 Passage
- F13 Privacy

- Entry/Office F04
- F05 Classroom
- Storage/Mechanical F076
- Approved Manufacturers: 3.
  - Schlage a.
  - No other approved manufacturers b.
- 2.6 EXIT DEVICES Α.
  - General
    - ANSI A156.3 Grade 1 ANSI A117.1 Accessibility Code 1.
    - 2. ANSI/BHMA 630 Finished.
    - 3. Fire-rated and non-rated type: see Door Schedule.
    - Cylinder: Rim and/or Mortise, interchangeable core at all doors 4
    - Push-Bar Style Device. 5.
  - Rim exit device with pull trim Β.
    - Exit Device ED5000 Series Corbin Russwin 1.
      - a. Single door application.
      - b. Surface applied: single point latching.
      - c. Standard Strike
    - 2. Exit Device - ED5000 Series - Corbin Russwin
      - a. Pair of doors with key removable mullion.
      - b. 2 independent active doors.
      - c. Surface applied each door: single point latching.
      - d. Standard strike
    - 3. Approved Manufacturers:
      - a. Corbin Russwin, No other approved manufacturers
- 2.7 **CLOSERS / AUTO OPERATORS** 
  - General

Α.

- ANSI A156.4, Grade 1 ANSI A117.1 Accessibility Code 1
- 2. Provide closer on active leaf of non-rated paired doors.
- 3. Install closer on interior (push) side of door.
- Size closer as per Manufacturer's recommendations. 4.
- Install thru-bolts with backer plates on all wood doors. 5.
- Provide parallel arm mounting ANSI/BHMA CO2021. Use regular arm 6.
- mounting only where parallel mounting is not appropriate or recommended. 7. Provide heavy duty type arms.
- Covers: (molded plastic); Color: Aluminum, BHMA 689. 8.
- Β. Schedule:

Item	Location
	Ecoderon

1.	Closer A	Handicap Rated, Interior Doors	Norton 7500 Series
2.	Auto Op A	Handicap Entrance	Norton 6300 Series

- C. No other approved manufacturers
- PUSH-PULLS 2.8
  - General Α.
    - ANSI/BHMA US32DMS finished. 1.
    - 2. Plates: 1/8" extruded, beveled top and bottom, 4" x 16".
    - Pulls: Bolt Through Door, 3/4" diameter x 8". 3.
    - Push Plates: Countersink pull through bolts and cover with push plates. 4.
  - Β. Schedule:
    - Push/Pull 110x73C/73CL. 1.
- 2.9 STOPS AND HOLDERS

Orion High School Pasco, Washington Α. General

ANSI A156.16 1.

ANSI A117.1 Accessibility code.

- 2. ANSI/BHMA 626 finished. 3.
  - Fasteners
    - Machine screws and threaded anchors at concrete or masonry. a.
      - Self tapping screws at wood or metal framing. b.
- Metal risers at carpet floors. 4.
- Β. Schedule

1.	Wall Stop	403	Rockwood
2.	Floor Stop	463	Rockwood
3.	Overhead Door Holder	9-036	Rixson

2.12 THRESHOLDS

General Α.

- ANSI A117.1, Accessibility Code 1.
- Aluminum, ANSIBBHMA 719 finished 2.
- 3. Thermal Break (where specified)
- Stainless Steel Anchors 4.
- Β. Schedule:
  - Threshold 253X4AFG, PEMKO, 1715AK 1.

#### 2.13 WEATHERSTRIP AND SEALS

- General Α.
  - 1. NFPA 80, 2-5.4 at fire rated and smoke assembly doors
  - 2. Aluminum, ANSI/BHMA 719 finished
  - Seals, vinyl and silicone 3.
- B. Schedule:
  - Door Seal 1.
  - 2. Door Sweep

- S88D PEMKO (Fire/Smoke/weather)
- 18062 PEMKO (Exterior Door)

- **REMOVABLE MULLION** 2.14
  - General Α.
    - 1. ANSI 156.3
    - 2. Aluminum Mullion, SP28 finished.
    - 3. Steel Mullion.
  - Β. Schedule:
    - Key Removable Mullion Corbin Russwin CR908BKM 1.
- 2.15 DOOR DRIP CAP
  - General Α.
    - Clear Anodized Aluminum, 346C 1.
    - 2. Install full width of door opening with 2" extension of coverage on both sides of operable door.

### PART 3 - EXECUTION

- 3.1 EXAMINATION
  - Verify site conditions under provisions of Division 01. Α.
  - Β. Verify that doors and frames are ready to receive work and dimensions are as instructed by the Manufacturer.
  - C. Verify that electric power is available to power operated devices and of the correct characteristics.
- 3.2 INSTALLATION
  - Mount hardware units at heights indicated in "Recommended Locations for Builders Α. Hardware for Standard Steel Doors and Frames" by the Door and Hardware

Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.

- B. Use templates provided by hardware item manufacturer.
- C. Conform to ANSI 117.1 and American Disabilities Act Guidelines for positioning requirements for the handicapped.
- D. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protection with finishing work specified in the Division 9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.
- E. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- G. Set supporting elements of thresholds for exterior doors in full bed of Type E sealant as specified in Section 07 92 00.
- 3.3 FIELD QUALITY CONTROL
  - A. Field inspection and testing will be performed under provisions of Division 01.
  - B. Architectural Hardware supplier to inspect finished installation and certify in writing that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.
- 3.4 ADJUST AND CLEAN
- A. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to punch list, acceptance, or occupancy, and make final check and adjustments of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- B. Continued Maintenance Service: Approximately six months after the acceptance of hardware in each area and before substantial completes the installer, accompanied by representatives of the latch and lock, exit device, and closer manufacturers, shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware, and to consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated of failed due to faulty design, materials, or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.
- 3.5 HARDWARE SCHEDULE HARDWARE GROUPS
- A. Reference following schedule (9 pages):

- 2 ea Continuous Hinge SL27 CLHD x ATW (2 1/4 Dr)
- 1 ea Key Removable Mullion CR908BKM
- 1 ea Exit Device ED5200 TH957ET 630 MELR M54 M110 D214
- 1 ea Exit Device ED5200 TH950ET 630 MELR M54 M110 D214
- 1 ea Cylinder Housing 20-060 626 (mullion)
- 1 ea Cylinder Housing 20-079 626 (trim)
- 2 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 20-740 626
- 1 ea Perm Core 23-030 626
- 2 ea Closer UNI7500 689 x 7788 x 6891 x 6890 D214
- 1 ea Threshold 273X3AFG x pemkote
- 2 ea Sweep 18062CNB x tek
- 1 ea Wire Harness QC-C1500P
- 1 ea Wire Harness QC-C006P
- 1 ea Power Supply 1420-DN
- 1 ea Wiring Schematic
  - Weatherstrip by door mfr Access control / lockdown by others as required

- 2 ea Continuous Hinge SL27 CLHD x ATW (2 1/4 Dr)
- 1 ea Key Removable Mullion CR908BKM
- 1 ea Exit Device ED5200 TH957ET 630 MELR M54 M110 D214
- 1 ea Exit Device ED5200 TH950ET 630 MELR M54 M110 D214
- 1 ea Cylinder Housing 20-060 626 (mullion)
- 1 ea Cylinder Housing 20-079 626 (trim)
- 2 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 20-740 626
- 1 ea Perm Core 23-030 626
- 1 ea Auto Operator 6300 689
- 1 ea Closer UNI7500 689 x 7788 x 6891 x 6890 D214
- 1 ea Concealed Overhead Stop 100S 630
- 1 ea Threshold 273X3AFG x pemkote
- 2 ea Sweep 18062CNB x tek
- 1 ea Wire Harness QC-C1500P
- 1 ea Wire Harness QC-C006P
- 1 ea Wiring Schematic
- 2 ea Actuator 502
- 2 ea Mounting Box 10BOXSQFM475
- 1 ea Power Supply 1420-DN Weatherstrip by door mfr Access control / lockdown by others as required

- 2 ea Continuous Hinge SL27 CLHD x ATW (2 1/4 Dr)
- 1 ea Key Removable Mullion CR908BKM
- 1 ea Exit Device ED5200 TH957ET 630 MELR M54 M110 D214
- 1 ea Exit Device ED5200 TH950ET 630 MELR M54 M110 D214
- 1 ea Cylinder Housing 20-060 626 (mullion)
- 1 ea Cylinder Housing 20-079 626 (trim)
- 2 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 20-740 626
- 1 ea Perm Core 23-030 626
- 1 ea Auto Operator 6300 689
- 1 ea Closer UNI7500 689 x 7788 x 6891 x 6890 D214
- 1 ea Concealed Overhead Stop 100S 630
- 1 ea Wire Harness QC-C1500P
- 1 ea Wire Harness QC-C006P
- 2 ea Actuator 502
- 2 ea Mounting Box 10BOXSQFM475
- 1 ea Wiring Schematic
- 1 ea Power Supply 1420-DN Access control / lockdown by others as required
  - HW4
- 2 ea Continuous Hinge SL27 CLHD x ATW (2 1/4 Dr)
- 1 ea Key Removable Mullion CR908BKM
- 1 ea Exit Device ED5200 TH957ET 630 MELR M54 M110 D214
- 1 ea Exit Device ED5200 TH950ET 630 MELR M54 M110 D214
- 1 ea Cylinder Housing 20-060 626 (mullion)
- 1 ea Cylinder Housing 20-079 626 (trim)
- 2 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 20-740 626
- 1 ea Perm Core 23-030 626
- 2 ea Closer UNI7500 689 x 7788 x 6891 x 6890 D214
- 1 ea Wire Harness QC-C1500P
- 1 ea Wire Harness QC-C006P
- 1 ea Power Supply 1420-DN
- 1 ea Wiring Schematic

Access control / lockdown by others as required

- 1 ea Continuous Hinge SL11 CLHD x ATW
- 1 ea Continuous Hinge SL11 CLHD
- 2 ea Flushbolt 555 626
- 1 ea Dustproof Strike 570 626
- 1 ea Lockset L9092EUJ 06A 626 x 10-072-7/8
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Closer CPS7500 689 x 7788 x 6891 x 6890
- 1 ea Closer PR7500 689 x 7788 x 6891 x 6890
- 1 ea Wire Harness QC-C1500P
- 1 ea Wire Harness QC-C300P
- 1 ea Wiring Schematic Access control / lockdown by others as required

- 3 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Lockset L9050J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Wall Stop 403 626
- 1 set Gasket S88D

### HW7

- 3 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Lockset L9486J 06A 626 x L583-375
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Closer PR7500 689
- 1 ea Wall Stop 403 626
- 1 set Gasket S88D

### HW8

- 2 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Elec Hinge TA2714 26D 4 1/2 x 4 1/2 x QC8
- 1 ea Lockset L9092EUJ 06A 626 x 10-072-7/8
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Closer PR7500 689
- 1 ea Wire Harness QC-C1500P
- 1 ea Wire Harness QC-C300P
- 1 ea Wiring Schematic Access control / lockdown by others as required

### HW9

- 3 ea Hinges T4A3786 26D 4 1/2 x 4 1/2 NRP
- 1 ea Exit Device ED5200 TH957ET 630 M52 M54 M110
- 1 ea Cylinder Housing 20-060 626 (dogging)
- 1 ea Cylinder Housing 20-079 626 (trim)
- 2 ea Temp Cont Core 23-030 ICX
- 2 ea Perm Core 23-030 626
- 1 ea Closer CPS7500H 689
- 1 ea Kickplate K1050 10 x 2 LTDW 630
- 1 set Gasket S88D

- 2 ea Cylinder Housing 20-060/20-079 626 (verify)
- 2 ea Temp Cont Core 23-030 ICX
- 2 ea Perm Core 23-030 626 Balance of hardware by door mfr

- 3 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Lockset L9080J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Kickplate K1050 10 x 2 LTDW 630
- 1 ea Wall Stop 403 626
- 3 ea Silencers SR64

### HW12

- 3 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Lockset L9071J 06A 626 x L283-711
- 2 ea Temp Cont Core 23-030 ICX
- 2 ea Perm Core 23-030 626
- 1 ea Wall Stop 403 626
- 1 set Gasket S88D

### HW13

- 1 ea Cylinder Housing 20-060/20-079 626 (verify)
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626 Balance of hardware by door mfr

### HW14

- 3 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Lockset L9466J 06A 626
- 2 ea Temp Cont Core 23-030 ICX
- 2 ea Perm Core 23-030 626
- 1 ea Wall Stop 403 626
- 1 set Gasket S88D

- 6 ea Hinges TA2714 26D 4 1/2 x 4 1/2 NRP
- 2 ea Flushbolt 557 626
- 1 ea Dustproof Strike 570 626
- 1 ea Lockset L9070J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Kickplate K1050 10 x 2 LTDW 630
- 1 ea Surface Overhead Stop 9-336 630
- 1 ea Wall Stop 403 626
- 4 ea Silencers SR64

- 3 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Lockset L9080J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Kickplate K1050 10 x 2 LTDW 630
- 1 ea Mop Plate K1050 6 x 1 LTDW 630
- 1 ea Wall Stop 403 626
- 3 ea Silencers SR64
- 1 ea Kickdown Holder 461 626

### HW17

- 3 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Lockset L9080J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Closer 7500 689
- 1 ea Kickplate K1050 10 x 2 LTDW 630
- 1 ea Wall Stop 403 626
- 1 set Gasket 379CPK
- 1 ea Auto Door Bottom 434ARL

### HW18

- 3 ea Hinges T4A3386 32D 4 1/2 x 4 1/2 NRP
- 1 ea Exit Device ED5200 TH957ET 630 M51 M54 M110
- 1 ea Cylinder Housing 20-079 626 (trim)
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Closer PR7500 689
- 1 ea Kickplate K1050 10 x 2 LTDW 630
- 1 ea Stop 463 BLK
- 1 ea Threshold 171AK
- 1 ea Sweep 18062CNB
- 1 set Gasket S88D
- 1 ea Drip Cap 346C

- 3 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Exit Device ED5200 TH957ET 630 M51 M54 M110
- I ea Cylinder Housing 20-079 626 (trim)
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Closer PR7500 689
- 1 ea Kickplate K1050 10 x 34 630
- 1 ea Wall Stop 403 626
- 1 set Gasket S88D

- 3 ea Hinges T4A3386 32D 4 1/2 x 4 1/2 NRP
- 1 ea Lockset L9080J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 20-740 626
- 1 ea Closer UNI7500 689
- 1 ea Kickplate K1050 10 x 34 630
- 1 ea Threshold 171AK
- 1 ea Sweep 18062CNB
- 1 set Gasket S88D
- 1 ea Drip Cap 346C

### HW21

- 6 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 2 ea Flushbolt 555 626
- 1 ea Dustproof Strike 570 626
- 1 ea Lockset L9070J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 2 ea Kickplate K1050 10 x 2 LTDW 630
- 1 ea Wall Stop 403 626
- 1 ea Surface Overhead Stop 9-116 630
- 4 ea Silencers SR64

### HW22

- 6 ea Hinges T4A3786 26D 4 1/2 x 4 1/2 NRP
- 2 ea Flushbolt 555 626
- 1 ea Dustproof Strike 570 626
- 1 ea Lockset L9050J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 2 ea Armor Plate K1125 30 x 2 LTDW 4BE
- 2 ea Wall Stop 403 626
- 4 ea Silencers SR64

- 3 ea Hinges T4A3786 26D 4 1/2 x 4 1/2 NRP
- 1 ea Deadbolt B660J 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 set Push/Pulls 110 x 73C/73CL 630
- 1 ea Closer CLP-R7500 689
- 1 ea Armor Plate K1125 30 x 2 LTDW 4BE
- 1 ea Wall Stop 403 626
- 3 ea Silencers SR64

All hardware by door mfr

### HW25

- 3 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Lockset L9050J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Surface Overhead Stop 9-336 630
- 1 ea Armor Plate K1125 30 x 2 LTDW 4BE
- 3 ea Silencers SR64

#### HW26

- 2 ea Continuous Hinge SL27 CLHD (2 1/4 Dr)
- 2 ea Push Bar ED5000 TH950ET 630 D214
- 2 ea Closer UNI7500 689 x 7788 x 6891 x 6890 D214 Balance of hardware by door mfr

### HW27

- 2 ea Continuous Hinge SL27 CLHD (2 1/4 Dr)
- 2 ea Exit Device ED5860 N957ET 630 M52 M54 M55 M110 D214
- 1 ea Cylinder Housing 20-060 626 (dogging)
- 2 ea Cylinder Housing 20-079 626 (trim)
- 2 ea Temp Cont Core 23-030 ICX
- 2 ea Perm Core 23-030 626
- 2 ea Closer UNI7500 689 x 7788 x 6891 x 6890 D214

- 6 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Flushbolt 557 626 (top only)
- 1 ea Lockset L9070J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 2 ea Wall Stop 403 626
- 4 ea Silencers SR64
- 2 ea Kickdown Holder 461 626

- 3 ea Hinges T4A3386 32D 4 1/2 x 4 1/2 NRP
- 1 ea Power Transfer CEPT-10
- 1 ea Exit Device ED5200 TH957ET 630 M54 M110 MELR
- 1 ea Cylinder Housing 20-079 626 (trim)
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 20-740 626
- 1 ea Closer UNI7500 689
- 1 ea Threshold 273X3AFG x pemkote
- 1 ea Sweep 18062CNB
- 1 set Gasket S88D
- 1 ea Drip Cap 346C
- 1 ea Wire Harness QC-C1500P
- 1 ea Wire Harness QC-C006P
- 1 ea Power Supply 1420-DN
- 1 ea Wiring Schematic Access control / lockdown by others as required

### HW30

- 3 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Lockset L9050J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Armor Plate K1050 30 x 2 LTDW 4BE
- 1 ea Wall Stop 403 626
- 3 ea Silencers SR64

### HW31

- 3 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 1 ea Lockset L9070J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Wall Stop 403 626
- 3 ea Silencers SR64

- 8 ea Hinges T4A3786 26D 5 x 4 1/2 NRP
- 2 ea Exit Device ED5860 N955ET 630 M52 M54 M55 M110
- 2 ea Cylinder Housing 20-060 626 (dogging)
- 2 ea Cylinder Housing 20-079 626 (trim)
- 2 ea Temp Cont Core 23-030 ICX
- 2 ea Perm Core 23-030 626
- 2 ea Closer CPS7500H 689
- 4 ea Silencers SR64

- 5 ea Hinges T4A3386 32D 4 1/2 x 4 1/2 NRP
- 1 ea Elec Hinge T4A3786 26D 4 1/2 x 4 1/2 x QC8
- 2 ea Flushbolt 555 626
- 1 ea Dustproof Strike 570 626
- 1 ea Lockset L9492EUJ 06A 626 x 10-072-7/8
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 20-740 626
- 1 ea Closer UNI7500 689 (active leaf)
- 2 ea Armor Plate K1125 30 x 2 LTDW 4BE
- 1 ea Wall Stop 403 626
- 1 ea Threshold 1715AK
- 2 ea Sweep 18062CNB x tek
- 1 set Gasket S88D
- 2 pcs Meeting Stile Gasket 18041CNB
- 1 ea Wire Harness QC-C1500P
- 1 ea Wire Harness QC-C300P
- 1 ea Power Supply 1420-DN
- 1 ea Wiring Schematic Access control / lockdown / air curtain / bell by others

### HW34

- 6 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 2 ea Flushbolt 555 626
- 1 ea Dustproof Strike 570 626
- 1 ea Lockset L9050J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 2 ea Armor Plate K1125 30 x 2 LTDW 4BE
- 2 ea Wall Stop 403 626
- 4 ea Silencers SR64
- 2 ea Kickdown Holder 461 626

- 1 ea Continuous Hinge SL21 CLHD
- 1 ea Lockset L9453J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Latch Guard 325 626
- 1 ea Closer UNI7500H 689
- 1 ea Threshold 1715AK
- 1 ea Sweep 18062CNB
- 1 set Gasket S88D
- 1 ea Drip Cap 346C

- 6 ea Hinges TA2714 26D 4 1/2 x 4 1/2
- 2 ea Flushbolt 555 626
- 1 ea Dustproof Strike 570 626
- 1 ea Lockset L9080J 06A 626
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Kickplate K1050 10 x 2 LTDW 630
- 1 ea Wall Stop 403 626
- 1 ea Surface Overhead Stop 9-336 630
- 4 ea Silencers SR64

### HW37

- 6 ea Hinges TA2714 26D 4 1/2 x 4 1/2 NRP
- 1 set Flushbolts 1845 630
- 1 ea Dustproof Strike 570 626
- 1 ea Lockset L9080J 06A 626 x 10-072-7/8
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Closer PR7500 689 (active leaf)
- 1 ea Surface Overhead Stop 9-336 630 (inactive leaf)
- 2 pcs Meeting Stile Gasket 18041CNB
- 1 set Gasket S88D

### HW38

- 6 ea Hinges TA2714 26D 4 1/2 x 4 1/2 NRP
- 2 ea Flushbolt 555 626
- 1 ea Dustproof Strike 570 626
- 1 ea Lockset L9080J 06A 626 x 10-072-7/8
- 1 ea Temp Cont Core 23-030 ICX
- 1 ea Perm Core 23-030 626
- 1 ea Closer PR7500 689 (active leaf)
- 1 ea Kickplate K1050 10 x 2 LTDW 630
- 1 ea Wall Stop 403 626
- 2 pcs Meeting Stile Gasket 18041CNB
- 1 set Gasket S88D

HW39 (for miscellaneous access doors)

- 12 ea Cylinder Housing 20-060/20-079 626 (verify)
- 12 ea Temp Cont Core 23-030 ICX
- 12 ea Perm Core 23-030 626 Balance of hardware by door mfr
  - Access panels

END OF SECTION 08 71 00

### SECTION 08 80 00 - GLAZING

### PART 1 - GENERAL

- 1.1 SUMMARY
- A. This Section includes glazing & mirrors for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
  - 1. Windows.
  - 2. Exterior and Interior Doors.
  - 3. Interior borrowed lites.
  - 4. Glazed storefront and window systems.
  - 5. Bullet Resistant safety glazing.
- B. Related Sections include the following:
  - 1. Division 05 Section "Decorative Metal Railings" for glass panels forming guards in railings.
  - 2. Division 06 Section "Architectural Woodwork" for glass panels occurring in casework and display cases.
  - 3. Division 08 Sections for Doors and Frames for relites/side lites.
  - 4. Division 08 Sections for Aluminum-Framed Storefront coordination.
- C. Performance Requirements:
  - 1. Glass and glazing materials of this Section shall provide continuity of building enclosure vapor and air barrier:
    - a. In conjunction with materials described in other sections of Division 07 and Division 08
    - b. To utilize the inner pane of multiple pane sealed units for the continuity of the air and vapor seal.
    - c. Maintain continuous air and vapor barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.
  - 2. Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass as calculated in accordance with IBC requirements and the design criteria contained within the construction documents
  - 3. All glazing shall be type and quality as required to meet UBC requirements for safety glazing. Provide labeling required as per IBC requirements
- 1.2 REFERENCES
- A. ASTM E 330 Test method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- B. ANSI Z97.1- Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
- C. ASTM C 1036 Specification for Flat Glass.
- D. ASTM C 1048 Specification for Heat-Treated Flat Glass Kind HS, Kind FT Coated and Uncoated Glass.
- E. ASTM E 546 Test Method For Frost Point of Sealed Insulating Glass Units.
- F. ASTM E 576 Test Method For Frost Point of Sealed Insulating Glass Units in Vertical Position.
- G. ASTM E 773 Test Methods for Seal Durability of Sealed Insulating Glass Units.
- H. ASTM E 774 Specification for Sealed Insulating Glass Units.
- I. FGMA Glazing Manual.
- J. FGMA Sealant Manual.
- K. Laminator Safety Glass Association Standards Manual.
- L. SIGMA Sealed Insulated Glass Manufacturers Association.
- M. CPSC 16 CFR 1201
- 1.3 SUBMITTALS
- A. Submit under provisions of Division 01.
- B. Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- D. Manufacturer's Certificate: Certify that sealed insulated glass, meet or exceed specified requirements.
- E. Submit drawings indicating required backing for mirrors
- F. Submit glazing sample of each glazing type, minimum 12" x 12".

# 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with FGMA Glazing Manual, FGMA Sealant Manual, SIGMA and Laminator Safety Glass Association Standards Manual for glazing installation methods.
- B. Glazing Publications: Comply with the following published recommendations for Mirrors
  - 1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
  - 2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."
- C. Fire Rated Glass Assemblies: Conform to ASTM E119.
- D. Bullet-Resisting Glass: UL 752 Level II.
- E. Installer Qualifications: Minimum 5 years documented experience in work of this Section.
- F. Regulatory Requirements:
  - 1. Provide safety glass for locations subject to human impact as required by Building Code.
  - 2. Safety glass: Tested and labeled to CPSC 16 CFR 1201.
- G. Perform Work in accordance with GANA Glazing Manual, GANA Laminated Glass Design Guide, SIGMA TM-3000 and IGMA TB-3001.

# 1.5 PROJECT/SITE CONDITIONS

- A. Field Measurements
  - 1. Verify that field measurements are as indicated on shop Drawings.
- 1.6 SEQUENCING AND SCHEDULING
  - A. Coordination
    - 1. Coordinate the Work with glazing frames, wall openings, and perimeter air and vapor seal to adjacent Work.
- 1.7 EXTENDED WARRANTY
- A. Under provisions of Division 01
- B. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
  - 1. Warranty Period: 10 years from date of Substantial Completion.
- C. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form, made out to Owner and signed by laminated-glass manufacturer agreeing to replace laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
  - 1. Warranty Period: Five years from date of Substantial Completion.
- D. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

# PART 2 - PRODUCTS

# 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Basis-of-Design Product: The design for each glazing product is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

# 2.2 GLASS PRODUCTS

- A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
  - 1. Ultra-Clear (Low-Iron) Float Glass: Class I (clear); with a minimum 91 percent visible light transmission and a minimum solar heat gain coefficient of 0.87.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
  - 1. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in "Performance Requirements".
  - 2. For uncoated glass, comply with requirements for Condition A.
  - 3. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
  - 4. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heatstrengthened) float glass where safety glass is indicated.
- C. Laminated Glass: ASTM C 1172, and complying with other requirements specified and with the following:
  - 1. Interlayer: Polyvinyl butyral or cured resin of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
    - a. For polyvinyl butyral interlayers, laminate lites in autoclave with heat plus pressure.
    - b. For cured-resin interlayers, laminate lites with laminated-glass manufacturer's standard cast-in-place and cured-transparent-resin interlayer.
  - 2. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.
- D. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.
  - 1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
  - 2. Provide Kind FT (fully tempered) glass lites where safety glass is indicated.
  - 3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
  - 4. Sealing System: Dual seal, with primary and secondary sealants as follows:
    - a. Manufacturer's standard sealants.
    - b. Polyisobutylene and silicone.
  - 5. Spacer Specifications: Manufacturer's standard spacer material and construction.
- E. Bullet-Resistant Glass Units: Clear laminate assembly with two-ply sheet and acrylic sheet. Level II bullet resistant glazing. Panels to provide controlled internal delamination and the encapture of a penetrating projectile. Ultraviolet stability non ricochet type.
- F. Spandrel Units: Not Used.

# 2.3 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
  - 1. EPDM, ASTM C 864.

- 2. Silicone, ASTM C 1115.
- 3. Thermoplastic polyolefin rubber, ASTM C 1115.
- 4. Any material indicated above.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:
  - 1. EPDM.
  - 2. Silicone.
  - 3. Thermoplastic polyolefin rubber.
  - 4. Any material indicated above.
- C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

# 2.4 GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
  - 1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  - 3. VOC Content: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
  - 1. Neutral-Curing Silicone Glazing Sealants GS-<#>:
    - a. Available Products:
      - 1) Dow Corning Corporation; 791.
      - 2) Dow Corning Corporation; 795.
      - 3) GE Silicones; SilPruf NB SCS9000.
      - 4) GE Silicones; UltraPruf II SCS2900.
      - 5) Pecora Corporation; 865.
      - 6) Pecora Corporation; 895.
      - 7) Pecora Corporation; 898.
    - b. Type and Grade: S (single component) and NS (nonsag).
    - c. Class: 50.
    - d. Use Related to Exposure: NT (nontraffic).
    - e. Uses Related to Glazing Substrates: M, G, A, and, as applicable to glazing substrates indicated, O.
      - 1) Use O Glazing Substrates: Coated glass color anodic aluminum, aluminum coated with a high-performance coating galvanized steel.

# 2.5 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
  - 1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  - 2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

- 1. Type 1, for glazing applications in which tape acts as the primary sealant.
- 2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

# 2.6 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

# 2.7 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with outdoor and indoor faces.
- C. Grind smooth and polish exposed glass edges and corners.
- D. Bullet-Resisting Glass:
  - 1. Comply with UL 752.
  - 2. Laminate glass with laminating film by manufacturer's standard heat and pressure process.
  - 3. Cut glass to required size at factory. Treat edges to prevent moisture intrusion. Coordinate speak-thru void where shown.
  - 4. Discard glass with voids, delamination, or entrapped dirt or foreign matter.

# 2.8 GLASS PRODUCTS

- A. Available Manufacturers:
  - 1. Basis of Design: Vitro Architectural Glass
  - 2. Libby-Owens-Ford Company
  - 3. Pilkington
  - 4. Saint Gobain Glass
  - 5. Nippon Electric Glass Co., Ltd., and distributed by Technical Glass Products
- B. See drawings for locations where glazing types G# (specified below) are indicated.
- C. **G1S-** Insulated Tinted Glazing Units, safety rated for locations subject to impact
  - 1. Solar-Control Low-E Insulating-Glass Units: Vitro: Solarban 70 XL (2) Solargray
  - 2. Overall Unit Thickness and Thickness of Each Lite: 1" overall, with two 1/4" nominal layers of glass with 1/2" air space between.
  - 3. Interspace Content: Air.
  - 4. Outdoor Lite: Class 1 (tinted).
    - a. Kind FT (fully tempered) where heat strengthening is required to resist thermal stresses induced by differential shading of individual glass lites and to comply with system performance requirements
    - b. Color: "**Solargray"** by PPG
  - 5. Indoor Lite: Class 1 (clear) float glass.
    - a. Kind FT (fully tempered)
  - 6. Low-E Coating: sputtered on second surface.
  - 7. Visible Light Transmittance: 31 percent minimum.
  - 8. Solar Heat Gain Coefficient: .19 maximum.
  - 9. Shading Coefficient: 0.22

- D. **G2S-** Obscure Translucent Glazing (Satin Etch), safety rated for locations subject to impact
  - 1. Uncoated Clear Float-Glass Units: Class 1 (clear) float glass Kind FT (fully tempered) float
  - glass Tempered: Pilkington Optifloat Clear (Statin Etch) single glazed for interior installation
  - 2. Thickness: 6.0 mm.
- E. **G3S-** Clear Glazing, safety rated for locations subject to impact
  - 1. Uncoated Clear Float-Glass Units: Class 1 (clear) float glass Kind FT (fully tempered) float glass Tempered: Pilkington Optifloat Clear (single glazed for interior installation)
  - 2. Thickness: 6.0 mm.
- F. **G4S** Clear Bullet Resistant Glazing, safety rated for projectile. Glass clad polycarbonate multi-ply flat assembly.
  - 1. Bullet Resistant Glass-Clad Polycarbonate Level II
  - 2. Thickness: 1.06 inch
  - 3. Weight: 9.33 pounds per square foot
  - 4. Security Level:
    - a. HP White TP-0500.02 Level II Forced Entry
    - b. HP White Level B Ballistics 357 mag (Low Spall)
    - c. WMFL Level II 60 minute Physical Attack
  - 5. Fire Rating: not required
  - 6. Light Transmission: 81 percent

# PART 3 - EXECUTION

# 3.1 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:

- 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
- 2. Presence and functioning of weep system.
- 3. Minimum required face or edge clearances.
- 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

# 3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm) as follows:

- 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
- 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

# 3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

# 3.5 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Install gaskets so they protrude past face of glazing stops.

# 3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

# 3.7 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.
- F. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- G. Do not permit edges of mirrors to be exposed to standing water.
- H. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

END OF SECTION 08 80 00

# **DIVISION 09 – FINISHES**

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Image         Nome         <	ROOM	ROOM	FLOOR	BASE	N. WALL		E. WALL		S. WALL		W. WALL		CEILING		REMARKS
INTENDEDINDE<	No.	Name	Finish	Matl	Matl	Finish	Matl	Finish	Matl	Finish	Matl	Finish	Matl	Finish	
Orbit         Orbit <t< td=""><td>FIRST FL</td><td>.00R</td><td></td><td></td><td>1</td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td></t<>	FIRST FL	.00R			1		1								1
OND         OND         Norm	CR-1	Corridor	RT-1/2/3/4/5/6	RB-1	GB	FRP-1/PT-1/3/5/7	GB	VWC-1	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	SC-4	FF	PT-7 above ceiling, chair rail
GA3         Colds         Fitt 100000         Fitt 100000         Fitt 100000         Fitt 100000         Fitt 1000000         Fitt 10000000         Fitt 10000000         Fitt 10000000         Fitt 10000000         Fitt 10000000         Fitt 10000000         Fitt 100000000         Fitt 100000000         Fitt 100000000         Fitt 100000000000000000000000000000000000	CR-2	Corridor	RT-1/2/3/4/5/6	RB-1	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	SC-3	FF	White & tack boards, PT-7 above ceiling, chair rail
Order         Uncode Name         Uncod Name         Uncode Name <th< td=""><td>CR-3</td><td>Corridor</td><td>RT-1/2/3/4/5/6</td><td>RB-1</td><td>GB</td><td>FRP-1/PT-1</td><td>GB</td><td>FRP-1/PT-1</td><td>GB</td><td>FRP-1/PT-1/VWC-1</td><td>GB</td><td>FRP-1/PT-1</td><td>SC-3/4</td><td>FF</td><td>PT-7 above ceiling, chair rail, tackboard</td></th<>	CR-3	Corridor	RT-1/2/3/4/5/6	RB-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1/VWC-1	GB	FRP-1/PT-1	SC-3/4	FF	PT-7 above ceiling, chair rail, tackboard
One A         Deck M         Proceed M         Proc	CR-4	Corridor	RT-1/2/3/4/5/6	RB-1	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	SC-3/4	FF	White & tack boards, PT-7 above ceiling, chair rail
NameN	CR-5	Corridor	RT-1/2/3/4/5/6	RB-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	SC-1	FF	FRP and chair rail
Image         Number         Number<					11		1								
11         Control         0.91 <t< td=""><td>100</td><td>Vestibule</td><td>WALK</td><td>RB-1</td><td>GB</td><td>Brick, VWC-1/PT-7</td><td>GB</td><td>VWC-1/PT-7</td><td>GB</td><td>PT-1/7</td><td>GB</td><td>Brick, VWC-1/PT-7</td><td>SC-4</td><td>FF</td><td>Brick veneer accent, PT-7 above ceiling, chair rail, security window, display cabinet</td></t<>	100	Vestibule	WALK	RB-1	GB	Brick, VWC-1/PT-7	GB	VWC-1/PT-7	GB	PT-1/7	GB	Brick, VWC-1/PT-7	SC-4	FF	Brick veneer accent, PT-7 above ceiling, chair rail, security window, display cabinet
100         1010         0 min         0	101	Secretary	CPT-1	RB-1		-	GB	 PT-3/7	GB	PT-5/7	GB	VWC-1/PT-7	SC-4	FF	PT-7 above ceiling, solid surfacing
101endityendityendityendityendityendityendityendityendityendityendityendity103lineTitleTitleGPitelGPitelPitelGPitelFitel <td>102</td> <td>Waiting</td> <td>CPT-1</td> <td>RB-1</td> <td>GB</td> <td>VWC-1/PT-3/7</td> <td>GB</td> <td>PT-3/7</td> <td>-</td> <td>-</td> <td>GB</td> <td>VWC-1/PT-7</td> <td>SC-4</td> <td>FF</td> <td>PT-7 above ceiling</td>	102	Waiting	CPT-1	RB-1	GB	VWC-1/PT-3/7	GB	PT-3/7	-	-	GB	VWC-1/PT-7	SC-4	FF	PT-7 above ceiling
100.         6fed         OP/1         No.         6 a         PP1 2         6 a         PP1 3	103	Health	RT-1	RB-1	GB	PT-1	GB	VWC-1	GB	VWC-1	GB	PT-1	SC-1	FF	Privacy curtains, appliances, FRP splash
1000         Intel         11.4.1         60.4         1992/12         60.4         1992/	103A	Office	CPT-1	RB-1	GB	PT-1	GB	PT-3	GB	PT-1	GB	PT-1	SC-1	FF	White and Tack boards
104         Rome         Fir.1         6.9         Pir.1         6.9         Pir.1         6.9         Pir.1         6.0	103B	Unisex	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bar, mirror
105         06% Nom         CPU-1         161         074         161         174         162         174         1600         1740         1600         17	104	Storage	RT-1	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	SC-1	FF	
100         result         TLE 1         TLE 1         TLE 1         FLE 1	105	Work Room	CPT-1	RB-1	GB	PT-3	GB	PT-5	GB	PT-1	GB	PT-5	SC-1	FF	Mailboxes
1000         ThEA1         111<	106	Unisex	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall. OFCI wall equipment, grab bar, mirror
1989         Converse         CPI-1         Re1.         6.8         PI-1.         6.6         PI-1.	107	Unisex	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bar, mirror
199         Offer         OP1-1         Ref.         Gen         PT-1         Gen         PT-1 <th< td=""><td>108</td><td>Corridor</td><td>CPT-1</td><td>RB-1</td><td>GB</td><td>PT-1</td><td>GB</td><td></td><td>GB</td><td>VCW-1</td><td>GB</td><td>PT-1</td><td>SC-1</td><td>FF</td><td>VCW at entire south wall</td></th<>	108	Corridor	CPT-1	RB-1	GB	PT-1	GB		GB	VCW-1	GB	PT-1	SC-1	FF	VCW at entire south wall
110         Offer         CPT-1         RPL         OR         PT-1         CR         PT-1         CR<	109	Office	CPT-1	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-3	SC-1	FF	White and Tack boards
1111       Other       OFI-1       Ref.       Gal       PT-1       Gal       PT-	110	Office	CPT-1	RB-1	GB	PT-1	GB	PT-3	GB	PT-1	GB	PT-1	SC-1	FF	White and Tack boards
1111         Conteness         Off.         1         0.00         PT-1         <	111	Office	CPT-1	RB-1	GB		GB		GB	PT-1	GB	PT-3	SC-1	FF	White and Tack boards
1111       Learning Contr.       11.1       Contr.       Contr.       Contr.       Contr.       Contr.       Field       Perton       Contr.       Perton       Perton <td>112</td> <td>Conference</td> <td>CPT-1</td> <td>RB-1</td> <td>GB</td> <td></td> <td>GB</td> <td></td> <td>GB</td> <td>PT-1</td> <td>GB</td> <td>VCW-1</td> <td>SC-1</td> <td>FF</td> <td>Floor Box White and Tack boards</td>	112	Conference	CPT-1	RB-1	GB		GB		GB	PT-1	GB	VCW-1	SC-1	FF	Floor Box White and Tack boards
111       Summa Contr.       111.0       00       111.0       000       111.0 <td>113</td> <td>Learning Center</td> <td>RT-1/2/3/4/5/6</td> <td>RB-1</td> <td>GB</td> <td></td> <td>GB</td> <td>PT-5</td> <td>GB</td> <td>PT-1</td> <td>GB</td> <td>VCW-1/PT-1</td> <td>SC-1</td> <td>FF</td> <td>Partition Door White and Tack boards lockers</td>	113	Learning Center	RT-1/2/3/4/5/6	RB-1	GB		GB	PT-5	GB	PT-1	GB	VCW-1/PT-1	SC-1	FF	Partition Door White and Tack boards lockers
This         Observer Automatical Section         The section         Observer Automatical Section	114	Learning Center	PT-1/2/3/4/5/6	PB-1	GB	DT_1	GB	DT 5	GB	PT-4	GB	VCW_1/PT_1	SC-1	EE	Partition Door, White and Tack boards, lockers
The Anticipant State         Cold         Print         Obs         Print         Obs<	114	Student Collaborate	DT 1/2/3/4/5/0			EDD 1/DT 1		гтэ 					SC 4	 EE	White & task boards, BT 7 above spilling, above roll boards
The Barge         The Barge <ththe barge<="" th=""> <ththe barge<="" th=""> <tht< td=""><td>110</td><td>Storage</td><td>RT-1/2/3/4/3/0</td><td></td><td>CP CP</td><td>DT 1</td><td></td><td>DT 1</td><td></td><td></td><td></td><td></td><td></td><td></td><td>Two layers of CP at solling</td></tht<></ththe></ththe>	110	Storage	RT-1/2/3/4/3/0		CP CP	DT 1		DT 1							Two layers of CP at solling
Interview         OF 1         Obs         OP 1         Obs         OP 1         Obs         PT 1         No	447	Teesher			GB CD	Г I-I DT 0	GD CD	DT 4			GB		66	F 1-1	Cheff Lealare Eabria Denale Ampliance
International Carteria         Orace         File         Orace         File         Orace         File	117	Office	CPT-1/KT-1		GB	PI-3	GB	PI-I	GB		GB	P1-1	50-1		Stan Lockers, Fabric Panels, Appliance
ITTP         Unlex         ILE-1         ILE-1         ICB         IPP-2PT-2         GB         PP-2PT-2         GB         PP-2PT-2         GB         PP-2PT-2         GB         PP-2PT-2         GB         PP-2PT-2         GB         PP-2PT-2         GB         PP-2         FP-2	11/A	Unice		RD-1	GB	FI-1	GB	FI-1	GB	FDD 0/DT 0	GB		50-1	FF DT 0	FDD Malasset 014all, OFOLiss II a milasset, make has milase
The Lating Charles       The Charles       The Lating Charles       The Charles<	117B	Unisex	TILE-1	TILE-1	GB	FRP-2/P1-2	GB	FRP-2/P1-2	GB	FRP-2/P1-2	GB	FRP-2/P1-2	GB	P1-2	FRP Wainscot 8 tail, OFCI wail equipment, grab bar, mirror
International Lab         PFS         NE1         CB         PF1-1         CB         PF1-1         CB         PF1-1         NC         NC         PF1-1         NC         NC         PF1-1         NC	110	Learning Center	R1-1/2/3/4/5/0		GB	FI-I	GB	VCVV-1/P1-1	GB	P1-3	GB	P1-0	30-1		FDD above d fabric grants
Lab       UPULB       UPUL	119	Manufacture Lab	PF5	RB-1	GB	FRP-1/P1-1	GB	FRP-1/P1-1	GB	PI-1	GB	PI-1	NC NC	P1-1/4	FRP, plywood, tabric panels
121         PHS         HS-1         GB         PF-1         GB         PF-1         GB         PF-1         GB         PF-1         GB         PF-1         CB         PF-1 <td>120</td> <td>CPU Lab</td> <td>CP1-1</td> <td>RB-1</td> <td>GB</td> <td>PI-1</td> <td>GB</td> <td>PI-3</td> <td>GB</td> <td>P1-1</td> <td>GB</td> <td>P1-5</td> <td>50-1</td> <td>FF</td> <td>Floor Boxes, white and Lack boards</td>	120	CPU Lab	CP1-1	RB-1	GB	PI-1	GB	PI-3	GB	P1-1	GB	P1-5	50-1	FF	Floor Boxes, white and Lack boards
121A         PMR         PFS         RB1         GB         P1-1         GB         P1-1         GB         P1-1         RC         P1-1         RC         P1-1           121B         Storage         PFS         RB1         GB         PT-1         GB         PT-1         RG         PT-1         NC         PT-1         NC         PT-1           122         Gas         Storage         TLE-1         TLE-1         GB         PT-1         GB         PT-1         GB         PT-1         NC         PT-1         NC         PT-1         NC         PT-1         RFP         Storage         PT-1         NC         PT-1         NC         PT-1         RFP         Storage         PT-1         GB         PT-1         GB         PT-1         GB         PT-1         NC         PT-1         RFP         Storage         PT-1         RFP         RFP         Storage         PT-1         GB         PT-1         MGB         PT-1         GB         PT-1         GB         PT-1         MGB         <	121	Manufacture Lab	PFS	RB-1	GB	PI-1	GB	FRP-1/P1-1	GB	FRP-1/P1-1	GB	PI-1	NC	P1-1/4	FRP, plywood, tabric panels
1218       Storage       Pris       Rd-1       GB       P1-1       GB       P1-1       GB       P1-1       GB       P1-1       GB       P1-1       Rd       P1-1	121A	Print	PES	RB-1	GB	PI-1	GB	PI-1	GB	PI-1	GB	PI-1	NC	PI-1	
122         Customal         SC         KB-1         GB         P1-1         GB         P1-1         GB         P1-1         NC         P1-1         PRC         P1-1         P1-1         PRC         P1-1         PRC         P1-1         PRC         P1-1         PRC         P1-1         P1-1         PRC         P1-1         <	1218	Storage	PES	RB-1	GB	PI-1	GB	PI-1	GB	PI-1	GB	PI-1	NC	PI-1	
123       Gris       TILE-1       TILE-1       GB       FRP-2/P1-2       GB       FP1-1       GB       FP1-1       GB       PT-1	122	Custodial	SC	RB-1	GB	PI-1	GB	PI-1	GB	PI-1	GB	PI-1	NC	PI-1	FRP Surround at Mop Sink, SS wall sheet
124         BOS         ILE-1         ILE 1         ILE	123	Girls	TILE-1	TILE-1	GB	FRP-2/P1-2	GB	FRP-2/P1-2	GB	FRP-2/P1-2	GB	FRP-2/P1-2	GB	P1-2	partitions, mirror ERP Wainscot 8 tall, OECI wall equipment, grab bars, toilet
125         Elevator Equipment         SC         RB-1         GB         PT-1         GB         PT-1         GB         PT-1         GB         PT-1           126         Compressor         SC         RB-1         GB         PT-1         GB	124	boys	IILE-I	1166-1	GB	FRP-2/P1-2	GB	FRP-2/P1-2	GD	FRP-2/P1-2	GD	FRP-2/P1-2	GB	P1-2	partitions, mirror
126         Compressor         SC         RB-1         GB         PT-1	125	Elevator Equipment	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	
127         Electrical Room         SC         RB-1         GB         PT-1         GB         PT-1         GB         PT-1         NC         PT-1         NC         PT-1           128         Fire Riser         SC         RB-1         GB         PT-1         GB         PT-1         GB         PT-1         NC         PT-1         NC         PT-1           129         Mech/Cust.         PFS         RB-1         GB         PT-1         GB         PT-1         GB         PT-1         NC         PT-1         FRP Surround at Mop Sink, Metal Shelving, appliances           130         Storage         SC         RB-1         GB         PT-1         GB         PT-1         GB         PT-1         NC         PT-1         AV rack, power ovhd door           131         Kitchen         TILE-2         TILE-2         GB         PT-1         GB         PT-1         GB         PT-1         SC-2         FF         FRP Wainscot 8' tail, FS Equipment, 6' Tail Cove Base           1314         Office         TILE-2         TILE-2         GB         PT-1         GB         PT-1         GB         PT-2         FRP AP/1PT-2         GB         PT-2         FRP Wainscot 8' tail, OFC wait ap/1 ap/1 ap/1 ap/1 ap/1 ap/1 ap/1 ap	126	Compressor	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	Metal Shelving, compressor
128         Fire Riser         SC         RB-1         GB         PT-1         MC         PT-1         NC         PT-1         NC         PT-1         PT-1         PT-1         RE         PT-1         RE         PT-1         GB         PT-1         GB         PT-1         GB         PT-1         GB         PT-1         GB         PT-1         GB         PT-1 <t< td=""><td>127</td><td>Electrical Room</td><td>SC</td><td>RB-1</td><td>GB</td><td>PT-1</td><td>GB</td><td>PT-1</td><td>GB</td><td>PT-1</td><td>GB</td><td>PT-1</td><td>NC</td><td>PT-1</td><td></td></t<>	127	Electrical Room	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	NC	PT-1	
129       Mech/Cust.       PFS       RB-1       GB       PT-1       GB       PT-1       GB       PT-1       NC       PT-1       FRP Surround at Mop Sink, Metal Shelving, appliances         130       Storage       SC       RB-1       GB       PT-1       GB       PT-1       GB       PT-1       NC       PT-1       AV rack, power ovhd door         131       Kitchen       TILE-2       TILE-2       GB       FRP-2/PT-2	128	Fire Riser	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	NC	PT-1	
130StorageSCRB-1GBPT-1GBPT-1GBPT-1GBPT-1NCPT-1AV rack, power ovhd door131KitchenTILE-2TILE-2GBFRP-2/PT-2GBFRP-2/	129	Mech/Cust.	PFS	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	NC	PT-1	FRP Surround at Mop Sink, Metal Shelving, appliances
131KitchenTILE-2TILE-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2SC-2FFFRP Wainscot 8' tail, FS Equipment, 6' Tail Cove Base131AOfficeTILE-2TILE-2GBPT-1GBPT-1GBPT-1GBPT-1SC-1FFStaff Lockers131BUnisexTILE-2TILE-2GBFRP-1/PT-2GBFRP-1/PT-2GBFRP-1/PT-2GBPT-1SC-1FFStaff Lockers131CSculleryTILE-2TILE-2GBFRP-1/PT-2GBFRP-1/PT-2GBFRP-1/PT-2GBFRP-1/PT-2GBFRP-1/PT-2GBFRP-1/PT-2SC-2FFFRP Wainscot 8' tail, FS Equipment, 6' Tail Cove Base131CSculleryTILE-2TILE-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2SC-2FFFRP Wainscot 8' tail, FS Equipment, 6' Tail Cove Base131DServingTILE-2TILE-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2SC-2FFPower colling grilles, FRP Wainscot 8' tail, FS Equipment, 6' Tail Cove Base131EFreezer131FCooler<	130	Storage	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	NC	PT-1	A/V rack, power ovhd door
131AOfficeTILE-2TILE-2GBPT-1GBPT-1GBPT-1GBPT-1SC-1FFStaff Lockers131BUnisexTILE-2TILE-2GBFRP-1/PT-2GBFRP-1/PT-2GBFRP-1/PT-2GBFRP-1/PT-2GBPT-2FRP Vainscot 8' tall, OFCI wall equipment, grab bars131CSculleryTILE-2TILE-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2SC-2FFFRP Wainscot 8' tall, FS Equipment, 6'' Tall Cove Base131DServingTILE-2TILE-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2SC-2FFPower colling grilles, FRP Wainscot 8' tall, FS Equipment, 6'' Tall Cove Base131DServingTILE-2TILE-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2SC-2FFPower colling grilles, FRP Wainscot 8' tall, FS Equipment, 6'' Tall Cove Base131EFreezerTILE-2TILE-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2SC-2FFPower colling grilles, FRP Wainscot 8' tall, FS Equipment, 6'' Tall Cove Base131EFreezer131FCooler </td <td>131</td> <td>Kitchen</td> <td>TILE-2</td> <td>TILE-2</td> <td>GB</td> <td>FRP-2/PT-2</td> <td>GB</td> <td>FRP-2/PT-2</td> <td>GB</td> <td>FRP-2/PT-2</td> <td>GB</td> <td>FRP-2/PT-2</td> <td>SC-2</td> <td>FF</td> <td>FRP Wainscot 8' tall, FS Equipment, 6" Tall Cove Base</td>	131	Kitchen	TILE-2	TILE-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	SC-2	FF	FRP Wainscot 8' tall, FS Equipment, 6" Tall Cove Base
1318UnisexTILE-2TILE-2GBFRP-1/PT-2GBFRP-1/PT-2GBFRP-1/PT-2GBFRP-1/PT-2GBFRP-1/PT-2GBFRP-2/PT-2GBGBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GB	131A	Office	TILE-2	TILE-2	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	SC-1	FF	Staff Lockers
131CSculeryTILE-2TILE-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2SC-2FFFRP Wainscot 8' tall, FS Equipment, 6" Tall Cove Base131DServingTILE-2TILE-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2GBFRP-2/PT-2SC-2FFPower colling grilles, FRP Wainscot 8' tall, FS Equipment, 6" Tall131DFreezer	131B	Unisex	TILE-2	TILE-2	GB	FRP-1/PT-2	GB	FRP-1/PT-2	GB	FRP-1/PT-2	GB	FRP-1/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bars
131D       Serving       TILE-2       TILE-2       GB       FRP-2/PT-2       GB       FRP-2/PT-2       GB       FRP-2/PT-2       GB       FRP-2/PT-2       GB       FRP-2/PT-2       GB       FRP-2/PT-2       SC-2       FF       Power colling grilles, FRP Wainscot 8' tall, FS Equipment, 6' Tall         131E       Freezer       -       -       -       -       -       -       Insulated Food Service Unit, factory finishes         131F       Cooler       -       -       -       -       -       -       Insulated Food Service Unit, factory finishes         131G       Dry       TILE-2       GB       PT-1       GB       PT-1       GB       PT-1       GB       PT-1       SC-2       FF       Power colling grilles, FRP Wainscot 8' tall, FS Equipment, 6'' Tall         131G       Dry       TILE-2       GB       PT-1       GB       PT-1       GB       PT-1       SC-2       FF       Power colling grilles, FRP Wainscot         1312       Vestibule       WALK       RB-1       GB       FRP-1/PT-1       GB       Brick       GB       FRP-1/PT-1       GB       PT-1       BG       PT-1       Brick weeer accent, chair rail, FRP wainscot	131C	Scullery	TILE-2	TILE-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	SC-2	FF	FRP Wainscot 8' tall, FS Equipment, 6" Tall Cove Base
131E         Freezer	131D	Serving	TILE-2	TILE-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	SC-2	FF	Power coiling grilles, FRP Wainscot 8' tall, FS Equipment, 6" Tall Cove Base
131F         Cooler         -         -         -         -         -         -         -         Insulated Food Service Unit, factory finishes           131G         Dry         TILE-2         TILE-2         GB         PT-1         GB         PT-1         GB         PT-1         SB         PT-1         SB         PT-1         SC-1         FF         FS Equipment           132         Vestibule         WALK         RB-1         GB         FRP-1/PT-1         GB         Brick         GB         FRP-1/PT-1         GB         PT-1         Brick         Brick         FB         PT-1         Brick veneer accent, chair rail, FRP wainscot	131E	Freezer	-	-	-	-	-	-	-	-	-	-	-	-	Insulated Food Service Unit, factory finishes
131G         Dry         TILE-2         TILE-2         GB         PT-1         GB         PT-1         GB         PT-1         SC-1         FF         FS Equipment           132         Vestibule         WALK         RB-1         GB         FRP-1/PT-1         GB         Brick         GB         FRP-1/PT-1         GB         PT-1         Brick         GB         FRP-1/PT-1         GB         FR-1/PT-1         GB         FR-1/PT-1         GB         FR-1/PT-1         GB         FR-1/PT-1         GB         FR-1/PT-1         GB         FR-1/PT-1         FR         F	131F	Cooler	-	-	- 1	-	- 1	-	-	-	-	-	-	-	Insulated Food Service Unit, factory finishes
132 Vestibule WALK RB-1 GB FRP-1/PT-1 GB FRP-1/PT-1 GB Brick GB FRP-1/PT-1 GB PT-1 Brick veneer accent, chair rail, FRP vainscot	131G	Dry	TILE-2	TILE-2	GB		GB	 PT-1	GB	PT-1	GB	PT-1	SC-1	FF	FS Equipment
	132	Vestibule	WALK	RB-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	Brick	GB	FRP-1/PT-1	GB	PT-1	Brick veneer accent, chair rail, FRP wainscot

ROOM	ROOM	FLOOR	BASE	N. WALL		E. WALL		S. WALL		W. WALL		CEILING		REMARKS
No.	Name	Finish	Matl	Matl	Finish	Matl	Finish	Matl	Finish	Matl	Finish	Matl	Finish	
133	Career Center	CPT-1	RB-1	GB	PT-3	GB	PT-5	GB	VWC-1	GB	PT-6	SC-1	FF	White and Tack boards
133A	Office	CPT-1	RB-1	GB	PT-1	GB	PT-3	GB	PT-1	GB	PT-1	SC-1	FF	White and Tack boards
133B	Office	CPT-1	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-3	SC-1	FF	White and Tack boards
133C	Office	CPT-1	RB-1	GB	PT-1	GB	PT-3	GB	PT-1	GB	PT-1	SC-1	FF	White and Tack boards
133D	MDF	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	NC	PT-1	Elec/Data equipment
134	Commons	RT-1/2/3/4/5/6	RB-1	GB	FRP-1/PT-3	GB	FRP-1/PT-1	GB	FRP-1/PT-1/5	GB	FRP-1/PT-1	NC	PT-1/3/4	Benches, Display Bid Alt, FRP wainscot, chair rail, fabric panels, flag, white and tack boards
135	Unisex	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bars, changing station
136	Office	CPT-1	RB-1	GB	PT-1	GB	PT-3	GB	PT-1	GB	PT-3	SC-1	FF	White and Tack boards
137	Security	CPT-1	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	SC-1	FF	White and Tack boards, OFOI Monitors
138	Student Store	TILE-2	TILE-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	SC-2	FF	FRP Wainscot 8' tall, FS Equipment, 6" Tall Cove Base, SS countertops, slat wall, display cabinet, cash drawers
139	Credit Union	CPT-1	RB-1	GB	VWC-1	GB	VWC-1	GB	PT-1	GB	PT-3	SC-1	FF	Power coiling grille, solid surfacing
140	Unisex	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bars
141	Custodial	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	NC	PT-1	FRP Surround at Mop Sink, Metal Shelving, SS wall sheet
142	Boys	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bars, toilet partitions, mirror
143	Girls	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bars, toilet partitions, mirror
144	Learning Center	RT-1/2/3/4/5/6	RB-1	GB	PT-5	GB	PT-1	GB	VCW-1/PT-1	GB	PT-1	SC-1	FF	Partition Door, White and Tack boards, lockers
144A	Storage	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	NC	PT-1	Metal Shelving
145	Learning Center	RT-1/2/3/4/5/6	RB-1	GB	PT-5	GB	PT-1	GB	VCW-1/PT-1	GB	PT-1	SC-1	FF	Partition Door, White and Tack boards, lockers
146	Teacher	CPT-1/RT-1	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-3	SC-1	FF	Staff Lockers, Fabric Panels, Appliance
146A	Office	CPT-1	RB-1	GB	PT-1	GB	PT-3	GB	PT-1	GB	PT-1	SC-1	FF	White and Tack boards
146B	Unisex	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bar, mirror
147	Storage	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	Two layers of GB at ceiling
148	Student Collaborate	RT-1/2/3/4/5/6	RB-1	GB	PT-1	GB	FRP-1/PT-1	GB	PT-3	GB	FRP-1/PT-1	SC-4	FF	White & tack boards, PT-7 above ceiling, chair rail, bench
149	Learning Center	RT-1/2/3/4/5/6	RB-1	GB	VCW-1/PT-1	GB	PT-4	GB	PT-5	GB	PT-3	SC-1	FF	White and Tack boards, lockers
150	Learning Center	RT-1/2/3/4/5/6	RB-1	GB	VCW-1/PT-1	GB	PT-3	GB	PT-5	GB	PT-1	SC-1	FF	White and Tack boards, lockers
151	Tech Center	CPT-1	RB-1	GB	PT-1/3	GB	VWC-1	GB	PT-5	GB	PT-6	SC-1	FF	Floor Boxes, White and Tack boards
151A	Office	CPT-1	RB-1	GB	PT-1	GB	PT-1	GB	PT-3	GB	PT-1	SC-1	FF	White and Tack boards
152	Office	CPT-1	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-3	SC-1	FF	White and Tack boards
153	Office	CPT-1	RB-1	GB	PT-1	GB	PT-3	GB	PT-1	GB	PT-1	SC-1	FF	White and Tack boards
				1		1		1		1				
ST-1	Stair	TERRAZO	RB-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	PT-1	Pipe Handrail, FRP Wainscot, Wood Cap/Chair Rail, Steel Stringer PT-7
ST-2	Stair	TERRAZO	RB-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	PT-1	Pipe Handrail, FRP Wainscot, Wood Cap/Chair Rail, Steel Stringer PT-7
ST-3	Stair	TERRAZO	RB-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	FRP-1/PT-1	GB	PT-1	Pipe Handrail, FRP Wainscot, Wood Cap/Chair Rail, Steel Stringer PT-7
EL1	Elevator	CPT-1	-	-	-	-	-	-	-	-	-	-	-	Factory Finishes by MNFR, Hoist Beam, sump pit, ladder
			]	1		1		1					1	
SECONE	FLOOR													
CR-6	Corridor	RT-1/2/3/4/5/6	RB-1	GB	PT-1	FRP-1/PT-1	FRP-1/PT-1	FRP-1/PT-1	FRP-1/PT-1	FRP-1/PT-1	FRP-1/PT-1	SC-4	FF	White & tack boards, PT-7 above ceiling, chair rail
CR-7	Corridor	RT-1/2/3/4/5/6	RB-1	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	SC-3	FF	White & tack boards, PT-7 above ceiling, chair rail
CR-8	Corridor	RT-1/2/3/4/5/6	RB-1	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	GB	FRP-1/PT-1/3/5/7	SC-3	FF	White & tack boards, PT-7 above ceiling, chair rail
		[	1	1				1					1	
200	Mech Mezz	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	NC	PT-1	Roof access and wall ladder, Mech Equipment
201	IDF	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	Two layers of GB at ceiling, Elec/Data equipment
202	Custodial	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	NC	PT-1	FRP Surround at Mop Sink, SS wall sheet

ROOM	ROOM	FLOOR	BASE	N. WALL		E. WALL		S. WALL		W. WALL		CEILING		REMARKS
No.	Name	Finish	Matl	Matl	Finish	Matl	Finish	Matl	Finish	Matl	Finish	Matl	Finish	
203	Girls	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bars, toilet
204	Boys	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bars, toilet partitions mirror
205	Teachers	CPT-1	RB-1	GB	PT-1	GB	PT-3	GB	PT-1	GB	PT-1	SC-1	FF	Staff Lockers, Fabric Panels, Appliance
205A	Office	CPT-1	RB-1	GB	PT-1	GB	PT-3	GB	PT-1	GB	PT-1	SC-1	FF	White and Tack boards
205B	Unisex	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bar, mirror
206	Learning Center	RT-1/2/3/4/5/6	RB-1	GB	PT-5	GB	PT-1	GB	VCW-1/PT-1	GB	PT-3	SC-1	FF	White and Tack boards lockers
207	Learning Center	RT-1/2/3/4/5/6	RB-1	GB		GB	PT-1	GB	VCW-1/PT-1	GB	PT-1	SC-1	FF	Partition Door, White and Tack boards, lockers
208	Learning Center	RT-1/2/3/4/5/6	RB-1	GB	PT-5	GB	PT_1	GB	VCW_1/PT_1	GB	PT_1	SC-1	FF	Partition Door, White and Tack boards, lockers
200	Office	CPT-1	RB-1	GB	PT-1	GB	PT-1	GB	PT-3	GB	VCW-1/PT-1	SC-1	FF	White and Tack boards Fabric Panels
210	Unicev	TILE_1	TIL E_1	GB	EDD_2/DT_2	GB	EPD_2/DT_2	GB	EPD_2/DT_2	GB	EPD 2/DT 2	GR	DT 2	ERP Wainscot 8' tall OECI wall equipment grab bar mirror
210	Custodial	SC	DB 1	GB	DT_1		DT_1	GB	DT_1	GB	DT_1	NC	DT_1	EPD Surround at Mon Sink, Metal Shelving, SS wall sheet
212	Student Collaborate				DT 1			CB						White & took boards DT Z above soiling above roll bonch
212		DT 4/0/0/4/5/0		GB CD				GB CD	г I-3			50-4	 	White and Task boards, F 1-7 above centry, chair fail, bench
213	Learning Center	R1-1/2/3/4/5/0	RD-1	GD		GB	P1-4	GB	P1-0	GB	PT-3	50-1		White and Tack boards, lockers
214	Learning Center	R1-1/2/3/4/5/6	RB-1	GB	VCW-1/PT-1	GB	PI-1	GB	P1-5	GB	P1-3	50-1	FF	White and Tack boards, lockers
215	Learning Center	RT-1/2/3/4/5/6	RB-1	GB	VCW-1/PT-1	GB	PI-1	GB	PI-5	GB	P1-3	SC-1	FF	White and Tack boards, lockers
216	Mech Mezz	SC	RB-1	GB	PI-1	GB	PI-1	GB	PI-1	GB	PI-1	NC	PI-1	Mech Equipment
217	Esport	CPT-1	RB-1	GB	PT-4/7	GB	PT-4/7	GB	PT-4/7	GB	PT-3/7	SC-4	FF	White & tack boards, PT-7 above ceiling, Floor boxes
218	Learning Center	RT-1/2/3/4/5/6	RB-1	GB	PT-1	GB	PT-5	GB	PT-1	GB	VCW-1/PT-1	SC-1	FF	Partition Door, White and Tack boards, lockers
219	Learning Center	RT-1/2/3/4/5/6	RB-1	GB	PT-1	GB	PT-5	GB	PT-1	GB	VCW-1/PT-1	SC-1	FF	Partition Door, White and Tack boards, lockers
220	Learning Center	RT-1/2/3/4/5/6	RB-1	GB	PT-1	GB	PT-5	GB	PT-4	GB	VCW-1/PT-1	SC-1	FF	Partition Door, White and Tack boards, lockers
221	Student Collaborate	RT-1/2/3/4/5/6	RB-1	GB	FRP-1/PT-1	GB	PT-3	GB	FRP-1/PT-1	GB	PT-1	SC-4	FF	White & tack boards, PT-7 above ceiling, chair rail, bench
222	Teachers	CPT-1/RT-1	RB-1	GB	PT-3	GB	PT-1	GB	PT-1	GB	PT-1	SC-1	FF	Staff Lockers, Fabric Panels, Appliance
222A	Office	CPT-1	RB-1	GB	PT-1	GB	PT-1	GB	PT-3	GB	PT-1	SC-1	FF	White and Tack boards
222B	Unisex	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bar, mirror
223	Unisex	TILE-1	TILE-1	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	FRP-2/PT-2	GB	PT-2	FRP Wainscot 8' tall, OFCI wall equipment, grab bar, mirror
224	Mech Mezz	SC	RB-1	GB	PT-1	GB	PT-1	GB	PT-1	GB	PT-1	NC	PT-1	Mech Equipment
225	Health Lab	RT-1/2/3/4/5/6	RB-1	GB	PT-1	GB	PT-1/5	GB	PT-1	GB	PT-3	SC-1	FF	White and Tack boards, epoxy counters, lab equipment
226	Health Lab	RT-1/2/3/4/5/6	RB-1	GB	PT-1	GB	PT-1/5	GB	PT-1	GB	PT-3	SC-1	FF	White and Tack boards, epoxy counters, lab equipment, partition
														door
227	Health Lab	RT-1/2/3/4/5/6	RB-1	GB	PT-1	GB	PT-1/5	GB	PT-1	GB	PT-3	SC-1	FF	White and Tack boards, epoxy counters, lab equipment, partition door
	Cham Dran	DT 4		CD			DT 4	CD			DT 4	00.4		Appliances, energy counters, lab environment
220	Chem Steres		RD-1	GB	P1-1	GB	P1-1	GB	P1-1	GB	PT-1	50-1	FF	Appliances, epoxy counters, lab equipment
220A	Chem Storage	PF5	KD-1	GB	P1-1	GB	P1-1	GB	P1-1	GB	P1-1	30-1	FF	epoxy counters, lab equipment, partition door
MAINTEN	ANCE BUILDING - BID ALTE	RNATE #3		+		+								
301	Maintenance Bldg	DES	PB 1	CMU	DT_1	CMU	DT_1	CMU	DT 1	CMU	PT_1	NC	PT 1	Power outd doors
	Maintenance blug	110	10-1	CIVIO			1 1-1	CIWIO		CINIO	1 1-1	110		
STORAC		TE #4		+		+								
401	Storage Bidg	PES		CMU	PT-1	CMU	PT_1	CMU	PT-1	CMU	PT-1	NC	PT-1	Power ovhd doors
	otorage bidg		10-1					0000						
	IATIONS KEY			+				<del>                                      </del>			1			İ
ACT	Acoustical Ceiling Tile	HPC	Honed & Poli	shed Concret	e	RB	Rubber Base	÷		RT	Rubber Tile	+		
CMU	Concrete Masonry Unit	o NA	Not Applicab			WAIK	Walk Off Matt Tile Carpe	tina		VCT	Vinyl Composite Tile			
CONC	Concrete	NF	No Finish	Ĩ		VWC	Vinvl Wall Covering	a		sv	Sheet Vinvl			
CPT	Carnet	DT	Paint	· · · · · · · · · · · · · · · · · · ·		TH =	Tile				Access Floor			
	Calper		Plantia Lamir	ata.		eti	Stool				Aluminum Paga			
	Fiber Reinforced Blactic						Dainted floor Scale-	·			Pubbor Stair Trood Dise	.: vr Ø Stringer		
	Cuppum Roard	ų I 60	Quarry Tile	roto		PF5	Fainted noof Sealer			K5	Aluminum Rass	n a sunger		
	Gypsum Board	50	Sealed Conc	rete				.i						
	Acoustical Suspended Cing	WD	ννοοα	+			wealum Density Fiberboa	ard		CONC TOP	Seit Leveling Concrete T	opping		
			1								I		L	1
		<u>General</u>	Finish Notes:	1		Install FRI	norizontally in 8' wide	sections an	d vertically in 4' wide	sections unle	ess noted otherwise - a	nd provide alu	minum joint t	ransitions at all panel edges.
			<b>.</b>	2		Install wat	er resistant backer boa	rd at plumbi	ng fixture locations.					ļ
			<u> </u>	3		Reference	sheets A3.41 - A3.42 f	tor Floor Fin	shes layout.		I	ļ		
ļ				4		Install soli	d wood blocking/backin	g at all wall	hung equipment prior	to gypsum b	oard installation.			
			ļ	5		Some toile	et accessories to be OF	CI. Referer	ce specification 10 28	3 00.	İ			
			1	6		Vinyl wall	covering shall be install	led first and	extend behind all wall	equipment a	and casework.			

Reference	e ABBREVIATION KEY above in Finish Sche	dule			
Spec.	Section/Item	Reference	Mfgr./Product	Finish Color	Remarks
	•			·	•
Div. 3	Concrete				
03 30 00	Cast-in-Place Concrete	PFS	Sherwin Williams, Armorseal 1000	Full Standard Color Range	
		SC	Seal Finish System - Clear Aguapond	Apply concrete sealer - see division 09 below	
03 45 00	Precast Architectural Concrete		None	Standard Grev	Wall Cap, Sill, Bench Top
00 40 00				Standard Groy	
Div 4	Masonny				
04.21.00	Nasoniy	Face Brick	Mutual Materiala - Redenda Cray, Missian Taytura	2 E/0" x 2 1/4" x 7 E/0"	Coldier accent research areas
04 21 00	brick veneer System	Face Drick	Mutual Materials - Redondo Gray, Mission Texture	$1/0^{\circ} \times 2 1/4^{\circ} \times 7 5/0^{\circ}$	Interior at achinete
		SIIII DIICK	Mulual Malenais - Redondo Gray, Mission Texture	1/2 X 2 1/4 X 7 5/6	Interior at cabinets
		<b>-</b> -			and the second second second second second second second second second second second second second second second
04 22 00	Concrete Unit Masonry	Type 1	Western Materials - Smooth 8 x 16 x thickness	Integral Color - Charcoal	Load bearing
	See Wall Tag symbols on	Type 2	Western Materials - Ground Face 8 x 16 x thickness	Integral Color - Grey	Load bearing
	floor plan sheets for	Type 1a	Soundblox - Smooth Face 8 x 16 x thickness	Integral Color - Charcoal	Chiller, Batt Inserts
	various CMU thickness	Type 2a	Soundblox - Ground Face 8 x 16 x thickness	Integral Color - Grey	Chiller, Batt Inserts
		Misc.	Western Materials - Smooth Face 8 x 16 x thickness	Integral Color - Standard Grey	Load bearing, Misc.
					-
Div. 5	Metals				
05 12 00	Structural Steel	-	None	Paint Exposed Steel - see division 09 below	
05 21 00	Steel Joists	-	See Paint Colors - Finish Schedule	Paint Exposed Steel - see division 09 below	
05 30 00	Metal Decking		See Paint Colors - Finish Schedule	Paint Exposed Deck - see division 09 below	
00 00 00	Metal Deoking				
05 40 00	Cold Formed Motel Framing		Neno		
05 40 00	Cold-Formed Metal Framing	-	NOTE	-	
05 50 00					
05 50 00	Metal Fabrications	-	See Paint Colors - Finish Schedule	Paint Exposed Steel Fabrications - see division U9 below	
05 51 00	Metal Stairs	-	See Paint Colors - Finish Schedule	Paint Exposed Steel Fabrications - see division 09 below	
05 52 00	Metal Railings	-	Steel pipe guardrails and hand rails	Paint Exposed Steel - see division 09 below	
Div. 6	Wood and Plastics				
06 10 00	Rough Carpentry	-	None	-	
06 16 43	Sheathing	-	None	-	
06 20 00	Interior Finish Carpentry	-	White Maple	Chair rail, Wall cap, Rail cap, Display trim	Stain to match cabinet PLAM-1
06 40 23	Interior Architectural Woodwork				
	Cabinets (vertical surfaces)	PLAM-1	Approved Mnfr List	WilsonArt Laminate - 8208K-16 Fawn Cypress, Casuak Rust	ic Finish
	Counter Top and edge (horizontal surfaces)	PLAM-2	Approved Mnfr List	WilsonArt Laminate - 4947-38 Raw Cotton	
	Cobineta (accent)			Wilson Art Laminate 4970 38 Steel Meeh	Admin and Cradit Union
				WilsonArt Laminate - 4079-30 Steel Wesh	Admin and Credit Union
	Cabinets (white board surfaces)	PLAIVI-4	Approved Winir List	wilsonArt Laminate - D354-01 Designer white (high-gloss)	
	Edge Banding	PVC	Approved Mnfr List	PVC - Color TBD	
	Solid Surfacing Countertop	-	Approved Mnfr List	Wilsonart - Avalanche Melange	Admin and Credit Union
	Expoy Resin Countertop	-	Approved Mnfr List	Color: Charcoal	Health Sciences
	Stainless Steel Countertop	-	-	-	Student Store
	Diamond Plate Countertop	-		-	Shops
	•				·
Div.7	Thermal & Moisture Protection				
07 11 13	Bituminous Dampproofing	-	None	Black	
07 21 13	Board Insulation and Sheathing		Owens Corning Sheathing - Formular XPS E250		Tane all seams/nenetrations
07 21 10	Board mouldaion and choulding				
07 21 16	Blanket Insulation		Varias		Thormal and Acquistic Installation
0/21/0		-	Valies		mermai anu Acoustic Installation
07.04.00	0 1 1 5				
07 21 29	Spray Insulation	-	varies		Seal Thermal Envelope
07 26 00	Vapor Retarders	-	Varies	Reinforced -Polyethylene	Wall, Deck, Floor
07 27 00	Weather Barrier	-	Henry Company, BlueskinVP	Blue	Entire envelope application

Material Legend / Key 09 00 00

Reference	erence ABBREVIATION KEY above in Finish Schedule										
Spec.	Section/Item	Reference	Mfgr./Product	Finish Color	Remarks						
07 42 13	Pre-Formed Metal Siding			· · ·	•						
	Standing Seam Wall Panel	Type - A	AEP-Span, Design Span hp Series with wide batten	Shasta White (vertical)	See Exterior Elevations						
	Smooth Wall Panel	Type - B1	Citadel, Envelope 2000 RS	Color 1: Charcoal Grey	See Exterior Elevations						
	Smooth Wall Panel	Type - B2	Citadel, Envelope 2000 RS	Color 2: Slate Grey	See Exterior Elevations						
	Smooth Wall Panel	Type - B3	Citadel, Envelope 2000 RS	Color 3: Silver Grey	See Exterior Elevations						
	Insulated Insert Panel	Type - C	Citadel, Glazeguard 1000	Silver Grey	Curtain Wall System Insert						
07 42 93	Pre-Formed Metal Soffit										
	Perforated Soffit Panel	-	AEP-Span, Prestige Series	Cool Surf White (fully perforated)							
07 54 00	Polyariny Chlorido (PVC) Poofing		Carlisle Syntae Sure Flax BVC	White 60 mil	Polyostor Poinforced Membrane						
07 54 00	Folyvinyi Chionde (FVC) Kooning	-	Callisie Syntec, Sule-Flex FVC	Writte, 00 mil	Polyester-Reinforced Membrane						
07 61 13	Standing Seam Metal Roofing	-	AEP-Span, Design Span hp	Cool Zinc Grev	Snow Rails						
	5 5										
07 62 00	Sheet Metal Flashing and Trim	-		Match adjacent material color being flashed							
	Precast Sill and Head Flashing	-	•	Match adjacent material color being flashed							
	Roof and Parapet Flashing	-	-	Match adjacent material color being flashed							
07 72 00	Roof Accessories	-	Bilco, Roof Hatch DSH6096	Paint to match roof color							
07 84 00	Penetration Firestopping	-		_							
	· ·····										
07 92 00	Joint Sealants	-	See Sealant Requirements - Various Mnfr	Match adjacent material color being sealed							
Div. 8	Doors and Windows										
08 11 13	Hollow Metal Doors and Frames	-	Ceco Door Products	Prime finish for field paint - see Division 09							
08 14 00	Flush Plastic Faced Doors	WD	VT Industries. Plastic Laminate Face	Match PLAM-1 fselected finish							
08 31 13	Access Doors and Frames	-	-	Shop primed for field painting, match adjacent finish							
08 32 13	Sliding Alum Framed Glass Door										
	Sliding Glass Wall	SGW	Nanawall, HSW60	Aluminum clear anodized	Stacking within wall pocket						
00 22 12	Overhead Dear										
08 33 13	Overnead Door	000	Caskaan Campany ESC10	Stainland staal	Mater Operated						
	Colling Counter Door	OCD	Cookson Company, ESC 10	Stairliess steel	Motor Operated						
08 33 23	Overhead Doors										
	Coiling Service Door	OHD	Cookson Company, ESD30	Color Coat Factory Finish - Grey	Motor Operated, Insulated						
	g				·······						
08 33 26	Overhead Doors										
	Security Grille Door	ORG	Cookson Company, ESG12	Anodized Aluminum	Motor Operated						
08 41 13	Aluminum-Frame Storefronts, Entries &		Kawneer 1600 System1 & Trifab VG 451T	Black, Permafluor coating							
	Window Systems Storefront		Isolock, Versoleil Sunshade, Heavy 500	Black, Permafluor coating							
08 71 00	Door Hardware	-	See Hardware Requirements - Various Mnfr	-							
00 00 00	Glazing										
00 00 00	Giazing Insulated Tinted Glazing (safety)	G15	Vitro Solarban 70 XI (2)	Solargray	1 inch assembly						
	Observe Clazing (safety)	615	Pilkington Ontiflagt	Obseuro	6 mm						
	Clear Clazing (safety)	020	Filkington Optilloat	Clear	6 mm						
	Ciear Giazing (salety)	635	Flixingion Opinioai Class Clad Belycarbonate	Clear	1 inch assembly						
	FIOJECHIE RESISTATIL	645	Glass Glau Fulycal Dullate	Ultai	i mon assembly						
Div. 9	Finishes										
09 22 16	Non-Structural Metal Framing	-	None	-							
	-										

09 29 00 Gypsum board assemblies

- None

Typical finish - Level 4, fine orange peel

Material Legend / Key 09 00 00

Reference	e ABBREVIATION KEY above in Finish	Schedule					
Spec.	Section/Item	Reference	Mfgr./Product		Finish Color		Remarks
09 30 00	Tiling						
09 30 00					a a lata <i>t</i>		
	Porcelain Tile (floor)	LILE-1	Daltile, Ironcraft, 12 x 24		Casper Grey IC12 (runn	ing bond)	Grout Color: TBD
	Porcelain Tile (base)	TILE-1	Daltile, Ironcraft, Cove Base, 6 x 12		Casper Grey IC12		Grout Color: TBD
	Quarry Tile (floor & base)	TILE-2	Daltile, Quarry Textures	8x8	Ashen Grav		Grout Color: TBD-Dark
	<u> </u>		,,				
09 51 23	Acoustical Panel Ceilings						
	Acoustical Suspended Ceiling	SC-1	Armstrong, Fine Fissured		White - 2x4x5/8		Square Lay-in
	Food Service Suspended Ceiling	SC-2	Armstrong, Clean Room, VL Unperforated		White - 2x4x5/8		Square Lav-in
	Acoustical Suspended Coiling	SC 3	Armstrong Optima Axiom Formations		White 2x2x5/9		Square Law in Black duct liner above
		00-0	Amistolig, Optima, Axion 1 omations				Di la la la la la la la la la la la la la
	Acoustical Suspended Celling	SC-4	Armstrong, woodworks Grille		Dowel, Maple (GMP)		Black duct liner above
09 65 13	Resilient Base and Accessories						
	Rubber Base	RB-1	Tarkett Rubber Wall Base		63 Burnt Umber	4" tall standard 6" tall at wet area	applications
	Resilient Melding Assessories	112 1	Tarkett Transition		62 Burnt Umber	Verify required profile with ediage	applications
	Resilient Molding Accessories	-			63 Burnt Offiber	verify required profile with adjace	nt hooring types
09 65 19	Resilient Tile Flooring						
	Resilient Tile	RT-1	Marmoleum, Real, 20" tile module		T3718 - Pluto	Main Floor Color	
	Resilient Tile	RT-2	Marmoleum, Real, 20" tile module		T3716 - Mercury	Floor Accent	
	Resilient Tile	RT-3	Marmoleum Real 20" tile module		T3053 - Dove Blue	Floor Accent	
		DT 4			Tooso		
	Resilient The	RI-4	Marmoleum, Real, 20" tile module		13238 - Laguna	Floor Accent	
	Resilient Tile	RT-5	Marmoleum, Real, 20" tile module		T3048 - Graphite	Floor Accent	
09 66 23	Pre-Cast Epoxy Terrazzo Stairs	Terrazzo	Wausau Tile, Atmosphere Series		Brilliance TZ63		Tread, Riser and Landing
09 68 13	Tile Carpeting						
	Walk Off Mat Tile Carpeting	WALK	Mannington Ruffian II Modular		Ebony Earth - 1506		Entries
	Walk of Mat The outpeting	W/ LIV	Mannington, Haman II, Modalar		Ebony Editin 1000		Enalos
00 00 40	Chart Competing						
09 68 16	Sneet Carpeting						
	Sheet Carpeting	CPT-1	Mannington, HP Backer, Skyway, Googie, 12'-6" roll		Helmetron - 13634		Standard Color
09 72 00	Vinyl Wall Covering	VWC-1	DeNovo Wall, Truro		Zinc DN2-TRR-01		Wrap TB and cork
	Dry Erase Wall Covering	-	Walltalker, 60" wide roll		Matte-Rite		Wood Trim
	Cork Wall Panel	_	Manton Cork		1/4 inch thick rolls		Wood Trim
			Manon ook				Wood min
00 77 00	Special Well Surfacing						
097700	Special Wall Surfacing						
	Fiber-Reinforced Panel	FRP-1	Nudo, Allure Wall Panels		WilsonArt - 5033-38 Har	idspun Peari	Corridors
	Fiber-Reinforced Panel	FRP-2	Nudo, Allure Wall Panels		WilsonArt - 4945-38 Org	anic Cotton	Restrooms and Kitchen
	Panel Trim	-	None		Extruded Aluminum Trin	n All profiles	
09 84 00	Sound Absorbing Wall Panels	-	Lamvin Acoustical Wall Panel, 1" thick - 0.95 NRC Panel	els	Woven Polyester, up to	(4) colors	See interior elevations
	-						
09 91 00	Painting						
000.00	Standard Paint (Interior)	PT-1	Shenwin Williams		SW/ 7005 - Pure White		Standard Color
	Standard Paint (Interior)	DT 0	Chanvin Williams		CW 7005 - Fure White		
	Stanuaru Pariti (Epoxy)	F1-2			Sw 7003 - Pure writte (	epoxy)	WEL AIEas
	Accent Paint (Interior)	PT-3	Sherwin Williams		SW 6793 - Bluebell (sof	blue)	Accent
	Accent Paint (Interior)	PT-4	Sherwin Williams		SW 6517 - Regatta (stro	ng blue)	Accent
	Accent Paint (Interior)	PT-5	Sherwin Williams		SW 7668 - March Wind	(soft grev)	Accent, Mtl Door Body
	Accent Paint (Interior)	PT-6	Sherwin Williams		SW 2849 - Westchester	Grav (strong grev)	Accent
	Accent Paint (Int/Ext)		Sherwin Williama		SW 2060 Iron Oro	Gruy (Suong groy)	Steel Boof Foosia, Handreil, Frames
	Accent Paint (Int/Ext)	P1-7	Sherwin Williams		Sw 7069 - Iron Ore		Steel Rool Fascia, Handrall, Frames
Div 40	Onenialting						
DIV. 10	Specialties						
10 11 16	Visual Display						
	Liquid Marker Board	-	Claridge, Series 800 LCS		TBD - Color to be select	ed from full standard color range	
10 11 23	Vinyl Faced Tackboards	-	Koroseal, Lineage		Heir 9521-22		
	Framed Tack Board	-	Claridge, Aluminum Framed		Match 09 72 00 Selecter	d Finish	
			÷ *				
10 14 00	Signage						
10 17 00	Danal Signa		Post		TRD Color to be select	od from full standard color range	
		-	Deat			ed nom full standard color fallye	
	Metal Cast Letters	-	-		Aluminum		
	Vinyl Signs	-	-		Vinyl Letters		
	Flag Signs	-	-		Aluminum		
	Building Plaque	-	Best		Satin Brass Finish		
	<b>5</b> 1						

Spec.	Section/Item	Reference	Mfgr./Product	Finish Color	Remarks
<u> </u>	•	•		•	•
10 14 53	Traffic Signage	-	-	As Specified in 10 14 53	
10 14 63	Electronic Readerboard	-	WatchFire, Time O-Matic	Black	Two Signs, vertical orientation
					5
10 21 13	Toilet Compartments	-	Scranton Products, Hiny Hider Solid Plastic HDPE	TBD - Color to be selected from full standard color range	
10 26 13	Wall Protection				
	Corner Guards	-	C/S Acrovyn, CO-8	Stainless Steel (brushed), 6 feet tall	
10 28 00	Toilet, Bath and Health Care Accessories		OF CI		
	Paper Towel Dispenser	-			
	Soan Dispenser		OFCI		
	Grab Bar	-	Bobrick		
	Sanitary-Nankin Disposal Units	_	OECI		
	Mirror Unit	-	Bobrick B-290		
	Robe Hook	-	Bobrick B-672		
	Mop Rack	-	Bobrick B-224		
	Privacy Curtain	-	Diamond Drapery Co	Track System 5000 Series #5000-30 90 degree curve	
	Diaper Changing Station	-	Koala	Reccessed Wall System	
	Electric Hand Drvers	-	Excel Xelerator Eco	Wall mounted	
10 41 16	Emergency Key Cabinets	-	Knox-Box 3200-R	GC to Verify location with Local Fire Marshal	
10 44 00	Fire Extinguishers & Cabinete				
10 44 00	Fire Extinguishers & Cabinets				
	Pile Exiliguistiers	-	J. L. Industries		
	AED Cabinet	-	J. L. Industries	Local Alarm	
	AED Cabinet		1400 Lifestari AED Storage Cabinet	Local Alam	
10 51 13	Metal Lockers	-	DeBourah Mfa	TBD - Color to be selected from full standard color range	
10 01 10		-	Staff - Hallway Locker (louvered)	12w x 12d x 36t (double tier)	
		-	Student - Athletic Locker (full mesh)	18w x 18d x 18t (triple tier)	
10 55 00	Mail Box	-	Salsbury 4200 Series	Factory Finish	
Div 11	Equipment				
11 13 00	Loading Dock Equipment	-	Dock Bumpers	Black	
11 30 13	Residential Appliances	-	Fridge, Mini-Fridge, W/D, Ice-Maker, Dishwasher	As Specified in 11 30 13	
44 40 00					
114000	Foodservice Equipment	-	varies	As Specified in 11 40 00	
11 53 00	Laboratory Equipment	-	Storage Cabinets, Fume Hood, Blanket, First Aid	As Specified in 11 53 00	
11 68 00	Playground Equipment and Structures	-	-	As Specified in 11 68 00	
Div. 12	Furnishings				
12 24 13	Roller Blinds				
	Motorized Blinds	-	Mecho Shade: Electro Shade System	TBD - Color to be selected from full standard color range	
	Manual Blinds	-	Mecho Shade: Mecho5 and SlimLine	TBD - Color to be selected from full standard color range	
12 93 00	Site Furnishings	-	-	As Specified in 12 93 00	
Div. 13	Special Construction				
13 21 68	Security Transaction Window	-	Total Security Solutions, Sliding Transaction Window	Custon Size, Aluminum Trim, Level 2	Two Units
Div 14	Convoying Systems				

14 24 00 Hydraulic Elevators - Passenger

-

Schindler 330A Holeless Hydraulic, Hospital/Service

Dual Jack, Front Opening, Stainless Steel Trim

# SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

# PART 1 - GENERAL

# 1.1 SUMMARY

- A. This Section includes non-load-bearing steel framing members for the following applications:
  - 1. Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).
  - 2. Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).
  - 3. Exterior wall panel furring system.
- B. Related Sections include the following:
  - 1. Division 05 Section "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; joists; and ceiling joists.
  - 2. Division 05 Section "Rough Carpentry" for solid wood backing and blocking.
  - 3. Division 07 Section "Thermal Insulation" for insulation in steel headers.

# 1.2 SUBMITTALS

- A. Product Data: For each type of product and accessory indicated.
- B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices and accessories.
- C. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:
  - 1. Expansion anchors.
  - 2. Power-actuated anchors.
  - 3. Mechanical fasteners.
  - 4. Vertical deflection clips.
  - 5. Miscellaneous structural clips and accessories.
- D. WSSP Submittals:
  - 1. Not Used.
- E. Submit fully engineered structural drawings and calculations for all stud framing that is not already engineered within the project documents. This includes all exterior and interior framing.

# 1.3 QUALITY ASSURANCE

- A. Fire-Resistance Rating: Where metal framed gypsum board or plaster assemblies with fire resistance ratings are required, provide materials and installations identical with applicable assemblies which have been tested and listed by recognized authorities, including Underwriter's Laboratories
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- D. AISI Specifications: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members" or "Load and Resistance Factor Design Specification for Cold-Formed Steel Structural Members", its "Standard for Cold-Formed Steel Framing - General Provisions", AISI's "Standard for Cold-Formed Steel Framing - Header Design", and the following for calculating structural characteristics of cold-formed metal framing:
  - 1. CCFSS Technical Bulletin: "AISI Specification Provisions for Screw Connections."
    - 1. Metal support: ASTM C754.
    - 2. Interior lathing and furring: ASTM C841.
    - A. Fire-Resistance Rating: Where metal framed gypsum board or plaster assemblies with fire resistance ratings are required, provide materials and installations identical with applicable assemblies which have been tested and listed by recognized authorities, including Underwriter's Laboratories.

- E. Installer Qualifications: An experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- F. Perform work in accordance with ASTM C 754. Maintain one copy on site
- G. Calculate structural properties of framing members in accordance with AWCI, MFMA and AWS D1.3 requirements
- H. Standards:
  - 1. Northwest Wall and Ceiling Bureau Manual, including sections:
    - a. FR-3, Installing Resilient Channels
    - b. FR-5, Suspended Gypsum Board or Cement Board Ceilings
  - 2. Metal support: ASTM C754.
  - 3. Interior lathing and furring: ASTM C841
- 1.4 DELIVERY, STORAGE, AND HANDLING
  - A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
  - B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.
- PART 2 PRODUCTS

Α.

- 2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL
  - Framing Members, General: Comply with ASTM C 754 for conditions indicated.
    - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
    - 2. Protective Coating: ASTM A 653, G40, hot-dip galvanized, unless otherwise indicated.
- 2.2 SUSPENSION SYSTEM COMPONENTS
  - A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.
  - B. Hanger Attachments to Concrete:
    - 1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
      - a. Type: Postinstalled, expansion anchor.
    - 2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosionresistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.
  - C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.
  - D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length required to suit applicaton.
  - E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.
    - 1. Depth: As indicated on Drawings.
  - F. Furring Channels (Furring Members):
    - 1. Cold-Rolled Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch- wide flanges, 3/4 inch deep.
    - 2. Steel Studs: ASTM C 645.
      - a. Minimum Base-Metal Thickness: 0.0179 inch.
      - b. Depth: As indicated on Drawings.
    - 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
      - a. Minimum Base Metal Thickness: 0.0179 inch.

- 4. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.
  - a. Configuration: Asymmetrical.
- G. Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Armstrong World Industries, Inc.; Drywall Grid Systems.
    - b. Chicago Metallic Corporation; 640-C Drywall Furring System.
    - c. USG Corporation; Drywall Suspension System.
- 2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES
  - Steel Studs and Runners: ASTM C 645.

Α.

- 1. Minimum Base-Metal Thickness: 18 mil/25 ga, or as indicated otherwise in the drawings or to suit the installation conditions.
- 2. Depth: As indicated on Drawings.
- B. Slip-Type Head Joints: Where indicated, provide one of the following:
  - 1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
  - 2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
  - 3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
    - a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - b. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Steel Network Inc. (The); VertiClip SLD Series.
      - 2) Superior Metal Trim; Superior Flex Track System (SFT).
- C. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.
      - b. Metal-Lite, Inc.; The System.
  - Flat Strap Plate: Steel sheet bracing in length and width indicated.
  - 1. Minimum Base-Metal Thickness 0.027 inch.
- E. Cold-Rolled Channel Bridging: 0.0538-inch bare-steel thickness, with minimum 1/2-inch- wide flanges.
  - 1. Depth: 1-1/2 inches.
  - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.
- F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
  - 1. Minimum Base Metal Thickness: 0.0179 inch.
  - 2. Depth: 7/8 inch to 1-1/2 inch verify with wall condition.
  - 3. Orient both vertical and horizontal furring channels to meet wall panel manufacturer substrate framing requirements. Verify layout with various panel anchorage system requirements.
  - 4. Provided punched/vented where required at rain screen wall assemblies.

D.

- G. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.
  - 1. Configuration: Asymmetrical
- H. Cold-Rolled Furring Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch- wide flanges.
  - 1. Depth: 3/4 inch.
  - 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum baresteel thickness of 0.0312 inch.
  - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.
- I. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum bare-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

# 2.4 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123.
- B. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
- C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- D. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.
   1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- E. Welding Electrodes: Comply with AWS standards.

### 2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
  - 1. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.
  - 2. Shims: Load bearing, high-density multimonomer plastic, nonleaching
  - 3. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time
  - 4. Galvanizing Repair Paint: ASTM A 780

# 2.6 FABRICATION

Α.

Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.

- 1. Fabricate framing assemblies using jigs or templates.
- 2. Cut framing members by sawing or shearing; do not torch cut.
- 3. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.
  - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
  - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
- 4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  - 2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/4 inch.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

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

# 3.2 PREPARATION

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

# 3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
  - 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
  - 2. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.
  - 1. Cut framing members by sawing or shearing; do not torch cut.
- E. Install supplementary framing, and solid wood blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- F. Install bracing at terminations in assemblies.
- G. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.
- H. Install insulation, specified in Division 07 Section "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

# 3.4 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
  - 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  - 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  - 5. Do not attach hangers to steel roof deck.
  - 6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
  - 7. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

# 3.5 INSTALLING FRAMED ASSEMBLIES

- A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- B. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
  - 1. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs as indicated.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Install double deep-leg deflection tracks and anchor outer track to building structure, or connect vertical deflection clips to studs and anchor to primary building structure.
- E. Install horizontal bridging in curtain-wall studs (all walls not sheathed on both sides), spaced in rows indicated on Shop Drawings but not more than 72 inches apart. Fasten at each stud intersection.
  - 1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs or
  - 2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated (1.25"x20 ga minimum) and stud-track solid blocking of width and thickness to match
studs (maximum 8' c/c). Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.
- G. Install studs so flanges within framing system point in same direction.
  - 1. Space studs as follows:
    - a. Single-Layer Application: 16 inches o.c., unless otherwise indicated.
    - b. Multilayer Application: 16 inches o.c., unless otherwise indicated.
    - c. Tile backing panels: 16 inches o.c., unless otherwise indicated.
- H. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
  - 1. Install deflection accommodating top tracks at all connections with overhead structural supports and decks.
  - 2. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  - 3. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs at each jamb, unless otherwise indicated.
    - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
  - 4. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
  - 5. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistancerated assembly indicated.
  - 6. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- I. Direct Furring:
  - 1. Screw to wood framing.
  - 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
- J. Z-Furring Members:
  - 1. Erect insulation (specified in Division 07 Section "Thermal Insulation") vertically and hold in place with Z-furring members spaced 24 inches o.c.
  - 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
  - 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
- K. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

## 3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Protect paper-surfaced gypsum sheathing that will be exposed to weather for more than 30 days by covering exposed exterior surface of sheathing with a securely fastened air-infiltration barrier. Apply covering immediately after sheathing is installed.
- C. Protect cutouts, corners, and joints in sheathing by filling with a flexible sealant or by applying tape recommended by sheathing manufacturer at time sheathing is applied.
- D. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer to ensure cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

#### 3.7 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

#### 3.8 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer to ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 22 16

#### SECTION 09 29 00 - GYPSUM BOARD

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Interior gypsum board.
  - 2. Tile backing panels.
  - 3. Taped and sanded joint treatment.
  - 4. Texture finish.
  - 5. Installation of acoustical sealant specified in Section 07 92 00, at sound rated walls.
  - 6. Installation of access doors specified in Section 08 31 13.
- B. Related Sections include the following:
  - 1. Division 05 Section "Cold-Formed Metal Framing" for load-bearing steel framing that supports gypsum board.
  - 2. Division 06 Section "Rough Carpentry" for wood framing and furring that supports gypsum board.
  - 3. Division 06 Section "Sheathing" for exterior gypsum board applications.
  - 4. Division 07 Section "Thermal Insulation" for insulation and vapor retarders installed in assemblies that incorporate gypsum board.
  - 5. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board.
  - 6. Division 09 Section "Tiling" for cementitious backer units installed as substrates for ceramic tile.
  - 7. Division 09 painting Sections for primers applied to gypsum board surfaces.
  - 8. Division 10 Section "Signage" for wall finish at vinyl lettering.
- 1.2 SUBMITTALS
  - A. Product Data: For each type of product indicated. Provide certification that all drywall materials to be incorporated into the project are manufactured in the USA.
  - B. WSSP Submittal:
    - 1. Not Used.
  - C. Samples: For the following products:
    - 1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.
    - 2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.
- 1.3 QUALITY ASSURANCE
  - A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
  - B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
  - C. Mockups: Before beginning gypsum board installation, install mockups of at least 50 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
    - 1. Install mockups for the following:
      - a. Each level of gypsum board finish indicated for use in exposed locations.
      - b. Each texture finish indicated.
    - 2. Apply or install final decoration indicated, including painting, on exposed surfaces for review of mockups.
    - 3. Simulate finished lighting conditions for review of mockups.
    - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.4 STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

# 1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

# PART 2 - PRODUCTS

- 2.1 PANELS, GENERAL
  - A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
  - B. General: Complying with ASTM C 36 or ASTM C 1396, as applicable to type of gypsum board indicated and whichever is more stringent.
  - C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1. National Gypsum Company basis of design
    - 2. American Gypsum Co. products equal to basis of design
    - 3. BPB America Inc. products equal to basis of design
    - 4. Certainteed products equal to basis of design
    - 5. G-P Gypsum products equal to basis of design
    - 6. Lafarge North America Inc. products equal to basis of design
    - 7. PABCO Gypsum products equal to basis of design
    - 8. USG Corporation products equal to basis of design
  - D. All drywall materials incorporated into the project shall be manufactured in the USA.
- 2.2 FIRE-RESISTANCE RATED GYPSUM BOARD: Use in all locations unless noted otherwise in specifications or drawings.
  - A. Basis of Design: Gold Bond® BRAND Fire-Shield® Gypsum Board
    - 1. Type X, Panel Physical Characteristics
      - a. Core: Fire-resistance rated gypsum core
      - b. Surface paper: 100 percent recycled content paper on front, back and long edges
      - c. Long Edges: Tapered
      - d. Overall thickness: 5/8 inch
      - e. Panel complies with Type X requirements of ASTM C 1396
- 2.3 MOLD AND MOISTURE RESISTANT GYPSUM BOARD; Use <u>throughout</u> rooms at all Restrooms, Locker Rooms, Kitchens, Janitor Closets, and within 6'-0" of the center line of any plumbing fixture in other locations.
  - A. Basis of Design: Gold Bond® BRAND XP Gypsum Board
    - 1. Panel Physical Characteristics
      - a. Core: Mold and moisture resistant gypsum core
      - b. Surface paper: 100 percent recycled content moisture/mold/mildew resistant paper on front, back, and long edges
      - c. Long Edges: Tapered
      - d. Overall thickness: 5/8 inch
      - e. Panel complies with requirements of ASTM C 1396

- f. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D 3273
- g. Environmental Requirements: Provide products that comply with testing and product requirements for low emitting materials
- 2.4 FIRE-RESISTANCE RATED GYPSUM BOARD WITH ENHANCED MOLD AND MILDEW RESISTANCE; use in fire rated conditions in Restrooms, Locker Rooms, Kitchens, Janitor Closets or locations within 6'-0" of the centerline of any plumbing fixture.
  - A. Basis of Design: Gold Bond® BRAND XP® Fire-Shield® Gypsum Board
    - 1. Type X, Panel Physical Characteristics
      - a. Core: Mold and moisture resistant, fire-resistance rated gypsum core
      - b. Surface paper: 100 percent recycled content moisture/mold/mildew resistant paper on front, back and long edges
      - c. Long Edges: Tapered
      - d. Overall thickness: 5/8 inch
      - e. Panel complies with Type X requirements of ASTM C 1396
      - f. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D 3273
- 2.5 GYPSUM SHAFTLINER PANEL; use in locations indicated in the drawings or as necessary to complete a fire rated construction assembly
  - A. Basis of Design: Gold Bond® BRAND 1" Fire-Shield® Shaftliner
    - 1. Panel Physical Characteristics
      - a. Core: Fire-resistance rated gypsum core
      - b. Surface Paper: 100 percent recycled content moisture resistant paper on front, back, and long edges
      - c. Long Edges: Beveled
      - d. Overall Thickness: 1 inch
      - e. Panel complies with Type X requirements of ASTM C 1396
- 2.6 HIGH IMPACT GYPSUM BOARD; use at all corridor walls above FRP Wainscott (see 09 77 00), vestibules, commons, gymnasium, locker room, stair wells, cafeteria and multi-purpose room. Impact resistant gypsum board shall be installed continuously at 8 feet in height above finish floor at all listed locations.
  - A. Basis of Design: Gold Bond BRAND Hi-Impact® XP® Gypsum Board
    - 1. Performance Criteria Wall Assembly STC: 47
      - 2. Panel Physical Characteristics
        - a. Core: Fire-resistance rated gypsum core, with additives to enhance mold/mildew resistance, surface indentation resistance, impact resistance and moisture and mold resistant
        - b. Surface paper: Abrasion resistant, 100 percent recycled content moisture/mold/mildew resistant paper on front, back and long edges
        - c. Embedded fiberglass mesh
        - d. Long Edges: Tapered
        - e. Overall thickness: 5/8 inch
        - f. Panel complies with Type X requirements of ASTM C 1396
        - g. Surface Abrasion Resistance: Classification Level 3 in accordance with ASTM C 1629
        - h. Indentation Resistance: Classification Level 1 in accordance with ASTM C 1629.
        - i. Soft Body Impact Resistance: Classification Level 3 in accordance with ASTM C 1629
        - j. Hard Body Impact Resistance: Classification Level 3 in accordance with ASTM C 1629.
        - k. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D 3273.
        - I. Environmental Requirements: Provide products that comply with testing and product requirements for low emitting materials
- 2.7 ACOUSTICALLY ENHANCED GYPSUM BOARD; use in acoustically rated assemblies as defined in the drawings, including all related sealant and attachment details
  - A. Basis of Design: Gold Bond® BRAND SoundBreak® XP® Gypsum Board
    - 1. Performance Criteria Wall Assembly STC: (wood stud construction) 52

(metal stud construction) - 54

- 2. Panel Physical Characteristics
  - a. Core
    - 1) Inner layer: Viscoelastic damping polymer
    - 2) Outer layers: Enhanced, high density mold-resistant gypsum core
  - b. Overall thickness: 5/8 inch, Type X
  - c. Long Edges: Tapered
  - d. Mold Resistance:
    - 1) 10 when tested in accordance with ASTM D 3273
    - 2) 0 when tested in accordance with ASTM G 21
  - e. Surface Abrasion Resistance: Classification Level 3 in accordance with ASTM C 1629
  - f. Indentation Resistance: Classification Level 1 in accordance with ASTM C 1629
  - g. Soft Body Impact Resistance: Classification Level 2 in accordance with ASTM C 1629
  - h. Hard Body Impact Resistance: Level 1 in accordance with ASTM C 1629
  - i. Environmental Requirements: Provide products that comply with testing and product requirements for low emitting materials

## 2.8 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board or Cementitious Backer Units: ANSI A118.9. Install in lieu of gypsum wall board panels at all ceramic wall tile installation substrates. Install 24 inches in height continuously at all ceramic wall tile base locations.

- 1. Products: Subject to compliance with requirements, provide one of the following:
  - a. G-P Gypsum : "DensShield Tile Guard"
  - b. Custom Building Products; Wonderboard.
  - c. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
  - d. USG Corporation; DUROCK Cement Board.
- 2. Thickness: 5/8 inch.

## 2.9 TRIM ACCESSORIES

A. Aluminum Trim: Extruded accessories of profiles and dimensions indicated. At all locations calling out for Control Joints in interior elevation drawings of gypsum board walls, the product for this joint shall be:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Basis of Design: Standard Single-V Metal Expansion Joint. Reference Drawings.
    - 1) Fry Reglet Corp.
    - 2) Gordon, Inc.; equivalent to above
    - 3) Pittcon Industries; equivalent to above
  - b. Specialty Joint:
    - 1) NOT USED
- B. Interior Trim: At all joint locations not defined in interior elevation drawings, joint system complying with ASTM C 1047.
  - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
  - 2. Shapes:
    - a. Cornerbead.
    - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
    - c. L-Bead: L-shaped; exposed long flange receives joint compound.
    - d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    - e. Expansion (control) joint.
    - f. Curved-Edge Cornerbead: With notched or flexible flanges.
- C. Exterior Trim: ASTM C 1047.
  - 1. Material: Hot-dip galvanized steel sheet, plastic, or rolled zinc.
  - 2. Shapes:
    - a. Cornerbead.
    - b. LC-Bead: J-shaped; exposed long flange receives joint compound.

- c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.
- 2.10 JOINT TREATMENT MATERIALS
  - A. General: Comply with ASTM C 475/C 475M.
    - B. Joint Tape:
      - 1. Interior Gypsum Wallboard: Paper.
      - 2. Exterior Gypsum Soffit Board: Paper.
      - 3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
      - 4. Tile Backing Panels: As recommended by panel manufacturer.
    - C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
      - 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
      - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
        - a. Use setting-type compound for installing paper-faced metal trim accessories.
      - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
      - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
      - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
    - D. Joint Compound for Exterior Applications:
      - 1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
      - 2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.
      - Joint Compound for Tile Backing Panels:
        - 1. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and settingtype, sandable topping compound.
        - 2. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
        - 3. Cementitious Backer Units: As recommended by backer unit manufacturer.

## 2.11 AUXILIARY MATERIALS

Ε.

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
  - Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
  - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound Attenuation Blankets: Reference and coordinate with Division 07 "Building Insulation". ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."
  - 1. Provide sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."
- G. Vapor Retarder: As specified in Division 07 Section "Thermal Insulation."
- 2.12 TEXTURE FINISHES
  - A. Reference and coordinate with Division 09 "Painting" for products and sequence of primer and gypsum board texture finishes.
  - B. Primer: As recommended by textured finish manufacturer.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

## 3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
  - 1. Type X: As indicated on Drawings, typical product for use unless noted otherwise in specifications or drawings.
  - 2. Ceiling Type: As indicated on Drawings.
  - 3. Water-, Moisture- and Mold-Resistant Type: As indicated on Drawings, and use throughout rooms at all Restrooms, Locker Rooms, Kitchens, Janitor Closets, and within 6'-0" of the center line of any plumbing fixture in other locations. Install 24 inches in height continuously at all ceramic wall tile base locations.
- B. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
  - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

- a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
- b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
- 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
- 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
  - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
  - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
  - 3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
  - 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

# 3.4 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panel: Comply with manufacturer's written installation instructions and install at showers, and where indicated and in locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.
- B. Cementitious Backer Units: ANSI A108.11, at where indicated.
- C. Areas Not Subject to Direct Wetting: Install Water-, Moisture- and Mold-Resistant Type gypsum wallboard panels to produce a flat surface.
- D. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.
- E. Fasten with corrosion-resistant screws.

# 3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
  - 1. Provide control joints in all gypsum board surfaces that extend for greater than 25' in a single plane (i.e. without offset of internal or external corners). Coordinate exact locations of joints with architect prior to framing.
  - 2. Provide control joints at all locations indicated in drawings, reference interior elevations and related drawings.
  - 3. Provide control joints at all locations where supporting substrate framing changes support condition (i.e. transitions from ground supported to suspended soffits and wall surfaces for example).
- C. Interior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners, unless otherwise indicated.
  - 2. LC-Bead: Use at exposed panel edges.
  - 3. L-Bead: Use where indicated.
  - 4. U-Bead: Use at exposed panel edges.

- 5. Curved-Edge Cornerbead: Use at curved openings.
- D. Aluminum Trim: Install in locations indicated on Drawings. Install in accordance with trim manufacturers recommendations and requirements.

## 3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  - 1. Level 1: not used
  - 2. Level 2: At locations: ceiling plenum areas, mechanical mezzanine areas, and all concealed areas.
  - 3. Level 3: not used.
  - 4. Level 4: Final texture of light orange peel spray applied texture, at all panel surfaces that will be exposed to view, unless otherwise indicated.
    - a. Primer and its application to surfaces are specified in other Division 09 Sections.
  - 5. Level 5: Smooth. At interior vinyl wall lettering sign location, see 10 14 00. At dry erase wall covering writing surface locations, see 09 72 00.
- E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

## 3.7 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: In accordance with 09 90 00, prepare and apply base coat primer to gypsum panels and other surfaces prior to applying texture finishes. Apply primer to surfaces that are clean, dry, and smooth per Painting Specification.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.
- D. Finish Primer: In accordance with 09 90 00, prepare and apply top coat primer to gypsum panels and other surfaces after applying texture finishes. Apply finish primer to surfaces that are clean, dry, and smooth per Painting specification.

## 3.8 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
    - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

#### SECTION 09 30 00 - TILING

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Porcelain floor and wall tile.
  - 2. Waterproof membrane for thin-set tile installations.
  - 3. Crack-suppression membrane for thin-set tile installations.
  - 4. Metal edge strips installed as part of tile installations.
  - 5. Accessories: Floor Sealers, as required to attain proper substrate condition, subfloor fillers, primers, and adhesives
- B. Related Sections include the following:
  - 1. Division 02 Section "Selective Structure Demolition" for removing existing finishes.
  - 2. Division 03 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.
  - 3. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
  - 4. Division 09 Section "Gypsum Board" for installation of cementitious backer board.

#### 1.2 DEFINITIONS

- A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.
- B. Facial Dimension: Actual tile size (minor facial dimension as measured per ASTM C 499).
- C. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
  - 1. Level Surfaces: Minimum 0.6.

## 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification:
  - 1. Full-size units of each type and composition of tile and for each color and finish required.
  - 2. Assembled samples with grouted joints for each type and composition of tile and for each color and finish required, at least 12 inches square and mounted on rigid panel. Use grout of type and in color or colors approved for completed work.
  - 3. Full-size units of each type of trim and accessory for each color and finish required.
  - 4. Metal edge strips in 6-inch lengths.
- D. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- E. Maintenance Instructions: For each type of product installed.
- F. Product Certificates: For each type of product, signed by product manufacturer.
- G. Qualification Data: For Installer.
- H. Material Test Reports: For each tile-setting and -grouting product.
- 1.5 QUALITY ASSURANCE
  - A. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.
    - 1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
  - 1. Waterproofing.
  - 2. Joint sealants.
  - 3. Metal edge strips.
- D. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
  - 1. Build mockup of each type of floor tile installation.
  - 2. Build mockup of each type of wall tile installation.
  - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

# 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

## 1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

## 1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 5 percent of amount installed, for each type, composition, color, pattern, and size indicated.

## 1.9 WARRANTY

A. Provide two year defect-free specialty warranty. Warranty period commences on the date of substantial completion.

# PART 2 - PRODUCTS

# 2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

 Basis-of-Design Product: The design for each tile type is based on the product named in the finish schedule. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

## 2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

- 1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
- 2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.
- C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
  - 1. As indicated by manufacturer's designations in the Finish Schedule and Finish Material Designations.
- D. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.
  - 1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.
- F. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

# 2.3 TILE PRODUCTS

- A. Available Manufacturers, Reference Finish Schedule and Finish Material Designations for specific product. Subject to substation request, the following manufactuer's may be acceptable:
  - 1. American Marazzi Tile, Inc.
  - 2. American Olean; Div. of Dal-Tile International Corp.
  - 3. Buchtal Corporation USA.
  - 4. Cerim-Floor Gres Ceramiche.
  - 5. Crossville Ceramics Company, L.P.
  - 6. Daltile; Div. of Dal-Tile International Inc.
  - 7. Florida Tile Industries, Inc.
  - 8. GranitiFiandre.
  - 9. Interceramic.
  - 10. KPT, Inc.
  - 11. Laufen USA.
  - 12. Lone Star Ceramics Company.
  - 13. Metropolitan Ceramics.
  - 14. Monarch Tile, Inc.
  - 15. Porcelanite, Inc.
  - 16. Quarry Tile Company.
  - 17. Seneca Tiles, Inc.
  - 18. Summitville Tiles, Inc.
  - 19. United States Ceramic Tile Company.
  - 20. Winburn Tile Manufacturing Company.
  - B. **Restroom Floor Tile**: Porcelain Floor Tile Units, conforming to ANSI A137.1. Cushioned edge. Provide shapes as follows, selected from manufacturer's standard shapes:
    - 1. Composition: Porcelain
    - 2. Module Size: 12 x 24 (running bond) Reference drawings for pattern
    - 3. Trim: all available trim, see section below
    - 4. Thickness: 3/8 inch nominal
    - 5. Floor Face: Unglazed, abrasive, slip resistant
    - 6. Base: Cove Base 6 x 12
    - 7. Basis-of-Design Product: Daltile, Ironcraft
      - a. Reference drawings for required patterns.

- b. Reference Finish Schedule for product color and texture selection for TILE-1.
- c. Substitution requests for approved equal per Division 01.
- C. **Kitchen Floor Tile**: Quarry Floor Tile Units, conforming to ANSI A137.1. Cushioned edge. Provide shapes as follows, selected from manufacturer's standard shapes:
  - 1. Composition: Quarry Tile
  - 2. Module Size: 8 x 8 field

6.

- 3. Trim: all available trim, see section E. below
- 4. Thickness: 1/2 inch nominal
- 5. Floor Face: Unglazed, abrasive, slip resistant
  - Basis-of-Design Product: Daltile Quarry Textures Tile
    - a. Reference drawings for required patterns.
    - b. Reference Finish Schedule for product color and texture selections, for Kitchen Flooring, TILE-2.
    - c. Substitution requests for approved equal per Division 01.
- D. All Tile Types Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:
  - 1. Base for Thin-Set Mortar Installations: Straight, module size to coordinate with floor and wall tile.
  - 2. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose, module size to coordinate with wall tile
  - 3. External Corners for Thin-Set Mortar Installations: Surface bullnose.
  - 4. Internal Corners: Field-butted square corners except with coved base and cap angle pieces designed to fit with stretcher shapes.
  - 5. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from 1/2 to 1/4 inch across nominal 4-inch dimension.
- E. Quarry Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes to coordinate with installation condition for quarry tile types, selected from manufacturer's standard shapes:
  1. Base: Coved with surface bullnose top edge, 6 inches tall.
- 2.4 THRESHOLDS
  - A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
    - 1. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch (12.7 mm) or less, and finish bevel to match face of threshold.
  - B. Solid Polymer Thresholds: Made from homogeneous solid sheets of filled plastic resin complying with material and performance requirements in ANSI Z124.3, for Type 5 or Type 6, without precoated finish.
    - 1. Available Manufacturers:
      - a. Avonite, Inc.
      - b. DuPont Polymers.
      - c. Formica Corporation.
      - d. Nevamar; International Paper; Decorative Products Division.
      - e. Swan Corporation (The).
      - f. Wilsonart International; Div. of Premark International, Inc.
- 2.5 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANES FOR THIN-SET TILE INSTALLATIONS
  - A. General: At all floor tile locations, provide waterproofing and crack-suppression membrane complying with ANSI A118.10.

- 1. Moisture content of concrete substrate must meet manufacturer's requirements prior to application.
  - a. Provide sheet membrane if moisture content level in concrete substrate does not meet manufacturer's requirements for liquid applied membrane products.

#### 2.6 SETTING AND GROUTING MATERIALS

- Α. Available Manufacturers:
  - Atlas Minerals & Chemicals, Inc. 1
    - 2. Boiardi Products Corporation.
    - Bonsal, W. R., Company. 3.
    - 4. Bostik.
    - C-Cure. 5.
    - Custom Building Products. 6.
    - 7. DAP. Inc.
    - 8. Jamo Inc.
    - LATICRETE International Inc. 9.
    - 10. MAPEI Corporation.
    - 11. Southern Grouts & Mortars, Inc.
    - 12. Summitville Tiles, Inc.
    - 13. TEC Specialty Products Inc.
  - Β. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
    - Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive 1. to which only water must be added at Project site. 2.
      - Prepackaged dry-mortar mix combined with acrylic resin liquid-latex additive.
        - For wall applications, provide nonsagging mortar that complies with Paragraph Fа 4.6.1 in addition to the other requirements in ANSI A118.4.
  - Water-Cleanable, Tile-Setting Epoxy Adhesive: ANSI A118.3, with a VOC content of 65 g/L or C. less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - All Grout: Factory blend of epoxy base, Portland cement and additives. Dark in color. 1/16" D. maximum at small tile and 1/4" maximum at large tile.
    - Color to be selected from manufacturer full standard color range. a.

#### 2.7 ELASTOMERIC SEALANTS

- Α. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 07 Section "Joint Sealants."
  - Use sealants that have a VOC content of [250] <Insert limit> g/L or less when calculated 1. according to 40 CFR 59, Subpart D (EPA Method 24).
- Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed Β. joints, unless otherwise indicated.
- One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; C. Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
  - Available Products: 1.
    - Dow Corning Corporation; Dow Corning 786. a.
    - GE Silicones: Sanitary 1700. b.
    - Pecora Corporation; Pecora 898 Sanitary Silicone Sealant. C.
    - d. Tremco, Inc.; Tremsil 600 White.

#### 2.8 CEMENTITIOUS BACKER UNITS

Reference and Coordinate with 09 29 00 "Gypsum Board" for cementitious backer unit product Α. and installation.

## 2.9 MISCELLANEOUS MATERIALS

- A. Provide any and all floor substrate sealers and preparations necessary to obtain a warranted installation based upon the carpet manufacturer's requirements. No additional time will be allowed to the contract performance period to complete substrate preparations.
- B. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- C. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material.
- D. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
  - 1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.
  - 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- E. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- F. Wet Areas: Provide abrasive slip resistant tile finish on all floor tile when specified for wet areas. This includes (but not limited to): kitchens, restrooms, showers, locker rooms, training rooms and lobbies/entries.
- G. Grout Sealer: Manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.
  - 1. Available Products:
    - a. Bonsal, W. R., Company; Grout Sealer.
    - b. Bostik; CeramaSeal Grout Sealer.
    - c. C-Cure; Penetrating Sealer 978.
    - d. Custom Building Products; Surfaceguard Grout and Tile Sealer.
    - e. Jamo Inc.; Penetrating Sealer.
    - f. MAPEI Corporation; KER 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
    - g. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
    - h. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
    - i. TEC Specialty Products Inc.; TA-256 Penetrating Silicone Grout Sealer.

## 2.10 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

## PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - 1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.

- 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
- 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Provide concrete substrates for tile floors installed with adhesives or thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
  - 1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
  - 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- C. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

# 3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
  - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
  - 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- H. Grout tile installation shall comply with ANSI A108.10 requirements.

## 3.4 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANE INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.

- B. Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.
- C. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

# 3.5 FLOOR TILE INSTALLATION

Β.

- A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.
  - 1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
    - a. Tile floors in wet areas.
    - b. Tile floors composed of tiles 8 by 8 inches or larger.
  - Joint Widths: Install tile on floors with the following joint widths:
    - 1. Ceramic Tile: 1/8 inch.
    - 2. Quarry Tile: 1/4 inch.
- C. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.
- D. Grout Sealer: Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

## 3.6 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods.
- B. Joint Widths: Install tile on walls with the following joint widths:
  - 1. Ceramic Tile: 1/8 inch.
  - 2. Quarry Tile: 1/4 inch.

## 3.7 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
  - 3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

## 3.8 FLOOR TILE INSTALLATION SCHEDULE

A. Reference and coordinate with Finish Schedule for manufacturer and products.

## END OF SECTION 09 30 00

## SECTION 09 51 23 - ACOUSTICAL PANEL CEILINGS

## PART 1 - GENERAL

- 1.1 SUMMARY
  - A. This Section includes acoustical panels and exposed suspension systems for ceilings.
  - B. Related Sections include the following:
    - 1. Division 09 Section "Acoustical Tile Ceilings" for ceilings consisting of mineral-base acoustical tiles used with concealed suspension systems, stapling, or adhesive bonding.
    - 2. Division 09 Section "Acoustical Metal Panels."
  - C. Products furnished, but not installed under this Section, include anchors, equipment labels, clips, and other ceiling attachment devices to be cast in concrete at ceilings.

#### 1.2 DEFINITIONS

- A. AC: Articulation Class.
- B. CAC: Ceiling Attenuation Class.
- C. LR: Light Reflectance coefficient.
- D. NRC: Noise Reduction Coefficient.

## 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. 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.
  - 2. Method of attaching hangers to building structure.
    - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
  - 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
  - 4. Minimum Drawing Scale: 1/4 inch = 1 foot.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
  - 1. Acoustical Panel: Set of 6-inch- square Samples of each type, color, pattern, and texture.
  - 2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch- long Samples of each type, finish, and color.
- D. Qualification Data: For testing agency.
- E. Field quality-control test reports.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
- G. Research/Evaluation Reports: For each acoustical panel ceiling and components and anchor and fastener type.
- H. Maintenance Data: For finishes to include in maintenance manuals.
- I. Provide description of identification labels to be used in field for above ceiling equipment. Identification style/type and colors to be approved by Owner. Provide list of equipment to be identified for Owner review.
- J. WSSP Requirements: Not Used.

#### 1.4 QUALITY ASSURANCE

- A. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAPaccredited laboratory, with the experience and capability to conduct the testing indicated. NVLAPaccredited laboratories must document accreditation, based on a "Certificate of Accreditation" and a "Scope of Accreditation" listing the test methods specified.
- B. Source Limitations:
  - 1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
  - 2. Suspension System: Obtain each type through one source from a single manufacturer.

- C. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system through one source from a single manufacturer.
- D. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
  - 1. Surface-Burning Characteristics: Provide acoustical panels with the following surfaceburning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:
    - a. Smoke-Developed Index: 450 or less.
- E. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:
  - 1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
  - CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings--Seismic Zones 0-2."
  - 3. ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."
- F. 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.

# 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

# 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
  - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.
  - 2. Do not install acoustical ceilings until building is enclosed, sufficient heat is provided, dust generating activities have terminated and overhead mechanical work is completed, tested and approved
  - 3. Permit wet work to dry or cure prior to commencement of installation
  - 4. Maintain temperatures of 61 degrees F to 78 degrees F and humidity of 20% to 40% prior to, during and after installation

# 1.7 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.
- B. Coordinate and provide 30 days notice for Owner installed equipment above ceilings
- C. Following installation of metal grid, allow up to 14 days for Owner installation of above ceiling items before tile installation

# 1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- 1. Acoustical Ceiling Panels: Provide six extra cartons (12 each) of tile of each size for each type of ceiling tile and store as directed.
- 2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity installed.
- 3. Hold-Down Clips: Equal to 2.0 percent of quantity installed.

# PART 2 - PRODUCTS

- 2.1 ACOUSTICAL PANELS, GENERAL
  - A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
    - 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E 795.
  - B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
    - 1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.
  - C. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.
  - D. Antimicrobial Fungicide Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment consisting of manufacturer's standard formulation with fungicide added to inhibit growth of mold and mildew and showing no mold or mildew growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

# 2.2 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

- A. **SC-1** Lay-in Acoustical Ceiling Tile Products: Subject to compliance with requirements, Provide panels complying with the following:
  - 1. Manufacturer and product:
    - a. Basis of Design: Armstrong, Fine Fissured, "Square Lay-in", White 2' x 4' x 5/8".
    - b. Celotex; equivalent to above
    - c. BPB USA; equivalent to above.
    - d. Chicago Metallic Corporation; equivalent to above.
    - e. Ecophon CertainTeed, Inc.; equivalent to above.
    - f. USG Interiors, Inc.; equivalent to above.
  - 2. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:
    - a. Type and Form: Type III, mineral base with painted finish; Form 2, cast or molded.
    - b. Color: White.
    - c. LR: Not less than 0.85.
    - d. NRC: Not less than 0.55.
    - e. Edge/Joint Detail: Square.
    - f. Thickness: 5/8 inch.
    - g. Modular Size: 24 by 48 inches.
- B. **SC-2** Lay-in Acoustical Ceiling Tile Products (for use at Kitchens, and similar wet areas): Subject to compliance with requirements, Provide panels complying with the following:
  - 1. Manufacturer and product:
    - a. Basis of Design: Armstrong, Clean Room, "VL Unperforated", White 2' x 4' x 5/8
    - b. Capaul Vinylrock X; equivalent to above
    - c. BPB USA; equivalent to above.

- d. Celotex; equivalent to above
- e. Chicago Metallic Corporation; equivalent to above.
- f. Ecophon CertainTeed, Inc.; equivalent to above.
- g. USG Interiors, Inc.; equivalent to above.
- 2. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:
  - a. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2,
  - nodular; with washable vinyl-film overlay.
  - b. Color: White.
  - c. LR: Not less than 0.88.
  - d. NRC: Not less than N/A
  - e. Edge/Joint Detail: Square.
  - f. Thickness: 5/8 inch.
  - g. Modular Size: 24 by 48 inches.
  - h. Antimicrobial Treatment: Broad spectrum fungicide and bactericide based.
- C. **SC-3** Lay-in Acoustical Ceiling Tile Products: Subject to compliance with requirements, Provide panels complying with the following:
  - 1. Manufacturer and product:
    - a. Basis of Design: Armstrong, "Optima", White 2' x 4' x 3/4".
    - b. Basis of Design: Armstrong, Axiom Classic Trim, Square Formations
    - c. Celotex; equivalent to above
    - d. BPB USA; equivalent to above.
    - e. Chicago Metallic Corporation; equivalent to above.
    - f. Ecophon CertainTeed, Inc.; equivalent to above.
    - g. USG Interiors, Inc.; equivalent to above.
  - 2. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:
    - a. Type and Form: Type III, mineral base with painted finish; Form 2, cast or molded.
      - b. Tile Color: White
      - c. Grid Color: Gun Metal Grey
      - d. LR: Not less than 0.84.
      - e. NRC: Not less than 0.55.
      - f. Edge/Joint Detail: Square
      - g. Thickness: 3/4 inch.
      - h. Modular Size: 24 by 24 inches.
  - 3. Suspension Axiom Classic Trim Accessories
    - a. Height: 6 inch tall edge trim (all sides) straight
    - b. Trim Color: Gun Metal Grey
    - c. Corners: Mitered, conceal fasteners
  - 4. Acoustic Sound Batten
    - a. Provide 2" thick black duct liner rolled out flat on top of ceiling assembly for full width and length coverage of free floating ceiling assembly. Pin linear to ceiling system.
    - b. Black duct liner batten shall not be visible from below.
- D. **SC-4** Wood Acoustical Ceiling System. Subject to compliance with requirements, Provide panels complying with the following:
  - 1. Manufacturer and product:
    - a. Basis of Design: Armstrong, Woodworks Grille Classics- Backer and Dowel System
    - b. Substitutions under specification 01 60 00; equivalent to above
  - 2. Classification: Provide blades and backers complying with ASTM E 84 for surface burning meeting Class A characteristics.
    - a. Type and Form: Wood blade and dowel assembly
    - b. Color: Wood, Grille Maple GMP
    - c. LR: Not less than 0.85
    - d. Description: 3/4" x 1-3/8" wood blade with 9/16" diameter dowel
    - e. Slat Spacing: 2" clear between slats
    - f. Blade Length: linear profile, up to 10 feet in length

- g. Wood Backer: provide as needed for seismic requirements above blade and dowel system, black in color
- h. Edge/Joint Detail: Square. 5-1/4" tall and 3/4 inch thick continuous trim on all perimeter edges of free floating ceiling assembly, hardwood
- i. Antimicrobial Treatment: Broad spectrum fungicide and bactericide based
- 3. Acoustic Sound Batten
  - a. Provide 2" thick black duct liner rolled out flat on top of ceiling assembly for full width and length coverage of free floating ceiling assembly. Pin linear to ceiling system.b. Black duct liner batten shall not be visible from below.
- 4. Coordinate linear light fixture placement within wood ceiling assembly. Refer to Division 26 specifications.
- 5. Coordinate linear HVAC diffuser placement within wood ceiling assembly. Refer to Division 23 specifications. The diffuser finish shall match wood ceiling finish.

## 2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
- B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
  - 1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
  - 1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
    - a. Type: Postinstalled expansion anchors.
    - b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
    - c. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchor.
    - d. Corrosion Protection: Components fabricated from nickel-copper-alloy rods complying with ASTM B 164 for UNS No. N04400 alloy.
  - 2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to [10] times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
  - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  - 2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
  - 3. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.
  - 4. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.
- E. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- F. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch- thick, galvanized steel sheet complying with ASTM A 653/, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.
- G. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- H. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

- I. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in-place.
- J. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.
- 2.4 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING
  - A. Available Products: Subject to compliance with requirements, provide one of the following:
    - 1. Basis of Design: Armstrong World Industries, Inc.; Prelude Grid
      - 2. BPB USA; equivalent to above
      - 3. Rockfon Corporation; equivalent to above
      - 4. Ecophon CertainTeed, Inc.; equivalent to above
      - 5. USG Interiors, Inc.; equivalent to above
  - B. Wide-Face, Capped, Double-Web: Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation, with prefinished 15/16-inch- wide metal caps on flanges.
    - 1. Structural Classification: Intermediate-duty system.
    - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
    - 3. Face Design: Flat, flush.
    - 4. Cap Material: Steel cold-rolled sheet.
    - 5. Cap Finish: Painted white.
  - C. Provide hold-down clips at all panels.
  - D. Provide <u>identification labels</u> at panels for access to all maintenance items including but not limited to valves, dampers, disconnects, etc. as required by Owner. Reference Division 22 and 23 specifications for Identification for Plumbing and HVAC Equipment label colors corresponding with service equipment.
    - 1. BLUE: HVAC Isolation Valves
    - 2. GREEN: Plumbing Isolation Valves
    - 3. ORANGE: HVAC Units of Filters
    - 4. YELLOW: Control Dampers or OSA Valves
    - 5. RED: Fire or Smoke Dampers
    - 6. WHITE: Waste of Roof Drain Clean-Outs
    - 7. Provide additional labels for pipes and ducts. Reference Division 22 and 23 specifications.

#### 2.5 METAL EDGE MOLDINGS AND TRIM

- A. Available Products: Subject to compliance with requirements, provide one of the following:
  - 1. Basis of Design: Armstrong World Industries, Inc.; Prelude Grid
  - 2. BPB USA; equivalent to above
  - 3. Chicago Metallic Corporation; equivalent to above
  - 4. Ecophon CertainTeed, Inc.; equivalent to above
  - 5. USG Interiors, Inc.; equivalent to above
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.
  - 1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.
  - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- 2.6 ACOUSTICAL SEALANT
  - A. Available Products: Subject to compliance with requirements, provide one of the following:
    - 1. Acoustical Sealant for Exposed and Concealed Joints:
      - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
      - b. USG Corporation; SHEETROCK Acoustical Sealant.

- 2. Acoustical Sealant for Concealed Joints:
  - a. OSI Sealants, Inc.; Pro-Series SC-175 Rubber Base Sound Sealant.
  - b. Pecora Corporation; BA-98.
  - c. Tremco, Inc.; Tremco Acoustical Sealant.
- B. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- C. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), recommended for sealing interior concealed joints to reduce airborne sound transmission.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

## 3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 3. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 4. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  - 5. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  - 6. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  - 7. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  - 8. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.

- 9. Do not attach hangers to steel deck tabs.
- 10. Do not attach hangers to steel roof deck. Attach hangers to structural members.
- 11. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
- 12. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
  - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  - 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
  - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
  - 1. Arrange directionally patterned acoustical panels as follows:
    - a. As indicated on reflected ceiling plans.
  - 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
  - 3. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
  - 4. For reveal-edged panels on suspension system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
  - 5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
  - 6. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.
  - 7. Install clean-room gasket system in areas indicated, sealing each panel and fixture as recommended by panel manufacturer's written instructions.
  - 8. Protect lighting fixtures and air ducts to comply with requirements indicated for fireresistance-rated assembly.
- G. Review above ceiling equipment label locations and format with Owner, prior to placing labels.

#### 3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 23

## SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

#### PART 1 - GENERAL

#### 1.1 SUMMARY

Α.

- Section Includes:
  - 1. Resilient base.
  - 2. Resilient molding accessories.
  - 3. Aluminum molding accessories.
- B. Related Sections:
  - 1. Division 09 Section "Resilient Tile Flooring" for resilient floor tile.
  - 2. Division 09 Section "Carpeting" for carpet floor coverings.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.
- C. Product Schedule: For resilient products. Use same designations indicated on Drawings.

#### 1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Mockups: Provide resilient products with mockups specified in other Sections.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

#### 1.5 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

#### 1.6 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

## PART 2 - PRODUCTS

- 2.1 RESILIENT BASE
  - A. Resilient Base:

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- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Armstrong World Industries. Inc.
  - b. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
  - Endura Rubber Flooring; Division of Burke Industries, Inc. C.
  - Tarkett d.
  - e. Johnsonite.
  - f. Mondo Rubber International. Inc.
  - Musson, R. C. Rubber Co. g.
  - Nora Rubber Flooring; Freudenberg Building Systems, Inc. h.
  - Roppe Corporation, USA. i.
- Resilient Base Standard: ASTM F 1861. Β.
  - Material Requirement: Type TS (rubber, vulcanized thermoset) or Type TP (rubber, 1. thermoplastic).
  - 2 Manufacturing Method: Group I (solid, homogeneous) or Group II (layered).
  - Style: Cove (base with toe), and Straight (base without toe). 3.
- C. Minimum Thickness: 0.125 inch.
- D. Height: 4 inches or 6 inches - as indicated in Drawings and Finish Schedule.
- Ε. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Job formed.
- G. Inside Corners: Job formed.
- Η. Finish: Matte.
- Colors and Patterns: As indicated by manufacturer's designations, reference Finish Schedule L. Material Finish Designations.

#### 2.2 **RESILIENT STAIR ACCESSORIES** Α.

Resilient Stair Finishes:

1. Not Used.

#### 2.3 MOLDING ACCESSORY

- Α. Molding Accessory:
  - Manufacturers: Subject to compliance with requirements, provide products by one of the 1 following:
    - Burke Mercer Flooring Products; Division of Burke Industries, Inc. a.
    - b. Tarkett
    - Johnsonite. C.
    - R.C.A. Rubber Company (The). d.
    - Roppe Corporation, USA. e.
    - Schluter Systems f.
  - Description: Carpet edge for glue-down applications, Nosing for carpet, Nosing for resilient floor Β. covering, Reducer strip for resilient floor covering, Joiner for tile and carpet and miscellaneous Transition strips.
  - Material: Rubber or Aluminum as noted on drawings C.
  - Flooring Transitions: As indicated or type and size to accommodate transition between flooring D. materials:
    - Basis of Design for Vinyl Transition Strip: Tarkett 1. 2.
      - Basis of Design for Aluminum Transition Strip:
        - a. Flat Transitions: Schluter - RENO-RAMP/-K - 1/8" Tall
        - Elevated Transitions: EZ-Access TMER 1.5, slip resistant b.
  - Confirm other molding, trim, transition strips to suit individual applications and conditions 3. E. Colors and Patterns: As indicated by manufacturer's designations, reference Finish Schedule Material Finish Designations.

## 2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
  - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. Cove Base Adhesives: Not more than 50 g/L.
    - b. Rubber Floor Adhesives: Not more than 60 g/L.
- C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.
- D. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

## PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
  - 4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until they are same temperature as the space where they are to be installed.
  - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

# 3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
  - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
  - 2. Inside Corners: Use straight pieces of maximum lengths possible. Miter cut to provide tight fitting joint with no gaps.

## 3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
  - 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
  - 2. Tightly adhere to substrates throughout length of each piece.
  - 3. For treads installed as separate, equal-length units, install to produce a flush joint between units.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

# 3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
    - 2. Sweep and vacuum surfaces thoroughly.
    - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products until Substantial Completion.

END OF SECTION 09 65 13

## SECTION 09 65 19 - RESILIENT TILE FLOORING

#### PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Resilient tile floor covering, including pattern layout and designs as indicated in the drawings.
  - 2. Accessories: Floor Sealers, as required to attain proper substrate condition, subfloor fillers, primers, and adhesives
- B. Related Sections:
  - 1. Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with resilient floor coverings.
  - 2. Division 09 Section "Resilient Sheet Flooring" for resilient floor coverings for use in support areas.

## 1.2 REFERENCES

Α.

- American Society for Testing & Materials (ASTM):
- 1. ASTM E 648: Standard Test Method for Critical Radial Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
- 2. ASTM E 662 Test Method for Specific Density of Smoke Generated by Solid Materials.
- 3. ASTM F 710 Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
- 4. ASTM F 970 Test Method for Static Load Limit.
- B. National Fire Protection Association
  - 1. NFPA 101: Code for Safety to Life from Fire in Buildings and Structures.
  - 2. NFPA 253 Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Energy Source
  - 3. NFPA 258 Test Method for Specific Density of Smoke Generated by Solid Materials
- 1.3 SUBMITTALS
  - A. Product Data: For each type of product indicated.
  - B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
    - 1. Show details of special patterns.
  - C. Samples for Verification: Full-size units of each color and pattern of floor tile required.
    - 1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.
  - D. Seam Samples: For seamless-installation technique indicated and for each flooring product, color, and pattern required; with seam running lengthwise and in center of [6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.
  - E. Product Schedule: For floor tile. Use same designations indicated on Drawings
  - F. Qualification Data: For qualified Installer.
  - G. Maintenance Data: For each type of floor tile to include in maintenance manuals.
  - H. WSSP Requirements: Not Used.

## 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation indicated.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.
- B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

- 1. Installation of mock-up is required and must be deemed acceptable by Owner and Architect. Mock-up to be installed following the same procedure and material as per the actual floor.
- 2. Build mockups for floor tile including resilient base and accessories.
  - a. Size: Minimum 100 sq. ft. for each type, color, and pattern in locations directed by Architect.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Materials must be delivered in manufacturer's original, unopened and undamaged containers with identification labels intact.
- B. Store material protected from exposure to harmful weather conditions, on a clean, dry, flat surface protected from all possible damage.
- C. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 55 deg F or more than 90 deg F. Store floor tiles on flat surfaces.
- D. Material shall not suffer excessive damage during handling (i.e. edge chipping, excessive warping etc).

#### 1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 80 deg F, in spaces to receive floor tile during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 90 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Installation to be carried-out no sooner than the specified curing time of concrete subfloor (normal density concrete curing time is approximately 28 days for development of design strength).
- F. Moisture vapor emission content of the concrete slab must not exceed 3 lbs/1000 ft2 per 24 hrs when using the Calcium Chloride test as per ASTM F 1869-98.
- G. Install floor tile after other finishing operations, including painting, have been completed.

## 1.7 WARRANTY

- A. Provide manufacturer's standard five year warranty.
- B. This flooring is warranted to be free from manufacturing defects for a period of five years from the date of shipment from the manufacturer.

#### 1.8 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Tile: Furnish (2) boxes, of each type, color, and pattern of floor tile installed. Clearly identify on each box the color, type, and installed location of the tile.
  - 2. Repair material must be from the same dye lot as material supplied for initial installation. Maintain surface as per manufacturer's instructions (see Maintenance Instructions for Flooring)

# PART 2 - PRODUCTS

#### 2.1 RESILIENT TILE FLOORING

A. Products: Subject to compliance with following requirements:

- 1. Basis of Design: Forbo, Marmoleum Modular Real
  - 2. Mohawk
  - 3. Mondo America

- 4. Nora
- B. Finish: Marbleized and Hammered.
- C. Wearing Surface: Smooth.
- D. Thickness: 3.5 mm
- E. Size: 20 inches module
- F. Manufactured from natural raw materials. Granules shall extend through the thickness of the wear layer. Sheet flooring shall conform to the requirements of ASTM F 1303, Type II, Class A Backing. 100% biobased content.
- G. Base: Rubber Wall Base
- H. Provide adhesive certified by the manufacturer.
- I. Colors and Patterns:
  - 1. Color: Reference Finish Schedule, Finish Material Designations.
  - 2. Pattern: Reference Finish Schedule, Finish Material Designations

#### 2.2 INSTALLATION MATERIALS

- A. Provide any and all floor substrate sealers and preparations necessary to obtain a warranted installation based upon the carpet manufacturer's requirements. No additional time will be allowed to the contract performance period to complete substrate preparations.
- B. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- C. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
  - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. VCT Adhesives: Not more than 50 g/L.
    - b. WSSP Requirements: Not Used.
- D. Floor Polish: Polish and seal flooring following substantial completion.
- 2.3 SOURCE QUALITY

A. Source Quality: Obtain flooring product materials from a single manufacturer.

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
  - 4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

- a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
- b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.
- C. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.
- Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
  Do not install floor tiles until they are same temperature as space where they are to be installed.
  - Do not install floor tiles until they are same temperature as space where they are to be installed. 1. Move resilient products and installation materials into spaces where they will be installed
  - at least 48 hours in advance of installation.
- F. Sweep & vacuum substrates to be covered by resilient products immediately before installation.

# 3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
  - 1. Lay tiles in pattern indicated. Reference Drawings.
  - 2. Alternate tile grain pattern direction in checker board pattern of single tiles.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged. Discard broken, cracked, chipped, or deformed tiles.
  - 1. Lay tiles in pattern of colors and sizes indicated.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

## 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
    - 2. Sweep and vacuum surfaces thoroughly.
    - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish Preparation: Remove soil, visible adhesive, and surface blemishes from floor tile surfaces before applying liquid floor polish.
- E. Joint Sealant: Apply sealant to resilient floor tile perimeter (where flooring base is omitted) and around columns, at door frames, and at other joints and penetrations.
- F. Cover floor tile until Substantial Completion.

END OF SECTION 09 65 19

Orion High School Pasco, Washington

## SECTION 09 66 23 - TERRAZZO FLOORING

## PART 1 – GENERAL

#### 1.1 SUMMARY

- Types of Precast Terrazzo work included: Α.
  - Precast Cement Terrazzo Stairs 1.
  - Precast Cement Terrazzo Tile at Stair Landing 2.
- Setting material, grouts, sealants and caulks Β.
- Installation of precast cement terrazzo stairs, base, etc. C.
- Related work not specified under this section D.
  - Installation of structural stair substrates to receive precast terrazzo. 1.

#### REFERENCES 1.2

- Α. American Society for Testing and Materials (ASTM)
  - ASTM C-150 1.
  - ASTM C-33 2.
  - ASTM C-140 3.
  - 4. ASTM C-293
  - 5. ASTM C-1028
- Β. National Terrazzo and Mosaic Association Inc. (NTMA)
- Federal Register Part III 1. 28 CFR Part 36 C.

#### 1.3 SUBMITTALS Α.

- Shop Drawings
  - Submit shop drawings of all precast epoxy terrazzo items showing detail sections and profile for 1 all precast items. Details shall show all reinforcing and special hardware for fastening.
- Β. Samples:
  - Submit maximum of 3 samples 6" x 6" size for all color. 1.
  - Color to be selected from Manufacturer's full available range. 2.
  - Submit two copies of NTMA maintenance literature. 3.
  - Quality Assurance and Procedure Program 4.
- Performance Requirements: C.
  - Compressive Strength 5000 p.s.i. 1.
  - Flexural Strength 4300 p.s.i. 2.
- D. Certification:
  - Suppliers shall furnish certification attesting that materials meet specification requirements. 1

#### 1.4 QUALITY ASSURANCE

- NTMA Standards: Comply with specified provisions and recommendations of the National Terrazzo & Α. Mosaic Association, Inc. (NTMA).
- Manufacturer's Instructions: In addition to specified requirements, comply with precast terrazzo Β. manufacturer's instructions and recommendations for substrate preparation, materials storage, mixing and application, finishing and curing.
- Qualifications: Precast Terrazzo Manufacturer and Trade Contractor must have a minimum of 5 years C. of successful experience on projects of similar magnitude and complexity to that indicated project. Manufacturer and contractor to be prequalified by Architect prior to bidding. Failure to prequalify will void bid.
- D. Manufacturer to supply a written Quality Assurance Program and Procedure manual.

# 1.5 DELIVERY, STORAGE AND HANDLING

- A. Packaging and Shipping: Precast terrazzo to be palletized and shrink wrapped, delivered in original unopened packaging with legible manufacturer identification, including size, piece number, quantities, manufacturer date and inspector initials.
- B. Storage and Protection: Precast terrazzo to be stored indoors, sheltered from moisture in original packaging. Protect from damage by other trades.

## 1.6 WARRANTY

A. Manufacturer/Installer shall warrant installed system for a period of 1 year from date of substantial completion against failure of workmanship and materials.

# PART 2 – PRODUCTS

# 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Wausau Tile, Inc.
  - 1. Basis of Design: S-31 Cement Terrazzo Tread and Riser System
    - a. Provide minimum 2" thick continuous flat epoxy terrazzo rise and run at tread.
    - b. Provide minimum 18" x 18" flat epoxy floor tile at stair landing to match thickness of epoxy tread thickness.
    - c. Include (3) 1/2 inch black epoxy abrasive strips at each stair nosing.
    - d. Terrazzo finish and pattern to be selected from full standard color range.
- B. Clarification Note: Drawings and specifications are based on Wausau Tile, Inc. Other manufacturer's shall comply with minimum levels of material specifications and detailing indicated on the drawings of specified herein.
- C. Substitutions under provision of Division 01.

# 2.2 MATERIALS

- A. Epoxy Resin
- B. Aggregates: All aggregates to meet ASTM C-33 specifications, cleaned and properly graded to size. Aggregate shall be blended to meet individual project requirements.
- C. Marble chips, size to conform with NTMA gradation standards.
- D. Abrasive Inserts: Shall consist of silicon carbide and black epoxy Three lines.
- E. Caulks & Sealants:
  - 1. Urethane or Polyurethane Sealant
  - 2. Color to be selected by Architect from standard color pallet.
- F. Cleaner: Liquid neutral chemical cleaner, with pH factor between 7 and 8, of formulation recommended by sealer manufacture for type of precast terrazzo used and complying with NTMA requirements.
- G. Sealer: Colorless, slip and stain-resistant penetrating sealer with pH factor between 7 and 8, that does not affect color or physical properties of precast terrazzo surface. Flash point (ASTM D56): 80 degrees F, Minimum.

## 2.3 MANUFACTURED UNITS

# A. Sizing Tolerances:

- 1. All units to conform to shop drawings with a 1/16" tolerance in dimension.
- B. Precast Surfaces and Edges:
  - 1. All exposed edges to be ground and polished with a minimum of 1/16" bevel.
  - 2. All finished surfaces to be ground and polished, free of holes and to have overall uniformity in matrix and aggregate.
  - 3. All precast epoxy terrazzo finished surfaces to be sealed with a sealer approved by manufacturer.
## PART 3 - EXECUTION

## 3.1 INSPECTION

- A. Examine areas to receive precast epoxy terrazzo for the following:
  - 1. Defects in existing work.
  - 2. Deviations beyond allowable tolerances for the substrate.
- B. Start work only when all defects have been corrected by others.

## 3.2 INSTALLATION

- A. Setting: 1. S
  - Set accurately as shown on approved shop drawings. Setting methods are:
    - a. Thin Set
    - b. Epoxy
  - 2. Alignment of precast shall be straight and true to all dimensions. It may not vary more than 1/8" in length, height or width.
  - 3. Install anchors as shown on details.
  - 4. Fill joints between with manufacturer approved caulk or as specified.
- B. Protection:
  - 1. Upon completion, the work shall be ready for final inspection and acceptance by owner or owner agent.
  - 2. General Contractor shall protect the finished work from the time the terrazzo contractor completes the work.
- C. Finish: All precast epoxy terrazzo finished surfaces to be sealed with a sealer approved by manufacturer.

END OF DOCUMENT 09 66 23

## SECTION 09 68 13 - TILE CARPETING

#### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. This Section includes the following:
    - 1. Walk off mat.
    - 2. Accessories: Floor Sealers, as required to attain proper substrate condition, subfloor fillers, primers, and adhesives
  - B. Related Sections include the following:
    - 1. Division 05 Section "Metal Fabrications" for aluminum trim profiles.
    - 2. Division 09 Section "Resilient Tile Flooring and Resilient Base and Accessories" for resilient wall base and accessories installed with carpet.
- 1.2 SUBMITTALS
  - A. Product Data: For the following, including installation recommendations for each type of substrate:
    - 1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
  - B. Shop Drawings: Show the following:
    - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
    - 2. Carpet type, color, and dye lot.
    - 3. Locations where dye lot changes occur.
    - 4. Seam locations, types, and methods.
    - 5. Type of subfloor.
    - 6. Type of installation.
    - 7. Pattern type, repeat size, location, direction, and starting point.
    - 8. Pile direction.
    - 9. Type, color, and location of insets and borders.
    - 10. Type, color, and location of edge, transition, and other accessory strips.
    - 11. Transition details to other flooring materials.
    - 12. Type of carpet cushion.
  - C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
    - 1. Carpet: 12-inch- square Sample.
    - 2. Exposed Edge, Transition, and other Accessory Stripping: 12-inch- long Samples.
    - 3. Carpet Cushion: 6-inch- square Sample.
    - 4. Carpet Seam: 6-inch Sample.
    - 5. Mitered Carpet Border Seam: 12-inch- square Sample. Show carpet pattern alignment.
  - D. Product Schedule: For carpet. Use same designations indicated on Drawings.
  - E. Qualification Data: For Installer.
  - F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency.
  - G. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
    - 1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  - 2. Precautions for cleaning materials and methods that could be detrimental to carpet.
  - H. Warranties: Special warranties specified in this Section.
  - I. WSSP Requirements: Not Used.

## 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.
  - 1. Carpet contractor shall be a firm established not less than five (5) years.
  - 2. Carpet contractor must be mill certified for installing products.
  - 3. Carpet contractor will be responsible for the proper product installation, including floor preparation, in those areas indicated in the Drawings.
- B. Single Source Responsibility: Provide products from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- D. Mockups: Before installing carpet, 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.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to carpet installation including, but not limited to, the following:
  - 1. Review delivery, storage, and handling procedures.
  - 2. Review ambient conditions and ventilation procedures.

# 1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104, Section 5, "Storage and Handling."

# 1.5 PROJECT CONDITIONS

- A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."
- B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

## 1.6 WARRANTY

- A. Special Warranty for Carpet: Manufacturer's standard from in which manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, and runs, loss of tuft bind strength, excess static discharge and delamination.
  - 1. Warranty Period Lifetime from date of Substantial Completion.
    - a. Lifetime warranties must cover face components and backing components
    - b. Warranties must be non-prorated.
    - c. Carpet manufacturer must warrant both product and adhesive systems.
    - d. Fiber must have lifetime static warranty.
  - 2. Warranty to include coverage for:
    - a. Provide carpet installer's warranty against defects in installation
    - b. Provide full spectrum of Manufacturer's Lifetime warranties including, but not limited to, wear, tuft bind, static, edge ravel, zippering, delamination, impervious to liquids, and dimensional stability.
  - 3. Provide carpet installer's warranty against defects in installation.

- 4. Provide full spectrum of Manufacturer's Lifetime warranties including, but not limited to, wear, tuft bind, static, edge ravel, zippering, delamination, impervious to liquids, and dimensional stability.
- 1.7 EXTRA MATERIALS
  - A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
    - 1. Carpet: Unopened boxes from same production run as installed material. Quantity equal to a minimum of 5 percent of amount installed for each type indicated, but not less than two (2) unopened boxes of 14 tiles each.

# PART 2 - PRODUCTS

2.1 CARPET TILE

A. Products: Subject to compliance with requirements, provide one of the following:

- 1. WALK: Mannington Commercial, Ruffian II Collection (walk-off mat areas)
  - a. Color: Reference Finish Schedule, Finish Material Designations.
  - b. Pattern: Reference Finish Schedule, Finish Material Designations
  - c. Construction: Tip-Sheared Loop
  - d. Face fiber: Type 6,6 nylon
  - e. Dye method: 100% Solution Dyed
  - f. Gauge: 5/32
  - g. Stitches per inch: 9
  - h. Pile thickness: 0.155 inches
  - i. PrimaryBacking: Synthetic
  - j. Secondary Backing: Infinity RE Modular
  - k. Standard size: 24" x 24".
  - I. Wear warranty: Lifetime Limited Wear Warranty
  - m. Standards:
    - 1. Methenamine pill test (ASTM-D-2859): passes
      - 2. Flooring radiant panel test (ASTM-E-648): Class I (direct glue)
      - 3. N.B.S. smoke chamber test (ASTM-E-662): <450 (flamming mode)
      - 4. Electrostatic propensity test: < 3.0 kv
      - 5. CRI indoor air quality control green label
      - 6. CRI IAQ testing certification
  - Applied Soil-Resistance Treatment: Manufacturer's standard material
- 3. Basis-of-Design Product: Listed Above
  - a. Reference drawings for required patterns.
  - b. Reference Finish Schedule for product color and texture selections, for WALK.
  - c. Substitution requests for approved equal per Division 01.

## 2.2 INSTALLATION ACCESSORIES

- A. Provide any and all floor substrate sealers and preparations necessary to obtain a warranted installation based upon the carpet manufacturer's requirements. No additional time will be allowed to the contract performance period to complete substrate preparations.
- B. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.
- C. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
  - 1. VOC Limits: Provide adhesives with VOC content not more than 50g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).
- D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

2.

## E. WSSP Requirements: Not Used.

## PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
  - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet[ cushion] manufacturer.
  - 2. Subfloor finishes comply with requirements specified in Division 03 Section "Cast-in-Place Concrete" for slabs receiving carpet.
  - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- C. Do not commence with carpet installation until painting and finishing work is complete and ceilings and overhead work, tested, approved and completed
- D. Maintain room temperature at minimum 60 deg F for at least 24 hours prior to installation and relative humidity at approximately that at which the area is to be maintained
- E. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.
- F. Broom and vacuum clean substrates to be covered immediately before installing carpet.

## 3.3 INSTALLATION

- A. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
  - 1. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions
- B. Provide sufficient lighting, 25 F.C. minimum
- C. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- D. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
  - 1. Install quarter turned
  - 2. Install pattern as shown on drawings and approved in submittals
- E. Extend carpet beneath door frame jambs and completely under island cabinets to allow relocation
- F. Do not bridge building expansion joints with carpet.
- G. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- H. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

- I. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- J. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.
- K. Prohibit traffic on floor finish for 48 hours after installation.

# 3.4 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet:
  - 1. Remove excess adhesive, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove yarns that protrude from carpet surface.
  - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 16, "Protection of Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

END OF SECTION 09 68 13

#### SECTION 09 68 16 - SHEET CARPETING

#### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. This Section includes the following:
    - 1. Tufted carpet.
    - 2. Accessories: Floor Sealers, as required to attain proper substrate condition, subfloor fillers, primers, and adhesives
  - B. Related Sections include the following:
    - 1. Division 09 Section "Resilient Tile Flooring and Resilient Base and Accessories" for resilient wall base and accessories installed with carpet.
- 1.2 SUBMITTALS
  - A. Product Data: For the following, including installation recommendations for each type of substrate:
    - 1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
    - 2. Carpet Cushion: For each type indicated. Include manufacturer's written data on physical characteristics and durability.
  - B. Shop Drawings: Show the following:
    - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
    - 2. Carpet type, color, and dye lot.
    - 3. Locations where dye lot changes occur.
    - 4. Seam locations, types, and methods.
    - 5. Type of subfloor.
    - 6. Type of installation.
    - 7. Pattern type, repeat size, location, direction, and starting point.
    - 8. Pile direction.
    - 9. Type, color, and location of insets and borders.
    - 10. Type, color, and location of edge, transition, and other accessory strips.
    - 11. Transition details to other flooring materials.
    - 12. Type of carpet cushion.
  - C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
    - 1. Carpet: 12-inch- square Sample.
    - 2. Exposed Edge, Transition, and other Accessory Stripping: 12-inch- long Samples.
    - 3. Carpet Cushion: 6-inch- square Sample.
    - 4. Carpet Seam: 6-inch Sample.
    - 5. Mitered Carpet Border Seam: 12-inch- square Sample. Show carpet pattern alignment.
  - D. Product Schedule: For carpet. Use same designations indicated on Drawings.
  - E. Qualification Data: For Installer.
  - F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency.
  - G. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
    - 1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
    - 2. Precautions for cleaning materials and methods that could be detrimental to carpet.
  - H. Warranties: Special warranties specified in this Section.
  - I. WSSP Requirements: Not Used.

#### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.
- B. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Mockups: Before installing carpet, 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.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to carpet installation including, but not limited to, the following:
  - 1. Review delivery, storage, and handling procedures.
  - 2. Review ambient conditions and ventilation procedures.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104, Section 5, "Storage and Handling."

#### 1.5 PROJECT CONDITIONS

- A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."
- B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

#### 1.6 WARRANTY

- A. Special Warranty for Carpet: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength and delamination.
  - 3. Warranty Period: 20 years from date of Substantial Completion.

## 1.7 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 6 sq. yd..

#### PART 2 - PRODUCTS

- 2.1 TUFTED CARPET
  - A. Products: Subject to compliance with requirements of the following:
  - B. Basis of Design: Mannington Commercial
    - 1. Reference drawings for required patterns and various carpet locations.
    - 2. **CPT-1**: Mannington Flooring (main carpeting)

- a. Color: Reference Finish Schedule, Finish Material Designations
- b. Pattern: Reference Finish Schedule, Finish Material Designations
- C. Fiber Content: Type 6,6 nylon
- D. Pile Characteristic: Patterned-loop pile, broadloom roll goods.
- E. Total Weight: 22 ounce
- F. Pile Thickness: 0.092 inch for finished carpet per ASTM D 6859
- G. Gage: 5/64
- H. Stiches per inch: 10.33
- I. Primary Backing: Manufacturer's standard material; synthetic non-woven.
- J. Cushion Backing: Integra HP, high-performance broad-loom backing with pre-consumer recycle content with chemically welded seams.
- K. Width: 12 feet 6 inches
- L. Applied Soil-Resistance Treatment: Manufacturer's standard material for stain-resistance
- M. Substitution requests for approved equal per Division 01.

## 2.2 INSTALLATION ACCESSORIES

- A. Provide any and all floor substrate sealers and preparations necessary to obtain a warranted installation based upon the carpet manufacturer's requirements. No additional time will be allowed to the contract performance period to complete substrate preparations.
- B. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.
- C. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
  - 1. VOC Limits: Provide adhesives with VOC content not more than 50g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).
  - 2. WSSP Requirements: Not Used.
- D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

## PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
  - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet[ cushion] manufacturer.
  - 2. Subfloor finishes comply with requirements specified in Division 03 Section "Cast-in-Place Concrete" for slabs receiving carpet.
  - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.
- B. Provide any and all floor substrate sealers and preparations necessary to obtain a warranted installation based upon the flooring manufacturer's requirements. No additional cost or time will be allowed to the contract performance period to complete substrate preparations.

- C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- D. Do not commence with carpet installation until painting and finishing work is complete and ceilings and overhead work, tested, approved and completed
- E. Maintain room temperature at minimum 60 deg F for at least 24 hours prior to installation and relative humidity at approximately that at which the area is to be maintained
- F. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.
- G. Broom and vacuum clean substrates to be covered immediately before installing carpet.

## 3.3 INSTALLATION

- A. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
  - 1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, "Direct Glue-Down Installation."
- B. Provide sufficient lighting, 25 F.C. minimum
- C. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- D. Extend carpet beneath door frame jambs and completely under island cabinets to allow relocation
- E. Do not bridge building expansion joints with carpet.
- F. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- G. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- H. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- I. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.
- J. Comply with carpet cushion manufacturer's written recommendations

## 3.4 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove yarns that protrude from carpet surface.
  - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI 104, Section 16, "Protection of Indoor Installations."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer.

END OF SECTION 09 68 16

## SECTION 09 72 00 - VINYL WALL COVERINGS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

#### Section Includes: Α.

- Vinvl wall covering. 1.
- 2. Vinyl facing for tackable wall panels in 10 11 23.
- Cork tackable wall covering, roll product for complete wall coverage. 3.
- 4. Dry Erase Wall Covering.

#### 1.2 SUBMITTALS

- Product Data: For each type of product indicated. Α.
- Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern Β. placement seams and termination points.
- C. Samples: Full width by 36-inch- long section of wall covering from same print run or dye lot to be used for the Work, with specified applied. Mark top and face of fabric.
- D. D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for wall covering.

#### QUALITY ASSURANCE 1.3

- Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied Α. with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency. 1.
  - Surface-Burning Characteristics: As follows, per ASTM E 84:
    - Flame-Spread Index: 25 or less. a.
    - Smoke-Developed Index: 50 or less. b.

#### 1.4 EXTRA MATERIALS

- Furnish extra materials that match products installed and that are packaged with protective Α. covering for storage and identified with labels describing contents.
  - Wall-Covering Materials: For each type, full-size units equal to 5 percent of amount 1. installed.

#### 1.5 MAINTENANCE

- Furnish extra materials that match products installed and that are packaged with protective Α. covering for storage and identified with labels describing contents.
  - Wall-Covering Materials: For each type, full-size units equal to 5 percent of amount 1. installed.
  - 2. Maintenance Instructions: Provide for each type of product installed.

#### 1.6 WARRANTY

Provide two year defect-free specialty warranty. Warranty period commences on the date of Α. substantial completion.

## PART 2 – PRODUCTS

#### WALL COVERINGS 2.1

- General: Provide rolls of each type of wall covering from same print run or dye lot. Α.
- Vinyl Wall-Covering Standards: Provide mildew-resistant products complying with the following: Β.
  - FS CCC-W-408D and CFFA-W-101-D for Type II, Medium -Duty products. 1.
  - 2. ASTM E84, Type II
- Products: Subject to compliance with requirements, provide the following: C.
  - Basis of Design: DeNovo Wall Covering, Truro 1

- 2. Substitution requests for approved equal per Division 01.
- D. Coordinate first paragraph below with CFFA-W-101-D type.
- E. Total Weight Excluding Coatings: 20 oz/ly (452 gr/sq m).
- F. Width: 52/54 inches (1372 mm).
- G. Retain first paragraph below if vinyl wall covering selected has fabric backing; delete if paper backing. Coordinate backing material below with CFFA-W-101-D type. Verify, with manufacturers, availability of backing used with wall covering selected.
- F. Backing: Osnaburg fabric.
  - 1. Fiber Content: Polycotton
- G. Repeat: Refer to manufacturer for specific pattern repeat.
- H. Finishes: Reference Div 09 Finish Schedule, Div 09 Finish Material Legend for manufacturer, product and color selections.

## 2.2 TACKABLE CORK

Β.

Α.

- A. General: Provide rolls of cork for full wall covering. Fully adhere cork roll to smooth wall substrate. Cover cork with vinyl wall covering.
  - Products: Subject to compliance with requirements, provide the following:
    - 1. Basis of Design: Manton Cork
      - a. Size: 1/4 inch thick roll cork, 4' wide by 8' length. Stagger vertical joints.
      - b. Fully adhere cork to smooth wall substrate.
      - c. Natural cork, self-healing. Cover entire wall area. Reference drawings.
      - d. Cover cork with vinyl wall coverings. Hide all seams.
      - e. Coordinate wood edge trim at all sides. See interior elevations.
    - 2. Substitution requests for approved equal per Division 01.

# 2.3 DRY ERASE WALL COVERINGS

- Products: Subject to compliance with requirements, provide the following:
  - 1. Koroseal Walltalkers "Matte Rite" Dry Erase Wall Covering
    - a. Role Width: 60" Minimum. Wall Covering shall be installed with no seams.
    - b. Length: Full length of wall per finish schedule and interior elevations. Wall covering shall be installed as continuous roll with no vertical seams.
    - c. Install and adhere per manufacturer's instructions.
    - d. Accessories:
      - 1. Marker Tray: Clear satin anodized aluminum tray with aluminum ends. 4 ft length at center of each dry erase wall covering.
      - 2. Trim: Wood trim bottom, top and all sides of wall covering. See interior elevations.

## 2.4 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application. All adhesive products used as a part of the installation shall comply with VOC limits stated in Section 01 81 14.
- B. Primer/Sealer: Mildew resistant, complying with requirements in Division 09 Section "Interior Painting" and recommended in writing by wall-covering manufacturer for intended substrate. If priming and sealing work occurs within the interior of the building, materials shall comply with VOC limits stated in Section 01 81 14.
- C. Seam Tape: As recommended in writing by wall-covering manufacturer.

## PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- B. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

- 1. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
- 2. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- 3. At dry erase vinyl wall coverings, provide smooth level 5 drywall finish full area of white board extents.
- C. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- D. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.
- E. Install wall covering according to manufacturer's written instructions as they pertain to the specified pattern. Ambient room temperature during installation shall be 60 degrees Fahrenheit minimum.
- F. Install wall covering full height and width of areas indicated, install prior to casework and markerboards, to allow full coverage.
- G. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
- H. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.
- I. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.
- J. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- K. Do not install interior vinyl wall covering on any building exterior walls.
- L. Install tackable cork as noted in drawings.
  - 1. Unroll cork and allow time to flatten. Work within clean dry area.
  - 2. Trim cork evenly with sharp utility knife. Multiple passes may be required.
  - 3. Apply adhesive per manufacturer's recommendation. Apply 100% adhesive coverage to wall surface with v-notched trowel. Lightly position cork in place then roll flat across entire cork surface. Use small brad or nail in corners as needed. Fasteners shall not be evident or visible at completion of installation.
  - 4. Cover cork entirely with vinyl wall covering.
  - 5. Coordinate all wall hung equipment with tackable cork. Provide spacers or shims as required for flush equipment installations.

## 3.2 SCHEDULE

A. Finishes: Reference Finish Schedule, Finish Material Legend for manufacturer, product and color selections.

END OF SECTION 09 72 00

## SECTION 09 77 00 - PLASTIC WALL PANELING

PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Section includes:
    - 1. Composite panel reinforced plastic wall paneling and trim accessories.
  - B. Related Sections:
    - 1. Division 06 Section "Rough Carpentry" for wood furring for installing plastic paneling.
    - 2. Division 10 Section "Wall and Door Protection" for corner guards installed over plastic paneling.
- 1.2 SUBMITTALS
  - A. Product Data: For each type of product indicated.
  - B. Submit manufacturers installation instructions
  - C. Samples for Initial Selection: For plastic paneling and trim accessories.
  - D. Samples for Verification: For plastic paneling and trim accessories, in manufacturer's standard sizes.

#### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.
- B. Manufacturer: Company specializing in manufacturing FRP Panels with 3 years documented experience
- C. Installer: Company specializing in installing FRP Panels with 3 years documented experience
- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency. Materials shall comply with a Class "B" Flame Spread Rating.
  - 1. Flame-Spread Index: 26 to 75.
  - 2. Smoke-Developed Index: 450 or less.
- B. Performance Requirements:
  - 1. Resist lateral Impact force of 25 in. lbs. at any point without damage or permanent set. Test Method ASTM D5420.
  - 2. Barcol Hardness: 45 Test Method ASTM D2583.

#### 1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Protect panel material, packaged adhesives, and sealants from temperature cycling and cold temperatures
- C. Provide continuous ventilation and heating facilities to maintain substrate surface and ambient temperature above 60 degrees F, unless required otherwise by manufacturer's instructions
- D. Do not apply adhesive when substrate surface temperature or ambient temperature is below 60 degrees F or relative humidity is above 50 percent
- E. Maintain these conditions 24 hours before, during and after installation of FRP Panels
- F. Provide lighting level of 80 ft candles measured mid-height at substrate surfaces, during installation

#### PART 2 - PRODUCTS

#### 2.1 PLASTIC SHEET PANELING

A. General: Gelcoat-finished, glass-fiber reinforced plastic panels complying with ASTM D 5319.

- 1. Basis-of-Design Product: as indicated in Finish Material Legend for manufacturer, product and color selections. Subject to compliance with those requirements, provide
  - a. FRP: Nudo Allure
  - b. By prior substitution request per Division 01 requirements identical product by one of the following may be acceptable:
- 2. Nominal Thickness: Not less than 0.15 inch
- 3. Surface Finish: As indicated by manufacturer's designations in the Finish Schedule, Finish Materials Designations, two finishes.
- 4. Color: As indicated by manufacturer's designations in the Finish Schedule, Finish Materials Designations, two patterns.

#### 2.2 ACCESSORIES

- A. Aluminum Trim Accessories: Manufacturer's aluminum extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
  - 1. Color: Clear Anodized Aluminum, Match Architect's sample.
- B. Concealed Mounting Splines: Continuous, H-shaped aluminum extrusions designed to fit into grooves routed in edges of factory-laminated panels and to be fastened to substrate.
- C. Adhesive: As recommended by plastic paneling manufacturer.
  - 1. VOC Content: 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Sealant: Single-component, Latex sealant recommended by plastic paneling manufacturer and complying with requirements in Division 07 Section "Joint Sealants."
  - 1. VOC Content: 250> g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify that substrate surfaces are ready to receive work and conform to requirements of the FRP Panel manufacturer
- C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/ft
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Remove wallpaper, vinyl wall covering, loose or soluble paint, and other materials that might interfere with adhesive bond.
- B. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation. Fill cracks and smooth irregularities with filler; sand smooth.
- C. Work of this section will include wall floating, filling, shimming and grinding necessary to provide a suitable substrate for the installation of the fiber reinforced panels. In no case will existing substrate joints be allowed to be visible after installation of the panels. Should installed panels telegraph underlying joints then the conditions will be corrected by contractor's expense.
- D. Clean substrates of substances that could impair bond of adhesive, including oil, grease, dirt, and dust.
- E. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- F. Remove electrical, telephone, and wall plates and covers
- G. Lay out paneling before installing. Locate panel joints where indicated] and to provide equal panels at ends of walls not less than half the width of full panels.
  - 1. Mark plumb lines on substrate at [trim accessory] [panel joint] locations for accurate installation.

- 2. Locate trim accessories and panel joints to allow clearance at panel edges according to manufacturer's written instructions.
- 3. Reference drawings for panel joint locations.
- H. Vacuum clean surfaces free of loose particles

# 3.3 DELIVERY AND STROAGE

A. All materials shall be inspected immediately upon delivery and effects reported. Remove panels from shipping skid and restack on a solid, flat, dry surface. Do not stack on fresh concrete floors or other surfaces that may emit moisture. Lay panels flat. Do not store on edge. Panels should be acclimated at least 24 hours in temperature and humidity conditions approximating the operating environment of the finished room. Damaged or deteriorated materials shall be removed from the premises.

# 3.4 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels horizontally in one piece from floor to height of wainscot, as indicated on Drawings. Horizontal joints not indicated in the drawings are not acceptable, Vertical joints only allowed at maximum panel lengths and corners.
- C. Razor trim edges on flat work table. Do not cut on gypsum board substrate surfaces
- D. Install panels in a full spread of adhesive to eliminate all bubbles or adhesive voids on back side of panels. Visible mechanical fasteners are not acceptable. Panels that bubble or pull out from wall substrate shall be re-installed with proper adhesive coverage.
- E. Install inside and outside corner and cap moldings at all applicable locations. Install trim accessories with adhesive and nails.
- F. Fill grooves in trim accessories with sealant before installing panels and bed inside corner trim in a bead of sealant.
- G. Install wall covering before installation of bases, hardware, or items attached to or spaced slightly from wall surface
- H. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- I. Maintain uniform space between adjacent panels and between panels and floors, ceilings, and fixtures. Fill space with sealant. Joint shall not exceed 3/32 inches wide.
- J. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

## 3.5 ADJUSTING AND CLEANING

- A. Repair damaged and defective work, where possible, to eliminate functional and visual defects; where not possible to repair, replace work. Adjust joinery for uniform appearance.
- B. Clean wall panels of excess adhesive, dust, dirt and other contaminants.
- C. Do not permit work at or near finished wall covered areas

END OF SECTION 09 77 00

# SECTION 09 84 00 - SOUND ABSORBING WALL UNITS

- A. Section includes shop-fabricated, fabric-wrapped panel units tested for acoustical performance, including:
  - 1. Surface Mounted Sound-absorbing wall panels, fabric wrapped.
- B. Related Sections:
  - 1. Division 09 Section "Wall Coverings" for adhesively applied textile wall coverings.

# 1.2 DEFINITIONS

- A. NRC: Noise Reduction Coefficient.
- B. SAA: Sound Absorption Average.

## 1.3 SUBMITTALS

- A. Product Data: For each type of fabric facing, panel edge, core material, and mounting indicated.
- B. Shop Drawings: For sound-absorbing wall units. Include mounting devices and details; details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge and core materials.
  - 1. Include elevations showing panel sizes and direction of fabric weave and pattern matching.
- C. Samples for Initial Selection: For each type of fabric facing from sound-absorbing wall unit manufacturer's full range.
- D. Samples for Verification: For the following products, prepared on Samples of size indicated below:
  - 1. Fabric: Full-width by approximately 36-inch- long sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
  - 2. Panel Edge: 12-inch- long Sample(s) showing each edge profile, corner, and finish.
  - 3. Core Material: 12-inch- square Sample at corner.
  - 4. Mounting Devices: Full-size Samples.
  - 5. Assembled Panels: Approximately 36 by 36 inches including, radius layout and edge conditions, joints and mounting methods.
- E. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Electrical outlets, switches, and thermostats.
  - 2. Items penetrating or covered by sound-absorbing wall units including the following:
    - a. Lighting fixtures.
    - b. Air outlets and inlets.
    - c. Speakers.
    - d. Alarms.
    - e. Sprinklers.
    - f. Access panels.
- F. Product Certificates: For each type of sound-absorbing wall unit, from manufacturer.
- G. Maintenance Data: For sound-absorbing wall units to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal recommendations.
- H. Warranty: Sample of special warranty.
- I. WSSP Submittals:

1. Not Used.

# 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain sound-absorbing wall units from single source from single manufacturer.
- B. Fire-Test-Response Characteristics: Provide sound-absorbing wall units meeting the following as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  - 1. Surface-Burning Characteristics: As determined by testing per ASTM E 84.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.

- 2. Fire Growth Contribution: Meeting acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials, fabrication, and installation.
  - 1. Build mockup of typical wall area as directed by Architect. Include intersection of wall and ceiling, corners, and perimeters.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and sound-absorbing wall unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.
- C. Schedule delivery and stocking of materials after ceiling and wall painting and floor finishing is complete.

#### 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install sound-absorbing wall units until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Lighting: Do not install sound-absorbing wall units until a lighting level of not less than 50 fc is provided on surfaces to receive the units.
- C. Air-Quality Limitations: Protect sound-absorbing wall units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.
- D. Field Measurements: Verify locations of sound-absorbing wall units and actual dimensions of openings and penetrations by field measurements before fabrication.

## 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of sound-absorbing wall units that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to the following:
    - a. Acoustical performance.
    - b. Fabric sagging, distorting, or releasing from panel edge.
    - c. Warping of core.
  - 2. Warranty Period: Two years from date of Substantial Completion.

## 1.8 EXTRA MATERIALS

- A. Furnish extra materials from same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Fabric: For each fabric, color, and pattern installed, provide length equal to 10 percent of amount installed, but no fewer than 10 yards.
  - 2. Mounting Devices: Full-size units equal to 5 percent of amount installed, but no fewer than five devices, including unopened adhesives.

## PART 2 - PRODUCTS

#### 2.1 SOUND-ABSORBING WALL UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Lamvin Acoustical Wall Panel, 1" thick 0.95 NRC Panels. Subject to compliance with requirements, provide product indicated or comparable product by one of the following:

- 1. Quiet Technologies Systems, product QTS ACC-U-Sound.
- 2. Kinetics Noise Control, Inc., product Hardside and High Impact Hardside Panels
- 3. Jasco, Quiet Touch
- 4. Armstrong Sonotrol
- 5. Perdue Acoustics; product LSS OFP
- 6. Wall Technology, Inc.; an Owens Corning company.
- C. General Requirements for Sound-Absorbing Wall Units: Provide sound-absorbing wall panels that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.
- D. Sound-Absorbing Wall Panel: Manufacturer's standard panel construction consisting of facing material laminated to front face, edges, and back edge border of core.
  - 1. Basis-of-Design Product: Lamvin Acoustical Wall Panel, 1" thick 0.95 NRC Panels.
  - 2. Mounting: Back mounted with manufacturer's standard hook-and-loop strips, secured to substrate.
  - 3. Core: Semi-rigid, 6 pcf Certainteed OEM acoustical fiberglass board.
  - 4. Edge Construction: Manufacturer's standard chemically hardened core with no frame.
  - 5. Edge Profile: square (reinfoirced)
  - 6. Corner Detail in Elevation: square (reinforced)
  - 7. Reveals between Panels: reveals as indicated on Drawings.
  - 8. Facing Material: 100% woven polyester, up to four colors selected by Architect from manufacturer's full standard color range.
  - 9. Acoustical Performance: Sound absorption NRC of 0.95 according to ASTM C 423 for mounting according to ASTM E 795.
  - 10. Nominal Overall Panel Thickness: 1 inches.
  - 11. Panel Width: As indicated on Drawings.
  - 12. Panel Height: As indicated on Drawings.
  - 13. Colors: Multiple fabric colors and patterns to be selected from manufacturers standard color range. Reference 09 Finish Material Legend for more information.

## 2.2 MATERIALS

- A. General:
  - 1. Minimum Recycled Content: Provide sound-absorbing wall units with postconsumer recycled content plus one-half of preconsumer recycled content of <Insert number> percent by weight.
  - 2. Regional Materials: Provide sound-absorbing wall units that have been manufactured within 500 miles of Project site.
- B. Core Materials: Manufacturer's standard.
  - 1. Glass-Fiber Board: ASTM C 612, Type standard with manufacturer; nominal density of 6 to 7 lb/cu. ft., unfaced, and dimensionally stable, molded rigid board; and with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
  - 2. Fire-Retardant Formed Plastic: Manufacturer's standard formed plastic with flame-spread index of 25 or less and smoke-developed index of 25 or less according to ASTM E 84.
- C. Facing Material as indicated on Drawings.
- D. Mounting Devices: Concealed on back of unit, recommended by manufacturer to support weight of unit, and as follows:
  - 1. Adhesives: As recommended by sound-absorbing wall unit manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Hook-and-Loop Strips: Manufacturer's standard.
- 2.3 FABRICATION
  - A. General: Use manufacturer's standard construction except as otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

- 1. Glass-Fiber Board Cores: Chemically harden core edges and areas of core where mounting devices are attached.
- B. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.
  - 1. Square Corners: Tailor corners.
  - 2. Radius and Other Nonsquare Corners: Attach facing material so there are no seams or gathering of material.
  - 3. Fabrics with Directional or Repeating Patterns or Directional Weave: Mark fabric top and attach fabric in same direction so pattern or weave matches in adjacent units.
  - Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:
    - 1. Thickness.
    - 2. Edge straightness.
    - 3. Overall length and width.
    - 4. Squareness from corner to corner.
    - 5. Chords, radii, and diameters.

## PART 3 - EXECUTION

C.

## 3.1 EXAMINATION

- A. Examine fabric, fabricated units, substrates, areas, and conditions, for compliance with requirements, installation tolerances, and other conditions affecting performance of sound-absorbing wall units.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. Install sound-absorbing wall units in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B. Comply with sound-absorbing wall unit manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.
- C. Align and level fabric pattern and grain among adjacent unit.

## 3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb and Level: Plus or minus 1/16 inch.
- B. Variation of Panel Joints from Hairline: Not more than 1/16 inch wide.

## 3.4 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION 09 84 00

#### PART 1 - GENERAL

- 1.1 SUMMARY
  - A. Section Includes
    - 1. All surface preparation throughout the project
    - 2. All site-applied painting and clear finish application on the project, including Site, Mechanical, and Electrical areas of work.
    - 3. Surface finish schedule.
    - 4. Metal fabrication finishes.
  - B. Related Sections
    - 1. Mechanical items: Painting of anchors/hangers, piping, mechanical equipment, ductwork, insulation, etc. shall be performed by this section except where specifically stated otherwise in Division 22, or 23. All paint materials and methods, regardless of installer, shall meet the requirements set forth in Section 09 91 00 for Products and Execution. Upon completion of the project, all materials exposed to view shall be painted.
    - 2. Electrical items: Painting of anchors/hangers, piping, mechanical equipment, ductwork, insulation, etc. shall be performed by this section except where specifically stated otherwise in Division 26, 27, or 28. All paint materials and methods, regardless of installer, shall meet the requirements set forth in Section 09 91 00 for Products and Execution. Upon completion of the project, all materials exposed to view shall be painted.

#### 1.2 REFERENCES

- A. ASTM D 16 Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
- B. ASTM D 2016 Test Method for Moisture Content of Wood.
- C. ASTM E 84 Test Method for Surface Burning Characteristics of Building Materials.

#### 1.3 SUBMITTALS

- A. Submit product data under provisions of Division 01.
- B. Provide product data on all finishing products.
- C. Submit three (3) 8"x 10" paint draw downs of each specified paint material in each specified color and sheen
- D. WSSP Submittals: Not Used.

## 1.4 QUALITY ASSURANCE

- A. Qualifications
  - 1. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with three years experience.
  - 2. Applicator: Company specializing in commercial painting and finishing approved by product manufacturer.
- B. Field Samples
  - 1. Provide samples under provisions of Division 01.
  - 2. Before proceeding with paint application, finish one complete typical wall with trim, door frames, doors, etc. of each paint type and color scheme required, clearly indicating selected colors, finish texture, materials and workmanship
  - 2. Provide field sample panel, on at least 100-sq. ft. of surface until required sheen, color and texture are achieved.
  - 3. Locate where directed.
  - 4. Once each scheme has written approval of the Architect and the Owner, sample may remain as part of the Work.
  - 5. If approved, sample area will serve as a minimum standard for workmanship throughout work

- C. Regulatory Requirements
  - 1. Conform to ASTM E 84 for flame/smoke rating requirements for finishes.

# 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division 01.
- B. Store and protect products under provisions of Division 01.
- C. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.
- D. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.
- E. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions.
- F. Take precautionary measures to prevent fire hazards and spontaneous combustion.

## 1.6 PROJECT/SITE CONDITIONS

- A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 50 degrees for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is above 85 percent unless required otherwise by manufacturer's instructions.
- C. Minimum Application Temperatures for Latex Paints: 50 degrees F; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish Finishes: 65 degrees F, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80-ft candles measured mid-height at substrate surface.

## 1.7 SPECIAL WARRANTY

- A. Under provisions of Division 01.
- B. Provide Manufacturer's Standard Material Warranty.

## 1.8 MAINTENANCE

A. Extra Stock: provide NEW (1) gallon of each type and color of paint or coating used—unopened and labeled buckets. Contractor shall remove and dispose of all opened containers, brushes and rollers used during construction. Only unopened new gallons of paint shall remain as extra stock transferred to owner.

## PART 2 - PRODUCTS

Β.

## 2.1 MANUFACTURERS

1.

- A. PAINT, STAIN, AND URETHANE
  - 1. Sherwin-Williams Company
  - 2. Standard Paint LLC
  - 3. Benjamin Moore Paints
  - 4. Rodda Paint
  - HIGH PERFORMANCE COATING EXPOSED EXTERIOR STEEL
    - Basis of Design: Sherwin Williams
      - a. By substitution request: Carboline products equivalent to basis of design
      - b. By substitution request: Tnemec products equivalent to basis of design
- C. HIGH PERFORMANCE COATING Elastomeric Paint
  - 1. Sherwin Williams
- D. ANTI-GRAFFITI COATING Exterior Exposed Cast-in-Place Concrete Walls, Pre-Cast Concrete Walls, Brick and Concrete Masonry Unit Walls
  - 1. Sherwin Williams B97C00150
    - a. Single Component, non-sacrificial, siloxane coating
- E. PAINTED/SEALED CONCRETE FLOORS

- 1. Sherwin Williams Armorseal seal finish system (Solid Color Coating)
- 2. BASF MasterKure seal finish system (Transparent Sealer)
- F. Substitutions: Under provisions of Division 01.

## 2.2 MATERIALS

- A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
- B. Coatings: Good flow and brushing properties; capable of drying or curing free of streaks or sags.
- C. Provide a tint variation between all under coats and the final coat.
- D. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
- E. Refer to schedule at end of Section for surface finishes.
- F. VOC Content of Field-Applied Interior Primers, Paints, Coatings, Stains, and Transparent Finishes: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
  - 1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
  - 2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
  - 3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC content not more than 250 g/L.
  - 4. Floor Coatings: VOC content not more than 100 g/L.
  - 5. Shellacs, Clear: VOC content not more than 730 g/L.
  - 6. Shellacs, Pigmented: VOC content not more than 550 g/L.
  - 7. Clear Wood Finishes, Varnishes: VOC content not more than 350 g/L.
  - 8. Clear Wood Finishes, Lacquers: VOC content not more than 550 g/L.
  - 9. Stains: VOC content not more than 250 g/L.
- G. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop.
  - 1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
  - 2. Restricted Components: Paints and coatings shall not contain any of the following:
    - a. Acrolein.
    - b. Acrylonitrile.
    - c. Antimony.
    - d. Benzene.
    - e. Butyl benzyl phthalate.
    - f. Cadmium.
    - g. Di (2-ethylhexyl) phthalate.
    - h. Di-n-butyl phthalate.
    - i. Di-n-octyl phthalate.
    - j. 1,2-dichlorobenzene.
    - k. Diethyl phthalate.
    - I. Dimethyl phthalate.
    - m. Ethylbenzene.
    - n. Formaldehyde.
    - o. Hexavalent chromium.
    - p. Isophorone.
    - q. Lead.
    - r. Mercury.

- s. Methyl ethyl ketone.
- t. Methyl isobutyl ketone.
- u. Methylene chloride.
- v. Naphthalene.
- w. Toluene (methylbenzene).
- x. 1,1,1-trichloroethane.
- y. Vinyl chloride.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Verify that substrate is 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. 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. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
  - 3. Interior Located Wood: 15 percent, measured in accordance with ASTM D 2016.
  - 4. Concrete Floors: 12 percent.
  - 5. Beginning of installation indicates acceptance of substrate.
- D. Ensure surface temperatures or the surrounding air temperature is above 45 deg F before applying finishes. Minimum application temperatures for latex paints for interior work is 45 degrees F and 50 degrees F for exterior work. Minimum application temperature for varnish and stain finishes is 65 degrees F.
- E. Provide adequate continuous ventilation and sufficient heating facilities to maintain temperatures above 45 degrees F for 24 hours before, during and 48 hours after application of finishes.
- F. Provide minimum 80 foot candles of lighting on surfaces to be finished. No exceptions
- 3.2 PREPARATION
  - A. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing for finishing.
  - B. Correct defects, patch and fill substrate cracks, dents, holes, and other surface inconsistencies to match adjacent surfaces. Clean surfaces which affect work of this Section.
  - C. Shellac and seal marks which may bleed through surface finishes.
  - D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
  - E. Concrete Floors: Schedule to receive clear wear surface, remove contamination, shot blast and prepare according to wear surface manufacturers instructions. Verify required acidalkali balance is achieved. Allow to dry.
  - F. Concrete floors scheduled to receive sealer: Prepare floor according to sealer manufacturer's instructions.
  - G. Gypsum Board Surfaces: Latex fill minor defects. Spot prime defects after repair.
  - H. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
  - I. Concrete Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose paint, mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry. Confirm all surfaces are smooth and structurally sound. All loosely adhering paint, coatings and concrete shall be completely removed by scraping, pressure washing, blasting or other mechanical means. Chalky, oxidized or contaminated surfaces must be washed with Marathon Cleaning Concentrate (MCC) or equal biodegradable cleaner.
    - 1. All cracks greater than hairline shall be routed to 1/16" and caulked with NP-1 urethane sealant.

- J. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.
- L. Steel Doors: Remove surface contamination and oils and wash with solvent. Seal top and bottom edges with primer.
- 3.3 APPLICATION
  - A. Apply products in accordance with manufacturer's instructions.
  - B. Do not apply finishes to surfaces that are not dry.
  - C. Apply each coat to uniform finish, without streaking, telegraphing of drywall joints or brush marks.
  - D. Apply finish coats of paint slightly darker than preceding prime coat unless otherwise approved.
  - E. Sand lightly between coats to achieve required finish.
  - F. Allow applied coat to dry before next coat is applied.
  - G. Back-roll all spray applied primer and finish coats on gypsum board or plaster finishes
  - H. Prime back surfaces of interior and exterior woodwork with primer paint.
  - I. Seal concrete floors with polyurethane sealer.
  - J. Elastomeric Paint:
    - a. Application Primer, apply per manufacturer's full recommendations.
    - b. Application Topcoat, apply per manufacturer's full recommendations.
  - K. Paint all roof top items, including but not limited to, ducts, pipe vents, roof hatches smoke vents, and ladders.
  - L. Paint all Mechanical and Electrical Equipment exposed to public view, this shall include but not be limited to, ducts, conduits, fitting, suspension/anchors and boxes. Protect interior reflector surfaces of light fixtures from any paint application or overspray.
  - M. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.
  - N. Field finish surfaces not factory pre-finished. <u>Extend finish all the way behind all casework</u>, <u>chalkboards</u>, <u>markerboards</u>, and <u>tackboards to allow relocation</u>.
  - O. Protection
    - 1. Adequately protect other surfaces from paint and damage. Repair damage as a result of inadequate or unsuitable protection.
    - 2. Furnish sufficient drop cloths, shields and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.
    - 3. Place cotton waste, cloths and materials which may constitute a fire hazard in closed metal containers and remove daily from site.
    - 4. Remove electrical plates, surface hardware, mechanical equipment, fittings and fastenings, prior to painting operations. These items are to be carefully stored, cleaned and replaced on completion of work in each area. Do not use solvent to clean hardware that may remove permanent lacquer finish.
  - P. Mechanical and Electrical Equipment
    - 1. Refer to mechanical and electrical sections with respect to painting and finishing requirements, color coding, identification banding of equipment, ducting, piping and conduit.
    - 2. Remove grilles, covers and access panels for mechanical and electrical systems from location, sand and paint separately.
    - 3. Finish paint primed and existing field painted equipment to color selected.
    - 4. Prime and paint insulated and bare pipes, conduits, boxes, insulated and bare ducts, hangers, brackets, collars and supports, except where items are plated or covered with a pre-finished coating.
- 3.4 CLEANING
  - A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.
  - B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.

- C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.
- 3.5 PROTECTION
  - Protect elements surrounding the work of this Section from damage or disfiguration. Α.
  - Β. Repair damage to other surfaces caused by work of this Section.
  - C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.
  - D. Remove empty paint containers from site.
- 3.9 SCHEDULES
  - Shop-Primed Items for Site Finishing. Α.
    - Standard steel doors and frames (Division 08): All exposed surfaces, tops and 1. bottoms of doors.
  - Β. Exterior Surfaces
    - 1. Pavement Markings: All striping and signage shall be in accordance with the City Standard Specifications and the latest Manual on Uniform Traffic Control Devices (MUTCD):
      - a. Two coat chlorinated rubber paint. b.
      - Standard color shall be white.
      - Handicapped symbols shall be painted standard blue. C.
      - No parking fire zone shall be painted yellow. d.
    - Exposed Exterior Steel and field painted metals; including existing standing seam 2. roofing, parapet cap flashing, exposed steel brackets, and other similar items (all exterior steel or metal on project unless noted otherwise):
      - Thoroughly remove all existing deteriorated finishes and clean surfaces а. completely. Reference Examination and Preparation sections above, and observe all of the paint manufacturer's recommendations.
      - Primer: Sherwin Williams Pro-Cryl Primer, applied at 3.0 mil dry film b. thickness.
      - Intermediate Coat: Sherwin Williams Sher-Cryl HPA, applied at 3.0 -4.0 mil C. thickness.
      - Finish Coat: Sherwin Williams Sher-Cryl HPA, applied at 3.0 -4.0 mil d. thickness.
      - Approved substitution: Carboline or Tnemec system by approved e. substitution in accordance with Division 01 procedures.
    - 3. Steel Shop Primed (exterior hollow metal doors and frames only):
      - Touch up with primer per TTP-645A specifications. a.
      - Two Coats enamel, gloss, 3.0 mil gloss per TTP-37D specifications. b.
    - Exposed Concrete and Concrete Masonry Units Surfaces to receive clear finish 4. (Clear Masonry Sealer and Graffiti Protection). Integrally colored masonry units as indicated in the drawings and specifications-two coats total up to 9'-4" in height above finish floor.
      - One coat Masonry Sealer, clear finish, 2.0 dry thickness, Professional a. Products of Kansas, PWS-15. Two coats where Graffiti protective coat not installed.
      - One coat non-sacrificial barrier coating, SW B97C00150, clear finish, 9 mil b. min. drv thickness
    - 5. Pre-cast Concrete and Concrete Masonry Unit to receive opague paint finish (Opague Painted Finish) as indicated in the drawings.
      - Paint Finish Loxon Exterior Acrylic Masonry Primer A24W300. Apply at 8 a. mils wet / 3.2 mils dry.
      - Paint Finish ConFlex XL Smooth Elastomeric High Build Coating A5-400 b. Series – Two Coat System. 13.0 – 16.0 mils wet / 6.0 – 7.5 mils dry.
    - Exterior exposed wood based or similar trim, composite trim, siding and panel 6. products:

- a. Patch and fill all surface cracks, holes, and irregularities with paintable latex caulking and filling compound (caulking shall be guaranteed for 30 year working life).
- b. One coat Primer: Exterior primer for acrylic enamels, manufacturer's standard for exterior siding application.
- c. Two coats Exterior semigloss acrylic enamel. Equal to Columbia Chem-Clad #05059WB, 3.0 mils minimum, total of two coats.
- 7. Clear Finished Exposed Composite Wood Members:
  - a. One coat stain. Penetrating alkyd oil, wiping type, color selected by Architect.
  - b. One coat: Sikkens Cetol 1 base coat, applied according to manufacturers requirements.
  - c. Two coats Sikkens Cetol 23 top coats, applied according to manufacturers requirements.
- C. Interior Surfaces
  - 1. Steel Primed:
    - a. Touch-up with original primer.
    - b. Paint Finish One coat acrylic primer. 1.5 mil min.
    - c. Paint Finish Two coats Alkyd (Pro Mar 200) semi-gloss finish. 3 mil min
  - 2. Steel Galvanized:
    - a. One coat zinc chromate primer, 2.0 mil, per TTP-645A specifications.
    - b. Paint Finish One coat acrylic primer. 1.5 mil min.
    - c. Paint Finish Two coats Alkyd (Pro Mar 200) semi-gloss finish. 3 mil min
  - 3. Gypsum Board:
    - a. Sponge raw drywall tape joints and then apply one coat acrylic latex primer sealer with a vapor transmission rating less than one per TTP-1975 specifications, apply before final gypsum board texture coat.
    - b. One coat acrylic latex primer sealer with a vapor transmission rating less than one per TTP-1975 specifications, apply after final gypsum board texture coat.
    - c. Two coats acrylic latex enamel, semi-gloss sheen, 3.0 mil total of two coats per TTP-1511B specifications.
  - 4. Gypsum Board at toilet rooms and wet areas:
    - a. Sponge raw drywall tape joints and then apply one coat acrylic latex primer sealer with a vapor transmission rating less than one per TTP-1975 specifications, apply before final gypsum board texture coat.
    - b. One coat acrylic latex primer sealer with a vapor transmission rating less than one per TTP-1975 specifications, apply after final gypsum board texture coat.
    - c. Two coats epoxy enamel, semi-gloss sheen 3.0 mil.
  - 5. Concrete Block:
    - a. Paint Finish-one coat alkali resistant acrylic primer. 2.5 mil min
    - b Paint Finish-one coat ("Polymide") acrylic-epoxy block filler. 1.5 mil min
    - c. Paint Finish- two coats semi-gloss (high solids) "Aquapon" Polymide- epoxy coating. 3 mil min
  - 6. Concrete:
    - a. Paint Finish-one coat alkali resistant acrylic primer. 2.5 mil min
    - b Paint Finish-one coat ("Polymide") acrylic-epoxy block filler. 1.5 mil min
    - c. Paint Finish- two coats semi-gloss (high solids) "Aquapon" Polymide- epoxy coating. 3 mil min
  - 7. Concrete Floors (PFS Solid Coating Floor Sealer):
    - a. Paint Finish-one coat Sherwin Williams Armorseal 33 Primer. 1 mil min
    - b Paint Finish-two coats Sherwin Williams Armorseal 1000 HS Epoxy color coat; 1.5 mil min. each coat
    - c. Clear Floor Finish- Sherwin Williams Armorseal 1000 HS Epoxy clear topping coat. 3 mil min.

- 9. Concrete Panel Floors Mezzanine (PFS Solid Coating Floor Sealer):
  - a. Sherwin Williams SherCrete Flexible Concrete Waterproofer
  - b. Two coats flat finish. 10-12 wet mils each coat.
  - c. Provide integral base by extending coating 4" up all walls in Mezzanine.
  - d. Seal all floor penetrations prior to application. Finished installation shall provide a watertight surface.
- 10. Concrete Polished/Honed Floors (Sealed Concrete 03 35 60):
  - a. Finish-Two coats minimum as needed for new concrete: BASF MasterKure CC 300 SB; 30% solids, high-gloss finish.
- 9. Cementitious Backing Board Exposed:
  - a. One coat acrylic elastomeric primer, 4 mil, per TT-C-555B specifications.
  - b. Two coats acrylic elastomeric emulsion, 10 mil ea. per TT-C-555B.
- D. Colors Reference Finish Schedule and Finish Materials Designations.

END OF SECTION 09 91 00