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PROJECT MANUAL

**VOLUME 1 OF 2
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Howard Elementary School Building & Site Reconciled Set

Eugene School District 4j

700 Howard Ave
Eugene, OR 97404

Date: October 28, 2014

Owner: Eugene School District 4j

CIP#: 410-213-001

Architect: PIVOT Architecture, PC
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Architect's Project: 1336

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PROJECT TITLE PAGE**

PROJECT INFORMATION

PROJECT NAME

Howard Elementary School, Building & Site

DATE OF ISSUE

September 23, 2014

PROJECT OWNER

Eugene School District 4j

CIP NUMBER

410-213-001

ARCHITECT'S PROJECT NUMBER

1336

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END OF LIST OF DRAWINGS

**DOCUMENT 00 1113
INVITATION TO BID**

Sealed bids will be received by Kathi Hernandez, Facilities Management Assistant, for the **construction of a replacement Howard Elementary School on Tuesday, October 28, 2014** until the Deadline for Bid Submission at 2:00 pm, at the Eugene School District 4J Facilities Management Office, 715 West Fourth Avenue, Eugene, Oregon 97402. The Bids will be opened publicly and read aloud immediately after the deadline for submission of bids. Late Bids will not be considered. **Briefly, the work is described as construction of a new two story school, approximately 85,000 sf with associated site development.**

Beginning **September 23, 2014**, Prime Bidder, Sub-bidders, and Suppliers may obtain bidding documents at the following hyperlink: <http://www.4j.lane.edu/bids/>. Hard copies are not provided by the School District. It is the responsibility of all Prime Bidders, Sub-bidders, and Suppliers to obtain Bidding Documents and all Addenda from the hyperlink.

Bidders and Suppliers may also obtain bidding documents from Central Print and Reprographic Services, 45 West 5th Avenue, Eugene, OR by paying the cost of reproduction. It is the responsibility of those obtaining bidding Documents in this manner to obtain any and all addenda from the hyperlink or the Plan Centers.

Bidding Documents may be examined at the following locations:

Eugene Builder's Exchange, 2460 W. 11th, Eugene, OR 97402
Central Oregon Builders Exchange, 1902 NE 4th Street, Bend, OR 97701
McGraw Hill Construction, 3461 NW Yeon Ave. Portland, OR 97210
Daily Journal of Commerce Plan Center, 921 S.W. Washington St., Ste 210, Portland, OR 97205-2810
Douglas County Plan Center, 3076 NE Diamond Lake Blvd, Roseburg, OR 97470
Oregon Contractor Plan Center, 5468 SE International Way, Milwaukee, OR 97222
Reed Construction Data, 30 Technology Parkway South, Ste 500, Norcross, GA 90092
Salem Contractor's Exchange, 2256 Judson Street SE, Salem, OR 97309
Willamette Valley Bid Center, 33862 SE Eastgate Circle, Corvallis, OR 97333
Or, the office of PIVOT Architecture, 44 W Broadway, Suite 300, Eugene, OR, 97401

A **non-mandatory** pre-bid conference and walk-through has been scheduled for **September 30, 2014, at 2:00 pm**. The location of the conference will be at the Project Site – **Howard Elementary School, 700 Howard Ave, Eugene, OR 97404. The meeting will begin in the existing school Cafeteria.** Statements made by the District's representatives at the conference are not binding upon the District unless confirmed by Written Addendum. Pre-qualification of bidders is not required.

Each Bid must be submitted on the prescribed form and accompanied by a Surety Bond, Cashiers Check, or Certified Check, executed in favor of Eugene School District 4J, in the amount not less than ten percent (10%) of the total bid, based upon the total bid amount for those items bid upon.

Either with the Bid or within two working hours of the Deadline for Submission of Bids, bidders shall submit, on the form provided, information for first-tier subcontractors furnishing labor or labor and materials, as provided in ORS 279C.370. Bids for which disclosure forms are required, but not submitted, will be rejected.

No bid for a construction contract will be received or considered unless the Bidder is registered with the Construction Contractors Board or licensed by the State Landscape Contractors Board at the time the Bid is made, as required by OAR 137-049-0230. A license to work with asbestos-containing materials under ORS 468A.720 is not required for this project.

For every bid \$100,000 or greater, all Contractors and Subcontractors shall have a public works bond, in the amount of \$30,000, filed with the Construction Contractors' Board (CCB), before starting work on the project, unless exempt. A copy of the Contractor' BOLI Public Works Bond shall be provided with the executed contract documents.

Each Bid shall contain a statement indicating whether the Bidder is a "resident bidder", as defined in ORS 279A.120.

Each Bid shall contain a statement that the "Contractor agrees to be bound by and will comply with the provisions of ORS 279C.800 through 279C.870 regarding payment of Prevailing Wages".

Contractor shall certify nondiscrimination in obtaining required subcontractors, in accordance with ORS 279A.110(4).

School District 4J reserves the right to (1) reject any or all Bids not in compliance with all public bidding procedures and requirements, (2) postpone award of the Contract for a period not to exceed sixty (60) days from the date of bid opening, (3) waive informalities in the Bids, and (4) select the Bid which appears to be in the best interest of the District.

Date: **September 23, 2014**

By: Kathi Hernandez, Facilities Management Assistant

Published: Register Guard, Daily Journal of Commerce, ORPIN (Oregon Procurement Information Network)

Posted: School District 4J Administration Office
200 North Monroe
Eugene, OR 97403

SECTION 00 2113
INSTRUCTIONS TO BIDDERS

PART 1 GENERAL

STANDARD FORM

Instructions to Bidders - AIA Document A701, 1997 Edition, immediately following are part of this Project Manual.

END OF DOCUMENT 00 21 13



AIA[®] Document A701[™] – 1997

Instructions to Bidders

for the following PROJECT:

(Name and location or address)

THE OWNER:

(Name, legal status and address)

THE ARCHITECT:

(Name, legal status and address)

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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.

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 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.

§ 1.3 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.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 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.

§ 1.6 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.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 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.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. 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 missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 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 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 SUBSTITUTIONS

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

§ 4.2 BID SECURITY

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 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 bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS

§ 4.3.1 All copies of the Bid, the bid security, if any, 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 receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the 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.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a 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. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 REJECTION OF BIDS

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 ACCEPTANCE OF BID (AWARD)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified 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 informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 CONTRACTOR'S QUALIFICATION STATEMENT

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 OWNER'S FINANCIAL CAPABILITY

The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 SUBMITTALS

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or 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 the Bidder's option, (1)

withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and 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 Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

**SECTION 00 2213
SUPPLEMENTARY INSTRUCTIONS TO BIDDERS**

PART 1 GENERAL

The following Supplementary Instructions to Bidders modify, change from or add to AIA Document A701 Instruction To Bidders, 1997 Edition. Where any Article of the Instructions to Bidders is modified or any paragraph, subparagraph, or clause thereof is modified or deleted by these Supplementary Instructions to Bidders, the unaltered provisions of that Article, paragraph, subparagraph, or clause shall remain in effect.

1.1 ARTICLE 2 BIDDER'S REPRESENTATIONS

A. Add the following subparagraphs to 2.1.3:

2.1.3.1 Bidders are required to attend any mandatory pre-bid conferences or tours as stated in the Advertisement for Bids. Bidders not attending this pre-bid conference and tour shall be disqualified from bidding. Bidders will be required to sign in at the project site prior to the conference or tour.

2.1.3.2 Bidders are encouraged to visit the site(s) to become familiar with existing conditions. The Owner is not responsible and shall not bear financial burden for oversights made by the Bidder for failure to inspect sites prior to submitting a bid.

2.1.3.3 In all cases, persons wishing to examine the area of work must sign in at the school office prior to visiting the work area. Prior to leaving the school, sign-out at the office is required.

2.1.3.4 If access is required at times when the school office is not staffed, contact the Facilities Office, 541-790-7417, for assistance.

B. Add the following paragraph 2.1.5:

2.1.5 The Bidder certifies by signing the Bid that the Bidder has a drug-testing program in place for its employees that includes, at a minimum, the following:

- .1 A written employee drug-testing program,
- .2 Required drug testing for all new Subject Employees, or alternatively, requiring testing of Subject Employees every six months on a random selection basis,
- .3 Required testing of a Subject Employee when the Contractor has reasonable cause to believe the Subject Employee is under the influence of drugs, and
- .4 Required testing of a Subject Employee when the Subject Employee is involved in: (I) an incident causing an injury requiring treatment by a physician, or (ii) an incident resulting in damage to property or equipment.

A drug-testing program that meets the above requirements will be deemed a "Qualifying Employee Drug-testing Program". For purposes of this rule an employee is a "Subject Employee" only if that employee will be working on the Project job site; and

That if awarded the Public Improvement Contract, the Bidder will execute a contract in which the Contractor shall represent and warrant to the District that the Qualifying Employee Drug-testing Program is in place at the time of contract execution and will continue in full force and effect for the duration of the Public Improvement Contract; and that the Contract will condition the Agency's performance obligation upon the Contractor's compliance with this representation and warranty; and

That the Public Improvement Contract shall contain Contractor's covenant requiring each subcontractor providing labor for the Project to:

- .1 Demonstrate to the Contractor that it has a Qualifying Employee Drug-testing Program for the subcontractor's Subject Employees, and represent and warrant to the Contractor that the Qualifying Employee Drug-testing Program is in place at the time of subcontract execution and will continue in full force and effect for the duration of the subcontract; or
- .2 Require the subcontractor's Subject Employees to participate in the Contractor's Qualifying Employee Drug-testing Program for the duration of the subcontract.

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS – DOCUMENT 00 22 13

1.2 ARTICLE 3 BIDDING DOCUMENTS

A. 3.3 SUBSTITUTIONS

1. Add the following:

3.3.2.1 All requests for approval must be submitted in duplicate on "Substitution Request Form". Include a self-addressed stamped envelope. Requests received by Architect less than ten (10) days prior to bid will not be considered.

B. 3.4 ADDENDA

1. Delete paragraph 3.4.1 and substitute the following:

3.4.1 Addenda will be issued to plan centers listed in the Advertisement for Bids and all firms listed on the Planholder List.

1.3 ARTICLE 4 BIDDING PROCEDURES

A. 4.1 PREPARATION OF BIDS

1. Add the following Paragraphs:

4.1.8 Bidders shall certify to non-collusion practices on the form included as part of the Bid Form, to be submitted with the Bid Form.

.1 A Non-Collusion Affidavit is required for any contract awarded pursuant to the bid. According to the Oregon Public Contracts and Purchasing Laws, a public contracting agency may reject any or all bids upon a finding of the agency that it is in the public interest to do so (ORS 279C.395). This agency finds that it is in the public interest to require the completion of this affidavit by potential contractors.

.2 The Non-Collusion Affidavit must be executed by the member, officer or employee of the bidder who makes the final decision on prices and the amount quoted in the bid.

.3 Bid rigging and other efforts to restrain competition, and the making of false sworn statements in connection with the submission of bids are unlawful and may be subject to criminal prosecution. The person who signs the Affidavit should examine it carefully before signing and assure himself or herself that each statement is true and accurate, making diligent inquiry, as necessary, of all other persons employed by or associated with the bidder with responsibilities for the preparation approval or submission of the bid.

.4 In the case of a bid submitted by a joint venture, each party to the venture must be identified in the bid documents, and an Affidavit must be submitted separately on behalf of each party.

.5 The term "complementary bid" as used in the Affidavit has the meaning commonly associated with the term in the bidding process, and includes the knowing submission of bids higher than the bid of another firm, any intentionally high or noncompetitive bid, and any other form of bid submitted for the purpose of giving a false appearance of competition.

.6 Failure to file an Affidavit in compliance with these instructions will result in disqualification of the bid.

4.1.9 Bidders shall certify to non-discrimination in employment practices on the form, included as part of the Bid Form, to be submitted with the Bid Form. By submitting its bid, the Bidder certifies conformance to the applicable federal acts, executive orders, and Oregon statutes and regulations concerning affirmative action toward equal employment opportunities. All information and reports required by the federal or Oregon state governments having responsibility for the enforcement of such laws shall be supplied to the Owner in compliance with such acts, regulation, and orders.

4.1.10 Bidder shall indicate, on the Bid Form where provided, the bidder's status as a "resident" or "non-resident" in accordance with ORS 279C.365 and ORS 279A.120.

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS – DOCUMENT 00 22 13

4.1.11 First-Tier Subcontractor Disclosure:

.1 Within two working hours after the date and time of the deadline when the bids are due, a Bidder shall submit to the District a disclosure of the first-tier subcontractors that will be furnishing labor or will be furnishing labor and materials in connection with the public improvement; and will have a contract value that is equal to or greater than 5% of the project bid or \$15,000, whichever is greater, or \$350,000, regardless of the percentage of the total project bid.

.2 The disclosure of first-tier subcontractors shall include the name of each subcontractor, the category of work that the subcontractor would be performing, and the dollar value of each subcontract.

.3 The first-tier subcontractor disclosure applies only to public improvements with a contract value of more than \$100,000.

.4 The District will consider the bid of any contractor that does not submit a required subcontractor disclosure to the District to be a non-responsive bid. A non-responsive Bid will not be considered for Award.

.5 Contractor shall certify that all subcontractors performing Work are registered with the Construction Contractors Board or licensed by the State Landscape Contractors Board in accordance with ORS 701.035 to 701.055 before the subcontractors commence work under the Contract.

B. 4.2 BID SECURITY

1. Delete paragraphs 4.2.2 and 4.2.3 and substitute the following:

4.2.2 Each Bid shall be accompanied by a surety bond, cashiers check, or certified check, executed in favor of Eugene School District 4J, in the amount not less than ten percent (10%) of the total bid, based upon the total bid amount for those items bid upon. Should the Bidder refuse to enter into such Contract or fail to furnish Performance and Labor and Materials Payment Bonds and Certificates of Insurance as required by the Supplementary Conditions within ten (10) working days after contract forms are provided to the Bidder, the amount of the Bid Security may be forfeited to the Owner as liquidated damages, not as a penalty.

.1 The Surety Bond shall be written by a Bonding Company authorized and licensed by the Oregon Insurance Commissioner. The bonding company must be listed on the most current US Government Treasury List, Department Circular 570, or approved PRIOR TO BID SUBMISSION by the Eugene School District 4J's Risk Manager. The Bond shall be on a AIA Document A310, most current edition. The Attorney-in-Fact who executes the Bond on behalf of the Surety shall affix to the Bond, a certified copy of a power of attorney.

.2 The Owner will have the right to retain the Bid Security of Bidders until either; a) the Contract has been executed and Bonds have been furnished, or b) the specified time has elapsed so that Bids may be withdrawn, or c) all Bids have been rejected.

C. 4.4 MODIFICATION OR WITHDRAWAL OF BID

1. Delete paragraph 4.4.1 and substitute the following:

4.4.1 A Bid may not be withdrawn or canceled by the Bidder following the time and date designated for the receipt of bids to the expiration of a 60 day period. The Bid for that sixty days is irrevocable and each Bidder so agrees in submitting a Bid.

1.4 ARTICLE 6 POST-BID INFORMATION

A. Delete Paragraph 6.1.

B. Modify paragraph 6.3.1 as follows:

In the first sentence delete the phrase "as soon as practicable" and add "within 48 hours."

C. Add the following:

6.3.1.4 Where asbestos abatement is required, Contractor or appropriate subcontractor shall be licensed by the Department of Environmental Quality to perform "asbestos abatement work", per OAR 340-248-0120,

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS – DOCUMENT 00 22 13

Adopted 1/25/90, and meet requirements of AHERA as specified in the Federal Register, 40 CFR part 763. Bidder shall submit evidence of licensing to Owner.

1.5 ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

A. 7.1 BOND REQUIREMENTS

1. Delete paragraphs 7.1.1, 7.1.2 and 7.1.3 and add the following:

7.1.1 Unless otherwise stated in the solicitation document, prior to execution of the Agreement, the successful Bidder shall furnish a separate Performance Bond and a Labor Bond and Materials Payment Bond that in all respects conform to the requirements of ORS 279C.380 covering faithful performance of the Contract, and the payment of all obligations arising thereunder, each in an amount equal to one hundred percent (100%) of the Contract sum. The duration of the performance bond shall match the length of the project warranty.

7.1.2 Bonds shall be submitted on AIA Document A312, latest edition.

7.1.3 The surety issuing such bonds shall be duly authorized and licensed to issue bonds in the State of Oregon. The bonds shall be executed by an attorney-in-fact, principal or other authorized representative for the surety company, showing the Oregon agent for service, and bears the seal of the surety company. Where the bond is executed by a person outside the state of Oregon, his authority to execute bonds shall be shown. The Bonds shall be fully executed, payable to the Owner.

7.1.4 The cost of furnishing such bonds shall be included in the Bid.

B. BOLI Public Works Bond:

1. Add the following:

Pursuant to ORS 279C.836, for any contract awarded where the contract price is \$100,000.00 or greater, the Contractor and every subcontractor shall have a Public Works bond filed with the Construction Contractors Board before starting work on the project. This bond is in addition to performance bond and payment bond requirements. A copy of the Contractor's BOLI Public Works Bond shall be provided with the executed contract.

1.2 TIME OF DELIVERY AND FORM OF BONDS

A. Delete paragraph 7.2.1 and substitute the following:

7.2.1 The successful Bidder will be provided with contract forms through the Architect. These forms shall be executed and delivered to the Owner, along with Performance Bond and Labor and Material Payment Bond, within ten (10) days after receiving forms.

B. Add the following article:

ARTICLE 9 MISCELLANEOUS PROVISIONS

9.1 ADMINISTRATIVE RULES

All bidders are required to comply with the provisions of Oregon Revised Statutes and 4J Board Policy. Attention is directed to ORS 244, Government Ethics; ORS 279A and 279C, Public Contracting Code; Oregon Administrative Rules, Chapter 137, Divisions 46, 48 and 49; and 4J Board Policy DJC.

9.2 PROTEST OF BID

Protests of bid specifications or contract terms shall be presented to the Owner in writing five (5) calendar days prior to bid opening. Such protest or request for change shall include the reason for protest or request, and any proposed changes to specifications or terms. No protest against award because of the content of bid specifications or contract terms shall be considered after the deadline established for submitting such protest.

9.3 PROTEST OF AWARD

Any actual bidder or proposer who is adversely affected by the Owner's notice of award of the contract to another bidder or proposer on the same solicitation shall have seventy two (72) hours from the notice of award to submit to the Owner, a written protest of the notice of award. In order to be an adversely affected or aggrieved bidder or proposer with a right to submit a written protest, a bidder or proposer must itself claim to

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS – DOCUMENT 00 22 13

be eligible for award of the contract as the lowest responsible bidder or best proposer and must be next in line for award.

9.4 FINAL AWARD

The written notice of award of the contract shall constitute a final decision of the Owner to award the contract if no written protest of the notice of award is filed with the Owner within the designated time.

END OF DOCUMENT 00 22 13

SECTION 00 3100
AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 EXISTING REPORTS AND SURVEYS

A. SUBSURFACE INVESTIGATION REPORT

1. A copy of a geotechnical report with respect to the building site is included with this document:
 - a. Title: Geotechnical Investigation
 - b. Date: July 16, 2014
 - c. Prepared by:
 - 1) Foundation Engineering, Inc.
 - 2) 820 NW Cornell Avenue, Corvallis, OR 97330-4517
 - 3) Phone: 541/757-7645, Fax: 541/ 757-7650
 - d. Note: This document is described as a Draft because it also applies to the future New Howard Elementary School project, and the recommendations for the building foundation site prep requirements have not been confirmed yet.
2. A Peer Review of the Seismic Hazard Study which is a part of the Geotechnical Investigation has been completed as required by code. A copy of the Peer Review has been provided to the City of Eugene Building Division. Copies may be obtained from the Architect upon request. The Peer Review was prepared by Branch Engineering and is dated July 15, 2014.
3. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect.
4. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in the Contract Documents.
5. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.
6. The Owner does not warrant the correctness of the subsurface investigation report of any interpretation, deduction, or conclusion given in the report relative to subsoil conditions.

B. TOPOGRAPHIC SURVEY

1. A copy of a topographic survey with respect to the project site is included with this document:
 - a. Title: Sheet G021 - West Survey, and Sheet G022 - East Survey
 - b. Date: 09.10.2013
 - c. Prepared by:
 - 1) Balzhiser and Hubbard Engineering
 - 2) P.O. Box 10347, Eugene, OR 97440
 - 3) Phone: 541/686-8478, Fax: 541/345-5303
2. After completion of the topographic survey, earthwork was completed on the site including excavation, grading, and partial demolition. A survey of the completed earthwork is not available at the time of bidding but will be provided to the contractor prior to the start of construction.
3. This survey identifies grade elevations prepared primarily for the use of Architect in establishing new grades and identifying natural water shed.
4. The survey shall not be construed as a requirement of this Contract, unless specifically referenced in the Contract Documents.
5. The Owner does not warrant the correctness of the topographic survey or any interpretation, deduction, or conclusion given relative to the information contained therein.
6. This survey identifies conditions of existing construction prepared primarily for the use of the Architect in establishing the extent of the new versus existing work.

7. The existence and location of underground and other utilities and construction indicated as existing are not guaranteed.
8. Verify all information shown.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



Geotechnical Investigation

Howard Elementary School

Eugene, Oregon

Prepared for:

**Lane County School District 4J
Eugene, Oregon**

July 16, 2014

*Professional
Geotechnical
Services*

Foundation Engineering, Inc.



Ben Brantley, Manager
Capital Improvement Program
Eugene Public Schools
Lane County School District 4J
715 West 4th Avenue
Eugene, Oregon 97402

July 16, 2014

**Howard Elementary School
Geotechnical Investigation and Seismic Hazard Study
Eugene, Oregon**

Project 2131078

Dear Mr. Brantley:

We have completed the requested geotechnical investigation for the replacement of Howard Elementary School in Eugene, Oregon. Our report includes a description of our work, a discussion of site and subsurface conditions, a summary of laboratory and field testing and a discussion of key geotechnical issues pertaining to the proposed project. Recommendations for site preparation, foundation design and construction, and pavements are also provided. Our report also includes a site-specific seismic hazard study that is intended to meet current Oregon Structural Specialty Code (OSSC) requirements.

It has been a pleasure assisting you with this phase of your project. Please do not hesitate to contact us if you have any questions or if you require further assistance.

Sincerely,

FOUNDATION ENGINEERING, INC.

Matthew D. Mason
Geotechnical staff

MDM/JKM/zc
enclosure

James K. Maitland, P.E., G.E.
Principal



**GEOTECHNICAL INVESTIGATION AND SEISMIC HAZARD STUDY
HOWARD ELEMENTARY SCHOOL
EUGENE, OREGON**

BACKGROUND

Lane County School District 4J plans to replace Howard Elementary School located at 700 Howard Avenue in Eugene, Oregon. The location is shown on the Vicinity Map (Figure 1A, Appendix A). Conceptual site plans indicate the replacement facility will include a new, two-story classroom building and separate gym/cafeteria structure with an estimated total plan area of $\pm 79,700$ SF. The project will also include play fields and a synthetic turf field (to be built south of Kelly Middle School). The existing school building will be demolished and replaced by paved bus and parent drop-off lanes and a parking lot. A site layout with the existing and proposed facilities is shown on Figure 2A (Appendix A).

PIVOT Architecture (PIVOT) and DOWA-IBI Group Architects, Inc. are the project architects. Balzhiser & Hubbard Engineers (BHE) is the civil engineering consultant. Hohbach-Lewin, Inc. (HBI) is the structural consultant. Foundation Engineering, Inc. (FEI) was retained by the school district as the geotechnical consultant. Our scope of work was outlined in a proposal dated October 31, 2013, and authorized by a contract dated November 18, 2013.

LOCAL GEOLOGY

Detailed discussions of the regional geology, tectonic setting, local faulting and historical seismicity are presented in the Seismic Hazard Study (Appendix D). An abbreviated discussion of local geology is provided below.

Eugene is situated within the southern extent of the Willamette Valley, which is bordered by the Western Cascades to the east and the Coast Range to the west. The Willamette and McKenzie Rivers have deposited a mantle of alluvial material consisting of clayey fan-delta alluvial deposits that typically underlie the city (Madin and Murray, 2006).

Local geological mapping indicates the site is underlain at an unknown depth by fan-delta alluvial deposits (Madin and Murray, 2006; McClaughry et al., 2010). These deposits consist of silt to boulder-size material, with primarily sandy gravel covering most of the area. With depth, the alluvial deposits are underlain by marine, tuffaceous sandstone and siltstone of the Eugene Formation (Yeats et al., 1996; Madin and Murray, 2006).

Consistent with the mapped geology, our site investigation encountered primarily stiff clayey silt overlying dense sandy gravel. Two nearby borings were reviewed including ES-14, $\pm 1/2$ mile to the north, at North Eugene High School, and SB-1 at Kelly Middle School. Both borings encountered similar conditions relative to our explorations.

FIELD EXPLORATION

Exploratory Drilling

We drilled seven exploratory boreholes (BH-1 through BH-7) at the site between November 11 and 13, 2013. The borings were located in consultation with PIVOT to establish overall subsurface conditions for the classroom building and the gym/cafeteria. Some of the locations were established based on available access or conflicts with existing structures. The approximate borehole locations are shown on Figure 2A (Appendix A).

Borings BH-2, BH-4 and BH-5 were drilled using a small track rig with hollow stem auger drilling techniques. The small tracked rig had difficulty penetrating the gravels at some locations. Therefore, the remaining four borings were completed using a larger, CME-55, track-mounted drill rig using mud rotary drilling techniques. Maximum drilling depths ranged from ± 7 to 36.5 feet.

Samples were obtained at 2.5-foot intervals to the surface of the gravels and at 5-foot intervals thereafter. Disturbed samples were obtained with a split-spoon sampler in conjunction with the Standard Penetration Test (SPT). The SPT provides an indication of the relative stiffness or density of the foundation soils. Relatively undisturbed samples were obtained at various depths using thin-walled Shelby tubes. At some locations, the borings were supplemented by hand sampling of the near-surface soils.

The borings were continuously logged during drilling. The final logs (Appendix B) were prepared based on a review of the field logs, laboratory test results, and an examination of the soil samples in our office. Ground surface elevations reported on the boring logs were estimated using a topographic site plan prepared by BHE and should be considered approximate only.

Exploratory Test Pits

We dug seven exploratory test pits (TP-1 through TP-7) on November 14, 2013, using a small tracked excavator. Their approximate locations are shown in Figure 2A (Appendix A). The locations were selected in consultation with PIVOT. Six of the test pits were located south of Kelly Middle School and were intended to establish overall subsurface conditions within the planned play fields and the new synthetic turf field. TP-7 was dug between BH-1 and BH-3 to determine if any site fill was present near the west edge of the proposed new gym/cafeteria building.

The test pits typically extended to maximum depths ranging from ± 3 to 4 feet, with the exception of TP-4, which extended to $\pm 9\frac{1}{2}$ feet. Disturbed soil samples were obtained for possible laboratory testing and undrained shear strength measurements were made on the test pit side walls using a Torvane shear device. The soil profile, sampling depths and strength measurements are summarized on the appended test pit logs. The final logs (Appendix B) were prepared based on a review of the field logs, an examination of the soil samples in our laboratory and

the results of laboratory testing. Ground surface elevations reported on the test pit logs were estimated using a topographic site plan prepared by BHE and should be considered approximate only.

DISCUSSION OF SITE CONDITIONS

Site Topography and Vegetation

The new school buildings are to be built in the open area south of the existing school. The site for the classroom building is presently a baseball field. A topographic site plan prepared by BHE indicates the ground surface within this portion of the site ranges from \pm El. 394 (along the eastern and western edges of the field) to \pm El. 395 (near the center). The planned gym/cafeteria building will extend partially over an existing soccer field and track. The ground surface within the soccer field to the west ranges from \pm El. 397.5 to \pm El. 398.5. The topographic site plan was used to estimate the ground surface at the test pits and borings. The elevations shown on the logs are approximate only.

The site is presently covered with grass, but contains a gravel track, baseball backstop and other miscellaneous structures.

Subsurface Conditions at Proposed School Buildings

The exploratory boreholes suggest the soil profile beneath the planned building site generally consists of the following soil units:

- Site Fill
- Clayey silt and silty sand
- Sandy gravel

Site Fill. Site fill was encountered only in BH-5. At this location, the fill is limited to the upper \pm 12 inches and consists of medium stiff silt with scattered organics. We anticipate the fill was placed to create the existing baseball infield.

Clayey silt and silty sand (alluvium). The surficial soil predominantly consists of brown, damp, stiff, medium to high plasticity, clayey silt (alluvium). An Atterberg limits test run on a sample obtained from BH-1 from a depth of \pm 2.5 to 4.0 feet indicated a plasticity index (PI) of 23 and a Unified Soil Classification System (USCS) designation of MH. This soil unit grades to low plasticity silt with depth. At BH-1, the soil had a PI of 12 at a depth of \pm 7 to 8.5 feet, and a USCS designation of ML. At BH-7, a sample from 3.5 to 5.5 feet had \pm 65% fines (i.e., fraction of material passing the No. 200 sieve).

The clayey silt is typically thicker in the western portion of the proposed building footprint. Some of the variation may be due to previous grading activities. We observed the sod and fine roots were typically limited to a depth of \pm 4 inches.

Field vane tests run in the Shelby tube samples indicate undrained shear strengths ranging from ± 0.18 tons/ft² (tsf) to > 1.0 tsf. The strength tests and field observations indicate the silt is typically stiff to very stiff near the ground surface, becoming softer, sandier and moister with depth.

The surficial silt typically grades with depth to sandy silt or silty sand. The soil has essentially the same appearance as the silt (described above), but has an increased fraction of fine sand. Fines content determination tests on samples SS-4-3 and SH-7-1 indicated 47.8% and 64.8% fines, respectively. Although the logs show distinct layers for the silt and sand, in the field the two materials may be difficult to distinguish.

Sandy Gravel (alluvium). Sandy gravel (alluvium) was encountered below the silt in all the borings, but at significantly different depths. The depth to the surface of the gravel ranges from ± 2.5 (at BH-5) to ± 10 feet (at BH-1) and ± 15.5 feet (BH-3). The gravels extend to at least 35 feet (the limits of our exploration). Nearby water wells indicate the alluvial gravel extends to at least ± 80 feet and may be interbedded with clayey gravel.

The gravel encountered in the borings is typically sandy, contains trace to some silt and is well graded. A gradation test on sample SS-4-4 from ± 7.5 to 9 feet (BH-4) indicated the soil consists of $\pm 56.4\%$ gravel, 36.4% sand, and 7.2% fines (i.e., silt). SPT (N) values of between 24 and 67 were recorded in the gravels, suggesting they are predominantly medium dense, grading to dense or very dense within the limits of our exploration.

Subsurface Conditions at Play Fields

Six exploratory test pits were completed within the footprint of the planned play fields and the synthetic turf fields. The explorations indicate the subsurface profile typically consists of topsoil followed by alluvial clayey silt.

The topsoil is typically ± 1 to 1.5 feet thick and consists of brown, damp, low plasticity silt with a trace of sand and gravel. This soil had a PI of 13 and a USCS designation of ML. We assume this material was imported to create the existing play fields. At the time of our exploration, the topsoil was relatively stiff. However, it is a moisture-sensitive soil and is expected to soften significantly when exposed to rainfall.

The topsoil is underlain by brown, moist, medium plasticity, clayey silt. The silt is typically stiff and softens with depth. Laboratory tests on a sample of this soil indicated a PI of 20 and a USCS designation of MH (similar to the soil beneath the planned school site).

Medium dense, silty gravel with some sand was encountered in TP-1 at ± 3.6 feet and in TP-2 at 2.8 feet. The gravels are typically dirty (i.e., silty) near the contact with the silt, becoming cleaner and sandier with depth. No gravel was encountered in the other test pits, suggesting the gravel surface is relatively deep beneath the middle and eastern portion of the planned play fields. The gravels are similar to those encountered in the borings.

Ground Water

The borings were advanced using hollow stem augers. During drilling, ground water was encountered at ± 14.5 feet (BH-4) and ± 14 feet (BH-6). These depths correspond to \pm El. 380.2 and \pm El. 380.6, respectively. Given the approximate nature of the estimated ground surface elevations, it should be assumed that the water table currently lies at an average \pm El. 380.4. No ground water seepage was observed in the exploratory test pits.

There are several dozen water well logs, as well as a few geotechnical and Geoprobe holes within a $\pm 3,000$ -foot radius of the school site. In general, relatively shallow gravels were reported in all water wells. The reported depth of the static water level in most water wells ranged from ± 10 to 12 feet for wells completed during the summer or fall months. These levels are within 2 to 4 feet of those encountered in the recent FEI borings. Wells completed during the winter or spring typically reported water levels at ± 7 to 10 feet. A well drilled at the adjacent Kelly Middle School in March 1995 reported a static water level at 7 feet. This level is probably the best indication of a seasonally high water table.

LABORATORY AND FIELD TESTING

Laboratory Tests

The laboratory work included natural water content and Atterberg limits tests to classify the foundation soils, determine their homogeneity and estimate their overall engineering properties. Additional laboratory tests were run as a part of supplemental infiltration tests. Results of all index tests are summarized in Table 1C (Appendix C).

A one-dimensional consolidation test was run on sample SH-7-1 to estimate the compressibility of the fine-grained foundation soils. The results are summarized on Figure 1C (Appendix C). The results indicate modified compression and recompression indices ($c_{c\epsilon}$ and $c_{r\epsilon}$) of 0.13 and 0.005, respectively, and a preconsolidation pressure (p_c) of 1.1 ksf.

Laboratory pH tests were also run on selected soil samples (ASTM G51). Those test results are summarized in Table 2C and indicate pH values of 6.2 to 6.3 (i.e., slightly acidic).

Resistivity Testing

In-situ resistivity tests were completed near the middle of the site, within the panned play courts adjacent to the proposed classroom building. The tests were using a Nilsson 400, 4-pin, soil resistance meter (ASTM G57). The approximate location of the resistivity tests are shown on Figures 2A (Appendix A).

The 4-pin resistance meter provides an estimate of the average resistivity of a soil profile extending to a depth equal to the spacing between the pins. The tests were performed with the pins spaced at ± 2 to 8 feet. The resistivity values, summarized in Table 3C (Appendix C), ranged from $\pm 3,064$ to 6,128 ohm-cm.

These average values are relatively low, possibly due to the influence of the silt, and may not reflect the resistivity of the underlying gravels.

DCP Testing

Dynamic Cone Penetration (DCP) Tests were run at selected locations to estimate the strength of the existing subgrade for pavement analysis and design. Figure 2A shows the approximate locations of the DCP tests. The DCP test consists of driving the cone of the DCP apparatus into the soil and recording the penetration versus blow count (mm/blow) as the DCP value. The Oregon Department of Transportation (ODOT) Pavement Design Guide (2011) provides a correlation for estimating the in-situ resilient modulus from results of the DCP testing. A summary of the DCP test results and the correlated in-situ subgrade modulus values are summarized in Table 4C (Appendix C).

DISCUSSION OF KEY GEOTECHNICAL ISSUES

Construction Timing

The site is underlain by fine-grained surficial fill and fine-grained alluvium, which are moisture-sensitive and will soften considerably during wet weather (i.e., during the winter and spring). Thickened building pads, base rock sections and access roads are typically required to support construction traffic during wet weather and mitigate severe rutting and subgrade pumping. Wet weather construction substantially increases the earthwork costs and construction difficulty.

Compaction of the surficial soils will only be practical in dry summer months when moisture-conditioning is possible. We understand the construction schedule is not set. Therefore, recommendations for site grading and foundation construction are provided for both dry and wet weather construction schedules. However, dry weather construction is strongly recommended.

Soft Ground Conditions

During the field exploration, isolated seams of soft soil were observed beneath the stiff, dry surficial material. The soil in these soft zones was atypically moist and/or sandy. It is possible that more soft soils may be present at the time of construction due to exposure to wet weather. Depending on the weather at the time of the site grading or the contractor's schedule, the soft soils will have to be moisture conditioned (dried) and re-compacted or replaced with granular material (e.g. Select Fill or Granular Site Fill, as defined below). The extent of soft soils and the required mitigation, if any, should be established by FEI at the time of construction. Our settlement analysis (discussed below) assumes that all soft ground conditions are mitigated prior to foundation construction.

Play Fields and Synthetic Turf Field Construction

The subgrade beneath the proposed new play fields and the synthetic turf field south of Kelly Middle School was relatively stiff at the time of the field exploration. However, the subgrade soils are moisture-sensitive and will tend to soften significantly when exposed to rainfall (as indicated above). If moist, the subgrade will tend to pump or rut under truck or construction equipment traffic. In addition, an excessively moist subgrade cannot be compacted.

We have assumed herein that the construction of these fields will be delayed until the soils are sufficiently dry and stiff to permit moisture-conditioning and compaction, and to support the required construction activities without damage to the subgrade. If soft soils are present, subgrade stabilization in the form of a separation geotextile and additional granular subbase will be required. Subgrade treatment in the form of lime or cement is possible to mitigate soft, wet soils, but could significantly add to earthwork costs. Development of construction guidelines for this option of subgrade stabilization was beyond the current scope of work.

On-Site Storm Retention

The site is underlain by a relatively thin mantle of silt followed by gravel. Local water wells suggest the local ground water level typically lies at ± 10 to 12 feet below the ground surface in the summer and fall, rising to ± 7 to 10 feet in the winter. At the time of exploration (November 2013), ground water was encountered in some of the borings at ± 14 to 14.5 feet. However, no long-term ground water data is available. A log for a well drilled on the Kelly Middle School property reported a static water level at ± 7 feet. That is the closest available information and we have assumed this depth to be representative of a seasonally high ground water levels.

Supplemental infiltration tests are planned. Results of those tests will be provided in a supplemental memorandum.

ENGINEERING ANALYSIS

Foundations for Structures

We have assumed the new buildings will have a finished floor elevation (FFE) of \pm El. 397. Assuming ± 1 foot for the floor slab and crushed rock leveling course, we estimate the subgrade elevation will be \pm El. 396. As a result, very little site grading (i.e., new site fill or excavation) will be required.

For our foundation analysis, we assumed new footings would bear on a nominal 1 foot of compacted crushed rock followed by medium stiff silt. At most locations, the gravels are deep enough that they lie below the influence depth of the footings. At BH-2 and BH-5, the gravels are relatively shallow and provide a positive influence on the foundations by reducing overall settlement.

Bearing Capacity. Footing dimensions and loads were not available for the building unit foundations at the time this report was prepared. Vikki Bourcier, S.E. (HLI) provided an estimate of the loads based on their previous experience with similar schools. They indicated a maximum column load of 50 kips (22 kips dead plus 28 kips live) and a maximum wall load of 2.5 kips per lineal foot (klf) (1.1 klf dead plus 1.4 klf live). The live load is estimated to comprise $\pm 56\%$ of the total load, which should represent the worst case condition.

We have assumed that column spread footings will have maximum dimensions of 4x4 to 5x5 feet. Continuous wall footings are expected to be 2 to 3 feet wide.

We estimated a bearing capacity of the foundation soils assuming a nominal footing depth of ± 2 feet (below FFE), bearing on 12 inches of Select Fill followed by silt with a minimum undrained shear strength of 1,000 psf for the native silt. Our analysis suggests an allowable bearing pressure of 2,300 psf for column footings and 2,100 psf for strip footings. This assumes a typical factor of safety of 3.

Our bearing capacity analysis assumes that FEI will be present during foundation construction to confirm the presence and extent of any soft soils beneath new footings. If present, soft soils will be mitigated by recompaction or replacement with granular fill.

Settlement. Potential foundation settlements were estimated using the assumed range of footing dimensions and preliminary foundation loads provided by HLI. For settlement analysis we included the dead load and half of the estimated live load, resulting in a maximum column load of ± 36 kips and maximum wall load of ± 1.8 klf. The subsurface profile encountered in the exploratory borings was used to model foundation conditions. Results of the consolidation test (Appendix C) were used to estimate the compressibility of the fine-grained soil that underlies the site. The gravels were assumed to be relatively incompressible.

Our analysis indicates total settlement under the largest column loads should be less than $\pm \frac{3}{4}$ inch. Total settlement of a 2 to 3-foot wide continuous wall footing is estimated to be less than $\pm \frac{1}{4}$ inch for the maximum wall load. For design, we recommend assuming a maximum differential settlement of $\pm \frac{1}{2}$ inch between the columns or between the columns and perimeter walls. Because the bearing pressure used in our analysis is close to the estimated preconsolidation pressure, it is important that we review the final design loads to confirm the calculated settlements.

Our settlement analysis assumes that FEI will be present during foundation construction to confirm the presence and extent of any soft soils beneath new footings and slabs. If present, soft soils will be mitigated by recompaction or replacement with granular fill.

Pavement Analysis and Design

A bus loop and a parking lot are planned for the new school. Additional paved access to the back of the new school is also planned but its location had not been determined at the time this report was prepared.

For the bus loop an estimate of average daily traffic (ADT) of 37 was provided to us by the design team. The traffic consists of 16 full-sized buses, 8 smaller special needs buses and 5 delivery trucks (2 to 3-axle). An ADT of 300 was estimated for the parking lot. We have assumed 1% of the total traffic for the parking area would consist of 2 to 3-axle delivery trucks.

Equivalent (18-kip) Single-Axle Loads (ESALs) for design were calculated using ESAL-conversion factors from the 2011 ODOT Pavement Design Guide. Car and pickup truck factors were obtained from the 1993 AASHTO Pavement Design Guide and bus values were obtained from the 2003 Asphalt Pavement Design Guide prepared by the Asphalt Pavement Association of Oregon (APAO). A 20-year and 30-year design life was assumed for flexible and rigid pavements, respectively.

The pavement subgrade is expected to consist of predominantly medium stiff to stiff, medium plasticity, clayey silt. The DCP test results suggest the subgrade resilient modulus (M_r) value ranges from $\pm 3,100$ to 4,600 lb/in² (psi). For design, a M_r value of 3,100 psi was selected to account for variability within the subgrade.

Pavement analysis was completed using the AASHTO (1993) procedure and input parameters recommended in the ODOT Pavement Design Guide (ODOT, 2011). Using the design traffic and M_r value, we calculated a flexible pavement section consisting of 2.5 inches of asphaltic concrete (AC) over 13 inches of base rock for the parking lot, and a flexible pavement section of 4 inches of AC over 14 inches of base rock for the bus loop and for other areas subject to increase truck traffic (e.g., in driveways and near trash/recycle bins). These sections are similar to the sections currently used by the school district.

It is anticipated that most pavements will consist of flexible sections. However, areas at cross walks or for emergency vehicle access may be designed with PCC concrete. We calculated a minimum rigid section would consist of 6 inches of PCC over a 6-inch thick leveling course of base rock. However, ODOT typically recommends a minimum PCC section of 8 inches, with consideration to a thicker panel at bus stops. Therefore, we recommend using a rigid pavement section consisting of a minimum 8 inches of PCC over 6 inches of base rock.

Native gravel or gravel fill from past site grading may be present north of, or in the vicinity of, the existing school buildings. Where gravel is present, the thickness of the base rock section may be reduced. The presence of shallow gravel and a subsequent reduction in base rock thickness should be confirmed by an FEI representative at the time of construction.

Seismic Analysis

A spectral acceleration response spectrum for the site was established based on Section 1613 of the Oregon Structural Specialty Code (OSSC) 2010. Based on our explorations, we recommend using a Site Class D. The seismic design parameters and OSSC response spectrum are shown on Figure 3A (Appendix A).

DISCUSSION OF SEISMIC HAZARDS

A site-specific hazard study was completed by Brooke Running, C.E.G. for the school site and provided in Appendix D. That study concluded there are not seismic hazards that would preclude the construction of the planned school project.

To expedite review by the City, we have summarized the soil and seismic issues based on the requirements of OSSC Sections 1803.2 through 1803.6, and the headings from the code.

1803.2 Investigations Required

The field exploration and sampling program and the associated geotechnical investigation performed by FEI for this site meet the requirements of this section and address the appropriate items listed.

1803.5.1 Classification

Soils present at the site are described in this report and on the test pits logs (Appendix B). Laboratory tests used to classify the soils are described above and are summarized in Appendix C.

1803.5.2 Questionable Soils

There are no questionable soils on the site. However, soft subgrade conditions were noted in isolated conditions. Furthermore, the surficial soils are moisture sensitive and are expected to soften significantly when exposed to rainfall. It is anticipated the site grading will remove and replaced or reprocess any soft surficial soil beneath the planned structures. We have recommended herein that an FEI representative be present to confirm foundation conditions in new footing excavations.

1803.5.3 Expansive Soils

No high plasticity clays were encountered during the field exploration. Therefore, no significant impact to foundations is anticipated from expansive soils.

1803.5.4 Ground Water Table

No below-grade construction is planned. Ground water levels at the site should lie below footings and slab levels and should not adversely impact foundations. Perimeter foundation drains are recommended to deal with potential perched ground water during the winter.

1803.5.5 Deep Foundations

No piles or piers are planned.

1803.5.6 Rock Strata

Alluvial gravel is estimated to extend to a relatively great depth below the site. Therefore, no bedrock is anticipated within the excavation limits.

1803.5.7 Excavation near Foundations

No excavations near foundations are planned.

1803.5.8 Compacted Fill Material

Specifications for fill materials and compaction are described below in the Recommendation section.

1803.5.9 Controlled low-strength material (CLSM)

All foundations will bear on compacted Select Fill underlain by native soil.

1803.5.10 Alternate setback and clearance

The site is relatively flat; therefore, no natural or man-made slopes are present and no minimum setback or clearance is required.

1803.5.11 Seismic Design Category C through F

Individual seismic-related items addressed within this category of the code are discussed below.

Slope Instability. The site is relatively flat. Therefore, there is no risk of slope instability or earthquake-induced landslides. The Relative Earthquake Hazard Map of the Eugene-Springfield Metropolitan Area, Lane, County (Black et al., 2000) indicates the school site lies within Zone D - the lowest hazard designation.

Liquefaction. The new school buildings will be supported by spread footings, bearing on a layer of structural fill followed by medium stiff silt underlain by medium dense to very dense gravel. Based on the stiffness and plasticity of the foundation soil and the relative density of the underlying gravel, there is no significant risk of liquefaction. Consequently, there is no significant risk of loss of strength of the foundations soils or settlement due to a seismic event. As a result, no mitigation measures are required for the foundations.

Differential Settlement. There is no risk of significant differential settlement due to the conditions described under liquefaction.

Surface displacement due to faulting or lateral spreading. The site is underlain by a relatively thick layer of alluvial deposits. There is no known displacement of the alluvial deposits and there are no potentially active, nearby faults that would cause a surface rupture at the site.

There are no natural slopes near the planned school buildings or liquefiable soils that would allow lateral spreading to occur.

1803.6 Reporting

FEI dug exploratory test pits, drilled exploratory borings, completed laboratory tests, conducted engineering analyses and summarized our findings in this report, which was prepared to meet the requirements of OSSC 2010, Section 1803.

RECOMMENDATIONS

We recommend the earthwork be completed during dry weather when aeration is more practical and the subgrade is less prone to pumping and disturbance. However, we understand the construction schedule is not currently known. Therefore, recommendations are provided for both wet and dry weather construction. The contractor may still experience pumping problems in the summer if the surficial soils have not adequately dried. Therefore, we recommend an on-site conference with the contractor prior to the grading work to review site conditions.

A site grading plan was not available at the time this report was prepared. For purposes of our analysis, we assumed individual building pads will extend at least 1 foot (possibly more) above existing grades.

Foundation Design and Construction

Design the foundations and slabs for the classroom and gym/cafeteria buildings as follows:

1. Design all continuous wall footings and isolated column footings using allowable bearing pressures of 2,100 and 2,300 psf, respectively.
2. Use of coefficient of friction of 0.35 at the base of the footing for analysis of sliding resistance, assuming all footings bear on compacted Select Fill. A lateral bearing of 200 psf can be assumed for footings backfilled with Select Fill.
3. Provided all new footings are designed and built as specified herein, assume settlement under the maximum anticipated column load to be less than $\pm \frac{3}{4}$ inch, settlement under the maximum anticipated wall load to be less than $\pm \frac{1}{4}$ inch. Assume a potential differential settlement between columns and walls of up to $\pm \frac{1}{2}$ inch.
4. Provide a minimum footing width of 2 feet for all continuous wall footings. This minimum does not apply to grade beams or thickened slab sections that support non-load bearing walls.
5. Use a modulus of subgrade reaction, k_s , of 250 kcf for floor slab design. Reinforce all floor slabs to reduce cracking, warping and the risk of ground water infiltration. Rebar, instead of wire mesh, is recommended. The use of fiber as the sole method of reinforcement is

not recommended. Provide a suitable vapor barrier under the slab that is compatible with the proposed floor covering and the method of slab curing.

6. Design the building assuming a Site Class D and the seismic parameters provided in Figure 3A (Appendix A). These values are based on OSSC 2010 (Section 1613). The corresponding response spectrum for the OSSC 2010 General Procedure is also shown in Figure 3A. The liquefaction potential of the foundation soils is negligible due to the plasticity of the surficial soils and the density of the underlying gravel.

Perimeter Foundation Drainage System for Buildings

7. Install foundation drains along the perimeter of the building. The drains should consist of 3 or 4-inch diameter, perforated or slotted, PVC pipe wrapped in a Filter Fabric (specified below). The flowline of the pipe should be set as deep as possible (i.e., on top of the perimeter footings or near the base of the building pad fill). The pipe should be bedded in at least 6 inches of 2-inch minus, clean drain rock and backfilled to the full depth with drain rock. The entire mass of drain rock should be wrapped in a similar filter fabric that laps at least 12 inches at the top.
8. Provide clean-outs at appropriate locations for future maintenance of the drainage system.

Materials and General Earthwork Specifications

9. Select Fill as defined herein should consist of 1 or ¾-inch minus, clean (i.e., less than 5% passing (by weight) the #200 U.S. Sieve), well-graded, durable, crushed rock that is free of plastic clay, organic matter and construction debris. We should be provided a sample of the intended fill for approval, prior to delivery to the site.
10. Granular Site Fill should consist of 3-inch minus, clean, well-graded, crushed (quarry) rock or approved bar-run gravel. The latter is appropriate only if placed during dry weather or when the gravel is adequately dry for compaction.
11. Compact all Select Fill, Granular Site Fill or native material in loose lifts not exceeding 12 inches, unless specified otherwise below. Thinner lifts will be required if light or hand-operated equipment is used. Compact the fill to a minimum of 95% relative compaction. The maximum dry density of ASTM D698 should be used as the standard for estimating relative compaction. Field density tests should be run frequently to confirm adequate compaction.

12. The Separation Geotextile should have Mean Average Roll Value (MARV) strength properties meeting the requirements of an AASHTO M 288-06 Class 2 woven geotextile.

The geotextile should have MARV hydraulic properties meeting the requirements of AASHTO M 288-2006 (geotextile for separation) with a permittivity greater than 0.05 sec^{-1} and an AOS less than 0.6 mm. We should be provided a specification sheet on the selected geotextile for approval prior to delivery to the site. This geotextile is not suitable for construction during wet weather.

13. Filter Fabric should consist of a non-woven geotextile with a grab tensile strength greater than 200 lb., an apparent opening size (AOS) of between #70 and 100 (US Sieve) and a permittivity greater than 0.1 sec^{-1} .
14. Inform contractors that utility construction will require dewatering for any deep excavations completed during the winter. Shoring will be needed in all trenches to protect workers from sloughing or caving soils. Assume an OR-OSHA Type C soils for planning utility trenching and/or shoring.

Site Preparation for the Building Pad and Staging Areas (Dry Weather)

Prepare the pads for the new classroom and gym/cafeteria buildings, and any staging areas in dry weather as follows:

15. Strip the existing ground ± 4 inches, or as required to remove roots, sod or unsuitable soil. The actual depth of stripping should be confirmed by FEI during construction. Dispose of all strippings outside of construction areas. The strippings should be hauled from the site or reused only in landscape areas. No strippings should be placed beneath foundations, slabs, sidewalks or pavements.
16. Compact the subgrade as specified in Item 11.
17. Proof-roll the completed subgrade with an approved vehicle. Where soft soil is present, moisture condition the soil (i.e., dry it) and re-compact as specified in Item 11. This option requires dry weather and sufficient time for aeration. If the zone of soft soil is more than 12 inches thick, excavation, stockpiling, aeration and recompaction in lifts may be required.

Alternatively, over-excavate the soft soil and replace with Select Fill or a combination of Granular Site Fill and Select Fill. The actual depth of overexcavation should be confirmed by FEI during construction. The final excavation for areas requiring removal of soft soil should be done with a hoe equipped with a smooth bucket. The surface of the subgrade should be left clean, free of loose or disturbed soils or large clods.

We recommend the bid documents include a unit cost for the option of on-site aeration and recompaction of soft, wet soil in lifts and for the option of over-excavation and replacement with compacted, granular fill.

18. Overexcavate any test pits that extend beneath the footprint of the building and replace with compacted Select Fill or Granular Site Fill.
19. Place a Separation Geotextile on the prepared subgrade that meets the requirements specified above. The geotextile should be laid smooth, without wrinkles or folds in the direction of construction traffic. Overlap adjacent rolls a minimum of 2 feet. Pin fabric overlaps or place the building pad fill in a manner that will not separate the overlap during construction. Seams that have separated will require removal of the building pad fill to establish the required overlap. The geotextile may be eliminated if the building pad fill will not be subjected to wet weather and heavy construction traffic.
20. Place at least 12 inches of Select Fill to create the individual building pads, provided the subgrade is stiff and stable. If more than 12 inches of granular fill is required for grading purposes or to stabilize the subgrade under building pads, Granular Site Fill capped with a minimum of 12 inches of Select Fill can be used. Compact the building pad fill as specified in Item 11.
21. Provide at least 12 inches of Select Fill beneath all footings. Depending on the grading plan, trenching through the building pad may be required to place the structural fill beneath the footings. At most locations, we expect the footing excavations will terminate in silt. The bottom of the excavations should be left free of clods and disturbed soil. The subgrade at the bottom of the footing excavations should have a minimum undrained shear strength of 1,000 psf (to be confirmed by FEI during construction). Any soft soil present at the bottom of the excavation should be removed and replaced with additional Select Fill. In the event any footings extend to native gravel, the Select Fill may be reduced to a leveling course over the undisturbed gravels.
22. Prepared the subgrade for staging areas as described above for the building pad. We recommend that any staging areas subject to heavy truck or construction equipment or to wet weather should consist of at least 24 inches of granular fill (Select Fill or a combination of Granular Site Fill and Select Fill) over a Separation Geotextile. Do not allow continuous construction traffic on the rock section until a minimum of 24 inches of rock is placed.

Site Preparation for the Building Pad and Staging Areas (Wet Weather)

If site grading and construction of building pads for the new classroom and gym/cafeteria buildings and any staging areas extend into wet weather, the following recommendations are applicable:

23. Strip the existing ground ± 4 inches, or as required to remove roots, sod or unsuitable soil. The actual depth of stripping should be confirmed by FEI during construction. Dispose of all strippings outside of construction areas. The strippings should be hauled from the site or reused only in landscape areas. No strippings should be placed beneath foundations, slabs, sidewalks or pavements.

Overexcavate the surficial soils at least 24 inches. The overexcavation should extend at least 5 feet beyond the limits of the new foundations. The actual depth of overexcavation should be confirmed by FEI during construction and may vary depending on soil conditions at the time of construction. The excavation should be done with a hoe equipped with a smooth bucket. The surface of the subgrade should be left clean, free of loose or disturbed soils or large clods.

We recommend the bid documents include a unit cost for the option of overexcavation and replacement with compacted, granular fill (beyond the recommended minimum depth of 24 inches, if required).

24. Do not compact the subgrade. Attempts to compact the subgrade when the soil is wet of optimum are likely to lead to rutting or subgrade disturbance.
25. Overexcavate any test pits that extend beneath the footprint of the building and replace with compacted Select Fill or Granular Site Fill.
26. Place a Separation Geotextile on the subgrade that meets the requirements specified above. The geotextile should be laid smooth, without wrinkles or folds in the direction of construction traffic. Overlap adjacent rolls a minimum of 3 feet. Pin fabric overlaps or place the building pad fill in a manner that will not separate the overlap during construction. Seams that have separated will require removal of the building pad fill to establish the required overlap. The geotextile may be eliminated if the building pad fill will not be subjected to wet weather and heavy construction traffic.
27. Place at least 24 inches of Select Fill to create the individual building pads, provided the subgrade is stiff and stable. Alternatively, Granular Site Fill capped with a minimum of 12 inches of Select Fill can be used. The initial lift should be ± 18 inches thick and compacted with a vibratory roller. Do not allow construction traffic on the rock section until a minimum of 24 inches of Select Fill and/or Granular Site fill is placed.

28. Provide at least 12 inches of Select Fill beneath all footings. Depending on the grading plan, trenching through the building pad may be required to place the structural fill beneath the footings. At most locations, we expect the footing excavations will terminate in silt. The bottom of the excavations should be left free of clods and disturbed soil. The subgrade at the bottom of the footing excavations should have a minimum undrained shear strength of 1,000 psf (to be confirmed by FEI during construction). Any soft soil present at the bottom of the excavation should be removed and replaced with additional Select Fill. In the event any footings extend to native gravel, the Select Fill may be reduced to a leveling course over the undisturbed gravels.
29. Prepare the subgrade for staging areas as described above for the building pad. Do not allow continuous construction traffic on the rock section until a minimum of 24 inches of rock is placed.

Subgrade Preparation and Pavement Construction

The required site grading for the proposed paved parking lots is not currently known. Subgrade preparation should be done in dry weather to avoid the need for subgrade stabilization and/or overexcavation of any remaining surficial fill.

30. Strip the existing ground ± 2 to 4 inches, or as required to remove roots and sod, or any existing demolition debris. Haul all strippings and demolition debris from the site.
31. Grade the subgrade as required. Do not reuse soils generated by site grading under any sidewalks, parking lots or foundation areas.
32. Strip any remaining unsuitable fill or other deleterious material. The extent or depth of additional site stripping should be established by an FEI representative during construction. We recommend that a unit cost for overexcavation and replacement of unsuitable soil or fill be included in the construction bid documents.
33. Compact the subgrade under pavements to a depth of at least 12 inches. Compaction may not be practical if the soils are too wet of optimum. Therefore, the site work should not be attempted during wet weather and should be delayed until the subgrade soils are sufficiently dry or until weather permits efficient aeration.

If wet weather construction cannot be avoided, do not compact the subgrade. Instead, overexcavate the subgrade to provide a minimum 24-inch thick base rock section.

Place a Separation Geotextile under any areas to be used as a staging area, haul roads or subject to heavy traffic (e.g., at entrances). A Separation Geotextile is also recommended if overexcavation and

additional subbase is planned in lieu of subgrade compaction. We recommend a Separation Geotextile be placed at least under all bus lanes and driveways. A geotextile should be considered under parking lots if they are built during wet weather. Where dense gravels are shallow, the base rock thickness may be reduced. We recommend such an adjustment be made during construction based on actual conditions exposed during site grading.

34. Backfill the prepared subgrade with base rock (Select Fill) immediately to reduce exposure to weather and compact to 95% relative compaction, as specified in Item 11.
35. Proof-roll the prepared base rock. Overexcavate and replace any areas of base rock and/or subgrade pumping with additional compacted Select Fill.
36. Provide a minimum flexible pavement section of 2.5 inches of AC over 13 inches of base rock for all parking lots, parking stalls, and driveways not subject to buses or truck traffic. Do not allow loaded trucks or heavy construction equipment on the finished base rock prior to paving.

Increase the pavement section to 4 inches of AC over 14 inches of base rock for bus lanes and driveways or any paved areas that will be subject to truck traffic. Where rigid pavements are planned, we recommend a minimum PCC thickness of 8 inches over 6 inches of base rock. Increase the base rock thickness for the individual pavement sections to 24 inches (as indicated in Item 33 for wet weather construction).

Subgrade Preparation Under Playfield and Synthetic Turf Field

We have assumed all site grading for the new play fields and the new synthetic turf field will be completed during dry weather (i.e., late summer or early fall). Otherwise, moisture conditioning and subgrade compaction will not be practical.

At the time this report was prepared, a site grading plan was not available for the new fields. Therefore, we do not know to what extent the subgrade for the new fields will include the existing topsoil within the track/soccer field or the underlying native silt.

The subgrade beneath the fields should be prepared as specified above for the building pads (or as specified by the turf manufacturer, if different). If soft subgrade conditions are present or develop this winter, additional mitigation measures will be required. Mitigation of a relatively thin (i.e., 12 inches or less) layer of soft, wet soil can be accomplished by aeration and re-compaction. If the soft layer is relatively deep, over-excavation and replacement with granular fill will be required. Other mitigation options include lime or cement stabilization.

Development of measures for subgrade stabilization is beyond the present scope of work. We recommend the subgrade be examined prior to bidding (and after a site grading plan is known) to confirm the moisture levels in the soil. Options for mitigation, if needed, should be established at that time.

DESIGN REVIEW/CONSTRUCTION OBSERVATION/TESTING

We should be provided the opportunity to review all drawings and specifications that pertain to site preparation, foundation construction and pavements. Preparation of the building pads and subgrade preparation for new fields will require field confirmation of the soil condition. Mitigation of any unsuitable fill or soil, ground water infiltration, or subgrade pumping will also require engineering review and judgment. That judgment should be provided by one of our representatives. Frequent field density tests should be run on all engineered fill, subgrade and base rock. We recommend that we be retained to provide the necessary construction observation.

VARIATION OF SUBSURFACE CONDITIONS, USE OF THIS REPORT AND WARRANTY

The analysis, conclusions and recommendations contained herein are based on the assumption that the soil profiles and ground water levels encountered in the borings and test pits are representative of overall site conditions. No changes in the enclosed recommendations should be made without our approval. We will assume no responsibility or liability for any engineering judgment, inspection or testing performed by others.

This report was prepared for the exclusive use of Lane County School District 4J and their design consultants for the Howard Elementary School in Eugene, Oregon. Information contained herein should not be used for other building sites or for unanticipated construction without our written consent. This report is intended for planning and design purposes. Contractors using this information to estimate construction quantities or costs do so at their own risk. Our services do not include any survey or assessment of potential surface contamination or contamination of the soil or ground water by hazardous or toxic materials. We assume that those services, if needed, have been completed by others.

Climate conditions in western Oregon typically consist of wet weather for almost half of the year (typically between mid-October and late May). The recommendations for foundation design and drainage are not intended to represent any warranty (expressed or implied) against the growth of mold, mildew or other organism that grows in a humid or moist environment.

Our work was done in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

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Appendix A

Figures



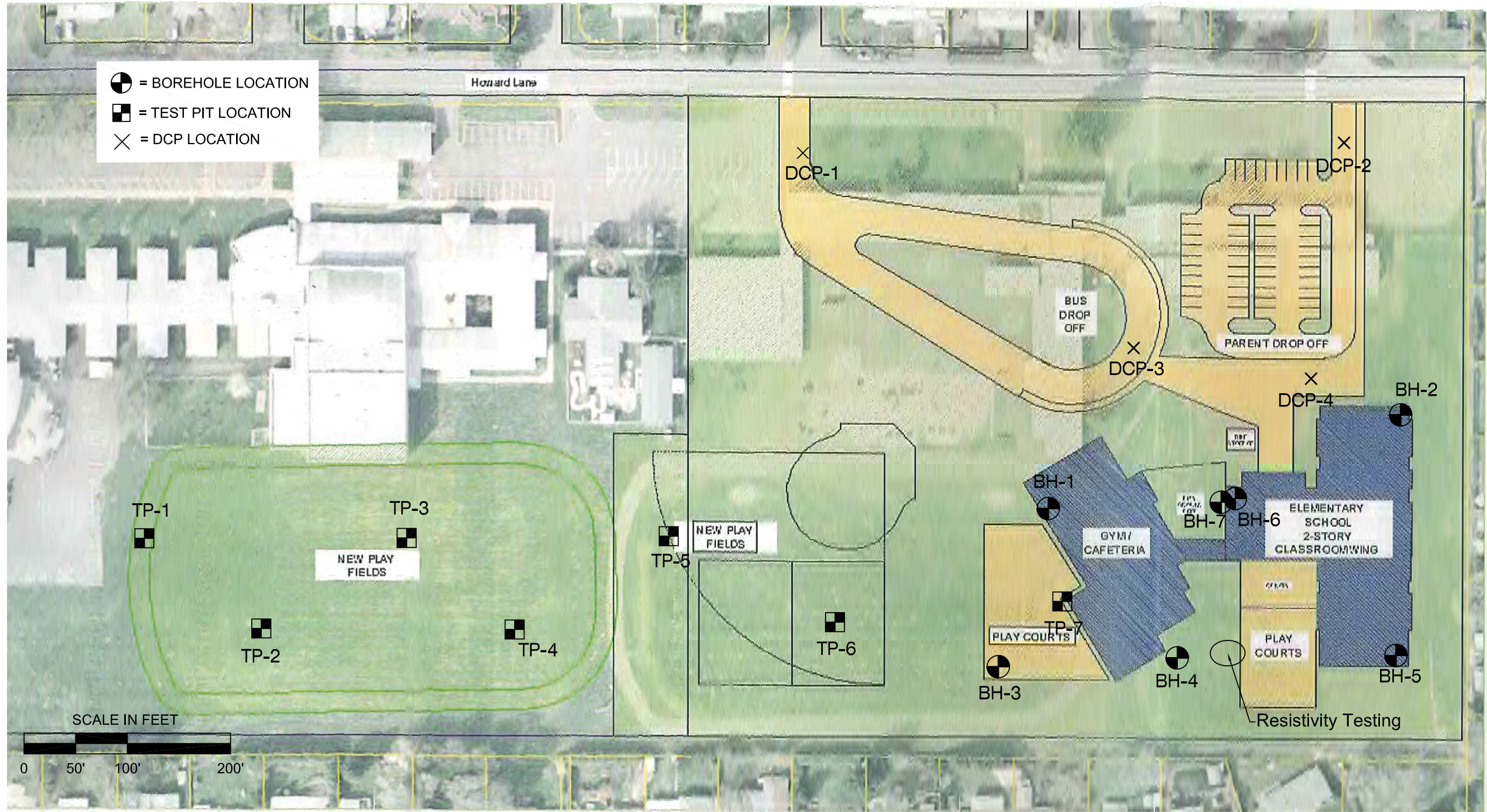
Not to Scale


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DATE NOV. 2013
 DWN. mdm
 APPR. _____
 REVIS. _____
 PROJECT NO.
 2131078

VICINITY MAP
 HOWARD ELEMENTARY SCHOOL
 EUGENE, OREGON

FIGURE NO.
1A



- NOTES:
1. EXPLORATION LOCATIONS ARE APPROXIMATE ONLY.
 2. SEE REPORT FOR A DISCUSSION OF SUBSURFACE CONDITIONS.
 3. BASE MAP PROVIDED BY PIVOT ARCHITECTURE.

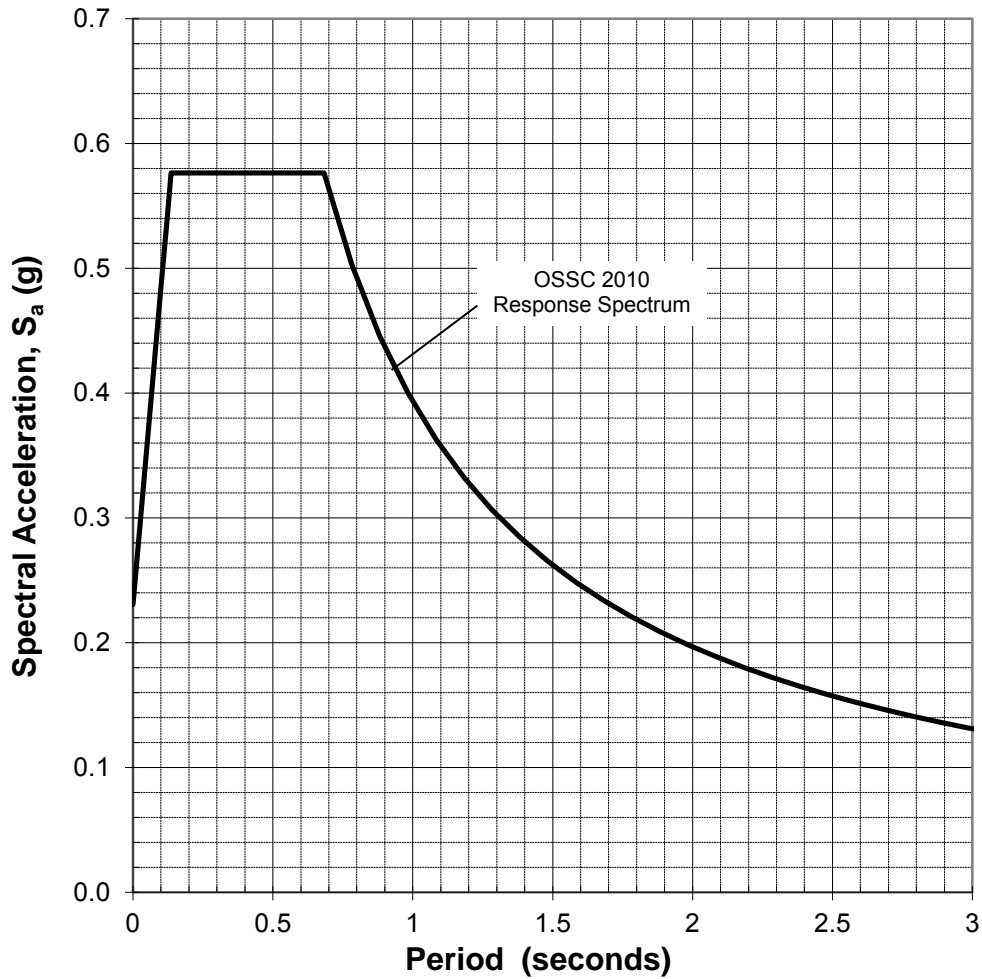
FOUNDATION ENGINEERING INC.
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 PROJECT NO. 2131078

SITE LAYOUT AND EXPLORATIONS

HOWARD ELEMENTARY SCHOOL
 EUGENE, OREGON

FIGURE NO.
2A



Notes:

1. The Design Response Spectrum is based on OSSC 2010 Section 1613 using the following parameters:

Site Class= D	Damping = 5%		
$S_S = 0.70$	$F_a = 1.24$	$S_{MS} = 0.86$	$S_{DS} = 0.58$
$S_1 = 0.35$	$F_v = 1.71$	$S_{M1} = 0.59$	$S_{D1} = 0.39$
2. S_S and S_1 values for 5% damping are based on the USGS 2002 mapped maximum considered earthquake spectral accelerations for 2% probability of exceedence in 50 years. The corresponding peak ground acceleration on rock is 0.29g.
3. F_a and F_v were established based on OSSC 2010, Tables 1613.5.3(1) and 1613.5.3(2) using the selected S_S and S_1 values. S_{DS} and S_{D1} values include a 2/3 reduction on S_{MS} and S_{M1} as discussed in OSSC 2010 Section 1613.5.4.
4. Site location is: Latitude 44.0876, Longitude -123.1392.

FIGURE 3A
OSSC 2010 SITE RESPONSE SPECTRUM
Howard Elementary School
Eugene, Oregon
FEI Project 2131078



Appendix B

Boring and Test Pit Logs

DISTINCTION BETWEEN FIELD LOGS AND FINAL LOGS

A field log is prepared for each boring or test pit by our field representative. The log contains information concerning sampling depths and the presence of various materials such as gravel, cobbles, and fill, and observations of ground water. It also contains our interpretation of the soil conditions between samples. The final logs presented in this report represent our interpretation of the contents of the field logs and the results of the laboratory examinations and tests. Our recommendations are based on the contents of the final logs and the information contained therein and not on the field logs.

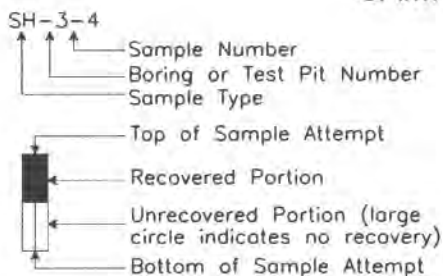
VARIATION IN SOILS BETWEEN TEST PITS AND BORINGS

The final log and related information depict subsurface conditions only at the specific location and on the date indicated. Those using the information contained herein should be aware that soil conditions at other locations or on other dates may differ. Actual foundation or subgrade conditions should be confirmed by us during construction.

TRANSITION BETWEEN SOIL OR ROCK TYPES

The lines designating the interface between soil, fill or rock on the final logs and on subsurface profiles presented in the report are determined by interpolation and are therefore approximate. The transition between the materials may be abrupt or gradual. Only at boring or test pit locations should profiles be considered as reasonably accurate and then only to the degree implied by the notes thereon.

SAMPLE OR TEST SYMBOLS



- S - Grab Samples
- SS - Standard Penetration Test Sample (split-spoon)
- SH - Thin-walled Shelby Tube Sample
- C - Core Sample
- CS - Continuous Sample

- ▲ Standard Penetration Test Resistance equals the number of blows a 140 lb. weight falling 30 in. is required to drive a standard split-spoon sampler 1 ft. Practical refusal is equal to 50 or more blows per 6 in. of sampler penetration.
- Water Content (%).

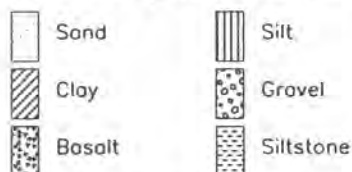
UNIFIED SOIL CLASSIFICATION SYMBOLS

- | | |
|------------|---------------------|
| G - Gravel | W - Well Graded |
| S - Sand | P - Poorly Graded |
| M - Silt | L - Low Plasticity |
| C - Clay | H - High Plasticity |
| Pt - Peat | O - Organic |

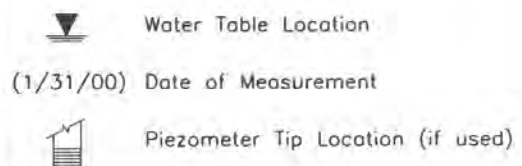
FIELD SHEAR STRENGTH TEST

Shear strength measurements on test pit side walls, blocks of soil or Shelby tube samples are typically made with Torvane or pocket penetrometer devices.

TYPICAL SOIL/ROCK SYMBOLS



WATER TABLE



Explanation of Common Terms Used in Soil Descriptions

Field Identification	Cohesive Soils			Granular Soils	
	SPT	S_u^* (tsf)	Term	SPT	Term
Easily penetrated several inches by fist.	0 - 1	< 0.125	Very Soft	0 - 4	Very Loose
Easily penetrated several inches by thumb.	2 - 4	0.125-0.25	Soft	5 - 10	Loose
Can be penetrated several inches by thumb with moderate effort.	5 - 8	0.25 - 0.50	Medium Stiff (Firm)	11 - 30	Medium Dense
Readily indented by thumb but penetrated only with great effort.	9 - 15	0.50 - 1.0	Stiff	31 - 50	Dense
Readily indented by thumbnail.	16 - 30	1.0 - 2.0	Very Stiff	> 50	Very Dense
Indented with difficulty by thumbnail.	31 - 60	> 2.0	Hard		

* Undrained shear strength

Term	Soil Moisture Field Description
Dry	Absence of moisture. Dusty. Dry to the touch.
Damp	Soil has moisture. Cohesive soils are below plastic limit and usually moldable.
Moist	Grains appear darkened, but no visible water. Silt/clay will clump. Sand will bulk. Soils are often at or near plastic limit.
Wet	Visible water on larger grain surfaces. Sand and cohesionless silt exhibit dilatancy. Cohesive silt/clay can be readily remolded. Soil leaves wetness on the hand when squeezed. "Wet" indicates that the soil is wetter than the optimum moisture content and above the plastic limit.

Term	PI	Plasticity Field Test
Nonplastic	0 - 3	Cannot be rolled into a thread.
Low Plasticity	3 - 15	Can be rolled into a thread with some difficulty.
Medium Plasticity	15 - 30	Easily rolled into thread.
High Plasticity	> 30	Easily rolled and rerolled into thread.

Term	Soil Structure Criteria
Stratified	Alternating layers at least 1 inch thick - describe variation.
Laminated	Alternating layers at less than 1 inch thick - describe variation.
Fissured	Contains shears and partings along planes of weakness.
Slickensides	Partings appear glossy or striated.
Blocky	Breaks into lumps - crumbly.
Lensed	Contains pockets of different soils - describe variation.

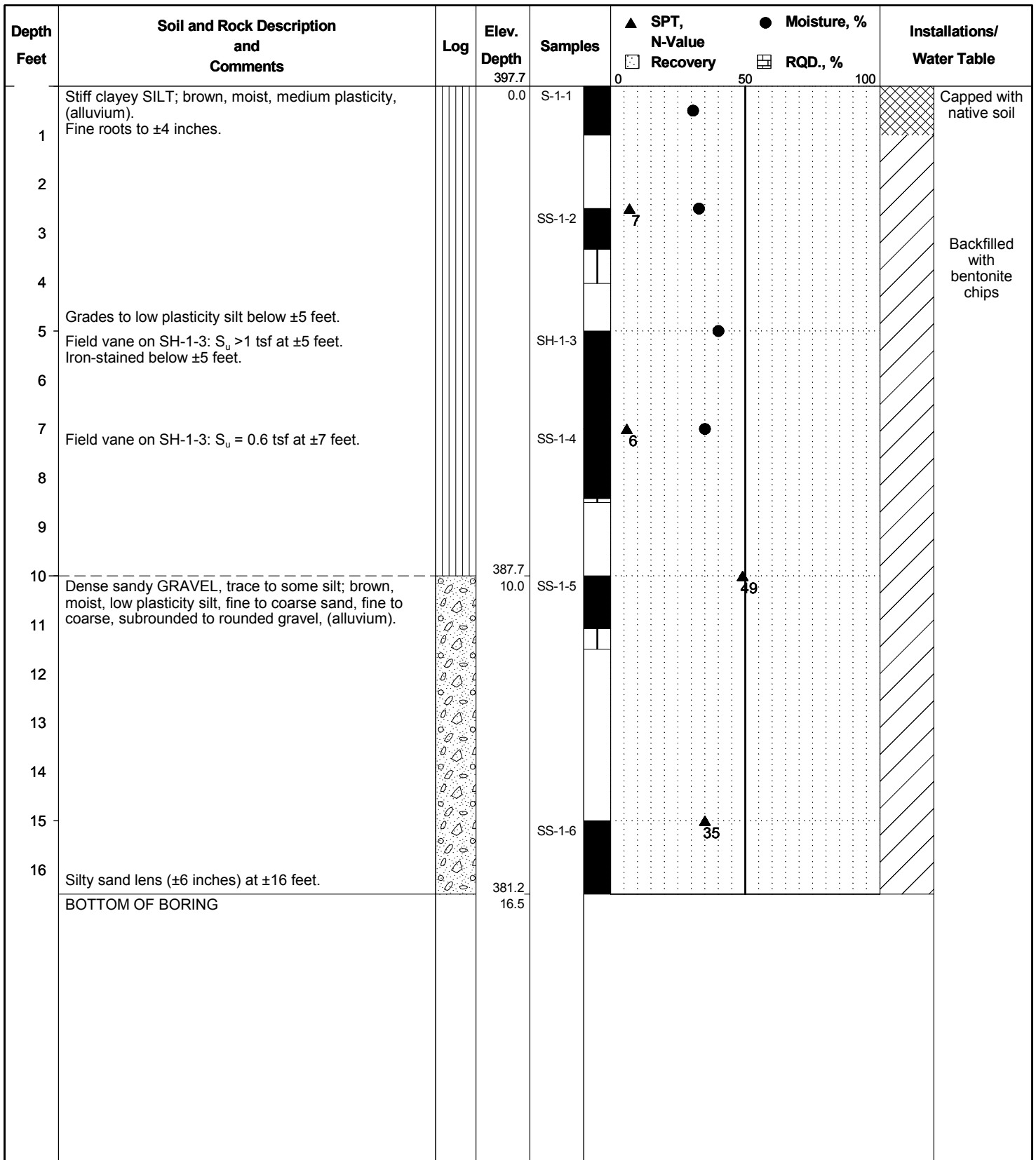
Term	Soil Cementation Criteria
Weak	Breaks under light finger pressure.
Moderate	Breaks under hard finger pressure.
Strong	Will not break with finger pressure.



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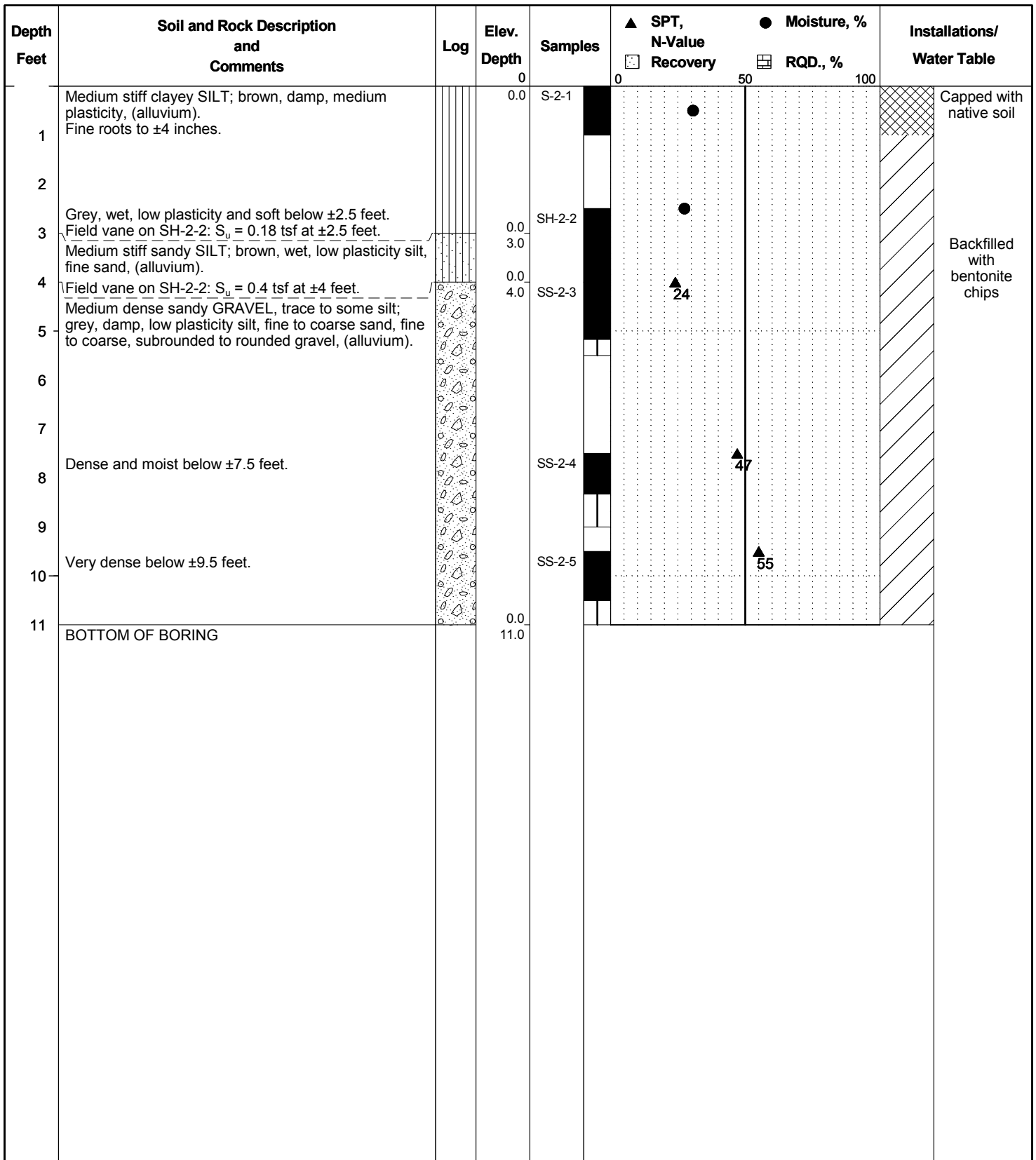
COMMON TERMS
SOIL DESCRIPTIONS



Project No.: 2131078
 Surface Elevation: 397.7 feet (Approx.)
 Date of Boring: November 13, 2013

Boring Log: BH-1
Howard Elementary School
Eugene, Oregon





Project No.: 2131078

Surface Elevation: N/A (Approx.)

Date of Boring: November 11, 2013

Boring Log: BH-2

Howard Elementary School

Eugene, Oregon



Foundation Engineering, Inc.

Depth Feet	Soil and Rock Description and Comments	Log	Elev. Depth 398.39	Samples	▲ SPT, N-Value	● Moisture, %	Installations/ Water Table
					☐ Recovery	▣ RQD., %	
1	Stiff clayey SILT; brown, damp, medium plasticity, (alluvium). Fine roots to ±4 inches.		0.0	S-3-1		●	Capped with native soil
2							
3				SS-3-2	▲ 8	●	Backfilled with bentonite chips
4	Grades to low plasticity silt with depth below ±5 feet.						
5	Moist below ±6.5 feet.			SH-3-3		●	
6							
7	Field vane on SH-3-3: $S_u = 0.8$ tsf at ±6.5 feet.			SS-3-4	▲ 8	●	
8							
9							
10				SS-3-5	▲ 6		
11							
12							
13							
14							
15	Sandy below ±15 feet.						
16	Medium dense gravelly SAND, some silt; grey-brown, moist, low plasticity silt, fine to coarse sand, fine to coarse, subrounded to rounded gravel, (alluvium). BOTTOM OF BORING	○	382.9 15.5 381.9 16.5	SS-3-6	▲ 26		

Project No.: 2131078

Surface Elevation: 398.4 feet (Approx.)

Date of Boring: November 13, 2013

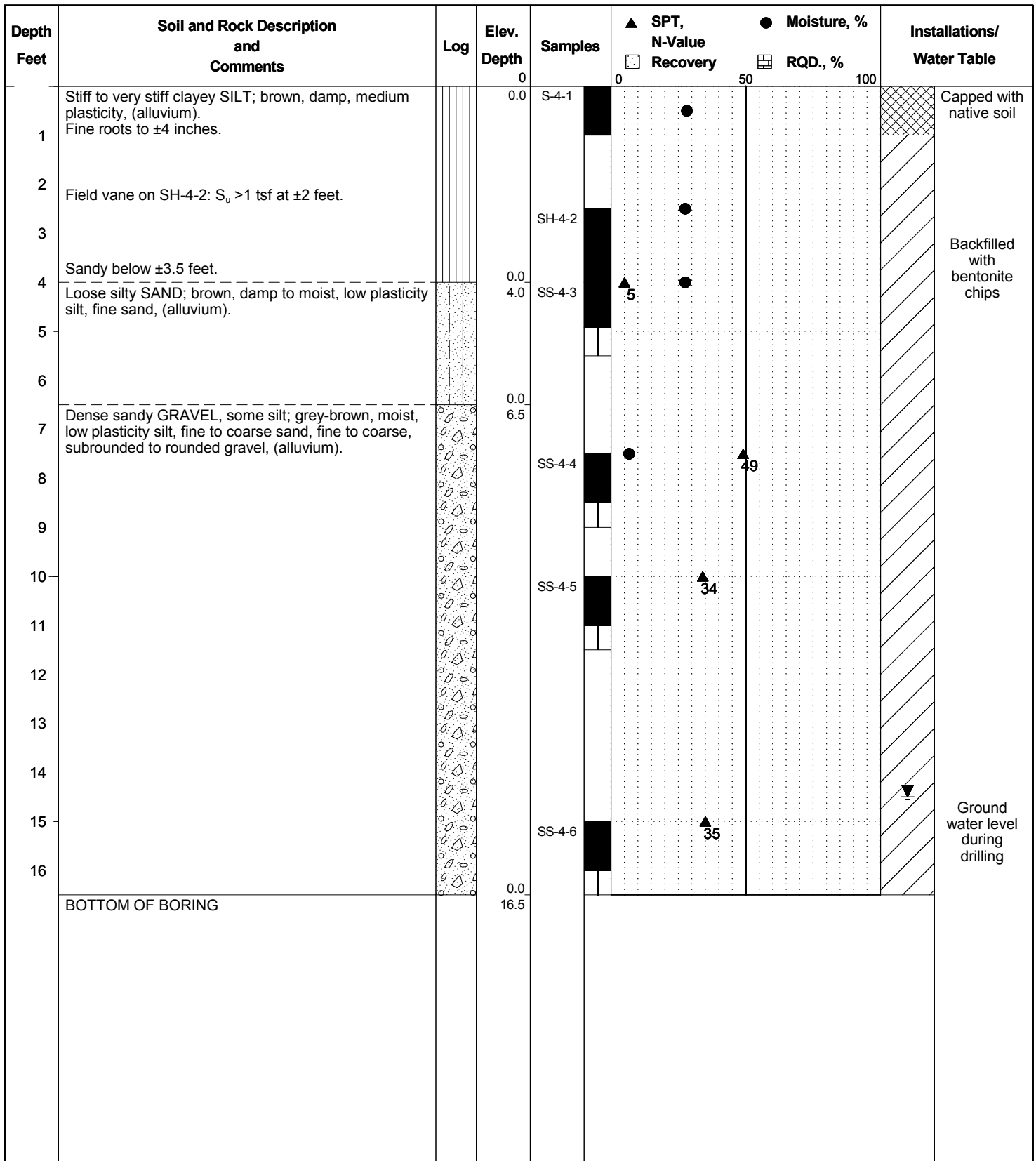
Boring Log: BH-3

Howard Elementary School

Eugene, Oregon



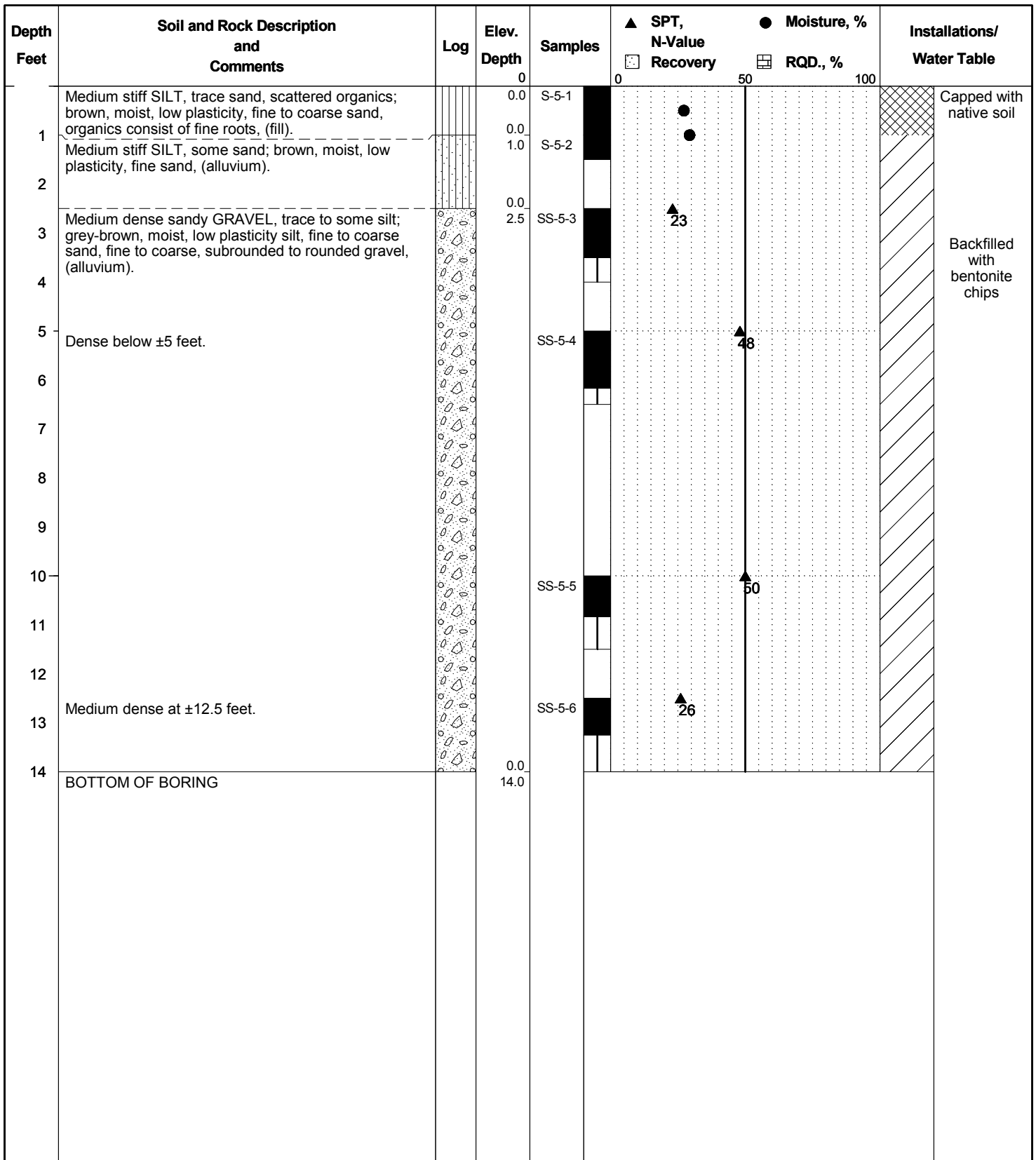
Foundation Engineering, Inc.



Project No.: 2131078
 Surface Elevation: N/A (Approx.)
 Date of Boring: November 13, 2013

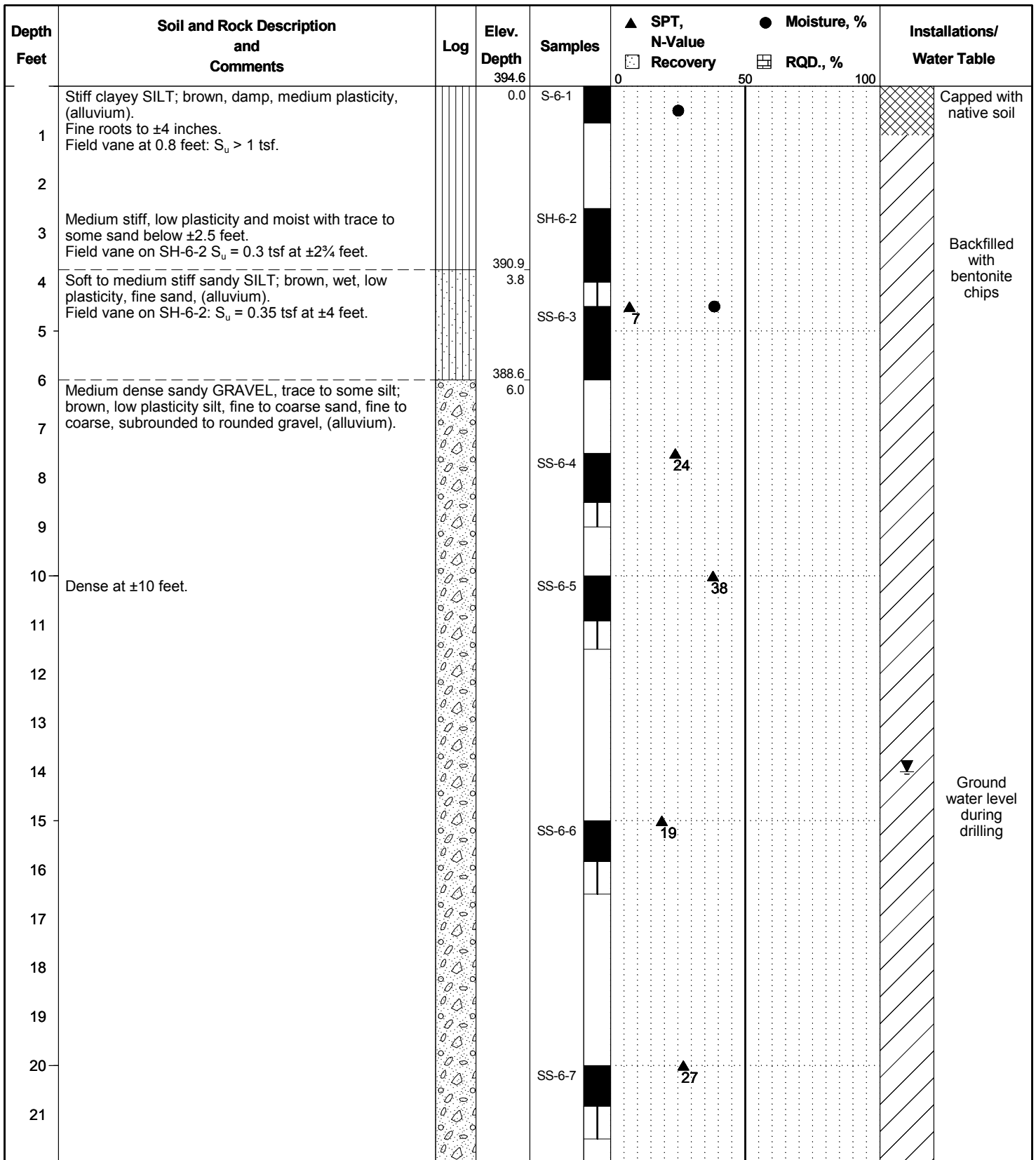
Boring Log: BH-4
Howard Elementary School
Eugene, Oregon





Project No.: 2131078
 Surface Elevation: N/A (Approx.)
 Date of Boring: November 11, 2013

Boring Log: BH-5
Howard Elementary School
Eugene, Oregon



Project No.: 2131078

Surface Elevation: 394.6 feet (Approx.)

Date of Boring: November 13, 2013

Boring Log: BH-6

Howard Elementary School

Eugene, Oregon



Foundation Engineering, Inc.

Depth Feet	Soil and Rock Description and Comments	Log	Elev. Depth	Samples	▲ SPT, N-Value	● Moisture, %	Installations/ Water Table
					☐ Recovery	☐ RQD., %	
			372.6		0	50	100
23							
24							
25	Dense sandy GRAVEL, trace to some silt; brown, wet, low plasticity silt, fine to coarse sand, fine to coarse, subrounded to rounded gravel, (alluvium).		369.6	SS-6-8	▲ 40		
26			25.0				
27	Scattered cobbles below ±27 feet.						
28							
29							
30				SS-6-9	▲ 38		
31							
32							
33							
34							
35	Very dense and grey-brown below ±35 feet.			SS-6-10	▲ 67		
36							
	BOTTOM OF BORING		358.1 36.5				

Project No.: 2131078
 Surface Elevation: 394.6 feet (Approx.)
 Date of Boring: November 13, 2013

Boring Log: BH-6
Howard Elementary School
Eugene, Oregon



Depth Feet	Soil and Rock Description and Comments	Log	Elev. Depth	Samples	▲ SPT, N-Value	● Moisture, %	Installations/ Water Table	
					☐ Recovery	▣ RQD., %		
0			0		0	50	100	
1	Stiff clayey SILT; brown, damp, medium plasticity, (alluvium). Fine roots to ±4 inches.		0.0					Capped with native soil
2								
3	Grades to low plasticity silt with trace to some sand below ±3.5 feet.							
4	Field vane on SH-7-1: S_u 0.5 tsf at ±3.5 feet.			SH-7-1		●		 Backfilled with bentonite chips
5	Soft sandy SILT; brown, wet, low plasticity, fine sand, (alluvium). Field vane on SH-7-1: S_u = 0.25 tsf at ±5 feet.		0.0 4.8					
6				SS-7-2	▲ 5	●		
7	Medium dense sandy GRAVEL, trace to some silt; brown, wet, low plasticity, fine to coarse sand, fine to coarse, subrounded to rounded gravel, (alluvium). BOTTOM OF BORING		0.0 6.5 0.0 7.0					

Project No.: 2131078

Surface Elevation: N/A (Approx.)

Date of Boring: November 13, 2013

Boring Log: BH-7

Howard Elementary School

Eugene, Oregon



Foundation Engineering, Inc.

Comments	Depth, Feet	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
Surface: grass. Fine roots to ±2 inches. No seepage or groundwater encountered to the limit of excavation.	1-	S-1-1	█			0.8 tsf		Stiff SILT, trace sand; brown, damp, low plasticity, fine to coarse sand, (topsoil/fill).
	2-							
	3-	S-1-2	█			0.5 tsf		Medium stiff clayey SILT; brown, moist, medium plasticity, (alluvium).
	4-	S-1-3	█			0.5 tsf		Medium dense silty GRAVEL, some sand, scattered cobbles; brown, moist, low plasticity silt, fine to coarse sand, fine to coarse, subrounded to rounded gravel, cobbles up to ±4 inches in diameter, (alluvium).
	5-							
	6-							BOTTOM OF TEST PIT
	7-							
	8-							
	9-							
	10-							
	11-							

Project No.: 2131078

Test Pit Log: TP-1

Surface Elevation: 397.4 feet (Approx.)

Howard Elementary School

Date of Test Pit: November 14, 2013

Eugene, Oregon

Comments	Depth, Feet	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
Surface: grass. Fine roots to ±4 inches. No seepage or groundwater encountered to the limit of excavation.	1-	S-2-1	█			0.7 tsf		Stiff SILT, trace sand and gravel; brown, damp, low plasticity, fine to coarse sand, fine, subrounded gravel, (topsoil/fill).
	2-	S-2-2	█			1 tsf		Stiff clayey SILT; brown, moist, medium plasticity, (alluvium).
	3-							
	4-							Medium dense silty GRAVEL, some sand; brown, moist, low plasticity silt, fine to coarse sand, fine to coarse, subrounded to rounded gravel, (alluvium).
	5-							BOTTOM OF TEST PIT
	6-							
	7-							
	8-							
	9-							
	10-							
	11-							

Project No.: 2131078

Test Pit Log: TP-2

Surface Elevation: 397.1 feet (Approx.)

Howard Elementary School

Date of Test Pit: November 14, 2013

Eugene, Oregon

Comments	Depth, Feet	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
Surface: grass. Fine roots to ±7 inches. No seepage or groundwater encountered to the limit of excavation.	1-	S-3-1	█			0.5 tsf		Stiff SILT, trace sand; brown, moist, low plasticity, fine to coarse sand, (topsoil/fill).
	2-	S-3-2	█			0.9 tsf		
	3-							BOTTOM OF TEST PIT
	4-							
	5-							
	6-							
	7-							
	8-							
	9-							
	10-							
	11-							

Project No.: 2131078

Test Pit Log: TP-3

Surface Elevation: 397.5 feet (Approx.)

Howard Elementary School

Date of Test Pit: November 14, 2013

Eugene, Oregon

Comments	Depth, Feet	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
Surface: grass. Fine roots to ±4 inches. No seepage or groundwater encountered to the limit of excavation.	1-	S-4-1	█			0.9 tsf		Stiff SILT, trace sand and gravel; brown, damp, low plasticity, fine to coarse sand, fine, subrounded gravel, (topsoil/fill).
	2-	S-4-2	█			0.6 tsf		
	3-	S-4-3	█			0.7 tsf	BOTTOM OF TEST PIT	
	4-							
	5-							
	6-							
	7-	S-4-4	█					
	8-							
	9-							
	10-							
	11-							

Project No.: 2131078

Test Pit Log: TP-4

Surface Elevation: 397.5 feet (Approx.)

Howard Elementary School

Date of Test Pit: November 14, 2013

Eugene, Oregon

Comments	Depth, Feet	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
Surface: grass. Fine roots to ±4 inches. No seepage or groundwater encountered to the limit of excavation.	1-	S-5-1	█			0.35 tsf		Medium stiff SILT, trace sand and gravel; brown, moist, low plasticity, fine to coarse sand, fine, subrounded gravel, (topsoil/fill).
	2-	S-5-2	█					
	3-	S-5-3	█			0.75 tsf		Stiff clayey SILT; brown, moist, medium plasticity, (alluvium). BOTTOM OF TEST PIT
	4-							
	5-							
	6-							
	7-							
	8-							
	9-							
	10-							
	11-							

Project No.: 2131078	Test Pit Log: TP-5
Surface Elevation: 398.0 feet (Approx.)	Howard Elementary School
Date of Test Pit: November 14, 2013	Eugene, Oregon

Comments	Depth, Feet	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
Surface: grass. Fine roots to ±4 inches. No seepage or groundwater encountered to the limit of excavation.	1-	S-6-1	█			0.6 tsf		Stiff SILT, trace sand; brown, damp, low plasticity, fine to coarse sand, (topsoil/fill).
	2-	S-6-2	█					
	3-					0.75 tsf		Stiff clayey SILT; brown, moist, medium plasticity, (alluvium). BOTTOM OF TEST PIT
	4-							
	5-							
	6-							
	7-							
	8-							
	9-							
	10-							
	11-							

Project No.: 2131078	Test Pit Log: TP-6
Surface Elevation: 398.6 feet (Approx.)	Howard Elementary School
Date of Test Pit: November 14, 2013	Eugene, Oregon

Comments	Depth, Feet	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description	
Surface: grass. Fine roots to ±4 inches. No seepage or groundwater encountered to the limit of excavation.	1-	S-7-1	█					Stiff clayey SILT; brown, damp, medium plasticity, (alluvium).	
	2-								
	3-								
	4-		S-7-2	█					BOTTOM OF TEST PIT
	5-								
	6-								
	7-								
	8-								
	9-								
	10-								
	11-								

Project No.: 2131078

Test Pit Log: TP-7

Surface Elevation: 398.4 feet (Approx.)

Howard Elementary School

Date of Test Pit: November 14, 2013

Eugene, Oregon



Appendix C

Field and Laboratory Test Results

**Table 1C. Atterberg Limits, Natural Water Contents, and Percent Fines
 (Borehole Samples)**

Sample Number	Sample Depth (feet)	Moisture Content (percent)	LL	PL	PI	USCS Classification	Percent Fines
S-1-1	0-1.0	30.6					
SS-1-2	2.5-4.0	32.8	56	33	23	MH	
SH-1-3	5.0-7.0	40.0					
SS-1-4	7.0-8.5	35.0	43	31	12	ML	
S-2-1	0-1.0	30.6					
SH-2-2	2.5-4.0	27.4					
S-3-1	0-1.0	30.5					
SS-3-2	2.5-4.0	28.4					
SH-3-3	5.0-7.0	36.1					
SS-3-4	7.0-8.5	30.0					
S-4-1	0-1.0	28.1					
SH-4-2	2.5-4.0	27.5					
SS-4-3	4.0-5.5	27.5					47.8
SS-4-4	7.5-9.0	6.7					7.2
S-5-1	0-1.0	27.2					
SS-5-2	1.0-1.5	29.3					
S-6-1	0-0.8	25.1					
SH-6-2	2.5-4.5	35.6					
SS-6-3	4.5-6.0	38.5					
SH-7-1	3.5-5.5	32.8					64.8
SS-7-2	5.5-7.0	36.8					

**Table 1C. Atterberg Limits, Natural Water Contents, and Percent Fines
 (Test Pit Samples)**

Sample Number	Sample Depth (feet)	Moisture Content (percent)	LL	PL	PI	USCS Classification	Percent Fines
S-1-1	0.5-1.5	27.2					
S-1-2	2.5-3.5	32.7					
S-2-1	0-1.0	25.3	42	29	13	ML	
S-3-1	0-0.8	28.8					
S-3-2	1.0-2.	36.4					
S-4-2	1.0-2.0	40.3	59	39	20	MH	
S-5-1	0-0.5	25.5					
S-5-2	1.0-2.0	25.0					
S-6-1	0.5-1.5	21.7					
S-6-2	2.0-3.0	37.2					

Table 2C. pH Test Results (ASTM G51)

Sample Number	Sample Depth (ft)	Sample Description	pH
SS-4-3	4.0 – 5.5	Silty SAND	6.2
SS-5-1	0.0 – 1.0	SILT, trace sand, scattered organics	6.3

Table 3C. Summary of Resistivity Testing

Location	Pin Spacing (ft.)	Resistivity (Ω -cm)
Near BH-4 (See Figure 2A)	2	3,064
	4	3,983
	6	5,171
	8	6,128

Table 4C. Summary of DCP Test Results

Test Hole	Initial Test Depth (inches)	Soil Description	¹ Average DCP (mm/blow)	² Average M _r (psi)	³ Corrected M _r (psi)
DCP-1	1	Medium stiff, clayey SILT (alluvium)	67.7	9,474	3,126
DCP-2	1	Medium stiff, clayey SILT (alluvium)	69.7	9,368	3,091
DCP-3	1	Stiff, clayey SILT (alluvium)	34.4	12,331	4,069
DCP-4	1	Stiff, clayey SILT (alluvium)	25.2	13,931	4,597

- Notes:**
1. DCP (mm/blow) based on the average of several readings from the initial test depth.
 2. M_r value based on average DCP value at the test depth and the ODOT recommended correlation: $M_r = 49023(DCP)^{-0.39}$. Values may vary slightly due to rounding.
 3. Corrected M_r values are based on the ODOT recommended correction factors of 0.33 for fine-grained soil.



Appendix D

Seismic Hazard Study

**HOWARD ELEMENTARY SCHOOL
SEISMIC HAZARD STUDY
EUGENE, OREGON**

INTRODUCTION

A seismic hazard study was completed to identify potential geologic and seismic hazards and evaluate the effect those hazards may have on the proposed project. The study fulfills the requirements presented in the 2010 Oregon Structural Specialty Code, Section 1803.7, for site-specific seismic hazard reports for essential and hazardous facilities, and major and special-occupancy structures (OSSC, 2010).

LITERATURE REVIEW

Available geologic and seismic publications and maps were reviewed to characterize the local and regional geology and evaluate relative seismic hazards at the site. The literature review included geologic and seismic hazard studies completed in western Lane County and the Eugene/Springfield metropolitan area. Information from several geotechnical and seismic hazard investigations completed by Foundation Engineering, Inc. (FEI) and local water well logs, available from the Oregon Department of Water Resources (ODWR) website were also reviewed to help establish the subsurface conditions.

SEISMIC CONSIDERATIONS

Regional Geologic and Tectonic Setting

The site is located at the southern end of the Willamette Valley, which is a broad north-south-trending basin separating the Coast Range to the west from the Cascade Range to the east. In the early Eocene (± 50 to 58 million years ago), the Willamette Valley was part of a broad continental shelf extending west from the Western Cascades beyond the present coastline (Orr and Orr, 1999). Basement rock underlying most of the Valley includes Siletz River Volcanics, which erupted as part of a submarine oceanic island-arc. The thickness of the volcanic basement rock is unknown, but is estimated to be ± 3 to 4 miles (Yeats et al., 1996). The island-arc collided with and was accreted to the western margin of the converging North American plate near the end of the early Eocene. Volcanism subsided and a fore arc basin was created. The basin was then infilled (primarily to the south) with marine sediments of the Flournoy, Yamhill, Spencer and Eugene Formations throughout the late Eocene and Oligocene, and terrestrial sedimentary and volcanic deposits of the late Eocene Fisher Formation, Miocene-Oligocene Little Butte Volcanics and other basaltic flow and volcanoclastic sedimentary rocks (Orr and Orr, 1999; Madin and Murray, 2006; McClaughry et al., 2010).

After emerging from a gradually shallowing ocean, the marine and volcanic formations were covered by terrestrial Columbia River Basalt (middle Miocene; ± 17 to 10 million years ago). The basalt poured through the Columbia Gorge from northeastern Oregon and southwestern Washington, spreading as far south as Salem with some flows reaching west to the Pacific Ocean. Uplift and tilting of the

Coast Range and the Western Cascades during the late Miocene formed the trough-like configuration of the Willamette Valley. Thick layers of Pleistocene and Holocene fluvial and floodplain deposits blanket the Columbia River Basalt (northern Willamette Valley) and older Tertiary deposits (Orr and Orr, 1999).

The Southern Willamette Valley is located ± 130 miles inland from the surface expression of the Cascadia Subduction Zone (CSZ) (Peterson et al., 1986; Goldfinger et al., 1992; Geomatrix Consultants, 1995). The CSZ is a converging, oblique plate boundary where the Juan de Fuca plate is being subducted beneath the western edge of the North American continent (Geomatrix Consultants, 1995). The CSZ extends from central Vancouver Island in British Columbia, Canada, through Washington and Oregon to Northern California. The CSZ is capable of generating earthquakes within the descending Juan de Fuca plate (intraplate), along the inclined interface between the two plates (interface), or within the overriding North American Plate (crustal) (Weaver and Shedlock, 1996). Western Oregon is located in an area of potentially high seismic activity due to its proximity to the CSZ.

Local Faulting

A review of nearby faults was completed to establish the seismic setting and the seismic sources. Numerous concealed and inferred crustal faults are located within ± 20 miles of Eugene (Yeats et al., 1996; Madin and Murray, 2006). However, none of these faults show any evidence of movement in the last ± 1.6 million years (Geomatrix Consultants, 1995; USGS, 2006). Four potentially active Quaternary (< 1.6 million years or less) crustal fault zones have been mapped within ± 40 miles of the site (Geomatrix Consultants, 1995; Personius et al., 2003; USGS, 2006; USGS, 2013) and are listed in Table 1D. The approximate locations of these faults in the central Willamette Valley are shown on Figure 1D (attached) (Personius et al., 2003).

Table 1D. Potentially Active Quaternary Crustal Faults within ± 40 miles of Howard Elementary School, Eugene

Fault Name	Length (miles)	Last Known Activity	Distance from Site (miles)	Slip Rate (mm/yr)
Upper Willamette River (#863)	± 27	< 1.6 million years	± 25 SE	< 0.20
Owl Creek (#870)	± 9	$< 750,000$ years	± 30 N	< 0.20
Unnamed faults near Sutherlin (#862)	± 17	$< 750,000$ years	± 33 SW	< 0.20
Corvallis (#869)	± 25	< 1.6 million years	± 35 NW	< 0.20

Note: Fault data based on USGS, 2006 and USGS, 2013.

The Owl Creek fault is the only fault considered a USGS Class A fault (geologic evidence supporting tectonic movement in the Quaternary with movement known or presumed to be associated with large-magnitude earthquakes). The remaining three are Class B faults.

The source of the coseismic displacement on faults located within the Cascadia forearc (along the coast) is not fully known. The displacement might be caused by subduction zone megathrust earthquakes or other smaller earthquakes within the North American plate (USGS, 2006). The USGS (2002) interactive deaggregation indicates that the primary seismic sources affecting the site are the CSZ faults. Additional fault information can be found in the literature (Personius et al., 2003; USGS, 2006).

Historic Earthquakes

No significant interface (subduction zone) earthquakes have occurred on the CSZ in historic times; however, several large-magnitude ($>M \sim 8.0$, $M =$ unspecified magnitude scale) subduction zone earthquakes are thought to have occurred in the past few thousand years. This is evidenced by the discovery of tsunami inundation deposits, combined with geologic evidence for episodic subsidence along the Oregon and Washington coasts (Peterson et al., 1993; Atwater et al., 1995). The Oregon Department of Geology and Mineral Industries (DOGAMI) and USGS estimates the maximum magnitude of an interface subduction zone earthquake ranges from moment magnitude (M_w) 8.5 to M_w 9.0 (Wang and Leonard, 1996; Wang et al., 1998; Wang et al., 2001; Petersen et al., 2008), and the rupture may potentially occur along the entire length of the CSZ (Weaver and Shedlock, 1996). Interface earthquakes are believed to have an average return period of 400 to 700 years (Nelson and Personius, 1996), with the last event occurring ± 313 years ago (January 26, 1700) (Nelson et al., 1995; Satake et al., 1996). Turbidite deposits in the Cascadia Basin has been investigated recently as a paleoseismic record for the CSZ (Goldfinger et al., 2012). Turbidite findings (based on the last 10,000 years) suggest an average recurrence interval of ± 240 years for a large interface earthquake on the southern portion of the CSZ. The estimated recurrence interval for a large interface earthquake on the northern portion of the CSZ is ± 500 to 530 years (Goldfinger et al., 2012).

Intraplate (Benioff Zone) earthquakes occur within the Juan de Fuca Plate at depths of ± 28 to 37 miles (Weaver and Shedlock, 1996). The maximum estimated magnitude of an intraplate earthquake is about M_w 7.5 (Wang et al., 2001). No intraplate earthquakes have been recorded in Oregon in historic times; however, the Puget Sound region of Washington State has experienced three intraplate events in the last ± 64 years including a surface wave magnitude (M_s) 7.1 event in 1949 (Olympia), a M_s 6.5 event in 1965 (Seattle/Tacoma) (Wong and Silva, 1998), and a M_w 6.8 event in 2001 (Nisqually) (USGS, 2001).

Crustal earthquakes dominate Oregon's seismic history. Crustal earthquakes occur within the North American Plate, typically at depths of ± 6 to 12 miles. The estimated maximum magnitude of the relatively shallow crustal earthquake in the Willamette Valley and adjacent physiographic regions is about M_w 6.5 (Wang and

Leonard, 1996; Wang et al., 1998; Wang et al., 2001). Only two major crustal events in Oregon have reached Richter local magnitude (M_L) 6 (the 1936 Milton-Freewater M_L 6.1 earthquake and the 1993 Klamath Falls M_L 6.0 earthquake) (Wong and Bott, 1995). The majority of Oregon's larger crustal earthquakes are in the M_L 4 to 5 range (Wong and Bott, 1995).

Table 2D summarizes earthquakes with a M of 3.5 or greater that have occurred within a ± 40 -mile radius of Eugene in the last 180 years (Johnson et al., 1994; ANSS, 2013). Although not listed, several sources make reference to a $M_L = 4 +$ earthquake ($MM = V$) with an epicenter near Corvallis. The coordinates of this earthquake (44.6 N, 123.2 W) suggest the 1946 or 1947 event was most likely located on the Corvallis fault (Bela, 1979; Yeats et al., 1996). Yeats et al. (1996) and Geomatrix Consultants (1995) also indicate that two other earthquakes have been felt near the Corvallis fault. One occurred in 1957 ($MM = III$) and the other in 1961 ($MM = III-IV$).

Table 2D. Historic Earthquakes within ± 40 -mile Radius of Eugene

Year	Month	Day	Hour	Minute	Latitude	Longitude	Depth (miles)	Magnitude
1961	08	19	04	56	44.7	122.5	unknown	$M = 4.5$
1962	09	05	05	37	44.5	122.9	unknown	$M = 3.5$

Note: M = unspecified magnitude, M_b = compressional body wave magnitude, M_c = primary coda magnitude, and M_L = local Richter magnitude

It should be noted that earthquakes in Oregon were not comprehensively documented until the 1840's (Wong and Bott, 1995). According to Wong and Bott (1995), seismograph stations sensitive to smaller earthquakes ($M_L \leq 4$ to 5) were not implemented in Northwestern Oregon until 1979 when the University of Washington expanded their seismograph network to Oregon. Prior to 1979, few seismograph stations were installed in Oregon. Oregon State University (Corvallis) likely had the first station installed in 1946 (Wong and Bott, 1995). The local Richter magnitude (M_L) of events occurring prior to the establishment of seismograph stations have been estimated based on correlations between magnitude and Modified Mercalli (MM) intensities. Some discrepancy exists in the correlations.

Distant strong earthquakes felt in the Eugene area are summarized in Table 3D (Noson et al., 1988; Bott and Wong, 1993; Stover and Coffman, 1993; Wiley et al., 1993; Wong and Bott, 1995; Black, 1996; USGS, 2001). None of these events caused significant reportable damage in the Eugene metropolitan area.

Table 3D. Distant Earthquakes Felt in the Eugene Area

Earthquake	Modified Mercalli Intensities (MM)
2001 Nisqually, Washington	II-III
1993 Klamath Falls, Oregon	IV
1993 Scotts Mills, Oregon	IV
1965 Seattle-Tacoma, Washington	I-IV
1962 Portland, Oregon	I-IV
1961 Lebanon/Albany, Oregon	IV
1949 Olympia, Washington	IV
1873 Crescent City, California	V

SEISMIC HAZARDS

The OSSC (2010) Section 1803.7 requires the evaluation of risks from a range of seismic hazards. A seismic hazard study by DOGAMI has been completed for the Eugene-Springfield area and part of this study included obtaining shear-wave velocity data (Wang et al., 1998; Black et al., 2000). More recent investigations have been completed by DOGAMI to identify geologic and seismic hazards (Burns et al., 2008). We have also developed conclusions regarding seismic hazards based on previous geotechnical and seismic studies performed within the project vicinity, our knowledge of the site geology, and the soil profile encountered in the explorations.

The relative earthquake hazard is based on the combined effects of ground shaking amplification and earthquake-induced landslides with a range in hazard from Zone A (highest hazard) to Zone D (lowest hazard). Based on the DOGAMI mapping, the site is within Zone D (lowest hazard) for the overall, relative earthquake hazard (Black et al., 2000).

Ground Motion Amplification. The influence of a soil deposit on the earthquake motion is routinely evaluated in terms of Site Effects, in which an estimate of the amplification or de-amplification of the underlying bedrock/firm soil seismic motions is made. As seismic energy propagates up through the soil strata, the energy is typically increased (i.e., amplified) or decreased (i.e., attenuated) to some extent. The site is underlain by fan-delta alluvial deposits consisting of a thin mantle of stiff clayey silt followed by medium dense to dense sandy gravel. Therefore, it is our opinion that the amplification hazard at the site is low. This conclusion is consistent with DOGAMI’s amplification hazard map, Hazard Zone 1 (low hazard, amplification ≤ 1) (Black et al., 2000). The relative ground-shaking amplification susceptibility map for Lane County also indicates that there is a low susceptibility to amplification (NEHRP Site Class B) (Burns et al., 2008).

Ground Rupture. We anticipate the risk of ground rupture is low due to lack of known faulting beneath the site. However, hidden and/or deep-seated active faults could remain undetected. Additionally, recent crustal seismic activity cannot always be tied to observable faults. In the event of a catastrophic earthquake with a large seismic moment, inactive faults could potentially be reactivated.

Landslides and Earthquake-Induced Landslides. The site is located on a relatively flat ground. DOGAMI's hazard map indicates there is no hazard for instability in the immediate vicinity of the school site (Black et al., 2000). Burns et al. (2008) mapped the site as being within an area of primarily low landslide susceptibility, with no identified landslides.

Based on our site and subsurface observations, we believe the risk of slope instability (earthquake-induced or otherwise) that could affect the school structures is low. Such conditions typically have little or no landslide risk.

Liquefaction and Lateral Spread. Liquefiable soils typically consist of loose, fine-grained sand and non-plastic or low plasticity silt below the ground water table. The explorations indicate the school site is underlain by predominantly stiff, medium plasticity clayey silt, followed by medium dense to dense sandy gravel. Therefore, it is our opinion that the risk of cyclically-induced liquefaction, ground subsidence or a bearing capacity failure beneath the tank foundations due to liquefaction is very low to negligible. The risk of seismically-induced lateral spread is also considered low because of the low liquefaction risk and the low risk of slope instability (discussed above).

The relative liquefaction hazard susceptibility map indicates the site is within a low to moderate liquefaction susceptibility zone (Burns et al., 2008). According to Black et al., (2000), gravel will only liquefy under exceptional circumstances and the best indicator of gravel liquefaction is determining the shear-wave velocity. Typically, very strong shaking in addition to shear-wave velocities less than 705 feet/second can liquefy clean sand and gravel deposits. Shear-wave velocities of Pleistocene gravels are consistently greater than 984 ft/sec; therefore, not liquefying (Black et al., 2000).

Tsunami/Seiche. Tsunami inundation is not applicable to this site since Eugene is not on the Oregon Coast. Seiche (the back and forth oscillations of a water body during a seismic event) is also not a concern due to the absence of large bodies of water near the site.

SITE CLASS, DESIGN EARTHQUAKES AND SITE RESPONSE SPECTRUM

The site is underlain by a thin mantle of fine-grained soil followed by a deep deposit of medium dense to dense gravels and gravels interbedded with clay or silt. Based on the available information, we recommend an OSSC/IBC Site Class D for analysis and design.

The OSSC (2010), Section 1803.3.2.1, requires the design of structures classified as essential or hazardous facilities, and major and special-occupancy structures address, at a minimum, the following earthquakes:

- Crustal: A shallow crustal earthquake on a real or assumed fault near the site with a minimum moment magnitude (M_w) of 6.0 or the design earthquake ground motion acceleration determined in accordance with the 2010 OSSC Section 1613.
- Intraplate: A deep subduction earthquake (Benioff Zone earthquake) with a moment magnitude (M_w) of 7.0 or greater on the seismogenic part of the subducting plate (Juan de Fuca) of the CSZ.
- Interface: A subduction earthquake with a minimum moment magnitude (M_w) of 8.5 on the seismogenic part of the interface between the Juan de Fuca and the North American Plates on the CSZ.

The design maximum considered earthquake ground motion maps provided in OSSC 2010 are based on the 2002 maps prepared by USGS for an earthquake with a 2% probability of exceedence in 50 years (i.e., a $\pm 2,475$ -year return period). USGS released updated maps in 2008. These maps are used in the 2012 IBC and will presumably be adopted into the next edition of the OSSC.

The 2002 and 2008 USGS maps were established based on probabilistic studies and include aggregate hazards from a variety of seismic sources. Information obtained from the USGS National Earthquake Hazard Mapping website indicates the following earthquake magnitudes and source-to-site distances were included in the 2002 USGS maps (USGS, 2002):

- Crustal: M_w 6.4 to 6.95 earthquake located ± 4 to 16 miles from the site.
- Subduction: M_w 8.3 earthquake located ± 35 to 70 miles from the site.
- Subduction: M_w 9.0 earthquake located ± 35 to 69 miles from the site.

The following earthquake magnitudes and source-to-site distances were included in the 2008 USGS maps (USGS, 2008):

- Crustal: M_w 6.2 to 6.8 earthquake located ± 4 to 61 miles from the site.
- Subduction: M_w 8.0 to 8.7 earthquake located ± 35 to 82 miles from the site.
- Subduction: M_w 9.0 to 9.2 earthquake located ± 35 to 81 miles from the site.

The earthquake magnitudes and source-to-site distances used to generate the 2002 and 2008 USGS maps satisfy the requirements of OSSC 2010. Refer to the Seismic Design section of the main report for a discussion of the peak bedrock acceleration and parameters for constructing the site response spectrum (Figure 3A, Appendix A).

FOUNDATION TYPE AND RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

Conventional shallow foundations (spread footings and continuous wall footings) are planned. Their analysis is discussed in the Engineering Analysis section of the main Geotechnical Report (pp. 7 and 8, and 10 and 11). Recommendations for the design and construction of foundations are found in the Recommendations section of the main Geotechnical Report (pp.12 through 17).

CONCLUSION

Based on the findings presented herein, it is our opinion there are no geologic or seismic hazards that require mitigation as part of the seismic upgrades to the school. The site response spectrum (Figure 3A, Appendix A) should be used to establish potential seismic acceleration forces on the structures.

This site-specific seismic hazard investigation for the Howard Elementary School in Eugene, Oregon, was prepared by Brooke Running, R.G., C.E.G.



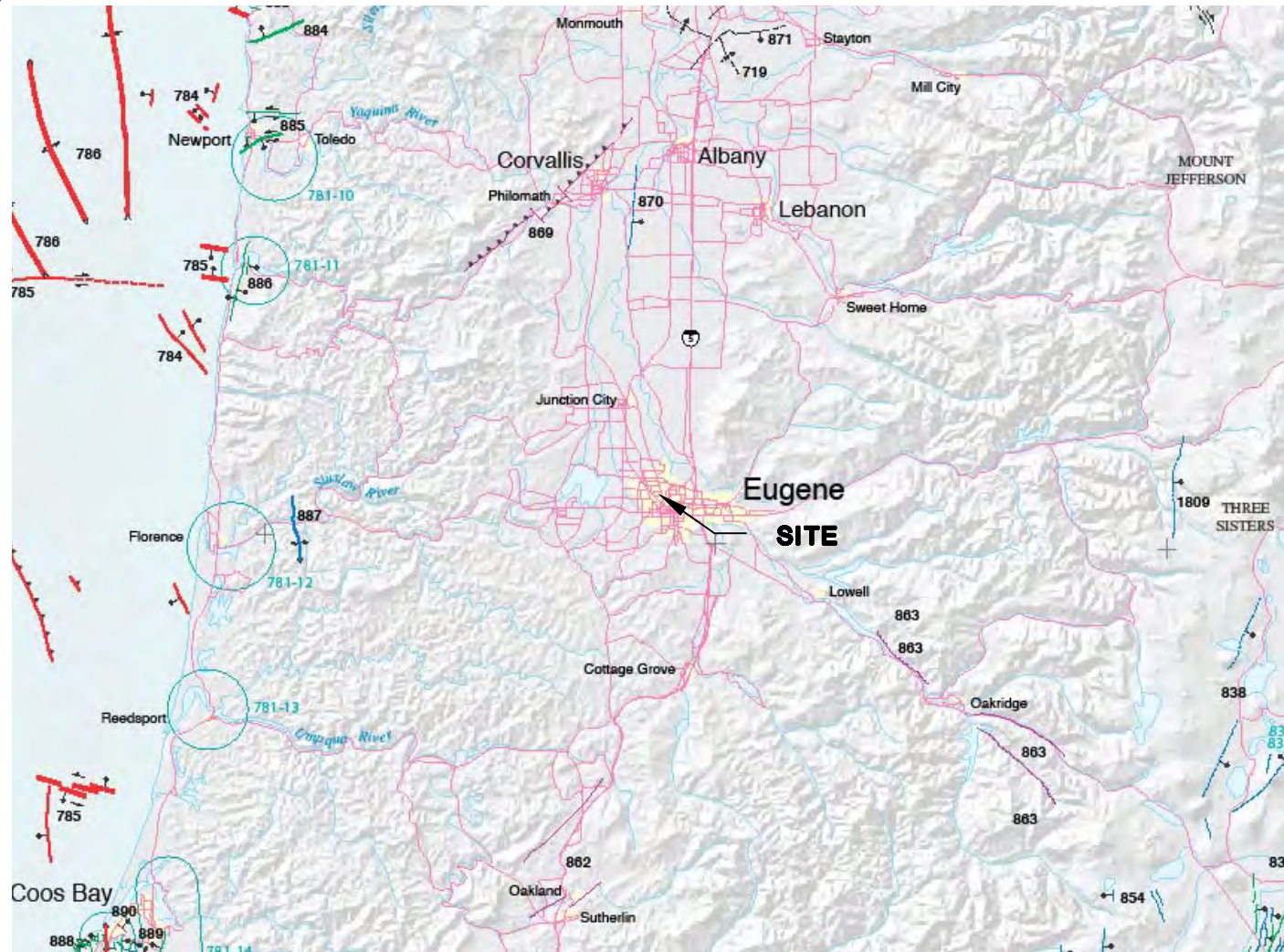
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NOT TO SCALE

LEGEND

- TIME OF MOST RECENT SURFACE RUPTURE**
- Red line: Holocene (<10,000 years) or post last glaciation (<15,000 years; 15 ka); no historic ruptures in Oregon to date
 - Blue line: Late Quaternary (<130,000; post penultimate glaciation)
 - Green line: Late and middle Quaternary (<750,000 years; 750 ka)
 - Pink line: Quaternary, undifferentiated (<1,600,000 years; <1.6 Ma)
 - Black line: Class B structure (age or origin uncertain)
- SLIP RATE**
- Thick black line: >5 mm/year
 - Medium black line: 1.0-5.0 mm/year
 - Thin black line: 0.2-1.0 mm/year
 - Dashed black line: <0.2 mm/year
- TRACE**
- Solid black line: Mostly continuous at map scale
 - Dashed black line: Mostly discontinuous at map scale
 - Dotted black line: Inferred or concealed
- STRUCTURE TYPE AND RELATED FEATURES**
- Red line with arrow: Normal or high-angle reverse fault
 - Blue line with arrow: Strike-slip fault
 - Green line with arrow: Thrust fault
 - Blue line with cross: Anticlinal fold
 - Green line with cross: Synclinal fold
 - Blue line with cross: Monoclinial fold
 - Blue line with arrow: Plunge direction of fold
 - Black line with arrow: Fault section marker
- DETAILED STUDY SITES**
- Blue circle: Trench site
 - Red circle: Subduction zone study site
- CULTURAL AND GEOGRAPHIC FEATURES**
- Red line: Divided highway
 - Blue line: Primary or secondary road
 - Blue line: Permanent river or stream
 - Blue line: Intermittent river or stream
 - Blue circle: Permanent or intermittent lake

NOTES:

1. PORTION OF MAP BASED ON MAP OF QUATERNARY FAULTS AND FOLDS IN OREGON (PERSONIUS ET AL., 2003).
2. SEE SITE SPECIFIC HAZARD STUDY FOR A DISCUSSION OF LOCAL FAULTING.
3. FAULTS: #862= UNNAMED FAULTS NEAR SUTHERLIN; #863= UPPER WILLAMETTE RIVER; #869= CORVALLIS; AND #870= OWL CREEK.

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DATE NOV. 2013
 DWN. BKR
 APPR. _____
 REVIS. _____
 PROJECT NO.
 2131078

QUATERNARY CRUSTAL FAULT MAP
SOUTHERN WILLAMETTE VALLEY
 HOWARD ELEMENTARY SCHOOL
 EUGENE, OREGON

FIGURE NO.
1D



July 15, 2014

Mr. Ben Brantley, Manager
Capital Improvement Program
Lane County School District 4J
Eugene, Oregon
Via Email: Brantley_b@4j.lane.edu

**RE: PEER REVIEW OF SEISMIC HAZARD STUDY
PREPARED BY FOUNDATION ENGINEERING, INC - DECEMBER 31, 2013
FOR HOWARD ELEMENTARY SCHOOL
EUGENE, OREGON**

A geotechnical engineer and structural engineer from Branch Engineering Inc. have reviewed the above referenced report, which is included as Appendix D of the *Geotechnical Investigation* by Foundation Engineering, Inc.. Our work scope did not include review of the *Geotechnical Investigation* report.

Based on our review, the report is complete and addresses the required elements of a Seismic Site Hazard Report as defined in the 2010 Oregon Structural Specialty Code (OSSC). Below are two suggested items to provide report clarity:

1. The caption on Figure 3A, referenced on pages 7 & 8 of the report, gives "Corvallis" as the location of Howard Elementary School; change to Eugene.
2. Number 10 of Section 1803.7 of the OSSC requires recommendations for foundation type and design criteria; we suggest referencing the appropriate sections of the *Geotechnical Investigation* to satisfy.

If there are any questions about our review, please contact the undersigned.

Sincerely,
Branch Engineering Inc,

A handwritten signature in blue ink, appearing to read "Ronald J. Derrick".

Ronald J. Derrick, P.E., G.E.
Principal Geotechnical Engineer

ALLOWANCES

The Undersigned proposes to include in the Base Bid indicated above the items of work relating to the following Allowances as described in the Project Manual, Section 01 2100. The Allowances may be authorized by the Owner for additional excavation and structural fills and shall be computed by multiplying the Contactor’s price per cubic yard as entered below by the quantity of 500 cubic yards.

Additional work includes the scope of Allowances will be subject to Owner approval. Unused portions of each Allowance will be deducted from the contract by changed order at the completion of the project. In the event that additional work is required in excess of the Allowances, the contract may be modified by considering these Allowances as the basis of unit costs.

ALLOWANCE NO. 1:

Over-excavation of unsuitable native soils as defined in Section 01 21 00 - Allowances

\$ _____ per Cubic Yard times the quantity of 500 Cubic Yards equals \$ _____

ALLOWANCE NO. 2:

Placement of Select Fill as defined in Section 01 21 00 - Allowances

\$ _____ per Cubic Yard times the quantity of 500 Cubic Yards equals \$ _____

ALLOWANCE NO. 3:

Placement of Granular Fill as defined in Section 01 21 00 - Allowances

\$ _____ per Cubic Yard times the quantity of 500 Cubic Yards equals \$ _____

BID SECURITY

Accompanying herewith is Bid Security, which is not less than ten percent (10%) of the total amount of the Base Bid plus additive alternates.

STIPULATIONS

The undersigned acknowledges the liquidated damages provision included in the Supplementary Conditions.

The undersigned agrees, if awarded the contract, to comply with the provisions of Oregon Revised Statutes 279C.800 through 279C.870 pertaining to the payment of prevailing rates of wage.

The undersigned agrees, if awarded the Contract, to execute and deliver to the Owner within ten (10) working days after receiving contract forms, a signed Agreement and a satisfactory Performance Bond and Payment Bond each in an amount equal to 100 percent (100%) of the Contract Sum.

For every Agreement of \$100,000 or greater in value, all Contractors and Subcontractors shall have a public works bond in the amount of \$30,000, filed with the Construction Contractors’ Board (CCB), in compliance with ORS 279C.836, before starting work on the project unless exempt. Contractor agrees to provide a copy of the Contractor’s BOLI Public Works bond with the signed Agreement as Specified in the Supplementary Conditions.

The undersigned agrees that the Bid Security accompanying this proposal is the measure of liquidated damages which the Owner will sustain by the failure of the undersigned to execute and deliver the above named agreement and bonds; and that if the undersigned defaults in executing that agreement within ten (10) days after forms are provided or providing the bonds, then the Bid Security shall become the property of the Owner; but if this proposal is not accepted within sixty (60) days of the time set for the opening of bids, or if the undersigned executes and delivers said agreement and bonds, the Bid Security shall be returned.

By submitting this Bid, the Bidder certifies that the Bidder:

- a) has available the appropriate financial, material, equipment, facility and personnel resources and expertise, or the ability to obtain the resources and expertise, necessary to meet all contractual responsibilities;
- b) has a satisfactory record of past performance;
- c) has a satisfactory record of integrity, and is not disqualified under ORS 279C.440;
- d) is qualified legally to contract with the Owner; and
- e) will promptly supply all necessary information in connection with any inquiry the Owner may make concerning the

responsibility of the Bidder.

Prior to award of a Contract, the Bidder shall submit appropriate documentation to allow the Owner to determine whether or not the Bidder is “responsible” according to the above criteria.

The contractor agrees with the provisions of Oregon Revised Statutes 279C.505, which requires that the contractor shall demonstrate it has established a drug-testing program for employees and will require each subcontractor providing labor for the Project to do the same.

The undersigned has received addenda numbers _____ to _____ inclusive and has included their provisions in the above Bid amounts.

The undersigned has visited the site to become familiar with conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

The undersigned certifies that the Bidder is a _____ Bidder under ORS. ("Resident" or "Non-resident", to be filled in by Bidder)

Names of Firm: _____

Street Address: _____
(City) (State) (Zip)

Telephone Number: _____ FAX Number: _____

Email Address: _____

Signed By: _____ Printed Name: _____
(Signature of Authorized Official. If bid is from a partnership, one of the partners must sign bid).

Date Signed: _____

Official Capacity: _____

If corporation, attest: _____ Date: _____
(Secretary of Corporation)

SEAL (If Corporate)

_____ Corporation
_____ Partnership
_____ Individual

Enclosed: Bid Security

NON-DISCRIMINATION REQUIREMENT

Contractor certifies that the Contractor has not discriminated against minorities, women or emerging small business enterprises in obtaining any required subcontracts.

The Contractor agrees not to discriminate against any client, employee, or applicant for employment or for services, because of race, color, religion, sex, national origin, physical or mental handicap, sexual orientation or age, unless based upon bona fide occupational qualifications, and that they are otherwise in compliance with all federal, state and local laws prohibiting discrimination, with regard to, but not limited to, the following: Employment upgrading, demotion or transfer; Recruitment or recruitment advertising; Layoffs or termination; Rates of pay or other forms of compensation; Selection for training; Rendition of services. It is further understood that any vendor who is in violation of this clause shall be barred forthwith from receiving awards of any purchase order from the School District, unless a satisfactory showing is made that discriminatory practices have terminated and that a recurrence of such acts is unlikely.

FIRM NAME: _____

ADDRESS: _____

TELEPHONE: _____

BY: _____
(Company or Firm Officer)

BY: _____
(Type or Print Name)

NON-COLLUSION AFFIDAVIT

STATE OF _____)

County of _____)

I state that I am _____ of _____
(Title) (Name of Firm)

and that I am authorized to make this affidavit on behalf of my firm, and its owners, directors, and officers. I am the person responsible in my firm for the price(s) and the amount of this bid.

I state that:

(1) The price(s) and amount of this bid have been arrived at independently and without consultation, communication or agreement with any other contractor, bidder or potential bidder, except as disclosed on the attached appendix.

(2) That neither the price(s) nor the amount of this bid, and neither the approximate price(s) nor approximate amount of this bid, have been disclosed to any other firm or person who is a bidder or potential bidder, and they will not be disclosed before bid opening.

(3) No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than this bid, or to submit any intentionally high or noncompetitive bid or other form of complementary bid.

(4) The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or noncompetitive bid.

(5) _____, its affiliates, subsidiaries, officers, directors and
(Name of my Firm)

employees are not currently under investigation by any governmental agency and have not in the last four years been convicted of or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as described on the attached appendix.

I state that _____ understands and acknowledges that the above representations
(Name of my Firm)

are material and important, and will be relied on by School District 4J in awarding the contract(s) for which this bid is submitted. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from School District 4J of the true facts relating to the submission of bids for this contract.

(Authorized Signature)

Sworn to and subscribed before me this ____ day of _____, 2014

(Notary Public for Oregon)

My Commission Expires: _____

END OF BID FORM

**SECTION 00 4522
FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM**

PROJECT: Howard Elementary School

CIP NUMBER: 410-213-001

TO: Kathi Hernandez, Facilities Management Assistant
Eugene School District 4J
715 West Fourth Avenue
Eugene, Oregon 97402

BID SUBMISSION DEADLINE: Date: Tuesday, October 21, 2014

Time: 2:00

SUBMITTAL REQUIREMENTS

Subcontractor disclosure is required on all public improvement contracts greater than \$100,000.

This form must be submitted at the location specified in the Invitation to Bid on the advertised bid closing date and within two working hours after the advertised bid closing time.

List below the name of each subcontractor that will be furnishing labor or labor and materials, and that is required to be disclosed, the category of work that the subcontractor will be performing, and the dollar value of the subcontract. Enter "NONE" if there are no subcontractors that need to be disclosed. (ATTACH ADDITIONAL SHEETS IF NEEDED.)

SUBCONTRACTOR	DOLLAR VALUE	CATEGORY OF WORK
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

The above listed first- tier subcontractor(s) are providing labor, or labor and material, with a Dollar Value equal to or greater than:

- a) 5% of the total Contract Price, but at least \$15,000. [If the Dollar Value is less than \$15,000 do not list the subcontractor above.]
- b) \$350,000 regardless of the percentage of the total Contract Price

Failure to submit this form by the disclosure deadline will result in a non-responsive bid. A non-responsive bid will not be considered for award.

Form submitted by (Bidder Name): _____

Contact Name: _____ **Phone:** _____

Signature: _____

END OF DOCUMENT 00 45 22

SECTION 00 5213
FORM OF AGREEMENT

PART 1 GENERAL

STANDARD FORM

The form of Agreement will be executed on AIA Form A 101, Standard Form of Agreement Between Owner and Contractor, 2007 edition, which is included by reference. The document, as edited by Owner, is available for review at <http://www.4j.lane.edu/bids/> .

END OF DOCUMENT 00 52 13

**SECTION 00 7213
GENERAL CONDITIONS**

PART 1 GENERAL

STANDARD FORM

General Conditions of the Contract for Construction AIA Document A-201, 2007 edition, immediately following, are part of these specifications.

The Contractor and all Subcontractors shall read and be governed by them.

CONFLICTS

In the case of conflicts between the General Conditions and these Specifications, the Specifications govern.

END OF DOCUMENT 00 72 13



AIA[®] Document A201[™] – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

THE OWNER:

(Name, legal status and address)

THE ARCHITECT:

(Name, legal status and address)

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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.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

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

§ 1.1.5 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 and certify termination of the Agreement under Section 14.2.2.

§ 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.

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

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

§ 1.3 CAPITALIZATION

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

§ 1.4 INTERPRETATION

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

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment 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 this 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 material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them 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 material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

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

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

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the

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portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 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.

§ 2.2.3 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.

§ 2.2.4 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.

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

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

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

§ 2.4 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 deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor 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. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

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

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

§ 3.1.3 The Contractor shall not be relieved of 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.

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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 2.2.3, 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 make 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 as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and 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 not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required 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.

§ 3.4 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.

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§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 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.

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

§ 3.5 WARRANTY

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.

§ 3.6 TAXES

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

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

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

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

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

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend 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 promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

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

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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,

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

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

§ 3.9 SUPERINTENDENT

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

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply 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.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, 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.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be 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, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

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

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

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§ 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 the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

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

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

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

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

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

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

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completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 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, and 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 and patching shall be restored to the condition existing prior to the cutting, fitting and 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 such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's 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 or 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 Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect 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 such 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 the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

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§ 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 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.

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

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the 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, except as provided in Section 3.3.1.

§ 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 report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) 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 FACILITATING CONTRACT ADMINISTRATION

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 13.5.2 and 13.5.3, whether or not such 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, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

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

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize 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 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 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.

§ 4.2.12 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.

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

§ 4.2.14 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.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or 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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§ 5.2 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 furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

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

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

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

§ 5.3 SUBCONTRACTUAL RELATIONS

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

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor 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 such 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

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Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions 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 other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the 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, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

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

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report 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, except as to defects not then reasonably discoverable.

§ 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 the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors 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.

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ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; 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, and the Contractor shall proceed promptly, 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.

§ 7.3 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 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect 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.

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

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount

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for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the 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 7.3.7 shall be limited to the following:

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

§ 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 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.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. 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.

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

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

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

§ 8.2 PROGRESS AND COMPLETION

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 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.

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

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may 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 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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.

§ 9.2 SCHEDULE OF VALUES

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

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, 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 shall reflect retainage if provided for in the Contract Documents.

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

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

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

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

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encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having 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 issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons 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 comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. 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. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. 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 material 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 for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

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

§ 9.5.3 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 material or equipment suppliers 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 Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

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

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§ 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 material and equipment 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 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, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment 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 and 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, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven 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 shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

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

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall 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, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall 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 such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 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 and, 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 terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the 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 and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial 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 and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, 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. If such lien 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 such lien, including all costs and reasonable attorneys' fees.

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

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

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; 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 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 owners and users of adjacent sites and utilities.

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

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

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

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

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

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

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. 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 report the condition to the Owner and Architect in writing.

§ 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 such material or substance or who are to perform the task of removal or safe containment of such 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 in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

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

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

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

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

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§ 10.4 EMERGENCIES

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S 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;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .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.

§ 11.1.3 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.

§ 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.

§ 11.2 OWNER'S LIABILITY INSURANCE

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

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§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 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.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 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.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment

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property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 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 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.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to 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 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.

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ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

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

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

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

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an 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 written 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 2.4.

§ 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, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

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

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, 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 such 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 such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 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.

§ 13.4.2 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 there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 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 (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 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 13.5.1, 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 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by

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such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 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.

§ 13.5.5 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.

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

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may 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.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time 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 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

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

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

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

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

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor 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.

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§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, 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 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

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

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

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

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

§ 14.4.2 Upon receipt of 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 Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

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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, 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.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

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. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

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

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, 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. In the case of a continuing delay, only one Claim is necessary.

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

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

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

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

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, 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 arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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§ 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 such 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 an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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

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

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 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 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

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

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

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

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

§ 15.4.4 CONSOLIDATION OR JOINDER

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

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

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

SECTION 00 73 00
SUPPLEMENTARY CONDITIONS
FOR GENERAL CONDITIONS FOR THE CONTRACT FOR CONSTRUCTION

PART 1 GENERAL

The following supplements modify, change, delete from or add to AIA Document A201, General Conditions of the Contract for Construction 2007 Edition. Where any part of the AIA General Conditions is amended, voided, or superseded by the Supplementary Conditions, the unaltered provisions shall remain in effect.

1.1 ARTICLE 1 GENERAL PROVISIONS

A. BASIC DEFINITIONS

1. Add the following Subparagraphs:

1.1.9 ARCHITECT/ENGINEER

Where the term ARCHITECT is used in the Bidding documents, Contract documents, Addenda, Change Orders or other documents related to this contract it shall be defined as either "Architect" or "Engineer" depending upon which design professional has prepared the document in question. When the project has been designed and initiated under the direction of a licensed engineer, the term ENGINEER shall be substituted for the term "Architect" throughout all documents.

1.1.10 MISCELLANEOUS DEFINITIONS

- .1 "Provide:" Furnish and install, or furnish labor and materials required for installation, ready for use and in accordance with the Contract Documents.
- .2 "As shown:" As indicated, as detailed, as noted, or words of similar import refer to Contract Documents.
- .3 "Selected:" As selected by the Architect.
- .4 "Approved:" Approved by Architect.
- .5 "For Approval:" For the Architect's approval.

B. CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

1. Add the following to Subparagraph 1.2.1:

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

1. The Agreement.
2. Addenda, with those of later date having precedence over those of earlier date.
3. The Supplementary Conditions.
4. The General Conditions of the Contract for Construction.
5. Division 1 of the Specifications.
6. Drawings and Divisions 2- 49 of the Specifications.

In the case of conflicts or discrepancies between Drawings and Divisions 2- 49 of the Specifications or within either Document not clarified by Addendum, the Architect will determine which takes precedence in accordance with Subparagraph 4.2.11.

2. Add the following Subparagraphs:

1.2.4 If work is required in such a manner to make it impossible to produce first class work or should discrepancies appear among Contract Documents, request interpretation before proceeding with work. If Contractor fails to make such request, the Contractor will thereafter be expected to carry out work in satisfactory manner.

SUPPLEMENTARY CONDITIONS - DOCUMENT 00 73 00

1.2.5 Reference to codes, standard specifications, or other standards means and intends latest edition of such documents and/or adopted as of bid date. Where brand name products are specified and no installation instructions given herein, install product in accordance with the manufacturer's specifications and instructions, latest edition.

1.2.6 No provision of any reference standard specification, manual or code shall change the privileges or responsibilities of Owner, Architect, or Contractor, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to Architect, or any of Architect's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the work or any duty or authority to undertake responsibility contrary to the provision of the Contract Documents.

1.2.7 Sections of Division 1, General Requirements govern the execution of all sections of the specifications.

1.2 ARTICLE 2 OWNER

A. 2.1 GENERAL

1. Add the following Subparagraph:

2.1.3 The Owner is the Eugene School District 4J, 200 North Monroe Street, Eugene, Oregon 97402, (541) 790-7417.

The Owner's representative is **Ben Brantley, (541) 790-7427**, 715 West Fourth Avenue, Eugene, OR 97402.

B. INFORMATION AND SERVICES REQUIRED OF THE OWNER

1. Delete Subparagraph 2.2.5 and substitute the following:

2.2.5 The Contractor will be furnished free of charge up to **10** copies of the Contract Documents. The Owner will furnish additional copies requested by the Contractor at the cost of reproduction, postage and handling.

1.3 ARTICLE 3 CONTRACTOR

A. 3.1 GENERAL

1. Delete the second sentence to Subparagraph 3.1.1, and add the following:

The Contractor and each subcontractor shall maintain for the duration of the Project a registration with the Oregon State Construction Contractor's Board.

2. Add the following Subparagraph 3.1.4

3.1.4 The Contractor is required to demonstrate that an employee drug testing program is in place.

3. Add the following Subparagraph 3.1.5

3.1.5 The Contractor certifies that the Contractor is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in this Contract by any Federal department or agency. If requested by the Eugene 4J School District, the Contractor shall complete a Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion form. Any such form completed by the Contractor for this Contract shall be incorporated into this Contract by reference.

B. 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

1. Delete the last sentence to Subparagraph 3.2.4, and add the following:

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, unless the Contractor recognized such error, inconsistency, omission or difference and knowingly failed to report it to the Architect.

C. 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

1. Add the following Subparagraphs:

3.3.4 The Contractor shall review with all Subcontractors, construction means, methods and materials to be used to verify their compliance with all safety standards and laws and be responsible for compliance with same to insure safe, hazard free conditions for all persons visiting or working on the entire project.

3.3.5 The Contractor shall comply with the provisions of Oregon Revised Statutes and 4J Board Policy. Attention is directed to ORS 279A and 279C, Public Contracting Code.

D. 3.4 LABOR AND MATERIALS

1. Add the following Subparagraphs:

3.4.4 PAYMENT OF LABORERS AND MATERIALMEN, CONTRIBUTIONS TO INDUSTRIAL ACCIDENT FUND, LIENS AND WITHHOLDING TAXES: The Contractor shall: (1) Make payment promptly, as due, to all persons supplying to such contractor labor or material for the prosecution of the Work provided for in such contract. (2) Pay all contributions or amounts due the Industrial Accident Fund from such Contractor or subcontractor incurred in the performance of the contract. (3) Not permit any lien or claim to be filed or prosecuted against the state, county, school district, municipality, municipal corporation or subdivision thereof, on account of any labor or material furnished. (4) Pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.

3.4.5 HOURS OF LABOR: No person shall be employed for more than ten hours in any one day, or 40 hours in any one week, except in the cases of necessity, emergency, or where the public policy absolutely requires it, and in such cases the person so employed shall be paid at least time and a half of the regular pay for all time worked.

.1 For all overtime in excess of eight hours a day or 40 hours in any one week when the work week is five consecutive days, Monday through Friday; or

.2 For all overtime in excess of 10 hours a day or 40 hours in any one week when the work week is four consecutive days, Monday through Friday; and

.3 For all work performed on Saturday and on any legal holiday specified in ORS 279C.540.

.4 Worker claims for overtime, in order to be considered, must be filed with the Contractor within 90 days from the completion of the contract, in accordance with ORS 279C.545.

The Contractor shall give notice to employees who work on a public contract in writing, either at the time of hire or before commencement of work on the contract, or by posting a notice in a location frequented by employees, of the number of hours per day and days per week the employees may be required to work.

3.4.6 PAYMENT FOR MEDICAL CARE AND PROVIDING WORKERS' COMPENSATION: The Contractor shall promptly, as due, make payment to any person, co-partnership, association or corporation, furnishing medical, surgical and hospital care or other needed care and attention, incident to sickness or injury, to the employees of such Contractor, of all sums which the Contractor agrees to pay for such services and all moneys and sums which the Contractor collected or deducted from the wages of employees pursuant to any law, contract or agreement for the purpose of providing or paying for such service. All employers working under this contract are subject employers and must comply with ORS 656.017.

3.4.7 PREVAILING WAGE RATES: When the total price of the Project is \$50,000 or more, each worker in each trade or occupation employed in the performance of this Contract either by the contractor, subcontractor or other person doing or contracting to do contracting for the whole or any part of the Work on the Contract shall be paid not less than the applicable state prevailing rate of wage. This provision applies to all contracts, regardless of the price of the individual contract, as long as the combined price of all contracts awarded on the Project is \$50,000 or more.

a. The existing Oregon prevailing rate of wage in effect at the time the specifications are first advertised for bid solicitations is the applicable rate.

- b. The Owner will pay the public works fee to Oregon Bureau of Labor and Industries.
 - c. Certification of rate or wage by Contractor or Subcontractor (ORS 279C.845):
 - .1 The contractor or the contractor's surety and every subcontractor or the subcontractor's surety shall file certified statements with the public agency in writing, on a form prescribed by the Commissioner of the Bureau of Labor and Industries, certifying the hourly rate of wage paid each worker whom the contractor or the subcontractor has employed upon the public works, and further certifying that no worker employed upon the public works has been paid less than the higher of the applicable state or federal prevailing rate of wage or less than the minimum hourly rate of wage specified in the contract. The certificate and statement shall be verified by the oath of the contractor or the contractor's surety or subcontractor or the subcontractor's surety that the contractor or subcontractor has read the statement and certificate and knows the contents thereof and that the same is true to the contractor or subcontractor's knowledge. The certified statements shall set out accurately and completely the payroll records for the prior week, including the name and address of each worker, the worker's correct classification, rate of pay, daily and weekly number of hours worked, deductions made, and actual wages paid.
 - .2 If the Contractor does not file certified payroll as required (at least once per month) the Owner will withhold 25% of the amounts due the Contractor, in addition to any other required retainage.
 - .3 If a first-tier Subcontractor does not file certified payroll reports as required, the prime Contractor shall withhold 25% of amounts due the first-tier Subcontractor.
 - .4 Each certified statement required by subsection (1) of this section shall be delivered or mailed by the contractor or subcontractor to the public contracting agency. Certified statements shall be submitted to the public contracting agency once a month by the fifth business day of the following month, for each week workers are employed. Information submitted on certified statements may be used only to ensure compliance with the provisions of ORS 279C.800 to 279C.870.
 - .5 Each contractor or subcontractor shall preserve the certified statements for a period of three years from the date of completion of the contract.
 - .6 Certified statements received by a public agency are public records subject to the provisions of ORS 192.410 to 192.505. As such, they must be made available upon request.
 - 3.4.8 PAYMENT OF CLAIMS BY PUBLIC OFFICERS: If the Contractor fails, neglects or refuses to make prompt payment of any claims for labor or services furnished to the Contractor or a subcontractor by any person in connection with this Contract as such claim becomes due, the Owner may pay such claim and charge the amount of the payment against funds due or to become due the Contractor by reason of this Contract.
 - 3.4.9 PAYMENT FOR MEDICAL CARE AND PROVIDING WORKERS' COMPENSATION: The Contractor shall promptly, as due, make payment to any person, co-partnership, association or corporation, furnishing medical, surgical and hospital care or other needed care and attention, incident to sickness or injury, to the employees of such Contractor, of all sums which the Contractor agrees to pay for such services and all moneys and sums which the Contractor collected or deducted from the wages of employees pursuant to any law, contract or agreement for the purpose of providing or paying for such service.
 - 3.4.10 Any person owed for labor or material by a subcontractor or Contractor may file a complaint with the Construction Contractors Board in accordance with ORS 279C.515(3).
- E. 3.7 PERMITS, FEES AND NOTICES
- 1. Delete Subparagraph 3.7.1, and substitute the following:
 - 3.7.1 The OWNER will pay the plan check fee, building permit fee, and systems development charges directly to the authority having jurisdiction. [The Owner will pay the initial review and approval costs for deferred submittals, which are specifically required by the governing jurisdiction during the plan review process, directly to the authority having jurisdiction. Any deferred submittal costs due to incomplete](#)

submittals, or corrections required by the governing jurisdiction shall be the responsibility of the contractor.

The CONTRACTOR shall pay for all other permits, fees, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded. The Contractor shall pick up permits and call for inspections through final inspection, as required by the City Building Department.

F. 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

1. Add the following to Subparagraph 3.12.5:

Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect without action.

2. Add the following to Subparagraph 3.12.9:

Shop drawings that are submitted to the Architect for review do not constitute "in writing" unless it is brought to the attention of the Architect, in written form, that specific changes are being suggested. In any event, changes to the contract documents by means of shop drawings become the responsibility of the person initiating such changes.

G. 3.18 INDEMNIFICATION

1. Delete Subparagraph 3.18.1, and substitute the following:

13.18.1 To the fullest extent of the law, the Contractor will defend, indemnify, hold harmless and reimburse the Eugene School District 4J (including its officers, board members, agents, and employees) from all claims, demands, suits, actions, penalties, and damage expenses, for liability of any kind including attorney's fees. To the extent that death or bodily injury to persons or damage to property arises out of the fault of the Contractor, the Contractor's indemnity obligation exists only to the extent that the death or bodily injury to persons or damage to property arises out of the fault of the Contractor, or the fault of the Contractor's agents, representatives or subcontractors, contributed to or caused such damage, whether or not such incidents are contributed to or caused in any part by Eugene School District 4J.

1.4 ARTICLE 4 ARCHITECT

A. 4.1 GENERAL

1. Modify Paragraph 4.1.1

- a. In the first sentence delete "shall retain" and insert "may have retained" in its place.
- b. Add sentence: "The term "Architect" means the Architect or the Architect's authorized representative."

2. Add the following to Subparagraph 4.1.2:

Written consent of the Contractor shall only apply to those items which directly or indirectly affect the work of the Contractor.

3. Add the following Subparagraph:

In the first sentence delete "shall" and insert "may" in its place.

4. Add the following Subparagraph:

4.1.4 The Architect is defined as:

PIVOT Architecture, 44 W. Broadway, Eugene, OR 97401; 541-342-7291.

B. 4.2 ADMINISTRATION OF THE CONTRACT

1. Add the following sentence to 4.2.1:

The architect may be retained to administer the Contract through the specified period for correction of the Work described in Section 12.2

2. Add the following to Subparagraph 4.2.4:

4.2.4.1 The Owner may communicate directly with the Contractor when necessary or appropriate. The Owner may give direction to the Contractor in matters related to access to the site, coordination with Owner's occupancy and use by the public, use of parking and staging areas, use of potentially hazardous products, drug and alcohol policy, no smoking policy, appropriate dress and behavior, safety requirements and safe work practices, where appropriate. The Owner will advise the Architect regarding any communication with or direction given to the Contractor.

4.2.4.2 Representatives of the Owner, Contractor and Architect shall meet periodically at mutually agreed-upon intervals for the purpose of establishing procedures to facilitate cooperation, communication and timely responses among the participants. By participating in this arrangement, the parties do not intend to create additional contractual obligations or modify the legal relationships which may otherwise exist. Nothing in this agreement shall give the Architect the authority to make decisions or give direction without the Owner's concurrence.

3. Add the following to Subparagraph 4.2.9:

4.2.9.1 The Architect will make one inspection for the determination of Substantial Completion and one for determination of Final Acceptance. Such inspections will be made only after receipt of written notification of readiness for such inspections from Contractor.

4.2.9.2 Should additional inspections beyond those listed in 4.2.9.1 be required due to Contractor's failure to satisfactorily complete all work, the Contractor shall become responsible for all costs incurred by the Owner in conjunction with required re-inspections. A deductive Change Order shall be prepared using the following hourly rates as the basis for calculating the amounts to be deducted:

Architect/Engineer:	\$125 per hour
District 4J Personnel:	\$ 75 per hour

4.2.9.3 The amount to be deducted from the Contract shall be calculated by multiplying the hours expended in additional inspections and documentation by the hourly rates listed in 4.2.9.2.

4. Add the following sentence to Subparagraph 4.2.11:

The architect's response will be within 10 days of receipt of written requests from the Owner or Contractor.

5. Delete Subparagraph 4.2.13, and substitute the following:

4.2.13 Decisions on matters related to aesthetic effect will be made collaboratively between the Owner and the Architect. The final decision shall be the Owner's, if consistent with the intent expressed in the Contract Documents.

6. Add the following sentence to Subparagraph 4.2.14

The architect's response will be within 10 days of receipt of written requests from the Owner or Contractor.

1.5 ARTICLE 5 SUBCONTRACTORS

A. 5.3 SUBCONTRACTUAL RELATIONS

1. Add the following Subparagraphs:

5.3.1 The Contractor shall include in each subcontract for property or services entered into by the Contractor and a subcontractor, including a material supplier, for the purpose of performing a construction contract:

- .1 A payment clause that obligates the Contractor to pay the subcontractor for satisfactory performance under its subcontract within 10 days out of such amounts as are paid to the Contractor by the owner under such contract; and
- .2 An interest penalty clause that obligates the Contractor to pay to the subcontractor an interest penalty on amounts due in the case of each payment not made in accordance with the payment clause included in the subcontract pursuant to paragraph .1 of this section for the period beginning on the day after the required payment date and ending on the date on which payment of the amount

due is made; computed at the rate specified in ORS 279C.580.

5.3.2 The Contractor shall include in each of its subcontracts, for the purpose of performance of such contract condition, a provision requiring the subcontractor to include a payment clause and an interest penalty clause conforming to the requirements of Subparagraph 5.3.1 in each of its subcontracts and to require each of its subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or supplier.

1.6 ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

No modifications.

1.7 ARTICLE 7 CHANGES IN THE WORK

A. 7.1 GENERAL

1. Paragraph 7.1.2, delete the following: “an order for minor changes in the Work can be issued by the Architect alone”.

2. Add the following Subparagraph 7.1.4 to Paragraph 7.1:

7.1.4 The combined overhead and profit included in the total cost or credit to the Owner of a change in the Work shall not exceed that stated in 7.1.4.4 below. In no case shall the Contractor’s or Subcontractors individual overhead and profit request exceed the following schedule:

.1 For the Contractor, for Work performed by the Contractor’s own forces, 15 percent of the cost.

.2 For the Contractor, for Work performed by the Contractor’s Subcontractors, 10 percent of the amount due the Subcontractors.

.3 For each Subcontractor involved, for Work performed by that Subcontractor’s own forces, 10 percent of the cost.

.4 The **Base Cost** to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.7., articles .1, .2, .3, .4, and .5. To this **Base Cost** is added the applicable overhead and profit. In no case shall the combined overhead and profit (including all Contractor and Subcontractor(s) overhead and profit) exceed 25 percent of this **Base Cost**.

.5 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 those applicable costs from paragraph 7.3.7, .1 - .5, and Subcontractor and Contractor overhead and profit as applicable.

.6 Cost of preparing change order shall not be included in cost of Change Order.

3. Add the following Subparagraph 7.1.5 to Paragraph 7.1:

7.1.5 A Change Order providing a net CREDIT to the Owner shall include a credit for overhead and profit based on the following schedule:

.1 For the Contractor, 5 percent of the Cost to be credited.

.2 For each Subcontractor, 5 percent of the Cost to be credited.

.3 For each Sub-subcontractor, 5 percent of the Cost to be credited.

.4 All other provisions of Subparagraph 7.1.4 shall apply to Credit Change Orders.

B. 7.3 CONSTRUCTION CHANGE DIRECTIVES

1. Add the following to Subparagraph 7.3.1:

For the purposes of this Agreement, The Owner’s “CHANGE REQUEST/PROCEED ORDER” may be substituted for and used interchangeably with “CONSTRUCTION CHANGE DIRECTIVE”.

2. Modify Subparagraph 7.3.7 as follows:

In the first sentence, delete the words "a reasonable amount." and substitute "an amount for overhead

and profit in accordance with Paragraph 7.1.4 or 7.1.5.”

3. Delete Subparagraph 7.3.7.1 and substitute the following:

7.3.7.1 The maximum allowable hourly wage rate for Changes to the Work shall be the appropriate Base Wage Rate plus Fringe Rate as listed for each occupation in the Prevailing Wage Rate for Public Works Contracts in Oregon manual issued by the Oregon Bureau of Industries; multiplied by 1.25. An amount for Overhead and Profit may be added in accordance with Paragraph 7.1.4 or 7.1.5.

4. Delete 7.3.7.3, and substitute the following:

7.3.7.3 Rental costs of machinery and equipment, exclusive of hand tools and motor vehicles, when rented from the Contractor or others;

5. Change the first sentence of Subparagraph 7.3.8 to read as follows:

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, including overhead and profit according to the schedule in Subparagraph 7.1.5 above.

6. Change the first sentence of Subparagraph 7.3.9 to read as follows:

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 the Application for Payment accompanied by an executed Change Order indicating the parties’ agreement with part or all of such costs.

1.8 ARTICLE 8 TIME

A. 8.2 PROGRESS AND COMPLETION

1. Add the following Subparagraph 8.2.4

8.2.4 The Contractor agrees that said work shall be executed regularly, diligently, at such a rate of progress as will insure Substantial Completion thereof within the time specified. It is expressly understood and agreed by and between the Contractor and the Owner that the time for the completion of the work described herein is reasonable taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

1.9 ARTICLE 9 PAYMENT AND COMPLETION

A. 9.2 SCHEDULE OF VALUES

1. Revise the first sentence of Subparagraph 9.2 to read as follows:

“... the Contractor shall submit to the Architect and the Owner,.....”

2. Add the following sentence to Paragraph 9.2:

Submit on AIA Document A703, latest edition.

B. 9.3 APPLICATIONS FOR PAYMENT

1. Add the following sentence to Subparagraph 9.3.1:

The form of Application for Payment shall be a notarized AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet.

2. Delete Clause 9.3.1.1, and substitute the following:

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, accompanied by an executed Change Order.

C. 9.5 DECISIONS TO WITHHOLD CERTIFICATION

1. Delete Subparagraph 9.5.3.

D. 9.6 PROGRESS PAYMENTS

1. Add the following Clause to Subparagraph 9.6.1:

9.6.1.1 After the Architect has issued a certificate for payment and it has been approved by the Owner, the Owner will pay the Contractor 95 percent (95%) of the total value of material and labor incorporated into the project as indicated on the Application for Payment less the aggregate of previous payments. Progress schedule update shall accompany each payment request.

9.6.1.2 Payment will be made within fifteen (15) days of approval of the Application for Payment by School District 4J ("Progress Payment Due Date").

9.6.1.3 The first Application for Payment and each subsequent Application for Payment will not be considered complete unless it is accompanied by the certified payroll for the contractor and all subcontractors requesting payment.

2. Add the following Subparagraph to Paragraph 9.6:

9.6.8 In lieu of cash retainage to be held by the Owner, the Contractor may select one of the following options:

- 1 The Contractor may deposit bonds or securities with the Owner or in any bank or trust company to be held for the benefit of the Owner. In such event, the Owner shall reduce the retainage in an equal amount to the value of the bonds and securities.
- 2 Upon written request of the Contractor, the Owner will deposit any amounts withheld as retainage in an interest-bearing account in a bank, savings bank, trust company or savings association for the benefit of the Owner. Interest earned shall accrue to the Contractor.
- 3 If the Owner incurs additional costs as a result of the exercise of any of the options for retainage described herein, the Owner may recover such costs from the Contractor by reduction of final payment.

E. 9.8 SUBSTANTIAL COMPLETION

1. Delete Subparagraph 9.8.1 and substitute the following:

9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can fully occupy and fully utilize the Work for its intended use with only minor corrective work remaining which can be accomplished without disruption of the occupants.

2. Delete the last two sentences to Subparagraph 9.8.5 and add the following:

9.8.5 Upon Substantial Completion of the Work, the Contractor may submit an application for payment in accordance with Subparagraph 9.3.1 in an amount sufficient to increase the total payments to ninety-five percent (95%) of the Contract Sum, less such amounts as the Architect determines for incomplete Work or unsettled claims.

F. 9.10 FINAL COMPLETION AND FINAL PAYMENT

1. Add the following Subparagraph to Paragraph 9.10:

9.10.6 The Contractor shall not permit any lien or claim to be filed or prosecuted against the Owner on account of any labor or material furnished in connection with the Work.

G. Add the following Paragraphs to Article 9:

1. 9.11 LIQUIDATED DAMAGES

9.11.1 The Owner will suffer financial loss if the Work is not Substantially Complete, as defined in Article 9.8.1 above, on the dates specified in Section 01 11 00. The Contractor and the Contractor's surety shall be liable for and shall pay the Owner the sum hereinafter stipulated as fixed, agreed, and liquidated damages for each calendar day of delay until the date established in the Certificate of Substantial Completion.

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The agreed amount of liquidated damages is \$1,000 per each calendar day and for each portion of the project. Delay of Substantial Completion of the school building shall result in liquidated damages and delay of Substantial Completion of the site shall result in separate liquidated damages. Damage shall be cumulative. The amount of liquidated damages may be reduced in cases of partial occupancy, at the sole discretion of the Owner.

2. 9.12 AGENCY PAYMENT FOR UNPAID LABOR OR SUPPLIES

9.12.1 Contract incomplete. If the Contract is still in force, the Agency may, in accordance with ORS 279C.515, pay a valid claim to the Entity furnishing the labor or services, and charge the amount against payments due or to become due to the Contractor under the Contract. If an Agency chooses to make such a payment as provided in 279C.515, the Contractor and the Contractor's surety shall not be relieved from liability for unpaid claims.

9.12.2. Contract completed. If the Contract has been completed and all funds disbursed to the prime Contractor, all claims shall be referred to the Contractor's surety for resolution. The Agency shall not make payments to subcontractors or suppliers for Work already paid for by the Agency.

1.10 ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

A. 10.1 SAFETY PRECAUTIONS AND PROGRAMS

1. Add the following sentence to Article 10.1

Where asbestos abatement is part of the Work, the Contractor or appropriate subcontractor shall be licensed by the Department of Environmental Quality to perform "asbestos abatement work", OAR 340-248-0120, Adopted January 25, 1990, and meet requirements of AHERA, as specified in Federal Register 40CFR, Part 763.

B. 10.3 HAZARDOUS MATERIALS

1. Delete Subparagraph 10.3.3.

1.11 ARTICLE 11 INSURANCE AND BONDS

A. 11.1 CONTRACTOR'S LIABILITY INSURANCE

1. Modify the second sentence of Subparagraph 11.1.2 as follows:

a. Delete the following: "...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 coverage as specified in the Contract Documents."

2. Add the following Clause to Subparagraph 11.1.2:

.1. The Contractor shall provide and maintain in force for the duration of this agreement, the following:

.1 General Insurance:

The Contractor shall maintain in force for the duration of this agreement a Umbrella Insurance Policy with the limits not less than \$5,000,000, a Commercial General Liability, Automobile Liability (owned, non-owned and hired) Insurance policy(s) written on an occurrence basis with limits not less than \$1,000,000 per occurrence and \$2,000,000 in the aggregated naming the District, its employees, officials and agents as an additional insured as respects to work or services performed under this agreement. This insurance will be primary to any insurance the District may carry on its own. If the District requires Professional Liability coverage, the terms, conditions, and limits must be approved by the District's Risk Manager. (eff. 4/2/13)

.2 Workers' Compensation:

Contractor shall provide and maintain workers' compensation coverage for its employees, officers, agents, or partners, as required by applicable workers' compensation laws.

.3 Evidence of Coverage:

Evidence of the above coverages issued by a company satisfactory to the District shall be

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provided to the District by way of a certificate of insurance before any work or services commence. A 30-day notice of cancellation or material change in coverage clause shall be included. It is the Contractor's obligation to provide the 30 days notice if not done so by the Contractor's insurance company(s). Failure to maintain the proper insurance shall be grounds for immediate termination of this Agreement.

.4 Subcontractors:

The Contractor shall require all subcontractors to provide and maintain general liability, auto liability, professional liability (as applicable) and Workers' Compensation insurance with coverage's equivalent to those required of the General Contractor in this Agreement. The Contractor shall require certificates of insurance from all subcontractors as evidence of coverage.

.5 Exceptions or Waivers:

Any exception or waiver of these requirements shall be subject to review and written approval from the Eugene School District Risk Manager.

3. Delete the third sentence of Subparagraph 11.1.3

B. 11.3 PROPERTY INSURANCE

1. Provided by Owner.

2. Add the following Subparagraph:

11.3.11 EQUIPMENT AND MATERIAL:

The Contractor shall be responsible for any loss, damage, or destruction of Contractor's own property, equipment, and materials used in conjunction with the Work.

C. 11.4 PERFORMANCE BOND AND PAYMENT BOND

1. Delete 11.4.1 and 11.4.2 and substitute the following:

11.4.1 Unless otherwise stated in the solicitation document, prior to execution of the Agreement, the Bidder shall furnish separate bonds that in all respects conform to the requirements of ORS 279C.380 covering the faithful performance of the Contract, and the payment of all obligations arising thereunder, each in an amount equal to one hundred percent (100%) of the Contract sum. The duration of the performance bond shall match the length of the project warranty.

11.4.2 The surety issuing such bonds shall be duly authorized and licensed to issue bonds in the State of Oregon. The bonds shall be executed by an Attorney-in-fact, principal or other authorized representative for the surety company, showing the Oregon agent for service, and bears the seal of the surety company. Where the bond is executed by a person outside the state of Oregon, his authority to execute bond shall be shown.

11.4.3 Bonds are to be obtained through a company that is on the US Government Treasury list for approved sureties and/or approved by the Owner's Risk Manager.

11.4.4 Bonds shall be submitted on AIA Document A312, latest edition.

11.4.5 The cost of furnishing such bonds shall be included in the bid.

11.4.6 The Contractor shall deliver the required bonds to the Owner with the signed Agreement to:

Don Philpot, Project Manager
Facilities Management Office
Eugene Public School District 4J
715 West Fourth
Eugene, Oregon 97402

11.4.7 The Contractor shall require the Attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of their power of attorney.

- D. Add the following Paragraphs to Article 11:

1. 11.5 PUBLIC WORKS BOND:

11.5.1 Pursuant to ORS 279C.836, for any contract awarded where the contract price is \$100,000 or greater, the Contractor and every subcontractor shall have a Public Works bond, in the amount of \$30,000 filed with the Construction Contractors Board (CCB) before starting work on the project unless exempt. This bond is in addition to performance bond and payment bond requirements. **A copy of the Contractor's State of Oregon Statutory Public Works Bond shall be provided with the executed contract documents.**

11.5.2 Contractor shall include in every subcontract a provision requiring their Subcontractors to have a public works bond filed with the CCB before starting work on the project, unless exempt. Contractors shall verify that all of their subcontractors have filed a public works bond with the CCB.

1.12 ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

A. 12.2 AFTER SUBSTANTIAL COMPLETION

1. Add the following sentence to Clause 12.2.2.1:

The correction period relating to faulty products and workmanship will begin on the date appearing on the Certificate of Substantial Completion, or if a Certificate of Substantial Completion is not issued, on the date appearing on the Final Certificate of Payment to the Contractor, whichever is earlier. The

Owner's use of the project will not alter the warranty period herein defined.

2. Add the following sentence to Clause 12.2.2.2:

The correction periods specified are an extension of the one-year correction period called for in the General Conditions and are in addition to any guaranty bond called for elsewhere.

1.13 ARTICLE 13 MISCELLANEOUS PROVISIONS

A. 13.1 GOVERNING LAW

1. Change Paragraph 13.1 to read as follows:

13.1 The Contract shall be governed by the law of the place where the Project is located.

- B. Add the following Subparagraph 13.1.1:

13.1.1 Contractor shall be in compliance with the Oregon Department of Revenue tax certification rules including OAR 150-305.385 (6)-A, (6)-B, (6)-C and (7).

- C. Revise Subparagraph 13.2.1 as follows:

Delete last two sentences, and replace with:

Contractor shall not assign, sell, dispose of, or transfer rights, nor delegate duties under the contract, either in whole or in part, without the Contracting Agency's prior written consent. Unless otherwise agreed by the Contracting Agency in writing, such consent shall not relieve the Contractor of any obligations under the contract. Any assignee or transferee shall be considered the agent of the Contractor and be bound to abide by all provisions of the contract. If the Contracting Agency consents in writing to an assignment, sale, disposal or transfer of the Contractor's rights or delegation of Contractor's duties, the Contractor and its surety, if any, shall remain liable to the Contracting Agency for complete performance of the contract as if no such assignment, sale, disposal, transfer or delegation had occurred unless the Contracting Agency otherwise agrees in writing, in accordance with ORS 279A.065.

- D. Delete Subparagraph 13.2.2

- E. Add the following Paragraphs to Article 13:

1. 13.8 ENVIRONMENTAL AND NATURAL RESOURCES LAWS AND RULES

13.8.1 The Contractor and subcontractors shall comply with federal, state, and local ordinances and regulations dealing with prevention of pollution and preservation of natural resources that affect Work of this project.

13.8.2 Pursuant to ORS 279C.525, If the Contractor is delayed or must undertake additional work by reason of existing regulation or ordinances of agencies not cited in the Contract Documents or due to the enactment of new or the amendment of existing statutes, ordinances, or regulations relating to the prevention of environmental pollution and the preservation of natural resources occurring after the Bid Date, the Owner will grant a time extension and issue a change order setting forth the additional work that must be undertaken. The change order shall not invalidate the contract and there shall be, in addition to a reasonable extension of the Contract time, a reasonable adjustment in the Contract price to compensate the successful bidder for all costs and expenses incurred, including overhead and profits, as a result of such delay or additional work.

2. 13.9 FOREIGN CONTRACTORS

In the event this Contract is awarded to a Contractor not domiciled in or registered to do business in the State of Oregon and the contract price exceeds \$10,000, the Contractor shall promptly report to the Department of Revenue the total price, terms of payment, length of contract, and such other information as the Department of Revenue may require before final payment can be received on the public contract. The Owner will satisfy itself that the requirement of this subsection has been complied with before it issues a Final Payment.

3. 13.10 EQUAL OPPORTUNITY

13.10.1 The Contractor shall maintain policies of employment as follows:

13.10.1.1 The Contractor and the Contractor's subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, national origin, physical or mental handicap, sexual orientation or age, unless based upon bona fide occupational qualifications; and that they are otherwise in compliance with all federal, state and local laws prohibiting discrimination. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. It is further understood that any vendor who is in violation of this clause shall be barred forthwith from receiving awards of any purchase order from the School District, unless a satisfactory showing is made that discriminatory practices have terminated and that a recurrence of such acts is unlikely. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of nondiscrimination.

13.10.1.2 The Contractor and the Contractor's subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.

4. 13.11 DRUG-TESTING PROGRAM

13.11.1 The contractor agrees with the provisions of Oregon Revised Statutes 279C.505, which requires that the contractor shall demonstrate it has established a drug-testing program for employees and will require each subcontractor providing labor for the Project to do the same.

1.14 ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

No modifications.

1.15 ARTICLE 15 CLAIMS AND DISPUTES

A. 15 CLAIMS AND DISPUTES

1. Add the following to Clause 15.1.5.2

Abnormal weather conditions for the purposes of this agreement are defined as conditions more extreme than any conditions experienced within the general vicinity of the site for each project for a comparable period at any time within the past ten years.

2. Delete Subparagraph 15.1.6.

B. 15.2 INITIAL DECISION

1. Modify Subparagraph 15.2.1 as follows:

In the third sentence, change "30 days" to read "10 days" and add the following: The Initial Decision Maker shall review all submitted claims and render decisions as soon as possible.

2. Modify Clause 15.2.6.1 as follows:

In the first sentence, change the "30 days and "60 days" to read "10 days" and "30 days" respectively.

C. 15.3 MEDIATION

1. Delete Paragraph 15.3 MEDIATION, and substitute the following:

15.3 MEDIATION AND ARBITRATION

15.3.1 Parties shall attempt to resolve all disputes at the lowest possible level. Both parties to this Agreement agree to provide other resources and personnel to negotiate and find resolution to disputes that cannot be resolved at the Project Manager level. As a next step, claims, disputes or other matters in question between the parties to this Agreement arising out of or relating to this Agreement or breach

SUPPLEMENTARY CONDITIONS - DOCUMENT 00 73 00

thereof shall be determined by mediation, arbitration or litigation. Disputes shall be initially submitted to mediation by a mediator chosen by the parties. The cost of mediation shall be borne equally by the parties. If the parties are unable to agree upon a mediator within five days or if mediation fails to resolve the dispute, either party may request that the dispute be submitted to arbitration before a single arbitrator agreed to by the parties in an additional five days. If both parties agree to arbitration but are unable to agree upon an arbitrator, each party shall select an arbitrator, the arbitrators so chosen shall select a third, and the decision of a majority of the arbitrators shall be final, binding the parties, and any judgment may be entered thereon. Unless the parties mutually agree otherwise, any arbitration proceeding shall be conducted in accordance with the currently in effect Construction Industry Arbitration Rules of the American Arbitration Association.

Notwithstanding the above, the Owner may, at the Owner's sole discretion, elect to resolve disputes in excess of \$50,000 by litigation, if mediation is not successful.

15.3.2 In the event of arbitration or litigation arising out of the execution of this Agreement, the prevailing party shall be entitled to recover from the adverse party, reasonable attorney fees and costs for the arbitration proceedings, trial court or any appellate proceeding, in the amount determined by the arbitrator or the court, as appropriate.

For the purposes of the above provisions referring to attorney fees and related costs, the prevailing party in an arbitration proceeding or trial shall be a claimant who receives an award or damages in excess of the adverse party's pretrial or prehearing offer made at least 10 days before trial or hearing. If the claimant receives an award of damages no greater than the adverse party's pretrial or prehearing offer, the adverse party shall be deemed to be the prevailing party. In the event both sides are awarded damages, the prevailing party shall be the party who recovers the net award, provided the recovery exceeds the adverse party's pretrial or prehearing offer. If the claimant net recovery is no greater than the adverse party's pretrial or prehearing offer, the adverse party shall be deemed the prevailing party.

D. 15.4 ARBITRATION

1. Delete Paragraph 15.4 ARBITRATION.

END OF DOCUMENT 00 73 00

SECTION 00 7343
PREVAILING WAGE RATES

PART 1 GENERAL

The Prevailing Wage Rates dated July 2014, including any subsequent corrections or amendments issued by the Oregon Bureau of Labor and Industries, are included as a portion of the Contract Documents by reference. Copies are available for review at the office of Facilities Management, School District 4J, and can be viewed on line at www.boli.state.or.us. Click on Prevailing Wages, then PWR Rate Publications, and then Prevailing Wage Rates for Public Works Contracts in Oregon (subject only to state law).

END OF DOCUMENT 00 73 43

SECTION 01 1100
SUMMARY OF WORK

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Construction of a replacement elementary school on the Howard Site followed by demolition of the existing school. Site improvements are included. The replacement school will be 2 story plus mechanical attic. The school is approximately 85,000 sf in building area.
 - 1. Project Location: Howard Elementary School, 700 Howard Ave, Eugene, OR 97404
 - 2. Owner: Eugene School District 4J, 715 West Fourth Avenue, Eugene, OR 97402.
- B. Architect Identification: The Contract Documents, dated September 23, 2014, were prepared for Project by PIVOT Architecture, 44 W. Broadway, Suite 300, Eugene, OR 97401.
- C. Project Manager: Ben Brantley has been appointed by Owner to serve as Project Coordinator.

1.03 CONTRACT

- A. Project will be constructed under a general construction contract.
 - 1. AIA Document A101 - Standard Form of Agreement Between Owner and Contractor.
 - 2. Form of Agreement is available for view at <http://www.4j.lane.edu/bids/>.

1.04 WORK SEQUENCE

- A. Do not commence Work until after execution of Agreement and receipt of Notice-to-Proceed from Owner.
- B. Perform portions of the work so that Substantial Completion of each portion occurs no later than the dates listed below.
 - 1. The building shall be Substantially Complete no later than February 1, 2016.
 - 2. Demolition of existing school and completion of site improvements by August 14, 2016.
- C. Achieve Final Completion within seven (7) days following the date of Substantial Completion.
- D. Owner Occupancy of the existing building
 - 1. The east wing of the existing building will be available for demolition June 28, 2016.
 - 2. The south wing and a portion of the west wing will be available for demolition July 7, 2016.
 - 3. The west wing will be available for demolition July 14, 2016.
 - 4. The Owner reserves the right to maintain the existing Howard Elementary School Building in operation until the dates listed above. The Owner may elect to vacate the existing building and move into the new building in March of 2016 in which case the Contractor may commence demolition in May 2016.

1.05 USE OF PREMISES

- A. Work Limits: Confine activities to Work Limit 1 until the existing Howard Elementary School is no longer in use. Work Limit 1 excludes the existing school, certain playgrounds, access for school buses and vehicle parking, and associated areas that shall remain in use. After the existing School is no longer in use, perform work within Work Limit 2 as approved by the Owner.
- B. Work Area Access: Existing Buildings and site outside the work limits will be occupied during the Work. Access to the work area will be available on a week-day basis from approximately 7:00 am to 4:00 pm. Coordinate all other work hour schedules with Owner so as not to interfere with Owner's use of the existing building and site.
- C. Limit use of the premises to construction activities in areas indicated; allow for Owner occupancy and use by the public, subject to approval by a District Safety Specialist.
- D. Site Access to areas outside the Work Limits: Maintain drives and building entrances and exits clear and protected at all times to Owner's, employees, and public access and for use by

emergency personnel. Do not use these areas for parking or storage. Schedule deliveries to minimize space and time requirements for storage of materials at site.

- E. Parking: Limit parking to Work Limits indicated on Drawings.
- F. Contractor Staging Areas: Limit staging to Work Limits indicated on Drawings.
- G. Construction Operations: Limited to Work Limits indicated on Drawings.
- H. Use of areas outside the Work Limits allowed only by written approval of Owner.

1.06 WORK UNDER SEPERATE CONTRACTS

- A. Separate Contract: Owner will award separate contracts for performance of certain construction operations at Project site. Those operations will be conducted prior to and simultaneously with work under this Contract.
- B. Separate Contracts Completed Previously:
 - 1. Kelly Middle School
 - a. Synthetic Turf Field and Running Track.
 - 2. Howard Elementary School
 - a. Earthwork and Partial Demolition in advance of new replacement school.
- C. Separate Contracts Complete Concurrently:
 - 1. Howard Elementary School
 - a. Asbestos Removal within existing school.
 - b. Security Camera Systems for Replacement School.
 - c. Furniture and Equipment Installation within Replacement School.
 - d. Playground Equipment Installation on the site.
 - e. Building Commissioning of new Howard Elementary School.
- D. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

1.07 FUTURE WORK

- A. Future Work Planned: None.

1.08 PRODUCTS ORDERED IN ADVANCE

- A. Products Ordered in Advance: None

1.09 OWNER-FURNISHED PRODUCTS

- A. Owner-Furnished Products:
 - 1. Temporary Construction Fence, See 01 5000 - Temporary Facilities and Controls
 - 2. Toilet Room Accessories, See Section 10 2800 - Toilet Room Accessories as listed below.
 - a. Coordinate placement of accessories to meet accessibility requirements, clearance from grab bars and placement of backing.
 - b. Toilet Room Accessories Include the following:
 - 1) Hand dryers
 - 2) Toilet paper dispensers
 - 3) Paper towel dispensers
 - 4) Soap dispensers
 - 5) Sanitary napkin disposal
 - c. Install Toilet Room Accessories as specified in Section 10 2800 Toilet Room Accessories and as indicated on drawings.
 - 3. Recycled lumber (Salvage from Partial Demolition work of earlier Contract), See Section 06 2000 Finish Carpentry for transportation, milling, and installation of Recycled Lumber.
 - 4. Wireless Access Points: See Section 27 2133 - Wireless Access Points for installation.
 - 5. Video Projectors and Mounts, See Section 27 4116 - Audio Video Systems for installation.
- B. Owner will furnish items listed above. The Work includes providing support systems to receive Owner's equipment [and plumbing, mechanical, and electrical connections].
 - 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.
 - a. Exception: Contractor will provide transportation of recycled lumber as indicated in Section 06 2000 Finish Carpentry.
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. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Architect noting discrepancies or anticipated problems in use of product.
6. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.
7. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
8. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.

1.10 COORDINATION AND PERMITS

- A. Coordination
 1. The Contractor is responsible for overall coordination of the Project.
 2. The Drawings and Specifications are arranged for convenience only and do not necessarily determine which trades perform the various portions of the Work.
 3. Coordinate sequence of work to accommodate agreed-upon Owner occupancy.
 4. Perform all necessary work to receive and/or join the work of all trades.
 5. Verify location of existing utilities and protect from damage.
- B. Permits and Fees
 1. The Owner will be responsible for filing and paying for building permits and all fees associated with the building permit, system development charges, impact fees, etc. The Contractor will be responsible for picking up all Project permits and will have full responsibility for requirements of and payments for all trade permits (i.e. electrical, plumbing, mechanical).

1.11 DELEGATED DESIGN REQUIREMENTS

- A. Certain components of the Work under this project are Delegated Design. It is the Contractor's responsibility to coordinate and assume or assign to subcontractors the complete responsibilities for the design, calculation, submittals, fabrication, transportation and installation of the Delegated Design portions or components as required. Delegated Design components of the Work are defined as complete operational systems, provided for their intended use.
- B. Submit deferred submittals for delegated design elements to the governing agency for the separate approval of each Delegated Design item as defined in Section 01 3300 - Submittal Procedures.
- C. Owner shall not be responsible to pay for any delays, additional products, additional hours of work or overtime, restocking or rework required due to failure by the Contractor or the subcontractor to coordinate their work with the work of the other trades on the project or to provide the Delegated Design portion or component in a timely manner to meet the schedule of the project.
- D. Delegated Design components include, but are not limited to the following:
 1. Steel Joists, Section 05 2100 - Steel Joist Framing.
 2. Cold-Formed Metal Framing, Section 05 4000 - Cold-Formed Metal Framing.
 3. Ship's Ladders, Section 05 5000 - Metal Fabrications.
 4. Metal Stairs, Section 05 5100 - Metal Stairs.
 5. Metal Roof Panels, Section 07 4113 - Metal Roof Panels.
 6. Firestopping, Section 07 84 00 - Firestopping.
 7. Aluminum Storefront, Section 08 4313 - Aluminum-Framed Storefronts.

8. Glazed Aluminum Curtain Walls, Section - 08 4413.
9. Metal Framed Skylights, Section 08 6300 - Metal-Framed Skylights.
10. Butt Glazing/Frameless Glass Relites, Section 08 8000 - Glazing.
11. Seismic Anchorage for Suspended Acoustical Ceilings, Section 09 5100 - Acoustical Ceilings.
12. Flagpoles, Section 10 7500 - Flagpoles.
13. Seismic Anchorage Foodservice Equipment, Section 11 4000 - Foodservice Equipment.
14. Canopy Hood/Fire Protection, Section 11 4000 - Foodservice Equipment.
15. Walk-in Cold Storage Rooms, Section 11 4000 - Foodservice Equipment.
16. Seismic Anchorage Divisions 21, 23, 26, 27 and 28 equipment, hoods, panels and other components of mechanical, plumbing, gas and electrical systems.
17. Fire Suppression, Division 21.
18. Fire Alarm System, Division 28.
19. Additional requirements from specific sections.

1.12 PUBLIC RIGHT OF WAY WORK

- A. Improvements in the Public Right of Way along Howard Lane are to be performed under a Lane County Facility Permit. Drawings prepared under standards for Privately Engineered Public Improvements (PEPI) are included in the Work of this Contract. Follow referenced standards for Public Right of Way work including but not limited to inspections, procedures, testing, standard specifications, standard details, and requirements. The requirements of the County Facility Permit notwithstanding, the Contractor shall be bound by the General and Supplementary General Conditions and to the Agreement between Owner and Contractor.

1.13 MISCELLANEOUS PROVISIONS

- A. DRUG AND ALCOHOL POLICY
 1. The possession, use, or distribution of illicit drugs and alcohol on school premises is prohibited. Prescription medications brought to the project site shall be in the original container bearing the name of the drug, the name of the physician and the prescribed dosage.
- B. USE OF TOBACCO PRODUCTS
 1. Smoking and the other use of tobacco products is prohibited on all school district property pursuant to OAR 581-021-0110.
- C. SAFETY REQUIREMENTS
 1. Safety must not be sacrificed for the sake of productivity or expedience. Safety of students, staff, and the public is critical. Take all reasonable precautions to prevent endangerment or injury. Advise and coordinate operations with the school office.
 2. All contractors who perform work on District property, and their employees, are expected to know the District's expectations for safe work and to adhere to those expectations.
 3. Contractor's are to adhere to the regulations of Oregon OSHA for all projects within the School District.
- D. GENERAL SAFE WORK PRACTICES
 1. Students, public and school staff shall not be put at risk by the activities of contractors or their employees.
 2. Safe vehicle operation rules are to be followed at all times. These include positioning vehicles to minimize the necessity of backing and providing a "spotter", someone who will make sure that people do not run into the path of a vehicle when driving on a playground or field that is occupied by students.
 3. Tools shall never be left out when an unsecured work area is vacated.
 4. Ladders and scaffolding will be taken down when an unsecured work area is vacated.
 5. Open holes and other tripping hazards shall be fenced or barricaded when an unsecured work area is vacated.
 6. Operations resulting in vapors, emissions or flying objects shall be conducted in such a way as to prevent exposure to any unprotected parties or property.

7. "Secured Work Area" is defined as an area having a perimeter cyclone fence at least 6 feet in height, with gates which close and lock so that no casual entrance is possible by unauthorized adults or children.
 8. Contractor to follow all OR-OSHA rules for Confined Spaces, where applicable.
- E. COMMUNICATIONS REGARDING UNSAFE PRACTICES
1. Upon perceiving a problem, the District will immediately communicate the concern to the Contractor or Contractor's representative on the work site.
 2. If agreement on correction of unsafe conditions cannot be reached, the concerns of the District shall prevail and safety concerns shall be addressed in accordance with the District requirements.
- F. ELECTRICAL PANELS - LOCKOUT/TAGOUT
1. Contractor shall implement a Lockout/Tag-out program for his employees who take equipment out of service or place equipment back into service. Contractor shall review the District's Energy Control Program prior to commencing work. Rules applying to this procedure are Oregon Occupational Safety and Health Code OAR 437, Division 2, Subdivision J, General Environmental Controls Lockout/Tag-out (1919.147), or latest edition.
- G. ARC FLASH – ELECTRICAL SAFETY
1. Contractor shall comply with NFPA 70E (Electrical Safety in the Workplace), current edition. Contractor shall comply with Oregon OSHA 1910.137 (Personal Protective Equipment). The Contractor shall review with the School District Project Manager the 'Eugene School District Electrical Safety Program' before any work commences. The Contractor shall comply with all 'Arc Flash' and 'Electrical Safety' protocols referenced in any and all NFPA, OSHA, OROSHA, NEC, NESC, UL, IBC, IFC and ANSI documents (current editions).
- H. POTENTIALLY HAZARDOUS PRODUCTS
1. The District attempts to maintain a safe and healthy environment for students and staff. The Contractor is therefore required to follow District guidelines controlling the use of potentially hazardous products and to use these products in a safe manner. Guidelines include the use of materials (adhesives, coatings, carpeting, etc.) which are known to emit little or no airborne pollutants.
 2. MSDS information is required for all potentially hazardous products. The Project Manager and a District Safety Specialist will review these and determine what, if any, mitigation procedures will be required.
 3. Contractor is to maintain and post copies of all MSDS information at the project site and adhere to the required controls.
 4. Contractor is to ensure that work area by students and teachers is restricted. The District will provide signage appropriate for this purpose. The Contractor is to construct and maintain appropriate barriers. This shall include provision of physical separation barriers between "construction" and "occupied" spaces.
 5. Contractor to adopt means of maintaining the construction space in negative air pressure in relation to occupied spaces.
 6. Where there is a new or existing ventilation system in an affected space, the system shall be adjusted to provide the maximum amount of outside air possible with the system.
 7. Efforts shall be made to install and operate new ventilation systems as soon in the construction process as practical.
- I. ASBESTOS CONTAINING MATERIALS WARNING
1. Asbestos containing materials are known to exist in areas of the Work. The Contractor shall not, in any way, disturb materials which are known to contain asbestos, assumed to contain asbestos, or otherwise have not been tested and confirmed to be asbestos free.
 2. Where access to concealed spaces is required, or it is necessary to disturb building materials such as for drilling of holes, cutting, etc., notify the Owner so that proper investigation and/or removal procedures are followed.

3. Prior to commencing Work, the Contractor shall meet with the District Safety Specialist and review the Owner's Asbestos Management Plan for the locations of asbestos-containing materials and/or materials assumed to contain asbestos. After reviewing the Owner's Asbestos Management Plan, the Contractor is required to sign Form 01 11 00A, Asbestos-containing Materials Notification Statement, provided at the end of this Section.
 4. Contractor must not install any asbestos-containing materials when performing the Work of this project. At the completion of the Work, Contractor will be required to furnish a statement stating that no asbestos-containing materials were installed during the course of the Work. Refer to Sample Form 01 11 00B at the end of this Section.
- J. FULL TIME SUPERINTENDENT DISCLOSURE STATEMENT
1. Prior to or in conjunction with the Preconstruction Conference, the Contractor shall submit the disclosure statement which identifies the Full Time Superintendent for this Project. The form for this statement, Form 01 11 00C, is provided at the end of this Section.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PART 4 ASBESTOS FORMS

FORM 01 11 00A
ASBESTOS-CONTAINING MATERIALS NOTIFICATION STATEMENT
FOR CONTRACTORS

THIS FORM MUST BE COMPLETED AND SIGNED BY THE CONTRACTOR PRIOR TO BEGINNING WORK IN ANY EUGENE SCHOOL DISTRICT 4J BUILDING.

THE PRESENCE OF KNOWN AND ASSUMED ASBESTOS CONTAINING MATERIALS IS DOCUMENTED IN THE AHERA MANAGEMENT PLAN FOR EACH BUILDING. COPIES OF THE AHERA MANAGEMENT PLAN ARE AVAILABLE IN THE MAIN OFFICE OF EACH BUILDING AND IN THE FACILITIES MANAGEMENT OFFICE AT 715 WEST FOURTH AVENUE, EUGENE, OREGON. THE DISTRICT ASBESTOS SPECIALIST MUST BE INFORMED OF THE CONTRACTOR'S ACTIVITIES IN EACH BUILDING PRIOR TO THE START OF WORK SO THAT THE CONTRACTOR CAN BE INFORMED ON HOW TO USE THE AHERA MANAGEMENT PLAN AND TO DETERMINE IF ANY ASBESTOS-CONTAINING MATERIALS ARE LIKELY TO BE IMPACTED BY THE WORK OF THE CONTRACTOR.

THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING ALL EMPLOYEES AND SUBCONTRACTORS OF THE PRESENCE OF ASBESTOS IN THE BUILDING. THE CONTRACTOR SHALL NOT DISTURB KNOWN OR ASSUMED ASBESTOS-CONTAINING MATERIALS. IF THE CONTRACTOR DISCOVERS SUSPECTED ASBESTOS-CONTAINING MATERIALS THAT HAVE NOT BEEN IDENTIFIED, THE CONTRACTOR MUST STOP ANY WORK IMPACTING THE SUSPECTED MATERIALS AND NOTIFY THE DISTRICT ASBESTOS SPECIALIST SO THAT THE MATERIAL CAN BE SAMPLED. ANY ASBESTOS-CONTAINING MATERIALS THAT MUST BE REMOVED TO ALLOW THE CONTRACTOR TO COMPLETE THE CONTRACTOR'S WORK WILL BE REMOVED BY THE DISTRICT UNDER SEPARATE CONTRACT. IF THE CONTRACTOR DISTURBS ASBESTOS-CONTAINING MATERIALS, THE CONTRACTOR WILL BE RESPONSIBLE FOR THE COST OF THE CLEANUP AND DECONTAMINATION.

I _____, REPRESENTING _____,
(Print Name of Representative) (Business Name)

HAVE BEEN NOTIFIED OF THE LOCATION OF THE AHERA MANAGEMENT PLAN AND AGREE TO AVOID IMPACTING ALL KNOWN OR ASSUMED ASBESTOS-CONTAINING MATERIALS IN THE PERFORMANCE OF THE WORK.

SIGNATURE OF REPRESENTATIVE DATE

WORK SITE CIP #

FORM 01 11 00B

THE ENVIRONMENTAL PROTECTION AGENCY (AHERA) RULES REQUIRE THE SCHOOL DISTRICT OBTAIN A SIGNED STATEMENT FROM THE SITE SUPERINTENDENT THAT, TO THE BEST OF HIS/HER KNOWLEDGE, NO ASBESTOS-CONTAINING BUILDING MATERIALS WERE INSTALLED DURING THE WORK. THEREFORE, THE FOLLOWING STATEMENT MUST BE SUBMITTED ON THE CONTRACTORS LETTERHEAD PRIOR TO PROJECT CLOSEOUT.

**SAMPLE FORM
(TO BE SUBMITTED ON THE CONTRACTOR'S LETTERHEAD)**

**ASBESTOS-CONTAINING MATERIALS STATEMENT
EUGENE SCHOOL DISTRICT 4J**

(NAME OF PROJECT AND CIP NUMBER)

WE THE UNDERSIGNED, (NAME OF COMPANY), HEREBY WARRANT THAT TO THE BEST OF OUR KNOWLEDGE ALL MATERIALS FURNISHED FOR THE ABOVE REFERENCED PROJECT CONTAIN 0% ASBESTOS.

(NAME OF CONSTRUCTION COMPANY)

(SIGNATURE AND DATE)

PRINTED NAME

JOB TITLE

END OF SECTION

**SECTION 01 2100
ALLOWANCES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.
- B. Related Sections include the following:
 - 1. Division 1 Section 00 41 13 Bid Form
 - 2. Division 1 Section 01 25 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders for allowances.
 - 3. Division 1 Section 01 40 00 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.
 - 4. Divisions 2 through 49 Sections for items of Work covered by allowances.

1.03 SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.04 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.05 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's[overhead, profit, and] related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.06 TESTING AND INSPECTING ALLOWANCES

- A. Cost of testing associated with work performed under allowances will be paid for by the Owner.
- B. The allowance does include incidental labor required to assist the testing agency and costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.
- C. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

1.07 UNUSED MATERIALS

- A. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, prepare unused material for storage by Owner when it is not economically practical to return the material for credit. If directed by Architect, deliver unused material to Owner's storage space. Otherwise, disposal of unused material is Contractor's responsibility.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.02 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Over Excavation
 1. Description: Provide additional excavation of subgrade and removal from site as directed by Geotechnical Engineer and according to Division 31 Earthwork, Section 31 2000.
 2. Quantity of Work: Up to 500 cubic yards.
 3. Unit of Measurement: Cubic Yard, Truck Measure.
 4. Cost per Cubic Yard: As provided on the Bid Form by Contractor
- B. Allowance No. 2: Select Fill
 1. Description: Provide additional installation of Select Fill including compaction as directed by Geotechnical Engineer and according to Division 31 Earthwork, Section 31 2000.
 2. Quantity of Work: Up to 500 cubic yards.
 3. Unit of Measurement: Cubic Yard, Truck Measure.
 4. Cost per Cubic Yard: As provided on the Bid Form by Contractor
- C. Allowance No. 3: Granular Fill
 1. Description: Provide additional installation of Granular Fill including compaction as directed by Geotechnical Engineer and according to Division 31 Earthwork, Section 31 2000.
 2. Quantity of Work: Up to 500 cubic yards.
 3. Unit of Measurement: Cubic Yard, Truck Measure.
 4. Cost per Cubic Yard: As provided on the Bid Form by Contractor

END OF SECTION

**SECTION 01 2300
ALTERNATES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates.

1.03 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, the time to complete, 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 deduction from the Contract Sum to remove alternate into the Work. No other adjustments are made to the Contract Sum.

1.04 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

3.01 SCHEDULE OF ALTERNATES

- A. The following Deductive Alternates are described here and in the Contract Documents.
 - 1. Delete Skylights: Delete Unit Skylights specified in Section 08 62000 and Metal-Framed Skylights specified in Section 08 6300. Delete associated work including metal flashings, curbs, interior skylight wells consisting of metal stud frames and finishes, shades if any, and structural sub-framing supporting skylights. Delete Fall Arrest Systems on roofs. Add metal roofing, vapor barrier, and insulation at exterior skylight opening and interior ceiling finish.
 - 2. Eliminate Chiller: Eliminate chiller located in Utility Court and shown on Mechanical Drawings and specifications. Provide supporting slab, rough-in allowing for future addition of Chiller, and other items indicated in the contract documents.
 - 3. Delete Community Path: Eliminate the concrete paved community path where shown on the Landscape drawings. Delete concrete paved sidewalk, structural fills, and associated work. Provide fire lane structure, vegetation, and mow strips similar to those in adjoining areas.
 - 4. Delete Covered Play Structure: Delete the covered play area roof, structure, foundation, lighting, drainage, playground equipment (basketball hoops and back boards), and associated work. Retain playground paving below.

5. Delete Second Floor Exterior Balconies: Delete balconies from second floor level adjoining Commons areas. Includes removal of steel framing, steel deck, concrete topping slab, flashings, railings, and deck coatings. Eliminate aluminum storefront doors. Add exterior wall finishes and aluminum storefront windows where storefront doors are deleted..

END OF SECTION

SECTION 01 2500
CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
 - 1. Division 0 Document 00 5213 "Form of Agreement" for monetary values of established Unit Prices and Alternates.
 - 2. Division 0 Document 00 7213 "General Conditions" for additional requirements for Changes in the Work, Contract Sum, and Contract Time.
 - 3. Division 0 Document 00 7300 "Supplementary Conditions" for allowable percentages for Contractors' Overhead and Profit.
 - 4. Division 1 Section 01 2200 "Unit Prices" for administrative requirements for using unit prices.
 - 5. Division 1 Section 01 2501 CR/PO Form
 - 6. Division 1 Section 01 3300 "Submittal Procedures" for Schedule of Values requirements.
 - 7. Division 1 Section 01 6000 "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.
 - 8. Division 1 Section 01 7839 "Project Record Documents" documentation requirements.

1.03 MINOR CHANGES IN THE WORK

- A. Architect, with the concurrence of the Owner, will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.04 CHANGE REQUEST/PROCEED ORDER (CONSTRUCTION CHANGE DIRECTIVE)

- A. Architect or Owner may issue a Change Request/Proceed Order on form included in Section 01 2501 - CR/PO Form.
 - 1. Change Request 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.
 - 2. Proceed Order, when signed by the Owner, instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Proceed Order.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
- C. Authorization Required: When a Change Request is approved and signed by the Owner, it becomes a Proceed Order authorizing the change requested. Do not proceed with any change without the Owner's signature on the Change Request/Proceed Order.
- D. Owner-Initiated Change Requests: Architect will issue a Change Request, which will include 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. Change 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 time specified in Change Request after receipt of Change Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

- a. Include a complete cost breakdown including 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, supervision, overhead, and profit 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.
- E. Contractor-Initiated Requests: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to the Architect.
1. Changes requested by the Contractor will be authorized only by signature of the Owner on the prescribed form. Do not proceed with any changes without this authorization.
 2. 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.
 3. 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.
 4. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 5. Include costs of labor, supervision, overhead, and profit directly attributable to the change.
 6. 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.
 7. Comply with requirements in Division 1 Section 01 60 00 "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- F. Change Request Form: Use forms provided by Owner. Sample copies are included at end of this Section.

1.05 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Change Request, and at intervals to be determined, Architect will collect Change Requests and issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

SECTION 01 2501
CHANGE REQUEST/PROCEED ORDER
1992-2010 Capital Improvement Program
Eugene School District 4J

.....
CHANGE REQUEST NOTICE

Change Request No.: _____
Project No.: _____ Contract No.: _____ Date: _____
Project Title: _____
Contractor: _____

1. REQUEST INFORMATION

Estimated \$ _____ Time _____ Days _____ Initiated by _____
Reason for change: _____

2. DESCRIPTION

Describe changes: _____

Describe affected work: _____
List plan and spec sections: _____
Describe impacted activities: _____
Comment: _____

3. DATES

Need for change first known _____ By whom _____
Contractor first notified _____ How _____
Owner first notified _____
Date approved or rejected _____ By whom _____

4. RECOMMENDATION (cost and time) _____
.....

PROCEED ORDER

PROCEED ORDER NO.: _____ Date: _____

1. PAYMENT/COST

Actual amount of change \$ _____ The contract time will be:
Contractor amount \$ _____ () increased () decreased by _____ days
Subcontractor amount \$ _____ () will remain unchanged
Type of payment (LS/T&M) _____

2. MISCELLANEOUS

Subcontractors involved: _____
Major materials: _____
The cost is not to exceed \$ _____ Date: _____

3 CHANGE REQUEST ACCEPTED BY:

Contractor: _____ Date: _____
Architect: _____ Date: _____
4J CIP Project Manager: _____ Date: _____
4J CIP Program Manager: _____ Date: _____
4J Facilities Director: _____ Date: _____

Without the signature of Facilities Director, or the acting Director, this Proceed Order is neither accepted or authorized, except by written authorization of other specific delegation.

**SECTION 01 2900
PAYMENT PROCEDURES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 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 1 Section 01 22 00 "Unit Prices" for administrative requirements governing use of unit prices.
 - 2. Division 1 Section 01 25 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Division 1 Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.
 - 4. Division 1 Section 01 77 00 "Closeout Procedures" for final Application for Payment.

1.03 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.

1.04 SCHEDULE OF VALUES

- A. 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 and Owner at earliest possible date but no later than seven days before the date scheduled for submittal of initial Application for 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 AIA Document G703 Continuation Sheets.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 - 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 - 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.05 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 Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- C. 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 issued before last day of construction period covered by application.
 3. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours.
- D. Certified Statements of Intent to Pay prevailing Wage for each trade shall be on file with Architect and Owner prior to applying for payment of work of that trade. Where such Certified Statements are not provided, the at category of work will not be paid until appropriate documentation is filed.
- E. 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 (draft submitted previously).
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Products list.
 5. Schedule of unit prices.
 6. Submittals Schedule (based Architect's list or required submittals).
 7. List of Contractor's staff assignments.
 8. Initial progress report.
 9. Report of preconstruction conference.
- F. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

- G. 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 procedures (See itemized list in Section 01 77 00 "Closeout Procedures").
 2. Updated final statement, accounting for final changes to the Contract Sum.
 3. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 4. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 5. AIA Document G707, "Consent of Surety to Final Payment."
 6. Evidence that claims have been settled.
 7. Final, liquidated damages settlement statement.

1.06 PART 2 PRODUCTS (NOT USED)

1.07 PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 3100
PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Administrative and supervisory personnel.
 - 2. Project meetings.
- B. Related Sections include the following:
 - 1. Division 1 Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
 - 2. Division 1 Section 01 73 00 "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Division 1 Section 01 77 00 "Closeout Procedures" for coordinating Contract closeout.

1.03 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components 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.
- B. 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.
- C. 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.

- D. 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.

1.04 SUBMITTALS

- A. Key Personnel Names: Within 15 days of Notice-to-Proceed, 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 pager, cell, and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1.05 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. Schedule meeting dates and times with Owner and Architect.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Meeting Summaries: Architect will record significant discussions and agreements achieved. Distribute the meeting summaries to everyone concerned, within three days of receiving them from the Architect.
- B. Preconstruction Conference: Owner's Project Manager will schedule a preconstruction conference before starting construction, 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. Attendees: Owner's Project Manager, Architect, and their consultants, as required; 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.
 - 2. Agenda: Discuss items of significance that could affect progress, including the following (see sample agenda at the end of Part 3):
 - a. Introduction of persons present.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long-lead items.
 - e. Designation of key personnel and their duties.
 - f. Procedures for processing field decisions and Change Orders.
 - g. Procedures for requests for interpretations (RFIs).
 - h. Procedures for testing and inspecting.
 - i. Procedures for processing Applications for Payment.
 - j. Distribution of the Contract Documents.
 - k. Communications.
 - l. Role of District's Project Manager.
 - m. Submittal procedures, including MSDS information.
 - n. Energy design requirements.
 - o. Preparation of Record Documents.
 - p. Use of the premises and existing building.
 - q. Work hours and restrictions.
 - r. Owner's occupancy requirements.
 - s. Responsibility for temporary facilities and controls.
 - t. Construction waste management and recycling.
 - u. Parking availability.
 - v. Office, work, and storage areas.

- w. Equipment deliveries and priorities.
 - x. Safety and first aid.
 - y. Security.
 - a. Progress cleaning.
 - 3. Meeting Summaries: Architect will record and distribute meeting summaries.
 - 4. Statements made by the Contracting Agency's representative at the pre-construction conference are not binding upon the Contracting Agency unless confirmed by Written Addendum.
- C. Preinstallation Conferences: When required by individual specification sections, conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Owner's Project Manager a minimum of four days prior to scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract documents.
 - b. Related requests for interpretations (RFIs).
 - c. Related Change Orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Submittals.
 - g. Possible conflicts.
 - h. Compatibility problems.
 - i. Time schedules.
 - j. Weather limitations.
 - k. Manufacturer's written recommendations.
 - l. Warranty requirements.
 - m. Compatibility of materials.
 - n. Acceptability of substrates.
 - o. Space and access limitations.
 - p. Regulations of authorities having jurisdiction.
 - q. Testing and inspecting requirements.
 - r. Installation procedures.
 - s. Coordination with other work.
 - t. Required performance results.
 - u. Protection of adjacent work.
 - 3. Contractor to record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. Distribute summaries of the meeting to each party present and to parties who should have been present, within three working days.
 - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.
- 1. Attendees: In addition to the Owner's Project Manager 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.
 - 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) Requests for interpretations (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. Meeting Summaries: Architect will record and distribute to Contractor the meeting summaries.
4. Reporting: Distribute summaries of the meeting to each party present and to parties who should have been present.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

PRECONSTRUCTION CONFERENCE AGENDA (SAMPLE)

EUGENE SCHOOL DISTRICT 4J

[ENTER PROJECT NAME]

[DATE]

AGENDA

- A. Introduction of Persons Present
 - 1. District 4J
 - 2. Consultants
 - 3. Contractor (including job foreman)
 - 4. Subcontractors

- B. Availability of Contract Documents

- C. Building Permit Status
 - 1. Plan check and Building Permit paid by District
 - 2. Pick up Permit at City of Eugene by Contractor
 - 3. Location of site stored approved contract documents
 - 4. Utility permits
 - 5. LRAPA Permit

- D. Prevailing Wage Requirements
 - 1. Submittal schedule
 - 2. Conformance with requirements

- E. Communications
 - 1. Notification of problems

- F. Role of District's representative
 - 1. Limits of authority
 - 2. Visitation schedules

- G. Work Description and Schedule
 - 1. General work description
 - 2. Proposed start date: _____
 - 3. Proposed completion date: _____
 - 4. Proposed project schedule and phasing
 - 5. Progress schedule updates
 - 6. Methods to be employed to maintain schedule
 - 7. Work requiring Shop Drawings or submittals shall not commence until review is complete.

- H. Submittals Required per Contract Documents
 - 1. MSDS Information
 - 2. Written proof of Asbestos Worker Certification
 - 3. Name, Experience and Qualifications of Asbestos Supervisor
 - 4. Copy of Contractor's Asbestos Abatement License
 - 5. Other information as required by Section 01 31 00.
 - 6. Schedule of values
 - 7. List of subcontractors including name of contact person, telephone number, and address

- I. Construction
 - 1. Working hours
 - 2. Use of premises/set up locations
 - 3. Protection of existing facilities
 - 4. Traffic and protection
 - 5. Excavation and clean-up
 - 6. Weather restrictions
 - 7. Deviation from details and/or specifications

- J. Correction of Defects
 - 1. Daily and/or as observed
- K. Weekly On-Site Progress Meetings
 - 1. Establish day and time: Day _____ Time _____
 - 2. Provide updated project schedules
 - 3. Discuss project progress, problems, etc.
 - 4. Review applications for payment
 - 5. Required attendance
 - 6. Observation report distribution
- L. Change Order Requests and Change Order Procedures
 - 1. Written Change Order requests required
 - 2. Supporting back-up will be required for all Change Orders
 - 3. Mark-up limitations on Change Orders
 - a. Contractor - 15 percent
 - b. Subcontractors - 10 percent
 - c. Progressive requests and Change Orders
 - d. Processing time required
- M. Applications for Payment
 - 1. Use AIA documents G702 and G703 latest edition
 - 2. Provide 5 signed and notarized copies
 - 3. Wage certifications to be attached
- N. Safety and Emergency Procedures
- O. Clean-up Daily
 - 1. Project completion
- P. Project Closeout
 - 1. Inspections for
 - a. Air Clearance
 - b. AHERA Close Out Requirements
 - c. Substantial completion
 - 1) Contractor provided list of items to be completed
 - 2) Inspection with job foreman
 - 3) Final Acceptance
 - (a) Written notice from Contractor that all work is done and ready for inspection
 - (b) Inspection with job foreman
 - 4) Responsibility for cost of additional inspections
 - 5) Submittals for Closeout
 - (a) Final application for payment
 - (b) Final set of wage certifications
 - (c) Release of liens from all Subcontractors and general Contractor
- Q. Tour of Project Sites to Examine and Document Existing Conditions
- R. Additional Comments

THE UNDERSIGNED ACKNOWLEDGES THAT THE ITEMS LISTED ABOVE WERE DISCUSSED DURING THIS PRECONSTRUCTION CONFERENCE AND ARE FULLY UNDERSTOOD.

DATE:

A/E FIRM:

CONTRACTOR:

SUBCONTRACTORS:

END OF SECTION

SECTION 01 3200
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 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.
- B. Related Sections include the following:
 - 1. Division 1 Section 01 29 00 "Payment Procedures" for submitting the Schedule of Values.
 - 2. Division 1 Section 01 31 00 "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Division 1 Section 01 33 00 "Submittal Procedures" for submitting schedules and reports.
 - 4. Division 1 Section 01 40 00 "Quality Requirements" for submitting a schedule of tests and inspections.

1.03 SUBMITTALS

- A. Submittals Schedule: Submit three copies of schedule plus one digital copy in a software commonly available. 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.
- B. Contractor's Construction Schedule: Submit two opaque copies plus one digital copy in a software commonly available of initial schedule, large enough to show entire schedule for entire construction period.

1.04 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

2.01 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: List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.02 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
- B. Activities: Treat each floor or separate area as a separately numbered activity for each principal element of the Work
- C. 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.
- D. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 1 Section 01 11 00 "Summary of Work." Delivery dates indicated stipulate the earliest possible delivery date.
- E. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 1 Section 01 11 00 "Summary of Work." Delivery dates indicated stipulate the earliest possible delivery date.
- F. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- G. 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.

2.03 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within 10 days of date established for the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 1. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 5 percent increments within time bar.

PART 3 EXECUTION

3.01 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's Project Manager, 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

SECTION 01 3300
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, Information Submittals, Delegated Design and other submittals.
- B. Related Sections include the following:
 - 1. Division 1 Section 01 2900 "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
 - 2. Division 1 Section 01 3100 "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
 - 3. Division 1 Section 01 3200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
 - 4. Division 1 Section 01 4000 "Quality Requirements" for submitting test and inspection reports and for mockup requirements, if any.
 - 5. Division 1 Section 01 7700 "Closeout Procedures" for submitting warranties.
 - 6. Division 1 Section 01 7823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 7. Division 1 Section 01 7839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 8. Divisions 2 through 49 Sections for specific requirements for submittals in those Sections.

1.03 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.

1.04 SUBMITTAL PROCEDURES

- A. 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.
- B. Submittals Schedule: Comply with requirements in Division 1 Section 01 3200 "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- C. 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 14 calendar 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.

- D. Identification: 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.
- E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- F. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, if received from sources other than Contractor without prior consent.
 - 1. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Submittal and transmittal distribution record.
 - k. Remarks.
 - l. Signature of transmitter.
- G. 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.
 - 3. Resubmit submittals until they are marked "No Exception Taken" or "Make corrections noted".
- H. 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.
- I. Use for Construction: Use only final submittals with mark indicating "<Insert approval notation from Architect's action stamp>" taken by Architect.
 - 1. No exception taken
 - 2. Make corrections noted
 - 3. Revise and resubmit
 - 4. Not required for review
 - 5. Additional submittals required
 - 6. See attached consultant review
- J. Format: Except for Samples, provide digital copies of Submittals in a format and using a filing system approved by Owner and Architect.

PART 2 PRODUCTS

2.01 ACTION SUBMITTALS

- A. General: Prepare and submit Action 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. Compliance with specified referenced standards.
 - j. Testing by recognized testing agency.
 - k. Application of testing agency labels and seals.
 - l. Notation of coordination requirements.
 - m. MSDS information, where applicable.
4. Submit Product Data before or concurrent with Samples.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
- 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - d. Schedules.
 - e. Design calculations.
 - f. Compliance with specified standards.
 - g. Notation of coordination requirements.
 - h. Notation of dimensions established by field measurement.
 - i. Relationship to adjoining construction clearly indicated.
 - j. Seal and signature of professional engineer if specified.
 - 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 (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
- 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 at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor..
 - c. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.

2.02 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. 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.
 2. Test and Inspection Reports: Comply with requirements specified in Division 1 Section 01 40 00 "Quality Requirements."
- B. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section 01 3200 "Construction Progress Documentation."
 - C. 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.
 - D. 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.
 - E. 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.
 - F. 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.
 - G. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 - H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 - I. 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.
 - J. 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.
 - K. Schedule of Tests and Inspections: Comply with requirements specified in Division 1 Section 01 4000 "Quality Requirements."
 - L. 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.
 - M. 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.
 - N. 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.
 - O. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section 01 78 23 "Operation and Maintenance Data."
 - P. 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.

- Q. 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.
- R. 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.
- S. Material Safety Data Sheets (MSDS): Submit information directly to Owner; do not submit to Architect.

2.03 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.
- 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.
- C. See Section 01 1000 - Summary of Work and individual sections for additional requirements.

PART 3 EXECUTION

3.01 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.

3.02 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, as follows:
 - No exception taken
 - Make corrections noted
 - Revise & resubmit
 - Not required for review
 - Additional submittals required
 - See attached consultant review
- 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.

3.03 ELECTRONIC DOCUMENT SUBMITTALS

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via email directed to the personnel identified at the Preconstruction Meeting.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to submittal schedule, requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, proposal requests, change orders, construction change directives), applications for payment, field reports and meeting minutes, substitution requests and any other document any participant wishes to make part of the project record.
 - 2. It is Contractor's responsibility to submit documents in PDF format.
 - a. Limit PDF size to 10MB, unless otherwise authorized by Architect.
 - b. Name PDF's for product submittals is indicated under "Product Submittals - Detailed Requirements" Article.
 - 3. Paper document transmittals will not be reviewed, unless otherwise authorized by Architect.
 - 4. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

3.04 DEFERRED SUBMITTALS

- A. For delegated design elements defined in Section 01 10 00 - Summary, submit deferred submittals in accordance with the specified requirements and in accordance with Section 107.3.4.2 of the Oregon Structural Specialty Code.
- B. Submission will include the following, as a minimum, in quantities as required by the governing agency:
 - 1. Drawings showing all members, sizes, fastener information, where applicable, dimensions, connections, materials used and how attached to the main structure.
 - 2. Calculations, including criteria, design assumptions, substantiating computations and such additional data sufficient to show compliance with Code.
 - 3. Product information.
 - 4. Drawings and calculations must be stamped and signed by an Engineer registered in Oregon and must have Architect/Engineer of record's submittal review stamp.
- C. Architect or Engineer, as applicable, will review delegated design submittals, and, if the submittal is acceptable and receives a "No Exceptions Taken" or "Make Corrections Noted" action, will forward to the Contractor for submission to the building official with annotation indicating that the deferred submittal documents have been reviewed and that they have been found to be in general conformance with the design of the building.
- D. The Architect's and Engineer's approval is contingent upon approval of submittal by governing authorities.
- E. Contractor shall be responsible for submission to the governing agency and for coordinating with the governing agency for timely review and approval of the submittals. Architect will not be responsible for delays due to failure of the Contractor to submit with adequate time allowance for agency review of the submittals.
- F. The deferred submittal items shall not be installed until their design and submittal documents have been approved by the building official.
- G. Contractor is responsible for obtaining written approval from governing authority for all Deferred Submittals.
- H. Contractor is responsible for obtaining and costs associated with applicable permits for delegated design elements as required by governing authority.

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 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 quality-assurance 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.
- C. Related Sections include the following:
 - 1. Division 1 Section 01 32 00 "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 2. Divisions 2 through 49 Sections for specific test and inspection requirements.

1.03 CONFLICTING REQUIREMENTS

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

1.04 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. 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.
- C. 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.

1.05 MOCK-UPS

- A. Mock-ups: Full size physical assemblies that are constructed on-site. Mock-ups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mock-ups are not Samples. Unless otherwise indicated, approved mock-ups establish the standard by which the Work will be judged.
1. Integrated Exterior Mock-ups: Mock-ups of the exterior envelope erected separately from the building but on the project site, consisting of multiple products, assemblies and subassemblies.
 2. Partial Mock-ups: Mock-ups of specific items or finishes.

1.06 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Payment for these services will be made by Owner.
 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.
- B. 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.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. 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 1 Section 01 33 00 "Submittal Procedures."
- D. 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.

- E. 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 quality-control service through Contractor.
 - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 - 6. Do not perform any duties of Contractor.
- F. 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. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. 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.
- H. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility, in accordance with Section 1709.1 of the Oregon Structural Specialty Code, sent to authorities having jurisdiction and the Owner before starting work on the following systems.
 - 1. Seismic-force resisting system, designated seismic system, or component listed in the designated seismic systems and seismic-force-resisting systems statement of inspections indicated on the Structural Drawings.
 - 2. Main wind-force resisting systems and wind-resisting components listed in the wind-force-resisting systems statement of special inspections indicated on the Structural Drawings.

1.07 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of the Owner, described as follows:
 - 1. Structural fills and compaction
 - 2. Reinforcing of structural concrete
 - 3. Anchor bolt placement
 - 4. Concrete strength
 - 5. Structural concrete placement
 - 6. Adhesive anchors installed in concrete (Epoxy anchors)
 - 7. Expansion anchors
 - 8. Structural welding

9. Structural steel for SLRS
10. High strength bolting
11. Structural steel
12. Steel deck and light gage steel welds
13. Reinforcing for concrete masonry units.
14. Concrete masonry unit construction
15. Grout for CMU construction
16. Other structural testing and inspections listed in the structural specifications and drawings.
17. Testing and inspection required by Lane County for Work in the Public Right of Way (PEPI)
18. Asphalt concrete pavement
19. Domestic water system disinfection
20. Other testing as required by regulatory agencies or as indicated in the drawings or specifications.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 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.

3.02 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.
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

3.03 MOCK-UPS

- A. Mock-ups: Before installing portions of the Work requiring mock-ups, build mock-ups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 1. Build mock-ups 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 mock-ups will be constructed.
 3. Employ supervisory personnel who will oversee mock-up construction. Employ workers that will be employed during the construction at the Project.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's acceptance of mock-ups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mock-up.
 6. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Demolish and remove mock-ups when directed, unless otherwise indicated.

- B. Integrated Exterior Mock-ups: Construct integrated exterior mock-up as indicated on Drawings and in individual specification Sections. Coordinate installation of exterior envelope materials and products for which mock-ups are required in individual specification sections, along with supporting materials.
1. Mock-up will consist of an area of exterior wall as depicted on the Drawings and will include the following:
 - a. Masonry and masonry veneer, cold-formed metal framing, water repellents and graffiti-resistant coatings, thermal insulation, water-resistant barrier, metal wall panels, sheet metal flashing and trim, joint sealers, aluminum-framed storefront, glazing and exterior sheathing.
 2. Include field testing of storefront in accordance with Section 08 4313.
- C. Partial Mock-ups: Construct partial mock-ups of selected items or finishes, complete. Provide required lighting and additional lighting where required to enable Architect to evaluate quality of the Work. Provide the following partial mock-ups:
1. Polished and dyed floor finishing.
 2. Precast stair treads.
 3. Wood trim.
 4. Wood slat wall panels.
 5. Wood slat ceilings.
 6. Metal roof panels.
 7. Gypsum board finishes.
 8. Acoustic wall panels.
 9. Painting and high-performance coatings.
 10. Tackable wall surfaces.

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROL

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections include the following:
 - 1. Division 1 Section 01 11 00 "Summary of Work" for limitations on utility interruptions and other work restrictions.
 - 2. Division 1 Section 01 33 00 "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
 - 3. Division 1 Section 01 73 00 "Execution Requirements" for progress cleaning requirements.
 - 4. Divisions 2 through 49 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.03 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.

1.04 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.

1.05 SUBMITTALS

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

1.06 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.

1.07 PROJECT CONDITIONS

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

PART 2 PRODUCTS

2.01 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.76-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails.
- B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum

2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete bases for supporting posts.

- C. Chain-Link Fencing Provided by Owner: The Owner has installed temporary fencing as part of an earlier contract. Contractor may assume rent and maintain temporary fencing during the period of construction. If Contractor does not assume rent and maintenance, then Contractor shall arrange with Owner for removal of temporary fencing and provide other means of construction fencing.
- D. Lumber and Plywood: Comply with requirements in Division 6
- E. Gypsum Board: Minimum 1/2 inch (12.7 mm) thick by 48 inches (1219 mm) wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36/C 36M.

2.02 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of 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- (1.2-m-) square tack board.
 - 3. Drinking water and private toilet.
 - 4. Coffee machine and supplies.
 - 5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
 - 6. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.03 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. Heating Equipment: Unless Owner authorizes use of permanent heating 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.

PART 3 EXECUTION

3.01 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. 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.
- F. 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.
- G. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.
- H. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
- I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 2. Install lighting for Project identification sign.
- J. 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. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Architect's office.
 - e. Engineers' offices.
 - f. Owner's office.
 - g. Principal subcontractors' field and home offices.
 2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.03 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 (9 m) 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. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas as indicated on Drawings.

1. Provide adequate temporary rock for construction drives capable of preventing damage to the native subgrade. Remove temporary rock from site. Repair damage to native subgrade caused by construction activities at no cost to Owner
 2. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Traffic Controls: Coordinate with school staff and comply with requirements of authorities having jurisdiction.
1. Contractor shall avoid deliveries and reduce construction related traffic during the time of school closing. School closing is from 2:00 pm to 2:15 pm on Monday, Tuesday, Thursday, Friday and from 1:00 pm to 1:15 pm on Wednesday. During those times traffic from parents picking up children, pedestrians and bicyclists leaving the school, school bus loading, and related activities are most intense.
 2. Protect existing site improvements to remain including curbs, pavement, and utilities.
 3. Maintain access for fire-fighting equipment and access to fire hydrants.
- D. Parking: Arrange for temporary parking areas for construction personnel.
- E. 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.
- F. Project Identification and Temporary Signs: Provide Project identification and other signs as indicated on Drawings. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.
1. Provide temporary, directional signs for construction personnel and visitors.
 2. Maintain and touchup signs so they are legible at all times.
- G. 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 1 Section 01 77 00 "Execution Requirements" for progress cleaning requirements.

3.04 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 1 Section 01 11 00 Summary of Work.
- B. Temporary Erosion and Sedimentation Control: Comply with requirements specified in Section 31 2500 - Erosion Control, and requirements of authority having jurisdiction.
- C. 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.
- D. Tree and Plant Protection: Comply with requirements specified in Division 32.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. 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: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys.
 3. See above for fencing provided by Owner but maintained by Contractor.

- G. 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.
- H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- I. 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.
- J. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
 - 2. Insulate partitions to provide noise protection to occupied areas.
 - 3. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
 - 4. Protect air-handling equipment.
 - 5. Weather strip openings.
 - 6. Provide walk-off mats at each entrance through temporary partition.
- 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 construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.05 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. 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.

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
 - 1. Division 1 Section 01 23 00 "Alternates" for products selected under an alternate.
 - 2. Division 1 Section 01 77 00 "Closeout Procedures" for submitting warranties for Contract closeout.
 - 3. Divisions 2 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.03 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those 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.

1.04 SUBMITTALS

- A. Substitution Requests: Instructions to Bidders specify time restrictions for submitting requests for Substitutions during the bidding period, in compliance with this Section.
- B. After execution of Agreement, the Owner may, at the Owner's option, consider formal requests from the Contractor for substitution of products for those specified. One or more of the following conditions must be documented:
 - 1. Compliance with final interpretation of code requirements or insurance regulations which require that the use of a substituted Product.
 - 2. Unavailability of a specified Product through no fault of the Contractor.
 - 3. Inability of specified Product to perform properly of fit in designated place.
 - 4. Manufacturer's or Fabricator's refusal or inability to certify or guarantee performance of a specified Product in the application intended.
- C. A Substitution Request constitutes a representation that the Bidder/Contractor:
 - 1. Has investigated the proposed Product and determined that it meets or exceeds the quality level of the specified Product.
 - 2. Will provide the same warranty for the Substituted Product as for the specified Product.
 - 3. Will coordinate installation and make changes to the Work which may be required for the Work to be completed with no additional cost to the Owner.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 - 5. Will reimburse the Owner for review or redesign services associated with re-approval by authorities.

- D. Substitutions will not be considered when they are indicated or implied on Shop Drawings or Product Data Submittals, without separate request on the form provided, or when acceptance will require revision to the Contract Documents.
- E. Submit three copies of each request for consideration. Limit each request to one proposed Substitution. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
- F. Substitution Request Form - See Section 01 6023.
- G. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - 1. Statement indicating why specified material or product cannot be provided.
 - 2. 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.
 - 3. 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.
 - 4. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - 5. Provide MSDS information to confirm that the product is no more harmful than the products specified.
 - 6. Samples, where applicable or requested.
 - 7. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - 8. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - 9. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - 10. 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.
 - 11. Cost information, including a proposal of change, if any, in the Contract Sum.
 - 12. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - 13. 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.
 - 14. 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.

1.05 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.

1.06 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. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to 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.
 9. Provide bonded and insured off-site storage and protection when site does not permit on-site storage and protection.

1.07 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. Submittal Time: Comply with requirements in Division 1 Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

**SECTION 01 6023
SUBSTITUTION REQUEST FORM**

SUBSTITUTION REQUEST: DATE SUBMITTED _____

1.01 TO: PIVOT ARCHITECTURE, 44 WEST BROADWAY #300, EUGENE OR 97401-3038

1.02 PROJECT: HOWARD ELEMENTARY REPLACEMENT SCHOOL CIP #410-213-001, EUGENE SCHOOL DISTRICT 4J

1.03 SPECIFIED ITEM:

A. SECTION NAME AND NUMBER: _____

B. PARAGRAPH: _____

C. PRODUCT DESCRIPTION: _____

1.04 UNDERSIGNED REQUESTS CONSIDERATION OF THE FOLLOWING SUBSTITUTION:

A. MANUFACTURER AND MODEL NUMBER(S): _____

B. PRODUCT DESCRIPTION: _____

1.05 UNDERSIGNED STATES THAT THE FOLLOWING PARAGRAPHS ARE TRUE, EXCEPT WHERE NOTED OTHERWISE:

- A. The function, appearance and quality of the proposed substitution are equivalent or superior to the specified item;
- B. Proposed substitution does not affect dimensions shown on the drawings;
- C. Undersigned will pay for changes to the building design, including engineering and design services, detailing, and construction costs caused by requested substitution.
- D. Proposed substitution will have no adverse effect on other trades, construction schedule, or specified warranty requirements.
- E. Maintenance and service parts will be available locally for the proposed substitution.
- F. The undersigned has attached data concerning the proposed substitution, including: product description, specifications, drawings, photographs, performance and test data adequate for evaluation of request with applicable portions of the data clearly identified. Attached data also includes description of changes to Contract Documents which the proposed substitution will require for proper installation.
- G. Undersigned further certifies function, appearance, and quality of proposed substitution are equivalent or superior to specified item.
- H. Undersigned further certifies that the manufacturer of the proposed substitution is aware of this substitution request and agrees to the statements noted above.

1.06 SUBMITTED BY:

A. NAME: _____ SIGNATURE: _____

B. FIRM NAME: _____

C. FULL MAILING ADDRESS: _____

D. PHONE: _____ E-MAIL: _____

1.07 FOR USE BY ARCHITECT OR ENGINEER:

A. ___ APPROVED ___ APPROVED AS NOTED

B. ___ NOT APPROVED ___ RECEIVED TOO LATE

C. BY: _____

D. DATE: _____

END OF SECTION

**SUBSTITUTION
REQUEST**
(After the Bidding Phase)

Project: _____ Substitution Request Number: _____

From: _____
To: _____ Date: _____

Architect Project Number: _____
Re: _____ Contract For: _____

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

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No: _____
Installer: _____ Address: _____ Phone: _____
History: New Product 2-5 years old 5-10 years old More than 10 years old
Differences between proposed substitution and specified product: _____

Point by Point comparative data attached - REQUIRED

Reason for not providing specified item: _____

Similar Installation:

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

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

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

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

Supporting Data Attached:

Drawings Product Data Samples Tests Reports _____

**SUBSTITUTION
REQUEST**
(After the Bidding Phase)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
 - Same warranty will be furnished for proposed substitution as for specified product.
 - Same maintenance service and source of replacement parts, as applicable, is available.
 - Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
 - Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
 - Proposed substitution does not affect dimensions and functional clearances.
 - Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
 - Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.
-

Submitted by: _____
Signed by: _____
Firm: _____
Address: _____

Telephone: _____
Attachments: _____

REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01 30 00.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01 30 00.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Additional Comments: Contractor Subcontractor Supplier Manufacturer A/E _____

SECTION 01 7300
EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 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 1 Section 01 31 00 "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. Division 1 Section 01 33 00 "Submittal Procedures" for submitting surveys.
 - 3. Division 1 Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.03 SUBMITTALS

- A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- B. Final Property Survey: Submit 2 copies showing the Work performed and record survey data.

1.04 QUALITY ASSURANCE

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

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 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.

3.02 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.

3.03 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 and Owner's Project Manager promptly.
 1. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
- 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 and Owner's Project Manager.

3.04 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.
- 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.

3.05 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 seven feet in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated. Bring any conflicts to the Architect for review.
- 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. 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.
- F. 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.
- G. 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 where possible. Obtain Architect and Owner's Project Manager approval for all questionable conditions.
- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.06 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.

3.07 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 (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to applicable 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 safety and 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.

3.08 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 1 Section 01 40 00 "Quality Requirements."

3.09 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.
 - 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

SECTION 01 7329
CUTTING AND PATCHING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1. Division 1 Section 01 3100 – “Project Management and Coordination” for pre- construction and pre-installation conferences.
 - 2. Division 2 Section 02 4100 - Demolition for demolition of selected portions of the building and other structures.
 - 3. Divisions 2 through 49 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.03 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.

1.04 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a written request describing procedures prior to the time cutting and patching will be performed, requesting approval to proceed, for cutting or alteration which affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather-exposed or moisture-resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of site-exposed elements.
 - 5. Work of Owner or separate contractor.
- B. Include the following information:
 - 1. Identification of Project and CIP number
 - 2. Location and description of the affected Work.
 - 3. Necessity for cutting or alteration.
 - 4. Description of proposed Work and Products to be used.
 - 5. Alternatives to cutting and patching.
 - 6. Effect on work of Owner or separate contractor.
 - 7. Written permission of affected separate contractor, if any.
 - 8. date and time work will be executed.

1.05 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.
 - 1. 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.
 - 2. 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.
- B. 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.

1.06 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

2.01 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

3.01 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.

3.02 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 minimize interruption to occupied areas.

3.03 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 or 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 2 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 even-plane 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

**SECTION 01 7700
CLOSEOUT PROCEDURES**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Warranties.
 - 3. Final cleaning.
- B. Related Sections include the following:
 - 1. Division 1 Section 01 29 00 "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
 - 2. Division 1 Section 01 73 00 "Execution Requirements" for progress cleaning of Project site.
 - 3. Division 1 Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 4. Division 1 Section 01 78 39 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 5. Divisions 2 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.03 SUBSTANTIAL COMPLETION

- A. 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 occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems.
 - 9. Submit test/adjust/balance records.
 - 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 11. Advise Owner of changeover in heat and other utilities.
 - 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 - 13. Complete final cleaning requirements, including touchup painting.
 - 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect and Owner's Project Manager 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.

1.04 FINAL COMPLETION

- A. 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 1 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. Submit the following completed forms, items and documents:
 - a. AIA Document G706 Contractor's Affidavit of Payment of Debts and Claims.
 - b. AIA Document G706A Contractor's Affidavit of Release of Liens.
 - c. AIA Document G707 Consent of Surety Company to Final Payment.
 - d. Operation and Maintenance Manuals
 - e. Warranties and Bonds. Submit original documents, including Contractor's General Warranty,
 - f. Record Documents.
 - g. Keys.
 - h. Testing and Start-Up records.
 - i. Affidavit of Prevailing Wages paid.
 - j. Complete list of Contractor and all Subcontractors with address, phone numbers, and work
 - k. Asbestos-Containing Materials Statement (Form 01100B).
 - l. Proof of final acceptance and compliance from governing authorities having jurisdiction.
 - m. Certificate of insurance evidencing continuation of liability coverage including coverage for completed operations until the expiration of the specified warranty periods.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect and Owner's Project Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Cost of additional re-inspections by Architect and Owner's Project manager will be deducted from Final Payment to the Contractor.

1.05 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 10 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 (215-by-280-mm) 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.
 - 3. 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.

PART 2 PRODUCTS

2.01 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

3.01 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.
- 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. Remove snow and ice to provide safe access to building.
 - f. 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.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - j. 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.
 - k. Remove labels that are not permanent.

- l. 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.
 - m. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Replace parts subject to unusual operating conditions.
 - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - q. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - r. 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.
 - s. Leave Project clean and ready for occupancy.
- C. 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

SECTION 01 7823
OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 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, material, finishes, systems, and equipment.
- B. Related Sections include the following:
 - 1. Division 1 Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Division 1 Section 01 77 00 "Closeout Procedures" for submitting operation and maintenance manuals.
 - 3. Division 1 Section 01 78 39 "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
 - 4. Divisions 2 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.03 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.

1.04 SUBMITTALS

- A. Initial Submittal: Submit 2 draft copies of each manual at least 15 working days before requesting inspection for Final 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 one copy 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 3 copies of each corrected manual within 15 days of receipt of Architect's comments.

1.05 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

2.01 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. List of all subcontractors and material suppliers, including names, addresses and phone numbers.
 - 5. 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."

2.02 MANUALS, GENERAL

- A. Format: In addition to printed copies as described below, provide digital copies in PDF format. Provide with tabs matching table of contents. Provide in format allowing search for key words.
- B. 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.
- C. 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.
- D. 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.
- E. 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 binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) 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 a Table of Contents for each volume with a list of products and major components of equipment included in the section on the face of 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 media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) 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.

2.03 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. System, subsystem, or equipment failure.
 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
 1. Instructions on stopping.
 2. Shutdown instructions for each type of emergency.
 3. Operating instructions for conditions outside normal operating limits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures.

2.04 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.
- C. 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 where required for identification.

2.05 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. 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.
 6. Contact information.
- 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.

2.06 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. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 3 EXECUTION

3.01 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.
 2. Comply with requirements of newly prepared Record Drawings in Division 1 Section 01 78 39 "Project Record Documents."
- G. Comply with Division 1 Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION

SECTION 01 7839
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Sections include the following:
 - 1. Division 1 Section 01 77 00 "Closeout Procedures" for general closeout procedures.
 - 2. Division 1 Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Divisions 2 through 49 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.03 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Final Submittal: Submit one set of marked-up Record Prints (not "Job Shack" set).
- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one copy of each Product Data submittal.
 - 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.

PART 2 PRODUCTS

2.01 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup 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.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings 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 Alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Record 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 and Owner's Project Manager.
 - e. Name of Contractor.

2.02 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.

2.03 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 where applicable.

2.04 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

3.01 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 and Owner's Project Manager's reference during normal working hours.

END OF SECTION

SECTION 01 7900
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

- A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. All software-operated systems.
 - 2. HVAC systems and equipment.
 - 3. Plumbing equipment.
 - 4. Rainwater harvesting systems.
 - 5. Electrical systems and equipment.
 - 6. Conveying systems.
 - 7. Landscape irrigation.
 - 8. Communications and AV systems.
 - 9. Electronic Safety & Security Systems
 - 10. Items specified in individual product Sections.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
 - 1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
 - 2. Finishes, including flooring, wall finishes, ceiling finishes.
 - 3. Fixtures and fittings.
 - 4. Items specified in individual product Sections.

1.02 RELATED REQUIREMENTS

- A. Section 01 7800 - Closeout Submittals: Operation and maintenance manuals.
- B. Section 01 9113 - General Commissioning Requirements: Additional requirements applicable to demonstration and training.
- C. Other Specification Sections: Additional requirements for demonstration and training.

1.03 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures; except:
 - 1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority.
 - 2. Submit one copy to the Commissioning Authority, not to be returned.
 - 3. Make commissioning submittals on time schedule specified by Commissioning Authority.
 - 4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of overall Training Plan; submit in editable electronic format, Microsoft Word 2003 preferred.
- B. Draft Training Plans: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
 - 1. Submit to Commissioning Authority for review and inclusion in overall training plan.
 - 2. Submit not less than four weeks prior to start of training.
 - 3. Revise and resubmit until acceptable.
 - 4. Provide an overall schedule showing all training sessions.
 - 5. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
 - g. Media to be used, such as slides, hand-outs, etc.

- h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
 - 1. Include applicable portion of O&M manuals.
 - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.

1.04 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.
- C. Demonstration may be combined with Owner personnel training if applicable.
- D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
 - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

- A. Commissioning Authority will prepare the Training Plan based on draft plans submitted.
- B. Conduct training on-site unless otherwise indicated.
- C. Owner will provide classroom and seating at no cost to Contractor.
- D. Do not start training until Functional Testing is complete, unless otherwise specified or approved by the Commissioning Authority.
- E. Provide training in minimum two hour segments.
- F. The Commissioning Authority is responsible for determining that the training was satisfactorily completed and will provide approval forms.
- G. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- H. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
 - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.

2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
 3. Typical uses of the O&M manuals.
- I. Product- and System-Specific Training:
1. Review the applicable O&M manuals.
 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
 4. Provide hands-on training on all operational modes possible and preventive maintenance.
 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
 6. Discuss common troubleshooting problems and solutions.
 7. Discuss any peculiarities of equipment installation or operation.
 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
 10. Review spare parts and tools required to be furnished by Contractor.
 11. Review spare parts suppliers and sources and procurement procedures.
- J. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 01 9113
GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Contractor responsibilities for coordination and support of Commissioning activities performed by Owner through Owner's Commissioning Authority.
- B. Commissioning is intended to achieve the following specific objectives; this section specifies the Contractor's responsibilities for commissioning:
 - 1. Verify that the work is installed in accordance with the Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Prefunctional Checklists executed by Contractor are utilized to achieve this.
 - 2. Verify and document that functional performance is in accordance with the Contract Documents: Functional Tests executed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
 - 3. Verify that operation and maintenance manuals submitted to Owner are complete: Detailed operation and maintenance (O&M) data submittals by Contractor are utilized to achieve this.
- C. The Commissioning Authority directs and coordinates all commissioning activities; this section describes some but not all of the Commissioning Authority's responsibilities.
- D. The Commissioning Authority is employed by Owner.

1.2 SCOPE OF COMMISSIONING

- A. The following are to be commissioned:
- B. Plumbing Systems:
 - 1. Water heaters.
 - 2. Rainwater harvesting system.
- C. HVAC System, including:
 - 1. Major and minor equipment items.
 - 2. Terminal units.
 - 3. Variable frequency drives.
- D. Special Ventilation:
- E. Electrical Systems:
 - 1. Emergency power systems.
 - 2. Lighting controls other than manual switches.
- F. Electronic Safety and Security:
 - 1. Security system, including doors and hardware.
 - 2. Fire and smoke alarms.
- G. Communications:
 - 1. Voice and data systems.
 - 2. Public address/paging.
- H. Whole Building Envelope Testing:
 - 1. Whole Building Envelope Air Leakage: Air infiltration rate testing conducted in subdivided portions of building.
 - 2. Infrared Thermo graphic (IR) Imaging: Thermal imaging analysis to identify locations of air leakage and heat loss.
- I. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.

1.3 RELATED REQUIREMENTS

- A. Section 01 7000 - Execution and Closeout Requirements: General startup requirements.

- B. Section 01 7800 - Closeout Submittals: Scope and procedures for operation and maintenance manuals and project record documents.
- C. Section 01 7900 - Demonstration and Training: Scope and procedures for Owner personnel training.

1.4 REFERENCE STANDARDS

- A. PECEI (Samples) - Sample Forms for Prefunctional Checklists and Functional Performance Tests; Portland Energy Conservation, Inc.; located at <http://www.peci.org/library/mcpgs.htm>; current edition.

1.5 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures; except:
 - 1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority, unless they require review by Architect; in that case, submit to Architect first.
 - 2. Submit one copy to the Commissioning Authority, not to be returned.
 - 3. Make commissioning submittals on time schedule specified by Commissioning Authority.
 - 4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of Prefunctional Checklists or Functional Test requirements; submit in editable electronic format, Microsoft Word 2010 preferred.
 - 5. As soon as possible after submittals made to Architect are approved, submit copy of approved submittal to the Commissioning Authority.
- B. Manufacturers' Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.
- C. Product Data: If submittals to Architect do not include the following, submit copies as soon as possible:
 - 1. Manufacturer's product data, cut sheets, and shop drawings.
 - 2. Manufacturer's installation instructions.
 - 3. Startup, operating, and troubleshooting procedures.
 - 4. Fan and pump curves.
 - 5. Factory test reports.
 - 6. Warranty information, including details of Owner's responsibilities in regard to keeping warranties in force.
- D. Startup Plans and Reports.
- E. Completed Prefunctional Checklists.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

- A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will NOT become the property of Owner.
- B. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

PART 3 EXECUTION

3.1 COMMISSIONING PLAN

- A. Commissioning Authority will complete the Commissioning Plan.
 - 1. Attend meetings called by the Commissioning Authority for purposes of completing the commissioning plan.
 - 2. Require attendance and participation of relevant subcontractors, installers, suppliers, and manufacturer representatives.

- B. Contractor is responsible for compliance with the Commissioning Plan.
- C. Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.
- D. Commissioning Schedule:
 - 1. Submit anticipated dates of startup of each item of equipment and system to Commissioning Authority within 60 days after award of Contract.
 - 2. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.
 - 3. Prefunctional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
 - 4. Provide sufficient notice to Commissioning Authority for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

3.2 STARTUP PLANS AND REPORTS

- A. Startup Plans: For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 8 weeks prior to startup.
- B. Startup Reports: For each item of equipment and system for which the manufacturer provides a startup checklist (or startup plan or field checkout sheet), document compliance by submitting the completed startup checklist prior to startup, signed and dated by responsible entity.
- C. Submit directly to the Commissioning Authority.

3.3 PREFUNCTIONAL CHECKLISTS

- A. A Prefunctional Checklist is required to be filled out for each item of equipment or other assembly specified to be commissioned.
 - 1. No sampling of identical or near-identical items is allowed.
 - 2. These checklists do not replace manufacturers' recommended startup checklists, regardless of apparent redundancy.
 - 3. Prefunctional Checklist forms will not be complete until after award of the contract; the following types of information will be gathered via the completed Checklist forms:
 - a. Certification by installing contractor that the unit is properly installed, started up, and operating and ready for Functional Testing.
 - b. Confirmation of receipt of each shop drawing and commissioning submittal specified, itemized by unit.
 - c. Manufacturer, model number, and relevant capacity information; list information "as specified," "as submitted," and "as installed."
 - d. Serial number of installed unit.
 - e. List of inspections to be conducted to document proper installation prior to startup and Functional Testing; these will be primarily static inspections and procedures; for equipment and systems may include normal manufacturer's start-up checklist items and minor testing.
 - f. Sensor and actuator calibration information.
- B. Contractor is responsible for filling out Prefunctional Checklists, after completion of installation and before startup; witnessing by the Commissioning Authority is not required unless otherwise specified.
 - 1. Each line item without deficiency is to be witnessed, initialed, and dated by the actual witness; checklists are not complete until all line items are initialed and dated complete without deficiencies.
 - 2. Checklists with incomplete items may be submitted for approval provided the Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing; re-submission of the Checklist is required upon completion of remaining items.
 - 3. Individual Checklists may contain line items that are the responsibility of more than one installer; Contractor shall assign responsibility to appropriate installers or subcontractors, with identification recorded on the form.
 - 4. If any Checklist line item is not relevant, record reasons on the form.

5. Contractor may independently perform startup inspections and/or tests, at his option.
 6. Regardless of these reporting requirements, Contractor is responsible for correct startup and operation.
 7. Submit completed Checklists to Commissioning Authority within two days of completion.
- C. Commissioning Authority is responsible for furnishing the Prefunctional Checklists to Contractor.
1. Initial Drafts: Contractor is responsible for initial draft of Prefunctional Checklist where so indicated in the Contract Documents.
 2. Provide all additional information requested by Commissioning Authority to aid in preparation of checklists, such as shop drawing submittals, manufacturers' startup checklists, and O&M data.
 3. Commissioning Authority may add any relevant items deemed necessary regardless of whether they are explicitly mentioned in the Contract Documents or not.
 4. When asked to review the proposed Checklists, do so in a timely manner.
- D. Commissioning Authority Witnessing: Required for:
1. Each piece of primary equipment, unless sampling of multiple similar units is allowed by the commissioning plan.
 2. A sampling of non-primary equipment, as allowed by the commissioning plan.
- E. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.
1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.

3.4 FUNCTIONAL TESTS

- A. A Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.
- B. Contractor is responsible for execution of required Functional Tests, after completion of Prefunctional Checklist and before closeout.
- C. Commissioning Authority is responsible for witnessing and reporting results of Functional Tests, including preparation and completion of forms for that purpose.
- D. Contractor is responsible for correction of deficiencies and re-testing at no extra cost to Owner; if a deficiency is not corrected and re-tested immediately, the Commissioning Authority will document the deficiency and the Contractor's stated intentions regarding correction.
1. Deficiencies are any condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents or does not perform properly.
 2. When the deficiency has been corrected, the Contractor completes the form certifying that the item is ready to be re-tested and returns the form to the Commissioning Authority; the Commissioning Authority will reschedule the test and the Contractor shall re-test.
 3. Identical or Near-Identical Items: If 10 percent, or three, whichever is greater, of identical or near-identical items fail to perform due to material or manufacturing defect, all items will be considered defective; provide a proposal for correction within 2 weeks after notification of defect, including provision for testing sample installations prior to replacement of all items.
 4. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing.
 5. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing if the test failed due to failure to execute the relevant Prefunctional Checklist correctly; if the test failed for reasons that would not have been identified in the Prefunctional Checklist process, Contractor shall bear the cost of the second and subsequent re-tests.
- E. Functional Test Procedures:

1. Some test procedures are included in the Contract Documents; where Functional Test procedures are not included in the Contract Documents, test procedures will be determined by the Commissioning Authority with input by and coordination with Contractor.
2. Examples of Functional Testing:
 - a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).
 - b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.
 - c. Systems are run through all the HVAC control system's sequences of operation and components are verified to be responding as the sequence's state.
 - d. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Commissioning Authority is Functional Testing.
- F. Deferred Functional Tests: Some tests may need to be performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions; performance of these tests remains the Contractor's responsibility regardless of timing.

3.5 TEST PROCEDURES - GENERAL

- A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.
- B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test condition.
- C. Sampling: Where Functional Testing of fewer than the total number of multiple identical or near-identical items is explicitly permitted, perform sampling as follows:
 1. Identical Units: Defined as units with same application and sequence of operation; only minor size or capacity difference.
 2. Sampling is not allowed for:
 - a. Major equipment.
 - b. Life-safety-critical equipment.
 - c. Prefunctional Checklist execution.
 3. XX = the percent of the group of identical equipment to be included in each sample; defined for specific type of equipment.
 4. YY = the percent of the sample that if failed YY will require another sample to be tested; defined for specific type of equipment.
 5. Randomly test at least XX percent of each group of identical equipment, but not less than three units. This constitutes the "first sample."
 6. If YY percent of the units in the first sample fail, test another XX percent of the remaining identical units.
 7. If YY percent of the units in the second sample fail, test all remaining identical units.
 8. If frequent failures occur, resulting in more troubleshooting than testing, the Commissioning Authority may stop the testing and require Contractor to perform and document a checkout of the remaining units prior to continuing testing.
- D. Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").

- E. Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example apply hot air to a space sensor using a hair dryer to see the response in a VAV box.
- F. Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.
- G. Over-Writing Values: Change the sensor value known to the control system in the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.
- H. Indirect Indicators: Remote indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.
- I. Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of the relevant control systems; where monitoring of specific points is called for in Functional Test Procedures:
 - 1. All points that are monitored by the relevant control system shall be trended by Contractor; at the Commissioning Authority's request, Contractor shall trend up to 20 percent more points than specified at no extra charge.
 - 2. Other points will be monitored by the Commissioning Authority using dataloggers.
 - 3. At the option of the Commissioning Authority, some control system monitoring may be replaced with datalogger monitoring.
 - 4. Provide hard copies of monitored data in columnar format with time down left column and at least 5 columns of point values on same page.
 - 5. Graphical output is desirable and is required for all output if the system can produce it.
 - 6. Monitoring may be used to augment manual testing.

3.6 OPERATION AND MAINTENANCE MANUALS

- A. See Section 01 7800 for additional requirements.
- B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.
- C. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.
- D. Commissioning Authority will add commissioning records to manuals after submission to Owner.

END OF SECTION

**SECTION 02 4100
DEMOLITION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Building demolition excluding removal of hazardous materials and toxic substances.
- B. Selective demolition of built site elements.
- C. Abandonment and removal of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

- A. Section 00 3100 - Available Project Information: Existing building survey conducted by Owner; information about known hazardous materials.
- B. Section 01 1000 - Summary of Work: Limitations on Contractor's use of site and premises.
- C. Section 01 1000 - Summary of Work: Sequencing and staging requirements.
- D. Section 01 1100 - Summary of Work: Removal by Owner of asbestos materials prior to demolition.
- E. Section 01 5000 - Temporary Facilities and Controls: Security, protective barriers, and waste removal.
- F. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- G. Section 01 7300 - Execution and Closeout Requirements: Project conditions; protection of existing construction to remain; reinstallation of removed products.
- H. Section 31 2000 - Earth Moving: Vegetation and existing debris removal.
- I. Section 31 2000 - Earth Moving: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Company specializing in the type of work required.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Fill Material: 31 2000 - Earth Moving.

PART 3 EXECUTION

3.01 SCOPE

- A. Remove the entire building designated on drawings.
- B. Remove paving and curbs as required to accomplish new work.
- C. Remove all other paving and curbs within site boundaries.
- D. Within area of new construction, remove foundation walls and footings to a minimum of 2 feet below finished grade.
- E. Outside area of new construction, remove foundation walls and footings to a minimum of 2 feet below finished grade.
- F. Remove concrete slabs on grade within site boundaries.
- G. Remove manholes and manhole covers, curb inlets and catch basins.
- H. Remove fences and gates.

- I. Remove items indicated, for salvage, relocation, and recycling.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Provide, erect, and maintain temporary barriers and security devices.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Protect existing structures and other elements that are not to be removed.
- D. If hazardous materials are discovered during removal operations, stop work and notify Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
- E. Perform demolition in a manner that maximizes salvage and recycling of materials.
- F. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.
- G. Conform to applicable regulations relating to environmental requirements, disposal of debris, and noise control.
- H. Burning not permitted.

3.03 EXISTING UTILITIES

- A. Protect existing utilities to remain from damage.
- B. Remove exposed piping, valves, meters, equipment, supports, conduit, wiring, and foundations of disconnected and abandoned utilities.
- C. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.04 SALVAGE

- A. Salvage for Reuse:
 - 1. Identify materials shown on the drawings for removal that can be reused in the project for a similar use and in a new location as shown on drawings.
 - 2. Coordinate carefully, the removal of items to be reused with the requirements of reinstallation.
 - 3. Carefully remove, clean, pack as necessary and store for reuse. Protect from damage until reinstalled.
- B. Damaged items:
 - 1. If items to be reused are damaged during removal, storage or reinstallation, repair or replace with new to match existing condition prior to start of the work.
- C. Listing of Items to be salvaged for Reuse:
 - 1. Ceramic Tiles in corridors: Art tiles with children's faces.
- D. Other Salvage:
 - 1. Title to all other material to be removed is vested in the Contractor upon notice of award.

3.05 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.
- D. Clean remaining structure, equipment, and facilities of all dirt, dust and debris caused by demolition work. Return areas to conditions existing prior to the start of the work.

END OF SECTION

SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.
- E. Installation of slab edge and underslab insulation.
- F. Waterstops
- G. Placement of anchor bolts, embed plates, and anchorages

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing.
- B. Section 03 3000 - Cast-in-Place Concrete.
- C. Section 03 3500 - Concrete Floor Finishes: Specially surfaced concrete.
- D. Section 04 2000 - Unit Masonry: Reinforcement for masonry.
- E. Section 05 5000 - Metal Fabrications: Anchor Bolts for Metal Fabrications and other trades.
- F. Section 06 1000 - Rough Carpentry: Anchor bolts for Rough Carpentry.
- G. Section 07 2100 - Thermal Insulation: Slab edge and underslab insulation.
- H. Section 09 6466 - Wood Athletic Flooring: Verification of concrete slab recess for wood flooring system.

1.03 REFERENCE STANDARDS

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.
- B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute; 2010.
- C. OSSC - Oregon Structural Specialty Code, latest edition.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.
- C. Chamfer outside corners of beams, joists, columns, walls, and other surfaces exposed to view unless otherwise indicated on Drawings.
- D. Formwork design and engineering are Contractor's responsibility. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

2.02 WOOD FORM MATERIALS

- A. Form Materials:
 - 1. At exposed vertical surfaces: MDO plywood, smooth and free of any surface texture.
 - 2. At other locations: Contractor discretion in accordance with ACI 347.

2.03 FORMWORK ACCESSORIES

- A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.
- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
 - 1. Composition: Colorless mineral oil-based, soy-based, or vegetable-oil based compound.
- C. Reveal / Chamfer Strips: Rigid plastic or wood strip type; 3/4 x 3/4 inch size unless otherwise noted on Drawings; maximum possible lengths. Mill wood strips from straight-grained lumber and surface all sides.
- D. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 1200.
- E. Waterstops: Expandable Bentonite type. 1 inch wide by 3/4 inch thick (dry), strips of maximum possible lengths, moisture expanding. Provide Superstop manufactured by Tremco, or approved.
 - 1. Extent: At all cold joints below grade, and elsewhere as shown on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.
- B. Verify subgrade is at proper depth to accommodate footing and slab thickness.

3.02 EARTH FORMS

- A. Earth forms are not permitted.

3.03 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. Unless otherwise indicated, install form ties equidistant and symmetrical, aligned vertically and horizontally.
- F. Obtain approval before framing openings in structural members that are not indicated on drawings.
- G. Provide chamfer strips at the following locations:
 - 1. External corners of walls, beams, and exposed edges of slabs
 - 2. Vertical control joints at 12'-0" min or as described on the Drawings at all exposed concrete.
 - 3. Other locations indicated on Drawings.
- H. Coordinate this section with other sections of work that require attachment of components to formwork.
- I. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.04 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in or passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete. Do not 'wet set'.
- C. Place anchor bolts in accordance with AISC Code of Standard Practice.
- D. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- E. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- F. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement.
- G. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- H. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.

3.07 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

3.08 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.09 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

END OF SECTION

SECTION 03 2000
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Reinforcing steel for masonry
- C. Supports and accessories for steel reinforcement.
- D. Installation of Epoxy Adhesive Anchors in concrete.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories.
- B. Section 03 3000 - Cast-in-Place Concrete.
- C. Section 04 2000 - Unit Masonry: Reinforcement for masonry.
- D. Division 23 - Radiant floor heating system cast into concrete slabs, tie to top of reinforcing steel.

1.03 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2010.
- B. ACI 318 - Building Code Requirements For Structural Concrete and Commentary; American Concrete Institute International; 2011.
- C. ACI SP-66 - ACI Detailing Manual; American Concrete Institute International; 2004.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2013.
- E. CRSI (DA4) - Manual of Standard Practice; Concrete Reinforcing Steel Institute; 2009.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Product Data: Submit manufacturer's data on epoxy adhesives.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301.
- B. Provide 48 hours notice to Architect for review of completed reinforcement. Allow 24 hours for Architect's review. Allow sufficient time in construction schedule for corrections to reinforcement prior to placement of concrete.

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M Grade 60 (420); A706 where noted on structural drawings.
 - 1. Deformed billet-steel bars.
 - 2. Unfinished.
 - 3. Minimum 95 percent post-industrial recycled content.
- B. Reinforcing Steel, weldable: ASTM A706/A706M, Grade 60, deformed billet-steel bars.
- C. Steel Dowels: ASTM A615, 60ksi yield grade; smooth; where shown on drawings wrap or coat 1/2 of length with grease or coating designed to eliminate bond with concrete, allowing free movement of bar.
- D. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum ___ gage, ___ inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement; avoid damage to underslab vapor barrier where installed.
3. Provide stainless steel or plastic components for placement within 1-1/2 inches of weathering surfaces.
4. Mechanical couplers to meet or exceed strength of connected elements.

2.02 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice and ACI 318.
- B. Welding of reinforcement is not permitted unless shown on Drawings.

2.03 EPOXY ANCHORING SYSTEM

- A. Epoxy resin, ASTM C881, Type IV, Grade 3, Class B or Class C, Grade 2 may be used in vertical application; Simpson SET-XP Epoxy, Hilti HIT-HY 200 (at concrete), Hilti HY-150 Max (at CMU), or approved.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Conform to Structural Drawings and applicable codes for concrete cover over reinforcement.
- E. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout, except where dowels are specifically permitted to be ungrouted or required to be epoxied as shown on the Drawings.
- F. Do not "wet-set" reinforcing bars or anchor bolts.

3.02 SPECIAL REINFORCEMENT INSTALLATION, UNLESS OTHERWISE SHOWN ON DRAWINGS

- A. At Electrical Service Entrance:
 1. Provide 1 each, #4 bar lap spliced to foundation or slab reinforcing at lowest elevation. Extend minimum 12 inches above wall framing base plate near main electrical service entry point. Cap reinforcing end with protective plastic cap. Conform installation to National Electric Code Article 250-52, 250-66, 250-68 and 250-70.
- B. At Wall Corners and Intersections:
 1. Splice horizontal wall reinforcing with splice bars and corner bars; space and size to match horizontal wall reinforcing.
 2. Extend beyond corner or intersection 48 bar diameters; 24 inches minimum.
- C. At Wall Openings:
 1. Provide 2 each #5 bars around Openings; extend vertical bars full wall height and horizontal bars 24 inches minimum beyond opening corners.
 2. Where not possible: Hook bar ends.
- D. At Slab Re-entrant Corners:
 1. Provide 1 each, 48 inch long, #4 bar diagonally across re-entrant corner.

3.03 FIELD QUALITY CONTROL

- A. An independent testing agency, as specified in Section 01 4000, will inspect installed reinforcement for conformance to contract documents before concrete placement.
- B. An independent testing agency, as specified in Section 014000, will provide special inspection for all epoxy adhesive installation in accordance with the manufacturer's ICBO report.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete for composite floor construction.
- B. Footings, stem walls, floors, and slabs on grade.
- C. Site walls and seating walls.
- D. Joint devices associated with concrete work.
- E. Concrete curing.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories: Forms and accessories for formwork; placement of anchors and embeds.
- B. Section 03 2000 - Concrete Reinforcing.
- C. Section 03 3511 - Concrete Floor Finishes: Densifiers, hardeners, applied coatings, and polishing.
- D. Section 05 12 00 - Structural Steel: Grouting under base plates.
- E. Section 07 2100 - Thermal Insulation below heated concrete slabs.
- F. Section 07 9005 - Joint Sealers: Sealants for saw cut joints and isolation joints in slabs.
- G. Division 23 - Radiant floor heating system cast into concrete slabs.
- H. Section 32 1313 - Concrete Paving: Sidewalks, curbs and gutters.

1.03 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).
- B. ACI 301 - Specifications for Structural Concrete; American Concrete Institute International; 2010.
- C. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (Errata 2007).
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.
- E. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 2010.
- F. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 2010.
- G. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001 (Reapproved 2008).
- H. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2011.
- I. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.
- J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2012a.
- K. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2013.
- L. ASTM C150/C150M - Standard Specification for Portland Cement; 2012.
- M. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2012.
- N. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.
- O. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.

- P. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2012.
- Q. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2011.
- R. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).
- S. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop; Corps of Engineers; 1974.
- T. NSF 61 - Drinking Water System Components - Health Effects; 2012.
- U. NSF 372 - Drinking Water System Components - Lead Content; 2011.
- V. OSSC - Oregon Structural Specialty Code, latest edition.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Mix Design: Submit proposed concrete mix design and supporting test data confirming to OSSC and ACI 318 for each type of mix specified.
- D. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.

1.06 MOCK-UP

- A. Coordinate with Work of Section 03 3543 - Polished Concrete Finishing for casting slabs for mock-ups of polished and dyed concrete flooring.
 - 1. Cast 5 foot by 5 foot slabs for mock-ups of polished concrete.
 - 2. Cast slabs for a minimum of four different colors.
 - 3. Accepted mock-ups are considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work. Protect from weather.
 - 4. Mock-up may not remain as part of the Work.
- B. Accepted mock-up is considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work.
- C. Mock-up may not remain as part of the Work.

PART 2 PRODUCTS

2.01 FORMWORK

- A. Comply with requirements of Section 03 1000.

2.02 REINFORCEMENT

- A. Comply with requirements of Section 03 2000.

2.03 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I - Normal, or Type II - Moderate Portland type.
- B. Fine and Coarse Aggregates: ASTM C 33.
 - 1. Maximum Size: 1-1/2 inches and not more than 1/5 of narrowest dimension between sides of forms, 1/3 depth of flatwork, or 3/4 of narrowest space between reinforcing bars.
- C. Fly Ash: ASTM C618, Class C or F.

- D. Slag: Ground Granulated Blast-Furnace Slag; ASTM C989, Grade 100 or 120.
- E. Water: Clean and not detrimental to concrete.

2.04 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement. Calcium chloride is not allowed.
- B. Air Entrainment Admixture: ASTM C260/C260M.
- C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- D. Water Reducing Admixture: ASTM C494/C494M Type A.
- E. Shrinkage Reducing Admixture: ASTM C157.
 - 1. Acceptable Products: Grace Eclipse.
 - 2. Mixture: Of sufficient quantity to limit shrinkage to 0.045 percent as tested in accordance with ASTM C157, but no less than 1.0 gallons per cubic yard.
 - 3. Extent of Work: Provide over all uncovered interior concrete flatwork where polished o concrete floor slabs POL-1 through POL-3 are scheduled.

2.05 BONDING AND JOINTING PRODUCTS

- A. Waterstops: Bentonite and butyl rubber, complying with NSF 61 and NSF 372.
- B. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
 - 1. Material: ASTM D1751, cellulose fiber.

2.06 CURING MATERIALS

- A. Curing Compound: Not permitted. Use moisture curing method.
- B. Moisture-Retaining Sheet: ASTM C171.
 - 1. Curing paper, regular.
 - 2. Polyethylene film, clear, minimum nominal thickness of 0.0040 in..
 - 3. White-burlap-polyethylene sheet, weighing not less than 10 oz/per linear yd, 40 inches wide.
- C. Water: Potable, not detrimental to concrete.

2.07 CONCRETE MIX DESIGN

- A. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
 - 2. Supplier is responsible for achieving or exceeding concrete design strengths.
- B. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
 - 1. Use accelerating admixtures in cold weather only when approved by Architect. Use of admixtures will not relax cold weather placement requirements.
 - 2. Use set retarding admixtures during hot weather only when approved by Architect.
- C. Add air entraining agent to normal weight concrete mix for horizontal work exposed to exterior.
- D. Normal Weight Concrete:
 - 1. At Footings / Stem Walls:
 - a. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 3,000 psi.
 - b. Fly Ash or Slag Content: Minimum 15 percent and maximum 25 percent of cementitious materials by weight.
 - c. Water-Cementitious materials Ratio: Maximum 50 percent by weight.
 - d. Total Air Content: 5.0 to 6.5 percent, per ASTM C 173 .
 - e. Maximum Aggregate Size: 3/4 inch.

2. At Interior Slabs-on-Grade:
 - a. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 3,000 psi
 - b. Fly Ash or Slag Content: Minimum 15 percent and maximum 25 percent of cementitious materials by weight.
 - c. Water-Cementitious Materials Ratio: Maximum 42 percent by weight.
 - d. Total Air Content: 5 percent to 6 - ½ percent, per ASTM C 173.
 - e. Maximum Aggregate Size: ¾ inch.
 - f. Note: The Water-Cement Ratio is the governing criteria as the intent is to keep the moisture content of the slab low.
3. At Metal Decks, Stair Treads, and Stair Landings:
 - a. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 3,000 psi.
 - b. Fly Ash Content: Minimum 15 percent and maximum 25 percent of cementitious materials by weight.
 - c. Water-Cement Ratio: Maximum 42 percent by weight.
 - d. Maximum Aggregate Size: ¾ inch.

2.08 MIXING

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
- B. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Verify that forms are clean and free of rust before applying release agent.
- B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- D. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.03 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Notify Architect not less than 24 hours prior to commencement of placement operations.
- D. Ensure reinforcement, inserts, embedded parts, formed construction joint devices, and radiant floor heating system will not be disturbed during concrete placement.
- E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- F. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.04 SLAB JOINTING

- A. Locate joints as indicated on the drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.

- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
 - 1. Install where indicated on drawings, and wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.
- D. Load Transfer Construction and Contraction Joints: Install load transfer devices as indicated; saw cut joint at surface as indicated for contraction joints.
- E. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.
 - 1. Coordinate with Work of Section 03 3543 - Polished Concrete Finishing for placement of contraction joints within areas to receive polished finish.

3.05 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. Maximum Variation of Surface Flatness for Concrete Slabs on Grade:
 - 1. Exposed to View and Foot Traffic: F(F) of 20; and F(L) of 15.
 - 2. Under Thick-Bed Tile: F(F) of 20; F(L) of 15.
 - 3. Under Carpeting: F(F) of 25; F(L) of 20.
 - 4. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25.
 - 5. Polished Concrete Finish: F(F) of 40; F(L) of 25.
 - 6. Slabs under Wood Athletic Flooring: Floor must be level within plus or minus 1/8 inch in a 10 foot radius to meet floor manufacturer's requirements.
- B. Correct the slab surface if tolerances are less than specified.
- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.06 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
 - 1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, thin set quarry tile, and thin set ceramic tile.
 - 2. Surfaces to Receive Wood Athletic Flooring: Smooth "Steel trowel" finish.
 - 3. Polished Concrete Floors; "Steel trowel" as described in ACI 302.1R; use steel-reinforced plastic trowel blades instead of steel blades to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, and surfaces to be polished. Provide three passes with trowel. Refer to Section 03 3511 - Concrete Floor Finishes.
 - 4. Other Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.07 MISCELLANEOUS CONCRETE

- A. Provide concrete at miscellaneous locations as indicated, including but not limited to:
 - 1. Concrete fill at steel bollards.
 - 2. Concrete fill at fence posts.
 - 3. Concrete at wash basin in Utility Court.
 - 4. Other locations as indicated.

3.08 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Surfaces Not in Contact with Forms:
 - 1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-fog spray, or saturated burlap.
 - a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
 - b. Spraying: Spray water over floor slab areas and maintain wet for 4 days minimum.
 - c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place for 4 days minimum.
 - 2. Final Curing: Begin after initial curing but before surface is dry.
 - a. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.
 - b. Curing method: Water cure as recommended by Concrete Floor Polishing and Finishing systems manufactureres.

3.09 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm. Notify Architect and Testing Lab at least 48 hours before intended concrete placement.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- E. Compressive Strength Tests: ASTM C 39/C 39M. For each sampling of concrete, mold and cure a set of five concrete test cylinders. Obtain test samples for every 150 cu yd or less of each class of concrete placed in each day.
 - 1. Perform compressive strength tests on sets of cylinders at their respective age as follows:
 - a. One at seven days
 - b. One at 14 days
 - c. Two at 28 days, and
 - d. Hold one for future use
 - 2. If at the end of the project all of the concrete reaches the required compressive strength, the held cylinders may be discarded without being tested.
- F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- G. Perform one air content test for each set of cylinders taken for air-entrained concrete, following procedures of ASTM C173/C173M.

3.10 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.11 PROTECTION

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

END OF SECTION

**SECTION 03 3511
CONCRETE FLOOR FINISHES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface treatments for concrete floors and slabs.
- B. Application of topical moisture vapor mitigation in selected areas, Selaed Concrete (SC).

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.
- B. Section 03 3000 - Cast-in-Place Concrete: Curing compounds that also function as sealers.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with concrete floor placement and concrete floor curing.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.
- C. Maintenance Data: Provide data on maintenance and renewal of applied finishes.

1.05 PRE-INSTALLATION MEETINGS

- A. Polished Concrete System: Conduct a preinstallation meeting to verify project requirements, manufacturers' installation instructions, and manufacturer's warranty requirements.

1.06 MOCK-UP

- A. For coatings, construct mock-up area under conditions similar to those that will exist during application, with coatings applied.
- B. Mock-Up Size: 10 feet square.
- C. Locate where directed.
- D. Mock-up may remain as part of the work.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

1.08 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Warrant floor covering installed over SC-1 against failure due to moisture vapor migration or moisture-borne contaminants for a period of 15 years from date of original installation.
 - 1. Warranty shall cover all labor and materials needed to replace floor covering that fails due to moisture vapor emission and moisture borne contaminants

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.

1.10 FIELD CONDITIONS

PART 2 PRODUCTS

2.01 CONCRETE FLOOR FINISH APPLICATIONS

- A. Liquid Densifier/Hardener:
 - 1. Use where Finish Schedule indicates "Hardener" and/or "Sealer" and or "SLR".
- B. Moisture Mitigation Coating:
 - 1. Use where Finish Schedule indicates "SC-1"

2.02 DENSIFIERS AND HARDENERS

- A. Liquid Densifier/Hardener: Penetrating chemical compound that reacts with concrete, filling the pores and dustproofing; for application to concrete prior to set.
 - 1. Composition: Sodium silicate. Odorless, colorless, waterborne solution, compliant with project's VOC requirements.
 - 2. Products:
 - a. Ardex Engineered Cements; www.ardexamericas.com.
 - b. BASF Construction Chemicals-Building Systems; Kure-N-Harden: www.buildingsystems.basf.com.
 - c. Curecrete Distribution, Inc.; Ashford Formula: www.ashfordformula.com.
 - d. Dayton Superior Corporation; Pentra-Hard® Densifier : www.daytonsuperior.com.
 - e. Euclid Chemical Company; Diamond Hard: www.euclidchemical.com.
 - f. L&M Construction Chemicals, Inc; Seal-Hard: www.lmcc.com.
 - g. Nox-Crete; Duro-nox.
 - h. Vexcon Chemical; Starseal PS Clear.
 - i. W.R. Meadows, Inc; Liqui-Hard: www.wrmeadows.com.
 - j. Substitutions: See Section 01 6000 - Product Requirements.
 - k. Extent: Provide at exposed slabs where "Sealer" or "SLR" is indicated on the Finish Schedule.
 - 1) The exposed slabs scheduled to receive sealer include existing concrete and new concrete. If recommended by the manufacturer, provide products appropriate for new and existing concrete.

2.03 SEALERS

- A. Sealer SC-2: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
 - 1. Products:
 - a. Ashford Formula; Cure-Hard.
 - b. BASF; Lapidolith.
 - c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Intraseal.
 - d. Dayton Superior Corporation; Day-Chem Sure Hard.
 - e. Euclid Chemical Company (The); Euco Diamond Hard.
 - f. L&M Construction Chemicals, Inc.; Seal Hard.
 - g. Meadows, W. R., Inc.; Liqui-Hard.
 - h. US Mix Products Company; US Spec Industraseal.

2.04 MOISTURE BARRIER MITIGATION

- A. Sealer SC-1: ASTM C1315, Type 1, Class A, ASTM C309, Type 1 Class A, penetrating product with no less than 34 percent solids content, leaving no sheen, VOC content rating as required to suit regulatory requirements with a 5 year documented history in controlling moisture vapor emission from damaging floor coverings.
 - 1. Products:
 - a. Creteseal; SC2000: www.creteseal.com.
 - b. Curranseal PMC3300: www.curranseal.com.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that floor surfaces are acceptable to receive the work of this section.
- B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.

3.02 GENERAL

- A. Apply materials in accordance with manufacturer's instructions.

3.03 COATING APPLICATION

- A. Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- B. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.

3.04 LIQUID DENSIFIER/HARDENER

- A. Install Liquid Densifier/Hardener per manufacturer's requirements.
- B. Remove existing finish and/or grease, grime, and dirt from existing concrete surface to receive Liquid Densifier/Hardener.
 - 1. Contractor to identify their proposed method to prepare slab for Liquid Densifier/Hardener to Architect. Owner and Architect to approve method.
 - 2. Application methods include, but are not limited to sand blast new and/or existing slab surface prior to placement of Liquid Densifier/Hardener.

3.05 SEALER APPLICATION

- A. Sealer application: Comply with manufacturer's recommendations.
 - 1. Sealer SC-2: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
 - a. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 - b. Do not apply to concrete that is less than three days' old.
 - c. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
 - d. Locations of Use: At floors exposed to view, unless indicated otherwise, and precast stair treads.

3.06 MOISTURE MITIGATION COATING

- A. Sealer Application: Comply with manufacturer's recommendations.
 - 1. Sealer SC-1: Apply sealer the day of the concrete pour just after final finishing and saw cutting. Apply with a low-pressure industrial sprayer at 200 square feet per gallon. After the concrete sealer is applied, broom evenly across the concrete slab until completely absorbed into the concrete surface.
 - a. Locations of Use: All areas scheduled or indicated to receive resilient floor covering, ceramic tile, quarry tile, wood athletic flooring and carpet.
 - b. Verify with flooring manufacturers that sealer is compatible with flooring and adhesive materials prior to application.

END OF SECTION

SECTION 03 3543
POLISHED CONCRETE FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Polished and dyed concrete finishing, including sealer and densifiers indicated as POL-1 through POL-3. See finish legend on drawings.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-In-Place Concrete.
- B. Section 03 3511 - Concrete Floor Finishes
- C. Section 07 9005 - Joint Sealers.

1.03 REFERENCE STANDARDS

- A. ASTM C501 - Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser.
- B. ASTM C779/C779M - Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
- C. ASTM D523 - Standard Test Method for Specular Gloss.
- D. National Floor Safety Institute (NFSI) - NFSI Test Method 101-A Standard for Evaluating High-Traction Flooring Materials, Coatings, and Finishes.

1.04 PERFORMANCE DESCRIPTION

- A. Performance Criteria:
 - 1. Abrasion Resistance: ASTM C779, Method A, high resistance, no more than 0.008 inch wear in 30 minutes, or ASTM C501.
 - 2. Reflectivity: Minimum average 60 when tested in accordance with ASTM D523 by standard gloss meter.
 - 3. High Traction Rating: NFSI 101-A non-slip properties.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data:
 - 1. Submit special concrete finishes manufacturer's specifications, test data and other data required for each type of manufactured material and product indicated.
 - 2. Submit special concrete finishes describing product to be provided, giving manufacturer's name and product name for the specified material proposed to be provided under this section.
 - 3. Submit special concrete finishes technical data sheet giving descriptive data, curing time, and application requirements.
- C. Samples for Selection: Submit manufacturer's full range of available colors. Architect will select 4 colors to be installed in the mock-up for final color selection.
- D. Installation Instructions: Submit manufacturer's installation instructions for all special concrete finishes.
- E. Certificates:
 - 1. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 - 2. Letter of certification from the National Floor Safety Institute confirming the system has been tested and passed Phase Two Level of certification when tested by Method 101-A.
 - 3. Provide letter of certification from concrete finish manufacturer stating that installer is certified applicator of specified concrete finishes, and is familiar with proper procedures and installation requirements required by the manufacturer.
- F. Maintenance Data:

1. Manufacturer's maintenance procedures, recommended maintenance materials and suggested schedule for cleaning.
2. Protocols and product specifications for joint filling, crack repair and surface repair.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications:
1. Use a certified, factory trained installer and adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft.
 2. Applicator shall be approved by polished concrete finish manufacturer.
 3. Applicator shall be familiar with the specified requirements and the methods needed for proper performance of work of this section. Applicator must have availability of proper equipment and manpower to perform work within scope of this project on a timely basis during normal daytime working hours or must include in their bid the cost of all overtime required by the Contractor to supervise the additional hours of work.
 4. The installer must have performed a minimum of five projects of 5000 square feet or greater with concrete polishing/ dye/hardener-sealer combination.

1.07 PREINSTALLATION CONFERENCE

- A. Pre-Installation Conference: Conduct conference at project site to comply with requirements of Section 01 30 00 - Administrative Requirements. Owner, Architect, Contractor, Installer, Product Manufacturer and Equipment Manufacturer are to be in attendance. Review the following, as a minimum:
1. Polisher shall demonstrate understanding of work required by reviewing and discussing procedures for, but not limited to, following:
 - a. Tour areas to be polished and discuss and evaluate substrate conditions, surface preparation, sequence procedures and other preparatory work.
 - b. Review Contract Document requirements.
 - c. Status of submittal review.
 - d. Environmental requirements.
 - e. Scheduling and phasing of work.
 - f. Coordinating with other work and personnel.
 - g. Protection of adjacent surfaces.
 - h. Surface preparation.
 - i. Dust control.
 - j. Repair of defects and defective work prior to installation.
 - k. Mock-up review and acceptance.
 - l. Cleaning.
 - m. Installation of polished floor finishes, including procedural steps of grinding, honing and polishing operations.
 - n. Application of liquid hardener, densifier.
 - o. Installation of joint sealants.
 - p. Protection of floor surfaces prior to polishing or application of dye.
 - q. Protection of finished surfaces after installation.

1.08 MOCK-UP

- A. Provide mock-up of finish 5 foot by 5 foot in location directed by Architect.
- B. Install mock-up to demonstrate typical joints, surface finish, color variation and standard of workmanship. Include sealers in mock-ups.
 1. Mock-up shall also demonstrate dust control measures.
- C. Mock-up four different colors as selected by Architect. Architect will select one color for the final installation.
- D. Notify Architect seven days in advance of dates and times when mock-ups will be constructed.
- E. Obtain Architect's approval of mock-ups before starting actual installation.

- F. If Architect determines that mock-ups do not meet requirements, demolish and remove them from the site and prepare others until mock-ups are accepted.
- G. Maintain mock-ups during construction exposed to view in an undisturbed condition as a standard for judging the completed work. Protect from weather.
- H. Mock-up may remain as part of the Work.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original containers, with seals unbroken, bearing manufacturer labels indicating brand name and directions for storage.
- B. Dispense special concrete finish material from factory numbered and sealed containers. Maintain record of container numbers.

1.10 PROJECT CONDITIONS

- A. Environmental limitations: Comply with manufacturers written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting topping performance.
 - 1. Verify that concrete meets minimum F(F) Floor Flatness and F(L)F Floor Levelness specified in Section 03 30 00 - Cast-in-Place Concrete.
 - 2. Concrete must be cured a minimum of 28 days or as directed by the manufacturer before application can begin.
- B. Close areas to traffic during and after application, for time period recommended in writing by manufacturer.
- C. Slab Protection:
 - 1. Diaper all hydraulic powered equipment to avoid staining of the concrete.
 - 2. Do not permit any trade to park vehicles on the floor slab. If necessary to complete their scope of work, place drop cloths under vehicles at all times.
 - 3. No pipe cutting machines are to be used on the floor slab.
 - 4. Do no place steel on floor slab to avoid rust staining.
 - 5. Equip all equipment with non-marking tires.
 - 6. Do not allow the use of tape on polished or dyed floors.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers:
 - 1. L&M Construction Chemicals, Inc: www.lmcc.com.
 - 2. Lythic Solutions, Inc: www.lythic.com.
 - 3. Consolideck System by Prosoco: www.prosoco.com.
 - 4. RetroPlate: www.retroplatesystems.com.
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

- A. L&M Construction Chemicals System:
 - 1. Hardening/Sealing/Densifier Agent: Proprietary, water-based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film.
 - a. Product: L&M Construction Chemicals, Inc., FGS Hardener Plus.
 - 2. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing polyurea control joint and crack filler with Shore A 75 or higher hardness.
 - a. Product: As specified in Section 07 90 05 - Joint Sealers.
 - 3. Floor Sealer in Cafeteria and Toilet Rooms: Ready to use, silane, siloxane and fluoropolymers blended water based solution sealer, quick drying, low-odor, oil and water repellent, VOC compliant and compatible with chemically hardened floors.
 - a. Product: L&M Construction Chemicals, Inc., Permaguard SPS.
 - 4. Floor Sealer all Other Areas: Penetrating concrete sealer recommended by densifier manufacturer.

5. Concrete Dyes: Fast-drying dye, packaged in premeasured units ready for mixing with VOC exempt solvent; formulated for application to polished cementitious surfaces.
 - a. Colors: As selected from manufacturer's full range of available colors.
 - b. Product: L&M Construction Chemicals, Inc., Vivid Concrete Dyes.
 6. Cleaning Solution: Proprietary, mild, highly concentrated liquid concrete cleaner and conditioner containing wetting and emulsifying agents; biodegradable, environmentally safe and certified High Traction by National Floor Safety Institute (NFSI):
 - a. Product: L&M Construction Chemicals, Inc. FGS Concrete Conditioner.
- B. Lythic Solutions System:
1. Hardening/Sealing/Densifier Agent: Colloidal silica based concrete hardener and densifier.
 - a. Product: Lythic Densifier.
 2. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing polyurea control joint and crack filler with Shore A 75 or higher hardness.
 - a. Product: As specified in Section 07 90 05 - Joint Sealers.
 3. Floor Sealer in Cafeteria and Toilet Rooms: Micro film forming sealer.
 - a. Product: Lythic SPD Protector.
 4. Floor Sealer all Other Areas: Penetrating concrete sealer recommended by densifier manufacturer.
 - a. Product: Lythic Protector.
 5. Concrete Dyes: Fast-drying dye, packaged in premeasured units ready for mixing with VOC exempt solvent; formulated for application to polished cementitious surfaces.
 - a. Colors: As selected from manufacturer's full range of available colors.
 - b. Product: American Decorative Concrete Ameripolish Solvent-Based Concrete Dye.
 6. Cleaning Solution: Non-corrosive cleaner recommended by densifier manufacturer.
 - a. Product: Lythic Cleaner.
- C. Consolideck System:
1. Hardening/Sealing/Densifier Agent: Water-based lithium silicate concrete hardener and densifier.
 - a. Product: Consolideck LS.
 2. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing polyurea control joint and crack filler with Shore A 75 or higher hardness.
 - a. Product: As specified in Section 07 90 05 - Joint Sealers.
 3. Floor Sealer in Cafeteria: Micro film forming sealer.
 - a. Product: Consolideck LS GUARD diluted 1:1 with potable water applied in two coats at 2000 to 3000 sq ft/gal. High speed burnish each coat to 90.5 degree F.
 4. Floor Sealer in Toilet Rooms: Micro film forming sealer.
 - a. Product: Consolideck PolishGuard undiluted applied with manufacturer's recommended sprayer in two coats at 400 to 800 sq ft/gal. High speed burnish final coat. Note: Consolideck has a different product that needs to be used at toilet rooms.
 5. Floor Sealer all Other Areas: Penetrating concrete sealer recommended by densifier manufacturer for repelling water-based and oil-based stains.
 - a. Product: Consolideck SLX 100.
 6. Concrete Dyes: Penetrating, translucent dye, packaged in premeasured units ready for mixing with water or a VOC exempt solvent; formulated for application to polished cementitious surfaces.
 - a. Colors: As selected from manufacturer's full range of available colors.
 - b. Product: Consolideck GemTone Stain.
 7. Cleaning Solution: Non-corrosive cleaner recommended by densifier manufacturer.
 - a. Product: Consolideck LSKlean.
- D. Retroplate System:
1. Hardening/Sealing/Densifier Agent: Water-based silicate concrete hardener and densifier.
 - a. Product: Retroplate 99 Densifier.

2. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing polyurea control joint and crack filler with Shore A 75 or higher hardness.
 - a. Product: As specified in Section 07 90 05 - Joint Sealers or CureCrete Cretefill Pro 75.
3. Floor Sealer in Cafeteria and Toilet Rooms: Water-based silicate and polymeric component copolymer.
 - a. Product: RetroGuard diluted 1:1 with potable water applied in two 3000 sq. ft./gal. coats. Buff after each coat.
4. Floor Sealer all Other Areas: Penetrating concrete sealer recommended by densifier manufacturer.
5. Concrete Dyes: Fast-drying dye, packaged in premeasured units ready for mixing with VOC exempt solvent; formulated for application to polished cementitious surfaces.
 - a. Colors: As selected from manufacturer's full range of available colors.
 - b. Product: American Decorative Concrete Ameripolish Solvent-Based Concrete Dye.
6. Cleaning Solution: Non-corrosive cleaner recommended by densifier manufacturer.
 - a. Product: CreteClean Plus.

2.03 ACCESSORIES

- A. Patching Compound: Compound composed of 40 percent Portland cement, 45 percent limestone and 15 percent vinyl acetate copolymer, when mixed with dust salvaged from grinding process forms a paste that hardens when surface imperfections are filled.
- B. Grout Material: Clear modified silicate sealant, containing no pore clogging latex, when mixed with dust salvaged from grinding process forms a paste that reacts with calcium hydroxide in concrete that hardens when surface imperfections are filled.
 1. Available Product: Versaflex QuickMender or approved equal.
- C. Polishing Equipment: As required by installer to achieve specified aesthetic finish and gloss meter reading.
 1. Use dust extraction equipment with a flow rate suitable for dust generated by polishing installer's equipment.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine substrate, with installer present, for conditions affecting performance of finish. Correct conditions detrimental to timely and proper work. Do not proceed until unsatisfactory conditions are corrected.
- B. New Slabs:
 1. Verify that slab has cured in accordance with manufacturer's requirements.
 2. Verify that the floor surfaces are free of construction latents.
 3. Verify that concrete surfaces received a hard steel-trowel finish or plastic trowel finish (3 passes) during placement as specified in section 03 3000 Cast-in-Place Concrete.
 4. Remove any existing surface contamination that may be detrimental to finish.
 5. Verify that slab meets finish and surface profile requirements specified in Section 03 30 00 - Cast-In-Place Concrete.
- C. Mask and tape off all air supply/return duct diffusers and dampers, light fixtures, smoke alarms, technology closets, etc. to ensure that polishing dust does not spread into and contaminate these areas/devices. Cover open shelving/bookcases, cabinet drawers/doors, etc. Mock-up first area to be polished to demonstrate dust control measures.

3.02 INSTALLATION

- A. Protect adjacent areas from damage due to polishing, dying and sealing activities.
- B. Start any of the floor finish applications in presence of manufacturer's technical representative.
- C. Do not commence polishing until concrete has cured a minimum of 28 days, unless otherwise accepted by manufacturer.
- D. Floor Surface Polishing and Treatment:

1. Provide polished concrete floor treatment in entirety of slab indicated by Drawings. Provide consistent finish in all contiguous areas.
2. Finish to within 1/8 inch of vertical surfaces.
3. Apply floor finish prior to installation of fixtures and accessories.
4. Diamond polish concrete floor surfaces in accordance with the following requirements:
 - a. Expose fine aggregates for a salt and pepper finish.
 - b. Polish floor surfaces to an average minimum gloss meter reading of 80 high gloss (typically 1500 grit)
 - 1) Polish ramps (POL-3) to meet slip-resistance requirements (200 grit).
 - 2) Polish slabs adjacent to entrances where indicated to meet slip-resistance requirements (200 grit).
 - 3) Gloss meter testing may be performed by Owner prior to any application of a sealer. The first test in any area will be paid for by the Owner. If the first test fails in that area, all subsequent tests in that area will be at the expense of the polishing installer.
 - c. Comply with manufacturer's recommended polishing grits for each sequence to achieve desired finish level. Level of sheen shall match that of approved mock-up.
 - d. Expose aggregate in concrete surface only as determined by approved mock-up.
5. Dyed and Polished Concrete:
 - a. Locate demarcation line between dyed surfaces and other finishes.
 - b. Polish concrete to final finish level.
 - c. Apply diluted dyes to polished concrete surface.
 - d. Allow dye to dry.
 - e. Remove residue with dry buffer; reapply as necessary for desired result.
6. Hardener/Densifier Application: Apply densifier in strict accordance with manufacturer's recommendations.
 - a. Follow manufacturer's recommendations for drying time between successive coats.
7. Sealer Application: Apply two coats of sealer in accordance with manufacturer's published recommendations.
8. Remove defects and repolish defective areas.
9. Finish edges of floor finish adjoining other materials in a clean and sharp manner.

3.03 ADJUSTMENTS

- A. Polish to higher gloss those areas not meeting specified gloss levels per mock-up.
- B. Fill joints flush to surface.
- C. Mechanically scrub treated floors for seven days with soft to medium pads with approved cleaning solution.

3.04 CLEANING:

- A. Keep premises clean and free of debris at all times.
- B. Remove spatter from adjoining surfaces, as necessary.
- C. Repair damages to surface caused by cleaning operations.
- D. Remove debris from jobsite. Dispose of materials in separate, closed containers in accordance with local regulations.

3.05 PROTECTION:

- A. Final Protection: Following completion of final polishing, cover surfaces to protect from ongoing construction operations until Substantial Completion. Cover with breathable product such as kraft paper or thin curing blanket. Do not cover with masonite, plywood or polyethylene sheets.
 1. Do not tape protection to finished floor surfaces.

END OF SECTION

SECTION 03 4500

PRECAST ARCHITECTURAL CONCRETE (STAIR TREADS DOWA)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Architectural precast concrete stair treads and landings - PC-1
- B. Supports, anchors, and attachments.

1.02 RELATED REQUIREMENTS

- A. Section 03 20 00 - Concrete Reinforcing.
- B. Section 03 30 00 - Cast-in-Place Concrete: Admixtures and sealer SC-2 for precast stairs.
- C. Section 05 51 00 - Metal Stairs: Metal stairs supporting precast treads and landings.

1.03 REFERENCE STANDARDS

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
- F. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
- G. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts [Metric].
- H. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
- I. ASTM C150/C150M - Standard Specification for Portland Cement.
- J. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- L. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; American Welding Society.
- M. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products; Precast/Prestressed Concrete Institute.
- N. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete; Precast/Prestressed Concrete Institute.
- O. PCI MNL-122 - Architectural Precast Concrete; Precast/Prestressed Concrete Institute.
- P. PCI MNL-123 - Design and Typical Details of Connections for Precast and Prestressed Concrete; Precast/Prestressed Concrete Institute.
- Q. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; Precast/Prestressed Concrete Institute.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's information on accessory products, including pigments, admixtures, inserts, plates, etc.

- C. Shop Drawings: Indicate layout, unit locations, configuration, unit identification marks, reinforcement, connection details, support items, location of lifting devices, dimensions, openings, and relationship to adjacent materials.
 - 1. Include details of mix designs.
 - 2. Include coordination with metal stairs.
- D. Samples: Submit two, 12 x 12 inch in size, illustrating surface finish, color and texture.
- E. Selection Samples: For each type and finish of extruded nosing.
- F. Fabricator qualifications.

1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications:
 - 1. Firm having at least 5 years of documented experience in production of precast concrete of the type required.
 - 2. Plant certified under Precast/Prestressed Concrete Institute Plant Certification Program; product group and category A1 - Architectural Precast Concrete.
 - 3. Plant certified under Architectural Precast Association Plant Certification Program for production of architectural precast concrete.
- B. Welder: Qualified within previous 12 months in accordance with AWS D1.1 and AWS D1.4.

1.07 MOCK-UP

- A. Provide mock-up of stair treads, full stair width by full tread depth wide, with finish in accordance with approved sample.
 - 1. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Handling: Lift and support precast units only from support points.
- B. Blocking and Lateral Support During Transport and Storage: Use materials that are clean, non-staining, and non-harmful to exposed surfaces. Provide temporary lateral support to prevent bowing and warping.
- C. Protect units to prevent staining, chipping, or spalling of concrete.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Architectural Precast Concrete:
 - 1. Knife River Corporation; www.kniferiver.com.
 - 2. Michaels Precast Concrete: www.michaelsprecastconcrete.com.
 - 3. Olympian Precast, Inc.; www.olymprecast.com.
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PRECAST UNITS

- A. Precast Architectural Concrete Units: Comply with PCI MNL-120, PCI MNL-122, PCI MNL-123, PCI MNL-135, and ACI 318.
 - 1. Concrete Face Mix: Minimum 5000 psi, 28 day strength, air entrained to 5 to 7 percent; comply with ACI 301.

2.03 REINFORCEMENT

- A. Comply with requirements of Section 03 20 00 and manufacturer's recommendations as required to meet performance requirements.

2.04 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I - Normal Portland type.
- B. Fine and Coarse Structural Aggregates: ASTM C 33.
- C. Surface Finish Aggregate: Conforming to sample in office of Architect.
- D. Water: Clean and not detrimental to concrete.

- E. Air Entrainment Admixture: ASTM C260/C260M.
- F. Grout:
 - 1. Non-shrink, non-metallic, minimum 10,000 psi, 28 day strength.

2.05 FORMWORK

- A. Provide forms with acceptable form facing materials that are non-reactive with concrete or form release agents and that will produce required finish surfaces.
- B. Construct and maintain forms to produce precast concrete units of shapes, lines and dimensions indicated within specified tolerances.
- C. Provide forms to result in a consistent finish with no visible seams in precast surfaces.

2.06 SUPPORT DEVICES

- A. Connecting and Support Devices; Anchors and Inserts: ASTM A36/A36M steel; hot-dip galvanized in accordance with ASTM A153/A153M.
 - 1. Clean surfaces of rust, scale, grease, and foreign matter.
 - 2. Galvanize after fabrication in accordance with requirements of ASTM A123/A123M.
- B. Bolts, Nuts, and Washers: ASTM A307 heavy hex bolts, Type A, hot-dip galvanized, with matching ASTM A563 (A 563M) nuts and matching washers.

2.07 ACCESSORIES

- A. Bearing Pads: As recommended by manufacturer.
- B. Sealant: Silicone type specified in Section 07 90 05.

2.08 FABRICATION

- A. Fabricate in conformance with PCI MNL-117 and PCI MNL-135.
- B. Maintain plant records and quality control program during production of precast units. Make records available upon request.
- C. Use rigid molds, constructed to maintain precast unit uniform in shape, size, and finish.
- D. Place nosings into formwork in a manner protecting abrasive inserts. Extend nosings full width of treads. Align nosings flush with riser faces and level with finished tread surface.
- E. Maintain consistent quality during manufacture.
- F. Fabricate connecting devices, plates, angles, inserts, bolts, and accessories. Fabricate to permit initial placement and final attachment.
- G. Embed reinforcing steel, anchors, inserts plates, angles, and other cast-in items.
- H. Locate hoisting devices to permit removal after erection.
- I. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
- J. Minor patching in plant is acceptable, providing structural adequacy and appearance of units is not impaired.

2.09 FINISH - PRECAST UNITS

- A. Finish PC-1 - Stair Treads: Acid etch finish. Ensure exposed-to-view finish surfaces of precast units are uniform in color and appearance.
- B. Ensure exposed-to-view surfaces of precast units are uniform in color and appearance and consistent with approved samples.

2.10 FABRICATION TOLERANCES

- A. Conform to PCI MNL-117 and PCI MNL-135.

2.11 SOURCE QUALITY CONTROL

- A. Provide testing of concrete mix. Comply with testing requirements specified in Section 03 30 00 - Cast-in-Place Concrete.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that stair framing is ready to receive Work of this Section.

3.02 ERECTION

- A. Erect units without damage to shape or finish. Replace or repair damaged panels.
- B. Erect units level and plumb within allowable tolerances.
- C. Align and maintain uniform horizontal and vertical joints as erection progresses.
- D. Fasten stair tread units in place with mechanical connections.
- E. Provide non-combustible shields during welding operations.
- F. Touch-up field welds and scratched or damaged primed painted surfaces.
- G. Exposed Joint Dimension: 1/2 inch. Adjust units so that joint dimensions are within tolerances.
- H. Seal perimeter joints in accordance with Section 07 90 05.
- I. Coordinate with Work of Section 03 30 00 - Cast-in-Place Concrete for application of sealers on stair treads and platforms. Protect all surfaces from staining until surfaces have been sealed.

3.03 TOLERANCES

- A. Erect members level and plumb within allowable tolerances. Conform to PCI MNL-135.

END OF SECTION

SECTION 04 2000
UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete Block structural and veneer.
- B. Materials referred to as CMU, Concrete Masonry Units, and Block
- C. Mortar and Grout.
- D. Installation of Lintels.
- E. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing: Reinforcing steel for grouted masonry.
- B. Section 05 5000 - Metal Fabrications: Loose steel lintels.
- C. Section 07 1900 - Water Repellents.
- D. Section 07 2100 - Thermal Insulation: Insulation for cavity spaces.
- E. Section 07 2500 - Weather Barriers: Sealing of penetrations made by masonry veneer anchors
- F. Section 07 6200 - Sheet Metal Flashing and Trim: Embedded and through-wall masonry flashings.
- G. Section 07 9005 - Joint Sealers: Backing rod and sealant at control and expansion joints.
- H. Section 09 96 23 - Anti Graffiti Coating.

1.03 REFERENCE STANDARDS

- A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; American Concrete Institute International; 2011.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2013.
- D. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.
- E. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2011.
- F. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2013.
- G. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.
- H. ASTM C150/C150M - Standard Specification for Portland Cement; 2012.
- I. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).
- J. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2012.
- K. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.
- L. ASTM C476 - Standard Specification for Grout for Masonry; 2010.
- M. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2012.
- N. ASTM C1148 - Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar; 1992a (Reapproved 2008) .
- O. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2012.
- P. ASTM C1357 - Standard Test Methods for Evaluating Masonry Bond Strength; 2009.
- Q. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry; 2011.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting on the Project site at least one week before starting work of this section.
 - 1. Meet with Architect, Owner, testing and inspecting agency representatives, and all installers and manufacturer's representatives related to the following Sections:
 - a. Section 04 2000 - Unit Masonry.
 - b. Section 05 4000 - Cold-Formed Metal Framing.
 - c. Section 07 2100 - Thermal Insulation for exterior continuous insulation.
 - d. Section 07 2500 - Weather Barriers.
 - e. Section 07 4113 - Metal Roof Panels.
 - f. Section 07 4213 - Metal Wall Panels.
 - g. Section 07 4623 - Wood Siding.
 - h. Section 07 5400 - Thermoplastic Membrane Roofing
 - i. Section 07 4233 - Exterior Solid Phenolic Rainscreen Panel
 - j. Section 07 6200 - Sheet Metal Flashing and Trim.
 - k. Section 07 9005 - Joint Sealers.
 - l. Section 08 4300 - Aluminum-Framed Storefronts.
 - m. Section 08 4413 - Glazed Aluminum Curtainwalls.
 - n. Section 09 2116 - Gypsum Board Assemblies.
 - 2. Attendees shall include manufacturer's representative as required to meet warranty requirements.
 - 3. Coordinate related work. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
 - 4. Review preparation and installation procedures, including manufacturer's written instructions.
 - 5. Review governing regulations and requirements for insurance and certificates, if applicable.
 - 6. Review temporary protection requirements for during and after installation.
 - 7. Review observation and repair procedures after product installation.
 - 8. Meeting shall include review of integrated exterior mock-up to confirm installation procedures as required to provide a warrantable assembly.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, mortar, and masonry accessories.
- C. Samples: Submit two samples of decorative block units to illustrate color, texture, and extremes of color range.

1.06 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.
- B. Installer: Company specializing in performing the work of this Section with minimum three years documented experience.
- C. Advance notices: Notify Architect and Testing Lab at least 48 hours before Grout placement.

1.07 MOCK-UP

- A. Refer to Section 01 4000 - Quality Requirements for general mock-up requirements.
- B. Build mock-up of typical exterior wall in sizes indicated on Drawings.
 - 1. Include sealant-filled joints, cavity drainage material, weep vents and through-wall flashings matching conditions that will occur on the project.
 - 2. Clean one-half of exposed faces of mock-ups with masonry cleaner as indicated.
 - 3. Protect accepted mock-ups from the elements with weather-resistant membrane.

4. Approval of mock-ups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mock-ups is also for other material and construction qualities specifically approved by Architect in writing.
 - b. Approval of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless such deviations are specifically approved by Architect in writing.
- C. Locate where directed.
- D. Mock-up may not remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS (CMU)

- A. Concrete Block: Comply with referenced standards and as follows:
 1. Size: Standard units with nominal face dimensions of 16 x 8 inches by 8 inches thick nominal depth unless otherwise indicated on the drawings for specific locations for load-bearing units and 4 inches thick unless otherwise indicated on the drawings for specific locations for veneer.
 2. Special Shapes: Provide non-standard blocks configured for corners, lintels, and other detailed conditions. Field cut stretchers to make Bond Beams in CMU to assure color uniformity.
 - a. Provide double open end units at stack bond construction.
 3. Load-Bearing Units: ASTM C90, medium weight.
 - a. Hollow block.
 - b. Minimum compressive unit strength 750 psi.
 - c. Maximum moisture content 40 percent.
 - d. Exposed faces: Plain face, Ground face, and 1 score and 3 score plain face where indicated on Drawings. Provide scoring on both faces where exposed and where indicated on drawings.
 - e. Color: Plane, not color where concealed and Integral color where exposed, see schedule.
 4. Non-Loadbearing Units (Veneer): ASTM C129.
 - a. Hollow block.
 - b. Medium weight.
 - c. Exposed faces: Plain faced and single score plain faced and 3 score plain faced.
 - d. Color: Integrated color, see schedule.
 5. Units with Integral Water Repellent: Concrete block units as specified in this section with polymeric liquid admixture added to concrete masonry units at the time of manufacture.
 - a. Performance of Units with Integral Water Repellent:
 - 1) Water Permeance: When tested per ASTM E514 and for a minimum of 72 hours.
 - (a) No water visible on back of wall above flashing at the end of 24 hours.
 - (b) No flow of water from flashing equal to or greater than 0.032 gallons per hour at the end of 24 hours.
 - (c) No more than 25% of wall area above flashing visibly damp at end of test.
 - 2) Flexural Bond Strength: ASTM C1357; minimum 10% increase.
 - 3) Compressive Strength: ASTM C1314; maximum 5% decrease.
 - 4) Drying Shrinkage: ASTM C1148; maximum 5% increase in shrinkage.
 - b. Use only in combination with mortar and grout that also has integral water repellent admixture.

- c. Use water repellent admixtures for masonry units, mortar and grout by a single manufacturer.
 - d. Schedule: All exterior CMU to have Integral Water Repellent
 - e. Products:
 - 1) ACM Chemistries; RainBloc Water Repellent Masonry Unit Admixture.
 - 2) BASF Aktiengesellschaft; Rheopel Plus.
 - 3) Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block Block Admixture.
 - 4) Substitutions: See Section 01 60 00 - Product Requirements.
- B. Concrete Masonry Cap Blocks
- 1. Type: Solid Units
 - 2. Manufacturing Standards: Equivalent to Concrete Block described above.
 - 3. Units to have Face and Edge matching appearance and color of Concrete Block as shown on drawings.
 - 4. Nominal Sizes, unless otherwise shown on drawings:
 - a. CMU Coping Unit: 3 x 8 x 16 inches, Face to match adjacent CMU Units (all exposed surfaces)

2.02 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91, Type S.
- B. Portland Cement: ASTM C150, Type I; color as required to produce approved color sample.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Water: Clean and potable.
- G. Integral Water Repellent Admixture for Mortar and Grout: Polymeric liquid admixture added to mortar and grout at the time of manufacture.
 - 1. Use only in combination with masonry units manufactured with integral water repellent admixture.
 - 2. Use only water repellent admixture for mortar and grout from the same manufacturer as water repellent admixture in masonry units.
 - 3. Meet or exceed performance specified for water repellent admixture used in masonry units.

2.03 REINFORCEMENT AND ANCHORAGE

- A. Reinforcing Steel: Type specified in Section 03 2000; size as indicated on drawings; uncoated finish.
- B. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
 - 1. Similar to Hohmann & Barnard, Inc. with Pencil Rod.
 - a. At Frame Walls: HB-213S with HB 213 T-Lok Tie Adjustable Veneer Anchor, Stainless Steel, Depth 5" from face of sheathing at frame walls to center of veneer.
 - b. At Structural CMU Walls: HB-213S with HB 213 T-Lok Tie Adjustable Veneer Anchor, Stainless Steel, Depth 7" from face of structural CMU to center of CMU veneer. Provide with HB-213 Washer to hold insulation to back up. Anchor to structural CMU with manufacturer recommended threaded stainless steel masonry anchor.
 - c. At Structural Steel: HB - 359 Weld on Ties, with HB-301 column Web Tie, Galvanized Steel. Type able to span depth from face of steel to center of veneer as shown on drawings.
 - 2. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners. Provide anchor depth as required to center Pencil Rod within masonry mortar bed.
 - 3. Pencil Rod: 9 gage, galvanized as indicated above.

4. Vertical adjustment: Not less than 3-1/2 inches.
5. Fasteners: Stainless steel.
6. Seismic Feature: Provide lip, hook, or clip on end of wire ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch diameter.

2.04 FLASHINGS

- A. Metal Flashing Materials: Stainless Steel, as specified in Section 07 6200.
- B. Self-Adhered Membrane: Self-adhesive sheet flashing, ASTM D 1970.
 1. Self-Adhered Membrane: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.025 inch.
 - a. Verify material selection with Work of Section 07 25 00 - Weather Barriers for compatibility of materials.
 - b. Products:
 - 1) DuPont Company; Tyvek StraightFlash and FlexWrap.
 - 2) Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
 - 3) Henry Company; Blueskin SA.
 - 4) Protecto Wrap Company; Protecto Seal 45 White.
 - 5) Substitutions: See Section 01 60 00 - Product Requirements.

2.05 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
 1. Manufacturers:
 - a. Hohmann & Barnard, Inc (including Dur-O-Wal brand); ____: www.h-b.com.
 - b. WIRE-BON; Product Series 2900 Rubber Control Joint: www.wirebond.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 1. Manufacturers:
 - a. Advanced Building Products Inc; Product Mortar Break or Mortar Break II as applicable: www.advancedflashing.com.
 - b. Hohmann & Barnard, Inc; Product Mortar Trap: www.h-b.com.
 - c. WIRE-BOND; Product Cavity New DT: www.wirebond.com.
 - d. Mortar Net Solutions; Mortar Net with Insect Barrier: www.mortarnet.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- C. Weeps: Cellular plastic. One piece, flexible extrusion made from UV- resistant polypropylene copolymer, full heights and width of head joint and depth 1/8 less than depth of out wythe, color selection from manufacturer's standard.
 1. Manufacturers:
 - a. Advanced Building Products Inc; Product Mortar Maze weep vent.
 - b. Hohmann & Barnard, Inc; Product Quadro-Vent: www.h-b.com.
 - c. WIRE-BOND; Product Cell Vent #3601: www.wirebond.com.
 - d. Mortar Net Solutions; Mortar Net CellVent: www.mortarnet.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials; approved by masonry manufacturer, compatible with water repellent specified in Section 07 1900.

2.06 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C270, using the Property Specification.
 1. Loadbearing masonry: Type S (1800 psi).
 2. Non-loadbearing masonry: Type S.

3. Color: Natural Gray.
- B. Grout: ASTM C476. Consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches. Minimum compressive strength 2500 psi.
- C. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.
- D. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
- C. Coordinate masonry work with installation of windows, doors, louvers, anchors, concrete slabs, and mechanical and electrical work.

3.03 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.
 1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
 2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

3.04 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

3.05 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 1. Bond: Running. Exception: Stacked bond where shown on drawings.
 2. Coursing: One unit and one mortar joint to equal 8 inches.
 3. Mortar Joints: round tool, concave shape.

3.06 PLACING AND BONDING

- A. Lay hollow masonry units with face shell bedding on head and bed joints.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Double strike head and bed joints.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Interlock intersections and external corners, except for units laid in stack bond.

- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Cut mortar joints flush where wall tile is scheduled, resilient base is schedule, bitumen dampproofing is applied, or water-resistive membrane is applied.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- I. At units with scored face, rake horizontal joints.

3.07 WEEPS/CAVITY VENTS

- A. Install weeps in veneer walls at 24 inches on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.
- B. Use cellular plastic weep vents in open head joints to form weep holes.

3.08 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.09 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

- A. Install reinforcement as indicated on Drawings.
- B. Install horizontal joint reinforcement 8 inches on center.
- C. Secure reinforcement to prevent displacement during grouting operations.
- D. Install wall control joints as shown on Drawings. Stop horizontal reinforcing at joints except where shown otherwise.

3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- F. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- G. Seal all fastener penetrations through water-resistive barrier using EPDM washers, sealants, SAM or sealant tape placed between water-resistive barrier and veneer ties as required to prevent the passage of air and water in accordance with water resistive barrier performance requirements.
- H. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.

3.11 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 4 inches into adjacent masonry or turn up at least 4 inches to form watertight pan at non-masonry construction.
 - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 3. Seal lapped ends and penetrations of flashing before covering with mortar.

- B. Extend metal flashings through exterior face of masonry and turn down to form drip. Install joint sealer below drip edge to prevent moisture migration under flashing.
- C. Lap end joints of flashings at least 6 inches and seal watertight with mastic or elastic sealant.
- D. Thru-Wall Flashing
 - 1. Extend flashings through veneer, turn up minimum of 6 inches above top of concrete curb/base, and seal to exterior wall sheathing. Use flashing manufacturer's recommended adhesive and sealer.
 - 2. Lap weather barrier over vertical leg of flashing
 - 3. Lap thru-wall flashings over stainless steel flashing as shown on Drawings, to within 1/4 inch of exterior face of masonry.

3.12 LINTELS

- A. Install loose steel lintels over openings.
- B. Maintain minimum 8 inch bearing on each side of opening unless otherwise shown.

3.13 GROUTED COMPONENTS

- A. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- B. Place and consolidate grout fill without displacing reinforcing.

3.14 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control and expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. At double wythe concrete masonry, do not align interior and exterior control joints.
- D. Space control joints as follows, unless Drawings indicate closer spacing.
- E. Concrete Masonry Units: 3 to 1, length to height. 30 foot maximum.
- F. Concrete Masonry Veneer: 1 to 1, length to height. 20 ft maximum.

3.15 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.

3.16 TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- E. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.17 CUTTING AND FITTING

- A. Cut and fit for pipes, conduit, and sleeves. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.18 FIELD QUALITY CONTROL

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

- B. An independent testing agency will perform special inspection, as specified in Section 01400, to observe placement of reinforcing for masonry construction required to have Special Inspection as indicated on the Drawings.
- C. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.
- D. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.19 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

3.20 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

3.21 SCHEDULES

- A. Structural CMU inside face at Gym and Cafeteria: 8 x 16 face, no score, ground face, integrated color. See Interior Elevations for location on lower wall.
- B. Structural CMU inside face at Gym and Cafeteria: 8 x 16 face, 3 score, plane face, integrated color. See Interior Elevations for location on upper wall.
- C. Structural CMU exterior face at Utility Court: 8 x 16 face, 3 score both sides, plane face, integrated color, with integral water repellent.
- D. Structural CMU at Ball Wall (Play area): 8 x 16 face, no score, plane face, integrated color, with integral water repellent.
- E. Structural CMU interior face at North and South Walls of Library/Media Center: 8 x 16 face, 3 score and 2 score, ground face, integrated color.
- F. Structural CMU in utility areas or where not exposed: 8 x 16 face, no score, plane face, standard grey color. Utility areas include custodial, storage, boiler, electrical, and like spaces not accessible to students or public.
- G. Veneer CMU at building exterior: 8 x 16 face, 3 score, plane face, integrated color, with integral water repellent.
- H. CMU at other locations as noted on drawings.

END OF SECTION

SECTION 05 1200
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural steel framing members, support members.
- B. Anchor bolts and setting templates for structural steel.
- C. Grouting under base plates.
- D. Installation of plumbing drain pipe within structural columns.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forms and Accessories: Placement of Anchor Bolts & Embeds.
- B. Section 05 2100 - Steel Joist Framing.
- C. Section 05 3100 - Steel Decking: Support framing for small openings in deck.
- D. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work; anchor bolts for items other than structural steel.
- E. Section 05 5100 - Metal Stairs and Railings: Supports and connections.
- F. Section 09 9600 - High Performance Coatings.
- G. Section 22 2113 - Pipe and Pipe Fittings Plumbing: Pipe furnished to steel fabricator for installation in structural columns.

1.03 REFERENCE STANDARDS

- A. AISC (MAN) - Steel Construction Manual; American Institute of Steel Construction, Inc.; 2011.
- B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.; 2005.
- C. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2004.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2012.
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2012.
- G. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2010.
- H. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2013.
- I. ASTM A490M - Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric); 2012.
- J. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- K. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2007a (Reapproved 2014).
- L. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts [Metric]; 2007.
- M. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011.
- N. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2013.
- O. ASTM F436 - Standard Specification for Hardened Steel Washers; 2011.
- P. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2007a.

- Q. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2012.
- R. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.
- S. OSSC - Oregon Structural Specialty Code; current edition.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, fasteners, and finish.
 - 2. Connections not detailed.
 - 3. Indicate cambers and loads.
 - 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
 - 5. Indicate locations, critical dimensions, required clearances, construction details, installation methods including any splices, attachments and anchors. Show holes, threaded fasteners, and welds.
 - 6. Indicate which members are considered as Architecturally Exposed Structural Steel.
 - 7. Indicate members to be galvanized, location and size of drain holes, and which members are to receive field finish painting that may impact the galvanizing process.
 - 8. Indicate portions of members not to be painted due to member receiving fire proofing, in contact with concrete, or connected with slip critical-bolts.
- C. Material Samples:
 - 1. Submit sample of all required welds. Approved sample will be used as the standard for all welding.
- D. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.
- E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC "Steel Construction Manual."
- B. Fabricator: Company specializing in performing the work of this section with minimum five years of successful documented experience.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Steel Angles, Plates, Channels, and Bars: ASTM A36/A36M unless otherwise indicated on Drawings.
- B. Steel W Shapes and Tees: ASTM A992/A992M (Fy = 50 ksi).
- C. Cold-Formed Structural Tubing and Hollow Structural Sections: ASTM A500, Grade B.
- D. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A galvanized to ASTM A 153/A 153M, Class C.
- E. High-Strength Structural Bolts: ASTM A325 (ASTM A325M), with matching ASTM A563 (ASTM A563M) nuts and ASTM F436 washers; Type 1 alloy steel.
- F. Anchor Rods: ASTM F 1554; heavy hex head, Grade 36, unless otherwise noted.
- G. Welding Materials: AWS D1.1; type required for materials and conditions being welded.
 - 1. E70 Low Hydrogen Electrodes.
 - 2. E60 for light gage metal studs and metal decking.
- H. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C1107/C1107M and capable of developing a minimum compressive strength of 7,000 psi at 28 days.
 - 1. "Euco N.S." manufactured by Euclid Chemical Co.

2. "Crystex" manufactured by L&M Construction Chemicals.
 3. "Masterflow 928" by Master Builders
- I. J. Shop and Touch-Up Primer:
 1. Concealed Interior Steel in Non-Corrosive Environments: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
 2. Exposed Interior Surfaces: Either Tnemec Series 27 Typoxy WB at 3 to 4 mils DFT or primer specified in Section 09 96 00 - High-Performance Coatings.
 - J. Primer and Touch-Up Primer for Galvanized Surfaces: Either Tnemec Series 27 Typoxy WB at 2 to 2.5 mils or primer specified in Section 09 96 00 - High-Performance Coatings, complying with VOC limitations of authorities having jurisdiction.
 - K. Plumbing Drains: As specified in Section 22 2113 - Pipe and Pipe Fittings Plumbing.

2.02 FABRICATION

- A. Shop fabricate to greatest extent possible.
- 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. Concealed Interior Steel in Non-Corrosive Environments: SSPC-SP 3 "Power Tool Cleaning."
 2. Exposed Interior Surfaces: SSPC-SP 3 "Power Tool Cleaning."
 3. Exterior Steel and Steel in Corrosive Environments: SSPC-SP 6, "Commercial Blast Cleaning."
- C. Preparing Galvanized Steel for Shop Priming: After galvanizing, thoroughly clean steel of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
 1. Clean surfaces of weld seams according to SSPC-SP11, "Power Tool Cleaning to Bare Metal" unless otherwise recommended by coating manufacturer for substrate and exposure conditions.
- D. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- E. Fabricate connections for bolt, nut, and washer connectors. Hole size 1/16 inch larger than bolt diameter unless shown otherwise, 1/8 inch larger than bolt at base plates.

2.03 FABRICATION - ARCHITECTURALLY EXPOSED STRUCTURAL STEEL (AESS)

- A. Architecturally Exposed Structural Steel is defined as those steel surfaces and connections which will remain exposed on the following project elements:
 1. Exposed items covered in Section 05 5000 - Metal Fabrications
 2. Steel Stairs covered in Section 05 5100 - Metal Stairs & Railings
 3. Decorative Metal Fences and Gates in Section 32 3119
 4. Interior steel columns and diagonal bracing between columns
 5. Steel columns at Covered Play Structure, Bike Shelter, and Main Entry Canopy
 6. Balcony and bridge framing in Media Center
 7. Structural steel elements below the roof level. (Not including steel roof deck, open web joists, and roof framing).
 8. Other elements where so noted on Drawings.
- B. Ensure that all Architecturally Exposed Structural Steel meets the requirements set forth in Chapter 10 of the AISC Code of Standard Practice for Steel Buildings and Bridges, 2005 edition. In addition:
 1. Provide materials which are smooth and free of surface blemishes.
 2. Grind welds smooth at:
 - a. Splices and miters of same or similar member profiles such as stair stringers, mitered corners of canopies, handrails, guardrails, and downspout scuppers.
 - b. Abutting plate steel where a continuous surface is desired.
 - c. Where indicated on Drawings.

3. Well executed welds meeting the quality standards discussed of the approved sample may be left un-ground. Examples include:
 - a. At locations of perpendicular abutment such as stanchion to stringer connections, shear tab and HSS stub connections, column to beam connections.
 - b. HSS security enclosure frames
 - c. Stiffener plates.
4. Contouring and blending of welds: Where fillet welds are indicated to be ground-contoured, or blended, oversize welds as required and grind to provide a smooth transition and to match profile on approved mock-up.
5. Continuous Welds: Where welding is noted on the drawings, provide continuous welds of a uniform size and profile.
6. Minimize Weld Show Through: At locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material.
7. Coping and Blocking Tolerance: Maintain a uniform gap of $1/2" \pm 1/16"$ at all copes and blocks.
8. Joint Gap Tolerance: Maintain a uniform gap of $1/2" \pm 1/16"$.
9. Piece Marks Hidden: Fabricate such that piece marks are fully hidden in the final structure or made with such media to permit full removal after erection.
10. Mill Mark Removal: Fabricator shall deliver steel with no mill marks (stenciled, stamped, raised etc) in exposed locations. Mill marks shall be omitted by cutting of mill material to appropriate lengths where possible. Where not possible, the fabricator can fill and/or grind to a surface finish consistent with the approved mock up.
11. Grinding of sheared edges: Fabricator shall grind all edges of sheared, punched or flame cut steel to match approved mockup.
12. Seal weld open ends of round and rectangular hollow structural section with 3/8" closure plates. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AECS is exposed to weather.
13. Erection Brackets: Remove temporary braces or clips, grind welds smooth. Leave no visible evidence of change in texture from the base material.
14. Architecturally Exposed Structural Steel shall be wheel brush cleaned in accordance with SSPC-SP-6.

2.04 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP-6.
- B. Prepare components scheduled to receive High Performance Coating as required in Section 09 9600.
- C. Shop prime structural steel members. Do not prime surfaces that will be field welded, in contact with concrete, or high strength bolted.
- D. Where indicated, galvanize steel members to comply with ASTM A123/A123M. Provide minimum 1.7 oz/sq ft galvanized coating. Provide vent holes in closed shapes. Clip end plates, tab plates, and other features to prevent accumulation or pooling of galvanized material.

2.05 PLUMBING DRAINS IN STEEL COLUMNS

- A. Install plumbing drains within structural steel columns as indicated. Securely fasten plumbing pipe to structural steel by welding or other means as noted. Provide openings in structural steel as needed for connection of plumbing to drainage system.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

- A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".
- B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Field weld components and shear studs indicated on shop drawings.
- D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts". Snug tight.
- E. Do not field cut or alter structural members without approval of Architect.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- G. Treat field welded areas of galvanized members with zinc solder to replace galvanized protection.
- H. Touch-up Field Connections and damaged Shop Treatment areas as erection proceeds. Immediately prior to final covering, remove Rust and retreat any Members showing evidence of Rust through Shop Treatment over approximately 5% or more to total Shop Treatment area.
- I. Remove loose rust, heavy Mill Scale, Oil, Dirt, and other bond-reducing Foreign Substances from Members scheduled to receive Finish Painting, or other direct-to-steel Coatings.
- J. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 ERECTION - ARCHITECTURALLY EXPOSED STRUCTURAL STEEL

- A. Set AESS accurately in locations and to elevations indicated, and according to AISC specifications referenced in this Section.
- B. In addition to the special care used to handle and erect AESS, employ the following erection techniques:
 - 1. AESS Erection Tolerances: Erection Tolerances shall meet the requirements of Chapter 10 of the AISC Code of Standard Practice.
 - 2. Welds Ground Smooth: Erector shall grind welds smooth in the connections of AESS members. For groove welds, the weld shall be made flush to the surfaces of each side and be within + 1/16", -0" of plate thickness.
 - 3. Contouring and Blending of Welds: Where fillet welds are indicated to be ground contoured, or blended, oversize welds as required; grind to provide a smooth transition and to match profile on approved mock-up .
 - 4. Continuous Welds: Where noted on the drawings, provide continuous welds of a uniform size and profile.
 - 5. Minimize Weld Show Through: At locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material.
 - 6. Bolt Head Orientation: All bolt heads in a given connection shall be oriented to one side.
 - 7. Bolt Protrusions: Threaded ends exposed to view to have uniform extension beyond nuts of two threads +/- 1/8 inch.
 - 8. Removal of field connection aids: Run-out tabs, erection bolts and other steel members added to connections to allow for alignment, fit-up, and welding in the field shall be removed from the structure. Field groove welds shall be selected to eliminate the need for backing bars or to permit their removal after welding. Welds at run-out tabs shall be removed to match adjacent surfaces and ground smooth. Holes for erection bolts shall be plug welded and ground smooth.

9. Filling of weld access holes: Where holes must be cut in the web at the intersection with flanges on W shapes and structural tees to permit field welding of the flanges, they shall be filled. Filling shall be executed with proper procedures to minimize restraint and address thermal stresses in group 4 and 5 shapes.
- C. Field Welding: Weld profile, quality, and finish shall be consistent with mock-ups approved prior to fabrication.
- D. Splice members only where indicated.
- E. Obtain permission for any torch cutting or field fabrication from the Architect. Finish sections thermally cut during erection to a surface appearance consistent with the mock up.
- F. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts. Replace connection plates that are misaligned where holes cannot be aligned with acceptable final appearance.
- G. Field Connections:
 1. Bolted Connections: Install bolts of the specified type and finish in accordance with Division 5 section "Structural Steel."
 2. Welded Connections: Comply with AWS D1.1 for procedures, and appearance.
 - a. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp. Verify that weld sizes, fabrication sequence, and equipment used for AESS will limit distortions to allowable tolerances.
 - b. Obtain Architects approval for appearance of welds in repaired or field modified work prior to finish painting.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

3.05 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000.
- B. An independent testing agency will perform special inspection, as specified in Section 01 4000 for structural welding in accordance with OSSC 1701.5.5.1.
- C. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts", All A325 bolts to be tightened to snug tight conditions

END OF SECTION

SECTION 05 2100
STEEL JOIST FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Open web steel joists and shear stud connectors, with bridging, attached seats and anchors.
- B. Loose bearing members, such as plates or angles, and anchor bolts for site placement.
- C. Supplementary framing for floor and roof openings greater than 18 inches.

1.02 RELATED REQUIREMENTS

- A. section 04 2000 - Unit Masonry: Anchors and bearing plates for Steel Joists.
- B. Section 05 1200 - Structural Steel Framing: Superstructure framing.
- C. Section 05 3100 - Steel Decking: Support framing for openings less than 18 inches in decking.
- D. Section 05 5000 - Metal Fabrications: Non-framing steel fabrications attached to joists.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2012.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2013.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2012.
- E. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.
- F. OSSC - Oregon Structural Specialty Code; latest edition.
- G. SJI (SPEC) - Catalog of Standard Specifications and Load Tables for Steel Joists and Joist Girders; Steel Joist Institute; 2011.
- H. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders; Steel Joist Institute; 2008.
- I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
- J. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings; 1997 (Ed. 2004).
- K. SSPC-SP 3 - Power Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

1.04 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design steel joist framing, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Oregon, using performance requirements and design criteria indicated.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, attachments, and any reinforcement required for special or concentrated loads on the joists.
 - 1. For each joist designation, indicate dimensions of chord members, web members, and distance between bearing plate and top of joist.
 - 2. Indicate locations and sizes of additional web reinforcements or stiffeners required.
- C. Calculations: Provide structural calculations bearing the stamp of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

- D. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.
- E. Allow time in the joist submittal review process for the general contractor to coordinate final rooftop equipment product data, submittals, and approvals in order to confirm equipment weight and dimensions.
- F. Delegated-Design Submittal: For steel joist framing indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 - Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record.

1.06 QUALITY ASSURANCE

- A. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Perform Work, including that for headers and other supplementary framing, in accordance with SJI Standard Specifications Load Tables and SJI Technical Digest No.9.
- C. Design joists for loads and deflection criteria noted on the drawings, including special and concentrated loads where shown.
- D. Design joists to resist reactions from framing or bracing of other structural members as shown on the Drawings.
- E. Design and furnish bridging, bracing and all accessories as required to for a complete structural system.
- F. Manufacturer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
- G. Erector Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Transport, handle, store, and protect products to SJI requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel Joists:
 - 1. Canam Group Inc: www.canam-steeljoists.ws
 - 2. Nucor-Vulcraft Group: www.vulcraft.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Open Web Joists: Type(s) shown on drawings.
- B. Anchor Bolts, Nuts and Washers: ASTM A307, plain.
- C. Shear Stud Connectors: Made from ASTM A 108 Grade 1015 bars.
- D. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A 36/A 36M.
- E. Welding Materials: AWS D1.1; type required for materials being welded.
- F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.03 FABRICATION

- A. Steel joists shall be equivalent to those manufactured by Vulcraft for all material and design capabilities for the members sizes and spacings shown on the Drawings.
- B. Provide joists with additional web members as required to support concentrated loads shown on the Drawings, or furnish members for installation in the field.
- C. Camber joists with spans of 20 feet or more in conformance with SJI Standard Specifications recommendations.
- D. Provide top chord extensions, sloped and skewed bearing seats, and seat depths as shown on Drawings.
- E. Provide end caps at top chord ends as shown on Drawings.
- F. Cope flanges of joist top chord extensions as required for fascia framing where shown on Drawings.
- G. Frame special sized openings in joist web framing as detailed.

2.04 FINISH

- A. Galvanize joists as specified.
- B. Prepare surfaces to be finished in accordance with SSPC-SP 3.
- C. Galvanizing: Provide minimum 1.7 oz/sq ft galvanized coating to ASTM A123/A123M requirements.

2.05 SOURCE QUALITY CONTROL

- A. At completion of fabrication, joist manufacturer shall submit a certificate of compliance in accordance with OSSC 1704.2.2.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.02 ERECTION

- A. Erect joists with correct bearing on supports.
- B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.
- C. Coordinate the placement of anchors for securing loose bearing members furnished as part of the work of this section.
- D. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.
- E. Position and field weld joist chord extensions and wall attachments as detailed.
- F. Install supplementary framing for floor and roof openings greater than 18 inches.
- G. Do not permit erection of decking until joists are braced bridged, and secured or until completion of erection and installation of permanent bridging and bracing.
- H. Do not field cut or alter structural members without approval of joist manufacturer.
- I. After erection, prime welds, damaged shop primer, damaged galvanizing, and surfaces not shop primed, except surfaces specified not to be primed.

3.03 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL

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

- B. An independent testing agency will perform special inspection of fabricators per 1704.2 and steel construction and structural welding in accordance with OSSC 1704.3.
1. Review all WPS and welders certifications prior to start of work.
 2. Inspect erected steel joists as required to establish conformity of work with reviewed shop drawings and Contract Drawings.
 3. Periodically inspect all field welding, except where continuous welding is required.

END OF SECTION

SECTION 05 3100
STEEL DECKING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Acoustical roof deck.
- B. Roof deck.
- C. Composite floor deck.
- D. Supplementary framing for openings up to and including 18 inches.
- E. Bearing plates and angles.
- F. Stud shear connectors.
- G. Acoustical insulation in roof deck flutes.
- H. Cold-formed accessories including closures and blocking.

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing.
- B. Section 03 3000 - Cast-in-Place Concrete: Concrete topping over metal deck.
- C. Section 04 2000 - Unit Masonry Assemblies: Placement of anchors for bearing plates embedded in unit masonry assemblies.
- D. Section 05 1200 - Structural Steel Framing: Support framing for openings larger than 18 inches and shear stud connectors.
- E. Section 05 2100 - Steel Joist Framing: Support framing for openings larger than 18 inches and shear stud connectors.
- F. Section 05 2100 - Steel Joist Framing: Placement of embedded steel anchors for bearing plates and joist seats in cast-in-place concrete.
- G. Section 07 5400 - Thermoplastic Membrane Roofing, installation of acoustic insulation in acoustic roof deck.
- H. Section 07 7200 - Roof Accessories: Roof hatches, ladders, and roof mounted equipment.
- I. Section 07 8100 - Applied Fireproofing: Spray applied fireproofing.
- J. Section 08 6300 - Metal Framed Skylights: Supported on Steel Decking.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2012.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2013.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.
- D. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.
- E. AWS D1.3 - Structural Welding Code - Sheet Steel; American Welding Society; 2008.
- F. SDI (DM) - Publication No.31, Design Manual for Composite Decks, Form Decks, Roof Decks; Steel Deck Institute; 2007.
- G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); The Society for Protective Coatings; 2002 (Ed. 2004).
- H. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings; 1997 (Ed. 2004).

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittals procedures.

- B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
- C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- D. Certificates: Certify that products furnished meet or exceed specified requirements.
- E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

- A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Layout deck, spans, fastening, and joints as shown on the drawings and in accordance with the manufacturer's ICC Evaluation Services Report and recommendations.
- C. Installer Qualifications: Company specializing in performing the work of this Section with minimum two years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Cut plastic wrap to encourage ventilation.
- B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel Deck:
 - 1. VERCO Decking, Inc a Nucor Company; Product Formlock, PLB, PLN, and PLN-CD series floor, roof and acoustical decks.. www.vercodeck.com
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 STEEL DECK

- A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
 - 1. Calculate to structural working stress design and structural properties specified.
 - 2. Maximum Vertical Deflection of Roof Deck: 1/240 of span.
 - 3. Maximum Vertical Deflection of Form Deck: 1/360 of span.
 - 4. Maximum Lateral Deflection of Diaphragms: 1/500 of the height of the wall.
 - 5. At areas of spray-applied fireproofing, provide deck free of lubricants or oils which would impair the adhesion of fireproofing.
- B. Roof Deck D6: At kitchen, "knuckles" and where indicated.
 - 1. Model: Verco PLN-24, 18 gage
 - a. Type: Corrugated roof deck.
 - b. Installation: Concealed from view.
 - c. Nominal Height: 3 inch
 - d. Finish: Galvanized
 - e. Structural Properties: See structural drawings.
- C. Acoustical Roof Deck D4: Media Center Roof
 - 1. Model: Verco PLN-CD, Acoustical, 18 gage.
 - a. Type: Cellular, acoustical deck.
 - b. Installation: Exposed from below.
 - c. Cold-formed from steel sheets conforming to ASTM-A-653, Grade 40 or equal, having a minimum yield strength of 40,000 psi. Provide an exposed bottom surface that is essentially flat.
 - d. Provide sound absorbing elements of 3lb density fiberglass installed above the perforated holes factory installed.

- e. Before forming, the steel sheets shall have received a hot-dip protective coating of zinc, conforming to ASTM -A-924, Class G90. Finish painting to be done in field as specified in Section 09900.
 - f. Nominal Height: 3 inch
 - g. Finish: Prime for field painting.
 - h. Structural Properties: See structural drawings.
- D. Acoustic Roof Deck D5: Cafeteria and Gym Roof
- 1. Model: Verco PLN-24 - CD, acoustical, 18 gage
 - a. Type: Corrugated acoustical metal deck with perforated flutes.
 - b. Installation: Exposed from below.
 - c. Non-composite type, steel sheet with plain vertical flute faces perforated with 1/8 inch diameter holes staggered 3/8 inch on center.
 - d. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
 - e. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
 - f. Field installed acoustical insulation.
 - g. Nominal Height: 3 inches
 - h. Structural Properties: See structural drawings.
- E. Standard Roof Deck D3: For roofs other than Cafeteria, Gym and Media Center.
- 1. Model: Verco PLB-36, 18 gage
 - a. Type: Non-composite type, corrugated, fluted steel sheet.
 - b. Installation: Exposed and concealed
 - c. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) , with G60/Z180 galvanized coating.
 - d. Nominal Height: 1-1/2 inches
 - e. Structural Properties: See structural drawings.
- F. Composite Floor Deck D2: Where indicated on structural drawings.
- 1. Model: Verco Formlock B, 18 gage
 - a. Type: Fluted steel sheet embossed to interlock with concrete.
 - b. Installation: Concealed.
 - c. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) , with G60/Z180 galvanized coating.
 - d. Nominal Height: 1-1/2 inches
 - e. Structural Properties: See structural drawings.
- G. Composite Floor Deck D1: Where indicated on structural drawings.
- 1. Model: Verco Formlock W3, 18 gage
 - a. Type: Fluted steel sheet embossed to interlock with concrete.
 - b. Installation: Concealed.
 - c. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) , with G60/Z180 galvanized coating.
 - d. Nominal Height: 1-1/2 inches
 - e. Structural Properties: See structural drawings.

2.03 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A36/A36M steel, unfinished.
- B. Stud Shear Connectors: Made from ASTM A 108 Grade 1015 bars.
- C. Welding Materials: AWS D1.1.
- D. Fasteners: Galvanized hardened steel, self tapping.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

- F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
- G. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.
 - 1. At acoustical deck applications, provide neoprene rubber air dams in underside of ribs and in the larger topside cell at perpendicular conditions. Provide manufacturer's recommended air dams for parallel conditions.
 - 2. At all other roof deck applications, provide neoprene rubber air dams at deck perimeter and where indicated.
- H. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft density; profiled to suit deck.

2.04 FABRICATED DECK ACCESSORIES

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gage, 0.0299 inch thick sheet steel; of profile and size as indicated; finished same as deck.
- B. Roof Sump Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.
- C. Floor Drain Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below floor deck surface, bearing flange 3 inches wide, sealed watertight.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.02 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On concrete and masonry surfaces provide minimum 4 inch bearing.
- C. On steel supports provide minimum 1-1/2 inch bearing.
- D. Fasten deck to steel support members at ends and intermediate supports at 12 inches on center maximum, parallel with the deck flute and at each transverse flute using methods specified.
- E. Clinch lock seam side laps.
- F. Weld deck in accordance with AWS D1.3.
- G. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.
- H. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.
- I. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures, unless other wise detailed. Install with adhesive according to manufacturer's written instructions to insure complete closure.
 - 1. At exterior applications, provide expanded polystyrene insulation infill cut to fit deck profile between foam rubber closures as detailed
 - a. Install sheet metal closure cut to fit profile of deck outboard of foam closures.
 - b. All closure elements are to be cut to fit tight to the deck profile.
- J. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.
- K. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- L. Position floor drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

- M. Weld stud shear connectors through steel deck to structural members below.
- N. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

3.03 SCHEDULE

- A. See Deck Type and Gauge Schedule on Structural Drawings

END OF SECTION

SECTION 05 4000
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formed steel stud exterior wall and interior wall framing.
- B. Formed steel joist and purlin framing and bridging.

1.02 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Veneer masonry supported by wall stud metal framing.
- B. Section 05 3100 - Steel Decking.
- C. Section 06 1000 - Rough Carpentry: Roof and wall sheathing.
- D. Section 07 2100 - Thermal Insulation: Insulation within framing members.
- E. Section 07 2500 - Weather Barriers: Weather barrier and Zee furring over sheathing.
- F. Section 09 2216 - Non-Structural Metal Framing.
- G. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.
- C. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases; 2011c.
- D. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.
- E. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations .
 - 1. ICC Evaluation Services Reports for proprietary clips, deflection connections and accessories if different than shown on the Drawings. Products and connections shall have the same or greater structural capacity as those shown on the Drawings.

1.05 MOCK-UP

- A. Integrated Exterior Mock-Ups: Construct integrated exterior mock-up as indicated on Drawings and as specified in Section 01 40 00 - Quality Requirements.
 - 1. Provide mock-up of exterior framed wall, including components specified elsewhere, such as insulation, sheathing, window frame, exterior wall finish, and interior wall finish.
- B. Mock-Up Size: As indicated on the drawings.
- C. Location: As directed.
- D. Mock-up may not remain as part of the Work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Framing Members, General: Comply with ASTM C754 for conditions indicated. All products to be manufactured by current members of the Steel Stud Manufacturers Association (SSMA) or the Steel Framing Industry Association (SFIA).

- B. Metal Framing:
 - 1. ClarkDietrich Building Systems: www.clarkdietrich.com
 - 2. Marino: www.marinoware.com.
 - 3. SCAFCO Corporation: www.scafco.com.
 - 4. Steeler, Inc: www.steeler.com.
 - 5. The Steel Network, Inc: www.SteelNetwork.com.
 - 6. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FRAMING MATERIALS

- A. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
 - 1. Gage and Depth: As indicated on the drawings.
 - 2. Galvanized in accordance with ASTM A653/A653M, G90/Z275 coating.
- B. Joists and Purlins: Fabricated from ASTM A653/A653M steel sheet, with G90/Z275 hot dipped galvanized coating.
 - 1. Base Metal: Structural Steel (SS), Grade as indicated on drawings.
 - 2. Gage and Depth: As indicated on the drawings.

2.03 ACCESSORIES

- A. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.04 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
 - 1. ITW Buildex, "Dril-flex" by ELCO, or approved. Sheet metal screw, treated to maintain screw ductility.
 - 2. Hilti Kwik-Flex or approved for connections to structural steel. Heavy Duty hex head type screw (TEK screw), treated to maintain screw ductility.
- B. Sill Gasket on Top of Foundation Wall: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.
 - 1. Product: Grace Construction Products; Vycor V40 Self-Adhered Flashing.
- C. Anchorage Devices: Powder actuated; Hilti DX, or approved.
- D. Welding: In conformance with AWS D1.1.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Coordinate framing with the work and products of other Sections. Provide framing for openings using standard framing techniques and details unless specifically detailed otherwise.

3.02 3.02 PREPARATION

- A. A. Install sill gasket under stud track of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts. Prime surfaces as required for proper adhesion.
 - 1. Provide 3-inch minimum, laps between lengths of gasket material.
 - 2. Firmly roll sill gasket after installation.
- B. Install sill 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.

3.03 INSTALLATION OF STUDS

- A. Install components in accordance with manufacturers' instructions and ASTM C 1007 requirements.

- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Do not use powder actuated or expansion type fasteners on concrete curbs or near slab edges.
- D. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- E. Install load bearing studs full length in one piece. Splicing of studs is not permitted. Do not notch or cut stud flanges.
- F. Install load bearing studs, brace, and reinforce to develop full strength and achieve design requirements. Bear studs tight in top and bottom tracks for full bearing.
- G. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- H. Install intermediate studs above and below openings to align with wall stud spacing.
- I. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- J. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- K. Touch-up field welds and damaged galvanized surfaces with primer.

3.04 INSTALLATION OF JOISTS AND PURLINS

- A. Install framing components in accordance with manufacturer's instructions.
- B. Make provisions for erection stresses. Provide temporary alignment and bracing.
- C. Set floor and ceiling joists parallel and level, with lateral bracing and bridging.
- D. Locate joist end bearing directly over load bearing studs or provide load distributing member to top of stud track.

3.05 INSTALLATION OF ACCESSORIES

- A. Install Rolled Angles where indicated. Fasten to wall framing with a minimum of No. 8 self-drilling flat head screws, at 6 inches on center.
- B. Continuous Strapping:
 - 1. Install in Rooms indicated on Drawings, .
 - 2. Place strapping at 48 inches and 82 inches above Finished Floor Elevation to center of strapping, from corner to corner of each wall.
 - 3. Coordinate with placement of mechanical and electrical devices.

END OF SECTION

SECTION 05 5000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel and aluminum items.
- B. Ship ladders for roof access.
- C. Ship ladders for mechanical loft access
- D. Elevator pit ladder
- E. Elevator sump grates
- F. Elevator safety beam
- G. Steel Rain Water Runnels
- H. Exterior steel surround at classroom windows.
- I. Bollards
- J. Fabrication of steel lintels for concrete masonry veneer.
- K. Other items as indicated.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 05 1200 - Structural Steel Framing: Structural steel column anchor bolts.
- D. Section 05 2100 - Steel Joist Framing: Structural joist bearing plates, including anchorage.
- E. Section 05 3100 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.
- F. Section 05 5100 - Metal Stairs and Railings: Railings.
- G. Section 09 9600 - High-Performance Coatings: Paint finish.
- H. Section 09 9000 - Painting and Coating: Paint finish.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2012.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.
- D. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
- E. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2012.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- G. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2010.
- H. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2010.
- I. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2012.
- J. ASTM B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes (Metric); 2012.

- K. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2012e1.
- L. ASTM B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold-Finished Bar, Rod, and Wire (Metric); 2012e1.
- M. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2013.
- N. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2012.
- P. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.
- Q. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; American Welding Society; 2008.
- R. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc.; 2011.
- S. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).
- T. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
- U. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, critical dimensions, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Indicate members to be galvanized, location and size of drain holes, and which members are to receive field finish painting that may impact the galvanizing process.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.
- D. Furnish anchor bolt setting drawings and installation details for steel items provided by this Section.
- E. Material Samples: provide the following material samples unless the fabricator supplying the work of this section is also supplying the work in section 05 1200 - Structural Steel.
 - 1. Submit sample of all required welds. Approved sample will be used as the standard for all welding.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel (AC172).

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel channels, angles, bars, and plates: ASTM A 36/A 36M unless otherwise noted on Drawings.
- B. Steel W Shapes and Tees: ASTM A992/A992M (Fy = 50 ksi).
- C. Steel Tubing and Hollow Steel Sections: ASTM A 500, Grade B cold-formed structural tubing.
- D. Plates: ASTM A 283.
- E. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, hot-dip galvanized finish.
- F. Bolts and Nuts: Carbon steel, ASTM A307, Grade A galvanized to ASTM A 153/A, Class C.

- G. Anchor Bolts, Headed Anchor Rods: ASTM F 1554 Grade 36.
- H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with project's VOC limitations.
- J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with project's VOC limitations.

2.02 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210 (ASTM B210M), 6063 alloy, T6 temper.
- D. Aluminum-Alloy Bars: ASTM B211 (ASTM B211M), 6061 alloy, T6 temper.
- E. Bolts, Nuts, and Washers: Stainless steel.
- F. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 ACCESSORY MATERIALS

- A. Steel Floor Grating:
 - 1. Manufacturer: Welded Steel Grating Model W-19-4, by Grating Pacific, LLC., or approved.
 - 2. Material: ASTM A569 carbon steel.
 - 3. Steel Bars for Gratings: ASTM A36/A36M.
 - 4. Load Rating: Able to support traffic loads.
 - 5. Panel Size and Span: As shown on Drawings; maximum length of individual segments (not shown on the Drawings) 5 feet.
 - 6. Bearing Bar Size & Spacings: 2 inch x 3/16 inch bearing bars, spaced 1-3/16 inch on center; cross bars 4 inches on center; welded cross bar and bearing bar intersection.
 - 7. Top Surface: Slip resistant, Plain.
 - 8. Banding: Provide banding at panel ends.
 - 9. Finish: Galvanize after fabrication to ASTM A 123/A 123M.
 - 10. Frame: Provide galvanized steel angle frame for casting into concrete.
 - 11. Extent: Where shown on drawings.
 - 12. Metal Bar Grating Standards: Comply with applicable requirements of the following:
 - a. Non-Heavy-Duty Metal Bar Gratings: Comply with NAAMM MBG 531, "Metal Bar Grating Manual."
- B. Support Grid at Music Room - Slotted Channel Framing: ASTM A 653, Grade 33.
 - 1. Slotted Channel Fittings: ASTM A653.
 - 2. Basis-of-Design Manufacturer: Unistrut Corporation; www.unistrut.com.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Shop and Touch-Up Primer for Interior Ferrous Metal: Either Tnemec Series 27 Typoxy WB at 3 to 4 mils DFT or primer specified in Section 09 96 00 - High-Performance Coatings, complying with VOC limitations specified in Section 09 96 00.
 - 1. Manufacturer's standard fast-curing, lead- and chromate-free, universal modified-alkyd primer can be used only at the specific elements listed in the FINISHES - STEEL Article.
- D. Primer and Touch-Up Primer for Galvanized Surfaces: Either Tnemec Series 27 Typoxy WB at 2 to 2.5 mils or primer specified in Section 09 96 00 - High-Performance Coatings, complying with VOC limitations of authorities having jurisdiction.

2.04 METAL LADDERS

- A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; galvanized finish.
 - 1. Comply with ASME A17.1 for elevator pit ladders
 - 2. Side Rails: Tube steel members of size detailed spaced at 18 inches.
 - a. Extend rails 42 inches above top rungs or landing and return rails to wall or structure unless other secure handholds are provided.

3. Rungs: 3/4 inch diameter solid round bar spaced 12 inches on center.
 - a. 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.
 - b. Fit rungs in centerline of side rails; plug-weld and grind smooth on outer rail faces.
4. Space rungs 7 inches from wall surface with 3/8 inch by 3 inch steel angle brackets to support rails.
 - a. Comply with code requirements for placement of elevator pit ladders.
 - b. Drill bracket to receive wall anchors.
 - c. Weld brackets at 12 inches from each end of rails, unless otherwise indicated, and at not more than 60 inches on center at intermediate points.
5. Shop prime interior ladders.

2.05 METAL SHIPS LADDERS

- A. Provide aluminum ships ladders where indicated. Fabricate of open-type construction with channel or plate stringers and pipe and tube railings unless otherwise indicated. Provide brackets and fittings for installation.
 1. Ladder Angle: 60 degrees from horizontal unless otherwise indicated.
 2. Stringers: Minimum 2 x 6 x 1/8 inch channel stringers.
 3. Treads: Manufacturer's standard nonslip extruded-aluminum-alloy serrated treads.
 4. Ladder Width: 24 inches.
 5. Railings: Minimum 1-1/4 inch Schedule 40 aluminum pipe.
 - a. Comply with applicable railing requirements in Performance Requirements Article.
 6. Confirm angle of incline prior to fabrication.
 7. Products For Ladders Serving Access Hatches:
 - a. Alaco Ladder Company; Product Model 370: www.alacoladder.com.
 - b. O'Keeffes, Inc; Product Model 523: www.okeeffes.com.
 - c. Precision Ladders, LLC; Model SL Aluminum Ships Ladder to Roof Hatch: www.precisionladders.com.
 - d. UPNOVR Model U-502: www.unovr.com.
 - e. Substitutions: See Section 01 60 00 - Product Requirements.
 8. Products for Ladders with Railing Extensions:
 - a. Alaco Ladder Company; Product Model 375: www.alacoladder.com.
 - b. O'Keeffes, Inc; Product Model 520: www.okeeffes.com.
 - c. Precision Ladders, LLC; Model SL Aluminum Ships Ladder With Walk-Thru: www.precisionladders.com.
 - d. UPNOVR Model U-501: www.unovr.com.
 - e. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 METAL BOLLARDS

- A. Traffic Bollards: Schedule 40 steel pipe, 6-inch diameter, unless otherwise indicated, concrete filled, crowned cap, as detailed; galvanized finish.

2.07 MISCELLANEOUS FRAMING AND SUPPORTS

- A. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking, joists, and masonry; prime paint finish.
- B. Elevator Safety Beams: Beam sections; prime paint finish.
- C. Operable Partition Supports: Fabricate supports for operable partitions from continuous steel beams of sizes recommended by partition manufacturer with attached bearing plates, anchors, and braces as recommended by partition manufacturer. Include custom fabricated bolts, plates, tie rods, anchors, dowels and welded steel shapes for framing, supporting and miscellaneous framing elements. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
 1. Factory prime except where field welds are required.

2.08 ELEVATOR SUMP GRATE

- A. General: Produce metal bar grating of description indicated per NAAMM marking system that complies with the following:
 - 1. Non-Heavy-Duty Metal Bar Gratings: Comply with NAAMM MBG 531, "Metal Bar Grating Manual."
 - 2. Grating Mark W-19-4 (1-1/2 x 1/8).
 - 3. Welded steel, 1-1/2 by 1/8 inch bearing bars at 1-3/16 inches o.c. and crossbars at 4 inches o.c.
- B. Traffic Surface for Steel Bar Gratings: Applied abrasive finish consisting of aluminum-oxide aggregate in an epoxy-resin adhesive.
- C. Fabricate removable grating with banding bars attached by welding to entire perimeter. Include anchors and fasteners of type recommended by manufacturer for attachment to supports.
- D. Fabricate cutouts in grating to fit around discharge. Arrange cutout to permit grating removal without disturbing item penetrating grating.
- E. Manufacturers
 - 1. Amico Grating: www.amico-grating.com.
 - 2. Indiana Gratings, Inc: www.indianagratingsinc.com.
 - 3. McNichols Co; www.mcnichols.com.
 - 4. Ohio Grating, Inc: www.ohiogratings.com.
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Provide steel frames and supports. Fabricate unit to sizes, shapes and profile required to receive grating. Fabricate from galvanized structural steel shapes. Miter and weld connection for perimeter angle frames. Cut, drill, and tap units to receive hardware, and similar items.
- G. Equip unit with integrally welded anchors for casting into concrete.

2.09 FINISHES - STEEL

- A. Galvanize and prime paint all exterior steel items.
- B. Prime paint all steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete, items to be imbedded in masonry.
- C. Prepare surfaces to be primed in accordance with SSPC-SP2 where indicated to receive manufacturer's standard primer.
- D. Prepare surfaces to be primed in accordance with SSPC-SP6 where indicated to receive high-performance coating finish.
- E. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- F. Prime Painting: One coat of specified primer applied in strict accordance with primer manufacturer's instructions:
 - 1. Provide one coat of manufacturer's standard primer for the following items:
 - a. Interior ladders.
 - b. Operable partition supports.
 - c. Elevator beams.
 - d. Support grids.
- G. Galvanizing: Galvanize after fabrication to ASTM A123/A123M requirements.

2.10 FASTENERS, BOLTS, ANCHORS

- A. Powder-Driven Fasteners: Hilti X-U system, or approved.
- B. Post-Installed Concrete Bolts: Simpson Titen HD, or approved.
- C. Post-Installed Concrete Screws: Simpson Titen Concrete and Masonry Screws, Hilti Kwik-Con II or approved.

- D. Expansion Anchors: Hilti KB-TZ, or approved: See drawings for size. Stainless steel for attachment into masonry, where exposed, or where noted.
 - 1. Seismic qualification tested in accordance with ACI 355.2 and ICC-ES AC 193.
 - 2. Anchors to be used in locations, configurations, and materials only as approved by the manufacturer.
- E. Self-Drilling Screws: ITW Buildex, or approved; type and drill point as required for materials being fastened.
- F. Epoxy Adhesive Anchors for Concrete and Concrete Block:
 - 1. Hilti HIT-HY 200 (at concrete); Hilti HY 150 MAX (at CMU), or approved.
 - 2. Concrete and Epoxy preparation as required by epoxy manufacturer's ICC report.

2.11 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Provide holes and connections for work of other trades.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- G. Fabricate any Structural Connections not specifically detailed on Drawings as Directed by Architect and at no additional cost to Owner. If Directions are not obtained, fabricate consistent with balance of Design and strong enough to fully develop Members involved.
- H. Form elbows and bends to uniform radii, free from buckles and twists, and with finished surfaces smooth.
- I. Cap and fully weld exposed ends of pipe and tubing.

2.12 FABRICATION - ARCHITECTURALLY EXPOSED STRUCTURAL STEEL (AESS)

- A. Architecturally Exposed Structural Steel is defined as those steel surfaces and connections which will remain exposed on the following project elements:
 - 1. Other elements where noted.
 - 2. Steel Rain Water Runnels
 - 3. Exterior steel surround at classroom windows.
- B. Steel items indicated as Architecturally Exposed Structural Steel shall conform to the requirements described in Section 05 1200 - Structural Steel.

2.13 FABRICATED ITEMS

- A. Structural Performance of Ladders: Ladders shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
 - 1. Ladders accessing equipment on roofs or elevated structures shall comply with requirements of Section 306.5 of the Oregon Mechanical Specialty Code.

2.14 FINISHES - STEEL

- A. Prime paint all steel items.
 - 1. Exceptions: Galvanize steel lintels supporting masonry veneer and other items indicated on Drawings.
 - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

- D. Prime Painting: One coat.
- E. Galvanizing: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

2.15 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components indicated .
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. Treat field welded areas of galvanized members with zinc solder to replace galvanized protection.
- G. Touch-up Field Connections and damaged Shop Treatment areas as erection proceeds. Immediately prior to final covering, remove Rust and retreat any Members showing evidence of Rust through Shop Treatment over approximately 5% or more to total Shop Treatment area.
- H. Remove loose rust, heavy Mill Scale, Oil, Dirt, and other bond-reducing Foreign Substances from Members scheduled to receive Finish Painting, or other direct-to-steel Coatings.

3.04 INSTALLING METAL BOLLARDS

- A. Door Bollards: Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
 - 1. Coordinate with Work of Section 08 71 00 - Door Hardware for installation of door stops.
- B. Anchor bollards in place with concrete footings. Center and align bollards in holes 6 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- C. Traffic Bollards: Fill bollards solidly with concrete, mounding top surface to shed water where indicated.

3.05 INSTALLING ELEVATOR SUMP GRATES

- A. Cutting, Fitting and Placement: Perform cutting, drilling, and fitting required for installation. Set 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. Provide anchors in framework for items to be built into concrete.

- C. Secure removable units to supporting members with type and size of clips and fasteners as recommended by grating manufacturer for type of installation conditions shown.

3.06 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05 5100
METAL STAIRS AND RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Stairs with precast concrete treads and platforms.
- B. Stairs with grating treads.
- C. Structural steel stair framing and supports.
- D. Handrails and guards.

1.02 RELATED REQUIREMENTS

- A. Section 03 45 00 - Precast Architectural Concrete: Precast treads and platforms.
- B. Section 05 50 00 - Metal Fabrications: Metal handrails not connected or adjacent to steel stairs.
- C. Section 09 96 00 - High-Performance Coatings: Paint finish.

1.03 REFERENCE STANDARDS

- A. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges.
- B. AISC 360 - Specification for Structural Steel Buildings.
- C. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- D. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- G. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- H. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- I. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- J. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric).
- K. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
- L. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
- M. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.
- N. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.
- O. AWS D1.3 - Structural Welding Code - Sheet Steel.
- P. NAAMM AMP 510 - Metal Stairs Manual; The National Association of Architectural Metal Manufacturers.
- Q. NAAMM MBG 531 - Metal Bar Grating Manual; The National Association of Architectural Metal Manufacturers.
- R. NAAMM MBG 532 - Heavy Duty Metal Bar Grating Manual.
- S. SSPC-SP 1 - Solvent Cleaning.

T. SSPC-SP6 - Commercial Blast Cleaning; Society for Protective Coatings.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Include the design engineer's stamp or seal on each sheet of shop drawings.
- C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record.
- D. Welders' Certificates.
- E. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.05 QUALITY ASSURANCE

- A. Fabricate stairs and associated railings indicated as "architectural quality" to conform to AISC requirements for Category I Architecturally Exposed Structural Steel (AESS).
- B. Structural Designer Qualifications: Professional Engineer experienced in design of this work and licensed in the State of Oregon, or personnel under direct supervision of such an engineer.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.06 MOCK-UP

- A. Build mock-up of two adjacent sections of AESS guardrail to set quality standards for fabrication and installation. Demonstrate attachment of infill and quality of welds.
 - 1. Mock-ups may not remain as part of the work.

1.07 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

PART 2 PRODUCTS

2.01 FABRICATION FOR AESS STAIRS AND RAILINGS

- A. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.
- B. 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 of AESS to remove burrs and provide smooth surfaces and edges.
 - 3. Fabricate AESS with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identification.
 - 4. Fabricate AESS with exposed surfaces free of seams to maximum extent 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. Fabricate AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
 8. Seal-weld open ends of hollow structural sections with 3/8-inch closure plates for AESS.
- C. Coping, Blocking, and Joint Gaps: Maintain uniform gaps of 1/8 inch with a tolerance of 1/32 inch for AESS.
- D. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:
1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.
 2. Use weld sizes, fabrication sequence, and equipment for AESS that limit distortions to allowable tolerances.
 3. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather.
 4. Provide continuous welds of uniform size and profile where AESS is welded.
 5. Grind butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16 inch, minus 0 inch for AESS.
 6. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.
 7. At locations where welding on the far side of an exposed connection of AESS occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.
 8. Make fillet welds for AESS oversize and grind to uniform profile with smooth face and transition.

2.02 METAL STAIRS - GENERAL

- A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
 2. Delegated Design: Design commercial and service quality metal stairs, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Oregon, using performance requirements and design criteria indicated.
 3. Structural Design: Provide complete stair and railing assemblies complying with applicable code and the following:
 - a. Stair Capacity: Uniform live load of 100 lb/sq ft and a concentrated load of 300 lb with deflection of treads, platforms and framing members not to exceed 1/240 of span.
 - b. Uniform and concentrated loads need not be assumed to act concurrently.
 - c. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
 - d. Railing Assemblies: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
 - 1) Handrails and Top Rails of Guards:
 - (a) Uniform load of 50 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) Infill of Guards:
 - (a) Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
 - (b) Infill load and other loads need not be assumed to act concurrently.
 - e. Seismic Performance: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1) Component Importance Factor is 1.5.
 4. Dimensions: As indicated on drawings.
 5. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
 6. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.

7. Separate dissimilar metals using paint or permanent tape.
 8. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- B. Metal Jointing and Finish Quality Levels:
1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical. Comply with AESS requirements specified.
 - a. Welded Joints: Continuously welded and ground smooth and flush.
 - b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
 - c. Exposed Edges and Corners: Eased to small uniform radius.
 - d. Metal Surfaces to be Painted: Provide SSPC SP6 surface preparation and specified primer.
 - e. Locations of Use: All stairs with precast concrete treads.
 2. Service: Exposed joints tight with face surfaces aligned; underside of stair not covered by soffit is not considered exposed to view.
 - a. Welded Joints: Welded on back side wherever possible.
 - b. Welds Exposed to View: Ground smooth; not required to be flush.
 - c. Bolts Exposed to View: Countersunk flat or oval head bolts; no exposed nuts or screw threads.
 - d. Metal Surfaces to be Painted: Sanded smooth, suitable for satin or matte finish.
 - e. Locations of Use: All stairs with metal grating treads
- C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.03 METAL STAIRS WITH PRECAST CONCRETE TREADS

- A. Jointing and Finish Quality Level: Architectural, as defined above.
- B. Risers: Closed.
1. Provide perforated risers.
- C. Precast Concrete Treads: As specified in Section 03 45 00 - Architectural Precast Concrete.
- D. Tread Pan Material: Steel sheet.
- E. Abrasive Nosing: As specified in Section 03 45 00 - Precast Architectural Concrete.
- F. Risers: Same material and thickness as tread pans.
1. Riser/Nosing Profile: Sloped riser with rounded nosing of minimum radius.
 - a. Coordinate with installation of abrasive nosing specified in Division 03.
 2. Nosing Depth: Not more than 1-1/2 inch overhang.
 3. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch wide.
- G. Stringers: Steel plate.
1. Stringer Depth: As indicated on drawings.
- H. Landings: As detailed.
1. Provide connection for precast concrete at landings, supported on deck and/or perimeter miscellaneous framing as detailed.
- I. Railings: Steel bar stock and perforated panel infill.
- J. Finish: Shop- or factory-prime painted.
- K. Under Side of Stair: Exposed to view, to be finished same as specified for other exposed to view surfaces where indicated.

2.04 METAL STAIRS WITH GRATING TREADS

- A. Jointing and Finish Quality Level: Service, as defined above.
- B. Risers: Open.
- C. Treads: Steel bar grating.

1. Grating Type: Welded. Provide non-slip surface on all walking surfaces.
 2. Bearing Bar Depth: 3/4 inch, minimum.
 3. Top Surface: Standard.
 4. Nosing: Checkered plate.
 5. Nosing Width: 1-1/4 inch, minimum.
 6. Anchorage to Stringers: End plates welded to grating, bolted to stringers.
- D. Stringers: Rolled steel channels.
1. Stringer Depth: 10 inches.
 2. End Closure: Sheet steel of same thickness as risers welded across ends.
- E. Railings: Steel pipe railings.

2.05 HANDRAILS AND GUARDS

- A. Wall-Mounted Rails:
1. Architectural Stairs: Steel bar stock.
 2. Service Stairs: Round pipe rails, unless otherwise indicated.
 - a. Outside Diameter: 1-1/4 inch, minimum, to 2 inches, maximum.
- B. Guards:
1. Top Rails:
 - a. Architectural Stairs: Steel bar stock.
 - b. Service Stairs: Round pipe rails, unless otherwise indicated
 - 1) Outside Diameter: 1-1/4 inch, minimum, to 2 inches, maximum.
 2. Infill at Architectural Stairs: Perforated steel panels.
 - a. Panel Thickness: 16 gage.
 - b. Perforation Pattern: 1/4 inch round perforations, 3/8 inch on center.
 3. Infill at Service Stair Pipe Railings: Pipe or tube rails sloped parallel to stair.
 - a. Outside Diameter: 1 inch.
 - b. Material: Steel pipe or tube, round.
 - c. Vertical Spacing: Maximum 4 inches on center.
 - d. Jointing: Welded and ground smooth and flush.
 4. End and Intermediate Posts: Same material and size as top rails, unless otherwise detailed.
 - a. Horizontal Spacing: As indicated on drawings.
 - b. Mounting: Welded to top surface of stringer.
 5. 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.
 6. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.
 - a. Connect posts to stair framing by direct welding unless otherwise indicated.
 7. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.06 MATERIALS

- A. Steel Sections: ASTM A 36/A 36M.
- B. Steel Plates: ASTM A6/A6M or ASTM A283/A283M.
- C. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.
- D. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
1. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Designation CS (commercial steel).
 2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel).

- E. Gratings: Bar gratings complying with NAAMM MBG 531 or NAAMM MBG 532, whichever applies based on bar sizes.
- F. Perforated Metal for Risers: Steel panels with perforations as follows:
 - 1. Holes: Round hole pattern 0.375 rd by 0.2500 staggered pattern perforations.
 - 2. Thickness: 0.06-inch, 16 gage.
 - 3. Manufacturer: Diamond Manufacturing Company: www.diamondman.com or equal.
 - 4. Refer to details for extent of perforations for risers.
- G. Precast Concrete Treads: As specified in Section 03 45 00 - Precast Architectural Concrete.
- H. Abrasive Nosings: As specified in Section 03 45 00 - Precast Architectural Concrete.
- I. Steel Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, and galvanized to ASTM A153/A153M where connecting galvanized components.
- J. Welding Materials: AWS D1.1; type required for materials being welded.
- K. Shop and Touch-Up Primer for Interior Ferrous Metal: Either Tnemec Series 115 Uni-Bond DF at 2 mils DFT or primer specified in Section 09 96 00 - High-Performance Coatings for full-gloss, two-component, waterborne pigmented aliphatic acrylic polyurethane, complying with VOC limitations specified in Section 09 96 00.

2.07 SHOP FINISHING

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime Painting: Use specified shop- and touch-up primer.
 - 1. Preparation of Steel: In accordance with SSPC-SP 6, unless otherwise recommended by primer and coating manufacturer(s).
 - 2. Number of Coats: One.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. When field welding is required, clean and strip primed steel items to bare metal.

3.03 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects. Set units accurately in location, alignment and elevation, measured from established lines and levels and free of rack with no more variation between riser heights than allowed by code.
- B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.
- C. Set AESS accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
 - 1. Erect AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
- D. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- E. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1.
- F. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
- G. Obtain approval prior to site cutting or creating adjustments not scheduled.
- H. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

- I. Adjust railing systems before anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loads. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:
 1. Anchor posts to steel by welding directly to steel supporting members.
 2. Attach handrails to wall with wall brackets. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface.
 - a. For hollow masonry anchorage, use toggle bolts.
 - b. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.04 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with 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 dry film thickness, unless otherwise required by finish manufacturer.

3.05 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

**SECTION 06 1000
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural dimension lumber framing.
- B. Subflooring.
- C. Roof-mounted curbs.
- D. Roofing nailers.
- E. Preservative treated wood materials.
- F. Fire retardant treated wood materials.
- G. Miscellaneous framing and sheathing.
- H. Communications and electrical room mounting boards.
- I. Concealed wood blocking, nailers, and supports.
- J. Anchor Bolts and embeds for Rough Carpentry.
- K. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

- A. Section 07 2500 - Weather Barriers: Air barrier over sheathing.
- B. Section 07 4213 - Metal Wall Panels, furring and nailers
- C. Section 07 4623 - Wood Siding, furring and nailers
- D. Section 07 7200 - Roof Accessories: Prefabricated roof curbs.
- E. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.
- F. Section 09 6466 - Wood Athletic Flooring

1.03 REFERENCE STANDARDS

- A. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2012.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.
- E. AWWA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association; 2012.
- F. OSSC - Oregon Structural Specialty Code; latest edition.
- G. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; National Institute of Standards and Technology, U.S. Department of Commerce; 2010.
- H. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology, Department of Commerce; 2010.
- I. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association; 2011.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

1.06 OPTIONS

- A. Contractors may, at their option, substitute:
 - 1. Power-driven Fasteners in lieu of Anchor Bolts at Interior Non-Structural Stud Wall Base Plates as follows:
 - a. Manufacturer and Type:Hilti X-U or approved.
 - b. Maximum spacing at Non-load Bearing Walls: 24 inches, 6 inches minimum, 12 inches maximum from ends.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Douglas Fir-Larch, unless otherwise indicated.
 - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Provide wood harvested and milled within 500 miles of the project site.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Western Wood Products Association (WWPA).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Stud Framing (2 by 2 through 2 by 6):
 - 1. Grade: No. 2.
- E. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
 - 1. Grade: No. 1 & Btr.
- F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

- A. Underlayment Combination: Any PS 2 type, rated Single Floor.
 - 1. Bond Classification: Exterior.
 - 2. Span Rating: 48.
 - 3. Performance Category: 1-1/8 PERF CAT.
 - 4. Thickness: 1-1/8 inches, nominal.
 - 5. Panel Size: 48 x 96 inches.
 - 6. Edges: Square.
 - 7. Treatment: Fire retardant treated.
 - 8. Extent: As a substrate for flashing at roof edges and as indicated.
- B. Subflooring: Any PS 2 type, rated Sheathing.
 - 1. Bond Classification: Exposure 1.
 - 2. Span Rating: 32.
 - 3. Performance Category: 15/32 PERF CAT.
 - 4. Thickness: As shown on drawings.
 - 5. Extent: Music room floor install over metal deck.
- C. Underlayment: APA Underlayment; plywood, Exposure 2, 1/2 inch thick. Fully sanded faces at resilient flooring.

1. Extent: Music room floor, install over subfloor.
- D. Wall Sheathing, For Metal stud shear walls:
 1. Bond Classification: Exterior, all exterior glue..
 2. Grade: Structural I Sheathing. CD.
 3. Span Rating: 16.
 4. Identification Index: 32/16
 5. Thickness: 1/2 inch and 5/8 inch as indicated on drawings.
 6. Edge Profile: Square edge.
 7. Treatment: Fire Retardant Treated
 8. Composition: 5 ply construction, all Group 1 wood
- E. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.04 ACCESSORIES

- A. Fasteners and Anchors:
 1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 2. Machine Bolts, Nuts, Washers, and Screws: Conforming to ASTM A307, galvanized where exposed.
 3. Lag Bolts and Wood Screws: ANSI/ASME B18.6.1-1981, zinc plated.
 4. Threaded Rods: ASTM A36 or ASTM A307.
 5. Anchor Bolts: F 1554 Grade 36.
 6. Washers: Provide Hot-dip Galvanized Steel Washers under Bolt Heads, Lag Heads, and Nuts adjacent to all wood framing members.
 7. Epoxy Anchors: Hilti HIT HY-150 Max (at CMU); Hilti HIT-RE 500 SD (at concrete), or approved.
 8. Powder Actuated Fasteners:
 - a. Hilti X-U
 9. Self-drilling screws of wood-to-wood connections: Simpson SDS series or approved.
 10. Self-drilling screws to light-gage framing: Traxx by ITW Buildex or approved; with break-off wings, flat or bugle head.
- B. Framing Connectors: Zinc-coated steel; Simpson, or approved. Connector model numbers shown on Drawings are taken from Simpson Catalog. If specific type is not shown on Drawings, use type recommended by Manufacturer for conditions of installation.
- C. Subfloor Glue: Waterproof, water base, air cure type, cartridge dispensed.

2.05 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Fire Retardant Treatment:
 1. Exterior Type: AWWA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.

- b. Do not use treated wood in direct contact with the ground.
- C. Preservative Treatment:
 - 1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - b. Treat lumber in contact with roofing, flashing, or waterproofing.
 - c. Treat lumber in contact with masonry or concrete.
 - d. Treat lumber in other locations as indicated.
 - 2. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.4 lb/cu ft retention.
 - a. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.

PART 3 EXECUTION

3.01 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.
- E. Do not notch, bore, or drill framing members except as noted on Drawings, or as approved by Engineer.
- F. Provide preservative-treated wood nailers on roof deck as indicated on Drawings or as required by membrane roofing manufacturer.
 - 1. Coordinate thickness of nailer with thickness of roof insulation.

3.04 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.05 INSTALLATION OF CONSTRUCTION PANELS

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using fasteners as indicated on Drawings.
 - 1. Block unsupported edges at shear walls as shown on Drawings.
 - 2. Drive sheathing fasteners flush with panel face, do not overdrive.
- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.
 - 4. Size and Location: As indicated on drawings.
- C. Install panels with a minimum 1/16 inch, maximum 1/8 inch gap between adjoining panels.

3.06 ACCESSORIES AND FASTENER INSTALLATION

- A. Provide Framing Connectors where indicated; secure with fasteners recommended by manufacturer to achieve maximum load capacity.
- B. Provide Washers under Nuts and Heads when making Bolted or Lag Screwed connections.
- C. Drive Nails perpendicular to Grain in lieu of toe-nailing where feasible.
- D. Lag Screws: Pre-drill to 70% of the shank diameter in supporting member, 1/32 to 1/16 inch larger than shank diameter in attached members. Use standard cut washer between bolt head and wood. Install Lag Screws by turning, do not drive with hammer.
- E. Nails and Screws: Fasten members as shown on Drawings. Pre-drill holes as required to prevent splitting of members. Nailed connections not shown on Drawings or specified by manufacturer shall conform to the building code.
- F. Bolts: Set in holes 1/32 inch to 1/16 inch larger than bolt through wood member. Tighten to snug position. Use cut washer between nut or bolt head and wood.
- G. Powder-Driven Connectors: Select size and type for full penetration into substrate without splitting connected wood members or fracturing substrate. Use washer under head to prevent over-driving.

3.07 SITE APPLIED WOOD TREATMENT

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

3.08 TOLERANCES

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

END OF SECTION

SECTION 06 2000
FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior and exterior finish carpentry items, including running trim and panel material.
- B. Wood paneling WP-1 and WP-2
- C. Transportation, milling, and fabrication of salvaged lumber provided by Owner.
- D. Salvaged wood finished carpentry.
- E. Furnishing of Salvaged wood to Wood Ceiling Manufacturer.
- F. Plastic laminate wainscot WSCT-1
- G. Plastic laminate window sills
- H. Pegboard PB-1
- I. Hardware and attachment accessories.
- J. Shop Finishing

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 06 4100 - Architectural Wood Casework: Shop fabricated custom cabinet work.
- C. Section 09 6566 - Wood Athletic Flooring
- D. Section 09 5426 - Wood Ceilings: Salvaged lumber provided to Wood Ceiling manufacturer.
- E. Section 09 9000 - Painting and Coating: Painting and finishing of finish carpentry items.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2009.
- B. PS 1 - Structural Plywood; 2009.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Provide instructions for attachment hardware and finish hardware.
 - 2. For installation adhesives, include printed statement of VOC content.
 - 3. For each composite-wood product used, provide documentation indicating that the bonding agent contains no urea formaldehyde.
 - 4. For each adhesive used, provide documentation indicating that the adhesive contains no urea formaldehyde.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Provide the information required by AWI/AWMAC/WI (AWS).
- D. Samples:
 - 1. Submit 2 samples of wood trim 12 inches long with specified finish.
 - 2. Submit 2 samples of each type of wood panel 12 inches square with specified finish.
 - 3. Submit 2 samples of each plastic laminate color specified.

4. Submit 2 samples of Salvaged lumber milled to final size. Each sample to be 12 inches long. No finish.

1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
- B. Recycled Content of Medium-Density Fiberboard and Particleboard: Provide products with an average recycled content so Postconsumer recycled content plus one-half of preconsumer recycled content is not less than 20 percent.
- C. Formaldehyde Free Panel Products: Provide fiberboard, particleboard and plywood products made with binders and adhesives containing no urea formaldehyde.

1.07 MOCK-UP

- A. Wood Trim:
 1. Provide one mock-up for each trim type. Mock up to include at least two pieces of material, at least one joint of every major type, and each type of fastener..
 2. Locate where directed.
 3. Mock-up may remain as part of the Work.
- B. Wood Paneling WP-1:
 1. Provide a mock up section of the wood paneling showing backing, finish panels, fasteners, and joint treatment at corners and butt joints.
 2. Locate where directed.
 3. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Protect work from moisture damage.
- B. Protect material from discoloration due to uneven exposure to light.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

- A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI (AWS) for Premium Grade.
- B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.

2.02 WOOD-BASED COMPONENTS

- A. Wood salvaged from demolition of existing Howard School. Wood slats shown to be milled from softwood lumber roof joists removed from existing school as part of the partial demolition.

2.03 LUMBER MATERIALS

- A. Owner Furnished Lumber - Salvaged from partial demolition of existing school.
 1. Owner furnished lumber consists of softwood lumber 2 x 14 inch nominal roof joists salvaged from partial demolition of existing school. Material is mostly vertical grain and clear with some mixed grain.
 2. Approximate quantity: 62 pieces, each nominally 2 x 14 inches by 32 feet long. Verify final quantity.
 3. Condition & Grade:
 - a. Contractor may rely on 75 percent utilization of the existing lumber.
 - b. Do not use pieces exhibiting decay, excessive damage, lack of integrity, severe discoloration, or other defects.
 - c. Prior to fabrication, examine lumber with Architect. Agree on standard of acceptable quality.
 4. Location: Salvaged lumber is stored within 10 miles of the Howard School Site.
 5. Handling: Contractor shall load and transport lumber as required to complete the work.

- B. Salvaged lumber for work of other sections: Deliver to job site. Milling to be performed under work of Wood Ceiling manufacturer.
- C. Salvaged lumber for work of this section:
 - 1. Mill salvaged lumber to sizes shown on drawings.
 - 2. Thickness: Mill to 3/4 inch to 7/8 inch smooth finished thickness unless otherwise noted.
 - 3. Width: Mill to 13 inch finished width unless otherwise noted.
 - 4. Completely remove existing paint coating, surface discoloration, and markings.
 - 5. Tongue and Groove: Shape for tongue and groove construction where shown on drawings.
 - 6. Edges: Ease edges.
 - 7. Extent of work: Salvaged Wood bench seating in Story Nook south of Media Center, at bench seating near classroom stair ways, and trim above Media Center Work Room.
- D. Interior Hardwood Trim: White Maple species; PS 20, AWI Premium Grade; plain sawn, smooth texture; mixed grain; maximum moisture content of 6 percent; suitable for clear finish.
 - 1. Ease exposed edges with 1/16 inch radius, unless otherwise shown.
 - 2. Minimum lengths: Opening & Standing Trim: 1 piece, single length. Running Trim: Joints minimum 12 feet apart.
 - 3. Extent of Work: All window sills and elsewhere as indicated.
- E. Interior Painted Wood Trim: Medium Density Fiberboard (MDF); Industrial Grade engineered wood-based panel, water resistant, manufactured with a formaldehyde-free binder and which meets the requirements of ANSI A208.2-1994, product class MD.
 - 1. Manufacturer and Brand: Medite II, by Sierrapine, or approved.
 - 2. Ease exposed edges with 1/16 inch radius, unless otherwise shown.
 - 3. Minimum lengths: Opening & Standing Trim: 1 piece, single length. Running Trim: Joints minimum 12 feet apart.
 - 4. Extent of Work: As shown on Drawings, and/or as Scheduled.

2.04 SHEET MATERIALS

- A. MDO Plywood Wall Panels: Douglas Fir species; exterior rated; edges square, one side faced with medium-density overlay, smooth surface texture.
 - 1. Manufacturer: Eagle Plywood Specialties, Pacific Wood Laminates, or approved.
 - 2. Surface Material: Medium Density Overlaid - U. S. Product Standard PS-1 95.
 - 3. Thickness: 3/4 inch.
 - 4. Edges: Square
 - 5. Finish: Factory prime all surfaces prior to installation.
 - 6. Extent of Work: As shown on Drawings, and/or as Scheduled.
- B. Hardwood Veneer Plywood: White Maple species; AWI Premium Grade; PS 51; quarter-sliced; book match ; color carefully selected for color match.
 - 1. Type: Where exposed to moisture: Exposure 1; Elsewhere: Intermediate level glue.
 - 2. Thickness: 3/4 inch
 - 3. Extent of Work: WP-1 as indicated on drawings.
- C. Apply-Ply Plywood: White Maple species; AWI Premium Grade; PS 51; plain sliced; random match; no voids; faced on both sides.
 - 1. Manufacturer: Apple-Ply by States Industries, Europly by Colombia Forest Products, or approved.
 - 2. Thickness: 3/4 inch
 - 3. Extent: WP-2 as indicated on Drawings.
- D. Medium Density Fiberboard (MDF): Industrial Grade engineered wood-based panel, water resistant, manufactured with a formaldehyde-free binder and which meets the requirements of ANSI A208.2-1994, product class MD-EXTERIOR.
 - 1. Manufacturer and Brand: Medex, by Sierrapine, or approved.
- E. Pegboard PB-1: Pressed wood fiber with resin binder, standard grade; 1/4 inch thick, with holes spaced at 1 inch on center in both directions.

- F. Softwood Plywood Not Exposed to View: Any face species, veneer core; PS 1 Grade A-B; glue type as recommended for application.
 - 1. Extent: For use as substrate for Plastic Laminate Wainscots and Sills, Wall Panels, and Salvaged lumber Bench Seating.

2.05 PLASTIC LAMINATE MATERIALS

- A. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
 - 1. Provide specific types as follows:
 - 2. a. Horizontal Surfaces: HGS, 0.048 inch nominal thickness.
 - 3. b. Vertical Surfaces: VGS, 0.028 inch nominal thickness.
- B. Laminate Backing Sheet: NEMA LD 3, BKL; undecorated plastic laminate.
- C. Colors: As scheduled.

2.06 FASTENINGS

- A. Fasteners: Of size and type to suit application.
- B. Panel Clips: 6005A aluminum clips, 1/4 inch thick by full length of panel.
 - 1. Available Product: Panelclip manufactured by Brooklyn Hardware LLC Manufacturing.
- C. Framing Connector Installed in Finish Carpentry: Concealed Flange connector, BOD Simpson Concealed Flange Hangar LUCZ, 18 gauge. Extent of work: Wood slats in Media Center Work Room.

2.07 ACCESSORIES

- A. Adhesive: Type recommended by laminate manufacturer to suit application.
 - 1. Do not use adhesives that contain urea formaldehyde.
 - 2. 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):
 - a. Wood Glues: 30 g/L.
- B. Edge trim for Plastic Laminate Wainscots and Wall Panels:
 - 1. "J" Molding JDM-625 manufactured by Fry Reglet Corporation; www.fryreglet.com
 - 2. "X" Corner molding XDM - 625 - 625 manufactured by Fry Reglet Corporation, www.fryreglet.com
 - 3. Finish: Clear Anodized.
 - 4. See drawings for locations.
- C. Wood Filler: Solvent base, tinted to match surface finish color.

2.08 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- C. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
- D. Plastic Laminate Wainscots and Wall Panels: Fabricate with 1/2-inch thick plywood backer, unless otherwise indicated, as detailed:
 - 1. Conform to AWI Custom quality standards.
 - 2. Apply plastic laminate over plywood, adhered with adhesive over entire surface.
 - 3. Apply adhesive over entire back surface of panels and adhere to gypsum board or other wall substrate. Attach wainscot panels at top corners and at two intermediate points equally spaced along top. All fasteners to be concealed.
 - 4. Provide self-edge at all joints.
- E. Fabricate hardwood trim from hardwood lumber. Ease all edges 1/16-inch.

1. Finish: Satin with conversion varnish finish.

2.09 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- D. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for Grade specified and as follows:
 1. Transparent:
 - a. System - 5, Varnish, Conversion.
 - b. Sheen: Semigloss.
- E. Back prime woodwork items to be field finished, prior to installation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.
- C. Verify that gypsum board substrates have relieved a coat of primer prior to installation of wainscots and wood panels.
- D. Verify the substrates behind open joints between wainscots and between adjacent wall panels have been painted black prior to installation of panels.

3.02 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Miter corners.
- E. Use concealed fasteners wherever possible, unless noted otherwise on Drawings.
- F. At fasteners installed through the exposed surface(s) of the trim, countersink and/or set fasteners low enough to accommodate wood plugs or wood filler.
- G. At Hardwood Veneer Plywood Panels, install with Attachment Clips as shown on the Drawings.
- H. Install wall panels with exposed screws spaced as shown on drawings
- I. Plastic Laminate Wainscots: Install wainscot panels with adhesive suitable for application, unless detailed otherwise. Do not face nail.
 1. Paint substrate behind panels as indicated on Drawings for exposed reveal joints.
 2. Install reveal and trim pieces as detailed.
 3. Space panels as detailed on Drawings.
- J. Installation of Salvaged Lumber:
 1. At benches, install over plywood substrate.
 2. Fit T and G edges. Sand smooth. Remove tongue and groove at exposed edges.
 3. Secure with finishing nails, concealed where possible.

3.03 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 06 4100
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Countertops.
- C. Cabinet hardware.
- D. Factory finishing.
- E. Preparation for installing utilities.

1.02 RELATED REQUIREMENTS

- A. Section 06 2000 - Architectural Wood Casework
- B. Section 07 9005 - Joint Sealers
- C. Section 08 8000 - Glazing: Glass for casework.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2009.
- B. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles and elevations, fastening methods, jointing details, connections to adjacent work, schedule of finishes, and accessories.
- C. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.
- D. Resubmittal of Shop Drawings: If field measurements result in significant changes to the casework design, resubmit all shop drawings after field dimensions have been verified.
 - 1. Indicate on resubmitted drawings all dimensions which were verified.
 - 2. Indicate significant changes to casework resulting from field-measured conditions. Do not proceed with fabrication until approved by Architect.
- E. Product Data: Provide data for panel products, countertop materials and hardware accessories.
 - 1. Product catalog for hanging display system indicating available fittings.
 - 2. For installation adhesives, include printed statement of VOC content.
 - 3. For each adhesive used, provide documentation indicating that the adhesive contains no urea formaldehyde.
- F. Selection Samples: Submit actual samples of the full range of available colors for the following items:
 - 1. Thermoset decorative panels.
 - 2. Shop applied transparent finishes.
 - 3. Solid-surfacing materials.
- G.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
- B. Recycled Content of Medium-Density Fiberboard and Particleboard: Provide products with an average recycled content so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 20 percent.

- C. Formaldehyde Free Panel Products: Provide fiberboard, particleboard and plywood products made with binders and adhesives containing no urea formaldehyde.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver casework to jobsite until notified by General Contractor that Project is conditioned and prepared to handle and store casework without damage or discoloration.
- B. Protect units from moisture damage.

1.07 FIELD CONDITIONS

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. The following manufacturers are approved subject to conformance with Specifications:
 - 1. Advance Cabinet Designs, Inc; 541-465-3394.
 - 2. Ashland Glass and Millwork; Ashland, OR; 541-664-5557.
 - 3. Cascade Casework Corp; Albany, OR; 541-928-3750.
 - 4. Custom Source Woodworking Inc; Olympia, WA; 360-491-9365.
 - 5. Fremont Millwork Co; Klamath Falls, OR; 541-884-5554.
 - 6. ISEC Cabinets, 425-489-1333.
 - 7. Kriegsko Manufacturing, Inc; Hubbard, OR; 503-981-9083.
 - 8. Legend Custom Woodworking, Inc; Portland, OR; 503-669-1000.
 - 9. Neil Kelly Cabinets; Portland, OR; 503-335-9214.
 - 10. Pacific Cabinets, Inc; Ferdinand, ID; 208-962-5546.
 - 11. Specialty Cabinets; 503-835-6048.
 - 12. Westmark Products; Tacoma, WA; 800-755-3470.
- B. Substitutions: See Section 01 60 00 - Product Requirements.
 - 1. Substitution requests shall be accompanied by a mock-up of a typical cabinet produced by the manufacturer showing quality of workmanship normally produced for custom-grade work. Mock-up shall include a door and drawer combination with related specified hardware, countertop with edge and base. Mock-up shall meet quality and specified requirements of cabinets and hardware specified herein.

2.02 CABINETS

- A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI//AWMAC/WI Architectural Woodwork Standards (AWS) for Premium Grade.
- B. Plastic Laminate Faced Cabinets: Custom grade.
- C. Cabinets :
 - 1. Cabinet Construction Type: Type A Frameless.

2.03 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.
- B. Hardwood Lumber: White Maple material to match lumber specified in Section 06 2000 Finish Carpentry. Sizes as shown on drawings.

2.04 LAMINATE MATERIALS

- A. Manufacturers:
 - 1. Formica Corporation; ____: www.formica.com.
 - 2. Panolam Industries International, Inc\Nevamar; ____: www.nevamar.com.
 - 3. Wilsonart International, Inc; ____: www.wilsonart.com.
 - 4. Pionite: www.pionite.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- C. Provide specific types as follows:
 - 1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
 - 2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
 - 3. Post-Formed Horizontal Surfaces: HGP, 0.039 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
 - 4. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
 - 5. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.
- D. Solid-Core Material Laminates: Solid color laminates consisting of melamine-impregnated decorative surface papers combined with resin-treated kraft paper and consolidated in a press at high pressures.
 - 1. Products:
 - a. ColorCore2 manufactured by Formica Corporation: www.formica.com.
 - b. MelCor II manufactured by Pionite Decorative Surfaces: www.pionite.com.
 - 2. Colors: Colors as scheduled.

2.05 PANEL MATERIALS

- A. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated; composed of wood fibers pressure bonded with interior grade adhesive, containing no added urea formaldehyde, to suit application; sanded faces; thickness as required.
 - 1. Use for painted components, components receiving laminates, and concealed components.
 - 2. Product: Medite II manufactured by SierraPine Composite Solutions: www.sierrapine.com.
- B. Hardwood Plywood: Veneer core panels constructed from uniform lamination of solid grade 1/16-inch thick alder and birch, FSC Certified.
 - 1. Thickness: 3/8 inch, unless otherwise indicated.
 - 2. Product: ApplePly manufactured by States Industries: www.statesind.com.
- C. Softwood Plywood Not Exposed to View: Any face species, veneer core; PS 1 Grade A-B; glue type as recommended for application.
 - 1. Extent: For use as substrate for Plastic Laminate.
- D. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth two sides (S2S); use for drawer bottoms, dust panels, and other components indicated on drawings.
 - 1. Provide prefinished hardboard for cabinet drawer bottoms.

2.06 COUNTERTOPS

- A. Plastic Laminate Countertops: Plywood covered with high-pressure laminate.
- B. Solid-Surfacing Material SSM-1 and SSM-2 : Cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI Z124.6, having minimum physical and performance properties specified.
 - 1. Superficial damage to a depth of 0.010 inch shall be repairable by sanding and/or polishing.
 - 2. Thickness: 1/2 inch.
 - 3. Product: Corian manufactured by DuPont Company: www2.dupont.com.
 - 4. Color: As scheduled.

2.07 ACCESSORIES

- A. Adhesive: Type recommended by AWI/AWMAC to suit application.

- B. 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):
 - 1. Wood Glues: 30 g/L.
 - 2. Contact Adhesive: 250 g/L.
- C. Plastic Edge Banding: Extruded PVC, convex shaped; smooth finish; of width to match component thickness.
 - 1. Color: To match adjacent plastic laminate color.
 - 2. Use 3 mm at all exposed edges, doors and drawer fronts, vertical case ends, bottoms and sub-tops.
 - 3. Use 3 mm at all exposed shelf edges.
 - 4. Do not use adhesives that contain urea formaldehyde.
 - 5. Manufacturers: Dollken Woodtape: www.doellken-woodtape.com, 800-426-6362 or equal.
- D. Countertop Support Brackets: Prefinished cold-rolled steel L-bracket with 1,420 lbs. per pair load rating. Mount with manufacturer's recommended fasteners to wall backing.
 - 1. Size: 18 inches by 18 inches.
 - 2. Finish: White.
 - 3. Product: "Regular Bracket" manufactured by A & M Hardware.
- E. Glass: As specified in Section 08 80 00.
 - 1. Type 2 at bi-passing doors. Provide ground pulls.
 - 2. Type 2 at display cases, unless otherwise indicated.
 - 3. Type 2 at glass shelves.
- F. Glass Stops: Removable rigid PVC glass stops.
- G. Hanging Display System for Use in Display Cases: Cable hanging system comprised of the following components.
 - 1. Basis-of-Design Manufacturer: Arakawa Hanging Systems International: www.arakaragrip.com.
 - a. Other Manufacturer: Grip Lock.
 - 2. Components:
 - a. Cable: 3/32 inch, 7 x 7 stainless steel cable. Provide lengths as required to extend from ceiling to floor of display cases.
 - b. Ceiling Tensioner: SF35. Install with pan head stainless steel screws of sufficient length to bite into wood blocking.
 - c. Floor Tensioner: SF23B.
 - d. Shelf Gripper: FRG1S. Provide 2 per every 36 inches or less of shelf length, unless otherwise indicated.
- H. Book Drop Cart Spring: Spring assembly including top and bottom plates.
 - 1. Product: Model 9574-1 manufactured by Weber Knapp.
- I. Casework Ventilation Panels: Perforated steel panels.
 - 1. Panel Thickness: 16 gage.
 - 2. Perforation Pattern: 1/4 inch round perforations, 3/8 inch on center.
 - 3. Sizes: As indicated.

2.08 COMPUTER ACCESSORIES

- A. Cable Grommets:
 - 1. Large Wire Access Grommet: ABS plastic, two-piece assembly with 3-inch diameter opening hole. XG2 3" Flip-Top Grommet Cap and XG1 - 3" Grommet Sleeve manufactured by Mockett: www.mockett.com or equal.
 - 2. Quantity: As shown on Drawings.
 - 3. Color: Metallic silver
- B. Cable Manager:
 - 1. Provide raceway within casework assembly with access where details allow.

2. For wall-mounted computer station counters, provide "L-shaped" cable keeper finished in matching plastic laminate; 6-inches wide with a 2-inch high return lip. Install surface-mounted, full-length of counter at wall side.

2.09 HARDWARE

- A. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated shelf rests, nickel plated finish, for nominal 1 inch spacing adjustments.
 1. Product:
 - a. No. 282.04.711 manufactured by Hafele: www.hafeleonline.com.
 - b. No. 332 Flat Top Shelf Support manufactured by Knape & Vogt: www.knapeandvogt.com.
- B. Drawer and Door Pulls: Angled Bar pull, stainless steel with satin finish, 5 inch centers.
 1. Available Products:
 - a. No. A553-128-55 manufactured by EPCO: www.epcohardware.com.
 - b. No. DP54 manufactured by Mockett; www.mockett.com
- C. Drawer and Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with satin finish. Key to building master keyway.
 1. Lock Manufacturer: Olympus Lock, Inc.
 - a. Products:
 - 1) Door Locks: 100DR N Series; National Keyway.
 - 2) Drawer Locks: 200DW, N Series; National Keyway.
 - b. Provide strike plates for each lock.
 - c. Finish: 626.
 2. Coordinate with Work of Section 08 71 00 - Door Hardware for correct keying of locks.
- D. Catches: Magnetic.
 1. Product: 592 manufactured by EPCO: www.epcohardware.com, or approved equal.
- E. Elbow Catches: Cadmium plated steel; install on left-hand door of double door cases where locks are indicated.
 1. Products: No. 2 Elbow Catch manufactured by Ives: <http://us.allegion.com/brands/ives>, or approved equal.
- F. Drawer Slides:
 1. Type: Full extension.
 2. Typical Drawers: Steel ball bearings, full extension, progressive action, side mounting, with load rating of 100 pounds with polymer stop cushions.
 - a. Available Products:
 - 1) Model 7432 manufactured by Accuride International, Inc: www accuride.com.
 - 2) No. 8400 manufactured by Knape & Vogt: www.knapeandvogt.com.
 3. File Drawers: Steel ball bearings, full extension, progressive action, side mounting, with load rating of 150 pounds with hold-in feature to prevent bounceback.
 - a. Available Products:
 - 1) Model 4032 manufactured by Accuride International, Inc: www accuride.com.
 - 2) No. 8500 manufactured by Knape & Vogt: www.knapeandvogt.com.
- G. File Drawer Accessories: Provide hanging file system at all file drawers.
- H. Hinges: Five knuckle, fixed pin in chrome finish. Steel hinge 2-3/4 inches high with 270 degree opening.
 1. Finish: 26D Satin Chrome.
 2. Available Products:
 - a. No. EBB-1-26D-03 manufactured by E.B. Bradley Co: www.ebbradley.com.
 - b. No. 376 manufactured by RPC Rockford Process Control, Inc., www.rockfordprocess.com.
- I. Display Case Rolling Door Hardware: Provide complete assemblies including, but not limited to, top and bottom track, lock assembly, shoe filler, pull, molding, jamb, end caps, wheels, retainers and bumpers.

1. 2-Door Display Cases: Model No. 610187 manufactured by Stylmark: www.stylmark.com.
 2. Lock: No. 510808 manufactured by Stylmark: www.stylmark.com.
 3. Substitutions: See Section 01 60 00 - Product Requirements.
- J. Casters for Mobile Casework: 5-inch diameter, ball-bearing, minimum 300 lb. capacity.
1. Swivel Casters:
 - a. No. 5-30-213G-2/No. 5-30-213-2PL manufactured by Jarvis Caster: www.jarviscaster.com.
 - b. No. 5-40-213F-2/No. 5-40-213F-2 with Maxi Lock Brake manufactured by Vulcan Industries, Inc.: www.vulcan-industry.com.
 - c. Provide locking casters at front wheels of each piece of mobile casework.
 2. Distributor: Industrial Caster and Wheel, Phone 503.598.9722: www.icwco.com.
- K. Clothes Rods: Steel tube closet rod, bright chrome finish with mid-span support for shelf widths over 48-inches.
1. Products:
 - a. Rod: No. 770-1 manufactured by Knape & Vogt: www.knapeandvogt.com.
 - b. Rod Support Flanges: No. 734 manufactured by Knape & Vogt: www.knapeandvogt.com.
 - c. Mid-Span Support: No. 760ANO manufactured by Knape & Vogt: www.knapeandvogt.com.
- L. Coat Hooks: Dull chrome finish wardrobe hook.
1. Products:
 - a. Wall Mounted: No. 571 manufactured by Ives: <http://us.allegion.com/brands/ives>.
 - b. Under-Shelf Mount: No. 580 manufactured by Ives: <http://us.allegion.com/brands/ives>.

2.10 FABRICATION

- A. Laminate Finished Surface Definitions: Comply with requirements of AWI/AWMAC Architectural Woodwork Quality Standards Illustrated and the following:
1. Exposed portions of casework include all surfaces visible when doors and drawers are closed, interior faces of cabinet doors and exposed surfaces of open cases including top and bottom of shelving, interior cabinet surfaces visible behind glass doors.
 2. Semi-exposed surfaces of casework include those members behind opaque doors such as shelves, drawers, dividers, interior faces of ends, case backs and backs and bottoms.
 3. Concealed portions of casework include sleepers, dust panels, and other surfaces not visible after installation.
- B. Surface Finishes:
1. Exposed Surfaces: High-Pressure Laminate unless otherwise indicated. Provide colors and finishes as scheduled in Section 09 00 01 - Finish Legend.
 2. Semi-Exposed Surfaces: Thermoset decorative overlay. Colors as selected by Architect from manufacturer's full range of available colors.
- C. Cabinet Style: Type A Frameless or Flush Overlay.
- D. Drawer Construction Technique: Lock shoulder joints.
- E. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- F. Construct cabinets without integral base. Provide separate structural base as specified below.
- G. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- H. Cabinet Backs: Provide minimum 1/2-inch thick cabinet back. Where back of cabinet is exposed to view, provide 3/4-inch plywood with high pressure laminate facing.
- I. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- J. Base Construction: Construct cabinet bases of 3/4-inch thick marine grade plywood, glued and screwed. Provide reinforcing blocks as required for maximum strength. Recess base for toe

space as indicated. Set base on floor where casework is to be installed. Level top surface and scribe bottom surface to floor line leaving a height of 4-inches between floor and bottom of casework.

- K. Drawers:
1. Fronts: One piece 3/4-inch thick, plywood with 3 mm plastic edge facing on all four sides.
 2. Sides: 1/2-inch thick medium density overlay plywood.
 3. Back and Sub-Front: 3/4-inch thick plywood.
 4. Edge band top edges of sides, backs and sub-front.
 5. Bottoms: Minimum 1/2-inch plywood or 1/4-inch hardboard set into 1/4-inch deep grooves at front, back and both sides.
 6. Drawer Reinforcement: Reinforce drawer bottoms in excess of 400 square inches in area with 1 inch by 3 inch wood strip running front to back centered on drawer.
 7. Fabricate drawers full depth of cabinet.
 8. Mount drawers with positive in and out stops.
- L. Cabinet Doors: Plastic laminate clad 3/4-inch thick plywood or MDF with 3 mm plastic edge facing on all edges.
1. Provide hinges in the following quantities:
 - a. Two hinges for doors up to 36 inches high, 24 inches wide.
 - b. Three hinges for doors up to 48 inches high, 24 inches wide.
 - c. Four hinges for doors up to 82 inches high, 24 inches wide.
 - d. For doors in excess of dimension indicated above, comply with hinge manufacturer's recommendations for size and weight of door.
 2. Surface apply hinges, do not let-in hinges.
- M. Semi-Exposed Cabinet Shelving: Provide plastic laminate clad plywood or MDF as follows:
1. 3/4-inch thick plywood for shelving less than 32 inches wide.
 2. 1-inch thick plywood for shelving more than 32 inches wide.
 3. Provide "Line Bored" multi-hole shelf support holes.
 4. Allow 1/16-inch clearance at each end of loose shelving (1/8-inch overall) for ease of moving shelves.
 5. Cover all edges of shelving with plastic edging matching surface of shelves.
- N. Countertops:
1. Plastic Laminate Countertops: High-pressure laminate bonded to plywood top over wood framing.
 - a. Provide Self Edge.
 - b. At countertops indicated to receive solid-core laminate, provide solid-core edge molding from same manufacturer as countertop. Profile with beveled edge.
 - c. At areas with sinks, provide moisture-resistant plywood. Provide shop installed 1/4-inch maximum radius integral coved backsplashes and mechanically attached end splashes. If sink counter configuration is "L" or "U" shape, miter corners and continue integral coved backsplash detail for entire counter assembly. Scribe countertops or backsplashes to abutting wall surfaces for hairline joint. Seal joint with mildew-resistant silicone sealant as specified in Section 07 90 05 - Joint Sealers.
 - d. At countertops indicated to receive solid-core material laminates, bond laminate to MDF. Do not use plywood as a substrate.
 - e. Provide 3/4-inch backsplash covered with matching plastic laminate. Panel to extend to the entire length of base cabinet and return to all exposed ends.
 - 1) Shop install backsplashes.
 - 2) Mechanically fasten end splashes to countertops with steel brackets at 16 inches on center.
 - f. Coordinate with plumbing and electrical installation of pipes, drains, electrical outlets and fixtures.
 2. Solid-Surfacing Countertops: Fabricate components to greatest extent practical to sizes and shapes indicated. Form joints between components using manufacturer's

recommended joint adhesive without conspicuous joints. Reinforce with strip of solid polymer material, 2 inches wide.

- a. Backsplash: Coved.
 - b. Sidesplashes: Coved.
 - c. Edge Profile: Eased edge unless otherwise indicated.
 - d. Finish: Matte, gloss range of 5 - 20.
 - e. Color: As scheduled.
- O. Filler Panels: Provide 3/4-inch thick filler panels covered with matching plastic laminate to fill in all voids between cabinets and walls.
- P. Closet Shelving: Provide adjustable shelving unless noted as fixed on Drawings. Finish exposed and semi-exposed surfaces with thermoset decorative laminate. Finish bottom, vertical and top edges with 3 mm plastic edge facing. Install mid-support bracket for shelves over 48 inches long.
- Q. Library Shelving: Appleply construction with exposed edges. See drawings.
- R. Plastic Laminate, General: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners.
1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
 2. Balanced construction on all laminate-finished panels is mandatory. Unfinished stock surfaces, including all concealed surfaces and edges will not be permitted.
- S. Mechanically fasten back splash to countertops as recommended by laminate manufacturer at 16 inches on center.
- T. Provide cutouts for plumbing fixtures and fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.
- U. Shop glaze glass materials using the Interior Dry method specified in Section 08 8000.

2.11 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.
- C. Finish work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, Section 5 - Finishing for Grade specified and as follows:
 1. Transparent:
 - a. System - 5, Varnish, Conversion.
 - b. Sheen: Semigloss.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 INSTALLATION

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Use concealed joint fasteners to align and secure adjoining cabinet units.
- C. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- D. Secure cabinets to floor using appropriate angles and anchorages.
- E. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.
- F. Hanging Display System in Display Cases: Install in accordance with manufacturer's instructions. Adjust to level shelves.
 1. Do not field cut cable. All cable modifications are to be shop cut and the ends fused.

2. Provide cable supports spaced a maximum of 36 inches on center, with a maximum overhang of 6 inches on each end, unless otherwise indicated.
- G. Countertops and Backsplashes:
1. Secure countertops to grounds, furring and blocking with concealed or countersunk fasteners and by blind nailing. Fasteners shall not be exposed to view.
 2. Abut top and edge surfaces in one true plane, with internal supports placed to support joints in substrates and to avoid deflection. Use clamping devices to provide flush, hairline joints.
 3. Fasten countertop support brackets at maximum of 36-inches on center under unsupported counter surfaces. At corners, provide two brackets minimum - one at each unsupported corner, perpendicular to each wall surface. Provide even spacing of brackets beneath each countertop.
 4. Provide holes and cutouts neatly cut where required for mechanical and electrical services.
 5. Scribe backsplash at juncture with walls and other surfaces as recommended by AWI standards. Seal where backsplashes and endsplashes meet different surface materials with mildew-resistant silicone sealant as specified in Section 07 90 05 - Joint Sealers.
- H. Solid-Surfacing Countertops and Splashes:
1. Install components plumb, level and rigid, scribed to adjacent finishes.
 - a. Form field joints using manufacturer's recommended adhesives with joints inconspicuous in finished work.
 - b. Cut and finish component edges with clean, sharp returns.
 - c. Anchor securely to base cabinets or other supports.
 - d. Install countertops with no more than 1/8 inch sag, bow or other variation from a straight line.
 2. Coved backsplashes and sidesplashes:
 - a. Provide coved backsplashes and sidesplashes at all walls and adjacent millwork.
 - b. Fabricate radius cove at intersection of counters with backsplashes.
 - c. Adhere to countertops using manufacturer's standard color-matched joint adhesive.
 - d. Seal seam between backsplash and wall with specified sealant.
- I.

3.03 ADJUSTING

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

3.04 CLEANING

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

END OF SECTION

SECTION 07 1300
SHEET WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sheet membrane waterproofing.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete substrate.

1.03 REFERENCE STANDARDS

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension; 2006a (Reapproved 2013).
- B. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for membrane.
- C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and acceptable installation temperatures.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- F. Preconstruction Test Reports: For water samples taken at Project site along with recommendations resulting from these tests.
- G. Manufacturer's Statement: Waterproofing manufacturer's representative's written statement confirming that the waterproofing assembly has been installed according to applicable manufacturer's specifications and details, and is eligible for manufacturer's warranty.
 - 1. Statement must be submitted prior to covering of waterproofing Work.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual for selected system.
- B. Membrane Manufacturer Qualifications: Company specializing in waterproofing sheet membranes with three years experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum five years experience.
- D. Water Sample Test: Test a project site water sample, supplied to manufacturer by waterproofing contractor, to determine type of bentonite system (standard sodium bentonite or contaminate resistant sodium bentonite) to be utilized on the project. Manufacturer shall conduct test free of charge. Contractor is responsible for collection and shipment of one liter of actual site water, or, if water is not present at the site, one quart of earth from the lowest level on-site to be waterproofed. Water or earth should be shipped in uncontaminated, sealed plastic container to location identified by the manufacturer. Provide project name, city and state along with return address to forward test results.

1.06 FIELD CONDITIONS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.
- B. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

- C. Verify that areas to receive waterproofing are free of standing water, dirt, debris, loose material, voids and protrusions or deformations which could inhibit the application or performance of waterproofing.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water , except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.01 WATERPROOFING APPLICATIONS

- A. Composite HDPE/Bentonite Sheet Waterproofing: Use at walls and floor slab of elevator pit.
 - 1. Vertical Surfaces: Mechanically attached.
 - 2. Horizontal Surfaces: Mechanically attached.
- B. Acceptable Composite HDPE/Bentonite Manufacturers:
 - 1. Colloid Environmental Technologies Company; Product Voltex DS: www.cetco.com.
 - 2. Tremco Global Sealants; Product Paraseal LG: www.tremcosealants.com.

2.02 MEMBRANE MATERIALS

- A. Composite HDPE/Bentonite Sheet Membrane: Comprised of black/grey HDPE and granular bentonite with spun polypropylene fabric facing.
 - 1. Minimum Thickness: 0.150 inch
 - 2. Bentonite Minimum Weight: 1 pound/sq ft.
 - 3. Tensile Strength: 4,000 psi, measured in accordance with ASTM D412.
 - 4. Ultimate Elongation: 700 percent, measured in accordance with ASTM D412.
 - 5. Puncture Resistance: 169 lbs, measured in accordance with ASTM E154-88.
 - 6. Permeance: 0.031 Grains/hr ft in Hg measured in accordance with ASTM E96-92.
 - 7. Manufacturers:
 - a. CETCO; Product ____: www.cetco.com.
 - b. Tremco Global Sealants; Product Paraseal HDPE/Bentonite Sheet Membrane: www.tremcosealants.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Termination Bars: Aluminum; compatible with membrane and adhesives.
- C. Adhesives: As recommended by membrane manufacturer.
- D. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with sheet membrane.

2.03 ATTACHMENT MATERIALS

- A. At Concrete Substrate: Powder shot steel pins having minimum 3/4 inch diameter washers.
- B. At Masonry Substrate: Case-hardened steel cap masonry nails.

2.04 ACCESSORIES

- A. Waterstop: Flexible strip of bentonite waterproofing compound in coil form; designed specifically for vertical and horizontal joints in concrete construction.
- B. Products:
 - 1. CETCO; Waterstop-RX or equal.
 - 2. Tremco; SuperStop WaterStop
- C. Pipe Penetration Seals: Manufacturer's standard waterproof seals at conduit and pipe penetrations through wall to receive waterproofing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- C. Verify that items that penetrate surfaces to receive waterproofing are securely installed.

3.02 PREPARATION

- A. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- B. Seal cracks and joints with sealant using depth to width ratio as recommended by sealant manufacturer.

3.03 INSTALLATION - MEMBRANE

- A. Install membrane waterproofing in accordance with manufacturer's instructions.
- B. Roll out membrane. Minimize wrinkles and bubbles.
- C. Mechanically Fastened Membrane: Install mechanical fasteners in accordance with manufacturer's instructions.
- D. Overlap edges and ends and seal by method recommended by manufacturer, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- E. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
- F. Weather lap joints on sloped substrate in direction of drainage. Seal joints and seams.
- G. Install flexible flashings. Seal items penetrating through membrane with flexible flashings. Seal watertight to membrane.
- H. Seal membrane and flashings to adjoining surfaces. Install termination bar at all edges.

3.04 APPLICATION - VERTICAL SURFACES

- A. Install membrane sheets with masonry nails, starting at base of foundation.
- B. Install a continuous layer of waterproofing membrane with ends and edges lapped a minimum of 3 inches. Stagger end joints between membranes. Seal joints with permanent seam tape.
- C. Backfilled Wall Installation: Install membrane sheets in vertical or horizontal lifts with HDPE-side facing applicator to prepared surfaces conforming to manufacturer's requirements.
 - 1. Vertical installation: Securely fasten membrane 12 inches on center along top edge with sheet extending out onto footing surfaces 6 inches minimum, overlapping below-slab membrane 6 inches; install subsequent membrane sheets to overlap previous sheets 1-1/2 inches minimum; securely fasten membrane 24 inches on center through both sheets at overlaps; securely fasten 18 inches on center to tops of footing surfaces and horizontal shelves; apply seam tape to seam overlaps.
 - 2. Terminate membrane at finished grade with a metal termination bar fastened 12 inches on center. Embed top edge of membrane in 2 inches wide, by 1/2 inch thick layer of mastic.
- D. Elevator and Orchestra Pit Walls: Starting at bottom of wall, apply waterproofing panels with ends and edges lapped and with vertical joints staggered. Secure with fasteners or adhesive recommended in writing by manufacturer. Join to underslab membrane.

3.05 APPLICATION - BELOW SLABS

- A. Below Structural Slabs-on-Grade: Apply waterproofing membrane with HDPE side down and staple ends and edges.
 - 1. Install under elevator pits and orchestra pits and footings; or continue waterproofing through key joints between footings and pit walls, and extend a minimum of 8 inches up or beyond perimeter slab forms.
 - 2. Protect waterproofing from damage caused by reinforcing bar supports with sharp edges.

3. At Contractor's option or when recommended by membrane manufacturer due to weather conditions, membrane can be installed with HDPE side up subject to the following requirements:
 - a. Install a fully sealed polyethylene sheet below the bentonite membrane over stable, smoothed and compacted subgrade or mud slab. Lap joints of polyethylene sheet minimum 5 inches. Trim polyethylene sheet away from penetrations and terminations.
 - b. Comply with manufacturer's recommendations for installation of the membrane.
- B. Lap joints 3 inches. Secure laps to prevent displacement.
- C. Extend panels up vertical surfaces minimum 12 inches to overlap vertically applied bentonite panels.
- D. Lay joint seal continuously along and around protrusions, penetrations, and at abutting walls. Secure to prevent movement.

3.06

3.07 FIELD QUALITY CONTROL

- A. Inspection: Arrange for manufacturer's representative to inspect completed waterproofing installation before covering with other construction and provide written report that installation complies with manufacturer's written instructions.
 1. Remove and replace applications of bentonite waterproofing where inspection indicates that it does not comply with specified requirements.
- B. On completion of horizontal membrane installation, dam installation area in preparation for flood testing.
- C. Flood to minimum depth of 1 inch with clean water. After 48 hours, inspect for leaks.
- D. If leaking is found, remove water, repair leaking areas with new waterproofing materials as directed by Architect; repeat flood test. Repair damage to building.
- E. When area is proven watertight, drain water and remove dam.

3.08 PROTECTION

- A. Do not permit traffic over unprotected or uncovered membrane.

3.09 SCHEDULE

- A. Elevator Pits: Single panel waterproofing on walls, footing, and below floor slab; additional thicknesses at internal and external corners.

END OF SECTION

SECTION 07 1900
WATER REPELLENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water repellents applied to exterior masonry and concrete surfaces.
- B. Water repellents applied to interior masonry surfaces in selected locations.
- C. Pressure washing.
- D. Anti-Graffiti Coatings applied to surfaces receiving Water Repellents.

1.02 RELATED REQUIREMENTS

- A. Section 07 9005 - Joint Sealers.

1.03 REFERENCE STANDARDS

- A. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2013.
- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2013).
- C. ASTM D5095 - Standard Test Method for Determination of the Nonvolatile Content in Silanes, Siloxanes, and Silane-Siloxane Blends Used in Masonry Water Repellent Treatments; 1991 (Reapproved 2013).
- D. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; current edition, www.paintinfo.com.
- E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; 2004.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a meeting at least one week prior to starting work; require attendance of affected installers; invite Architect and Owner.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, limitations, and chemical composition.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention; cautionary procedures required during application.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Field Reports: Report whether manufacturer's "best practices" are being followed; if not, state corrective recommendations. Email report to Architect the same day as inspection occurs; mail report on manufacturer's letterhead to Architect within 2 days after inspection.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Water Repellent Material: Two gallons of the type installed.
- G. Manufacturer's Statement that water repellents and anti-graffiti coatings to be used on the Project are compatible with one another.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years experience.

- C. Manufacturer's Statement: Water repellent manufacturer's representative's written statement confirming that the water repellent has been installed according to applicable manufacturer's specifications and details, and is eligible for manufacturer's warranty.
- D. Warranty: Special warranties specified in this Section.
- E. Maintenance Data: Include procedures for stain removal, repairing surface, and cleaning.
- F. Test Application: Apply a finish sample for each type of water repellent and substrate required and of graffiti-resistant coating. Duplicate finish of approved sample. Test area for RILEM uptake test(s) can serve as finish samples.
 - 1. Locate each test application as directed by Architect.
 - 2. Size: 9 sq. ft. minimum.
 - 3. Final approval by Architect of water-repellent and graffiti-resistant coating application will be from test applications.
 - 4. Conduct RILEM test(s) to comply with requirements specified in Field Quality Control Article.

1.07 PERFORMANCE REQUIREMENTS

- A. Performance Requirements for CMU:
 - 1. No change in surface texture, no blotchy appearance
 - 2. ASTM C140 "Sampling and Testing of Concrete Masonry Units, Absorption" - 24 hour submersion test:
 - a. 99.4 percent reduction in water absorption.
 - 3. ASTM C642 "Specific Gravity, Absorption and Voids in Hardened Concrete" - 24 hour immersion:
 - a. 97.5 percent effective.
 - 4. ASTM D1653 "Moisture Vapor Permeability of Organic Coatings":
 - a. 68 g/sq ft/24 hours - 97 percent breathability.
 - 5. ASTM E514 "Water Permeance of Masonry."
 - a. 100 percent reduction in leakage rate over the control wall.
 - b. Control wall must have a leakage rate of at least 6.0 liters/hours.
- B. Performance Requirements for Graffiti-Resistant Coatings:
 - 1. Cleaning Cycles: Non-sacrificial, minimum 8 to 10 cleanings cycles without reapplication.
 - 2. Breathability: Greater than 95 percent water vapor transmission.
 - 3. Surface Appearance: No appreciable difference compared to non-coated surface.
 - 4. Ultraviolet light stability.

1.08 MOCK-UP

- A. Prepare representative surfaces 120 by 120 inch in size using specified materials and preparation and application methods on surfaces identical to those to be coated; approved mock-up constitutes standard for workmanship.
- B. Two mock-ups on concrete
- C. Two mock-ups on CMU
- D. One mock-up on each substrate to be water repellent only
- E. One mock-up one each substrate to be water repellent and anti-graffiti coating.
- F. Verify that water repellent will effectively repel moisture from surface, and will produce no surface stains. Verify compatibility, appearance, and adhesion.
- G. Locate where directed.
- H. Mock-up may remain as part of the Work.
- I. Mockup specified in Section 01 4000 and Section 04 20 00 - Unit Masonry may be used for sample and specified RILEM testing.
- J. For proposed substitutions, prepare side-by-side mock-ups of specified and substitute products

1.09 FIELD CONDITIONS

- A. Protect liquid materials from freezing.
- B. Do not apply water repellent when ambient temperature is lower than 50 degrees F or higher than 100 degrees F.
- C. Do not apply water repellents when wind velocity is higher than 10 mph.

1.10 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for [water repellency].
- C. Special Warranty for Water Repellents: Manufacturer's standard form in which manufacturer agree(s) to repair or replace materials that fail to maintain water repellency specified within specified warranty period.
 - 1. Loss of Water Repellency:
 - a. Concrete Masonry Units: 1.0 ml/20 minutes or greater (60 mph wind driven rain equivalent) using a water uptake tube meeting the requirements of RILEM Method II.
 - 2. Warranty Period: Ten years from date of Substantial Completion.
- D. Special Warranty for Graffiti-Resistant Coatings: Manufacturer's standard form of single source performance warranty in which manufacturer and Applicator agree(s) to repair or replace materials that fail to meet performance requirements specified within specified warranty period.
 - 1. All defective areas shall be retreated by the system manufacturer.
 - 2. Reseal areas where coating effectiveness does not meet the specified limits.
 - 3. Warranty Period: Ten years from date of Substantial Completion or 8 removal cycles, whichever occurs first.

1.11 EXTRA MATERIALS

- A. See Section 01 6000 - Product Requirements for additional provisions.
- B. Provide one gallon of water repellent
- C. Provide one gallon of anti-graffiti coating.
- D. Provide 2 gallons of manufacturer's recommended graffiti removal product.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Silane/Siloxane Water Repellents:
 - 1. Evonik Degussa Industries, Protectosil CHEM-TRETE; www.protectosil.com/protectosil
 - a. Concrete and Stone: 40 VOC or BSM 400
 - b. Concrete Masonry: PB VOC or PB 100
 - 2. Other Acceptable Water Repellent manufacturers:
 - a. Tnemec Company, Inc: www.tnemec.com.
 - b. BASF Construction Chemicals: www.buildingsystems.basf.com.
 - c. PROSOCO
- B. Anti-Graffiti Coating
 - 1. Evonik Degussa Industries, Protectosil ANTI-GRAFFITI; www.protectosil.com
- C. Substitutions: See Section 01 6000 - Product Requirements.
- D. Graffiti-Resistant Coatings same as water repellent manufacturer. No exceptions.

2.02 MATERIALS

- A. Water Repellent: Non-glossy, colorless, penetrating, water-vapor-permeable, non-yellowing sealer, that dries invisibly leaving appearance of substrate unchanged.
 - 1. Applications: Vertical surfaces and non-traffic horizontal surfaces.
 - 2. Maintains dry appearance when wetted.
 - 3. Products: Water-based siloxane, silane, or blend that reacts chemically with concrete and masonry; minimum 40 percent nonvolatile content.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify joint sealants are installed and cured.
- C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of water repellent.

3.02 PREPARATION

- A. Protection of Adjacent Work:
 - 1. Protect adjacent landscaping, property, and vehicles from drips and overspray.
 - 2. Protect adjacent surfaces not intended to receive water repellent.
- B. Prepare surfaces to be coated as recommended by water repellent manufacturer for best results.
- C. Do not start work until masonry mortar substrate is cured a minimum of 60 days.
- D. Pressure wash surfaces to be coated:
- E. Allow surfaces to dry completely to degree recommended by water repellent manufacturer before starting coating work.
- F. Verify that masonry joints found to be unsound, hollow or otherwise defective have been raked out to a depth of 1/2 inch and pointed with mortar.
- G. Verify that cracks that exceed 1/64 inch wide have been filled with pointing mortar.
- H. Remove oil and foreign substances with a chemical solvent that will not affect water repellent.
- I. Coordination: Verify compatibility of water repellent and graffiti-resistant coatings with curing compounds, patching materials, repair mortar, paints, sealants, etc. to be used on or adjacent to surfaces to be coated.

3.03 APPLICATION

- A. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended as producing the best results.
- B. Apply at rate recommended by manufacturer, continuously over entire surface.
- C. Apply number of coats recommended by manufacturer at their coverage rates, but not less than:
 - 1. Water Repellent: One coat
 - 2. Water Repellent and Anti-Graffiti: 1 coat water repellent following by 2 coats anti-graffiti coating.
- D. Remove water repellent from unintended surfaces immediately by a method instructed by water repellent manufacturer.
- E. Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.
- F. Provide manufacturer's field service representative to inspect preparation and application work for at least 3 hours on first day to ensure that manufacturer's "best practices" for preparation and application are being followed.

3.04 PREPARATION FOR GRAFFITI-RESISTANT APPLICATION

- A. Surface Preparation:
 - 1. Clean surfaces to receive coating of dirt, oil, graffiti, grease, laitance, and other contaminants. Clean all other surfaces by mid-pressure water (1500 psi) when required or recommended by manufacturer.
 - 2. Remove dirt, dust and materials that will interfere with the proper and effective application of the graffiti-resistant coating. Prepare the surfaces as recommended by the graffiti-resistant manufacturer.

3. Check the compatibility of all sealants and patching material to be used with the anti-graffiti coating.
4. Sealants, patching materials, and expansion joints shall have been installed and approved.

3.05 GRAFFITI-RESISTANT COATING APPLICATION

- A. Apply product in accordance with manufacturer's application instructions and recommendations for this specific project. Provide written copy of manufacturer's recommendations.
- B. Apply at temperature and weather conditions recommended by the manufacturer.
- C. Brush out surface residue thoroughly until they completely penetrate into the surface.
- D. Protect treated areas from rain and other surface water for a period of not less than four hours after application

3.06 FIELD QUALITY CONTROL

- A. Test Area: Before any water repellent application, perform the following field evaluation.
 1. Prepare a three foot by three foot area to be sprayed with the water repellent where directed by the Architect. Apply the water repellent at a rate of square foot per gallon as recommended by manufacturer to meet warranty requirements.
 2. After allowing five days for the sample to cure, run a RILEM uptake test on the treated area. Place one tube on the masonry and one tube on a mortar joint. Contact Architect at least one week prior to the application of the water repellent and the test.
 3. Repeat the test area procedure prior to application of graffiti-resistant coating.
- B. Coverage Spray Test: In the presence of Architect, hose down a dry, repellent-treated surface to verify complete and uniform product application. A change in surface color will indicate incomplete application.
 1. Notify Architect seven days in advance of the dates and times when surfaces will be tested.
 2. After surfaces have adequately dried, recoat surfaces that show water absorption.
 3. Run random RILEM tests on each elevation of structure.
- C. Manufacturer's Field Services: Furnish written certification that surface preparation method and final condition has manufacturer's approval and comply with warranty.
 1. Test Area: Furnish results of test area absorption on each type of substrate. Test results shall determine application rate.

3.07 DISPOSAL

- A. Contain and neutralize excess water repellent to Department of Environmental Quality standards.
- B. Dispose of neutralized excess repellent properly. Do not discharge into Sanitary Sewer or Storm Sewer Systems.

3.08 SCHEDULE

- A. Apply Water Proofing and Anti-Graffiti Coating to vertical surfaces of all exterior Concrete Masonry and Concrete that is not within a secure fenced area. Height of application: from ground level to 10' - 8" above finished floor.
- B. Apply Water Proofing to vertical surfaces of all other exterior Concrete Masonry and Concrete.
- C. Apply Water Proofing to vertical surfaces on exposed faces of interior Concrete Masonry as follows:
 1. Up to a height of 10 ft. 8 inches above first floor level.
 2. Full height both sides of wall at north and south sides of Media Center.

END OF SECTION

SECTION 07 2100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Rigid Board Insulation within double wythe Concrete Masonry Unit (CMU) wall cavity.
- B. Rigid Board Insulation applied continuously over exterior sheathing of frame walls.
- C. Batt Insulation within stud wall framing.
- D. Rigid Board Insulation at concrete slab edge and below heated concrete slabs.
- E. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.
- F. Vapor retarder.
- G. Minimally expanding foam insulation

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Insulation below heated concrete slabs.
- B. Section 04 2000 - Unit Masonry: Cavity wall insulation, Insulation holding disks furnished with Masonry Veneer Anchors. Coordination of Veneer Anchor layout with insulation.
- C. Section 07 2500 - Weather Barriers: Separate air barrier and vapor retarder materials. Sealing of fasteners penetrating weather barrier.
- D. Section 07 4113 - Metal Roof Panels: Insulation below metal roofing.
- E. Section 07 4213 - Metal Wall Panels: Furring connected to subgirts below Metal Wall Panels.
- F. Section 07 4623 - Wood Siding: Furring connected to subgirts below wood siding.
- G. Section 07 5400 - Thermoplastic Membrane Roofing: Insulation specified as part of roofing system.
- H. Section 09 2116 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

1.03 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.
- B. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2014.
- C. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.
- D. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- E. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.
- F. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2012.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.

1.04 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

1.05 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Insulation Under Concrete Slabs: Extruded polystyrene board.
- B. Insulation at Perimeter of Foundation: Expanded polystyrene board.
- C. Insulation Inside Masonry Cavity Walls: Mineral Fiber board.
- D. Insulation Over Metal Stud Framed Walls, Continuous: Mineral Fiber board.
- E. Insulation in Metal Framed Walls: Batt insulation with separate vapor retarder.
- F. Insulation over steel roof deck to receive Metal Roofing: Mineral Fiberboard

2.02 FOAM BOARD INSULATION MATERIALS

- A. Expanded Polystyrene (EPS) Board Insulation: ASTM C578, Type XI; with the following characteristics:
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 3. Board Size: 48 x 96 inch.
 - 4. Board Thickness: Approximately 3 inches.
 - 5. Board Edges: Square.
 - 6. Water Absorption: 4 percent by volume, maximum.
 - 7. Board Density: 0.7 lb/cu ft.
 - 8. Thermal Resistance: R 15
 - 9. Compressive Resistance: 10 psi.
 - 10. Location: At vertical edges of concrete slabs between wall and CMU veneer.
 - 11. Manufacturers:
 - a. Dow Chemical Co, Product: Styrofoam Square Edge; www.dow.com.
 - b. Owens Corning Corp, Product: Foamular Square Edge; www.owenscorning.com.
 - 12. Substitutions: See Section 01 6000 - Product Requirements.
- B. Extruded Polystyrene (XPS) Board Insulation: ASTM C578, Type XII; extruded polystyrene board with either natural skin or cut cell surfaces; with the following characteristics:
 - 1. Type: Suitable for use placed on top of subgrade below poured in place concrete slabs.
 - 2. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
 - 3. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 4. Board Size: 48 x 96 inch.
 - 5. Board Thickness: Approximately 2 inches.
 - 6. Board Edges: Square.
 - 7. Thermal Resistance: R 10
 - 8. R-Value per Inch: 5 per inch of thickness maintained over the life of the product in use.
 - 9. Compressive Resistance: 15 psi.
 - 10. Board Density: 1.20 lb/cu ft.
 - 11. Water Absorption: 0.3 percent by volume, maximum.
 - 12. Manufacturers:
 - a. Dow Chemical Co, Product: Styrofoam Square Edge; www.dow.com.
 - b. Owens Corning Corp, Product: Foamular 250 Square Edge; www.owenscorning.com.
 - 13. Substitutions: See Section 01 6000 - Product Requirements.
 - 14. Location: Continuous horizontal insulation below heated concrete slabs
- C. Polyisocyanurate Board Insulation with Facers Both Sides: Rigid cellular foam, complying with ASTM C1289; Type II, Class 1, cellulose felt or glass fiber mat both faces; Grade 1.
 - 1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
 - 2. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
 - 3. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 4. Compressive Strength: 16 psi
 - 5. Board Size: 16 x 60 inch. to fit masonry veneer anchor spacing.

6. Board Thickness: approximately 3 inches. Adequate to retain one inch clear air space between insulation and veneer.
7. Thermal Resistance: R-value of 19.
8. Board Edges: Square.
9. Installation: Disc washers provided by Masonry Veneer Anchors.
10. Manufacturers:
 - a. Atlas Wall CI Board, division of Atlas Roofing Corporation; EnergyShield: www.atlasroofing.com.
 - b. Dow Chemical Co: www.dow.com.
 - c. GAF: www.gaf.com.
 - d. Rmax Insulation Products: www.rmaxinc.com
11. Substitutions: See Section 01 6000 - Product Requirements.
12. Location: Within CMU cavity wall between structural CMU and CMU veneer.

2.03 FIBER BOARD INSULATION MATERIALS

- A. Mineral Fiber Board Insulation: Rigid or semi-rigid mineral fiber, ASTM C612 or C553; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
 1. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
 2. Thermal Resistance (R-value): 4.2 deg F sq ft/Btu at 75 degrees F, minimum, when tested according to ASTM C518.
 3. Thermal Resistance, Size, and Location:
 - a. Continuous insulation over sheathing at metal framed walls at masonry veneer: R9, 2 inch thickness, 24 inch by 60 inch board size. Disc washers provided by Masonry Veneer Anchors.
 - b. Continuous insulation over sheathing at metal framed walls at all other siding: R9, 2 inch thickness, 24 inches by 60 inches. Installation type: Friction fit.
 - c. Continuous insulation over concrete masonry units with wood or metal siding: R18, 4 inch thickness, 24 inches by 60 inches. Installation type: Friction fit.
 - d. Continuous insulation over sheathing at one hour fire rated metal framed walls: R4.5, 1 inch thickness, 24 inches by 60 inches. Installation type: Friction fit.
 4. Maximum Density: 8.0 lb/cu ft.
 5. Manufacturers:
 - a. Thermafiber, Inc: www.thermafiber.com.
 - b. ROXUL, Inc; CavityRock DD: www.rspec.com.
 - c. ROXUL, Inc; CavityRock MD: www.rspec.com.
 6. Substitutions: See Section 01 6000 - Product Requirements.

2.04 BATT INSULATION MATERIALS

- A. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
 1. Where not covered by wall finish provide foil facing on one side; with flame spread index of 25 or less, when tested in accordance with ASTM E84.
 2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
 3. Thermal Resistance: R of 19.
 4. Installation type: Friction fit.
 5. Manufacturers:
 - a. Thermafiber, Inc: www.thermafiber.com.
 - b. ROXUL, Inc; ComfortBatt: www.rspec.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.05 INSULATION VAPOR RETARDERS

- A. Batt Insulation Vapor Retarder: Polyamide film vapor retarder that changes permeance with change in humidity; Certainteed Membrane, or approved.
 1. Vapor Retarder Class: Class II.
 2. Water Vapor Permeance:

- a. ASTM E 96, dry cup method: 1.0 perms (57ng/Pa*s*m2) or less.
- b. ASTM E 96, wet cup method: 10.0 perms (1144ng/Pa*s*m2) or greater.
3. Fire Hazard Classification: ASTM E 84:
 - a. Maximum Flame Spread Index: 20.
 - b. Maximum Smoke Developed Index: 55.
4. Extent: Over thermal batt insulation at all walls except where not covered by wall finish.
5. Manufacturers:
 - a. Certainteed Corporation: www.certainteed.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.06 FOAM SEALANT

- A. Provide one of the following:
 1. One-component, minimally expanding, low pressure-build, polyurethane foam sealant.
 - a. Locations of Use: At perimeter window and door shim spaces and crevices in exterior wall and roof.
 - b. Products: Great Stuff Pro.
 - 1) Substitutions: See Section 01 60 00 - Product Requirements.
 2. Closed cell, medium density spray applied polyurethane foam insulation and air barrier.
 - a. Locations of Use: At perimeter window and door shim spaces and crevices in exterior wall and roof.
 - b. Products: BASF Walltite ECO v.2: www.walltite.com.
 - 1) Substitutions: See Section 01 60 00 - Product Requirements.
- B. Foam insulation at voids or cavities in exterior wall or roof:
 1. Closed cell, medium density spray applied polyurethane foam insulation and air barrier.
 - a. Locations of Use: At voids and crevices in exterior wall and roof.
 - b. Products: BASF Walltite ECO v.2: www.walltite.com.
 - 1) Substitutions: See Section 01 60 00 - Product Requirements.

2.07 ACCESSORIES

- A. Tape: Polyethylene self-adhering type, mesh reinforced, 2 inch wide, compatible with vapor retarder.
- B. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.
- C. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
 1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.
- D. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.
- B. Verify substrate surfaces are flat, free of irregularities.
- C. Verify that Weather Barrier System has been fully installed.

3.02 GENERAL

- A. Do not damage Weather Barrier system or disturb substrate.
- B. Use only the required number of fasteners to reduce penetrations through Weather Barrier System.

3.03 BOARD INSTALLATION AT HEATED FOUNDATION PERIMETER

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

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

3.04 BOARD INSTALLATION BELOW HEATED CONCRETE SLABS

- A. Verify that subgrade is level and free of debris suitable for installation of insulation.
- B. Install boards continuously with tight joints.

3.05 BOARD INSTALLATION AT METAL STUD FRAMED EXTERIOR WALLS

- A. Installation at frame walls to receive Masonry Veneer
 - 1. Secure insulation by installing insulation retainer discs provided by Masonry Veneer Anchor installer.
 - 2. Fit boards tight to one another.
 - 3. Cut and fit boards around irregularities and penetrations.
 - 4. Orient boards horizontally to match Masonry veneer tie spacing.
- B. Install boards vertically on walls.
- C. Installation at frame walls to receive other siding materials.
 - 1. Install Zee furring vertically by screw fastening to metal studs.
 - 2. Align Zee furring with metal studs at 24 inches on center unless other wise shown. Provide Zee furring at corners and around openings as needed to support subsequent trades.
 - 3. Do not install insulation boards until Weather Barrier System has been completed to seal over Zee fasteners.
 - 4. Fit boards tightly to Zee furring.
 - 5. Butt edges and ends tightly to adjacent boards and to protrusions.
 - 6. Do not use impaling pins.
- D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.06 BOARD INSTALLATION AT MASONRY CAVITY WALLS

- A. Coordinate with placement of seismic veneer ties.
 - 1. Refer to Section 04 20 00 - Unit Masonry.
- B. Install boards to fit snugly between wall ties.
- C. Secure boards by installing insulation retainer discs provided by Masonry Veneer Anchor system.
- D. Install boards horizontally on walls.
 - 1. Butt edges and ends tightly to adjacent boards and to protrusions.
- E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.07 BOARD INSTALLATION UNDER CONCRETE SLABS

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Prevent insulation from being displaced or damaged while placing slab.

3.08 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

- E. Install vapor retarder in continuous sheets over the inside face of all exterior wall surfaces and at bottom of batt ceiling insulation. Lap and seal sheet retarder joints over framing member face.
- F. Tape seal tears or cuts in vapor retarder.
- G. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.
- H. Seal all penetrations through Vapor Retarder with spray foam insulation or tape as recommended by Vapor Retarder Manufacturer.
- I. Install foam sealant at perimeters of doors and windows and shim spaces and crevices in exterior wall and roof.
 - 1. Isolate foam sealant from building interior with a layer of gypsum board or other thermal barrier as applicable to conditions of installation

3.09 PROTECTION

- A. Do not permit installed insulation or vapor barriers to be damaged prior to its concealment.
- B. Protect Weather Barrier System from damage.
- C. Repair damage to Weather Barrier System caused by work of this section.

END OF SECTION

**SECTION 07 2500
WEATHER BARRIERS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water-Resistive Barrier: Under exterior wall cladding, over sheathing or other substrate; not air tight or vapor retardant.
- B. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.
- C. Rainscreen steel subgirts, Zee Subgirts.
- D. Building envelope pre-installation meeting and mock up requirements.
- E. Neoprene tape: Thermal barrier between Weather Barrier and Z furring.

1.02 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Weather barrier application over structural concrete masonry and veneer ties.
- B. Section 07 2100 - Thermal Insulation: Installed between Z subgirts, friction fit.
- C. Section 07 2100 - Thermal Insulation: Vapor retarder installed on interior face of metal framed walls.
- D. Section 07 4113 - Metal Roof Panels: Roof weather barrier and insulation.
- E. Section 07 4213 - Metal Wall Panels: Furring over subgirts.
- F. Section 07 4233 - Exterior Solid Phenolic Rainscreen Panel: Furring over subgirts.
- G. Section 07 4623 - Wood Siding: Furring over subgirts.
- H. Section 07 5400 - Thermoplastic Membrane Roofing: Vapor retarder installed as part of roofing system.
- I. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.
- J. Section 07 9005 - Joint Sealers: Sealant materials and installation techniques.

1.03 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.

1.04 REFERENCE STANDARDS

- A. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test; 2013.
- B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2013.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.
- D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2013.
- E. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.
- F. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers; ICC Evaluation Service, Inc.; 2013.
- G. ICC-ES AC212 - Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing; ICC Evaluation Service, Inc.; 2012.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics, performance criteria, and limitations.
- C. Shop Drawings: Provide drawings of special joint conditions.
- D. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

1.06 PRE-INSTALLATION MEETING

- A. Hold a pre-installation conference, one week prior to start of weather barrier installation. Attendees shall include General Contractor, Architect, Weather Barrier Installer, Sheet Metal Installer, Owner's Representative, and Weather Barrier Manufacturer's Designated Representative.
- B. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.07 MOCK-UP

- A. Install weather barrier and accessories in a mock-up to be reviewed by the owner, architect, and contractor prior to the installation of the systems listed. Mock-up may not remain as part of the work.
- B. Contact manufacturer's designated representative prior to weather barrier assembly installation, to perform required mock-up visual inspection and analysis as required for warranty.
- C. General Contractor to coordinate integration of weather barrier system, exterior wall cladding and trim, furring, sheet metal flashing, window, sealant, and related accessories into the mock-up.

1.08 WARRANTY

- A. Provide manufacturer's standard 10 year material warranty for air barrier membrane materials, sealant, and flashing membranes.

1.09 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

- A. Water-Resistive Barrier: Provide on exterior walls under exterior cladding.
- B. Air Barrier:
 - 1. On outside surface of sheathing of exterior walls use air barrier coating.

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

- A. Air Barrier Membrane Assembly: Combination of air barrier material and accessories assembled to provide a complete, integrated assembly, tested for air leakage in accordance with ASST E2357. Evaluated and approved by the Air Barrier Association of America.
 - 1. Components: Includes Air Barrier Sheet, Transition Membranes, Flexible Flashings, Sealants, and other accessories required for complete air barrier system.
 - 2. Assembly Air Permeance: 0.04 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2357.
 - 3. Performance: Provide an air barrier 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.

- B. Air Barrier Sheet, Self-Adhered:
1. Air Permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
 2. Water Vapor Permeance: 20 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
 3. Water Penetration Resistance: Withstand a water head of 21 inches, minimum, for minimum of 5 hours, when tested in accordance with AATCC 127.
 4. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 250 or less, when tested in accordance with ASTM E84.
 5. Water Resistance: Comply with applicable water-resistive requirements of ICC-ES Acceptance Criteria AC38.
 6. Products:
 - a. Henry Blueskin VP 160.
 - b. Grace Perm-a-Barrier.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- C. Air Barrier Coating Assembly: Combination of air barrier material and accessories assembled to provide a complete, integrated assembly, tested for air leakage in accordance with ASST E2357; evaluated and approved by the Air Barrier Association of America.
1. Components: Includes Air Barrier Coating, Straight Flashing, Flexible Flashing, Sealants, and other accessories required for complete air barrier system.
 2. Assembly Air Permeance: 0.04 cubic feet per square foot, maximum, when tested in accordance with ASTM E2357.
- D. Air Barrier Coating: Fluid-applied, vapor permeable, elastomeric waterproofing membrane.
1.
 - a. Coating Material: Water-based acrylic or polymer-modified bitumen, with VOC content of zero. Suitable for application over plywood substrates.
 - 1) Dry Film Thickness: 10 mils (0.010 inch), minimum, and sufficient to achieve specified permeability.
 - b. Water Vapor Permeance: 10 perms, minimum, when tested in accordance with ASTM E96/E96M.
 - c. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - d. Nail Sealability: Pass, when tested in accordance with ASTM D1970.
 - e. VOC Content: 100 g per L or less.
 - f. Code Acceptance: Comply with applicable requirements of ICC-ES Acceptance Criteria AC212.
 - g. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
 - 1) Products:
 - (a) BASF Corporation; ENERSHIELD-HP: www.enershield.basf.com.
 - (b) Grace Construction Products; Perm-A-Barrier VP: www.graceconstruction.com.
 - (c) Henry Company; Air Bloc 31: www.henry.com.
 - (d) W.R. Meadows, Inc.; Air-Shield LMP: www.wrmeadows.com.
 - (e) Substitutions: See Section 01 6000 - Product Requirements.

2.03 RAINSCREEN SUBGIRTCOMPONENTS

- A. Zee Subgirts: Cold formed Z shaped steel.
1. Material: Fabricated from ASTM A653/A653M steel sheet, with G90/Z275 hot dipped galvanized coating.
 2. Standards: Comply with Steel Stud Manufacturer Association (SSMA).
 3. Depth of web: As indicated on drawings.
 4. Width of Leg: 2 inches min.

5. Gage: 12 gage
6. Shape: Z shape, unpunched web and flange.
7. Fasteners: Self-drilling. Comply with AISA Specifications for Screw Connections
 - a. Size: #8 SMS
 - b. Galvanized or Stainless Steel
 - c. Conform to SAE J78

2.04 SEALANTS

- A. Type compatible with air barrier material and part of approved assembly.

2.05 ACCESSORIES

- A. Neoprene Tape:
 1. Adhesive backed tape able to create thermal break between weather barrier system and Zee furring.
 2. Size: 1/8 inch thick by 3 inches wide.
 3. Material: Neoprene foam tape compatible with weather barrier system.
 4. Extent: Apply continuously over weather barrier system behind Zee furring.
 5. Manufacturer: As recommended by manufacturer of weather barrier system.
- B. Opening flashings, sill flashings, through-wall flashings, and transition membranes: Type compatible with air barrier material and part of manufacturer's approved assembly.
- C. Primers, Cleaners, and Sealants: As recommended by membrane manufacturer, appropriate to application, and compatible with adjacent materials.
- D. Fasteners:
 1. Steel Frame Construction: Similar to DuPont™ Tyvek® Wrap Cap Screws: 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap or manufacturer approved 1-1/4" or 2" metal gasketed washer.
 2. Wood Frame Construction: Similar to DuPont Tyvek® Wrap Caps: #4 nails with large 1-inch plastic cap fasteners, or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.
- D. Self-Adhesive Sheets:
 1. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
 2. Lap sheets shingle-fashion to shed water and seal laps air tight.
 3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that all laps are firmly adhered with no gaps or fishmouths.
 4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
 5. Seal membrane terminations, heads of mechanical fasteners, around penetrations, piping, electrical and other apparatus extending through the water resistive air barrier

- E. Coatings:
 - 1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
 - 2. Where exterior masonry veneer is to be installed, install masonry anchors before installing weather barrier over masonry; seal around anchors air tight.
 - 3. Mastic Coating: Install by trowel or roller to minimum thickness of 1/4 inch; use sheet seal to join to adjacent construction, seal air tight with sealant.
 - 4. Use flashing to seal to adjacent construction and to bridge joints.
- F. Openings and Penetrations in Exterior Weather Barriers:
 - 1. Install assembly components as indicated on drawings and according to the following.
 - 2. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
 - 3. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with at least 4 inches wide; do not seal sill flange.
 - 4. At openings to be filled with non-flanged frames, seal weather barrier to all sides of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
 - 5. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
 - 6. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
 - 7. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.
- G. Neoprene Tape: Align with face of stud and Zee furring. Apply continuously between Zee furring and weather barrier. Apply manufacturer recommended primer at areas to receive tape.
- H. Zee Furring
 - 1. Locate as indicated on drawings.
 - 2. Align with neoprene tape. Do not allow direct contact between Zee furring and weather barrier.
 - 3. Fasten to studs, at 24 inches on center max.
 - 4. Install fasteners to avoid damage to weather barrier.
 - 5. After installation of Zee, seal fastener penetration using manufacturer's recommended weather barrier tape or sealant.

3.04 FIELD QUALITY CONTROL

- A. Do not cover installed weather barriers until required inspections have been completed.
- B. Take digital photographs of each portion of the installation prior to covering up.

3.05 PROTECTION

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

3.06 SCHEDULE

- A. Use fluid applied Coating System at double wythe masonry walls
- B. Use Sheet System elsewhere.

END OF SECTION

**SECTION 07 4113
METAL ROOF PANELS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural roofing system of preformed steel panels.
- B. Metal Soffit Panels
- C. Thermal roof insulation.
- D. Fastening system.
- E. Zee furring at metal roofing applied to walls.
- F. Snow and ice retention system.
- G. Factory finishing.
- H. Accessories and miscellaneous components.

1.02 RELATED REQUIREMENTS

- A. Section 05 1200 - Structural Steel Framing: Roof framing.
- B. Section 05 3100 - Steel Decking: Substrate below metal roofing.
- C. Section 07 2100 - Thermal Insulation: wall insulation.
- D. Section 07 4213 - Metal Wall Panels: Preformed wall panels.
- E. Section 07 7273 - Fall Arrest Roof Anchors
- F. Section 07 9005 - Joint Sealers: Field-installed sealants.

1.03 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2011.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.
- C. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2005 (Reapproved 2012).
- D. ASTM E2140 - Standard Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head.

1.04 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures for submittal procedures.
- B. Delegated-Design Submittal: For metal roof panel assembly indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 - Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record.
- C. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Summary of test results, indicating compliance with specified requirements.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Specimen warranty.
- D. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
 - 1. Show work to be field-fabricated or field-assembled.
 - 2. Include structural analysis signed and sealed by qualified structural engineer, indicating conformance of roofing system to specified loading conditions, with attachment schedule specific to project.

- a. Submit engineering calculations defining cladding loads for all roof areas based on specified building codes, allowable clip loads, and required number of fasteners to secure the panel clips to the designated substructure.
 - b. Compute uplift loads on clip fasteners with full recognition of prying forces and eccentric clip loading.
 - c. Calculate holding strength of fasteners in accordance with submitted test data provided by fastener manufacturer based on length of embedment and properties of materials.
- E. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each roofing system specified, submit samples of minimum size 12 inches square, representing actual roofing metal, thickness, profile, color, and texture.
1. Include typical panel joint in sample.
 2. Include typical fastening detail.
- G. Coordination with systems mounted to metal roof panels:
1. Provide letter from roofing manufacturer stating that the panels and panel attachment to structure is sufficient to accommodate the vertical, lateral, snow, wind, and uplift loads of the photovoltaic panel system. Those loads will be provided by the system manufacturer.
 2. Provide stamped and sealed engineering calculations if required by the local jurisdiction.
- H. Test Reports: Indicate compliance of metal roofing system to specified requirements.
- I. Field Quality control reports.
- J. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in the manufacture of roofing systems similar to those required for this project.
1. Not less than 5 years of documented experience, and approved by manufacturer.
- B. Installer Qualifications: Company trained and authorized by roofing system manufacturer.
1. The roofing applicator shall be thoroughly experienced and upon request be able to provide evidence of having at least 5 years successful experience installing metal panel roofing systems similar to the specified system and having installed at least four roofing application of similar systems of equal or greater size within the last 12 months.
 2. Crew Experience and Supervision: Provide adequate number of experienced workmen regularly engaged in this type of work who are skilled in the application techniques of the materials specified. Provide at least one thoroughly trained and experienced foreman/superintendent on the job at all times roofing work is in progress.
- C. Perform Work in accordance with NRCA Roofing Manual and manufacturer's instructions.
- D. Manufacturer's Site Inspections: Metal roof panel manufacturer's technical representative shall make site inspection before, during and after installation of Work and at frequency as required to enable manufacturer to issue specified warranty.
1. Perform and document inspection by designated and properly qualified technical representative of metal roof panel manufacturer.
 2. Verify that materials and work meet specified requirements.
 3. Should Work and/or materials not meet specified requirements, promptly advise Architect with recommended course of actions.

1.06 MOCK-UP

- A. Visual Mock-Up: Construct mock-up, 10 by 10 feet or larger as required to show at least two pattern repeats.
1. Show integration with drip edge, gutter and fascia.
 2. Show sidewall interface with insulation and substrates.

1.07 PREINSTALLATION CONFERENCE

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, testing and inspecting agency representative, metal roof panel Installer, metal roof panel manufacturer's representative, deck Installer, and installers whose work interfaces with or affects metal roof panels including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to metal roof panel installation, including manufacturer's written instructions.
 - 3. Review mock-up of metal panel drip edge and sidewall interface with insulation and substrate.
 - 4. Examine deck substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 - 5. Review structural loading limitations of deck during and after roofing.
 - 6. Review flashings, special roof details, roof drainage, roof penetrations and condition of other construction that will affect metal roof panels.
 - 7. Review roof observation and repair procedures after metal roof panel installation.
 - 8. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Provide strippable plastic protection on prefinished roofing panels for removal after installation.
- B. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.
- C. Protect products and accessories from damage and discoloration during transit and at project site. Store sheets and components in dry storage area to prevent condensation.
- D. Do not overload roof structure with stored materials. Do not permit material storage or traffic on completed roof surfaces

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 20 year period from date of Substantial Completion.
- C. Warrant steel panel core substrate against rupture, structural failure or perforation due to exposure to normal atmospheric corrosion within a 25 year period after Substantial Completion.
- D. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of roofing system, including agreement to repair or replace roofing that fails to keep out water within specified warranty period of 20 years from date of Substantial Completion.
 - 1. The warranty shall have a maximum 2 year installer's obligation for weathertightness from Substantial Completion and shall not be tied to or reset by the occurrence of leaks within that or any other period.
 - 2. Pro-rated System Warranties are not acceptable.
 - 3. The warranty shall be from the manufacturer of the metal panel, not a marketer. No regraded products shall be accepted.
 - 4. The warranty shall include the full assembly, including, but not limited to: metal panels, associated flashings, insulation, SAHTS, vapor barrier, fasteners, clips, etc.
 - 5. The warranty shall contain no exclusion or limitation for improper installation.
 - 6. Warranty coverage shall not be excluded for roof slopes down to and including 1:12.
 - 7. Manufacturer shall ultimately provide warranty responses in the event installer/contractor fails to.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Design is based on Span-Lok HP, manufactured by AEP-Span.
- B. Other acceptable manufacturers are:
 - 1. Architectural Metal Solutions; AMS Armor Lock: www.ams-wa.com.
 - 2. Bryer Company; TBC-Superseam: www.thebryercompany.com.
 - 3. Fabral; PowerSeam: www.fabral.com.
- C. Substitutions: See Section 01 6000 - Product Requirements.

2.02 STRUCTURAL METAL ROOF PANELS

- A. General Performance: Metal roof panels shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Delegated Design: Design metal roof panel assembly, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Oregon, using performance requirements and design criteria indicated.
- C. Structural Metal Roofing: Provide complete roofing assemblies, including roof panels, clips, fasteners, connectors, and miscellaneous accessories, tested for conformance to the following minimum standards:
 - 1. Structural Design Criteria: Provide panel assemblies designed to safely support design loads at support spacing indicated, with deflection not to exceed 1/180 of the span when tested in accordance with ASTM E1592.
 - a. Dead Loads: Weight of roofing system, and roof-mounted components where indicated.
 - b. Live Loads: As required by ASCE 7.
 - c. Snow Load: 140 psf (Drift)
 - 2. Air Infiltration: Panel to meet the following standard when tested in accordance with ASTM E1680:
 - 3. With factory-applied continuous sealant 0.08 cfm/lineal ft. of panel seam at 1.57 psf positive pressure, and 0.13 cfm/lineal ft. of panel seam at 1.57 negative pressure.
 - 4. Water Penetration: No water penetration when tested according to procedures and recommended test pressures of ASTM E1646.
 - a. With factory-applied continuous sealant, no leakage at 6.24 psf.
 - 5. Water Submersion: No water penetration when tested according to procedures and static water head pressure of ASTM E2140.
 - a. Provide factory applied continuous sealant, and factory applied or field applied sealant at clip interfaces and all panel terminations.
 - 6. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F.
 - 7. Metal Panels: Factory- or field-formed panels with factory-applied finish.
 - a. Type: Single skin, uninsulated.
 - b. Steel Panels: One of the following:
 - 8. Zinc-coated SS (structural steel) sheet conforming to ASTM A653/A653M; minimum G90 galvanizing.
 - 9. Aluminum-zinc alloy-coated SS (structural steel) sheet conforming to ASTM A792/A792M; minimum AZ50 coating.
 - 10. Steel Thickness: Minimum 22 gage.
 - 11. Profile: Standing seam, with minimum 2.0 inch seam height; concealed fastener system for integral standing seam-shaped lap seam.
 - a. Provide 180 degree double locked seams.
 - 12. Coverage: 16 inches.
 - 13. Texture: Smooth. No stiffening ribs or striations.
 - 14. Length: Full length of roof slope, without lapped horizontal joints.

2.03 METAL SOFFIT PANELS

- A. Design is based on Prestige Series, manufactured by AEP SPAN.
- B. Soffit Panels: Factory-formed panels with factory applied-finish.
- C. Profile: Flat - no pencil ribs
- D. Dimensions:
 - 1. Nominal exposed width: 12"
 - 2. Depth: 1.5"
- E. Base Metal Material: Steel, conforming to ASTM A792 Zinalume, minimum yield 40,000psi
- F. Steel Thickness: 24 gage
- G. Length: Maximum possible length to minimize lapped joints. Where lapped joints are unavoidable, space laps so that each sheet spans over three or more supports.
- H. Accessories: Hat channels and support framing as shown on drawings.

2.04 METAL ROOFING ATTACHMENT SYSTEM

- A. Concealed System: Provide manufacturer's standard galvanized steel concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.
 - 1. Anchor clips shall be tested to establish that the clips will have 75% of the material thickness remaining after 100,000 cycles of the full range of motion.
 - 2. Clips: 2 piece, self centering allowing for thermal movement of panels.
- B. Bearing Plates: 24 gauge 4"x6" Zinalume coated steel bearing plate.

2.05 SECONDARY FRAMING

- A. Zee Furring: Cold formed Z shaped steel.
 - 1. Material: Fabricated from ASTM A653/A653M steel sheet, with G90/Z275 hot dipped galvanized coating.
 - 2. Standards: Comply with Steel Stud Manufacturer Association (SSMA).
 - 3. Depth of web: As indicated on drawings.
 - 4. Width of Leg: 2 inches min.
 - 5. Gage: 12 gage
 - 6. Shape: Z shape, unpunched web and flange.
 - 7. Fasteners: Self-drilling. Comply with AISA Specifications for Screw Connections
 - a. Size: #8 SMS
 - b. Galvanized or Stainless Steel
 - c. Conform to SAE J78
 - 8. Accessories: Steel strap material to match Zee furring. 2 inches wide by 12 gauge unless otherwise indicated.

2.06 PANEL FINISH

- A. Fluoropolymer Coating System: Manufacturer's standard multi-coat thermocured coating system, including minimum 70 percent fluoropolymer color topcoat with minimum total dry film thickness of 0.9 mil; color and gloss as scheduled.
- B. Underside finish: Manufacturer's standard off-white enamel.
- C. Color: As scheduled.

2.07 ACCESSORIES AND MISCELLANEOUS ITEMS

- A. Miscellaneous Sheet Metal Items: Provide flashings, trim, moldings, and closure strips of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.
- C. Sealants: As specified in Section 07 9005.

1. Exposed sealant must cure to rubber-like consistency.
 2. Concealed sealant must be non-hardening type.
 3. Seam sealant must be factory-applied, non-skinning, non-drying type.
- D. Sealant Tape: Pressure sensitive, 100 percent solid, sealing tape with a release paper backing. Provide permanently elastic, non-sagging, non-toxic, non-staining tape sealant approved by roofing manufacturer.
- E. Penetration Flashing: EPDM flashing as approved by roofing manufacturer.
1. Available Product: Dektite Ezi-Seal by ITWBuildex: www.itwbuildex.com.
 2. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Mineral Fiber Board Insulation: Rigid or semi-rigid mineral fiber, ASTM C612 or C553; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
1. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
 2. Thermal Resistance (R-value): 4.2 deg F sq ft/Btu at 75 degrees F, minimum, when tested according to ASTM C518.
 3. Thermal Resistance, Size, and Location:
 - a. Continuous insulation over metal deck and below metal roofing: R30 consisting of 2 layers, 6 inch total thickness, largest board size practical. Installation type: Screws and discs to metal roof deck.
 4. Maximum Density: 8.0 lb/cu ft.
 5. Manufacturers:
 - a. Thermafiber, Inc: www.thermafiber.com.
 - b. ROXUL, Inc; CavityRock DD: www.rspec.com.
 - c. ROXUL, Inc; CavityRock MD: www.rspec.com.
 6. Substitutions: See Section 01 6000 - Product Requirements.
- G. Snow and Ice Retention System
1. Material: Aluminum or stainless steel.
 2. Type: Clamp to standing seam of roofing system without penetration of roofing.
 3. Components: Clamping device at each roof seam and continuous single rod anchored to clamping device.
 4. Operation: Able to retain snow and ice and prevent snow and ice from falling from roof.
 - a. Available Products:
 - 1) S-5! Corporation SnoRail S-5-ASF and SnoRod; www.s-5.com.
 - 2) Substitutions: See Section 01 60 00 - Product Requirements.
 5. Extent: Where indicated on drawings.

2.08 FABRICATION

- A. Panels: Fabricate panels and accessory items at factory, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.
- B. Provide with factory notching allowing turn under at eave.
- C. Joints: Factory-install captive gaskets, sealants, or separator strips at panel joints to provide weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Broom clean wood sheathing prior to installation of roofing system.

- B. Coordinate roofing work with provisions for weather barrier, slip sheet, roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.
- C. Remove protective film from surface of roof panels immediately prior to installation. Strip film carefully, to avoid damage to prefinished surfaces.
- D. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.
- E. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.03 INSTALLATION

- A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
 - 1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
 - 2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.
- B. Accessories: Install all components required for a complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.
- C. Fasten bearing plates to roof deck over weather barrier and rigid insulation, directly behind roofing clip. Set in mastic where indicated on drawings.
- D. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.
 - 1. Seam Type: Span Seam 180 degree seam by AEP span.

3.04 THERMAL INSULATION INSTALLATION

- A. Board Insulation: Extend insulation in thickness required to provide specified R-Value to cover entire roof. Install a minimum of two layers with joints staggered and mechanically fastened.
- B. Install board insulation in accordance with manufacturer's instructions and code requirements.
- C. Install two layers of board insulation with staggered joints to reduce thermal transmission loss at joints.
- D. Install simi-rigid board in first layer on top of metal deck. Install rigid board on top.
- E. Install using disc washers and screws fastened through insulation to metal deck below. Fastener size and spacing as recommended by roof manufacturer.
- F. Coordinate installation with flexible flashing and metal roof clips.

3.05 METAL ROOF PANEL INSTALLATION

- A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
 - 1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
 - 2. Provide metal roof panels of full length from eave to ridge. Do not install lapped panels.
 - 3. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.
 - 4. Remove strippable protective film immediately preceding panel installation.

- B. Accessories: Install all components required for a complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.
- C. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.
 - 1. Thermal Movement. Rigidly fasten metal roof panels to structure at one and only one location for each panel. Allow remainder of panel to move freely for thermal expansion and contraction. Predrill panels for fasteners.
 - a. Avoid attaching accessories through roof panels in a manner that will inhibit thermal movement.
 - 2. Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.
 - a. Install clips to supports with self-tapping fasteners.
 - b. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 - c. Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
 - 3. Provide metal closures at rake edges, rake walls and each side of ridge and hip caps as applicable to project conditions.
 - 4. Flash and seal metal roof panels with weather closures at eaves, rakes, and perimeter of all openings.
 - 5. Install ridge and hip caps as metal roof panel work proceeds.
 - 6. Install metal flashing to allow moisture to run over and off metal roof panels.
 - 7. Form weathertight standing seams incorporating concealed clips, using an automatic mechanical seaming device approved by the panel manufacturer.
 - a. Form seams with 180 degree fold.
 - 8. Install sealant or sealant tape, as recommended by panel manufacturer, at end laps and side joints.
- D. Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal roof panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal roof panel manufacturer.
- E. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 - 1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- F. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion. Provide expansion joints every 50 feet maximum spacing.
- G. Downspouts: Connect gutters to sheet metal downspouts or to pipe downspouts specified in Section 05 5000 - Metal Fabrications, as applicable.
- H. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

3.06 INSTALLATION OF SNOW AND ICE RETENTION SYSTEM

- A. Install in accordance with manufacturer's recommended installation instructions including distance away from roof eave and spacing between devices.
- B. Extent: Install on roof edges as indicated to prevent snow and ice from falling to occupied areas below.

3.07 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect metal roof panel installation, including accessories. Report results in writing.
- B. Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.
- C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.08 CLEANING

- A. At completion of each day's work, sweep panels, flashings and gutters clean. Do not allow fasteners, cuttings, filings or scraps to accumulate.
- B. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.09 PROTECTION

- A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.
- B. Replace damaged roof panels or accessories before date of Substantial Completion. Panels or flashings that have severe paint and/or substrate damage shall be replaced as directed by the Architect's or Owner's representative.

END OF SECTION

**SECTION 07 4213
METAL WALL PANELS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manufactured metal panels for walls, with related flashings and accessory components.
- B. Hat channel furring supporting Metal Wall Panels

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wall panel substrate.
- B. Section 07 2100 - Thermal Insulation: Z girts and insulation behind metal panels.
- C. Section 07 2500 - Weather Barriers: Rainscreen and subgirt assembly.

1.03 REFERENCE STANDARDS

- A. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate dimensions, layout, joints, construction details, methods of anchorage, flashings, terminations.
 - 1. Shop drawings must reflect architectural detailing and conditions shown on the drawings. Manufacturer's standard catalog-type details are not acceptable.
- C. Samples: Submit two samples of wall panel, 12 inch by 12 inch in size illustrating finish color, sheen, and texture.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years of experience.

1.06 PRE-INSTALLATION MEETING

- A. Convene two weeks before starting work of this section.
- B. Review preparation and installation procedures, special conditions of the project.

1.07 MOCK-UP

- A. Integrated Exterior Mock-Ups: Construct integrated exterior mock-up as indicated on Drawings and as specified in Section 01 40 00 - Quality Requirements.
 - 1. Provide mock-up of exterior framed wall, including components specified elsewhere, such as insulation, sheathing, window frame, exterior wall finish, and interior wall finish.
- B. Mock-Up Size: As indicated on the drawings.
- C. Location: As directed.
- D. Mock-up may not remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- B. Store prefinished material off ground and protected from weather. Prevent twisting, bending, or abrasion, and provide ventilation to stored materials. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials that may cause discoloration or staining of products.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

- B. Provide 20 year manufacturer warranty for degradation of panel finish including chalking and fading, peeling, cracking, and delamination.
- C. Correct defective Work within a 2 year period after Substantial Completion, including defects in water tightness and integrity of seals.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. AEP Span; Product Mini-V-Beam.
- B. Other Acceptable Manufacturers:
 - 1. Centria; Product Concept Series CS-260: www.centria.com.
 - 2. Metal Sales Manufacturing Corporation; TLC Panel: www.metalsales.us.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MANUFACTURED METAL PANELS

- A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.
 - 1. Provide exterior panels and metal hat channel furring..
 - 2. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall.
 - 3. Design Pressure: In accordance with applicable codes.
 - 4. Maximum Allowable Deflection of Panel: 1/90 of span.
 - 5. Movement: Accommodate movement within system 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; and deflection of structural support framing.
 - 6. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
 - 7. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
 - 8. Corners: Factory-fabricated in one continuous piece with minimum 18 inch returns.
- B. Exterior Panels:
 - 1. Profile: Vertical.
 - 2. Pattern: Corrugated on 4 9/16" centers.
 - 3. Panel thickness: 1 3/8 inch
 - 4. Material: Precoated steel sheet, minimum 24 gage thick minimum.
 - 5. Panel Width, net: 32 inches.
 - 6. Color: As scheduled.
- C. Furring:
 - 1. Hat Channel vented profile; to attach panel system to Steel Z Subgirts.
 - 2. Install horizontally at 24 inches on center.
 - 3. Legs of hat channel to be perforated allowing air movement and drainage.
 - 4. Finish: Galvanized steel.
- D. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles.
- E. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- F. Anchors: Galvanized steel.
- G. Insect Protection:
 - 1. Perforated J Channel Rain Screen Trim, high back type. Size: 2" x 3/4 inches by 1/4 inch. Install at perimeter of wood siding as indicated. Paint black before installation. Perforated J Channel by Menzies Metal Products, www.menzies-metal.com.
 - 2. Insect screen: 4 inch wide fiberglass mesh insect screen at open joints in rainscreen as needed to prevent entry of insects. Color: Black.

2.03 MATERIALS

- A. Precoated Steel Sheet: Aluminum-zinc alloy-coated steel sheet, ASTM A792/A792M, Commercial Steel (CS)) or Forming Steel (FS), with AZ50/AZM150 coating; continuous-coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.
- B. Exterior Finish Coating: DuraTech 5000; Polyvinylidene Fluoride, full 70 percent Kynar 500/Hylar 5000, consisting of a baked-on 0.15-0.20 mil corrosion resistant primer and a baked-on 0.70-0.80 mil finish coat with a specular gloss of 8 to 15 when tested in accordance with ASTM D523 at 60 degrees.
- C. Panel Back coating: Manufacturer's primer as specified above.

2.04 ACCESSORIES

- A. Trims and Flashings: Material, metal thickness, and finish to match panels. Profiles indicated in Drawings.
- B. Profile Closures: Polyethylene foam, die-cut or formed to panel configuration.
- C. Sealants: Manufacturer's standard type suitable for use with installation of system; non-staining.
 - 1. Color: To match metal panel color.
- D. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized. Exposed fasteners same finish as panel system.
- E. Field Touch-up Paint: As recommended by panel manufacturer.
- F. Bituminous Paint: Asphalt base.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that framing members are ready to receive panels.

3.02 PREPARATION

- A. Install subgirts perpendicular to panel length, securely fastened to substrates and shimmed and leveled to uniform plane. Space at intervals indicated.
- B. Install at 48 inches on center, unless otherwise indicated.
- C. Refer to applicable wall types for maximum spacing.

3.03 INSTALLATION

- A. Install panels, trims, closures, and flashings on walls in accordance with manufacturer's instructions.
- B. Comply with methods and recommendations of SMACNA Architectural Sheet Metal Manual for flashing configurations required.
- C. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.
- D. Fasten panels to structural supports; aligned, level, and plumb.
- E. Secure panels without warp or deflection.
- F. Cutting and Fitting:
 - 1. Cut panels neat, square, and true with shearing action cutters. Torch or power saw cutting is prohibited.
 - 2. Openings 6 inches and larger: Shop fabricate and reinforce to maintain original load capacity.
 - 3. Openings less than 6 inches: Field cutting is acceptable.
- G. Install with exposed fasteners. Align fasteners vertically and horizontally at a uniform spacing.
- H. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

- I. Installation of insect protection: Install edge trim and screen as needed to prevent entry of insects within rain screen cavity. Locate over hat channel furring and below metal siding.

3.04 TOLERANCES

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.

3.05 CLEANING

- A. Remove site cuttings from finish surfaces.
- B. Panels or flashings with finish damage exposing metal or with substrate damage shall be replaced.
- C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

END OF SECTION

SECTION 07 4233
EXTERIOR SOLID PHENOLIC RAINSCREEN PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exterior rainscreen wall panels.
- B. Aluminum support furring.
- C. Fasteners and accessories.
- D. Referred to on drawings as Exterior Phenolic Panels

1.02 RELATED DOCUMENTS

- A. Section 07 2100 - Thermal Insulation; Insulation and Zee furring substrate
- B. Section 07 2500 - Weather Barrier, Subgirts supporting siding panels.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Adjacent flashings

1.03 SYSTEM DESCRIPTION

- A. Exterior Rainscreen Assembly: Solid phenolic core, fire-retardant, exterior grade rainscreen wall panels, aluminum substructure, attachment system components, air/vapor barrier membrane, continuous exterior insulation, and all accessories necessary for a complete rear-ventilated, weathertight exterior rainscreen wall system. Furnish fastenings and flashings as required to complete rainscreen system.

1.04 PERFORMANCE REQUIREMENTS

- A. General Performance: Solid phenolic exterior rainscreen wall panel system, aluminum substructure, and attachment accessories shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Delegated Design Engineering: Design solid phenolic exterior rainscreen wall panel system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
 - 1. Design shall be inclusive of aluminum support structure system and all attachment accessories.
 - 2. Design shall be inclusive of solid phenolic exterior rainscreen wall panel manufacturing and shall conform to Manufacturer's recommended installation procedures.
- C. Structural Performance: Provide solid phenolic exterior wall panel system capable of withstanding the effects of the following loads and stresses within limits and under conditions indicated based on Manufacturer's most current testing standards:
 - 1. Wind Loads: Provide exterior rainscreen wall panel system, including aluminum support structure, capable of withstanding wind loads calculated according to requirements of authorities having jurisdiction or as determined based on the following minimum design wind pressures, whichever are more stringent:
 - a. Uniform pressure as indicated on Drawings.
 - b. As determined by the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures," "Analytical Procedure".
- D. Deflection Limits: Aluminum support structure and exterior phenolic rainscreen panel system shall be designed in accordance with the Manufacturer's recommended maximum deflection when tested under positive and negative design wind gust loads and shall withstand wind gust loads with horizontal deflections no greater than the Manufacturer's allowable span.
- E. Thermal Movements: Exterior solid phenolic rainscreen panel system shall allow for thermal movements from ambient air and surface temperature changes by preventing buckling, opening of joints, over-stressing of components, failure of connections and other detrimental effects. Base calculations on surface temperature changes 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.

- F. Aluminum Support System: Provide aluminum support system capable of the following:
 - 1. 1. Design and install aluminum support structure to accommodate expected construction tolerances and misalignment, deflection of building structural components, and openings in the building enclosure as designed.

1.05 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures for submittal procedures.
- B. Product Data: For each type of product indicated. Include Manufacturer's written installation instructions, including recommendations for evaluating, preparing, and treating substrate, rainscreen panel technical data, material descriptions, and finishes and tested physical and performance properties.
- C. Shop Drawings: Show fabrication and installation layouts of solid phenolic exterior rainscreen panel, details of aluminum support structure conditions, anchorages for aluminum support structure, attachment system for panels, allowances for thermal expansion, trim, flashings, closures, corners, and accessories as required, and all special job specific details.
- D. Delegated-Design Submittal: For complete system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 - Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record
- F. Samples: For each type of exposed finish required, prepared on samples of size and type indicated below for approval:
 - 1. Rainscreen Wall Panels: Minimum 4" x 4" including fasteners and other wall panel accessories as required.
 - 2. Aluminum Support Structure: 12" long including fasteners and other accessories. Submit samples demonstrating materials, colors, and fastener attachment type.
- G. Installer Qualification Data: For Installer, provide certification signed by solid phenolic rainscreen panel Manufacturer certifying that Installer complies with requirements to perform the work specified in this Section.
- H. Qualification Data: For professional engineer.
- I. Engineering Design Certification: From solid phenolic rainscreen panel Manufacturer, provide certification of acceptance of final shop drawings and acceptance of qualifications for installer. Certification must be provided before the start of the Work.
- J. Closeout Submittals: From solid phenolic panel rainscreen panel Manufacturer, provide the following:
 - 1. Operation and Maintenance Data: Operation and maintenance manuals including methods for maintaining installed products, replacing damaged panels, and precautions against cleaning materials and methods detrimental to finishes and performance.
- K. Warranty: Sample of Manufacturer's standard 10 year limited warranty for solid phenolic exterior rainscreen wall panel system. Warranty shall be inclusive of material and labor for removal and reinstallation.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in the installation of exterior rainscreen wall panel systems who has a minimum of 3 years installing products indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is recognized and approved by the manufacturer as suitable for the execution of the Work.
- B. Fabricator Qualifications: A shop that employs skilled workers who custom fabricate solid phenolic or similar exterior rainscreen wall panel systems to those required for this Project and whose finished products have a record of successful in service performance and who is certified by the Manufacturer.

- C. Source Limitations: Obtain solid phenolic rainscreen panels and all auxiliary materials from a single-source Manufacturer who has a minimum of 25 years experience in the manufacture of exterior rainscreen wall systems or an accessory Manufacturer who is certified by the solid phenolic rainscreen panel Manufacturer. Panels shall be manufactured in accordance with ISO9001 and ISO14001.

1.07 MOCK-UP

- A. Integrated Exterior Mock-Ups: Construct integrated exterior mock-up as indicated on Drawings and as specified in Section 01 40 00 - Quality Requirements.
 - 1. Provide mock-up of exterior framed wall, including components specified elsewhere, such as insulation, sheathing, window frame, exterior wall finish, and interior wall finish.
- B. Demonstrate selections made under approved submittals and typical joints, surface finish, texture, tolerances, attachments to building structure, methods of installation, connections to adjacent building enclosure materials, and standard and quality or workmanship.
- C. Mock-Up Size: As indicated on the drawings.
- D. Location: As directed.
- E. Mock-up may not remain as part of the Work.

1.08 PREINSTALLATION CONFERENCE

- A. Pre-Installation Conference: Conduct pre-installation conference at Project site prior to commencing construction of mock-up specified herein to verify Project requirements.
 - 1. Review solid phenolic rainscreen panel installation requirements including substrate surface preparation, environmental limitations, typical details and flashings, Manufacturer's recommended installation procedures, coordination with adjacent trades, testing and inspection procedures, protection and repair procedures.
 - 2. Ensure all sub-trades interfacing with or affected by the construction of the solid phenolic rainscreen panel system are present, including Architect, General Contractor, solid phenolic rainscreen panel Manufacturer, mock up and commissioning testing agencies, air barrier installer, exterior insulation installer, structural substrate installer, plumbing installer, window installer, electrical installer and any other installer whose work interfaces with or affects the solid phenolic rainscreen wall panels.

1.09 PROJECT CONDITIONS, STORAGE, AND HANDLING

- A. Environmental Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of solid phenolic rainscreen wall panels to be performed according to Manufacturer's written installation instructions and warranty requirements.
- B. Field Measurements: Verify actual panel measurements/openings by field measurement before fabrication to accommodate site tolerances and changes in construction.
- C. Comply with Manufacturer's stated ordering, lead-time, and manufacturing requirements to avoid construction delays.
- D. Deliver solid phenolic panel materials, aluminum support structure, and other manufactured accessory materials in Manufacturer's original, unopened, and undamaged containers with identification labels intact and visible. Package solid phenolic rainscreen panels for protection during transportation and handling. Comply with Manufacturer's and Distributor's written delivery and handling guidelines.
- E. Store solid phenolic rainscreen panels horizontally, covered with suitable weathertight and ventilated covering to prevent exposure to UV light and to ensure dryness with positive slope for drainage. Do not store panels in contact with ground or with materials that might cause staining, damage, scratching, or other surface damage.
- F. Phenolic panel installer shall notify the General Contractor or Construction Manager immediately upon discovery of any issues with the substrate. i.e improper framing, walls out of plumb, windows not properly aligned, etc...These issues shall be appropriately addressed prior to continuation of panel system installation.

- G. Remove damage and waste panel material from site and legally dispose of according to authorities having jurisdiction.

1.10 WARRANTY

- A. A. Submit Manufacturer's standard limited 10 year warranty covering defects in material.

PART 2 PRODUCTS

2.01 SOLID PHENOLIC EXTERIOR RAINSCREEN WALL PANELS

- A. General: Subject to compliance requirements, provide solid phenolic rainscreen wall panels for exterior façade applications:
 - 1. Basis of Design: Fundermax Exterior F Quality as imported by Architects Surfaces LLC. 888-688-8892 www.architectssurfaces.com <<http://www.architectssurfaces.com/>>
 - 2. Alternate Products :
 - a. Trespa Mateon, www.trespa.com
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Product Description:
 - 1. Rainscreen Material: Solid phenolic resin, fire-retardant exterior grade rainscreen panel.
 - 2. Rainscreen Panel Finish: Standard Colors, finish as selected by Architect from Manufacturer's standard color range.
 - 3. Rainscreen Panel Core: Standard brown core.
 - 4. Rainscreen Panel Thickness: 0.39 inches (10 mm) unless otherwise indicated on drawings.
 - 5. Rainscreen Panel Standard Sizes: As indicated on drawings.
 - 6. Substructure : (Exposed Fastener Type) (Concealed Fastener Type) extruded aluminum profiles, clips, closures, and tees and indicated on the project drawings.
- C. Physical Properties:
 - 1. Smoke Development Index: Less than 450 per ASTM E-84.
 - 2. Flame Spread Index: Less than 10 per ASTM E-84.
 - 3. NFPA268 Surface Ignition test, pass.
 - 4. Ignition Temperature; Greater than 650 degrees Fahrenheit above ambient, ASTM D1929
 - 5. When required by code, the assembly shall meet the performance requirements of NFPA 285. 10mm exposed fastener panels with assemblies listed in ICC ESR #3340 are acceptable as NFPA 285 compliant. Any variations must be approved by the local code official.
 - 6. Panels shall have UV and weather resistance performance with a grey scale rating minimum of 4-5 per ISO 4892-2, 4892-3.
 - 7. Panels shall be impact resistant per EN-ISO 178
 - 8. Panels shall be scratch resistant per EN-438-6
 - 9. Panels shall be FSC Certified.
 - 10. Panels shall be ICC AC92 compliant and have ICC Evaluation Services Report.
 - 11. Panels shall be hail impact resistant, 70mm (2 3/4") ice ball at a velocity of 30 m/second (approx. 67 mph) with no breakage, discoloration or tearing. Tested per Austrian APBIC Standard, Association of Public Building Insurance Companies.

2.02 AUXILIARY MATERIALS

- A. Aluminum Furring Support Structure: Extruded, finished, and color-matched for the type of use indicated on project Drawings.
- B. Attachment Accessories: Of type, size, corrosion-resistance, holding-power and color-matched as required to suit attachment to aluminum support structure.
- C. Insect Protection:
 - 1. Perforated J Channel Rain Screen Trim, high back type. Size: 2 inch x 3/4 inches by 1/4 inch. Install at perimeter of wood siding as indicated. Paint black before installation. Perforated J Channel by Menzies Metal Products, www.menzies-metal.com.

2. Insect screen: 4 inch wide fiberglass mesh insect screen at open joints in rain screen as needed to prevent entry of insects. Color: Black.
- D. Louver Foundation & Soffit Vent, 8" Wide x 16" Long with screen. Model VS816 by FAMCO.

2.03 FABRICATION

- A. General: Fabricate solid phenolic rainscreen wall panels and accessory materials in accordance with Manufacturer's written instructions and approved submittals, and at a fabrication facility trained and approved by Manufacturer. Comply with indicated profiles and within dimensional and structural requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances of structural substrate, aluminum support structure, solid phenolic rainscreen panel, and other conditions affecting performance.
 1. Verify that substrate conditions, wall framing, and other structural panel support members and anchorages installed under other sections are acceptable for product installation and have been installed within acceptable tolerances in accordance with Manufacturer's written instructions.
 2. Verify that air and weather resistant barrier has been installed over structural sheathing in accordance with air barrier Manufacturer's recommend installation instructions and terminated properly at openings to prevent air infiltration or water penetration.
 3. Examine rough-in installation for components and systems adjacent to and penetrating into solid phenolic rainscreen panels to verify actual locations of penetrations relative to joint locations of panels prior to panel installation.
 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Aluminum Support Structure: Install clips, L-shapes, J-shapes, Z-shapes, hat channels, fillers, and other components in accordance with approved Shop Drawings and Manufacturer's recommended installation instructions.
- B. Install aluminum support structure framing level and plumb and within tolerances of the completed system as approved and recommend by Manufacturer and in accordance with approved Shop Drawings.
- C. Ensure air and water barrier is properly installed per air and water barrier Manufacturer's approved rainscreen wall panel installation instructions and is protected from UV light deterioration at panel open joint locations or is otherwise UV stable. Pay close attention to manufacturer's recommendations for treating penetrations in the membrane.
- D. Notify General Contractor or Construction Manager immediately upon discovery of any tears, holes, or other damages to the membrane or barrier.

3.03 SOLID PHENOLIC RAINSCREEN PANEL INSTALLATION

- A. Install solid phenolic rainscreen panels plumb and level and accurately spaced per Manufacturer's written installation instructions and in accordance with approved Shop Drawings.
- B. Fasten solid phenolic rainscreen wall panels to aluminum support structure with fasteners approved for use with adjoining construction and in accordance with approved Shop Drawings for color matching and to confirm compliance with wind load and engineering design requirements.
- C. Use exposed fasteners through the panel to the aluminum support structure. Arrange fasteners in a regular, orthogonal, alignment as indicated on shop drawings.
- D. Erection Tolerances: Install aluminum support structure within the required installation tolerances as recommended by Manufacturer and in accordance with approved Shop Drawings.
- E. Do not apply sealant to solid phenolic rainscreen panel joinery unless otherwise indicated on Drawings or in accordance with Manufacturer's recommended installation instructions.

3.04 CLEANING

- A. Upon completion of solid phenolic rainscreen wall panel installation clean finished surfaces as recommended by panel Manufacturer prior to Owners' acceptance.
- B. Legally dispose of all surplus materials off site.

END OF SECTION

SECTION 07 4623
WOOD SIDING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Board siding for Walls .
- B. Shop finishing of siding
- C. Trim, flashings, accessories, and fastenings.
- D. Wood Nailers and furring strips

1.02 RELATED REQUIREMENTS

- A. Section 05 4000 - Cold-Formed Metal Framing: Siding substrate.
- B. Section 05 4000 - Cold-Formed Metal Framing: Water-resistive barrier under siding.
- C. Section 07 2500 - Weather Barriers: Weather barrier under siding.
- D. Section 07 2500 - Weather Barriers: Rainscreen Subgirt assembly.
- E. Section 07 6200 - Sheet Metal Flashing and Trim: Product requirements for metal flashings and trim associated with wood siding for placement by this section.
- F. Section 07 9005 - Joint Sealers: Sealant at perimeter.

1.03 REFERENCE STANDARDS

- A. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17; West Coast Lumber Inspection Bureau; 2004, and supplements.
- B. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association; 2011.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating materials.
- C. Samples: Submit two samples 12 x 12 inch in size illustrating surface texture and shop finishing.

1.05 QUALITY ASSURANCE

- A. Grade lumber in accordance with the following:
 - 1. Western Red Cedar: WCLB (GR).
 - 2. NLGA 200b and WCLIB 102-b grading rules of Western Red Cedar Lumber Association.

1.06 MOCK-UP

- A. Refer to Section 01 40 00 - Quality Requirements for general mock-up requirements.
- B. Build mock-up of typical exterior wall in sizes indicated on Drawings.
 - 1. Protect accepted mock-ups from the elements with weather-resistant membrane.
 - 2. Approval of mock-ups is for color, texture, and aesthetic qualities of workmanship.
 - a. Approval of mock-ups is also for other material and construction qualities specifically approved by Architect in writing.
 - b. Approval of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless such deviations are specifically approved by Architect in writing.
- C. Locate where directed.
- D. Mock-up may not remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store in ventilated areas with constant minimum temperature of 60 degrees F and maximum relative humidity of 55 percent.

PART 2 PRODUCTS

2.01 SIDING

- A. Board Siding: Horizontal ship-lap Western Red Cedar, A-Clear VG grade without more than 15 percent B Grade allowed, maximum moisture content 15 percent.
 - 1. Nominal Size: 1 inch thick, 8 inch board with 11/16 inch lap.
 - 2. Profile: Ship lap. Pattern Western Wood Red Cedar Association similar to WRCL-SLO with 1-inch reveal and 7-inches overall exposed face.
 - 3. Surface Texture: Textured.

2.02 FINISH

- A. Bleaching Oil for WS-1: Factory applied weathering accelerator.
 - 1. Basis-of-Design Product: Bleaching Oil #6241 manufactured by Cabot: www.cabotstain.com <<http://www.cabotstain.com>>.
- B. Clear Finish for WS-2: Cabot, Clear Solution, 3000.

2.03 ACCESSORIES

- A. 2 x 4 Western Red Cedar furring strips, pressure treated. space 16 inches on center to diagonally across vertical Zee furring.
- B. Nails: Stainless steel ring-shank 1 - 1/4 inch penetration into substrate.
- C. Wood Screws: Stainless steel, #10 square drive.
- D. Flashing: Stainless as specified in Section 07 6200.
- E. Reveal: Match Aluminum Channel Screed, PCS-74-V-100, by Fry Reglet; www.fryreglet.com. Paint black prior to installation.
- F. Insect Protection:
 - 1. Perforated J Channel Rain Screen Trim, high back type. Size: 2" x 3/4 inches by 1/4 inch. Install at perimeter of wood siding as indicated. Paint black before installation. Perforated J Channel by Menzies Metal Products, www.menzies-metal.com.
 - 2. Insect screen: 4 inch wide fiberglass mesh insect screen at open joints in rainscreen as needed to prevent entry of insects. Color: Black.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrates are ready to receive work.
- B. Verify that weather barrier and sulfuring have been installed over substrate completely and correctly.
- C. Do not begin until unacceptable conditions have been corrected.

3.02 PREPARATION

- A. Factory apply bleaching oil to all surfaces of siding prior to delivery and installation.
 - 1. Comply with manufacturer's application instructions.
 - 2. Touch up site cut ends.

3.03 INSTALLATION

- A. Select pieces of longest possible lengths. Ensure that knots and obvious defects will not interfere with placing fasteners or making proper connections. Cut out and discard defects that render a piece unfit to serve its intended function.
- B. Install 2 x 4 wood furring. Install wood furring at 16 inches on center at a 45 degree angle to the Z subgirts. Fasten wood furring to Z girt with corrosion resistant fasteners. Do not damage or penetrate weather barrier.
- C. Install siding horizontally unless otherwise indicated.
- D. Install with reveal of 3/8 inch at each shiplap joint.

- E. Install siding with 3/8 open reveal where wood siding abuts other materials unless otherwise indicated.
- F. Discard pieces that are warped, twisted, bowed, crooked, or otherwise defective.
- G. Fasten siding in place, level and plumb.
 - 1. Arrange for orderly nailing pattern. .
 - 2. Install siding for natural shed of water.
 - 3. Position cut ends over bearing surfaces. Sand cut edges smooth and clean.
 - 4. Touch up cut ends with bleaching oil.
 - 5. Shim as required.
 - 6. Face nail at spacing recommended by siding manufacturer or trade association, using only stainless steel ring-shank nails; size in accordance with recommended installation instructions.
 - 7. Touch-up prefinished surfaces that are disfigured. Unsightly touch-up will require removal and replacement of affected siding.
- H. Installation of insect protection: Install edge trim and screen as needed to prevent entry of insects within rain screen cavity. Locate over wood furring and below wood siding.
- I. Install metal flashings at locations shown on Drawings.
- J. Sand work smooth and set exposed nails and screws.

3.04 TOLERANCES

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

END OF SECTION

SECTION 07 5400
THERMOPLASTIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Mechanically attached system with thermoplastic roofing membrane.
- B. Installation of acoustical insulation in acoustic roof deck.
- C. Insulation, flat and tapered.
- D. Vapor retarder.
- E. Flashings.
- F. Prefabricated membrane flashing materials.
- G. Roofing stack boots and walkway pads.
- H. Splash blocks.

1.02 RELATED REQUIREMENTS

- A. Section 05 3100 - Steel Decking: Product requirements for acoustical insulation for deck flutes, for placement by this section.
- B. Section 06 1000 - Rough Carpentry: Wood nailers and curbs.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Counterflashings, reglets, .
- D. Section 07 9513 - Expansion Joint Cover Assemblies
- E. Section 07 7200 - Roof Accessories: Roof-mounted units; prefabricated curbs.
- F. Section 07 7273 - Fall Arrest Roof Anchors
- G. Section 07 9513 - Expansion Joint Cover Assemblies
- H. Section 22 1006 - Plumbing Piping Specialties: Roof drains.
- I. Division 26 - Photovoltaic Cells, Roof mounted.

1.03 REFERENCE STANDARDS

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2014.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.
- C. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing; 2011a.
- D. FM DS 1-28 - Wind Design; Factory Mutual Research Corporation; 2007.
- E. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.
- F. UL (RMSD) - Roofing Materials and Systems Directory; Underwriters Laboratories Inc.; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene two weeks before starting work of this section.
 - 1. Review special conditions of the project, preparation and installation procedures and coordinating and scheduling required with related work.
 - 2. Minimum attendance: General Contractor Superintendent, Roofing Contractor Foreman, Roofing Manufacturer's Technical Representative, Sheet Metal Contractor's Foreman, Owner, Architect.

1.05 PERFORMANCE REQUIREMENTS

- A. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.

- B. U.L. Fire Rating Roof Classification: The completed membrane roofing system shall achieve a minimum UL Class A Fire Rating, and shall be listed in the current U.L. Directory.
- C. IBC Basic Wind Speed Design Criteria: The completed membrane roofing system shall meet or exceed IBC Basic Wind Speed Design Criteria of 103 mph, 3 second gust duration, Exposure B, urban and suburban areas. IBC uplift pressures shall be calculated in accordance with ASCE 7 "Minimum Design Loads for Building and Other Structures".
- D. ANSI/SPRI ES-1 Roof Edge Standard: The completed membrane roofing system and associated roof edge metal systems shall comply with ANSI/SPRI ES-1 Roof Edge Standard.
 - 1. Design, fabricate and install flashing at roof edges in accordance with ANSI/SPRI, ES-1 except with basic wind speed of 95 mph.

1.06 PREINSTALLATION CONFERENCE

- A. Preinstallation Conference: Convene one week before starting work of this section.
 - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.
 - 2. Meet with Owner, Architect, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 5. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 6. Review structural loading limitations of roof deck during and after roofing.
 - 7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 - 8. Review governing regulations and requirements for insurance and certificates if applicable.
 - 9. Review temporary protection requirements for roofing system during and after installation.
 - 10. Review roof observation and repair procedures after roofing installation.

1.07 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, fasteners, and accessories.
- C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation, and mechanical fastener layout.
- D. Manufacturer's Installation Instructions: Indicate membrane seaming precautions, special procedures, and perimeter conditions requiring special attention.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
 - 1.
- F. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.08 QUALITY ASSURANCE

- A. Perform work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 15 years of documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section:

1. With minimum five years documented successful experience on projects of a similar scope using specified system.
2. Approved by membrane manufacturer.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture.
- C. Protect foam insulation from direct exposure to sunlight.

1.10 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above temperature recommended by manufacturer degrees F.
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

1.11 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. System Warranty: Provide manufacturer's standard or customized form of system warranty without monetary limitation, agreeing to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
 1. The warranty shall contain no exclusion or limitation for damage caused by wind or gale. Minimum wind speed limitation under warranty shall be 72 M.P.H. measured at 10 meters above ground level.
 2. The warranty shall include all components of membrane roofing system such as membrane, insulation, cover board, substrate board, vapor barrier, fasteners and plates, accessories, adhesives, sealants, term bars, pre-fabricated roof edge and coping systems, walkways and other components of membrane roofing system.
 3. The warranty shall contain no exclusion or limitation for improper installation, or damage from environmental contaminants, or damage from water that ponds, or does not drain freely.
 4. For repair and replacement, include costs of both material and labor in warranty.
 5. Pro-Rated System Warranties shall not be accepted.
 6. Warranty Term: 20 years, "No Dollar Limit."

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Thermoplastic Polyolefin Membrane Materials:
 1. Carlisle Roofing Systems, Inc; Sure-Weld TPO: www.carlisle-syntec.com.
 2. Firestone Building Products, LLC: www.firestonebpc.com.
 3. GAF Materials Corporation; : www.gaf.com.
 4. Johns-Manville; www.jm.com.
 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation:
 1. Carlisle SynTec; SecurShield Insulation: www.carlisle-syntec.com.
 2. GAF; EnergyGuard PolyIso Insulation: www.gaf.com.
 3. Owens Corning Corp: www.owenscorning.com.
 4. ROXUL, Inc: www.rspec.com.
 5. Versico, a division of Carlisle Construction Materials Inc; SecurShield Insulation: www.versico.com.
 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ROOFING - UNBALLASTED APPLICATIONS

- A. Thermoplastic Membrane Roofing: One ply membrane, mechanically fastened, over insulation.
- B. Roofing Assembly Requirements:
 - 1. Roof Covering External Fire-Resistance Classification: UL Class B.
 - 2. Factory Mutual Classification: Class I and windstorm resistance of I-90, in accordance with FM DS 1-28.
 - 3. Insulation Thermal Value (R), minimum: 30; provide insulation of thickness required.
- C. Acceptable Insulation Types - Constant Thickness Application: Any of the types specified.
 - 1. Minimum 2 layers of polyisocyanurate board.
- D. Acceptable Insulation Types - Tapered Application: Any of the types specified.
 - 1. Tapered perlite, extruded polystyrene, or polyisocyanurate board.
 - 2. Tapered perlite, extruded polystyrene, or cellular glass board covered with uniform thickness cellulose, perlite, molded polystyrene, polyisocyanurate, glass fiber, extruded polystyrene, or composite board.
 - 3. Uniform thickness cellulose, perlite, composite, polyisocyanurate, extruded polystyrene, molded polystyrene, glass fiber, or cellular glass board covered with tapered extruded polystyrene or perlite board.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane:
 - 1. Material: Thermoplastic polyolefin (TPO) complying with ASTM D6878.
 - 2. Reinforcing: Internal fabric.
 - 3. Thickness: 0.060 inch, minimum (60 mil).
 - 4. Sheet Width: Factory fabricated into largest sheets possible.
 - 5. Solar Reflectance: 0.75, minimum, initial, and 0.65, minimum, 3-year, certified by Cool Roof Rating Council.
 - 6. Color: White.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Membrane Fasteners: As recommended and approved by membrane manufacturer.
- D. Flexible Flashing Material: Material recommended by membrane manufacturer.
- E. Coated Metal: 24 gauge galvanized steel sheet coated with 40 mil flashing material; as approved by membrane manufacturer.

2.04 INSULATION

- A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type II, Class 1, cellulose felt or glass fiber mat both faces; Grade 1 and with the following characteristics:
 - 1. CFC and HCFC Free
 - 2. Compressive Strength: 16 psi
 - 3. Board Size: 48 x 96 inch.
 - 4. Thermal Resistance: R-value of 30.
 - 5. Board Edges: Square.
 - 6. Use multiple layers of insulation board to achieve specified R-value, so that board joints may be staggered.
- B. Extruded Polystyrene (XPS) Board Insulation: ASTM C578, Type XII; extruded expanded polystyrene board with natural skin surfaces, with drainage channels one face; with the following characteristics:
 - 1. Tapered Board: Slope as indicated; minimum thickness 1/2 in; fabricate of fewest layers possible.
 - 2. Board Edges: Square.

2.05 ACCESSORIES

- A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- B. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
 - 1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.
- C. Membrane Adhesive: As recommended by membrane manufacturer.
- D. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.
- E. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.
- F. Sealants: As recommended by membrane manufacturer.
- G. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
 - 1. Composition: Roofing membrane manufacturer's standard.
 - 2. Size: Manufacturer's standard size(s).
- H. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.
- B. Do not apply roofing membrane during unsuitable weather.
- C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.
- D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- F. Coordinate the work with installation of associated counterflashings installed by other sections as the work of this section proceeds.

3.02 EXAMINATION

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

3.03 METAL DECK PREPARATION

- A. Install preformed sound absorbing glass fiber insulation strips supplied by Section 05 3100 in acoustic deck flutes. Install in accordance with manufacturer's instructions.

3.04 INSULATION - UNDER MEMBRANE

- A. Apply vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
 - 1. Extend vapor retarder under cant strips and blocking to deck edge.

2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.
- B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.
- C. Attachment of Insulation:
 1. Mechanically fasten insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.
- D. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.
- E. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- F. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
- G. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- H. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches.
- I. Do not apply more insulation than can be covered with membrane in same day.

3.05 MEMBRANE APPLICATION

- A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- B. Shingle joints on sloped substrate in direction of drainage.
- C. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- D. Mechanical Attachment: Apply membrane and mechanical attachment devices in accordance with manufacturer's instructions.
- E. Around roof penetrations, seal flanges and flashings with flexible flashing.
- F. Coordinate installation of roof drains and sumps and related flashings.

3.06 SPLASH BLOCK INSTALLATION

- A. Install below each roof drain leader where water from an upper roof is drained to a lower roof.
- B. Provide additional layer of roof membrane below splash block to prevent damage to roof.
- C. Position blocks to receive impact of water.

3.07 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field quality control and inspection.
- B. Upon completion of the installation, the manufacturer's representative shall make an inspection to ascertain that the roofing membrane system has been installed according to manufacturer's approved specifications and details. The inspection shall determine if any corrective work will be required before the warranty will be issued. Notify the architect 72 hours prior to manufacturer's representative visits.

3.08 CLEANING

- A. Remove markings from finished surfaces.
- B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- C. Repair or replace defaced or damaged finishes caused by work of this section.
- D. Prior to substantial completion broom clean entire roof surface to remove any and all accumulated dirt, construction debris, screws, nails, sheet metal snips, garbage, rags, buckets, tools, roofing scraps, etc. Assure all roof drains and scuppers are clean and free draining.

3.09 PROTECTION

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

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, gutters, and downspouts.

1.02 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Through-wall flashings in masonry.
- B. Section 07 4113 - Metal Roof Panels: Flashings associated with roofing system and metal soffit system.
- C. Section 07 4213 - Metal Wall Panels: Flashings associated with wall panel system
- D. Section 07 5400 - Thermoplastic Membrane Roofing: Flashings associated with roofing system.
- E. Section 07 7100 - Roof Specialties: Preformed flashings and manufactured expansion joint covers.
- F. Section 07 7200 - Roof Accessories: Roof-mounted units.
- G. Section 07 9005 - Joint Sealers.
- H. Section 07 9513 - Expansion Joint Covers
- I. Section 08 6300 - Metal-Framed Skylights: Metal curbs.
- J. Section 09 9000 - Painting and Coating: Field painting.

1.03 REFERENCE STANDARDS

- A. ANSI/SPRI ES-1 Roof Edge Standard.
- B. Design, fabricate and install flashings at roof edges in accordance with ANSI/SPRI, ES-1, except with basic wind speed of 85 mph.
- C. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.
- F. ASTM B32 - Standard Specification for Solder Metal; 2008.
- G. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products; 2003 (Reapproved 2009).
- H. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2009.
- I. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007 (Reapproved 2012)e1.
- J. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012)e1.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.06 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual and CDA Copper in Architecture Handbook requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 10 years of documented successful experience.

1.07 DELIVERY, STORAGE, AND HANDLING

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

1.08 MOCK-UPS

- A. Mock-ups: Provide sheet metal flashing and trim as required to complete integrated exterior mock-ups as specified in Section 01 40 00 - Quality Requirements and other Sections.

1.09 WARRANTY

- A. Special Project Warranty: Submit Installer's warranty, on Installer's standard or customized form, signed by Installer, covering the Work of this Section, including all components of flashing and sheet metal against defects in materials and workmanship, for the following warranty period:
 - 1. Warranty Period: Two years from date of Substantial Completion.
- 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 D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 0.025 inch (24 ga) thick base metal.
- B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 0.025 inch (24 ga) thick base metal, shop pre-coated with PVDF coating.
 - 1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
 - 2. Color: As scheduled.
- C. Lead: ASTM B749, 2.5 lb/sq ft thick.
- D. Stainless Steel: ASTM A666 Type 304, soft temper, minimum 0.015 inch (26 ga) thick; smooth No. 4 finish. Fully annealed.
- E. Perforated Metal Soffit Flashing: 18 gauge galvanized steel sheet. Perforated with 1/4 inch diameter holes at 3/8 inch on center each way. Prime for field painting.

2.02 ACCESSORIES

- A. Fasteners: Stainless steel, with soft neoprene washers.
- B. Underlayment: ASTM D226/D226M, organic roofing felt, Type I ("No. 15").
- C. Slip Sheet: Rosin sized building paper.
- D. Primer: Zinc chromate type.
- E. Protective Backing Paint: Asphaltic mastic, ASTM D4479 Type I.
- F. Sealant: Type as specified in Section 07 9005.

- G. Plastic Cement: ASTM D4586, Type I.
- H. Solder: ASTM B32; Sn50 (50/50) type.
- I. Flux: Rosin, cut Muriatic Acid, or commercial preparation suitable for use.
- J. Strainers: Stainless steel. Provide within gutter at each downspout.
- K. Self-Adhering, High-Temperature Sheet (SAHTS): Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 - 1. Thermal Stability: ASTM D1970; stable after testing at 240 deg F.
 - 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.
 - 3. Products:
 - a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
 - b. Henry Company; Blueskin PE200 HT.
 - c. Owens Corning; WeatherLock Metal High Temperature Underlayment.
 - d. Protecto Wrap Company; High Softening Point RainProof-40.
 - e. Substitutions: See Section 01 60 00 - Product Requirements.
- L. Form material with standing seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
 - 1. Standing Seams: 1-inch high with sealant at folded corners.
 - 2. Solder-Lap Seams: 1-inch finish width; sweat full with solder.
 - 3. Double S Lock Seams: Form 1-1/4 inch with S shaped seam on each edge of flashing sheet for concealed fastening.
- M. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant. Solder galvanized steel that is not prefinished. Do not solder prefinished steel.
 - 1. 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.
- N. Roof-Edge Flashings: Secure metal flashings at roof edges according to Section 1505.5 of the Oregon Structural Specialty Code.
- O. Install high-temperature self-adhered membrane (SAHTS) flashing where indicated. Install under all copings except where roof membrane extends under the full width of coping. Apply primer if required by manufacturer. 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 or as required by underlayment manufacturer.

2.03 FABRICATION

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

2.04 GUTTER AND DOWNSPOUT FABRICATION

- A. Gutters: Profile as indicated.

- B. Downspouts: Profile as indicated.
- C. Sheet metal gutter Concealed: Stainless steel, 24 gage minimum.
- D. Sheet metal gutter Surface Applied: Galvanized precoated steel sheet metal, 24 gage minimum, precoated finish to match metal roofing.
- E. Sheet metal down spouts: Galvanized precoated steel sheet metal, 24 gage minimum, precoated finish to match metal roofing.
- F. Gutters and Downspouts: Sizes as indicated on the drawings.
- G. Accessories: Profiled to suit gutters and downspouts.
 - 1. Anchorage Devices: In accordance with SMACNA requirements.
 - 2. Gutter Supports: as indicated on drawings..
 - 3. Downspout Supports: Brackets.
- H. Seal metal joints.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.
- C. Verify that nailers and blocking are properly installed.

3.02 PREPARATION

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

3.03 INSTALLATION

- A. Conform to drawing details.
- B. Install Work watertight, without waves, warps, buckles, tool marks, fastening stresses, distortion, or defects which impair strength of mar appearance.
- C. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- D. Apply plastic cement compound between metal flashings and felt flashings.
- E. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- F. Seal metal joints watertight.
- G. Install planes and lines in true alignment. Allow for sheet metal expansion and contraction.
- H. Secure gutters and downspouts in place using fasteners.
- I. Gutters:
 - 1. Provide expansion joints midway between downspouts; provide end caps spaced 1/2 inch apart. Rivet and seal thimble flanges to gutter bottom.
 - 2. Cover expansion joint tops with loose-lock cover; extend cover over outer edge of gutter, and embed in sealant.
 - 3. Secure gutter to roof framing with straps spaced 24" o.c. max.
 - 4. Install gutters level.
- J. Downspouts:
 - 1. Attach to wall with 1 1/2" wide straps as scheduled. Reinforce straps to allow standoff from walls for straight drop.
 - 2. Locate straps at downspout tops, bottom, horizontal joints, and 10 ft maximum centers.
 - 3. Secure straps to wall with fastener heads covered with strap-tabs.

4. Except where otherwise shown on Drawings, install downspouts plumb; modify straps if necessary.
 5. Connect downspouts to downspout boots installed by others. Grout connection watertight.
- K. Copings:
1. Install copings with continuous cleat on the exterior side, fastened at 16 inches on center. Use exposed fasteners with neoprene washers through elongated holes on the roof side, at 24 inches on center.

3.04 SCHEDULE

- A. Through-Wall Flashing in Masonry:
 1. Material: Stainless Steel.
- B. Exposed Gutters: Precoated steel, 24 gage.
- C. Concealed Gutters: 26 gage stainless steel.
- D. Downspouts: Precoated steel, 24 gage.
- E. Gutter and Downspout Supports and Straps: Match material, 14 gage.
- F. Through Wall Scuppers: 26 gage stainless steel.
- G. Drip Edge Flashings: 24 gage precoated steel.
- H. Drip Edge at Masonry Through-Wall Flashing: 24 gage stainless steel.
- I. Coping, Cap, Parapet, and Ledge Flashings: 24 gage precoated galvanized steel, unless otherwise indicated.
- J. Sill Flashings: 26 gage stainless steel.
- K. Sheet Metal Roof Expansion Joint Covers, and Roof-to-Wall Joint Covers:
- L. Counterflashings at Roofing Terminations (over roofing base flashings):
- M. Counterflashings at Curb-Mounted Roof Items, including skylights and roof hatches:
- N. Roofing Penetration Flashings, for Pipes, Structural Steel, and Equipment Supports: 24 gage precoated steel, unless otherwise indicated.

END OF SECTION

SECTION 07 7200
ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof hatches and accessories.
- B. Safety railings at roof hatches
- C. Davit Crane

1.02 RELATED REQUIREMENTS

- A. Section 05 3100 - Steel Decking.
- B. Section 05 5000 - Metal Fabrications, Ships Ladder.
- C. Section 07 4113 - Metal Roof Panels, snow guards.
- D. Section 07 5400 - Thermoplastic Membrane Roofing, splash blocks and walkway pads
- E. Section 07 6200 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.
- F. Section 07 7273 - Fall Arrest Roof Anchors
- G. Division 26 - Photovoltaic Panels, Roof Mounted

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 ROOF HATCHES

- A. Manufacturers - Roof Hatches:
 - 1. Acudor Products Inc; Aluminum Roof Hatch: www.acudor.com.
 - 2. Babcock-Davis Hatchways, Inc.
 - 3. Bilco Company Type E and Type F: www.bilco.com.
 - 4. Dur-Red Products Type NSH and Type SSH: www.dur-red.com.
 - 5. Milcor by Commercial Products Group of Hart & Cooley, Inc Type RB-3x3 and Type RB-3: www.milcorinc.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Roof Hatches: Factory-assembled aluminum frame and cover, complete with operating and release hardware.
 - 1. Style: Provide flat metal covers unless otherwise indicated.
 - 2. Mounting: Provide frames and curbs suitable for mounting conditions indicated on the drawings.
 - 3. For Ships Ladder Access: Single leaf; 30" x 96" inches.
 - 4. For Equipment Access: Double leaf; 36" x 36" inches.
- C. Frames/Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.

1. Material: Mill finished aluminum, 11 gage, 0.125 inch thick.
 2. Insulation: 1 inch rigid glass fiber, located on outside face of curb.
 3. Curb Height: 18 inches from surface of roof deck, minimum.
- D. Metal Covers: Flush, insulated, hollow metal construction.
1. Capable of supporting 40 psf live load.
 2. Material: Mill finished aluminum; outer cover 0.125 inch thick, liner 0.04 inch thick.
 3. Insulation: 1 inch rigid glass fiber.
 4. Gasket: Neoprene, continuous around cover perimeter.
- E. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.
1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
 2. Hinges: Heavy duty pintle type.
 3. Hold open arm with vinyl-coated handle for manual release.
 4. Latch: Upon closing, engage latch automatically and reset manual release.
 5. Manual Release: Pull handle on interior.
 6. Exterior latch: Able to unlatch and open hatch from exterior.
 7. Pad Lock: Provide hasp for locking hatch in closed position. At 48" by 48" roof hatch provide hasp on exterior of hatch. Elsewhere provide hasp on interior of hatch.
- F. Hatch Railing System:
1. Provide a hatch rail system by hatch manufacturer, field assembled and installed per the manufacturer's instructions.
 2. Performance characteristics:
 - a. High visibility safety yellow color shall be molded in.
 - b. Hatch rail system shall attach to the cap flashing of the roof hatch and shall not penetrate any roofing material.
 - c. Hatch rail system shall satisfy the requirements of OSHA 29 CFR 1910.23 and shall meet OSHA strength requirements with a factor of safety of two.
 - d. UV and corrosion resistant construction with a twenty-five year warranty.
 - e. Self-closing gate shall be provided with hatch rail system.
 3. Posts and Rails: Shall be round pultruded reinforced fire retardant yellow fiberglass treated with a UV inhibitor.
 4. Hardware: Mounting brackets shall be ¼" thick hot dip galvanized steel. Hinges and post guides shall be 6063T5 aluminum. Fasteners shall be Type 316 stainless steel.

2.02 DAVIT CRANE

- A. Manufacturers - Davit Crane
1. Thern, Portable Davit Crane, Series 5122, www.thern.com
 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Type: Portable crane with permanent base able to rotate 360 degrees. Adjustable boom with 2 operating positions. Type that folds down boom and mast for transport.
- C. Materials and finish: Stainless steel
- D. Operation: Hand winch
- E. Hand winch Operation: Stainless steel spur gear hand winch.
- F. Wire Rope Assembly: Stainless steel, 36 ft length, with load hook
- G. Lift Capacity: 500 lbs
- H. Base: Pedestal type, stainless steel, with mounting plate.
- I. Pedestal Base: Thern 5122 with pedestal/socket base mounted upright
- J. Accessories:
1. Base cover - water tight cap that fits in mast hole.
 2. Wire rope keeper.

3. Cable spool: Stainless steel reel
4. Bolts for attachment of pedestal base to building structure.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing weather integrity.
- B. Adjust hinges for smooth operation.

3.04 CLEANING

- A. Clean installed work to like-new condition.

3.05 PROTECTION

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

END OF SECTION

SECTION 07 7273
FALL ARREST ROOF ANCHORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof-mounted fall protection system including:
 - 1. Roof mounted fall arrest roof anchors.

1.02 RELATED SECTIONS

- A. Section 05 1200 Structural Steel: Substrate for anchors.
- B. Section 05 2100 - Steel Joists: Substrate for anchors.
- C. Section 05 3000 - Steel Deck: Substrate for anchors.
- D. Section 07 4413 - Metal Roof Panels: Substrate for anchors.
- E. Section 07 5400 - Thermoplastic Membrane Roofing: Substrate for anchors.

1.03 REFERENCES

- A. The work of this Section to conform to:
 - 1. Occupational Safety & Health Administration (U.S. Department of Labor)
 - a. OSHA 1910.28, SubPart D (Walking-Working Surfaces)
 - b. OSHA 1910.66, SubPart F (Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms).
 - c. OSHA 1926.500, SubPart M (Fall Protection).
 - d. Department of Labor Memorandum to Regional Administrators for Descent Control Devices.
 - 2. American National Standards Institute
 - a. ANSI A39.1-1969 (Safety Requirements for Window Cleaning).
 - 3. American Society of Mechanical Engineers
 - a. ASME A120.1-1996 (Safety Requirements for Powered Platforms for Building Maintenance).
 - b. ASME Addenda A120.1a-1997 and A120.1b-1999.
 - 4. International Window Cleaner's Association
 - a. IWCA I 14 (Window Cleaning Safety Standard).
 - 5. American Society for Testing and Materials
 - a. ASTM D3963/D M-87 (Structural Specification for Epoxy Reinforcing Steel).
 - b. ASTM A36 (Non exposed Structural Components).
 - c. ASTM A123 (Standard Specification for Zinc Coating - Hot Dip Galvanizing - of Iron and Steel Products).
 - d. ASTM Z325 (Bolts, Nuts and Washers).
 - 6. American Welding Society
 - a. AWS D1.1 (Structural Welding Code)
 - 7. Aluminum Association
 - a. AA 5AS-30 (Specifications for Aluminum Structures)

1.04 SYSTEM DESCRIPTION

- A. Provide fall restraint and fall arrest system capable of withstanding loads and stresses within limits and under conditions specified in OSHA and other applicable safety codes. Provide fall protection anchors permanently attached to roof structure. Where indicated, provide cable lifeline system to allow continuous travel past intermediate anchors
- B. Design Requirements: Anchors and accessories comprising system of following types:
 - 1. Roof anchors, spaced as indicated, for safety snap connection by individual workers capable of withstanding a 5,000 pound load or safety factor of 2 meeting the requirements of OSHA 1926.502(d)(8).
 - 2. Continuous stainless steel cable lifeline restrained by swaged terminations at anchor points, suitable for multiple safety snap connections along cable between anchors.

3. Tensioning system with tension indicator.
 4. Pass-thru technology allowing workers cable shuttle to run freely pass intermediate anchors without the working having to disconnect / re-connect to the fall protection system.
- C. Performance Requirements: System and components tested for resistance of following loads:
1. Fall Restraint: 4 persons simultaneously applied.
 2. Fall Arrest: 2 persons.
 3. Design fall protection anchors to resist at least 5,000 pound applied in any direction at a height of approximately 8 inches above top of roof deck or provide engineered system designed meeting the requirements of OSHA 1926.502(d)(8).
- D. Co-ordinate work of this Section with roofing systems to provide continuous waterproof protection.

1.05 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design fall arrest roof anchor system, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Oregon, using performance requirements and design criteria indicated.

1.06 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's descriptive literature for each product, including section or other type details.
- C. Manufacturer's written installation instructions.
- D. Shop drawings and samples in accordance with Section 01 30 00. Shop drawings to show roof layout indicating location and spacing of anchors, including dimensions, detail drawings of securement to structure, design details, and similar data. Drawings and calculations to bare stamp of Professional Engineer licensed in the State in which the project is located.
- E. Operation and Maintenance Data: Upon completion of project, provide written instructions for maintenance of fall prevention safety devices, and Log Book for mandatory annual inspection.
- F. Record Documents: Upon completion of project, provide Owner with roof plan showing layout of safety anchor system.
- G. Delegated-Design Submittal: For fall arrest roof anchor system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 - Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record.

1.07 QUALITY ASSURANCE

- A. Fall arrest roof anchors manufacturer to have minimum 5 years documented experience in the design and fabrication of fall protection systems.
- B. Comply with all requirements of:
1. OSHA Standards; Comply with Occupational Safety and Health Administration Standards for the Construction Industry 29 CFR 1296.500 Subpart M (Fall Protection), with applicable State Administrative Code safety standards for Fall Restraint and Fall Arrest.
 2. OSSC Oregon Structural Specialty Code - Uniform Building Code

1.08 COORDINATION

- A. Review documentation of structural deck, reinforcements, and anchorages to receive fall protection anchors.

1.09 WARRANTY

- A. Warrant products installed under this section of work to be free of leaks, condensation and defects in materials and/or manufacture for a period of 20 years when installed in accordance with the manufacturer's written instructions.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Guardian Fall Protection, 26609 79th Ave. S., Kent, WA 98032, Phone: 800-466-6385, ext. 113, Fax: 800-670-7892 www.guardianfall.com
- B. Super Anchor Safety, 8522-216th Street SE, Woodinville, WA 98072. Commercial Roof Anchor. Phone 425-488-8868 www.superanchor.com.
- C. Thaler Metal Industries, 1-800-387-7217, (Mississauga, Ontario, Canada) or 1-800-576-1200 (Niagara Falls, NY)
- D. Pro-Bel Enterprises Limited, -765 Westney Road South, Ajax, Ontario, Canada. L1S 6W1, (800) 461-0575 - U.S.A. Toll Free: www.pro-bel.ca
- E. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MANUFACTURED UNITS

- A. "Fixed Eye" Roof Anchors
 - 1. Materials:
 - a. Steel Plates, Bars: ASTM A240 / A240M - 09a (Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications).
 - b. Wire Rope: ASTM A 492 Standard Specification for Stainless Steel Rope Wire.
 - c. Aluminum: ASTM B221 - 08 Standard Specifications for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 2. Finish: Hot Dipped Galvanized.
 - 3. Extent:
 - a. Single point anchors at Single-Ply Membrane Roofing area.
 - b. Lifeline system at Metal Roofing area.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine framing and substrate and verify conditions comply with structural requirements for proper system performance.
- B. Proceed with installation of roof anchors only after verifying conditions are satisfactory.

3.02 INSTALLATION

- A. Roof Anchors
 - 1. Install anchors or equipment in accordance with manufacturer's printed instructions, shop drawings, manufacturer's recommendations and as specified.
 - 2. Where necessary, provide protection against deterioration due to contact of dissimilar materials.
 - 3. Where bolting is used for fastening anchors, no fewer than two threads is to be exposed and the nut is to be positively locked by deforming threads, welding, pinning or equivalent method.
 - 4. Ensure work is inspected prior to application of roofing by the manufacturer's factory-trained representative.
- B. Flashing
 - 1. Install roof support flashing in accordance with anchor manufacturer's printed instructions, and coordinated with the roofing manufacturer and subcontractor.

3.03 ADJUSTING AND FINAL INSPECTION

- A. Verify that all manufactured units have been installed in accordance with specifications and details, and will function as intended. Adjust any items where necessary to ensure proper operation.
- B. Replace damaged or malfunctioning items.

- C. Provide necessary documentation certifying system is acceptable for service (Manufacturer's Certificate of Acceptance).

3.04 CLEANING

- A. Clean manufactured units using materials and methods approved by manufacturer. Do not use cleaners or techniques which could impair performance of the roofing system.

3.05 DEMONSTRATION

- A. Instruct Owner's designated safety engineer in proper use of fall prevention devices.

END OF SECTION

**SECTION 07 8400
FIRESTOPPING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems.
- B. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies .
- C. Locate at fire rated building separation walls where indicated.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 2116 - Gypsum Board Assemblies: Gypsum wallboard fire rated assemblies.
- C. Section 07 9513 - Expansion Joint Cover Assemblies
- D. Divisions 21, 22, 23, 26: Firestopping of mechanical, electrical, and plumbing work.

1.03 REFERENCE STANDARDS

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a.
- B. ASTM E1966 - Standard Test Method for Fire Resistive Joint Systems; 2007 (Reapproved 2011).
- C. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2010.
- D. ASTM E2837 - Standard Test Method for Determining Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2011.
- E. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2009.
- F. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- G. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.
- H. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.
- I. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Underwriters Laboratories Inc.; 2004.
- J. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.
- K. OSSC - Oregon Structural Specialty Code: Current Edition

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Certificate from authority having jurisdiction indicating approval of materials used.

1.05 PERFORMANCE REQUIREMENTS

- A. Delegated-Design Submittal: For penetration firestopping indicated to comply with performance requirements and design criteria, including product data and, where applicable, engineering judgment drawings signed and sealed by the qualified professional engineer responsible for their preparation.

1. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 - Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record.

1.06 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
 3. For those firestop applications that exist but there is no UL tested system available through any manufacturer, a manufacturer's engineering judgement derived from similar UL system designs or other tests should be submitted by the contractor to local authorities having jurisdiction for their review and approval prior to installation.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: A firm experienced in installing penetration firestopping 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 penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

1.07 PREINSTALLATION CONFERENCE

- A. Preinstallation Conference: Conduct conference at Project site.
 1. Coordinate the conference to include the Building Inspector and provide the Inspector with a list of materials and assemblies proposed for use, type of penetrations where each material or assembly will be used, and UL listing and approval information.

1.08 SEQUENCING

- A. Sequence Work to permit firestopping materials to be installed after adjacent and surrounding work is complete.

1.09 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

PART 2 PRODUCTS

2.01 FIRESTOPPING - GENERAL REQUIREMENTS

- A. Manufacturers:
 1. A/D Fire Protection Systems Inc: www.adfire.com.
 2. 3M Fire Protection Products: www.3m.com/firestop.
 3. Hilti, Inc: www.us.hilti.com.
 4. Nelson FireStop Products: www.nelsonfirestop.com.
 5. Specified Technologies, Inc: www.stifirestop.com.
 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Firestopping: Any material meeting requirements.
- C. Firestopping Materials with Volatile Content: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- D. Mold Resistance: Provide firestopping materials with mold and mildew resistance rating of 0 as determined by ASTM G21.

- E. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.
- F. Fire Ratings: See Drawings for required construction assemblies and ratings.

2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Perimeter Fire Containment Firestopping: Use any system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of the floor assembly.
 - 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
- B. Head-of-Wall Firestopping at Joints Between Non-Rated Floor and Fire-Rated Wall: Use any system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
 - 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
- C. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use any system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
 - 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
- D. Through Penetration Firestopping: Use any system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
 - 1. For penetrations by combustible items including; insulated metal pipe, jacketed PVC, flexible cable or cable bundles, cable trays, and plastic pipe, an intumescent material is required to maintain fire rating of the assembly penetrated.

2.03 FIRESTOPPING SYSTEMS

- A. Firestopping: Any material meeting requirements.
 - 1. Fire Ratings: Use any system listed by UL, FM, or ITS (Warnock Hersey) or tested in accordance with ASTM E 814 that has F Rating equal to fire rating of penetrated assembly and T Rating Equal to F Rating and that meets all other specified requirements.
 - 2. Surface Burning Characteristics: Conform to OSSC.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authority having jurisdiction.

3.04 IDENTIFICATION

- A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage" or similar indication that the penetration is fire-rated.

2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.05 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

END OF SECTION

SECTION 07 9005
JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sealants and joint backing.

1.02 RELATED REQUIREMENTS

- A. Section 07 2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders:
- B. Section 08 6300 - Metal-Framed Skylights: Structural and weatherseal sealants and accessories.
- C. Section 08 8000 - Glazing: Glazing sealants and accessories.
- D. Section 09 2116 - Gypsum Board Assemblies: Acoustic sealant.

1.03 REFERENCE STANDARDS

- A. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- B. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.04 ADMINISTRATIVE REQUIREMENTS

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

1.05 PRECONSTRUCTION TESTING

- A. Preconstruction Field-Adhesion Testing: Before installing 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.
 - a. Locate test joints on integrated exterior mock-ups, where applicable.
 - 2. Conduct field tests for each application indicated below:
 - a. Each kind of sealant and joint substrate indicated.
 - 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 - 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
 - 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.
 - 5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 - 6. 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.

1.06 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant performance criteria, substrate preparation, and limitations.
 - 1. For sealants and sealant primers used inside the weatherproofing system, include printed statement of VOC content.

- C. Selection Samples: Submit manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- D. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.
- E. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.
- F. Manufacturer's Installation Instructions: Indicate surface preparation.
- G. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- H. Field-Adhesion Test Reports: For each sealant application tested.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

1.08 MOCK-UP

- A. Provide mock-up of sealant joints in conjunction with window and wall under provisions of Section 01 4000.
- B. Construct mock-up with specified sealant types and with other components noted.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work.

1.09 FIELD CONDITIONS

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

1.10 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish 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 for Silicone Sealants: 20 years from date of Substantial Completion.
 - 2. Warranty Period for All other Types of Sealants: 5 years from date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Gunnable and Pourable Sealants:
 - 1. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
 - 2. Bostik Inc: www.bostik-us.com.
 - 3. Dow Corning Corporation: www.dowcorning.com.
 - 4. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.
 - 5. Pecora Corporation: www.pecora.com.
 - 6. Tremco Global Sealants: www.tremcosealants.com.

7. Substitutions: See Section 01 6000 - Product Requirements.
- B. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.02 SEALANTS

- A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

2.03 SILICONE JOINT SEALANTS

- A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, for Use NT.
 1. Products:
 - a. BASF Building Systems; Omniseal 50.
 - b. Dow Corning Corporation; 795.
 - c. Momentive Performance Materials (formerly GE Silicones); SilPruf SCS2000.
 - d. Pecora Corporation; 864.
 - e. Sika Corporation, Construction Products Division; SikaSil-C995.
 - f. Tremco Incorporated; Spectrem 2.
 2. Locations of Use:
 - a. Control, expansion and isolation joints in steel or aluminum.
- B. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 100/50, for Use NT.
 1. Products:
 - a. Dow Corning Corporation; 790.
 - b. Momentive Performance Materials (formerly GE Silicones); SilPruf LM SCS2700.
 - c. Pecora Corporation; 890.
 - d. Sika Corporation, Construction Products Division; SikaSil-C990.
 - e. Tremco Incorporated; Spectrem 1.
 2. Sanding of Joints: Provide sanded joints at joints occurring in masonry surfaces.
 3. Locations of Use:
 - a. Exterior joints in vertical and nontraffic surfaces, unless otherwise indicated.
 - b. Vertical control and expansion joints on exposed interior surfaces of exterior walls.
 - c. Interior perimeter joints of exterior openings.
- C. Mildew-Resistant, Single-Component, Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT.
 1. Products:
 - a. BASF Building Systems; Omniplus.
 - b. Dow Corning Corporation; 786 Mildew Resistant.
 - c. Momentive Performance Materials (formerly GE Advanced Materials); Sanitary SCS1700.
 - d. Pecora Corporation; 898.
 - e. Tremco Incorporated; Tremsil 200 Sanitary or Tremsil 600.
 2. Locations of Use:
 - a. Interior joints between plumbing fixtures and adjoining walls, floors and counters.
 - b. Interior joints between cabinetry and counters and adjoining walls.
- D. Single-Component, Silicone USDA Approved Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Use NT.
 1. Products:
 - a. BASF Building Systems; Omniplus.
 - b. Dow Corning Corporation; 786 Mildew Resistant.
 - c. Momentive Performance Materials (formerly GE Advanced Materials); Sanitary SCS1002.
 - d. Pecora Corporation; 898.

- e. Tremco Incorporated; Tremsil 600.
- 2. Locations of Use:
 - a. Interior joints in contact with food.

2.04 URETHANE JOINT SEALANTS

- A. Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C920, Type M, Grade NS, Class 25, for Use T.
 - 1. Products:
 - a. BASF Building Systems; Sonolastic NP 2.
 - b. Pecora Corporation; Dynatred.
 - c. Sika Corporation, Construction Products Division; Sikaflex - 2c NS.
 - d. Tremco Incorporated; Dymeric 240FC.
 - 2. Locations of Use:
 - a. Interior ceramic tile expansion control and isolation joints in vertical surfaces.
 - b. Vertical joints on exposed surfaces of interior unit masonry walls.
- B. Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C920, Type M, Grade P, Class 25, for Use T and I.
 - 1. Products:
 - a. BASF Building Systems; Sonolastic SL 2.
 - b. Pecora Corporation; Urexpan NR-200.
 - c. Sika Corporation, Inc. Sikaflex - 2c SL.
 - d. Tremco Incorporated; THC 900/901.
 - 2. Locations of Use:
 - a. Interior ceramic tile expansion, control, construction and isolation joints in horizontal traffic surfaces.
 - b. Exterior paving joints.

2.05 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
 - 1. Products:
 - a. BASF Building Systems; Sonolac.
 - b. Pecora Corporation; AC-20+.
 - c. Tremco Incorporated; Tremflex 834.
 - 2. Locations of Use: Perimeter joints between interior wall surfaces and frames of interior doors and elevator entrances.

2.06 POLYUREA JOINT SEALANTS

- A. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, aromatic polyurea with a Type A shore durometer hardness range of 85 to 95 per ASTM D2240.
 - 1. Products:
 - a. BASF, TF-100.
 - b. Euclid Chemical Company, QUIKjoint 200.
 - c. L&M Construction Chemicals, Inc.; Joint Tite 750.
 - 2. Locations of Use:
 - a. Interior joints in floor slabs.

2.07 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.
 - 1. Products:
 - a. Pecora Corporation; AC-20 FTR
 - b. Tremco Incorporated; Tremflex 834.
 - c. USG Corporation; SHEETROCK Acoustical Sealant or Firecode Smoke-Sound Sealant (where fully concealed from view).

2.08 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- E. Joint Backing: Round foam rod compatible with sealant; ASTM C 1330 Type B, cylindrical, bi-cellular material; oversized 30 to 50 percent larger than joint width.
 - 1. Products:
 - a. Sof Rod manufactured by Nomaco Inc.
 - b. Sonolastic Soft Backer-Rod manufactured by BASF.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.
- E. Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction field 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.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave. Remove and replace sealant in joints improperly tooled.
- H. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, 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 C919 and with manufacturer's written recommendations.
- I. Sanding Joint Sealants: At masonry surfaces, sand sealant joints full height of wall as follows:
 - 1. Dry tool the sealant assuring a minimum sealant thickness of 1/8 inch in the middle of the joint.

2. Before the sealant has skinned, deposit the selected sand, grout, or stone particles to the tacky sealant surface using whatever method is site appropriate (casting, tossing, air-blowing). Catch the excess particles, if possible, for reuse. Start at the lower levels and work up to minimize substrate contamination below.
3. Compress the particles into the surface of the un-skinned sealant to a depth of not greater than 1/16-inch, using a dry tool or other technique.
4. Allow the joint sealant to cure a minimum of seven days before testing the adhesion of the particles to the sealant or the sealant to the substrate.

3.04 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 1. Provide periodic field-adhesion testing as work progresses. Submit test results after each test.
 2. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
 - b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.
 3. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
 - a. 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. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. 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 kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 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.
- B. Evaluation of Field-Adhesion 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.

3.05 CLEANING

- A. Clean adjacent soiled surfaces.

3.06 PROTECTION

- A. Protect sealants until cured.
- B. 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.

END OF SECTION

SECTION 07 9513
EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Expansion joint assemblies for floor, wall, ceiling and soffit surfaces.
- B. Provide assemblies at seismic joints extending through the building at each classroom wing.
- C. At each joint, provide assemblies at roof, exterior walls, interior walls, ceilings, and floors.

1.02 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry: Placement of joint assembly frames in masonry.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Flashing at roof control joints.
- C. Section 07 9005 - Joint Sealers: Expansion and control joint finishing utilizing a sealant and bond breaker.
- D. Section 09 2116 - Gypsum Board Assemblies: Control joints in gypsum board walls and ceilings.

1.03 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2013.
- B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2010.
- D. ASTM B455 - Standard Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Extruded Shapes; 2010.

1.04 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures for submittal procedures.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices, available colors and finish .
- C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction, anchorage locations . Show details of each condition with recommended model, fasteners, and installation in actual building materials.
- D. Manufacturer's Installation Instructions: Indicate rough-in sizes; provide templates for cast-in or placed frames or anchors; required tolerances for item placement.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Expansion Joint Cover Assemblies:
 - 1. Basis of Design: Watson Bowman Acme, A Division of BASF, Expansion Control Systems: www.wbacorp.com
 - 2. Architectural Art Mfg., Inc: www.archart.com.
 - 3. Construction Specialties, Inc: www.c-sgroup.com.
 - 4. Inpro: www.inprocorp.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS

- A. Interior Floor Joints Subject to Seismic Movement:
 - 1. Products:
 - a. Watson Bowman Acme, WABO Fast Floor FJF-400, Interior Expansion Joint cover.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2. Provide cover for adjoining floors and for floor to wall.
 3. Size: As needed for conditions of use and as indicated.
- B. Interior Non-Fire-Rated Wall/Ceiling Joints Subject to Seismic Movement:
1. Products:
 - a. Watson Bowman Acme, WABO Fast Wall, Interior Expansion Joint Cover..
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 - c. Provide configuration and size as shown on drawings.
- C. Exterior Wall Joints Subject to Seismic Movement:
1. Products:
 - a. Watson Bowman Acme, WSW-600MB, Exterior Expansion Joint Cover.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- D. Exterior Weather Membrane System
1. Products:
 - a. Watson Bowman Acme, WABO, Gutter Flex USG - 18N, Seismic Joints Weather Membrane System.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 - c. Provide flexible weather proof membrane with flanges allowing attachment to adjoining materials. Provide means of sealing ends of membrane.
- E. Exterior Roof Joint Subject to Seismic Movement
1. Products for curb to wall and curb to curb:
 - a. Watson Bowman Acme, WABO Roof Cover, Exterior Roof Expansion Joint Cover.
 2. Substitutions: See Section 01 6000 - Product Requirements.
 3. Provide types for use on two adjoining roof curbs and on roof curbs and adjoining walls.
 4. Sizes: Provide size suitable for conditions of use and as shown on drawings.
 5. Accessories: Transition and end terminations.

2.03 EXPANSION JOINT COVER ASSEMBLIES

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
1. Joint Dimensions and Configurations: As indicated on drawings.
 2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
 3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
 4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.
- B. Floor Joint Covers: Coordinate with indicated floor coverings.
1. Provide sizes for joint as shown on drawings.
- C. Resilient Seal Type Covers: Having flat exposed surface without crevices that could collect dirt; designed to withstand expected movement without extrusion of seal from joint assembly; for floors, provide style that is flush with top of floor covering; for exterior joints, weathertight.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
1. Exposed Finish Outdoors: Natural anodized.
 2. Exposed Finish at Floors: Mill finish or natural anodized.
 3. Exposed Finish at Walls and Ceilings: Natural anodized.
- B. Resilient Seals:
1. For Ceilings: Any resilient material, flush, pleated, or hollow gasket.
 2. Color: Submit samples of manufacturer's standard colors for selection by Architect.
- C. Anchors and Fasteners: As recommended by cover manufacturer.

- D. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

3.02 PREPARATION

- A. Provide anchoring devices suitable for installation in respective substrates.

3.03 INSTALLATION

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

3.04 PROTECTION

- A. Do not permit traffic over unprotected floor joint surfaces.
- B. Provide strippable coating to protect finish surface.

END OF SECTION

SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated steel doors and frames.
- B. Steel frames for wood doors.
- C. Fire-rated steel doors and frames.
- D. Thermally insulated steel doors.
- E. Sound-rated steel doors and frames.
- F. Steel glazing frames.

1.02 RELATED REQUIREMENTS

- A. Section 08 7100 - Door Hardware.
- B. Section 08 8000 - Glazing: Glass for doors and borrowed lites.
- C. Section 09 9600 - High Performance Coatings: Field painting

1.03 REFERENCE STANDARDS

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- B. ANSI A250.6 - Hardware on Standard Steel Doors (Reinforcement - Application)
- C. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003 (R2008).
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.
- E. ASTM C1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus; 2011.
- F. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- G. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- H. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.
- I. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.
- J. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2013.
- K. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- L. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. To provide a higher level of coordination the following building materials must be provided by the same sub-contractor.
 - 1. 08 1113 - Hollow Metal Doors and Frames
 - 2. 08 7100 - Door Hardware
- B. The steel door and frame supplier shall be a manufacturer or distributor regularly engaged in supplying hollow metal products in this geographic area who has competent field personnel available to consult with the Architect and Contractor regarding applications or field installation problems.
- C. It is the intent of this specification to provide a general guideline for the quality, function, and design of the hollow metal doors, frames, and windows. It is the specific responsibility of the

hollow steel supplier to furnish products which are fully functional, in full compliance with state and local building codes, fire codes, and disability and accessibility codes. Any supplier bidding on this section of the work shall notify the Architect prior to bidding, in accordance with Instructions to Bidders, of discrepancies or will be assumed to have included correct material to make this compliance.

1.05 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
 - 1. Indicate U-value for exterior doors.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. 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.
- F. 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.
- G. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
- 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 UL 10C.

1.07 DEFINITIONS

- A. Seamless: In addition to the requirements for full flush doors as defined in ANSI/SDI A250.8, no visible seams are permitted along the vertical edges of doors. Fabricate seams on the vertical edges by one of the following methods:
 - 1. Intermittently welded seams, edge filled, dressed smooth, or
 - 2. Continuously welded seam dressed smooth.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel Doors and Frames:
 - 1. Assa Abloy Ceco or Curries: www.assaabloydss.com.
 - 2. Republic Doors: www.republicdoor.com.
 - 3. Steelcraft, an Allegion brand: www.allegion.com/us.
 - a. Level 2 and Level 3 Doors: BW18 and BW16, respectively, manufactured by Steelcraft.
 - b. b. Frames: F16 and F14 manufactured by Steelcraft.
 - 4. Door Components: www.doorcomponents.com
 - 5. Stiles Custom Metal, Inc: www.stiles.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS AND FRAMES

- A. Requirements for All Doors and Frames:
 - 1. Accessibility: Comply with ANSI/ICC A117.1.
 - 2. Door Top Closures: Flush with top of faces and edges.
 - 3. Door Edge Profile: Beveled on both edges.
 - 4. Door Texture: Smooth faces.
 - 5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
 - 6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
 - 7. Finish: Factory primed, for field finishing.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.
- C. Hardware Preparation: In accordance with ANSI/SDI 250.6, with reinforcement welded in place, in addition to other requirements specified in door grade standard and as follows:
 - 1. Closers: 0.093 inch, 12 gage.
 - 2. Hinges: 0.167 inch, 7 gage.
 - 3. All other surface applied hardware: 0.067 inch, 14 gage.
- D. Finish: Factory primed, for field finishing.
 - 1. Provide primer compatible with primers specified in Section 09 96 00 - High-Performance Coatings.

2.03 STEEL DOORS

- A. Exterior Doors:
 - 1. Grade: ANSI A250.8 - SDI-100; Level 1 - Standard-Duty, Physical Performance Level C, Model 1 - Full Flush.
 - 2. Steel Thickness: 16 gage.
 - 3. Core: Polyurethane.
 - 4. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
 - 5. Thickness: 1-3/4 inches.
 - 6. Insulating Value: U-value of 0.50, when tested in accordance with ASTM C1363.
 - 7. Weatherstripping: Separate, see Section 08 7100.
- B. Interior Doors, Non-Fire-Rated:
 - 1. Grade: ANSI A250.8 - SDI-100; Level 1 - Standard-Duty, Physical Performance Level C, Model 1 - Full Flush.
 - 2. Steel Thickness: 16 gage.
 - 3. Core: Kraftpaper honeycomb.
 - 4. Thickness: 1-3/4 inch.
- C. Interior Doors, Fire-Rated:
 - 1. Grade: ANSI A250.8 - SDI-100; Level 1 - Standard-Duty, Physical Performance Level C, Model 1 - Full Flush.
 - 2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
 - a. Provide units listed and labeled by UL (Underwriters Laboratories) - UL (BMD).
 - b. Attach fire rating label to each fire rated unit.
 - 3. Core: Mineral board.
- D. Interior Doors, Sound-Rated:
 - 1. Grade: ANSI A250.8 - SDI-100; Level 1 - Standard-Duty, Physical Performance Level C, Model 2 - Seamless.

2. Acoustic Rating of Assembled Door, Frame, and Seals: STC of 35, calculated in accordance with ASTM E413, tested in accordance with ASTM E90.
 3. Core: Polyurethane.
 4. Sound Seals: Integral, concealed in door and/or frame.
 5. Force to Open and Close and Latch: Not more than 5 lbs.
- E. Panels: Same construction, performance, and finish as doors.

2.04 STEEL FRAMES

- A. General:
1. Comply with the requirements of grade specified for corresponding door, except:
 - a. ANSI A250.8 - SDI-100, Level 1 Door Frames: 16 gage, 0.053 inch, minimum thickness.
 - b. ANSI A250.8 Level 2 Doors: 16 gage frames, School District Standard for interior.
 - c. ANSI A250.8 Level 3 Doors: 14 gage frames, School District Standard for exterior.
 - d. ANSI A250.8 - SDI-100, Level 4 Door Frames: 12 gage, 0.093 inch, minimum thickness.
 - e. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 - SDI-100, Level 1, 18 gage, 0.042 inch
 2. Finish: Same as for door.
 3. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
 4. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
 5. Frames Installed Back-to-Back: Reinforce with steel channels anchored to floor and overhead structure.
 6. Anchor: Provide anchor recommended by the frame manufacturer for the wall construction application that each frame will be located in.
- B. Exterior Door Frames: Fully welded.
1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
 2. Weatherstripping: Separate, see Section 08 7100.
- C. Interior Door Frames, Non-Fire-Rated: Fully welded type.
- D. Interior Door Frames, Fire-Rated: Fully welded type.
1. Fire Rating: Same as door, labeled.
- E. Sound-Rated Door Frames: Fully welded type.
- F. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

2.05 ACCESSORY MATERIALS

- A. Glazing: As specified in Section 08 8000 .
- B. Removable Stops in steel window frames: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.
- C. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.
- D. Mineral-Fiber Insulation: ASTM C665, 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 E136 for combustion characteristics.
- E. 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-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- F. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick. Provide clip-type anchors, with two holes to receive fasteners.
- G. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.06 FINISH MATERIALS

- A. Primer: Rust-inhibiting, complying with ANSI A250.10 and compatible with finish coats specified in Section 09 9600 - High Performance Coatings.
- B. Corrosion Resistant Coating: High-build, water-resistant, resilient coating NFPA 101 Class A.
1. Product: Hi-Build Epoxoline II N69 manufactured by Tnemec or equal.

2.07 FABRICATION

- A. 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. Install top cap and mechanically attach to door to prevent water intrusion.
- B. 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 and Transom Bar 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. Floor Anchors: Provide adjustable base anchors at bottom of jambs. Provide fixed anchors at mullions.
 4. 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) Three anchors per jamb up to 90 inches high.
 - 2) 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) Four anchors per jamb up to 90 inches high.
 - 2) Five anchors per jamb from 90 to 96 inches high.
 - 3) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.
 5. Door Silencers: Except on weather-stripped or gasketed 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

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.

3.02 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with corrosion resistant coating at 4 mil DFT, prior to installation.

3.03 INSTALLATION

- A. Install in accordance with the requirements of the specified door grade standard .
- B. In addition, install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Coordinate installation of hardware.
- F. Coordinate installation of glazing.
- G. Coordinate installation of electrical connections to electrical hardware items.
- H. Touch up damaged factory finishes.
- I. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- J. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
- K. Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
- L. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 - 1. At post-installed anchors, countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

3.04 TOLERANCES

- A. Clearances Between Door and Frame: As specified in ANSI A250.8 - SDI-100.
- B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

- A. Adjust for smooth and balanced door movement.
- B. Adjust sound control doors so that seals are fully engaged when door is closed.

3.06 SCHEDULE - SEE DRAWINGS

END OF SECTION

**SECTION 08 1416
FLUSH WOOD DOORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush wood doors; flush configuration; fire rated and non-rated.
- B. Factory finishing.

1.02 RELATED REQUIREMENTS

- A. Section 08 1113 - Hollow Metal Doors and Frames.
- B. Section 08 7100 - Door Hardware.
- C. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard.
- B. ICC (IBC) - International Building Code; 2012.
- C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- D. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2013.
- E. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association; 2012.
- F. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- G. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- H. WDMA I.S.1-A - Architectural Wood Flush Doors; Window and Door Manufacturers Association; 2011.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. To provide a higher level of coordination the following building materials must be provided by the same sub-contractor.
 - 1. 08 1113 - Hollow Metal Doors and Frames
 - 2. 08 1416 - Flush Wood Doors
 - 3. 08 7100 - Door Hardware

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
 - 1. Provide product data for adhesives and composite wood products, indicating that product contains no added urea formaldehyde.
- D. Specimen warranty.
- E. Samples: Submit two samples of door veneer, 8-1/2 x 11 inch in size illustrating wood grain, stain color, and sheen.
- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. Warranty, executed in Owner's name.

1.06 QUALITY ASSURANCE

- A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

- 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 10C.
- D. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
- E. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated.

1.07 DELIVERY, STORAGE, AND HANDLING

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

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.
 - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 - 1. Algoma: www.algomahardwoods.com.
 - 2. Eggers Industries; ____: www.eggersindustries.com.
 - 3. Lynden Door, Inc.
 - 4. Marshfield DoorSystems, Inc; ____: www.marshfielddoors.com.
 - 5. Vancouver Architectural Doors: www.vancouverdoorco.com.
 - 6. VT Industries: www.vtindustries.com.
 - 7. Oregon Door; www.oregondoor.com.
 - 8. Oshkosh Door Company: www.oshkoshdoor.com.
 - 9. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS

- A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain added urea formaldehyde or doors that comply with CA 01350, the State of California's Department of Health Services Standard Practice for testing chemical emissions from building products used in schools, offices and other sensitive environments. Third party certification for this testing is required.
- B. All Doors: See drawings for locations and additional requirements.
 - 1. Quality Level: Custom Grade, Standard Duty performance, in accordance with WDMA I.S.1-A.
 - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- C. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at all locations except provide hollow core doors at ____.
 - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with NFPA 252 or UL 10B - Negative (Neutral) Pressure; Underwriters Laboratories Inc. (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
 - 3. Wood veneer facing with factory transparent finish where indicated on drawings.

2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), ANSI A208.1, Grade LD-2, plies and faces as indicated above, made with binder containing no added urea-formaldehyde resin or provide certification for low chemical emissions complying with CA 01350 noted above.
 - 1. Provide structural composite lumber core for full glazed doors.
- B. Fire Rated Doors: Mineral core, Type FD, plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting. This includes, but is not limited to, blocking for locksets, exit devices, closers and flush bolts.
- C. Hollow Core Doors: Type - Standard (FSHC); plies and faces as indicated.

2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Red oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
 - 1. Vertical Edges: Any option allowed by quality standard for grade.
 - 2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.
- B. Facing Adhesive: Type I - waterproof.

2.05 ACCESSORIES

- A. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamper proof screws.
- B. Astragals for Non-Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge.

2.06 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Blocking: Provide minimum 5 inch top rail blocking for all doors with closers. Provide 5 inch bottom rail for auxiliary hardware and undercut flexibility.
 - 1. At fire rated doors with mineral core, provide solid blocking at lock edge and top of door for lockset and closer reinforcement. Provide midrail blocking in doors indicated to have exit devices.
- C. Stiles (Vertical Edges): Provide manufacturer's standard laminated edge construction with improved screw-holding capability and split resistance. Both inner and outer stiles cannot contain salt treating.
- D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- E. Factory fit factory finished doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard except as follows:
 - 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.
 - 2. Comply with requirements in NFPA 80 for fire-rated doors.
- F. Bevel edges 1/8 inch in 2 inches at lock and hinge edges.
- G. Provide edge clearances in accordance with the quality standard specified.

2.07 FACTORY FINISHING - WOOD VENEER DOORS

- A. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for Grade specified and as follows:
 - 1. Transparent:
 - a. System - 9, UV Curable, Acrylated Epoxy, Polyester or Urethane.

- b. Stain: As selected by Architect.
- c. Sheen: Semigloss.
- B. Factory finish doors in accordance with approved sample.
- C. Seal door top edge with color sealer to match door facing.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.
- F. Protect veneer from damage during construction. Do not wedge open doors with any material that might cause the veneer to split or chip.

3.03 TOLERANCES

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Rehang or replace doors that do not swing or operate freely.
- C. 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
- D. Adjust closers for full closure.

3.05 SCHEDULE - SEE DRAWINGS

END OF SECTION

SECTION 08 3100
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall access door and frame units.
- B. Ceiling access door and frame units.

1.02 RELATED REQUIREMENTS

- A. Section 09 9000 - Painting and Coating: Field paint finish.

1.03 REFERENCE STANDARDS

- A. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- B. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Manufacturer's Installation Instructions: Indicate installation requirements.
- D. Project Record Documents: Record actual locations of all access units.

PART 2 PRODUCTS

2.01 WALL AND CEILING UNITS

- A. Manufacturers:
 - 1. Acudor Products Inc: www.acudor.com.
 - 2. Barco Manufacturing.
 - 3. Cierra Products.
 - 4. Dur-Red Products; www.dur-red.com.
 - 5. Karp Associates, Inc: www.karpinc.com.
 - 6. Milcor by Commercial Products Group of Hart & Cooley, Inc: www.milcorinc.com.
 - 7. Substitutions: See Section 01 6000 - Product Requirements.
- B. Access Doors: Factory fabricated door and frame units, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.
 - 1. Material: Steel.
 - 2. Similar to Milcor Model DWR at non rated wall openings. Type that accepts gypsum board applied over door flush with surrounding finish.
 - 3. Similar to Acudor Model # UF 5000 at ceilings.
 - 4. Material: Steel.
 - 5. Style: Exposed frame with door surface flush with frame surface.
 - 6. Door Style: Single thickness with rolled or turned in edges.
 - 7. Frames: 16 gage, 0.0598 inch, minimum.
 - 8. Single Thickness Steel Door Panels: 0.070 inch, minimum.
 - 9. Material: Stainless Steel in Restrooms, Primed steel elsewhere..
 - 10. Frames and flanges: 0.058 inch steel.
 - 11. Door panels: 0.070 inch single thickness steel sheet; rounded corners.
 - 12. Units in Fire Rated Assemblies: Fire rating as required by applicable code for the fire rated assembly in which they are to be installed.
 - a. Provide products listed and labeled by UL or ITS (Warnock Hersey) as suitable for the purpose specified and indicated.
 - 13. Steel Finish: Prime painted at steel doors. At Stainless steel doors provide type 304 number 4 finish.

14. Primed Finish: Polyester powder coat; manufacturer's standard color.
15. Size(s): 12 inch by 12 inch at restrooms, 18 inch by 18 inch elsewhere unless otherwise noted..
16. Hardware:
 - a. Hardware for Fire Rated Units: As required for listing.
 - b. Hinges for Non-Fire-Rated Units: Continuous piano hinge.
 - c. Latch/Lock in students or public areas: Cylinder lock operated cam latch, two keys for each unit.
 - d. Latch/Lock in areas not accessible to students or public: Screw driver slot for quarter turn cam latch.
17. Finish: At steel doors provide prime coat with baked on primer. At stainless steel doors provide number 4 finish.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings are correctly sized and located.

3.02 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings. Secure rigidly in place.
- C. Position units to provide convenient access to the concealed work requiring access.

END OF SECTION

**SECTION 08 3323
OVERHEAD COILING DOORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Location at Kitchen
- B. Overhead coiling doors and shutters, operating hardware, non-fire-rated, manual operation.

1.02 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.

1.03 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."
 - 2. Seismic Component Importance Factor: As indicated on Structural Drawings.
- B. Operation Cycles: Provide overhead coiling 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.

1.04 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures for submittal procedures.
- B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- C. Manufacturer's Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.
- D. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Overhead Coiling Doors:
 - 1. Alpine Overhead Doors, Inc: www.alpinedoors.com.
 - 2. Clopay Corporation: www.clopaydoor.com.
 - 3. Cornell Iron Works, Inc: www.cornelliron.com.
 - 4. The Cookson Company: www.cooksondoor.com.
 - 5. Wayne-Dalton, a Division of Overhead Door Corporation: www.wayne-dalton.com.
 - 6. Overhead Door Corporation: www.overheaddoor.com
 - 7. Raynor Rolling Doors: www.raynor.com
 - 8. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COILING DOORS

- A. Non-Fire-Rated Interior Coiling Doors: Stainless steel slat curtain.
 - 1. Single thickness slats.
 - 2. Nominal Slat Size: 2-3/4 inches wide x required length.
 - 3. Finish: No. 4.
 - 4. Hood Enclosure: Manufacturer's standard; primed steel.
 - 5. Hood Enclosure: Finish to match door.
 - 6. Manual push up operation.
 - a. Chain lock keeper: Suitable for padlock.
 - b. Provide chain bag for each door

7. Mounting: Within framed opening.
8. Interior latch only.

2.03 MATERIALS

- A. Curtain Construction: Interlocking slats.
 1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
 2. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.
- B. Stainless Steel Slats: Minimum thickness, 22 gage, 2 3/4 inch, conforming to ASTM A 666, Type 304, rollable temper.
- C. Guide Construction: Continuous, of profile to retain door in place with snap-on trim, mounting brackets of same metal.
- D. Hood Enclosure: Internally reinforced to maintain rigidity and shape.
- E. Hardware:
 1. Lock Cylinders: Specified in Section 08 7100.
 2. Latching: Inside mounted, adjustable keeper, spring activated latch bar with feature to keep in locked or retracted position.
 3. Latch Handle: Interior handle.
- F. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.
- G. General: All components easily cleaned and corrosion free for use in food service area.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

3.03 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch.
- C. Maximum Variation From Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.04 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.

3.05 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.
 1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

2. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance, and procedures for testing and resetting release devices.
3. Review data in the maintenance manuals.
4. Schedule training with Owner with at least 7 days' advance notice.

3.06 ADJUSTING

- A. Adjust operating assemblies for smooth and noiseless operation.

3.07 CLEANING

- A. Clean installed components.
- B. Remove labels and visible markings.

END OF SECTION

SECTION 08 3613
SECTIONAL DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Locations: South wall of cafeteria
- B. Overhead sectional doors, electrically operated.
- C. Operating hardware and supports.
- D. Electrical controls.

1.02 RELATED REQUIREMENTS

- A. Section 04 2000 - Unit Masonry - Prepared opening
- B. Section 26 2717 - Equipment Wiring.

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2010.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2010.
- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2013.
- E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- F. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- G. DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors; Door & Access Systems Manufacturers' Association, International; 2011.
- H. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2011.
- I. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Product Data: Show component construction, anchorage method, and hardware.
- D. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.
- E. Operation Data: Include normal operation, troubleshooting, and adjusting.
- F. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.
- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum three years of experience.
- C. Conform to applicable code for motor and motor control requirements.
- D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for electric motor and transmission.
- D. Provide five year manufacturer warranty for electric operating equipment.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Overhead Door Co.; Product Model 521.
- B. Other Acceptable Manufacturers:
 - 1. Wayne-Dalton, a Division of Overhead Door Corporation: www.wayne-dalton.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ALUMINUM DOOR COMPONENTS

- A. Aluminum Doors: Match Overhead Door Model 521. Stile and rail aluminum with glazed panels; Vertical lift operating style with track and hardware; complying with DASMA 102, Commercial application.
 - 1. Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.
 - 2. Door Nominal Thickness: 1-3/4 inches thick.
 - 3. Finish: Anodized, Prefinished with anodized coating of clear finish, see door and color schedule..
 - 4. Glazed Lights: Full panel width, multiple rows; set in place with resilient glazing channel. See drawings for number of glazed rows.
 - 5. Operation: Electric.
- B. Door Panels: 6063-T6 aluminum construction; extruded aluminum stiles and rails; 1-3/4 inch thick infill panels of sheet aluminum; stile and rail joints welded; rabbeted weather joints at meeting rails. Solid panels insulated.
- C. Door Panels: 6063-T6 aluminum construction; extruded aluminum stiles and rail construction; secured with 1/4 inch diameter through rods.
- D. Glazing: Type Insulated double glazing indicated on door schedule and specified in Section 08 8000.

2.03 DOOR COMPONENTS

- A. Track: Rolled galvanized steel, 0.090 inch thick; 3 inch wide, continuous one piece per side; galvanized steel mounting brackets 1/4 inch thick.
- B. Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel; floating hardened steel bearing rollers, located at top and bottom of each panel, each side.
- C. Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables.
 - 1. For Manual Operation: Requiring maximum exertion of 25 lbs force to open.

- D. Sill Weatherstripping: Resilient hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.
- E. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.
- F. Head Weatherstripping: EPDM rubber seal, one piece full length.
- G. Weather seal between panels: Joint seal between sections.
- H. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.
- I. Lock: Inside center mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior handle.
- J. Pull-rope automatic door release.
- K. Lock Cylinders: See Section 08 7100.
- L. Chain bag: Provide bag for manual chain allowing chain to be stored when not in use.

2.04 MATERIALS

- A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G60/Z180 coating, plain surface.
- B. Aluminum Sheet: ASTM B209 (ASTM B209M), 5005 alloy, H14 temper, plain surface.
- C. Aluminum Extrusions: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- D. Insulation: Rigid polyurethane, .
 - 1. Same thickness as core framing members.

2.05 ELECTRICAL OPERATION

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by a testing agency acceptable to authorities having jurisdiction.
- B. Electrical Characteristics:
 - 1. 1/2 hp ; manually operable in case of power failure, transit speed of 12 inches per second.
 - 2. 208 volts, single phase, 60 Hz.
- C. Motor: NEMA MG1, Type 1.
- D. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.
- E. Disconnect Switch: Factory mount disconnect switch in control panel.
- F. Electric Operator: Center mounted on cross head shaft, adjustable safety friction clutch; brake system actuated by independent voltage solenoid controlled by motor starter; enclosed gear driven limit switch; enclosed magnetic cross line reversing starter; mounting brackets and hardware.
 - 1. Similar to Overhead Door Model RSX.
- G. Electric Eye Safety Device: Provide one near sill at each door. Capable of reversing door upon sensing obstruction.
- H. Control Station: Standard key-operated control with open-close-stop-stop buttons, momentary type control for each electric operator.
 - 1. 24 volt circuit.
 - 2. Recess mounted in masonry wall.
 - 3. Locate at inside door jamb. Verify location with Architect.
- I. Provide two electrical contacts capable of signaling HVAC system and coordinating with DDC system - one which closes when door opens, and one which closes when door closes. Coordinate with HVAC contractor.
- J. Interconnection to Security System

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- B. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

- A. Install door unit assembly in accordance with manufacturer's instructions.
- B. Anchor assembly to wall construction and building framing without distortion or stress.
- C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- D. Fit and align door assembly including hardware.
- E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 1/16 inch.
- B. Maximum Variation from Level: 1/16 inch.
- C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.
- D. Maintain dimensional tolerances and alignment with adjacent work.

3.04 ADJUSTING

- A. Adjust door assembly for smooth operation and full contact with weatherstripping.

3.05 CLEANING

- A. Clean doors and frames and glazing.
- B. Remove temporary labels and visible markings.

3.06 PROTECTION

- A. Protect installed products from damage during subsequent construction.
- B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

END OF SECTION

SECTION 08 4229
AUTOMATIC ENTRANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Automatic Sliding Doors
- B. Operators.
- C. Controllers, actuators and safety devices.

1.02 RELATED REQUIREMENTS

- A. Section 08 4313 - Aluminum Framed Storefronts
- B. Section 08 4413 - Glazed Aluminum Curtain Walls
- C. Section 08 8000 - Glazing
- D. Division 26 - Electrical: Electrical power to operator.
- E. Division 28 - Electronic Safety and Security: Security system signal to operator.

1.03 REFERENCE STANDARDS

- A. ANSI A117.1 - American National Standard for Accessible and Useable Buildings and Facilities.
- B. ANSI A156.10 - Power Operated Pedestrian Doors.
- C. ANSI/UL 325 - Door, Drapery, Gate, Louver, and Window Operators and Systems - (UL) listed.
- D. ANSI-Z97.1.2 - Safety Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings.
- E. Aluminum Association Standard AA DAF-45 - Designation System for Aluminum Finishes.
- F. Miami-Dade County Building Code Compliance Office (BCCO) Notice of Acceptance (NOA)
- G. PA 201-94 - Large and Small Missile Impact Test. Dade County Code Compliance Protocols.
- H. PA 202-94 - Uniform Static Pressure Test. Dade County Code Compliance Protocols.
- I. PA 203-94 - Cyclic Wind Pressure Loading Test. Dade County Code Compliance Protocols.
- J. NFPA 101 - Life Safety Code.
- K. FBC - Florida Building Code Compliance Office.
- L. AAADM - American Association of Automatic Door Manufacturers/
- M. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2012.
- N. BHMA A156.10 - American National Standard for Power Operated Pedestrian Doors; Builders Hardware Manufacturers Association; 2011 (ANSI/BHMA A156.10).
- O. BHMA A156.19 - American National Standard for Power Assist and Low Energy Power Operated Doors; Builders Hardware Manufacturers Association; 2013 (ANSI/BHMA A156.19).
- P. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2011.
- Q. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- R. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:

1. Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, recesses, materials, and finishes, electrical characteristics and connection requirements.
- C. Product Data: Provide data on system components, sizes, features, and finishes.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and manufacturer's hardware and component templates.
- E. Maintenance Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.
- F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 1. Wrenches and other tools required for maintenance of equipment.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years of experience.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide two year manufacturer warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Sliding Automatic Entrance Door Assemblies:
 1. Acceptable Manufacturer: Tormax Technologies, Inc., which is located at: 12859 Wetmore Rd. ; San Antonio, TX 78247; Toll Free Tel: 888-685-3707; Tel: 210-494-3551; Fax: 210-494-5930; Email: request info (info@tormaxusa.com); Web:www.tormaxusa.com
 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 POWER OPERATED DOORS

- A. Telescoping Automatic Sliding Door: Model TX9430 by Tormax.
- B. Bi-part inside slide application (SO-SX-SX-SX-SO).
- C. All Power Operated Doors: Provide products that comply with the requirements of the authorities having jurisdiction; unless otherwise indicated, provide equipment selected for the actual weight of the doors and for light pedestrian traffic.
 1. Sliding and Folding Door Operators: In the event of power failure, provide for manual open, close, and break-away operation of door leaves.
 2. Packaged Door Assemblies: Provide all components by single manufacturer, factory-assembled, including doors, frames, operators, actuators, and safeties.
 3. Exterior and Vestibule Doors: Provide equipment suitable for operating temperature range of minus 20 to plus 140 degrees F ambient.
- D. Sliding and Folding Doors with Full Power Operators: Comply with BHMA A156.10; safeties required; provide break-away operation unless otherwise indicated; in the event of break-away operation, interrupt power operation.
 1. Comply with UL 325; acceptable evidence of compliance includes current UL or ULC listing.
 2. Force Required to Swing Break-Away Panel: 50 pounds-force, maximum, measured at 1 inch from the latch edge of the door at any point in the closing cycle.

2.03 PACKAGED AUTOMATIC ENTRANCE DOOR ASSEMBLIES

- A. TORMAX Series TX9430 Telescoping Inside Slide: System consists of sliding aluminum door(s) and sidelight(s), header, jambs, locking hardware, aluminum guide threshold, TORMAX iMotion direct drive system, synchronized 2:1 gear reduction unit, actuating and safety controls. All components factory assembled in the header, adjusted and tested. No field wiring or operator adjustment required other than connection to job-site power.
- B. Sliding Aluminum Doors: Provide door panel(s) with corner block construction to sizes indicated. Outer fast and inner slow sliding door panels allow "breakout" to the full open position and provides instant egress at any point in the door's movement. Provide with spring return closers to return the panel when broken out for emergency egress. Each door panel includes full-length interlocking extrusion that securely latches the swing out panel(s) to the sliding panel(s) in the fully closed position. Size doors and swing-out sidelights to prevent pinch points at meeting stiles.
 - 1. Door Type:
 - a. Medium stile with intermediate rail.
 - b. Bi-part slide
 - c. For two-way traffic
 - 2. Glazing Thickness: Doors are field glazed as specified in Section 08 8000 - Glazing. Provide with security glass stops for the following glass
 - a. At exterior doors: 1 inch (25 mm).
 - b. At interior doors: ¼ inch (6 mm)
 - 3. Automatic Locking Hardware: Limited Access security consists of electric solenoid lock and flush mount concealed vertical rod exit panic hardware. Electric solenoid locking is a 115 VAC fail-secure solenoid with self-contained solid-state electronic control factory installed inside TX9000 header. Solenoid lock is operational in the "Off" and "Exit" mode of operation. Lock is engaged in the "Off" mode of operation and with the unit in the "Exit" mode, solenoid lock retracts upon receipt of an operate signal from an actuating control allowing doors to open. Upon loss of signal the doors will slide closed. Solenoid lock shall self-latch in the closed position, returning system to locked status. During a power interruption, solenoid lock shall remain locked in the "Off" and "Exit" mode of operation, securing the doors in the closed position. Egress is provided with flush mounted panic bar allowing doors to breakout. Lock may be reprogrammed at the job-site for fail-safe type operation.
- C. Aluminum Frame and Extrusions: Provide with minimum .125 inch (3 mm) wall thickness in integral structural sections. Frame shall be 8 inches (204 mm) deep by 2 inches wide (51 mm) section.
- D. Aluminum Sidelights: Provide sidelight panel(s) with corner block construction to sizes indicated. Each panel shall include a full-length interlocking extrusion that securely latches the swing out panel(s) to the sliding panel(s) in the fully closed position. Sidelight(s) shall swing out and allow the sliding door(s) to "breakout" to the full open position for instant egress at any point in the door's movement per NFPA 101. Sidelight panel(s) shall contain a hydraulic dampener to control the swing of the panel in the event of a breakaway condition.
 - 1. Type:
 - a. Medium stile with intermediate rail.
 - 2. Glazing Thickness: Sidelights are field glazed as specified in Section 08 80 00 - Glazing. Provide with security glass stops for the following glass thickness:
 - a. At interior doors: 1/4 inch (6 mm)
 - b. At exterior doors: 1 inch (25 mm).
- E. Header Case: Aluminum extruded header contains the TORMAX iMotion direct drive system and door mounting components over a span of 14 feet (4267 mm) with minimal deflection.
 - 1. iMotion 2401 Direct Drive: For use with sliding one single door leaf weighing up to 265 pounds (120 kg) or two bi-parting door leaves weighing up to 220 pounds (100 kg) each.

- a. Concealed Mount Header: Extruded aluminum, 13 inches wide by 8 inches high (330 mm by 203 mm). Provide with extruded aluminum hinged cover allowing it to open approximately flush with the top of the header.
- F. Door Hanger Wheels:
1. Each door is suspended from an overhead track by nylon wheels with steel lifetime lubricated ball bearings. iMotion 2301 requires four 2-1/2 inch (64 mm) diameter wheels and held on track by two 7/8 inch (22 mm) diameter nylon anti-riser wheels. iMotion 2401 uses eight 2-1/2 inch (64 mm) diameter nylon wheels and held on track by four 7/8 inch (22 mm) diameter nylon anti-riser wheels. Roller track is field replaceable and isolated in rubber for smooth and quiet operation. Each door supported by a factory adjusted cantilever support pivot assembly that allows doors to swing outward for emergency egress and spring return closed without the need for a lower door pivot support. Door height has an adjustment of 1/2 inch (13 mm).
- G. Guide Threshold Track: Provide aluminum threshold track to guide the sliding panels from close to open and open to close. Provide with continuous threshold with following profile:
1. Surface combination surface bevel/square continuous full width inside jamb to inside jamb.
- H. Synchronized 2:1 Gear Reduction Unit: Sequencing of the outer "fast" panel and "inner" slow panel(s) shall be controlled by the 2:1 gear reduction unit. Unit shall permit both panels to arrive at the full open position together providing. Pulley or cable systems are not permitted.
- I. Accessories: Provide with following accessories:
1. Weather-stripping: Provide nylon sweep on the bottom of each sliding door panel; two rows of wool pile weather-stripping at the leading edge of the active sliding door and the back edge of the sidelight panel; wool pile weather-stripping between the header and sidelight top rail; wool pile weather-stripping between the lead stile of the sidelight and the pivot stile of the sliding doors.
 2. rubber vinyl weather-stripping between the header and the sidelight top rails.
 3. Provide with electric lock
 4. Provide with door position monitoring
 5. Provide with I/O module
 6. Provide with key switch
- J. AUTOMATIC SLIDING DOOR DRIVE AND CONTROL SYSTEM
1. Direct Drive System: TORMAX iMotion Direct Drive System consists of a gearless direct drive AC Synchronous motor with a frequency converter to control door speeds and a self-learning fully programmable iMotion microprocessor control unit. System includes an integrated distance measuring system that shall be protected against external interference to guarantee maximum operational performance. System maintains optimal performance at all times by use of an on-board self-adjusting closed loop fully programmable iMotion microprocessor control system that periodically checks the doors operating limits and makes automatic adjustments to compensate for temperature, wind, dust, stack pressure and other outside factors which may alter systems performance.
 - a. iMotion Direct Drive Type:
 - 1) iMotion 2401 Direct Drive .40 HP motor.
 - b. Control Unit: iMotion Microprocessor Control is fully programmable system that monitors doorway holding beams, door position, electric lock position, activators, motor temperature, condition of battery, and emergency off button. Control system continually performs self-diagnostic system checks and displays faults by flashing LED's on an external illuminated seven-segmented function control panel. Torque is factory set as per ANSI A156.10. Control unit and integrated distance measuring system automatically calibrates the opening and closing check positions, and the full open and full closed position of door system. Controller provides four programmable inputs for activators, key switch and mode of operation, four programmable inputs for safety and two auxiliary output signals for door position status, alarm, etc.
 - 1) Provide with optional I/O module with four additional inputs and four additional outputs.

- 2) Doorway Holding Beams: Doorway holding beams will be factory installed when required by design at 24 inches (610 mm) and 48 inches (1219 mm) from finished floor. When interrupted beams inhibit open door from closing. Beams are disabled in door-closed position. TORMAX iMotion microprocessor control monitors the performance for proper function of each DHB every 20 seconds and before each closing cycle. If DHB fault is detected door(s) will close in a creep speed.
- 3) Reverse on Obstruction Open and Close with Safety Search Circuitry: Doors stop and recycle open if an obstruction is encountered during the closing cycle. Safety search feature allows doors to cycle close at creep speed. If an obstruction is encountered while opening, doors will stop, reverse direction and close. Safety search feature allows doors to cycle open at creep speed. After obstruction is removed a new calibration is run and doors returned to normal operation. Reverse on obstruction sensitivity is adjustable and programmed from the function control panel.
- 4) Door Motion Adjustments: An illuminated seven-segmented function control pane provides for six operating modes, system configuration and auto-diagnostics and the following adjustments; opening and closing speeds, hold open time for full door opening width, hold open time for reduced door opening width, reduced door opening width size and manual operation (free wheeling). iMotion microprocessor controller shall optimize all other motion setting such as, acceleration and braking distances. Control panel provides for auto-diagnostics and is protected against unauthorized manipulation by an integrated access code and/or optional key switch.
- 5) Mode of Operation: Illuminated seven-segmented function control panel provides six modes of operation.
 - (a) OFF - Door opening activators inhibited. If doors are open when activators are inhibited DHB remains functional until doors are fully closed.
 - (b) AUTOMATIC - Standard two way automatic operation (open/time out/close)
 - (c) AUTORED - Doors automatically open at a reduced width.
 - (d) EXIT - (One-Way Traffic) Egress side activation sensor is inhibited when doors are in fully closed position without use of switches and magnets.
 - (e) OPEN - Doors power open and stay open. Door opening width is dependent on previously selected operating mode (AUTO or AUTORED)
 - (f) MANUAL OPERATION - Doors used manually "friction free manual operation" Door activating sensors are inhibited.
- c. Delta III Sensor: Unit is selectable for bi-directional or unidirectional detection and consists of five rows of focused active infrared with motion and presence detection. Threshold safety provides by two rows of presence detection closest to face of door. Motion and presence detection performance meets or exceeds ANSI/BHMA A156.10, Sections 8.1.1, 8.1.2, 8.1.3 and 8.3.2.3. Unit has dipswitch selectable rain and snow modes for extreme environments and four dipswitch selectable frequencies to eliminate interference from other infrared devices. Unit provides an extra-wide pattern to cover the door opening and sidelights, with detection for fast approaching traffic from any angle. Response time is less than .3 seconds in both directions with a relay hold time of .5 to 2 seconds. Approach width is adjusted by dipswitch. Shutters adjust the width of the motion presence area. Vertical angle adjustment are plus or minus 15 degrees for approach area and plus 5/ minus 8 degrees for motion/presence area. Supply voltage is 12-24 VAC or 12-30 VDC. Maximum power consumption is 250mA. Cover is black ABS plastic. Size is 11-31/32 inches W (304 mm) by 2-3/4 inches H (70 mm) by 2-19/32 inches D (66 mm).

K. FACTORY FINISH

1. Provide aluminum finishes in accordance with Aluminum Association Standard AA DAF-45.
 - a. AA-M12-C22-A31 Clear anodized.

2. Exposed Operator and Components: Finish
 - a. As selected from manufacturer's standard range.

2.04 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Electrical Characteristics:
 1. 5 rated load amperes.
 2. 120 volts, single phase, 60 Hz.
- B. Motors: NEMA MG 1.
- C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.
- D. Disconnect Switch: Factory mount disconnect switch in control panel.

2.05 GLAZING

- A. As specified in Section 08800 Glazing for interior and exterior glazing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available and is of the correct characteristics.

3.02 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions.
- B. Provide for thermal expansion and contraction of door and frame units and live and dead loads that may be transmitted to operating equipment.
- C. Provide for dimensional distortion of components during operation.
- D. Install pneumatic lines and door power units in a manner to prevent condensation or freezing.
- E. Coordinate installation of components with related and adjacent work; level and plumb.

3.03 ADJUSTING

- A. Adjust door equipment for correct function and smooth operation.

3.04 FIELD QUALITY CONTROL

- A. Manufacturer's representative to verify that installation of doors and controls are in conformance to the manufacturer's recommendations.

3.05 CLEANING

- A. Remove temporary protection, clean exposed surfaces.

3.06 CLOSEOUT ACTIVITIES

- A. Demonstrate operation, operating components, adjustment features, and lubrication requirements.

END OF SECTION

SECTION 08 4313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Infill panels of metal and glass.
- C. Aluminum doors and frames.
- D. Aluminum windows with operable sashes.
- E. Weatherstripping.
- F. Perimeter sealant.

1.02 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Steel attachment devices.
- B. Section 07 2500 - Weather Barriers: Perimeter air and vapor seal between glazing system and adjacent construction.
- C. Section 07 9005 - Joint Sealers: Perimeter sealant and back-up materials.
- D. Section 08 4229 - Automatic Entrances.
- E. Section 08 4413 - Glazed Aluminum Curtain Walls. Light shelves.
- F. Section 08 7100 - Door Hardware: Hardware items other than specified in this section.
- G. Section 08 8000 - Glazing: Glass and glazing accessories.
- H. Section 12 2400 - Window Shades: Attachments to framing members.

1.03 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 2012.
- B. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; American Architectural Manufacturers Association; 2009 (part of AAMA 501).
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 2012.
- D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; American Architectural Manufacturers Association; 2009.
- E. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 2011.
- F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2012.
- G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.
- H. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2010.
- I. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2010.
- J. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2013.
- K. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- L. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

- M. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- N. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).
- O. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.

1.05 PREINSTALLATION CONFERENCE

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation, installation procedures, coordination and scheduling necessary for related work.
 - 1. Insure that all parties whose work interfaces with door, security and hardware systems are in attendance. These parties include, but are not limited to, the following:
 - a. Owner.
 - b. Architect.
 - c. Contractor.
 - d. Contractor's superintendent.
 - e. Hardware supplier.
 - f. Architectural Hardware Consultant.
 - g. Access control system contractor

1.06 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, internal drainage details .
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
 - 1. Shop Drawings shall reflect all detail conditions shown on Drawings including support framing and adjoining materials. Submittals which use manufacturer's standard catalog type details will be rejected.
- D. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- E. Samples: Submit two samples 6 x 6 inches in size illustrating finished aluminum surface, glass, infill panels, glazing materials.
- F. Delegated-Design Submittal: For aluminum-framed storefront indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 - Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record.
 - 2. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations.
- G. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- H. Energy Performance Certificates: For aluminum-framed storefronts, accessories, and components, from manufacturer.
 - 1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed storefront and entrance system.

2. Provide a single certificate specifying glazing type, special coatings, spacers, gas fills, center-of-glass and overall U-factor and center-of-glass SHGC for every type of glass used.
 3. Maintain a copy of these certificates on the jobsite and make available to authorities having jurisdiction.
- I. Report of field testing for water leakage.
 - J. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State in which the Project is located.
- B. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum three years of documented experience.

1.08 MOCK-UP

- A. Mock-Ups: Provide storefront and windows with related materials as required to complete integrated exterior mock-ups specified in Section 01 40 00 - Quality Requirements and other Sections.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.10 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.11 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty against defects in material and workmanship of curtainwall components.
- C. Provide ten year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Kawneer; Product Trifab VG 451T (www.kawneer.com)
- B. Acceptable Manufacturers:
 1. EFCO, a Pella Company; www.efcocorp.com.
 2. Kawneer North America; ____: www.kawneer.com.
 3. Oldcastle BuildingEnvelope; ____: www.oldcastlebe.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 1. Basis-of-Design Products for Insulating Glazing:
 - a. EFCO, a Pella Company; Series 403, Thermal Storefront Framing.
 - b. Kawneer North America; VG 451T.
 - c. Oldcastle BuildingEnvelope; Series 3000 Thermal MultiPlane.

2. Basis-of-Design for Interior Monolithic Glazing:
 - a. EFCO, a Pella Company; Series 402, Non-Thermal Storefront Framing.
 - b. Kawneer North America; VG 450.
 - c. Oldcastle BuildingEnvelope; Series FG-2000.
 3. Glazing Rabbet: For 1 inch insulating glazing.
 4. Glazing Rabbet: For 1/4 inch monolithic glazing.
 5. Glazing Position: Front-set.
 6. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
 7. Finish: Pigmented organic coatings.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
 - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 - c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
 8. Finish Color: Clear anodized and otherwise as scheduled or indicated..
 9. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 10. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 11. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 12. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
 13. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
 14. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 15. Preparation for Window Treatments: Provide reinforced interior horizontal head rail.
- B. Performance Requirements:
1. Wind Loads: Design and size components and system attachment methods to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - a. Design Wind Loads: Comply with requirements of ASCE 7, basic wind speed of 95 mph.
 - b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
 2. Water Penetration Resistance: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8.00 lbf/sq ft as defined in AAMA 501.
 3. Air Leakage: Maximum of 0.06 cu ft/min/sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 pounds per square foot pressure differential across assembly.
 4. Condensation Resistance Factor of Framing: 60, minimum, measured in accordance with AAMA 1503 with 1 inch insulating glass installed.

2.03 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken.
 2. Glazing stops: Flush.

3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: As specified in Section 08 8000.
 1. For Exterior Framing: Type as indicated on drawings.
 2. For Interior Framing: Type T-2.
 3. Glass Spandrel Panels: Type _____.
- C. Swing Doors: Glazed aluminum.
 1. Thickness: 1-3/4 inches.
 2. Glazing Thickness: 1 inch exterior, 1/4 inch interior
 3. Top Rail: 6 inches wide.
 4. Vertical Stiles: 5 inches wide.
 5. Bottom Rail: 10 inches wide.
 6. Glazing Stops: Square.
 7. Finish: Same as storefront.
 8. Basis-of-Design Products:
 - a. EFCO, a Pella Company; Series D518 Durastile Heavy Duty.
 - b. Kawneer North America; 500 Tuffline Entrances.
 - c. Oldcastle BuildingEnvelope; Rugged Stile.
- D. Operable Sash: Aluminum project-in hopper; finished to match storefront; heavy duty 4-bar hinges, and cam turn handle latch.
- E. Provide limit stop integral to frame on all operable sashes to prevent sash from opening more than 4 inches.
- F. Provide insect screens at all operable sashes.
- G. Basis-of-Design Products:
 1. EFCO, a Pella Company; 2700.
 2. Kawneer North America; 8225TL Isolock Hopper Windows.
 3. Oldcastle BuildingEnvelope; Signature Series 12PF.
- H. Light Shelves: As specified in Section 08 4413 Glazed Aluminum Curtainwalls.
- I. Sills: Aluminum, manufacturer's standard for locations detailed.
- J. Deflection head channels: Aluminum, manufacturer's standard for locations detailed.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M) 6063-T6.
- B. Sheet Aluminum: ASTM B209 (ASTM B209M).
- C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- D. Fasteners: Stainless steel.
- E. Compensation Channel/Deflection Head: 0.032 inch thick aluminum sheet; finish to match framing members. Allow for minimum 1-inch vertical deflection.
- F. Aluminum Sill Pan: Manufacturer's aluminum sill pan including end and back dams. Finish to match adjacent storefront.
 1. Coordinate with Work of Section 07 62 00 - Sheet Metal Flashing and Trim for installation of prefinished steel sill pans and door sill pans provided as Work of that Section.
- G. Sill Attachment Angle: 0.032 inch thick aluminum sheet; finish to match framing members. Subset fastener heads to be flush with angle at interior conditions.
 1. Attachment Angle Cover: Aluminum to match frame color; L-shape, sized to conceal attachment angle. Install with silicone sealant.
- H. Exposed Flashings: 0.032 inch thick aluminum sheet; finish to match framing members.
- I. Concealed Flashings: 0.018 inch thick galvanized steel.

- J. Perimeter Sealant: Silicone as specified in Section 07 90 05.
 - 1. Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
 - a. Architectural Sealants: 250 g/L.
 - b. Sealant Primers for Nonporous Substrates: 250 g/L.
 - c. Sealant Primers for Porous Substrates: 775 g/L.
- K. Glass: As specified in Section 08 8000.
- L. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- M. Glazing Accessories: As specified in Section 08 8000.
- N. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.05 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. Color: Clear Anodized.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.06 HARDWARE

- A. For each door, include weatherstripping, sill sweep strip, and threshold.
- B. Door Hardware: As specified in Section 08 7100, except as included below.
- C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- D. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.
- E. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.
- F. Kick Plates: Synthetic sheet matching door finish. Kawneer Kydex Wear Shield or approved.

2.07 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- E. Arrange fasteners and attachments to conceal from view.
- F. Reinforce components internally for door hardware .
- G. Reinforce framing members for imposed loads.
- H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
 - 1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.

- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- J. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- K. Set thresholds in bed of mastic and secure.
- L. Install glass and infill panels in accordance with Section 08 8000, using glazing method required to achieve performance criteria.
- M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.
- B. Testing to be done by an AAMA accredited testing lab, and cost for testing shall be included in the Contract Price.
 - 1. Conduct three (3) separate regimes of testing. For each regime, test a minimum of three (3) installed units in conformance with AAMA 503 (Referencing ASTM E 1105) minimum requirements for air and water infiltration with the window manufacturer, Contractor, Architect and Owner present. Locations will be randomly determined by the Architect.
 - a. Regime test dates to be determined by Architect in coordination with Contractor.
 - 1) First Test: Take at initial installation.
 - 2) Second Test: Take at 50 percent completion.
 - 3) Third Test: Take at 80 percent completion.
 - b. Test area shall extend beyond perimeter of glazing frame to include adjacent materials, flashing and sealants.
 - c. Test areas shall not have interior finishes installed so as to permit visibility of test area.
 - d. Tests shall be conducted with a minimum of 4 cycles each lasting a minimum of 5 minutes.
 - 2. Testing pressure to be set at 2/3 lab rating (12 psf lab rating = 8 psf Field test) unless otherwise noted.
 - a. In accordance with AAMA 503 (Referencing ASTM E1105), there shall be no uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior.

3. If unit(s) fail testing, correct assembly of failed unit and any other unit with the same problem at no additional cost to Owner. Re-test failed assemblies and perform additional test(s) until window assembly achieves a "pass" result from testing.
 - a. In the event of a failed test, Architect will select two additional locations for testing. (These two areas shall be in addition to a re-testing the failed location)
 - b. Procedure will be repeated until all tested areas pass.
 - c. Additional testing from failed results shall be conducted at no extra cost to the Owner.

3.05 ADJUSTING

- A. Adjust operating hardware and sash for smooth operation.

3.06 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by method acceptable to sealant manufacturer.

3.07 PROTECTION

- A. Protect installed products from damage during subsequent construction.

END OF SECTION

SECTION 08 4413
GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed curtain wall, with vision glazing and glass infill panels.
- B. Integral exterior sunshading devices.
- C. Integral interior light shelf devices.

1.02 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Steel attachment devices.
- B. Section 07 2500 - Weather Barriers: Perimeter air and vapor seal between glazing system and adjacent construction.
- C. Section 07 9005 - Joint Sealers: Perimeter sealant and back-up materials.
- D. Section 08 4229 - Automatic Entrances
- E. Section 08 4313 - Aluminum-Framed Storefronts: Windows and doors.
- F. Section 08 4313 - Aluminum-Framed Storefronts: Entrance framing and doors.
- G. Section 08 6300 - Metal-Framed Skylights.
- H. Section 08 8000 - Glazing.
- I. Section 09 2116 - Gypsum Board Assemblies: Metal stud and gypsum board wall at interior of curtain wall.

1.03 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 2012.
- B. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; American Architectural Manufacturers Association; 2009 (part of AAMA 501).
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 2012.
- D. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 2011.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2013.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- G. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- H. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 PREINSTALLATION CONFERENCE

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers; review preparation, installation procedures, coordination and scheduling necessary for related work.
 - 1. Insure that all parties whose work interfaces with door, security and hardware systems are in attendance. These parties include, but are not limited to, the following:

- a. Owner.
- b. Architect.
- c. Contractor.
- d. Contractor's superintendent.
- e. Hardware supplier.
- f. Architectural Hardware Consultant.
- g. Access control system contractor

1.06 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glazing and infill, internal drainage details and operable sash.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- D. Samples: Submit two samples 4 x 4 inches in size illustrating finished aluminum surface, glazing, infill panels, glazing materials.
- E. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.
- F. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.
- G. Delegated-Design Submittal: For glazed aluminum curtain wall indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Submit submittals as "Deferred Submittals" in accordance with Section 01 33 00 - Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record.
 - 2. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations.
- H. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- I. Fenestration Certificate: To facilitate Energy Code compliance, provide a certificate specifying glazing type, special coatings, spacers, gas fills, center-of-glass and overall U-factor, and center-of-glass SHGC for every type of site built glass used. Maintain on the jobsite available for the building inspector.
- J. Report of field testing for water leakage.
- K. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the State in which the Project is located.
- B. Full-Size Mock-up Testing: Have a specimen representative of project conditions tested by an independent testing agency for compliance with specified air infiltration and water penetration criteria. Coordinate scheduling of testing to occur prior to installation of interior finishes.
- C. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum three years of documented experience.

1.08 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-ups.

- B. Mock-Ups: Provide storefront and windows with related materials as required to complete integrated exterior mock-ups specified in Section 01 40 00 - Quality Requirements and other Sections.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.10 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.11 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide ten year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Kawneer; Product 1620 with thermal break.
- B. Other acceptable manufacturers:
 - 1. EFCO, a Pella Company: www.efcocorp.com.
 - 2. Oldcastle BuildingEnvelope: www.oldcastlebe.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 CURTAIN WALL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Outside glazed, with pressure plate and mullion cover.
 - 2. Vertical Mullion Dimensions: 2 inches wide by 6 inches deep.
 - 3. Finish: Class I natural anodized.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
 - b. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
 - 4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 - 5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 - 6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 - 7. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.
 - 8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.

1. Design Wind Loads: Comply with the requirements of ASCE 7., basic wind speed of 95 mph
 - a. Member Deflection: For spans less than 13 feet 6 inches, limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 3/4 inch, whichever is less and with full recovery of glazing materials.
 - b. Member Deflection: For spans over 13 feet 6 inches and less than 40 feet, limit member deflection to flexure limit of glass in any direction, and maximum of 1/240 of span plus 1/4 inch, with full recovery of glazing materials.
2. Seismic Loads: Design and size components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7.
3. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - a. Expansion and contraction caused by 180 degrees F surface temperature.
 - b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
 - c. Movement of curtain wall relative to perimeter framing.
 - d. Deflection of structural support framing, under permanent and dynamic loads.
- C. Water Penetration Resistance: No uncontrolled water on indoor face when tested as follows:
 1. Test Pressure Differential: 12 lbf/sq ft.
 2. Test Method: ASTM E331.
- D. Air Leakage: Maximum of 0.06 cu ft/min/sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 pounds per square foot pressure differential across assembly.
- E. Air Infiltration Performance Requirements:
 1. Weather strip and seal to exceed Oregon Energy code section 502.4.3.
- F. Thermal Performance Requirements:
 1. Condensation Resistance Factor: 66, minimum, measured in accordance with AAMA 1503, using clear 1 inch thick sealed insulating glass.

2.03 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 1. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: As specified in Section 08 8000.
- C. Operable Sash: Aluminum project-in hopper; finished to match curtain wall; turn handle latch.
 1. Model: Kawneer 8225TL IsoLock Windows or other approved manufacturers listed above.
 2. Provide with insect screens at all operable sash.
- D. Sun Screens: Shop fabricated, shop finished, extruded aluminum outriggers, and fascia, free of defects impairing strength, durability or appearance.
 1. Sun Screen Configuration: As indicated on drawings.
 2. Louver Type: Perforated Panel.
 3. Perforation pattern: Round perforations, staggered pattern, 30 percent open.
 4. Material and finish: Aluminum with factory applied fluoropolymer paint coating.
 5. Color: Light reflective white.
 6. Sun Screen Angle: 90 degrees from horizontal.
 7. Outrigger Shape: Straight.
 8. Design Criteria: Design and fabricate to resist the same loads as curtain wall system as well as the following loads without failure, damage, or permanent deflection:
 - a. Snow and live loads: As indicated on Structural Drawings.
 9. Sizes: 18 inches and 24 inches projection out from surface of curtainwall as indicated on drawings. Width as shown on drawings based on mullion spacing.
 10. Accessories: Fastening devices for attachment to curtainwall.
 11. Compatibility: Type approved by curtainwall manufacturer for installation on their system.

12. Products:
 - a. Exterior sun shade: Piana Sunshade by Hendrick Architectural Products, www.hendrickarchproducts.com
- E. Light Shelves: Shop fabricated, shop finished, extruded aluminum free of defects impairing strength, durability or appearance.
 1. Products:
 - a. Interior light shelf: "InLighten", by Kawneer, or approved.
 2. Type: For mounting to interior mullion of Curtainwall or Aluminum Storefront Systems.
 3. Compatibility: Approved by Curtainwall and Aluminum Storefront manufacturers.
 4. Support and frames; Aluminum, finish to match Curtainwall or Aluminum Storefront.
 5. Configuration: Install with 3 to 5 degree tilt toward glazing (high end away from glass).
 6. Panel: Translucent, 16 mm Polycarbonate panel.
 7. Accessories: Fastening devices for attachment to curtainwall.
 8. Features: Ability to lower shelves for cleaning of shelf and glazing.
 9. Sizes: 24 inches projection out from surface of curtainwall, and as indicated on drawings. Width as shown on drawings based on mullion spacing.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
- C. Exposed Flashings: 0.032 inch thick aluminum sheet; finish to match framing members.
- D. Concealed Flashings: 0.018 inch thick galvanized steel.
- E. Glazing: As specified in Section 08 8000.
- F. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- G. Glazing Accessories: As specified in Section 08 8000.

2.05 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. Touch-Up Materials: As recommended by coating manufacturer for field application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
- C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Coordinate attachment and seal of perimeter air and vapor barrier materials.

- H. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- I. Where mullion covers are used, install in longest possible lengths, with hairline joints aligned with top or bottom of horizontal members.
- J. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.04 FIELD QUALITY CONTROL

- A. Provide the services of the manufacturer's field representative to observe installation and make report.
- B. See Section 01 4000 - Quality Requirements, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing. Testing should be performed per AAMA 503.
- C. ***Confirm level of testing that Owner desires...contractor self-test or 3rd party inspector...***
- D. Test installed curtain wall for water leakage in accordance with AAMA 501.2.
- E. Test installed curtainwall for air infiltration in accordance with ASTM E783, with infiltration not to exceed 0.09 cfm/square foot.
- F. Replace curtain wall components that have failed field testing and retest until performance is satisfactory.

3.05 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

3.06 PROTECTION

- A. Protect installed products from damage during subsequent construction.

END OF SECTION

**SECTION 08 5113
TRANSACTION WINDOW**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum, medium-duty interior sliding service windows indicated as "Transaction Window" in Drawings.

1.02 RELATED REQUIREMENTS

- A. Section 08 8000 – Glazing.

1.03 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit Manufacturer's technical product data substantiating that products comply with specified requirements.
- C. Shop Drawings: Submit for fabrication and installation of windows. Include details, elevations and installation requirement of finish hardware and cleaning.
- D. Certification: Provide printed data in sufficient detail to indicate compliance with the Contract Documents.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver windows crated to provide protection during transit and job storage
- B. Inspect windows upon delivery for damage. Unless minor defects can be made to meet the specifications. Remove and replace damaged parts.
- C. Store windows at building site under cover in dry location.

1.05 PROJECT CONDITIONS

- A. Field measurements: Check opening by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of work.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Warrant all material and workmanship against defects for a period of one year from the original date of purchase.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Product: C.R. Laurence Co., Inc.; Florence Model D1038A with standard D7 Overhead Track: www.crlaurence.com.
- B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Frames: Aluminum frame modules constructed of 6063-T5 extruded aluminum. Window rolls on top-hung ball bearing rollers. Provide keyed catch locks. Overall frame sizes as indicated on Drawings.
 - 1. Provide two-panel window, one fixed panel and one sliding panel oriented as indicated on Drawings.
 - 2. Include manufacturer's standard vinyl for glazing.
- B. Finish: Clear anodized.
- C. Glazing: Type T-2 as specified in Section 08 8000 - Glazing.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install window in accordance with manufacturer's printed instructions and recommendations. Repair damaged units as directed (if approved by the manufacturer and Architect) or replace with new units.

3.02 CLEANING

- A. Clean frame and glazing surfaces after installation, complying with requirements contained in the manufacturer's instructions. Remove excess glazing sealant compounds, dirt or other substances.

3.03 PROTECTION

- A. Institute protective measures required throughout the remainder of the construction period to ensure that all the windows do not incur any damage or deterioration, other than normal weathering, at the time of acceptance.

END OF SECTION

SECTION 08 6300
METAL-FRAMED SKYLIGHTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum skylight framing system.
- B. Fasteners, anchors, reinforcement, and flashings.

1.02 RELATED REQUIREMENTS

- A. Section 05 1200 - Structural Steel Framing: Structural support framing for system.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Skylight counterflashing.
- C. Section 07 9005 - Joint Sealers.
- D. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; American Architectural Manufacturers Association/Window and Door Manufacturers Association/Canadian Standards Association; 2011.
- B. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; American Architectural Manufacturers Association; 2009.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 2012.
- D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2010.
- E. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2010.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2013.
- G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- H. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- I. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2013).
- J. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
- K. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007 (Reapproved 2012)e1.
- L. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- M. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- N. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's specifications, standard details, and installation requirements. Provide structural, thermal, and daylighting performance values.
 - 1. Include NFRC Certified Product Directory Number.

- C. Performance Validation: Provide specified performance validation before submitting shop drawings or starting fabrication.
- D. Shop Drawings: Indicate framed opening requirements and tolerances, spacing of all members, anticipated deflection under load, affected related work, expansion and contraction joint locations and details, and sizes and locations for field welding.
- E. Delegated-Design Submittal: For metal-framed skylights indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 - Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record.
 - 2. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations.
- F. Manufacturer's Installation Instructions: Indicate special procedures, safety precautions, and perimeter conditions requiring special attention.
- G. Samples: Submit two samples, not less than 12 x 12 inch in size illustrating appearance of prefinished aluminum and specified glazing system, including glazed edge and corner.
- H. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.
- I. Structural Glazing Adhesive: Submit product data and calculations showing compliance with performance requirements.
- J. Report of field testing for water leakage.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Design skylight system under direct supervision of a professional structural engineer experienced in design of work of the type specified in this section and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with not fewer than 10 years of documented experience.
- C. Installer Qualifications: Company specializing in performing the type of work specified in this section.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Provide wrapping to protect prefinished aluminum surfaces. Do not use adhesive papers or spray coatings that bond when exposed to sunlight or weather.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide ten year warranty from manufacturer for materials and workmanship, agreeing to repair or replace any part of the skylight that fails to meet the performance requirements of this section at no additional costs to the owner. Replace and or repair damage to other parts of the building and the building contents caused by full or partial failure of the skylight system.
- C. Provide ten year warranty from installer for installation and watertight workmanship, agreeing to repair or replace any part of the skylight that fails to meet the performance requirements of this section. Replace and or repair damage to other parts of the building and the building contents caused by full or partial failure of the skylight system.
- D. Provide two year warranty to fully remove and replace skylight glazing that fails to perform to the standards of this specification section.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal-Framed Skylights:

1. DeaMor Skylights Inc.
2. Super Sky Products Enterprises, LLC; _____: www.supersky.com.
3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 METAL-FRAMED SKYLIGHTS

- A. Metal Framed Skylights: Factory-fabricated, glazed.
 1. Frame: Extruded aluminum structural members with integral condensation collection and guttering system thermally separated from exterior pressure bar.
 2. Glazing System: Pressure glazing bar system for sloped joints and structural adhesive glazing for horizontal joints.
 3. Glazing: Insulating glass.
- B. Performance Requirements:
 1. Design and size components to withstand the following load requirements without damage or permanent set:
 - a. Roof snow load: 25 lbf/sq ft.
 - b. Design wind load: 94.5 mph wind speed, exposure C, importance 1.
 - c. Concentrated load at any location on framing: 250 lb.
 - d. Measure performance by testing in accordance with ASTM E330/E330M, using test pressure equal to 1.5 times the design wind load and 10 second duration of maximum load.
 - e. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 requirements in accordance with the following:
 - 1) Performance Class (PC): R.
 - f. Performance Validation: Skylights shall comply with AAMA/WDMA/CSA 101/I.S.2/A440 performance requirements as indicated by having AAMA, WDMA, or CSA certified label, or an independent test report for indicated products itemizing compliance and acceptable by authorities having jurisdiction.
 2. Maximum allowable deflection of any glazing support member: 1/180 of span.
 3. Design system to limit stress on structural glazing adhesive to 20 percent of tested tensile adhesion and maximum compression or elongation to 25 percent of neutral dimension.
 4. Design system to accommodate thermal expansion and contraction over ambient temperature range of 100 degrees F, dynamic loading and release of loads, creep of concrete structural members, and deflection of structural support framing without damage to skylight system components or loss of weathertightness.
 5. Skylight system to be NFRC Certified with a minimum system U-Value of 0.50. Submit NFRC Certified Product directory Number with submittals.
 6. Solar Heat Gain Coefficient: Not to exceed 0.440
 7. Limit air infiltration through assembly to 0.06 cu ft/min/sq ft for glazed area, measured at a reference differential pressure across assembly of 6.24 psf in accordance with ASTM E283.
 8. Water Leakage: None, when measured in accordance with ASTM E331 at a test pressure difference of 2.86 lbf/sq ft.
 9. Design and fabricate to prevent harmonic vibration, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.
 10. Skylight system and glazing to meet OSHA 1910.23 Fall Protection without the use of exterior railings or screens.

2.03 MATERIALS

- A. Aluminum Extrusions: 6063-T5, 6063-T6, or 6061-T6 members complying with ASTM B221 (ASTM B221M). Minimum thickness 0.125 inch for structural members and 0.062 inch for non-structural members.
- B. Formed Aluminum: Sheet material of alloy 5052, 5005, or 6061-T651 complying with ASTM B209 (ASTM B209M). Minimum thickness: 0.125 inch for structural members and 0.062 inches for non-structural members.

- C. Internal Reinforcement: Aluminum sections only; no steel internal reinforcement permitted.
- D. Glass: Type Type C Laminated specified in Section 08 8000.
- E. Glazing Accessories: As recommended by manufacturer of skylight system.
- F. Perimeter Sealant: Non-hardening butyl type as recommended by skylight manufacturer.
- G. Structural Glazing Adhesive: Silicone, ASTM C920, Class 25, Grade NS, neutral cure; maximum hardness of 40, when tested in accordance with ASTM D2240 using Type A durometer; minimum tensile strength of 250 psi, when tested in accordance with ASTM D412.
 - 1. Available Product: Dow Corning 995 Silicone Structural Glazing Sealant.
- H. Weatherseal Sealant: Silicone, same type as glazing adhesive.
 - 1. One-component, low-modulus, neutral-cure silicone sealant.
 - 2. Product: Dow Corning 791 Silicone Weatherproofing Sealant.
- I. Touch-Up Primer for Galvanized Steel Surfaces: Zinc rich type.
- J. Protective Back Coating: Asphaltic mastic, ASTM D 4479 Type I.
- K. Fasteners: Stainless steel.

2.04 FABRICATION

- A. Rigidly fit and secure joints and corners with screw and spline. Make joints rigid, with connections that are flush, hairline, and weatherproof.
- B. Fabricate components to allow for expansion and contraction with minimum clearance and shim spacing around perimeter of assembly.
- C. Drain to exterior any water entering exterior joints, condensation occurring in glazing channels, or migrating moisture occurring within system.
- D. Prepare components to receive concealed anchorage devices. Ensure that fasteners and anchorage devices will be concealed upon completion of installation.
- E. Adhere glass to glazing frames with structural adhesive and cure under controlled conditions in shop. Field glazing of frames to glass is not acceptable.

2.05 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick; both interior and exterior surfaces.

PART 3 EXECUTION

3.01 PREPARATION

- A. Apply 1 coat of protective coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Set skylight structure plumb, level, and true to line, without warp or rack of frames or glazing panels. Anchor securely in place in accordance with approved shop drawings.
- C. Maintain assembly dimensional tolerances, aligning with adjacent work.
- D. Install sill flashings.
- E. Touch up damaged finishes so repair is imperceptible from 6 feet. Remove and replace components that cannot be satisfactorily touched up.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for testing and inspection.
- B. Test installed skylight for water leakage in accordance with AAMA 501.2.

3.04 CLEANING

- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down exposed surfaces; wipe surfaces clean.
- C. Remove excess sealant by methods recommended by skylight manufacturer.

END OF SECTION

SECTION 08 7100
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Lock cylinders for doors for which hardware is specified in other sections.
- B. Door hardware for gates.

1.02 RELATED REQUIREMENTS

- A. Section 08 1113 - Hollow Metal Doors and Frames.
- B. Section 08 3613 - Sectional Doors: Hardware for same, except cylinders; installation of cylinders.
- C. Section 08 4313 - Aluminum-Framed Storefronts: Hardware for doors in storefront.
- D. Section 32 3119 - Decorative Metal Fences and Gates, hardware for gates

1.03 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; Final Rule; current edition; (ADA Standards for Accessible Design).
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- C. BHMA A156.3 - American National Standard for Exit Devices; Builders Hardware Manufacturers Association; 2008 (ANSI/BHMA A156.3).
- D. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 2004.
- E. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; Door and Hardware Institute; 1993; also in WDHS-1/WDHS-5 Series, 1996.
- F. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2013.
- G. NFPA 101 - Life Safety Code; National Fire Protection Association; 2012.
- H. OSSC - Oregon Structural Specialty Code; current edition.
- I. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. To provide a higher level of coordination the following building materials must be provided by the same sub-contractor.
 - 1. 08 1113 - Hollow Metal Doors and Frames
 - 2. 08 1416 - Flush Wood Doors
 - 3. 08 7100 - Door Hardware
- B. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.
- C. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- D. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by all affected installers.
- E. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures, for submittal procedures.
- B. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.

- C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- D. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
- E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
 - 1. Final hardware schedule
- F. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.
- G. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- H. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Tools: One set of all special wrenches or tools applicable to each different or special hardware component, whether supplied by the hardware component manufacturer or not.
- I. Owner Training: Prior to final project acceptance, supplier's representative shall instruct Owner how to properly adjust and maintain hardware.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with 5 years of experience.
- C. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.
- D. Prior to final project acceptance, supplier's representative shall make one field inspection and certify, in writing to the Architect, that hardware installation complies with the project documents, approved hardware schedule, and Manufacturer's instructions, and that installation is complete and all hardware items have been properly installed and correctly adjusted, or provide a list of items that require correction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 DOOR HARDWARE - GENERAL

- A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
- B. Provide all items of a single type of the same model by the same manufacturer.
- C. Provide products that comply with the following:
 - 1. Applicable provisions of federal, state, and local codes.
 - 2. ADA Standards for Accessible Design.
 - 3. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
 - 4. Applicable provisions of NFPA 101, Life Safety Code.
 - 5. Fire-Rated Doors: NFPA 80.

6. All Hardware on Fire-Rated Doors : Listed and classified by UL as suitable for the purpose specified and indicated.
 7. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.
 8. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.
- D. Function: Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.
 - E. Electrically Operated and/or Controlled Hardware: Provide all power supplies, power transfer hinges, relays, and interfaces required for proper operation; provide wiring between hardware and control components and to building power connection.
 - F. Finishes: Identified in schedule.
 - G. Locksets: Strikes to have extended curved lip where required to protect trim from being marred by extended latch bolt.
 - H. Surface Mounted Closers: Check degree of opening for all closers. Mount closer away from exterior, corridors and public spaces. Unless specifically specified, do not restrict door swing.

2.02 KEYING

- A. Provide locks and interchangeable cylinder cores for construction purposes. In addition, provide one uncombined core and two key blanks to the Owner for each lockset scheduled. Final core combining and keying to be done by the Owner.
- B. Keying Conference:
 1. Upon receipt of approved hardware schedule, supplier will, at the earliest convenience, attend a meeting with the Owner at the project site. The purpose of the meeting will be to review keying requirements.
 2. Following this meeting, the Supplier will provide Written Schedule showing keying of all new Lock Systems.
 3. Provide 6 master keys all stamped "DO NOT DUPLICATE".
 4. Provide 4 change keys for each lock, all stamped "DO NOT DUPLICATE".

2.03 EXIT DEVICES

- A. Locking Functions: Functions as defined in BHMA A156.3, and as follows:
 1. Entry/Exit, Free Swing: Key outside retracts latch, latch holdback (dogging) for free swing during occupied hours, not fire-rated; outside trim must be specified as lever or pull.
- B. Manufacturers:
 1. Von Duprin, an Allegion brand: www.allegion.com/us.
- C. Description:
 1. Rim, IC Core
 2. Provide Strike to be secured to Strike Latch Receiver Bracket by Fence and Gate Installer.

2.04 KEY CONTROLS

- A. Fire Department Lock Box: Heavy-duty, surface mounted, solid stainless-steel box with hinged door and interior gasket seal; single drill resistant lock with dust covers and tamper alarm.
 1. Capacity: Holds 10 keys.
 2. Finish: Manufacturer's standard dark bronze.
 3. Type: Approved for use by City of Eugene Police, Fire and Emergency Medical responders.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
- D. Mounting heights for hardware from finished floor to center line of hardware item:
 - 1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
 - 2. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. At doors with attached pulls separate from the exit devices, and door cylinder locks, verify location of cylinder with Architect to maintain access clearance. Cylinder is not to be located in line with and behind door pulls.

3.03 FIELD QUALITY CONTROL

- A. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.04 ADJUSTING

- A. Adjust hardware for smooth operation.
- B. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.
- C. Test and adjust all Locks and Latches, including Lock Keyways for smooth and easy operation.

3.05 CLEANING

- A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.06 PROTECTION

- A. Protect finished Work under provisions of Section 01 7000.
- B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

MANUFACTURERS SPECIFIED:

PRODUCT SPECIFIED	MANUFACTURER NAME	SYMBOL SPECIFIED	APPROVED EQUAL
BUTTS	IVES	I	STANLEY, MCKINNEY
CONTINUOUS HINGES	IVES	I	MCKINNEY
CYLINDERS	SCHLAGE	SCH	NONE
CLOSERS	LCN	LCN	NONE
RIM PANICS	VON DUPRIN	VD	NONE
VR PANICS	PRECISION	PHI	NONE
MULLIONS	VON DUPRIN	VD	NONE
POWER TRANSFERS	VON DUPRIN	VD	NONE
POWER SUPPLIES	VON DUPRIN	VD	NONE
KICKPLATES	IVES	I	NONE
WALL MAGS	LCN	LCN	NONE
STOPS	IVES	IVES	NONE
OVERHEAD STOPS	GLYNN JOHNSON	GJ	NONE
THRESHOLDS	PEMKO	P	NGP
SEALS	STEELCRAFT	STE	NONE

KEYING: PROVIDE CONSTRUCTION CORES. FINAL KEYING AS DIRECTED BY ARCHITECT AND OWNER.

HARDWARE GROUPS:

GROUP 1

DOOR A100A, A100B

2	EA	IC CYLINDER VERIFY TTPE	626	SCH
2	EA	CORES 20-030 VERIFY KEYWAY	626	SCH

GROUP 2

DOOR A101A, 101D, 101E,

2	EA	CONTINUOUS HINGE 112HD	ALUM	I
1	EA	PANIC CD33/98NL X 990NL	626	VD
1	EA	PANIC CD33/98EO X 990EO	626	VD
1	EA	MULLION KR4954/ KR 5654 VERIFY	ALUM	VD
1	EA	CYLINDER 20-079	626	SCH
3	EA	CYLINDER 26-064	626	SCH
4	EA	CORES 20-030 VERIFY KEYWAY	626	SCH
2	EA	CLOSERS 4111 SPRING H CUSH	ALUM	LCN
2	EA	DROP PLATES IF REQUIRED	ALUM	LCN
2	EA	BLADE SUPPORT 4110-61	ALUM	LCN
2	EA	SHOE SUPPORT 4110-30	ALUM	LCN
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
2	SET	SEALS BY DOOR SUPPLIER		

GROUP 2A

DOOR A101B

1	EA	CONTINUOUS HINGE 224HD EPT	ALUM	I
1	EA	PANIC RX-EL33/98NL X 990NL	626	VD
1	EA	CYLINDER 20-079	626	SCH
1	EA	CORES 20-030 VERIFY KEYWAY	626	SCH
1	EA	POWER TRANSFER EPT-10	626	VD
1	EA	POWER SUPPLY PS914 X 4RL-4RL-BB-KL		VD
1	EA	OPERATOR 4642 VERIFY ARM	ALUM	LCN
2	EA	PUSH 8310-856T	630	LCN
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
1	SET	SEALS PS074	BLACK	STE
		CARD READER, WIRING, AND INSTALLATION BY OTHERS		

GROUP 3

DOOR A102A, A104A, A104B, A113C,

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	652	I
1	EA	LOCKSET ND93PD RHO	626	SCH
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOP 407.5	630	I
1	SET	SEALS PS074	BLACK	STE

GROUP 4

DOOR A103A, A103D

1	EA	CONTINUOUS HINGE 112HD	ALUM	I
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1	EA	PANIC LD33/98NL X 990NL	626	VD
1	EA	CYLINDER 20-079	626	SCH
1	EA	CORES 20-030 VERIFY KEYWAY	626	SCH
1	EA	CLOSERS 4111 SPRING H CUSH	ALUM	LCN
2	EA	DROP PLATES IF REQUIRED	ALUM	LCN
2	EA	BLADE SUPPORT 4110-61	ALUM	LCN
2	EA	SHOE SUPPORT 4110-30	ALUM	LCN
1	EA	DOOR CONTACT SWITCH 679-05HM	ALUM	SCH
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
1	EA	DOOR SHOE BY DOOR SUPPLIER		
1	SET	SEALS BY DOOR SUPPLIER		

GROUP 5

DOOR A103C, A103B, 104E, A111C, A113A, A113B

ALL HARDWARE BY DOOR SUPPLIER

GROUP 6

DOOR A103E, A111A, A111B, B137A, C100A, B132A, B132B, B132C, B132D

2	EA	CONTINUOUS HINGE 112HD EPT	ALUM	I
1	EA	PANIC RX-EL33/98NL X 990NL	626	VD
1	EA	PANIC RX-LD33/98EO X 990EO	626	VD
1	EA	MULLION KR4954/ KR 5654 VERIFY	ALUM	VD
1	EA	CYLINDER 20-079	626	SCH
1	EA	CYLINDER 26-064	626	SCH
2	EA	CORES 20-030 VERIFY KEYWAY	626	SCH
2	EA	POWER TRANSFER EPT-10	626	VD
1	EA	POWER SUPPLY PS914 X 4RL-4RL-BB-KL		VD
2	EA	CLOSERS 4111 SPRING CUSH	ALUM	LCN
2	EA	DROP PLATES IF REQUIRED	ALUM	LCN
2	EA	BLADE SUPPORT 4110-61	ALUM	LCN
2	EA	SHOE SUPPORT 4110-30	ALUM	LCN
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
2	EA	DOOR SHOE BY DOOR SUPPLIER		
2	SET	SEALS BY DOOR SUPPLIER		

CARD READER, WIRING, AND INSTALLATION BY OTHERS

GROUP 7

DOOR A103F

6	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	652	I
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1	EA	LOCKSET ND80PD RHO	626	SCH
2	EA	FLUSH BOLTS FB458	626	I
1	EA	DUST PROOF STRIKE DP-2	626	I
2	EA	KICKPLATE 10 X 2LDW	630	I
2	EA	WALLSTOPS 407.5	630	I
1	EA	ASTRAGAL 356AV	ALUM	P

GROUP 8

DOOR A104C

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	652	I
1	EA	LATCHSET ND10S RHO	626	SCH
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOP 407.5	630	I
1	SET	SEALS PS074	BLACK	STE

GROUP 9

DOOR A104D

1	EA	CONTINUOUS HINGE 224HD	ALUM	I
1	EA	LOCKSET RX ND80PDEU RHO	626	SCH
1	EA	POWER TRANSFER EPT-10	ALUM	VD
1	EA	CLOSERS 4111 SPRING H CUSH	ALUM	LCN
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
1	EA	DOOR SHOE 216AV	ALUM	P
1	SET	SEALS PS074	BLACK	STE
		CARD READER, WIRING, AND INSTALLATION BY OTHERS		

GROUP 10

DOOR A106A,

1	EA	CONTINUOUS HINGE 224HD EPT	ALUM	I
1	EA	PANIC RX-EL98NL X 990NL	626	VD
1	EA	CYLINDER 20-079	626	SCH
1	EA	CORES 20-030 VERIFY KEYWAY	626	SCH
1	EA	POWER TRANSFER EPT-10	626	VD
1	EA	POWER SUPPLY PS914 X 4RL-4RL-BB-KL		VD

1	EA	CLOSERS 4111 SPRING CUSH	ALUM	LCN
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
1	EA	DOOR SHOE 216AV	ALUM	P
1	SET	SEALS PS074	BLACK	STE
CARD READER, WIRING, AND INSTALLATION BY OTHERS				

GROUP 11

DOOR A106B

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
1	EA	PANIC 98L-BE	626	VD
1	EA	CLOSER 4111 SHCNS	ALUM	LCN
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOPS 407.5	630	I
1	SET	SEALS PS074	BLACK	STE

GROUP 12

DOOR A106C

2	EA	CONTINUOUS HINGE 224HD	ALUM	I
1	EA	PANIC CD98NL X 990NL	626	VD
1	EA	PANIC CD98EO X 990EO	626	VD
1	EA	MULLION KR4954	ALUM	VD
1	EA	CYLINDER 20-079	626	SCH
3	EA	CYLINDER 26-064	626	SCH
4	EA	CORES 20-030 VERIFY KEYWAY	626	SCH
2	EA	CLOSERS 4111 SPRING H CUSH	ALUM	LCN
2	EA	KICPLATES 10 X 2LDW	630	I
2	EA	WALLSTOPS 407.5	630	I
2	SET	SEALS PS074	BLACK	STE

GROUP 13

DOOR A107A, B104A, B105A, B111A, B112A, B108A, B121A, B139A, C102A, B220A, B239A, C202A

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
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1	EA	INDIACATOR PRIVACY L9496PD 06A	626	SCH
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOPS 407.5	630	I
1	SET	SEALS PS074	BLACK	STE

GROUP 14

DOOR A109A, A110A

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
1	EA	PUSH PLATE 8200 6 X 16	630	I
1	EA	PULL PLATE 8302 10	630	I
1	EA	CLOSER 4011	ALUM	LCN
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOPS 407.5	630	I
1	SET	SEALS PS074	BLACK	STE

GROUP 15

DOOR A111D, A111E, A111F, A111G

2	EA	CONTINUOUS HINGE 224HD	ALUM	I
2	EA	DEADBOLTS INTO HEAD B560P	626	SCH
2	EA	WALLSTOPS 407.5	630	I

GROUP 16

DOOR A112A, A115A, A116B, B138A, C201A,

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	652	I
1	EA	LOCKSET ND80PD RHO	626	SCH
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOPS 407.5	630	I

GROUP 17

DOOR A114A

1	EA	CONTINUOUS HINGE 224HD	ALUM	I
1	EA	LOCKSET ND93PD RHO	626	SCH
1	EA	CLOSER 4111 SPRING H CUSH	ALUM	LCN
1	EA	KICKPLATE 10 X 2LDW	630	I
1	SET	SEALS PS074	BLACK	STE

GROUP 18

DOOR A114B

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
1	EA	PANIC 98NL X 990NL	626	VD
1	EA	CYLINDER 20-079	626	SCH
1	EA	CORES 20-030 VERIFY KEYWAY	626	SCH
1	EA	CLOSER 4111	ALUM	LCN
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOPS 407.5	630	I
1	SET	SEALS PS074	BLACK	STE

GROUP 19

DOOR A116A

6	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	652	I
1	EA	LOCKSET ND80PD RHO	626	SCH
2	EA	FLUSH BOLTS FB458	626	I
1	EA	DUST PROOF STRIKE DP-2	626	I
2	EA	KICKPLATE 10 X 2LDW	630	I
2	EA	WALLSTOPS 407.5	630	I
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
2	EA	DOOR SHOE 217AV	ALUM	P
2	SET	SEALS PS074	BLACK	STE

GROUP 20

DOOR A117A

2	EA	CONTINUOUS HINGE 224HD	ALUM	I
1	EA	LOCKSET RX ND80PDEU RHO	626	SCH

2	EA	FLUSH BOLTS FB458	626	I
1	EA	DUST PROOF STRIKE DP-2	626	I
1	EA	POWER TRANSFER EPT-10	626	VD
2	EA	CLOSER 4111 SPRING H CUSH	ALUM	LCN
2	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
2	EA	DOOR SHOE 216AV	ALUM	P
2	SET	SEALS PS074	BLACK	STE
		CARD READER, WIRING, AND INSTALLATION BY OTHERS		

GROUP 21

DOOR A118A

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
1	EA	PANIC RX-EL98NL X 990NL	626	VD
1	EA	CYLINDER 20-079	626	SCH
1	EA	CORES 20-030 VERIFY KEYWAY	626	SCH
1	EA	POWER TRANSFER EPT-10	ALUM	VD
1	EA	POWER SUPPLY PS914 X 4RL-4RL-BB-KL		VD
1	EA	CLOSER 4111	ALUM	LCN
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOPS 407.5	630	I
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
1	EA	DOOR SHOE 216AV	ALUM	P
1	SET	SEALS PS074	BLACK	STE
		CARD READER, WIRING, AND INSTALLATION BY OTHERS		

GROUP 22

DOOR A119A

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
1	EA	LOCKSET RX ND80PDEU RHO	626	SCH
1	EA	POWER TRANSFER EPT-10	ALUM	VD
1	EA	CLOSERS 4111 SPRING CUSH	ALUM	LCN
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
1	EA	DOOR SHOE 216AV	ALUM	P
1	SET	SEALS PS074	BLACK	STE

GROUP 23

DOOR A119B

6	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	652	I
1	EA	LOCKSET ND80PD RHO	626	SCH
2	EA	FLUSH BOLTS FB458	626	I
1	EA	DUST PROOF STRIKE DP-2	626	I
1	EA	CLOSERS 4111 SPRING CUSH	ALUM	LCN
2	EA	KICKPLATE 10 X 2LDW	630	I
2	EA	WALLSTOPS 407.5	630	I
2	EQ	DOOR POSITION SWITCH 679-05HM		SCH
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
2	EA	DOOR SHOE 216AV	ALUM	P
2	SET	SEALS PS074	BLACK	STE

GROUP 24

DOOR B100A

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
1	EA	LOCKSET RX ND80PDEU RHO	626	SCH
1	EA	POWER TRANSFER EPT-10	ALUM	VD
1	EA	CLOSERS 4011	ALUM	LCN
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOPS 407.5	630	I
1	SET	SEALS PS074	BLACK	STE
		CARD READER, WIRING, AND INSTALLATION BY OTHERS		

GROUP 25

DOOR B101A, B102A, B103B, B107A, B109A, B109B, B110A, B114A, B114B, B116A, B117A, B119B, B134A, B136A

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
1	EA	LOCKSET ND93PD RHO	626	SCH
1	EA	WALLSTOPS 407.5	630	I
1	SET	SEALS PS074	BLACK	STE

GROUP 26

DOOR B103A, B106A, B133A,

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
1	EA	LOCKSET ND93PD RHO	626	SCH
1	EA	OVERHEAD STOP 100S	630	GJ
1	SET	SEALS PS074	BLACK	STE

GROUP 27

DOOR B119A, B143A, C106A, B224A, B237A, C206A,

6	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
2	EA	PANIC 2201 SNB	630	PRE
2	EA	CLOSERS 4111 EDA	ALUM	LCN
2	EA	KICPLATES 10 X 2LDW	630	I
2	EA	WALL MAGS 7850 VERIFY	ALUM	LCN
2	SET	SEALS PS074	BLACK	STE

GROUP 28

DOOR B120A, C101A, B238A, A200A, B232A, B300A, B301A, C300A, B107B

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	652	I
1	EA	LOCKSET ND80PD RHO	626	SCH
1	EA	CLOSER 4111	ALUM	LCN
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOPS 407.5	630	I
1	SET	SEALS PS074	BLACK	STE

GROUP 29

DOOR B125A, B125C,

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
1	EA	LOCKSET ND93PD RHO	626	SCH
1	EA	OPERATOR 4642	ALUM	LCN
2	EA	PUSH 8310-856T	630	LCN
1	EA	ELECTRIC STRIKE 6210	626	VD
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOPS 407.5	630	I
1	SET	SEALS PS074	BLACK	STE
		ACCESS CONTROL BY OTHERS		

GROUP 30

DOOR B126A, B127A, B129A, B131A, B144A, B146A, B148A, B149A, B150A, B225A, B226A, B227A, B229A, B231A, B244A, B246A, B248A, B249A, B250A, C207A, C209A, C211A, C212A, C213A, C111A, C112A, C113A, B216A, B218A, C107A, C109A

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
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1	EA	LOCKSET ND93PD RHO	626	SCH
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOPS 407.5	630	I
1	SET	SEALS PS074	BLACK	STE

GROUP 31

DOOR B125D

1	SET	BIFOLD HDW BFC125N		ST
1	EA	WIRE PULL 6"	626	I

GROUP 32

DOOR B130A, B145A, C108C, B230A, B245B, C208A,

1	EA	CONTINUOUS HINGE 112HD EPT	ALUM	I
1	EA	PANIC RX-EL33/98NL X 990NL	626	VD
1	EA	CYLINDER 20-079	626	SCH
1	EA	CORES 20-030 VERIFY KEYWAY	626	SCH
1	EA	POWER TRANSFER EPT-10	626	VD
1	EA	POWER SUPPLY PS914 X 4RL-4RL-BB-KL		VD
1	EA	CLOSERS 4111 SPRING CUSH	ALUM	LCN
1	EA	DROP PLATES IF REQUIRED	ALUM	LCN
1	EA	BLADE SUPPORT 4110-61	ALUM	LCN
1	EA	SHOE SUPPORT 4110-30	ALUM	LCN
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
1	EA	DOOR SHOE BY DOOR SUPPLIER		
1	SET	SEALS BY DOOR SUPPLIER		
		CARD READER, WIRING, AND INSTALLATION BY OTHERS		

GROUP 33

DOOR B140A, C103A, B221A, B240A, C203A,

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
1	EA	INDIACATOR PRIVACY L9486PD 06A	626	SCH
1	EA	CLOSER 4011	ALUM	LCN
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	WALLSTOPS 407.5	630	I
1	SET	SEALS PS074	BLACK	STE

GROUP 34

DOOR B234A, B236A

3	EA	BUTTS 5BB1HW 4.5 X 4.5 NRP	626	I
1	EA	LOCKSET ND93PD RHO	626	SCH
1	EA	KICKPLATE 10 X 2LDW	630	I
1	EA	OVERHEAD STOP 100S	630	GJ
1	SET	SEALS PS074	BLACK	STE

GROUP 35

DOOR G01, G04, G08, G09, G14, G15, G21,

NOTE: SEE PROJECT MANUAL SECTION 32 31 19 FOR HINGES

1	EA	PANIC LD98NL X 990NL	626	VD
1	EA	CYLINDER 20-079	626	SCH
1	EA	CORES 20-030 VERIFY KEYWAY	626	SCH
1	EA	ELECTRIC STRIKE 9600	630	HES
1	EA	SMART PAK 2005		HES

GROUP 36

DOOR G02, G05, G06, G07, G10, G12, G13,

NOTE: SEE PROJECT MANUAL SECTION 32 31 19 FOR HINGES

1	EA	PANIC LD98NL X 990NL	626	VD
1	EA	CYLINDER 20-079	626	SCH
1	EA	CORES 20-030 VERIFY KEYWAY	626	SCH

GROUP 37

DOOR G03, G11, G16, G22,

1	EA	PADLOCK VERIFY SIZE HINGES BY GATE SUPPLIER CANE BOLT BY GATE SUPPLIER		SCH
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GROUP 38

DOOR B125B,

1	EA	CONTINUOUS HINGE 112HD EPT	ALUM	I
1	EA	PANIC RX-EL33/98NL X 990NL	626	VD
1	EA	CYLINDER 20-079	626	SCH
1	EA	CORES 20-030 VERIFY KEYWAY	626	SCH
1	EA	POWER TRANSFER EPT-10	626	VD
1	EA	POWER SUPPLY PS914 X 4RL-4RL-BB-KL		VD
1	EA	OPERATOR 4642 VERIFY ARM	ALUM	LCN
2	EA	PUSH 8310-856T	630	LCN
1	EA	BLADE SUPPORT 4110-61	ALUM	LCN
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
1	EA	DOOR SHOE BY DOOR SUPPLIER		
1	SET	SEALS BY DOOR SUPPLIER		
		CARD READER, WIRING, AND INSTALLATION BY OTHERS		

GROUP 39

DOOR 101C

1	EA	CONTINUOUS HINGE 112HD	ALUM	I
1	EA	PANIC CD33/98NL X 990NL	626	VD
1	EA	CYLINDER 20-079	626	SCH
1	EA	CYLINDER 26-064	626	SCH
2	EA	CORES 20-030 VERIFY KEYWAY	626	SCH
1	EA	CLOSERS 4111 SPRING H CUSH	ALUM	LCN
1	EA	DROP PLATES IF REQUIRED	ALUM	LCN
1	EA	BLADE SUPPORT 4110-61	ALUM	LCN
1	EA	SHOE SUPPORT 4110-30	ALUM	LCN
1	EA	THRESHOLD 276A (VERIFY DETAIL)	ALUM	P
1	SET	SEALS BY DOOR SUPPLIER		

SECTION 08 8000

GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glass.
- B. Frameless Glass Doors, Sidelites, Transoms, and Hardware.
- C. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 4100 - Architectural Wood Casework: Cabinets with requirements for glass shelves
- B. Section 07 2500 - Weather Barriers.
- C. Section 07 9005 - Joint Sealers: Sealant and back-up material.
- D. Section 08 1113 - Hollow Metal Doors and Frames: Glazed doors and borrowed lites.
- E. Section 08 1416 - Flush Wood Doors: Glazed lites in doors.
- F. Section 08 3613 - Sectional Doors: Glazed lites in doors.
- G. Section 08 4229 - Automatic Entrances: Glazed lites in doors.
- H. Section 08 4313 - Aluminum-Framed Storefronts: Glazing.
- I. Section 08 4413 - Glazed Aluminum Curtain Walls: Glazing.
- J. Section 08 5113 - Transaction Windows: Glazing.
- K. Section 08 6300 - Metal-Framed Skylights: Glazing furnished by skylight manufacturer.
- L. Section 08 8723 - Decorative Glazing Films: Applied to glass.

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; U.S. Consumer Products Safety Commission; current edition.
- B. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2011).
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- D. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2012a.
- E. GANA (SM) - GANA Sealant Manual; Glass Association of North America; 2008.
- F. OSSC - Oregon Structural Specialty Code - Latest edition

1.04 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design frameless glass relites, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Oregon, using performance requirements and design criteria indicated.
 - 1. Design frameless glass relites to comply with Oregon Structural Specialty Code Section 2403.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Samples: Submit two samples 12 x 12 inch in size of glass and plastic units, showing coloration and design.

- D. Shop Drawings: Provide complete shop drawings showing coordination with adjoining architectural finishes and items furnished as Work of other Sections for the following:
 - 1. Frameless glass relites.
 - a. Provide detailed shop drawings and analysis or test data substantiating safe performance for the specific installation prepared by a registered design professional.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
- B. Safety glazing to comply with OSSC requirements.
- C. Perform Work in accordance with GANA Glazing Manual, GANA Sealant Manual, SIGMA TM-3000 Glazing Guidelines, GANA Laminated Glazing Reference Manual, and AAMA GSDG-1, "Glass Design for Sloped Glazing" for glazing installation methods.
- D. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
 - 1. Provide safety glazing at locations defined in Section 2406 of the Oregon Structural Specialty Code and elsewhere as indicated.

1.07 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for additional mock-up requirements.
- B. Provide glazing for integrated exterior mockup of areas indicated on Drawings including glass.
- C. Locate where directed.
- D. Mock-up may not remain as part of the Work.

1.08 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.
- C. Provide a ten (10) year warranty to include coverage for delamination materially obstruction vision through glass of laminated glass and replacement of same.
- D. Provide a ten (10) year warranty to include deterioration of coated glass including peeling, cracking and other indications of deterioration in coating

PART 2 PRODUCTS

2.01 GLAZING TYPES

- A. Type A - Sealed Insulating Glass Units
 - 1. Application(s): Exterior Aluminum Storefront and Curtainwall Systems.
 - 2. Outboard Lite: PPG Solarban 60 (2) Starphire, Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: PPG Solargray.
 - b. Coating: Low-E type, on #2 surface.
 - 3. Spacer: 1/2" Aluminum poly
 - 4. Inboard Lite: PPG Starphire, Annealed float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - 5. Total Thickness: 1 inch.
 - 6. Total Visible Light Transmittance: 74 to 78 percent, nominal.

7. Total Solar Heat Gain Coefficient: 41 to 62 percent, nominal.
 8. U Value: 0.27 to 0.30
- B. Type B - Sealed Insulating Glass Units
1. Application(s): Exterior Aluminum Storefront and Curtainwall Systems.
 2. Outboard Lite: PPG Solarban 72 Starphire, Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: PPG Solargray.
 - b. Coating: Low-E type, on #2 surface.
 3. Spacer: 1/2" Aluminum poly
 4. Inboard Lite: PPG Starphire, Laminated at skylight, Annealed float glass elsewhere, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 5. Total Thickness: 1 inch.
 6. Total Visible Light Transmittance: 69 to 71 percent, nominal.
 7. Total Solar Heat Gain Coefficient: 30 to 39 percent, nominal.
 8. U Value: 0.25 to 0.29
- C. Type C - Sealed Insulating Glass Units
1. Application(s): Skylights and Exterior Aluminum Storefront.
 2. Outboard Lite: PPG Solarban 70 XL, Laminated at skylights, Fully tempered float glass elsewhere, 1/4 inch thick, minimum.
 - a. Tint: PPG Solargray.
 - b. Coating: Low-E type, on #2 surface.
 3. Spacer: 1/2" Aluminum poly
 4. Inboard Lite: PPG Starphire, Laminated at skylights, Annealed float glass, 1/4 inch thick, minimum elsewhere.
 - a. Tint: Clear.
 - b. Light diffusing Frit on Surface #3: 100% coverage, Satin Etch SX80089 by Hartung Glass Industries
 5. Total Thickness: 1 inch.
 6. Total Visible Light Transmittance: 62 to 64 percent, nominal.
 7. Total Solar Heat Gain Coefficient: 27 to 31 percent, nominal.
 8. U Value: 0.24 to 0.29
- D. Type D - Sealed Insulating Glass Units
1. Application(s): Exterior Aluminum Storefront and Curtainwall Systems.
 2. Outboard Lite: PPG Solarban 60 (2) + Azuria, Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: PPG Solargray.
 - b. Coating: Low-E type, on #2 surface.
 3. Spacer: 1/2" Aluminum poly
 4. Inboard Lite: PPG Starphire, Laminated at skylight, Annealed float glass elsewhere, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 5. Total Thickness: 1 inch.
 6. Total Visible Light Transmittance: 51 to 54 percent, nominal.
 7. Total Solar Heat Gain Coefficient: 27 to 35 percent, nominal.
 8. U Value: 0.27 to 0.35
- E. Type E - Sealed Insulating Glass Units
1. Application(s): Exterior Aluminum Storefront and Curtainwall Systems.
 2. Outboard Lite: PPG Solarban XL (2) + Azuria, Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: PPG Solargray.
 - b. Coating: Low-E type, on #2 surface.
 3. Spacer: 1/2" Aluminum poly

4. Inboard Lite: PPG Starphire, Laminated at skylight, Annealed float glass elsewhere, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 5. Total Thickness: 1 inch.
 6. Total Visible Light Transmittance: 48 to 49 percent, nominal.
 7. Total Solar Heat Gain Coefficient: 22 to 27 percent, nominal.
 8. U Value: 0.26 to 0.30
- F. Type F - Sealed Insulating Glass Units
1. Application(s): Sectional Doors.
 2. Outboard Lite: PPG Solarban 60, Fully tempered float glass, 1/8 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Low-E type, on #2 surface.
 3. Spacer: 1/4" Aluminum poly
 4. Inboard Lite: Fully tempered float glass, 1/8 inch thick, minimum.
 - a. Tint: Clear.
 5. Total Thickness: 1/2 inch.
- G. Type G - Sealed Insulating Glass Units: Spandrel glazing.
1. Application: Exterior spandrel glazing where indicated.
 2. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Same as on vision units, on #2 surface.
 3. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick.
 - a. Tint: Clear.
 - b. Opacifier: Elastomeric Coating by Opacicoat Company, apply on #2 and #3 surface where interior face is visible, elsewhere apply on #4 surface.
 - c. Opacifier Color: See color schedule.
 4. Total Thickness: 1 inch.
- H. Type 2 - Single Vision Glazing
1. Application(s): All interior glass unless otherwise noted.
 2. Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: none
- I. Provide Tempered Safety Glass within any of the above Glazing Types where shown on drawings or where required by OSSC, and as listed below:
1. Glazing within doors
 2. Glazing within 2'
 3. Where safety glazing is required by code.

2.02 EXTERIOR GLAZING ASSEMBLIES

- A. Structural Design Criteria: Select type and thickness of glass to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass.
1. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
 2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
 3. Glass thicknesses listed are minimum.
- B. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
1. Provide fully tempered glass at outer light at all windows.

2.03 GLASS MATERIALS

- A. Primary Glass Manufacturers:
- B. Guardian Industries Corp: www.sunguardglass.com.
- C. Pilkington North America Inc: www.pilkington.com/na.

- D. PPG Industries, Inc: www.ppgideascales.com.
- E. Substitutions: Refer to Section 01 60 00 - Product Requirements.
- F. Commercial Glass Fabricators:
 - 1. Garibaldi Glass: www.garibaldiglass.com.
 - 2. Hartung Glass Industries: www.hartung-glass.com.
 - 3. Northwestern Industries: www.nwglass.com.
 - 4. Oldcastle BuildingEnvelope: www.oldcastle.com.
 - 5. Viracon, Inc: viracon.com.
 - 6. Vitrum Industries: www.vitrumindustries.com.
 - 7. Substitutions: Refer to Section 01 60 00 - Product Requirements.
- G. Heat-Treated Glass:
 - 1. Fabrication Process: By horizontal (roller hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
 - 2. Roll Wave Maximum Distortion Tolerance: 0.003 inch target with 0.005 inch maximum peak to valley measurement.
 - 3. Bow and Warp Maximum Tolerance: 50 percent of the maximum allowed in ASTM C1048.
- H. Laminated Glass, General: Float glass laminated in accordance with ASTM C1172.
 - 1. Laminated Safety Glass: Comply with 16 CFR 1201 test requirements for Category II.
 - 2. Plastic Interlayer: 0.030 inch thick, minimum, unless otherwise indicated.
 - 3. Where fully tempered is specified or required, provide glass that has been tempered by the tong-less horizontal method.
- I. Clear Tempered Safety Glass Type T-1, Type T-2, and Type T-3.
 - 1. Comply with ASTM C1048; Type I, Quality-Q3; Class I (clear).
 - 2. Thickness:
 - a. T-1: 1/4-inch, 6 mm.
 - 1) Locations of Use: Interior non-rated doors, interior storefront, interior sidelights and elsewhere as indicated
 - b. T-2: 3/8-inch, 9.5 mm.
 - 1) Locations of Use: Frameless glass relites up to 8 foot in height.
 - c. T-3: 1/2-inch, 12.7 mm.
 - 1) Locations of Use: Frameless glass relites between 8 foot and 10 foot in height.
 - 3. Fabricate glass for frameless relites with clean cut or flat ground edges in a manner that produces square edges with slight kerfs.
- J. Patterned Clear Tempered Safety Glass: ASTM C1048; Type I, Quality-Q3; Class I (clear) with etched pattern as indicated on Drawings.
 - 1. PG-1: 1/2 inch tempered glass for use at frameless relites exceeding 8 foot in height where indicated.
 - 2. Fabricate glass for frameless relites with clean cut or flat ground edges in a manner that produces square edges with slight kerfs.
 - 3. Note: This is for glazing in frameless relites that get "safety dots".
- K. Laminated Safety Glass (Type LT-1): Clear; fully tempered.
 - 1. Laminated with 0.030 inch thick polyvinyl butyral interlayer; comply with ASTM C1172.
 - a. Interlayer Color: Clear.
 - 2. Glass Thickness: Two layers 4.4 mm nominal clear tempered safety glass. Overall thickness of laminated glass not to exceed 3/8-inch.
 - 3. Comply with ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select) and ASTM C1048.
 - 4. Comply with 16 CFR 1201 test requirements for Category II.
 - 5. Provide safety glazing labeling.
 - 6. Locations of Use: Shelves in display cases.
- L. Laminated Safety Glass (Type LT-2): Clear; fully tempered.
 - 1. Laminated with 0.030 inch thick polyvinyl butyral interlayer; comply with ASTM C1172.

- a. Interlayer Color: Clear.
2. Glass Thickness: Two layers 3 mm nominal clear tempered safety glass.
3. Comply with ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select) and ASTM C1048.
4. Comply with 16 CFR 1201 test requirements for Category II.
5. Provide safety glazing labeling.
6. Locations of Use: Doors where indicated.

M. (Note) This type would be used for glazing into the gymnasium.

2.04 SEALED INSULATING GLASS UNITS

- A. Manufacturers:
- B. Any of the manufacturers/fabricators specified for float glass.
- C. Substitutions: Refer to Section 01 60 00 - Product Requirements.
- D. Sealed Insulating Glass Units: Types as indicated.
 1. Locations: Exterior, except as otherwise indicated.
 2. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 3. Edge Spacers: Aluminum, bent and soldered corners.
 4. Edge Seal: Glass to elastomer with supplementary silicone sealant.
 5. Purge interpane space with dry hermetic air.
- E. Insulated Clear Tempered Safety Glass Units Type IT-1: Double pane with silicone sealant edge seal.
 1. Locations of Use: All exterior storefront, curtain wall, entrance doors, and windows.
 2. Outer pane of 6 mm clear tempered float glass with glass, inner pane of 6 mm clear tempered float glass.
 3. Place low E coating on No. 2 surface within the unit.
 4. Interspace Content: Argon.
 5. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 6. Purge interpane space with dry air.
 7. Total unit thickness of 1 inch.
 8. Visible Light Transmittance: 68 percent minimum.
 9. Winter Nighttime U-Factor: 0.25 maximum.
 10. Solar Heat Gain Coefficient: 0.38 maximum.
 11. Products:
 - a. SunGuard Clear SN 68 manufactured by Guardian Industries.
 - b. Solarban 60 (2) Clear manufactured by PPG Industries.
 - c. VE 1-2M manufactured by Viracon.
- F. Insulated Clear Tempered Safety Glass Units Type IT-?: Double pane with silicone sealant edge seal.
 1. Locations of Use: Metal-framed skylights.
 - a. Refer to Section 08 63 00 - Metal-Framed Skylights and Structural drawings for loads.
 2. Outer Pane: Clear, thickness to be engineered for project specific loads.
 3. Place low E coating on No. 2 surface within the unit.
 4. Interspace Content: Argon.
 5. Inner Pane: Clear glass laminated with a minimum 0.030 "white diffused" PV interlayer. Glass thickness to be engineered to meet project specific loads.
 6. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 7. Purge interpane space with dry air.
 8. Total unit thickness of 1 inch.
 9. Visible Light Transmittance: 60 percent minimum.
 10. Winter Nighttime U-Factor: 0.25 maximum.
 11. Solar Heat Gain Coefficient: 0.37 maximum.
 12. Products:
 - a. SunGuard Clear SN 68 manufactured by Guardian Industries.

- b. Solarban 60 (2) Clear manufactured by PPG Industries.
- c. VE 1-2M manufactured by Viracon.

2.05 GLAZING COMPOUNDS

- A. Glazing Sealant for Frameless Glass Relites: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT.
 - 1. Products:
 - a. Dow Corning Corporation; 795.
 - b. GE Advanced Materials - Silicones; SilGlaze II SCS2800.
 - c. Tremco Incorporated; Spectrem 2.
 - 2. Locations of Use:
 - a. Butt joint in frameless glass relites.
 - 3. Color: As selected from manufacturer's full range of available colors.

2.06 GLAZING ACCESSORIES

- A. As recommended by the glazing manufacturer for particular applications.
- B. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; hardness of 5 to 30 Durometer Shore "A"; coiled on release paper; black color.
- D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I; black color.

2.07 FRAMELESS GLASS DOOR, RELITE, TRANSOM, AND WALL HARDWARE

- A. Channels
 - 1. Aluminum U-channel; similar to CR Laurence "CRL Wet/Dry Glaze U-Channel"; satin anodized finish. 2 inch channel at the head of all glass, 1 inch channel at the base of all glass.
 - 2. Glaze with roll-in gasket from channel manufacturer.
- B. Hinges
 - 1. Aluminum, self-closing hinge; adjustable closing speed; 90 degree hold open; similar to CR Laurence "Biloba hydraulic all-glass door hinges"; brushed satin finish.
 - 2. Sized for 1/2 inch glass.
- C. Stops
 - 1. At Double Doors: Aluminum patch connector; similar to CR Laurence "CRL Transom Mounted Patch Connector with Two Door Stops"; satin anodized finish.
 - 2. At Single Doors within MDF frames: Aluminum patch connector; similar to CR Laurence "CRL Header Mounted Single Door Stop"; satin anodized finish.
 - 3. At Single Doors adjacent to glass panels: Aluminum patch connector; similar to CR Laurence "CRL Sidelight Mounted Transom Patch Connector with Door Stop"; satin anodized finish.
- D. Patches
 - 1. To connect glass panels: Aluminum patch connector; similar to CR Laurence "CRL Sidelight Mounted Transom Patch Connector"; satin anodized finish.
- E. Pulls
 - 1. At Main Entry Double Doors: 1-3/8 inch diameter brushed stainless steel tube pulls, with fully concealed deadbolt mechanism that locks into the floor; thumbturn on one side; dustproof keeper; with cylinder cores; similar to CR Laurence "59" Locking Ladder Pull."
 - 2. At Single Doors: 1-1/4 inch diameter brushed stainless steel tube pulls, 24 inches long; similar to CR Laurence "Straight Style Ladder Pull."

2.08 FRAMELESS GLASS RELITES

- A. Provide complete systems as specified and detailed on Drawings.
 - 1. All components for each assembly type shall be supplied by the same manufacturer.
 - 2. Field measure all openings prior to fabrication.
 - 3. Install in accordance with manufacturer's instructions, maintaining recommended clearances.
 - 4. Basis-of-Design Manufacturer: CR Laurence Co: www.crlaurence.com.
 - a. Substitutions: Refer to Section 01 60 00 - Product Requirements.
- B. Frameless Relites with Glazing Channels:
 - 1. Glazing Channels and Accessories: Satin anodized aluminum for interior use as frames for butt joint frameless glass relites. Attach to structural components as detailed.
 - a. Head and Sill Sections: 4-inches high.
 - 1) Basis-of-Design Product: SR4TSA3812SL 4-inch Tapered Sidelight Rails with Saddle.
 - 2. Glazing Channels and Accessories: Satin anodized aluminum for interior use as frames for butt joint frameless glass relites. Attach to structural components as detailed.
 - a. Head Section: 1-5/8-inch high.
 - 1) Basis-of-Design Product: UCSA3812SL Regular U-Channel with Top Load Roll-in Glazing Gasket manufactured by CR Laurence.
 - b. Sill Section: 11/16-inch high.
 - 1) Basis-of-Design Product: SCSA3812SL Shallow U-Channel with Top Load Roll-in Glazing Gasket manufactured by CR Laurence.
 - 3. Provide aluminum and neoprene setting block at sills, sized for glass thickness.
 - 4. Glazing Gasket: Manufacturer's recommended black roll-in dry glaze gasketing sized for glass thickness.

2.09 DISPLAY CASE GLASS SHELVES

- A. Glass: 3/8 inch thick, tempered, clear, standard polished edges. Sizes as shown on Drawings.
 - 1. Laminated Glass

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.
- E. Install sealant in accordance with manufacturer's instructions.

3.03 INSTALLATION

- A. Install in strict accordance with manufacturer's instructions and FGMA Glazing Manual.

3.04 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

- A. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

- A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- D. Place glazing tape on free perimeter of glazing in same manner described above.
- E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- F. Knife trim protruding tape.

3.06 INSTALLATION - FRAMELESS RELITES

- A. Comply with manufacturer's recommended installation as required to comply with structural design criteria.
- B. Fill butt joints between and joint between adjacent wall and glass lite at frameless glass relites with silicone sealant in accordance with manufacturer's recommendations.

3.07 SPANDREL GLAZING

- A. Heat strengthen glazing material that is part of insulated unit to receive spandrel coating.
- B. Apply coatings per manufactures requirements.

3.08 CLEANING

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

3.09 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

END OF SECTION

SECTION 08 8723
DECORATIVE GLAZING FILMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Decorative Glazing Films.

1.02 REFERENCE STANDARDS

- A. ASTM E-84, "Test Method for Surface Burning Characteristics of Building Materials".
- B. ASTM E 903, "Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres."
- C. ASTM D 3330, "Standard Test Methods for Peel-Adhesion at 180 Degree Angle".

1.03 PERFORMANCE REQUIREMENTS

- A. Thermal and Optical Performance Properties: Provide glazing films with performance properties specified (on 1/8 inch clear glass) based on manufacturer's published test data, as determined according to procedures indicated in ASHRAE Handbook of Fundamentals:
 - 1. Performance requirements vary by product selected and will be identified by Architect from color selection samples submitted by the manufacturer.
- B. Surface Burning Characteristics: Provide films that have Flame Spread Index of 0 and Smoke Development Index of 30 or less when tested in accordance to ASTM E 84.
- C. Minimum Peel Strength: 2,000 grams per inch, average of two specimens when tested in accordance with ASTM D 3330.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Samples for Color Selection: Manufacturer's standard sample sets showing the full range of colors available for each type of product indicated.
- C. Samples for Verification: 12-inch square samples of each glazing film, of each product color specified.
- D. Closeout Submittals: Upon completion of the Work, submit the following:
 - 1. Executed warranty.
 - 2. Maintenance (cleaning) and replacement instructions.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engage a firm experienced in manufacturing systems similar to those indicated for this Project and meeting the standards of the International Standards Organization (ISO), ISO 9001 Quality Assurance in Production and Installation.
- B. Installer Qualifications: Engage an experienced installer certified, licensed, or otherwise qualified by film manufacturer as having the necessary experience, staff, and training to install manufacturer's products according to specified requirements.
- C. Mockups: Apply glazing films in locations as directed to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Obtain approval of field samples before continuing with remainder of installation.
 - 2. Maintain field samples during remainder of installation in an undisturbed condition as a standard for judging the completed Work.
 - 3. Approved field samples may become part of the completed Work.
- D. Pre-installation Conference: Before installing glazing films, conduct conference at Project site. Conduct pre-installation conference in conjunction with installation of mockup.
 - 1. Meet with Owner, Architect, glazing film Installer and glazing film manufacturer's representative.
 - 2. Review methods and procedures related to installation, including manufacturer's written instructions.

3. Examine substrate conditions for compliance with requirements.
4. Review temporary protection measures required during and after installation.
5. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing films according to manufacturer's written instructions and as needed to prevent damage condensation, temperature changes, direct exposure to sun, or other causes.

1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with film installation when ambient and substrate temperature conditions are outside limits permitted by manufacturer and when glass substrates are wet from frost, condensation, or other causes.

1.08 WARRANTY

- A. Manufacturer's Warranty: Fully executed warranty, written in favor of the Owner, agreeing to replace films that deteriorate as defined in "Definitions" Article, within 5 years from date of original installation.

PART 2 - PRODUCTS

2.01 GLAZING FILM

- A. Manufacturers:
 1. 3M Window Film: www.3m.com/us/arch_construct/scpd/windowfilm
 2. Madico, Inc: www.madico.com.
 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Film A: Single or multi-layered decorative film products, applied to interior glass surfaces:
 1. Similar to "Fasara, Mat Crystal-1", by 3M.
 2. Shading coefficient: 0.94.
 3. VLT: 85%.
 4. Roll size: 50 inches wide.
- C. Film B: Single or multi-layered, adhesive-backed film product, applied to interior glass surface, creating a 'one-way glass' effect, using a silver:
 1. Shading coefficient: 0.94.
 2. Roll size: Minimum 50 inches wide.

2.02 GLAZING FILM ACCESSORIES

- A. General: Provide products complying with requirements of glazing film manufacturer for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Adhesive: Pressure Sensitive acrylic adhesive system, compliant with project's VOC requirements.
- C. Cleaners, Primers, and Sealers: Types recommended by glazing film manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine glass and surrounding adjacent surfaces for conditions affecting installation.
 1. Report conditions that may adversely effect installation. In report, include description of any glass that is broken, chipped, cracked, abraded, or damaged in any way.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.

- B. Immediately before beginning installation of films, clean glass surfaces of substances that could impair glazing film's bond, including mold, mildew, oil, grease, dirt and other foreign materials.
- C. Protect window frames and surrounding conditions from damage during installation.

3.03 INSTALLATION

- A. General: Comply with glazing film manufacturers' written installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
 - 1. Install film continuously, but not necessarily in one continuous length. Install with no gaps or overlaps.
 - 2. If seamed, install with no gaps or overlaps. Install seams vertical and plumb. No horizontal seams allowed.
 - 3. Do not remove release liner from film until just before each piece of film is cut and ready for installation.
 - 4. Install film with mounting solution and custom cut to the glass with neat, square corners and edges to within 1/8 inch of the window frame.
 - 5. Remove air bubbles, wrinkles, blisters, and other defects.
- B. After installation, view film from a distance of 10 feet against a bright uniform sky or background. Film shall appear uniform in appearance with no visible streaks, banding, thin spots or pinholes.
 - 1. If installed film does not meet this criteria, remove and replace with new film.

3.04 CLEANING

- A. Remove excess mounting solution at finished seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended by glazing film manufacturer.
- C. Replace films that cannot be cleaned.

END OF SECTION

SECTION 08 9100

LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 4213 - Metal Wall Panels, adjacent wall material
- B. Section 07 4623 - Wood Siding, adjacent wall material.
- C. Section 07 6200 - Sheet Metal Flashing and Trim.
- D. Section 07 9005 - Joint Sealers.
- E. Section 09 9000 - Painting and Coating: Field painting.
- F. Section 23 3101 - HVAC Ducts and Casing - Low Pressure

1.03 REFERENCE STANDARDS

- A. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices; 2013.

1.04 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures for submittal procedures.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.
- D. Test Reports: Independent agency reports showing compliance with specified performance criteria.
 - 1. Test data indicating Class A performance at stated wind speed and rainfall performance requirements.

1.05 QUALITY ASSURANCE

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wall Louvers, Basis of Design: Construction Specialties, Inc; EVH-602D Vertical, and EVH-601D Horizontal; www.c-sgroup.com.
- B. Wall Louvers:
 - 1. Airo-lite Company, LLC; Match basis of design: www.airolite.com.
 - 2. American Warming and Ventilating; Match basis of design: www.awv.com.
 - 3. Pottorff; Match Basis of Design: www.pottorff.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOUVERS

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
 - 1. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.
- B. Stationary Louvers : Horizontal blade, extruded aluminum construction, with intermediate mullions matching frame.
 - 1. Free Area: 50 percent, minimum.
 - 2. Blades: V-shaped, sight-proof.

3. Frame: 5 inches deep, channel profile; corner joints mitered and, with continuous recessed caulking channel each side.
4. Aluminum Thickness: Frame 12 gage, 0.0808 inch minimum; blades 12 gage, 0.0808 inch minimum.
5. Aluminum Finish: Powder Coat, 100% resin flouropolymer coating, 1.5 to 3 mil thick. Meet or exceed requirements of AAMA 2605-5.; finish welded units after fabrication.
6. Color: Custom color as scheduled..

2.03 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), .
- B. Bird Screen: Interwoven wire mesh of steel, 0.063 inch diameter wire, 1/2 inch open weave, diagonal design.
- C. Insect Screen: 18 x 16 size aluminum mesh.
- D. Primer: Zinc chromate, alkyd type.

2.04 ACCESSORIES

- A. Blank-Off Panels: Aluminum face and back sheets, polyisocyanurate foam core, 2 inch where space allows, 1 inch thick elsewhere, painted black on exterior side; provide where duct connected to louver is smaller than louver frame, sealing off louver area outside duct. Thermal Insulation Value: R-5 and R10.
- B. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.
- C. Fasteners and Anchors: Galvanized steel.
- D. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Install louvers level and plumb.
- C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- D. Secure louver frames in openings with concealed fasteners.
- E. Install perimeter sealant and backing rod in accordance with Section 07 9005.
- F. Coordinate with installation of mechanical ductwork.
- G. Seal between louver, mechanical duct, and Blank-off-panel for air and water tight construction.

3.02 ADJUSTING

- A. Adjust operable louvers for freedom of movement of control mechanism. Lubricate operating joints.

3.03 CLEANING

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

END OF SECTION

SECTION 09 2116
GYPNUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Acoustic insulation.
- B. Cementitious backing board.
- C. Gypsum wallboard.
- D. Glass-mat faced sheathing board.
- E. Backing board for ceramic tile.
- F. Fire rated shaft wall system.
- G. Joint treatment and accessories.
- H. Textured finish system.

1.02 RELATED REQUIREMENTS

- A. Section 05 4000 - Cold-Formed Metal Framing: Wall framing
- B. Section 07 2100 - Thermal Insulation: Acoustic insulation.
- C. Section 07 2500 - Weather Barriers: Water-resistive barrier over sheathing.
- D. Section 07 8400 - Firestopping
- E. Section 07 9005 - Joint Sealers: Acoustic sealant.
- F. Section 09 2216 - Non-Structural Metal Framing.
- G. Section 09 3000 - Tiling: Tile backing board.
- H. Section 09 9000 - Painting: PVA primer/sealer on gypsum board.

1.03 REFERENCE STANDARDS

- A. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 2013.1.
- B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2013.1.
- C. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2012.
- D. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2009)e1.
- E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2013.
- F. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- G. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2011.
- H. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- I. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2011.
- J. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007 (Reapproved 2013).
- K. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2010a.

- L. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.
- M. ASTM C1280 - Standard Specification for Application of Gypsum Sheathing; 2013.
- N. ASTM C1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cement Substrate Sheets; 2008b.
- O. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- P. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2006 (Reapproved 2011).
- Q. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2013.
- R. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- S. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2013.
- T. OSSC - Oregon Structural Specialty Code; latest edition.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- C. Test Reports: For fire rated materials. Indicate specific test reports for each rated assembly.

1.05 MOCK-UPS

- A. Integrated Exterior Mock-ups: Provide sheathing for integrated exterior mock-ups as specified in Section 01 40 00 - Quality Requirements.
- B. Partial Interior Mock-ups: Before beginning gypsum board installation, install mock-ups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install mock-ups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mock-ups.
 - 3. Simulate finished lighting conditions for review of mock-ups.
 - 4. Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

1.07 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 5 years of documented experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.

- B. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assemblies indicated according to ASTM E119 by an independent testing agency acceptable to agencies having jurisdiction.
- C. Acoustic Assemblies: Construct walls indicated to receive acoustic insulation as acoustic assemblies. Provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.
- D. Fire Rated Assemblies: Provide completed assemblies complying with the hourly rating indicated on the Drawings and one of the following:
 - 1. ICC IBC Item Numbers: Comply with applicable requirements of ICC IBC for the particular assembly.
 - 2. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
 - 3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory.

2.02 METAL FRAMING MATERIALS

- A. Manufacturers - Metal Framing, Connectors, and Accessories: All products to be manufactured by current members of the Steel Stud Manufacturers Association (SSMA) or the Steel Framing Industry Association (SFIA).
 - 1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
 - 2. SCAFECO Corporation: www.scafco.com.
 - 3. Steeler, Inc: steeler.com
 - 4. The Steel Network, Inc: www.SteelNetwork.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
 - 1. Studs: "C" shaped with flat or formed webs with knurled faces.
 - a. Minimum Base-Metal Thickness (Gage): 0.0312 inch (20 gage), unless otherwise indicated
 - 1) Provide 0.0312 inch (20 gage) supporting tile backer board.
 - b. Depth: As indicated.
 - 2. Runners: U shaped, sized to match studs.
 - 3. Resilient Furring Channels: 1/2 inch depth, for attachment to substrate through one leg only.
 - a. Resilient channels shall be of flat, 24 to 26 gage sheet metal constructed with a 1-1/4 inch to 2-1/2 inch wide screw flange on one side and a 1/2 inch to 3/4 inch screw flange on the other side separated by a slotted metal bridge. Slots in bridge shall be 2-1/2 inch to 3-1/4 inch long and 0.25 inch to 0.32 inch wide and installed along the bridge on 3-1/2 inch to 4 inch center spacings.
 - b. Configuration: Asymmetrical.
 - c. Products:
 - 1) Auralex Acoustics, Inc: RC8.
 - 2) Dietrich Metal Framing; Type RCSD.
 - 3) USG Corporation; RC-1.
 - 4) Substitutions: See Section 01 60 00 - Product Requirements.
 - d. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 - 1) Minimum Base-Metal Thickness: 0.0312 inch (20 gage), unless otherwise indicated.
 - e. Loadbearing Studs for Application of Gypsum Board: As specified in Section 05 40 00.

- C. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
 - 1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
- D. Shaft Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.
 - 1. ASW Clips: Area separation wall clips, 0.05 inch aluminum, 2-inch wide with 2-inch by 2-1/2 inch legs.
- E. 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.
 - 1. Products:
 - a. Steel Network Inc (The); VertiClip SLD Series.
 - b. Superior Metal Trim; Superior Flex Track System (SFT).
 - 2. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems of fire rating and movement required.
 - 3. Deflection and Firestop Track:
 - a. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-rating of the wall assembly.
 - b. Products:
 - 1) Fire Trak Corp.; Fire Trak attached to studs with Posi Clips: www.firetrak.com.
 - 2) Metal-Lite, Inc; The System: www.metallite.net.
 - 3) Substitutions: See Section 01 60 00 - Product Requirements.
- F. Grid Suspension System for Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.
 - 1. Products:
 - a. Armstrong World Industries, Inc; Drywall Grid Systems.
 - b. USG Corporation; Drywall Suspension System.
 - c. Substitutions: See Section 01 60 00 - Product Requirements

2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 - 1. American Gypsum: www.americangypsum.com.
 - 2. Georgia-Pacific Gypsum: www.gpgypsum.com.
 - 3. USG Corporation: www.usg.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Gypsum Board, General: Provide Type X or Type C as required for fire-resistant ratings indicated on Drawings.
- C. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Use for vertical surfaces, unless otherwise indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
 - 3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 - 4. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Ceilings: 5/8 inch.
 - c. Edges: Tapered
 - d. Multi-Layer Assemblies: 5/8 inch thickness unless otherwise indicated on drawings.

5. Glass Mat Faced Products:
- D. Impact-Resistant Wallboard:
1. Application: All exposed gypsum wallboard locations 4' and below that do not receive wainscoting will receive impact resistant wallboard. All exposed gypsum wallboard in Gymnasium/Cafeteria including the gymnasium side of the Music Room/Platform will receive impact resistant wallboard full height.
 2. Soft-body Impact: Level 3 when tested in accordance with ASTM C1629/C1629M.
 3. Hard-body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
 4. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 5. Type: Fire-resistance rated Type X, UL or WH listed.
 6. Thickness: 5/8 inch.
 7. Edges: Tapered.
 8. Products:
 - a. American Gypsum; M-Bloc IR Type X.
 - b. CertainTeed Gypsum; AirRenew Impact Resistant Gypsum Board.
 - c. National Gypsum Company; Gold Bond Hi-Impact Brand XP Wallboard.
 - d. USG Corporation, Sheetrock Brand Mold Tough VHI Firecode Core Abuse-Resistant.
 - e. USG Corporation; Fiberock Brand Panels - VHI Abuse-Resistant.
 - f. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Cementitious Backing Board:
1. Application: Surfaces behind tile in wet areas including all areas to receive ceramic wall tile.
 2. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
 - a. Thickness: 1/2 inch.
 - b. Provide with 2 inch wide coated glass fiber tape for joints and corners.
 - c. Products:
 - 1) Custom Building Products: www.custombuildingproducts.com.
 - 2) National Gypsum Company: www.nationalgypsum.com.
 - 3) USG Corporation: www.usg.com.
 - 4) Substitutions: See Section 01 6000 - Product Requirements.
- F. Water-Resistant Gypsum Backing Board: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
1. Application: Vertical surfaces on all walls in wet areas such as restrooms, and within 4 feet of plumbing fixtures in all other rooms..
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Type: Regular and Type X, in locations indicated.
 4. Type X Thickness: 5/8 inch.
 5. Regular Board Thickness: 1/2 inch.
 6. Edges: Tapered.
- G. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
1. Application: Exterior sheathing, unless otherwise indicated.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
 4. Core Type: Regular and Type X, as indicated.
 5. Type X Thickness: 5/8 inch.
 6. Regular Board Thickness: 5/8 inch.
 7. Edges: Square, for vertical application.
 8. Glass Mat Faced Products:
 - a. American Gypsum; M-Glass Exterior Sheathing.

- b. CertainTeed Corporation; GlasRoc Brand.
 - c. Georgia-Pacific Gypsum; DensGlass Sheathing.
 - d. National Gypsum Company; Gold Bond Brand eXP Extended Exposure Sheathing.
 - e. USG Corporation; Securock Glass-Mat Sheathing.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- H. Shaftwall and Coreboard: Type X; 1 inch thick by 24 inches wide, beveled long edges, ends square cut.
- 1. Glass Mat Faced Type: Glass mat shaftliner gypsum panel or glass mat coreboard gypsum panel as defined in ASTM C1658/C1658M.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. Products:
 - a. American Gypsum; M-Bloc Shaft Liner.
 - b. CertainTeed Corporation; GlasRoc Brand Shaftliner Type X.
 - c. Georgia-Pacific Gypsum; DensGlass Shaftliner (mold-resistant).
 - d. National Gypsum Company; Gold Bond Brand eXP Extended Exposure Shaftliner.
 - e. USG Corporation; Sheetrock Gypsum Glas Mat Liner Panels--Enhanced (mold-resistant).

2.04 ACCESSORIES

- A. Acoustic Insulation, Sound Attenuation Blankets: ASTM C665; preformed glass fiber, friction fit type, unfaced.
- 1. Thickness: 3 1/2 inches.
 - 2. Certified by the Greenguard Environmental Institute under the Greenguard Standard for Low Emitting Products.
- B. Spray Applied Acoustic Sealant: Acrylic latex spray suitable for application at static and minimally dynamic linear joints or gaps in smoke and sound rated barriers. Material shall be resilient and non-setting.
- 1. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
 - a. Architectural Sealants: 250 g/L.
 - 2. Products:
 - a. Smoke and Acoustic Spray, CP 572 manufactured by Hilti Corporation.
 - b. Smoke "N" Sound Acoustical Spray manufactured by Specified Technologies Inc.
- C. Electric Outlet Box Pads: Provide pads to seal backs of outlet boxes penetrating acoustical walls.
- 1. Products:
 - a. SpecSeal Series SSP Putty Pads manufactured by STI Specified Technologies, Inc: www.stifirestop.com
 - b. Lowry's Outlet Box Pads manufactured by Lowry's: www.halowry.com.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Basecoat/Surfacer: Flat latex basecoat for use on surfaces indicated to receive Level 4 and 5 finish. Basecoat/surfacer does not replace skim coating for Level 5. Basecoat is in addition to primer specified in Section 09 90 00 - Painting and Coating.
- 1. Products:
 - a. "PrepRite High Build Interior Latex Primer/Surfacer", B28W601; Sherwin Williams.
 - b. "SHEETROCK Brand Primer-Surfacer, Tuff-Hide; USG Corporation.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless otherwise indicated.
- 1. Types: As detailed or required for finished appearance.
 - 2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.

- F. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
 - 1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 - 2. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
 - 3. Ready-mixed vinyl-based joint compound.
 - 4. Chemical hardening type compound.
- G. Textured Finish Materials: Latex-based compound; plain.
 - 1. Basis-of-Design Product: Sheetrock Brand Wall and Ceiling Spray Texture manufactured by USG Corporation.
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.
 - 3. Primer: Flat latex primer. Primer is in addition to primers specified in Section 09 90 00 - Painting and Coating.
 - a. Basis-of-Design Product: "SHEETROCK" Brand First Coat.
- H. Screws for Attachment to Steel Members Less Than 0.03 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.
- I. Screws for Attachment to Steel Members From 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.
- J. Nails for Attachment to Wood Members: ASTM C514.
- K. Reveal Molding: 5/8 inch deep, 2 inch wide, Fry Reglet DRMZ-625200.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 SHAFT WALL INSTALLATION

- A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
 - 1. Install studs at spacing required to meet performance requirements.
- B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.
- C. Area Separation Wall Assemblies:
 - 1. Follow requirements for UL Assembly Design Number U336, U347, U366, U373 or U375, Configuration "B" - Exposed to fire from both sides.
 - 2. Fasten ASW clips to H-stud using 3/8-inch Type "S" screws into flange.
 - 3. Provide ASW clips at maximum 5 feet on center vertically for the first 23 feet of wall height, and at maximum of 10 feet on center vertically for remainder of wall or as manufacturer requires, whichever is more stringent. Provide cross-blocking as required.

3.03 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Studs: Space studs as permitted by standard.
 - 1. Minimum stud spacing at ceramic tile backer board: 16 inches on center
 - 2. Extend partition framing to structure where indicated and to ceiling in other locations.
 - 3. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
- C. Installing Grid Suspension System for Ceilings:
 - 1. 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.

2. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
3. Suspend hangers from building structure as follows:
 - a. 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.
 - 1) Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - b. 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.
- D. Studs: Space studs at 16 inches on center, unless otherwise indicated.
 1. At areas to receive tile backing panels, space studs at 16 inches on center.
 2. Extend partition framing to structure in all locations.
- E. Openings: Reinforce openings as required for weight of doors or operable panels using not less than double 0.0312 inch (20 gage) studs at jambs.
- F. Acoustic Furring: Install resilient channels at maximum 24 inches on center. Locate joints over framing members.
 1. Attach resilient channels horizontally to the narrow flange side of the stud at 1-1/2 inches above the floor (with the open side of the channel facing down) and 6 inches below ceiling runner and 24 inches on center with the open side of channel facing up.
 2. Attach single layer of gypsum board screw attached 12 inches on center on perimeter and at resilient channels 6 inches from stud. Set each gypsum board layer perimeter on a bead of acoustical sealant. Perimeter edge of wall shall not be set back from interface surface by more than 1/4 inch to allow sealant to join both surfaces.
 3. Install resilient channels and apply acoustical sealant in compliance with recommendations of USG Company SA923.
- G. Blocking: Install mechanically fastened steel sheet blocking for support of:
 1. Framed openings.
 2. Wall mounted cabinets.
 3. Plumbing fixtures.
 4. Toilet partitions.
 5. Grab bars.
 6. Toilet accessories.
 7. Wall mounted door hardware, including wall stops and electromagnetic door holders.
 8. Heavy trim.

3.04 ACOUSTIC ACCESSORIES INSTALLATION

- A. Resilient Channels - install per manufacturer's installation instructions.
 1. Provide at 24' oc; install horizontally, Locate joints over framing members.
 2. Provide 2" wide perimeter gypsum board strips directly over framing at perimeter of wall and openings within the wall. Butt resilient channels into gyp board strips.
 3. Provide acoustical sealant at framing member prior to install the 2" wide gyp board strips, and on 2" wide gyp board strips prior to installing final layer of gyp board.
- B. Acoustic 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 C919 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.
- C. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions. Press blankets firmly in place against the back of one of the layers of gypsum board. Tightly butt ends of blankets, leaving no voids.

- D. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Place two beads continuously on substrate before installation of perimeter framing members.
 - 2. Place continuous bead at perimeter of each layer of gypsum board.
 - 3. In non-fire-rated construction, seal around all penetrations by items such as conduit, pipe, ducts, and rough-in boxes.
- E. Spray Applied Acoustic Sealant: Install spray applied acoustical sealant in accordance with manufacturer's instructions. Apply material continuously in multiple coats resulting in a minimum thickness of 1/8 inch (maximum 1/4 inch) on both sides of partition where indicated.
- F. Electrical Outlet Box Pads: Install pads to the back of installed electrical boxes, mold to box and fold around conduit cable entering the box.

3.05 BOARD INSTALLATION

- A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
- E. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- F. Installation on Metal Framing: Use screws for attachment of all gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.
- G. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For non-rated assemblies, install as follows:
 - 1. Single-Layer Applications: Screw attachment.
- H. Installation on Resilient Channels: Use 1-inch screws for the first layer of 5/8-inch gypsum board and 1-5/8-inch screws for the second layer of 5/8-inch gypsum board. Do not allow fasteners to touch the wall studs.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
 - 2. Fire-Rated Joints: Comply with Gypsum Association GA-234 for control joints in fire-rated assemblies.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.
- D. Reveal Moulding: Install in patterns as shown on drawings according to manufacturer's instructions, directly to wall framing, or base layer of wall board in multiple layer applications. Cutting in reveal molding after wall board installation is not acceptable.
- E. Wall and Ceiling Mounted Access Hatches: Coordinate size, location and number of access hatches shown to be provided in other specification sections or on the drawings. Install these access hatches in gypsum board walls and ceilings in accordance with manufacturer's instructions flat and smooth in wall and ceiling surfaces.

3.07 JOINT TREATMENT

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, bedded and finished with chemical hardening type joint compound.
- B. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated below.
 - 2. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 - 3. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
- E. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.08 TEXTURE FINISH

- A. Coordinate application of paint primer by Section 09 9000 over gypsum board after taping, filling, and sanding, but prior to texture application.
- B. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions .

3.09 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 3000

TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tile for floor applications, QT and QTB.
- B. Tile for wall applications, T.
- C. Non-ceramic trim.

1.02 RELATED REQUIREMENTS

- A. Section 03 3511 - Concrete Floor Finishes; moisture mitigation of slabs.
- B. Section 07 9005 - Joint Sealers.
- C. Section 09 2116 - Gypsum Board Assemblies: Installation of tile backer board.
- D. Section 22 4000 - Plumbing Fixtures: Shower and receptor.

1.03 REFERENCE STANDARDS

- A. ANSI A108.1A - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2013.1.
- B. ANSI A108.1B - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 2013.1.
- C. ANSI A108.1C - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement Mortar; 2013.1.
- D. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2013.1.
- E. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 2013.1.
- F. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 2013.1.
- G. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 2013.1.
- H. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 2013.1.
- I. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 2013.1.
- J. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2013.1.
- K. ANSI A108.12 - American National Standard Specifications for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar; 2013.1.
- L. ANSI A108.13 - American National Standard Specifications for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2013.1.
- M. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2013.1.
- N. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2013.1.
- O. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2013.1.

- P. ANSI A137.1 - American National Standard Specifications for Ceramic Tile - Version; 2013.1.
- Q. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation - Version; 2013.1.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, and thresholds.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Tile: 10 square feet of each size, color, and surface finish combination.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum 5 years of documented experience.
- B. Installer Qualifications: Company specializing in performing tile installation, with minimum of 5 years of documented experience.

1.07 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
- B. Construct tile mock-up where indicated on the drawings, incorporating all components specified for the location.
 - 1. Approved mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.09 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.01 TILE

- A. Manufacturers:
 - 1. American Olean Corporation: www.americanolean.com.
 - 2. Dal-Tile Corporation: www.daltile.com.
 - 3. Emser Tile, LLC: www.emser.com.
 - 4. Crossville Tiles; www.crossville.com
 - 5. Metropolitan Ceramics; www.metroceramics.com
 - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Quarry Tile Type QT and Quarry Tile Base Type QTB: ANSI A137.1, and as follows:
 - 1. Moisture Absorption: 0.5 to 3.0 percent.
 - 2. Size and Shape: 4 x 8 inches.
 - 3. Thickness: 1/2 inch.

4. Edges: Relieved.
 5. Surface Finish: Unglazed.
 6. Color(s): As scheduled.
 7. Pattern: Stacked bond.
 8. Trim Units: Matching cove base and transition tile shapes in sizes coordinated with field tile. Use transition tile where tile meets surrounding floor finishes.
 9. Products:
 - a. Quarry Basics by Metropolitan Ceramics: www.metroceramics.com.
 - b. Quarry Tile by Dal-Tile; www.dal-tile.com
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- C. Ceramic Wall Tile Type T: ANSI A137.1, and as follows:
1. Color by Numbers manufactured by Crossville or approved equivalent product.
 2. Moisture Absorption: 0 to 0.5 percent.
 3. Size and Shape: 4 x 8 inches.
 4. Edges: Cushioned.
 5. Surface Finish: Gloss and Matt as scheduled..
 6. Colors: T1 and T2 as scheduled.
 7. Trim Units: Matching bull nose, 2 x 8 inches.
 8. Grout Joint: 1/8 inch
 9. Pattern: As indicated on drawings.

2.02 TRIM AND ACCESSORIES

- A. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
1. Applications: Use in the following locations:
 - a. Open edges of wall tile: similar to Schluter - RONDEC - #EVR00100E 1/4 inch radius.
 - b. Open edges of floor tile, including at door openings:
 - 1) Same height transitions: similar to Schluter - SCHIENE.
 - 2) Different height transitions: similar to Schluter - RENO-TK.
 - c. Wall corners, outside and inside.
 - d. Transition between floor finishes of different heights: similar to Schluter - RENO-TK.
 - e. Expansion and control joints, floor and wall: similar to Schluter - DECO.
 - f. Borders and other trim as indicated on drawings.
 2. Manufacturer:
 - a. Schluter-Systems: www.schluter.com.
 - b. Genesis APS International: www.genesis-aps.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- B. Trowelable Underlayments, Self-Leveling Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
1. Available Products: Ardex Engineered Cements, self-leveling underlayments and pre-tile repair mortar.
- C. Sealer:
1. Available Products:
 - a. Aqua Mix Sealer's Choice Gold.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
 2. Locations of Use: Quarry tile and all grout joints that are not epoxy.

2.03 SETTING MATERIALS

- A. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
1. Application(s): Use this type of bond coat where indicated and where no other type of bond coat is indicated.
 2. Products:
 - a. Ardex Engineered Cements: www.ardex.com

- b. Flextile Ltd; www.flextile.net
 - c. Custom Building Products: www.custombuildingproducts.com.
 - d. LATICRETE International, Inc: www.laticrete.com.
 - e. Merkrete, by Parex USA, Inc; Merkrete 720 Marble Pro: www.merkrete.com.
 - f. TEC: www.tecspecialty.com.
 - g. Substitutions: See Section 01 6000 - Product Requirements.
- B. Provide setting materials made by the same manufacturer as grout.
- C. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
- 1. Application(s): Use this type of bond coat where indicated and where no other type of bond coat is indicated.
 - 2. Products:
 - a. ARDEX Engineered Cements; ARDEX X 5: www.ardexamericas.com.
 - b. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com or equal by other named manufacturers.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 GROUTS

- A. Manufacturers:
- 1. ARDEX Engineered Cements: www.ardexamericas.com.
 - 2. Flextile Ltd; www.flextile.net
 - 3. Custom Building Products: www.custombuildingproducts.com.
 - 4. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com.
 - 5. TEC: www.tecspecialty.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
- 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
 - 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
 - 3. Color(s): As selected by Architect from manufacturer's full line.
 - 4. Products:
 - a. ARDEX Engineered Cements; ARDEX FG-C MICROTEC for joints up to 1/4 inch or ARDEX FL for joints 1/8 inch to 1/2 inch, as applicable to joint width: www.ardexamericas.com.
 - b.
 - c. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
- 1. Applications: Where indicated.
 - 2. Color(s): As selected by Architect from manufacturer's full line.
 - 3. Products:
 - a. Ardex Engineered Cements: ARKEX WA Epoxy Grout and Adhesive.
 - b. LATICRETE International, Inc; LATICRETE SPECTRALOCK PRO Premium Grout: www.laticrete.com.
 - c. Merkrete, by Parex USA, Inc; Merkrete Pro Epoxy: www.merkrete.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 - 4. Locations of use: All floors, unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.
- D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

3.03 INSTALLATION - GENERAL

- A. Install tile and grout in accordance with applicable requirements of ANSI A108.1A thru A108.13, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install non-ceramic trim in accordance with manufacturer's instructions.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints. Use standard grout unless otherwise indicated.
- K. Install grout sealer at grout joints of porcelain tile per tile and grout manufacturer's instructions.
- L. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.
- M. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Quarry Tile: 3/8 inch.
 - 2. Glazed Wall Tile: 1/8 inch.
- N. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 - 2. Space control joints at 12 foot to 16 foot intervals in each direction, unless otherwise indicated.
 - 3. Provide joints at perimeter walls and at fixtures or structural elements.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Use epoxy grout at kitchen and all toilet rooms. Over interior concrete substrates, install in accordance with The Tile Council of North America Handbook Method F115, with epoxy grout.
 - 1. Where waterproofing membrane is indicated, install in accordance with The Tile Council of North America Handbook Method F122 except with epoxy grout.
 - 2. Locations of Waterproofing Use: Kitchen floor.
 - 3. Where crack isolation membrane is indicated, install in accordance with The Tile Council of North America Handbook Method F125 (full) except with epoxy grout.
 - 4. At large format tile installation, provide medium bed with crack isolation membrane and epoxy grout.

3.05 INSTALLATION - WALL TILE

- A. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244, using membrane at toilet rooms.
- B. Over coated glass mat backer board on studs, install in accordance with TCNA (HB) Method W245.
- C. Over gypsum wallboard on wood or metal studs install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.

3.06 CLEANING

- A. Clean tile and grout surfaces.
- B. Apply sealer to all quarry tile and to all grout joints that are not epoxy grout.

3.07 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation, unless otherwise approved by manufacturer. Protect tile during curing process as recommended by manufacturer.

END OF SECTION

SECTION 09 5100
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Acoustical units, ACT.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 08 3100 - Access Doors and Panels: Access panels.
- C. Section 28 3100 - Fire Detection and Alarm: Fire alarm components in ceiling system.
- D. Section 21 1300 - Fire Suppression Sprinklers: Sprinkler heads in ceiling system.
- E. Section 23 3700 - Air Outlets and Inlets: Air diffusion devices in ceiling.
- F. Section 26 5100 - Interior Lighting: Light fixtures in ceiling system.
- G. Section 27 5117 - Public Address Systems: Speakers in ceiling system.

1.03 REFERENCE STANDARDS

- A. ASCE 7-05 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; current edition.
- B. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.
- C. NWCB TB 401 - Suspension Systems for Acoustical Lay-in Ceilings, Field Technical Information; Northwest Wall and Ceiling Bureau; 2009.
- D. OSSC - Oregon Structural Specialty Code, current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

1.05 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design acoustical ceiling suspension systems, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Oregon, using the seismic standards indicated in the Quality Assurance Article.

1.06 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components, acoustical units, and seismic restraint components including perimeter clips.
- C. Samples: Submit two samples 6 x 6 inch in size illustrating material and finish of acoustical units.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and seismic restraint details.
- E. Delegated-Design Submittal: For ceiling suspension system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Submit submittals as "Deferred Submittals" in accordance with Section 01 30 00 - Administrative Requirements. Transmit a copy of each submittal indicating agency approval to the Architect for record.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.07 QUALITY ASSURANCE

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. 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 E580.
 - 2. CISCA's Guidelines for Systems Requiring Seismic Restraint: Comply with CISCA's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies--Seismic Zones 3 & 4."
 - 3. ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."
 - 4. Northwest Wall and Ceiling Bureau, Technical Bulletin 401 - Suspension Systems for Acoustical Lay-in Ceilings.

1.08 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

- A. Acoustical Tile ACT-1: Painted mineral fiber, ASTM E1264 Type III, Form 1, with the following characteristics:
 - 1. Size: 24 x 48 inches.
 - 2. Thickness: 3/4 inches.
 - 3. Composition: Water felted.
 - 4. Light Reflectance: 0.82 - 0.86, determined as specified in ASTM E1264.
 - 5. NRC: 0.70, determined as specified in ASTM E1264.
 - 6. Ceiling Attenuation Class (CAC): 30 - 35, determined as specified in ASTM E1264.
 - 7. Edge: Square.
 - 8. Surface Color: White.
 - 9. Surface Pattern: Pattern E1 or CE.
 - 10. Products:
 - a. Cirrus Square Lay-In Item No. 533 manufactured by Armstrong: www.armstrong.com.
 - b. Cashmere Item No. CM-497 NRCP manufactured by CertainTeed Corporation: www.certainteed.com.
 - c. Eclipse ClimaPlus Item No. 78575 manufactured by USG: www.usg.com.
- B. Acoustical Tile ACT-2: Not used.
- C. Acoustical Tile ACT-3: Acoustically transparent water-repellent membrane faced mineral fiber, ASTM E1264 Type IV, Form 2, with the following characteristics:
 - 1. Meets USDA/FSIS guidelines for use in food processing areas.
 - 2. Size: 24 x 48 inches.
 - 3. Thickness: 3/4 inches.
 - 4. Composition: Water felted.
 - 5. Light Reflectance: 0.86 to 0.90, determined as specified in ASTM E1264.
 - 6. NRC: 0.70 determined as specified in ASTM E1264.
 - 7. Ceiling Attenuation Class (CAC): 35, determined as specified in ASTM E1264.
 - 8. Edge: Square.
 - 9. Surface Color: White.
 - 10. Surface Pattern: E or E, G.
 - 11. Products:

- a. Ultima Health Zone Item No. 1938 manufactured by Armstrong: www.armstrong.com.
- b. Performa Rx Symphony m Item No. SYM M-1220-RXS-1 manufactured by CertainTeed Corporation: www.certainteed.com.
- c. Mars ClimaPlus Healthcare Item No. 88189 manufactured by USG: www.usg.com.

2.02 SUSPENSION SYSTEM(S)

- A. Manufacturers:
 1. Same as for acoustical units.
 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled heavy duty main beams and intermediate duty cross runners.
 1. Profile: Tee; 15/16 inch wide face.
 2. Construction: Double web.
 3. Finish: White painted.
 4. Products:
 - a. Prelude XL manufactured by Armstrong: www.armstrong.com.
 - b. Seismic Secure 15/16 inch Classic Stab: www.certainteed.com.
 - c. Seismic 1200 manufactured by Chicago Metallic: www.chicagometallic.com.
 - d. DX manufactured by USG: www.usg.com.
 - e. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
 1. Wire gauge: Minimum 12 gauge.
- B. Powder-driven Anchors: When used for seismic restraint purposes, anchors to be ICC-ES approved for seismic applications.
- C. Perimeter Moldings: Same material and finish as grid.
 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- D. Perimeter Clips: Manufacturer's standard; approved for use in lieu of 2 inch wide perimeter molding.
- E. Seismic ceiling joint trim or device: Manufacturer's standard providing 3/4 inch movement, matching grid.
- F. Ceiling tile restraint clips: Manufacturer's standard clips for connecting tile to grid to resist seismic forces and allow tile removal for service and replacement.
- G. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636/C 636M and seismic design requirements indicated, per manufacturer's written instructions, CISCA's "Ceiling Systems Handbook" and NWCB Technical Bulletin 401.
 1. Comply with restrictions of ASCE 7 on use of power actuated fasteners.
 2. Power actuated fasteners shall not be used for sustained tension loads or for brace applications unless approved for seismic loading, with the following exceptions:

- a. Power actuated fasteners in concrete where the service load on any individual fastener does not exceed 90 lb.
 - b. Power actuated fasteners in steel where the service load on any individual fastener does not exceed 250 lb.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
 - C. Provide seismic bracing as shown on drawings and as required by OSSC for Occupancy Category II, Seismic Design Category D. NWCB Technical Bulletin 401 may be used as a reference.
 1. Secure grid system to two adjacent walls, provide 3/4 inch movement at opposite walls.
 2. Utilize approved perimeter clips instead of 2 inch wide perimeter moldings.
 3. Install seismic ceiling expansion joints where indicated on drawings to divide ceiling system areas to less than 2,500 square feet.
 4. Install powder-driven anchors for seismic applications in accordance with ICC-ES approval and with special inspection.
 - D. Locate system on room axis according to reflected plan.
 - E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
 - F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
 - G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
 - H. Do not allow hangers or bracing to obstruct parts of mechanical or electrical systems requiring maintenance.
 - I. Provide framing around any recessed lighting fixtures and other openings.
 - J. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
 - K. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
 - L. Do not eccentrically load system or induce rotation of runners.
 - M. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 1. Use longest practical lengths.
 2. Overlap and rivet corners.

3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 1. Cut to fit irregular grid and perimeter edge trim.
 2. Make field cut edges of same profile as factory edges.
 3. Double cut and field paint exposed reveal edges.

3.04 FIELD QUALITY CONTROL

- A. An independent testing agency will perform Special Inspection for powder-driven shot-in anchors used as part of the seismic design, as specified in Section 01 1400.

- B. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections and prepare reports:
 - 1. Suspended ceiling system.
 - 2. Hangers, anchors and fasteners.
- C. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
- D. Tests and Inspections: Testing and inspecting of completed installations of acoustical panel ceiling hangers and anchors and fasteners shall take place in successive stages, in areas of extent and using methods as follows. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
 - 1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
 - a. Within each test area, testing agency will select 1 or every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 100 lbf of tension; it will also select 1 of every 2 postinstalled anchors used to attach bracing wires to concrete and will test them for 250 lbf of tension.
 - 1) When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
 - b. Within each test area, testing agency will select 5 percent of power-actuated and post-installed anchors used to attach hangers to concrete over metal deck and will test them for a minimum 250 lbs for not less than 10 seconds. Test samples will be selected from dispersed locations.
 - 1) When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test a minimum of 6 anchors in the immediate vicinity of the failed anchor. In the event of any additional failure, all anchors placed on the same day will be tested.
 - c. Replace all failed anchors.
- E. Remove and replace acoustical panel ceiling hangers and anchors and fasteners that do not pass tests and inspections and retest as specified above.

F.

3.05 CLEANING AND PROTECTION

- A. Replace any damaged, chipped, scratched, or broken ceiling tile units identified up to the time of final completion. Use of sealant or putty patch material to conceal damage is not allowed.

3.06 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 5426
WOOD CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wood ceiling panels.
- B. Suspension grid and supports.
- C. Trim and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 09 5100 - Acoustical Ceilings.
- B. Division 15 – “Mechanical” for work to be coordinated with ceiling.
- C. Division 16 – “Electrical” for light fixture and other above ceiling equipment coordination with ceiling.

1.03 REFERENCE STANDARDS

- A. ASTM A 641: Standard Specification for Zinc Coated (Galvanized) Carbon Steel Wire; 1992.
- B. ASTM C 423: Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 1990.
- C. ASTM C 635: Standard Specifications for Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
- D. ASTM C 636: Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 1992.
- E. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials; 1991.
- F. ASTM E 580: Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint; 1991.
- G. AWI (QSI): Architectural Woodwork Quality Standards Illustrated; 2003.
- H. Cisca: Ceiling Systems Handbook.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in panel ceiling installation with minimum [5] years experience, and approved by wood ceiling manufacturer.
- B. Single-Source Responsibility for Wood Ceiling System: Obtain each type of ceiling panel from a single fabricator, with in-house shop drawing capabilities, in-house assembly and finishing capabilities, and with resources to provide products of consistent quality in appearance and physical properties without delaying the project.
- C. Single-Source Responsibility for Suspension System: Obtain each type of suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying project.
- D. Pre-Installation Conference: Conduct conference at project site.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each type of product specified.
- C. Samples: For verification of each type of exposed finish required. Where finishes involve normal color and texture variations, include sample sets showing the range of variations expected.
 - 1. 12" x 18" samples of each panel type, pattern, and color.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

- E. Shop Drawings: Provide coordinated Shop Drawings to include reflected ceiling plan and product details. Coordinate layout and installation of wood panels and suspension system components with other construction elements that penetrate ceilings or are supported by them, including light fixtures, HVAC equipment, fire-suppression system components, partition assemblies and all perimeter conditions.

1.06 FIELD CONDITIONS

- A. Do not install wood panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is completed and dry, work above ceilings is complete, and ambient temperature and humidity conditions are being maintained at the levels indicated for Project when occupied for its intended use.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivery & Unloading: Coordinate crate sizes, weights, unloading options, and delivery schedule with manufacturer prior to fabrication. Deliver wood panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other mistreatment.
- B. Climatization: Before installing wood panels, permit them to reach room temperature and a stabilized moisture content (at least 72 hours) per AWI standards.
- C. Handling: Handle Wood ceiling panels carefully to avoid chipping edges or damaging units in any way.
- D. Protection:
 - 1. Personnel: Follow good safety and industrial hygiene practices during handling and installing of all products and systems, with personnel to take necessary precautions and wear appropriate protective equipment as needed. Read related literature for important information on products before installation. Contractor to be solely responsible for all personal safety issues during and subsequent to installation; architect, specifier, owner, and manufacturer will rely on contractor's performance in such regard.
 - 2. Existing completed work: Protect completed work above suspension system from damage during installation of suspension system components.

1.08 EXTRA MATERIALS/WARRANTIES

- A. Extra Materials: Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
 - 1. Wood ceiling panels: Furnish quantity of full-size units equal to 2.0 percent of amount installed.
 - 2. Suspension System Components: Furnish quantity of each component equal to 2.0 percent of amount installed.
- B. Warranties: Provide owner with a (1) year warranty for material and workmanship on all installed products.
 - 1. Manufacturers: All materials, wood ceiling and grid, shall be warranted for (1) one year for material and workmanship.
 - 2. Installer: All work shall be warranted for (1) year from date of substantial completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. 9wood, Inc., www.9wood.com.
- B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 WOOD CEILING PANELS

- A. Basis of Design: 9Wood, Inc. Linear, Series 2100.
 - 1. Wood Panels: WC-1
 - a. Species: White Maple.

- b. Member Size: Width x thickness, 3/4 inch thick x 5 1/4 inch wide
 - c. Edge Profile: Square
 - d. Members/LF: "2 Members/LF"
 - e. Assembly Style: Cross Piece backer (black)
 - f. Panel Sizes: Nominal size, 12 inches wide; lengths per drawings.
 - g. Fire Rating: Fire Rating Class, Class 1(A) Fire Rating
 - h. Factory Finish: Clear Interior Finish as recommended by manufacturer.
2. Wood Panels: WC-2
- a. Species: Salvaged Douglas Fir lumber as specified in Section 062000 - Finish Carpentry.
 - b. Member Size: Width x thickness, 3/4 inch thick x 11 1/4 inch wide
 - c. Edge Profile: Square
 - d. Members/LF: "1 Members/LF"
 - e. Assembly Style: Cross Piece backer (black)
 - f. Panel Sizes: Nominal size, 12 inches wide; lengths per drawings.
 - g. Fire Rating: Fire Rating Class, Class 1(A) Fire Rating
 - h. Factory Finish: Clear Interior Finish as recommended by manufacturer.
- 3.

2.03 SUSPENSION SYSTEMS

- A. Metal T-grid Suspension System: ASTM C635, standard interior 15/16 inch heavy-duty metal suspension system using main runners, cross-tees, and wall angles, with "black" finishes as indicated. Comply with all applicable seismic codes and ordinances.
- B. Attachment Devices: Size for 3 times the design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- C. Wire, Braces, Ties, Hanger Rods, Flat Hangers and Angle Hangers: Provide wires, rods and hangers that comply with applicable ASTM specifications.
- D. Unistrut: Provide where indicated. Size and attachment as needed to support wood ceiling.

2.04 ACOUSTICAL LINER

- A. Semi-rigid acoustical board applied to upper surface of certain wood grid sections, above the black fabric, where shown on drawings.
- B. Manufactured by AcoustiCotton, www.acousticotton.com.
 - 1. Northwest Distributor: Architextures/Magicare, 206.634.1166.
- C. Thickness: 2 inch.
- D. Density: 3 pounds.
- E. Material: 100% recycled post-industrial denim and cotton fibers.
- F. Fire Hazard Classification: Class A fire rating.
- G. Color: Black.

2.05 BLACK FABRIC

- A. Open weave black fabric applied to upper surface of all wood grid sections.
 - 1. Manufacturer's standard "Black reveal scrim" meeting required flame spread and smoke density developed requirements, to conceal suspension system.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. General: Examine substrates and structural framing to which ceilings attach or abut, with installer present, for compliance with requirements specified in this and other sections that affect ceiling installation and anchorage. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.
- B. Layout: Measure each ceiling area and establish the layout of Wood Panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and conform to the layout shown on reflected ceiling plans in accordance with wood ceiling manufacturer's approved Shop Drawings.

3.03 INSTALLATION

- A. General: Install ceiling grid and panel systems to comply with manufacturer's instructions and CISCA "Ceiling Systems Handbook."
- B. Attachments: Suspend ceiling hangers from building's structural members per manufacturer's instructions and in compliance with all local codes and regulations.
 - 1. Repair any damage made to existing fire proofing with approved fire rated caulking or equal.
- C. Installation of T-bar grid: Install in accordance with suspension manufacturer's instructions and in compliance with all local codes and regulations.
- D. Installation of Curved Metal Tubing Suspension: Install, align, brace, tie-off, mount, handle interferences, and space suspension Tubing in accordance with suspension manufacturer's instructions and in compliance with all local codes and regulations.
- E. Suspension Runners: Install suspension system runners so they are square and securely interlocked with one another. Install number and use on-center spacing per wood ceiling manufacturer's instructions, as indicated on approved Shop Drawings and in compliance with all local codes.
- F. Installation of wood panels: Install wood ceiling panels in accordance with manufacturer's installation instructions and in compliance with all local codes and regulations. Install with undamaged edges and fitted accurately to suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit, as required.
- G. Ensure that black fabric scrim is installed flat, without puckering.
- H. Field stain all exposed field-cut panel ends to match finish of panels.

3.04 CLEANING

- A. Clean exposed wood surfaces in accordance with manufacturer's instructions for cleaning and touchup of minor finish damage. Remove and replace wood ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 6466
WOOD ATHLETIC FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wood athletic floor assembly WAF-1.
 - 1. Work of the Section includes all tools and services to install a complete wood floor system from the concrete surface upward through the sanding and finishing, game lines, and installation of perimeter moldings and thresholds.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Floor flatness requirements.
- B. Section 08 71 00 - Door Hardware: Thresholds to be installed as Work of this Section.
- C. Section 08 71 01 - Hardware Schedule: Schedule of thresholds to be installed as Work of this Section.
- D. Section 11 66 23 - Gymnasium Equipment: Athletic equipment installed through flooring assembly.

1.03 REFERENCE STANDARDS

- A. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
- B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- C. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- D. MFMA (SPEC) - Guide Specifications for Maple Flooring Systems; Maple Flooring Manufacturers Association.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for wood athletic floor assemblies.
 - 1. Submit MFMA Recommendations for correct preparation, finishing and testing of concrete subfloor surfaces to receive wood flooring.
 - 2. Submit manufacturer's recommendations and requirements for flooring preparation, testing and slab conditions to meet warranty requirements.
 - 3. Confirm depth of recessed concrete slab to receive wood athletic floor system.
- C. Shop Drawings: Show installation details including location and layout of each type of floor assembly and accessory. Include the following:
 - 1. Expansion provisions and trim details.
 - 2. Layout, colors, widths, and dimensions of game lines and markers.
 - 3. Locations of floor inserts for athletic equipment installed through flooring assembly.
- D. Selection Samples: Manufacturer's color charts showing colors and glosses available for the following:
 - 1. Floor finish.
 - 2. Game-line and marker paint.
 - 3. Vented base.
- E. Samples for Verification: For each type of athletic floor assembly and accessory required; approximately 12 inches and of same thickness and material indicated for the Work.
 - 1. Include sample sets showing the full range of normal color and texture variations expected in wood flooring.
 - 2. Include sample sets showing finishes and game-line paint and marker paint colors applied to wood flooring.

- F. Qualification Data: For Installer.
- G. Maintenance Data: For wood athletic floor assemblies and finish systems to include in maintenance manuals.
 - 1. Include recommendations for types of tape that can be used by Owner for temporary line marking without damaging floor finish.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed wood athletic floor assembly installations similar in material, design, and extent to that indicated for this Project, whose work has resulted in installations with a record of successful in-service performance and who is approved by the wood flooring manufacturer.
 - 1. Installers shall be MFMA Mill Accredited Installation Company with MFMA Accredited Installers on-site for the duration of the wood floor installation.
 - 2. Installer responsibilities include installation and field finishing of athletic floor assembly components and accessories, and application of game lines and markers.
- B. Maple Flooring: Comply with MFMA grading rules for species, grade, and cut.
 - 1. Provide flooring that carries MFMA mark on each bundle or piece.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver assembly materials in unopened cartons or bundles.
- B. Protect wood from exposure to moisture. Do not deliver wood components until after concrete, masonry and similar wet work is complete and dry.
- C. Store wood components in a dry, warm, well-ventilated, weathertight location and in a horizontal position.

1.07 PROJECT CONDITIONS

- A. Conditioning period begins not less than seven days before athletic floor assembly installation, is continuous through installation, and continues not less than seven days after athletic floor installation.
 - 1. Environmental Conditioning: Maintain an ambient temperature between 65 and 75 deg F and relative humidity planned for building occupants, but not less than 35 percent or more than 50 percent, in spaces to receive athletic floor assemblies during the conditioning period.
 - 2. Wood Conditioning: Move wood components into spaces where they will be installed, no later than beginning of the conditioning period.
 - a. Do not install athletic floor assemblies until wood components adjust to relative humidity of, and are at same temperature as, spaces where they are to be installed.
 - b. Open sealed packages to allow wood components to acclimatize immediately on moving wood components into spaces in which they will be installed.
- B. After conditioning period, maintain relative humidity and ambient temperature planned for building occupants.
- C. Install athletic floor assemblies after other finishing operations, including painting, and all overhead work such as mechanical have been completed.

1.08 WARRANTY

- A. Manufacturer's standard warranty that material is free from manufacturing defects.
 - 1. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Products WAF-1:
 - 1. Action Floor Systems LLC; Action Thrust I; www.actionfloors.com.
 - 2. Connor Sports Flooring, Inc.; Product Neoshok; www.connorfloor.com.
 - 3. Robbins, Inc.; Product Bio-Cushion Classic; www.robbinsfloor.com.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 WOOD FLOORING

- A. Strip Flooring: Northern hard maple (*Acer saccharum*), kiln dried, random length, tongue and groove, and end matched.
1. Grade: MFMA-RL Second and Better.
 2. Thickness: 25/32 inch.
 3. Face Width: 2-1/4 inches.
 4. Provide continuous incremental expansion - factory milled.
 5. Preservative Treatment: Clear, penetrating, water-repellent wood preservative that protects against mold, mildew, staining, and decay fungi; complying with MFMA's written recommendations and applied by immersion.

2.03 SUBFLOOR SYSTEM

- A. Subfloor: Minimum 15/32-inch thick, CD face, Exposure I, APA rated plywood sheathing or as recommended by flooring manufacturer.
- B. Resilient Pads: Manufacturer's recommended rubber, EPDM or polyurethane pads installed at manufacturer's standard spacing for product designation indicated above. PVC pads are not acceptable.
1. Material: Manufacturer's standard.
 2. Thickness: As recommended by manufacturer.

2.04 ACCESSORIES

- A. Vapor Retarder: ASTM D4397, polyethylene sheet not less than 6 mils thick.
- B. Resilient Wall Base, Type B-2: Molded, vented, rubber or vinyl cove base; 4 by 3; with premolded outside corners.
1. Color: As selected from manufacturer's full range of available colors.
- C. Thresholds: As specified in Section 08 71 00 - Door Hardware and scheduled in Section 08 71 01 - Hardware Schedule.
- D. Fasteners: Type and size recommended by manufacturer, but not less than those recommended by MFMA for application indicated.
- E. Trowelable Leveling and Patching Compound: Portland-cement-based formulation approved by athletic floor manufacturer.
- F. Floor-Finish System: System of compatible components recommended in writing by flooring manufacturer and MFMA approved.
1. Type: MFMA Group 5, Water Based Finishes; polyurethane, unless otherwise recommended by flooring manufacturer.
 2. Game-Line and Marker Paint: Industrial enamel compatible with finish coats and recommended in writing by manufacturers of finish coats and paint for this use.
 3. VOC Content: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Floor Sealers and Finish Coats: VOC content of not more than 350 g/L.
 - b. Game-Line and Marker Paint: VOC content of not more than 150 g/L.
 4. Available Floor Finish Products:
 - a. BonaSport Super Sport Finish manufactured by Bona: www.bona.com.
 - b. 1907 Gym Finish manufactured by Hillyard, Inc: www.hillyard.com.
 - c. SikaFloor WP-36 Waterbased Acrylic Modified Aliphatic Urethane manufactured by Sika Corporation: www.sikafloorusa.com.
 - d. Substitutions: Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of athletic floor assemblies.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Concrete Slabs: Verify that concrete slabs comply with requirements specified in Section 03 30 00 - Cast-in-Place Concrete.
 - 1. Moisture Testing: Perform tests in accordance with ASTM F1869, unless otherwise recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 2. Relative Humidity Testing (In-Situ Probe Test): Perform tests in accordance with ASTM F2170. Use a prepackaged relative humidity testing kit (ASTM F2170) and follow the manufacturer's instructions.
 - a. Relative humidity level shall be 80 percent or lower before installation, unless manufacturer has more stringent requirements.

3.02 PREPARATION

- A. Grind high spots and fill low spots on concrete substrates to produce a maximum 1/8-inch deviation in any direction when checked with a 10-foot straight edge.
 - 1. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
- B. Broom and vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.03 INSTALLATION

- A. General: Comply with athletic floor assembly manufacturer's written instructions, but not less than written recommendations of MFMA applicable to flooring type indicated.
- B. Pattern: Lay flooring parallel with long dimension of space to be floored, unless otherwise indicated.
- C. Expansion Spaces: Provide 1-1/2- to 2-inch expansion void as required by manufacturer's written instructions and MFMA's written recommendations at walls and other obstructions, and at interruptions and terminations of flooring.
 - 1. Cover expansion spaces with vented base.
- D. Vapor Retarder: Install vapor retarder over entire area to be covered by wood athletic flooring, with joints lapped a minimum of 6 inches and sealed.
- E. Assembly:
 - 1. Attach resilient pads to underside of the first layer of plywood and 12 inches on center, unless otherwise recommended by flooring manufacturer.
 - 2. Place the first layer of plywood diagonal or perpendicular to the intended direction of the finish flooring, allowing 1/4 inch spacing at all edges.
 - 3. Lay the second layer of plywood without pads at the opposite 45 degree angle or at right angles to the first layer. Do not allow joints in the second layer to coincide with a joint in the first layer. Fasten layers together using manufacturer's recommended fasteners and spacing. Allow 1/4 inch between panel edges.
 - 4. Provide 1-1/2 to 2 inch expansion space, as required by manufacturer's written instructions and MFMA's written recommendations at walls and other obstructions, and at interruptions and terminations of flooring.
 - 5. Install strip flooring onto second layer of plywood parallel to the long dimension of the room. Provide adequate expansion at regular intervals across the floor during installation as dictated by the average humidity condition of the area according to the recommendations of the flooring manufacturer and installer.

- F. Installation Tolerances: 1/8 inch in 10 feet of variance from level.
- G. Vented Cove Base: Install manufacturer's recommended vented cove base, using premolded outside corners and mitered inside corners.
- H. Thresholds: Install thresholds furnished as Work of Section 08 71 00 - Door Hardware at all transitions of wood athletic flooring to other flooring to span expansion voids and to provide an even, accessible transition.
 - 1. Attach thresholds to adjacent floor surfaces to allow for movement of wood flooring system. Do not attach to wood athletic flooring.

3.04 SANDING AND FINISHING

- A. Follow applicable recommendations in MFMA's "Industry Recommendations for Sanding, Sealing, Court Lining, Finishing, and Resurfacing of Maple Gym Floors."
- B. Allow installed flooring to acclimate to ambient conditions for at least 10 days before sanding.
- C. Machine sand with coarse, medium, and fine grades of sandpaper to achieve a level, smooth, uniform surface without drum stop marks, ridges, cups, gouges, streaks or shines. Remove sanding dust by tack or vacuum.
- D. Finish: Apply seal and finish coats of finish system according to finish manufacturer's written instructions. Provide not less than four coats total and not less than two finish coats. Buff and vacuum or tack between each coat after it dries.
 - 1. Water-Based Finishes: Use finishing methods recommended by finish manufacturer to reduce grain raise and side bonding effect.
 - 2. Game Lines and Markers: Apply game-line and marker paint between final seal coat and first finish coat according to paint manufacturer's written instructions.
 - a. Mask flooring at game lines and markers, and apply paint to produce lines and markers with sharp edges.
 - b. Where game lines cross, break minor game line at intersection; do not overlap lines.
 - c. Apply game lines and markers in widths and colors according to requirements of Oregon School Activities Association (OSAA) and National Federation of State High School Association.
 - d. Apply finish coats after game-line and marker paint is fully cured.

3.05 PROTECTION

- A. Protect athletic floors during remainder of construction period to allow finish to cure and to ensure that flooring and finish are without damage or deterioration at time of Substantial Completion.
 - 1. Do not cover athletic floors after finishing until finish reaches full cure, and not before seven days after applying last finish coat.
 - 2. Do not move heavy and sharp objects directly over athletic floors. Protect fully cured floor finishes and surfaces with plywood or hardboard panels to prevent damage from storing or moving objects over athletic floors.

END OF SECTION

**SECTION 09 6500
RESILIENT FLOORING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Resilient base.
- C. Installation accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry, Wood underlayment to receive resilient flooring

1.03 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- B. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2010)e1.
- C. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008 (Reapproved 2012).
- D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association; 2011.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions. Provide data on sealer, if recommended by flooring manufacturer.
- C. Verification Samples: Submit two samples, 12x 12 inch in size illustrating color and pattern for each resilient flooring product specified.
- D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Material: 20 square feet of each type and color.
 - 3. Extra Wall Base: 10 linear feet of each type and color.
 - 4. Extra Stair Materials: Quantity equivalent to 5 percent of each type and color.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect roll materials from damage by storing on end.

1.06 FIELD CONDITIONS

- A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 TILE FLOORING

- A. Linoleum Tile: Homogeneous, with color extending throughout thickness, and:
 - 1. Minimum Requirements: Comply with ASTM F2195 for size, squareness, thickness, indentation, impact, deflection, resistance to chemicals and resistance to heat.
 - 2. Size: 20 x 10 inch.
 - 3. VOC Content: As specified in Section 01 6116.
 - 4. Thickness: 2.5 mm.

5. Static Load Limit: 1,500 pounds per square inch, per ASTM F970.
6. Pattern: Marbleized.
7. Manufacturers:
 - a. Forbo Flooring Systems, Product Marmoleum Moduar; www.forboflooring.com
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.02 RESILIENT BASE

- A. Resilient Base Type B-1: ASTM F1861, Type TP, rubber, thermoplastic; top set Style B, Cove, and as follows:
 1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with NFPA 253 (Class 1).
 2. Height: 4 inch.
 3. Thickness: 0.125 inch thick.
 4. Finish: Satin.
 5. Length: Roll.
 6. Color: As scheduled.
 7. Manufacturers:
 - a. Burke Flooring: www.burkemercer.com.
 - b. Johnsonite, a Tarkett Company: www.johnsonite.com.
 - c. Roppe Corp: www.roppe.com.
 - d. Marley Flexco www.marleyflexco.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- B. Quarter Round Base Type B-4
 1. Size: 3/4 inch quarter round.
 2. Material: Match rubber base.

2.03 ACCESSORIES

- A. Concrete Slab Moisture Barrier: High strength, latex-based compound formulated to isolate cut-back and other existing adhesives that could affect the bond of the new floor adhesives.
 1. The slab sealer material must be compatible with previously applied curing agents, and adhesives and must meet the CRI low-VOC emission criteria, C.R.I. ID# AA-580309, and shall not contain any known hazardous materials. The material must be non-toxic, ultra-low odor, waterproof when dry.
 2. Flammability Certification: Class A: Passes tunnel test ASTM number E84-70 (identical test method to ANS Number 2-5), NFPA number 755, UL number 723, and UBC 42-1.
 3. Warranty: Provide manufacturers lifetime moisture vapor emissions and moisture penetration warranty. Follow manufacturer's installation instructions exactly to guarantee that warranty will be issued.
 4. Products:
 - a. J & J Commercialon: 877 Premium Barrier Coat
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 5. Extent of Work: Provide floor sealer on all new concrete slabs to receive new floor covering.
- B. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- C. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
 1. VOC Content: As specified in Section 01 6116.
- D. Sealer: Type recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

- B. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
 - 1. Test in accordance with ASTM F710.
 - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- C. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is cured.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer's instructions say otherwise.

3.05 RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean and seal in accordance with manufacturer's instructions.

3.07 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 09 6813
TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Carpet tile.
- B. Entry Mat.
- C. Concrete Slab Moisture Barrier

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.

1.03 REFERENCE STANDARDS

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2006 (Reapproved 2011).
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2010e1.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- D. CRI (CIS) - Carpet Installation Standard; Carpet and Rug Institute; 2009.
- E. CRI (GLA) - Green Label Testing Program - Approved Adhesive Products; Carpet and Rug Institute; Current Edition.
- F. CRI (GLC) - Green Label Testing Program - Approved Product Categories for Carpet; Carpet and Rug Institute; Current Edition.
- G. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association; 2011.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate layout of joints, direction of carpet pile, and location of edge moldings.
- C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- E. Submit two, 12 inch long samples of edge strip.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet with minimum three years documented experience.

1.06 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.
- B. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
- C. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, excess static discharge and delamination.
- D. Warranty Period: 10 years from date of Substantial Completion.

1.07 FIELD CONDITIONS

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Carpet Tile Type CPT-1: Multi-level pattern loop.
 - 1. Product: Landform Colours manufactured by Tandus Flooring a Tarket Company; www.tandus-centiva.com.
 - 2. Tile Size: 24 x 24 inch, nominal.
 - 3. Finished Pile Thickness: 0.187 inch.
 - 4. Color: As Scheduled.
 - 5. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
 - 6. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
 - 7. VOC Content: Provide CRI Green Label certified product.
 - 8. Gage: 5/64 inch.
 - 9. Stitches: 10.6 per inch.
 - 10. Pile Weight: 20 oz/sq yd.
 - 11. Dye Method: 100% solution dyed.
 - 12. Secondary Backing Material: ER3 Modular.
 - 13. Fiber System: Antron Lumena Nylon

2.02 ENTRY MAT

- A. Entry Mat EM-1: 100 percent Asota solution-dyed UV stabilized polypropylene fibers backed with ExoDi composite rubber backing.
 - 1. Products:
 - a. Connexus; Product Super Nop 52: www.connexusflooring.com.
 - b. van Gelder; Inc; Product Champion Super Nop: www.vangelder-inc.com.
 - 2. VOC Content: Provide CRI Green Label Plus certified product; in lieu of labeling, independent test report showing compliance is acceptable.
 - 3. Tile Size: 19-11/16 inches by 19-11/16 inches.
 - 4. Pile Height: 1/4 to 3/8 inch.
 - 5. Total Height: 1/2 inch nominal.
 - 6. Pile Weight: 52 oz/sq yd minimum.
 - 7. Total Weight: 78 to 93 oz/sq yd as standard with manufacturer.
 - 8. Backing: High density rubber.
 - 9. Color(s): As indicated in Section 09 00 01 - Finish Legend

2.03 CONCRETE SLAB MOISTURE BARRIER:

- A. High strength, latex-based compound formulated to isolate cut-back and existing adhesives that could affect the bond of the new floor adhesives.
- B. The slab sealer material must be compatible with previously applied curing agents, and adhesives and must meet the CRI low-VOC emission criteria, C.R.I. ID# AA-580309, and shall

not contain any known hazardous materials. The material must be non-toxic, ultra-low odor, waterproof when dry.

- C. Flammability Certification: Class A: Passes tunnel test ASTM number E84-70 (identical test method to ANS Number 2-5), NFPA number 755, UL number 723, and UBC 42-1.
- D. Warranty: Provide manufacturers lifetime moisture vapor emissions and moisture penetration warranty. Follow manufacturer's installation instructions exactly to guarantee that warranty will be issued.
- E. Products:
 - 1. J & J Commercialon: 877 Premium Barrier Coat
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
- F. Extent of Work: Provide floor sealer on all new concrete slabs to receive new floor covering.

2.04 ACCESSORIES

- A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Edge Strips: Rubber, color as selected.
- C. At carpet tiles provide manufacturer's recommended full coverage peel and stick adhesive.
- D. Adhesives: Acceptable to carpet tile manufacturer, compatible with materials being adhered; maximum VOC of 50 g/L; CRI Green Label certified.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.
- C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and pH.
 - 1. Test in accordance with ASTM F710.
 - 2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 4. Moisture Testing:
 - a. Engage an independent testing agency to perform anhydrous calcium chloride test, ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Flooring installer shall perform additional tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- C. Vacuum clean substrate.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions and CRI Carpet Installation Standard.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

- E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
- F. Locate change of color or pattern between rooms under door centerline.
- G. Trim carpet tile neatly at walls and around interruptions.
- H. Complete installation of edge strips, concealing exposed edges.

3.04 ENTRY MAT INSTALLATION

- A. Install in strict accordance with manufacturer's recommendations, using manufacturer's recommended adhesive suitable for project conditions.
- B. Follow manufacturer's recommended seaming techniques.
- C. Roll with appropriate roller for complete contact of adhesive to entry mat backing, rolling at least twice, once in each direction.
- D. Coordinate installation of edge strips with Work of Section 09 65 00, concealing all exposed edges.
- E. Keep all traffic off entry mat for 24 hours after installation. Wait 72 hours prior to initial cleaning.
- F. Carpet Tile Layout.
 - 1. Verify recommended layout with carpet manufacturer.
 - 2. Follow layout patterns listed below unless shown otherwise on drawings.
 - 3. F. Lay carpet tile and entry mat in the following patterns:
 - a. CPT-1: Horizontal Ashlar.
 - b. EM-1: Quarter Turn

3.05 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 7733
GLASS FIBER REINFORCED PLASTIC PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glass fiber reinforced plastic panels.
- B. Trim.

1.02 RELATED SECTIONS

- A. Section 09 2116 - Gypsum Board Assemblies; Cement backer board substrate for Glass Fiber Reinforced Plastic Panels.

1.03 REFERENCE STANDARDS

- A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010.
- B. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of Barcol Impressor; 2013a.
- C. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- D. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels; 2012.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit two samples 12 by 12 inch in size illustrating material and surface design of panels.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Glass Fiber Reinforced Plastic Panels:
 - 1. Crane Composites, Inc; Innovative Finishes: www.cranecomposites.com.
 - 2. Marlite; Standard FRP: www.marlite.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PANEL SYSTEMS

- A. Wall Panels at where indicated:
 - 1. Panel Size: 4 by 8 feet (1219 mm by 2438 mm).
 - 2. Panel Thickness: 0.075 inch (1.9 mm).
 - 3. Surface Design: Linen.
 - 4. Color: As scheduled.
 - 5. Attachment Method: Adhesive only, sealant joints, no trim.

2.03 MATERIALS

- A. Panels: Glass fiber reinforced plastic, complying with ASTM D5319.
 - 1. Surface Burning Characteristics: Flame Spread Index of 25, maximum; Smoke Developed Index of 450, maximum; when whole system is tested in accordance with ASTM E84.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. Scratch Resistance: Barcol hardness score of not less than 35, when tested in accordance with ASTM D2583.

- 4. Impact Strength: Not less than 6 ft-lb/in, when tested in accordance with ASTM D256.
- B. Trim: Vinyl; color coordinating with panel.
- C. Adhesive: Type recommended by panel manufacturer.
- D. Sealant: Type recommended by panel manufacturer; color matching panel.
- E. Accessories: Metal hat channel furring as indicated on drawings.
- F. Backer Board: Cementitious backer board as specified in Section 09 3000 - Tiling.

PART 3 EXECUTION

3.01 INSTALLATION - WALLS

- A. Install panels in accordance with manufacturer's instructions.
- B. Cut and drill panels with carbide tipped saw blades or drill bits, or cut with snips.
- C. Apply adhesive to the back side of the panel using trowel recommended by adhesive manufacturer.
- D. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.
- E. Install panels with manufacturer's recommended gap for panel field and corner joints.
- F. Place trim on panel before fastening edges, if required.
- G. Fill channels in trim with sealant before attaching to panel.
- H. Install trim with adhesive and screws or nails as required.
- I. Seal gaps at floor, ceiling, and between panels with specified sealant to prevent moisture intrusion.
- J. Remove excess sealant as paneling is installed.

END OF SECTION

SECTION 09 8405
ACOUSTICAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabric-covered semi-rigid core panels and mounting accessories.
- B. Fabric covering.

1.02 RELATED REQUIREMENTS

- A. Section 09 5100 - Acoustical Ceilings.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, panel layout, and fabric orientation.
- D. Selection Samples: Manufacturer's color charts for fabric covering, indicating full range of fabrics, colors, and patterns available .

1.05 MOCK-UP

- A. See Section 01 40 00 - Quality Requirements, for additional mock-up requirements.
- B. Construct mock-up of acoustical panels at location indicated by Architect.
 - 1. Extent of mock-up:
 - a. Two adjacent full size panels of each type.
 - 2. Approved mock-up may remain as part of the Work.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company with not less than 5 years of experience in manufacturing acoustical products similar to those specified.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect acoustical panels from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until panels are needed for installation.
- B. Store panels flat, in dry, well-ventilated space; do not stand panels on end.
- C. Protect panel edges from damage.

PART 2 PRODUCTS

2.01 ACOUSTICAL WALL PANELS

- A. Acoustical Panels:
 - 1. CDC Corporation: www.conweddesignscape.com.
 - 2. Decoustics: www.decoustics.com.
 - 3. Jasco, Inc: www.jasco-usa.com.
 - 4. Kinetics Noise Control: www.kineticsnoise.com.
 - 5. Koroseal Sound Designs: www.korosealacoustics.com.
 - 6. Lamvin, Inc: www.lamvin.com.
 - 7. Sound Concepts: www.soundconceptscan.com.
 - 8. Wall Technology: www.walltechnology.com.
 - 9. Provide all acoustical panels by one manufacturer.
- B. Fiberglass Core Panels AWP-1: (Typical areas in classrooms)
 - 1. Products:
 - a. Respond ACT manufactured by Conwed.
 - b. Acoustical Panel AP manufactured by Decoustics.
 - c. Quiet Touch manufactured by Jasco.

- d. Hardside manufactured by Kinetics.
 - e. Performance Series Acoustical Wall Panels manufactured by Koroseal.
 - f. Sonic Series manufactured by Lamvin.
 - g. Reflect Impact Resistant AP Manufactured by Sound Concepts.
 - h. A100 Series Acoustical Panels manufactured by Wall Technology.
2. Density: 6 to 7 lb/cu ft.
 3. Noise Reduction Coefficient (NRC): Minimum 1.00 when tested in accordance with ASTM C423 for Type A mounting, per ASTM E 795.
 4. Panel Width: As detailed.
 5. Panel Height: As detailed.
 6. Panel Thickness: 2 inch.
 7. Edges: Perimeter edges reinforced by a formulated resin hardener.
 8. Corners: Square.
 9. Mounting: Back mounting.
 10. Finish: Seamless fabric facing material, for bonded covering of core material with all edges wrapped to back.
- C. AWP-2, Not used.
- D. Fiberglass High Abuse Panels AWP-3: (For use in gym)
1. Provide similar panel to AWP-1, except include a perforated co-polymer plastic face sheet installed over acoustical core.
 2. Products:
 - a. Respond Ultimate 1500 Panels manufactured by Conwed.
 - b. High Impact Extreme H.I.R. #4 as manufactured by Decoustics.
 - c. SportsBoard Conform manufactured by Kinetics.
 - d. Impact Performance Series Acoustical Wall Panels manufactured by Koroseal.
 - e. Ultra High-Impact Acoustical Wall Panel manufactured by Lamvin.
 - f. Super High Impact Resistant SHIR I manufactured by Sound Concepts.
 - g. Rebound Panels manufactured by Wall Technology.
 3. Density: 6 to 7 lb/cu ft.
 4. Noise Reduction Coefficient (NRC): Minimum 0.95 when tested in accordance with ASTM C423.
 5. Panel Width: As detailed.
 6. Panel Height: As detailed.
 7. Panel Thickness: 2 inches nominal.
 8. Edges: Perimeter edges reinforced by a formulated resin hardener.
 9. Corners: Square.
 10. Finish: Seamless fabric facing material, for bonded covering of core material with all edges wrapped to back.
- E. Fabric Covering AWP-1 and AWP-3: Seamless fabric facing material, for stretched covering of core material.
1. Product: Millenium by Momentum Textiels; www.themomgroup.com.
 2. Material Content: 85% post-consumer recycled polyester, 15% polyester.
 3. Finish: Soil and stain resistant.
 4. Backing: Acrylic.
 5. Width: 56 inches.
 6. Durability: 200,000 DR.
 7. Flammability: ASTM E84.
 8. Color: As indicated in Section 09 00 01 - Finish Legend.
 9. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FABRICATION

- A. General: Fabricate panels to sizes and configurations indicated, with fabric facing installed without sagging, wrinkles, blisters, or visible seams.

1. Where radiused or mitered corners are indicated, install fabric to avoid seams or gathering of material.

2.03 ACCESSORIES

- A. Back-Mounting Accessories for AWP-1, AWP-2 and AWP-3: Manufacturer's standard accessories for concealed support by one of the following methods:
 1. Two-part clip and base-support bracket system; brackets designed to support full weight of panels and clips designed for lateral support, with one part mechanically attached to back of panel and the other attached to substrate.
 2. Metal impaling clips designed to support full weight of panels, mechanically attached to substrate and adhesively bonded to back of panels.
 3. Hook and loop strips adhered to substrate and to back of panels.
 4. Z-clip hanger and magnet system with magnets recessed into panel frame and designed to engage steel mounting plates secured to substrate with screws.
- B. Fasteners: Concealed type recommended by manufacturers.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates for conditions detrimental to installation of acoustical panels. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install acoustical panels in locations indicated, following installation recommendations of panel manufacturer. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.
- B. Install panels to construction tolerances of plus or minus 1/16 in for the following:
 1. Plumb and level.
 2. Flatness.
 3. Width of joints.
- C. Field measure each wall area, which is to receive the acoustical or tackable treatment to establish the exact layout of the units as shown on elevations.

3.03 CLEANING

- A. Clean fabric facing upon completion of installation from dust and other foreign materials, following manufacturer's instructions.
- B. Remove surplus materials, trimmed portions of panels, and debris resulting from installation.

3.04 PROTECTION

- A. Provide protection of installed acoustical panels until completion of the work.
- B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION

**SECTION 09 9000
PAINTING AND COATING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints, stains, varnishes, and other coatings.
- C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Elevator pit ladders.
 - 3. Exposed surfaces of steel lintels and ledge angles.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Non-metallic roofing and flashing.
 - 6. Stainless steel, anodized aluminum, bronze, terne, and lead items, unless otherwise indicated.
 - 7. Marble, granite, slate, and other natural stones.
 - 8. Floors, unless specifically so indicated.
 - 9. Ceramic and other tiles.
 - 10. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
 - 11. Exterior insulation and finish system (EIFS).
 - 12. Glass.
 - 13. Acoustical materials, unless specifically so indicated.
 - 14. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

- A. Section 05 1200 - Structural Steel Framing: Shop primed items.
- B. Section 05 5000 - Metal Fabrications: Shop-primed items.
- C. Section 05 5100 - Metal Stairs: Shop-primed items.
- D. Section 07 1900 - Water Repellent Coatings: Coating of exterior and interior Concrete Masonry Units.
- E. Section 09 9600 - High-Performance Coatings: Painting of metals with high-performance coatings indicated as "HPC" on Drawings.
- F. Section 22 0500 - Common Work Results for Plumbing; painting of plumbing.
- G. Section 32 1723.13 - Painted Pavement Markings: Painted pavement markings.

1.03 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.
- B. Paint Gloss and Sheen: Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI values:

<u>Gloss Level</u>	<u>Description</u>	<u>Units @ 60 Degrees</u>	<u>Units @ 85 Degrees</u>
G3	Eggshell Finish	10 to 25	10 to 35
G5	Semi-Gloss Finish	35 to 70	

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2012.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of all products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 3. Manufacturer's installation instructions.
 - 4. Include printed statement of VOC content and chemical components.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
- D. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
- F. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.
 - 1. At project completion, provide an itemized list complete with manufacturer, paint type and color coding for all colors used for Owner's later use in maintenance.
 - 2. Include color drawdowns and sample chips for each color and sheen.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Coatings: 1 gallon of each color; store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.06 PREINSTALLATION CONFERENCE

- A. Preinstallation Conference: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers. Agenda items will include field conditions, substrate conditions, coordination of shop applied primers with finish coatings, application methods, and field quality control testing and inspection, schedule of painting applications and notifications to Owner of start of painting operations.
 - 1. Bring copies of reviewed color draw-downs for all required colors.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.

1.08 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
- B. Provide panel, 10 feet long by 10 feet wide, illustrating paint coating cut-in, color, texture, and finish.
- C. Provide door and frame assembly illustrating paint coating cut-in, color, texture, and finish.
- D. Locate where directed.

- E. Mock-up may remain as part of the work.
- F. Interior Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified.
 - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
 - 2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
 - 3. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.
- G. Integrated Exterior Mockups: Paint surfaces included in integrated exterior mockups as indicated on Drawings and as specified in Section 01 40 00 - Quality Requirements.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction over project.

1.10 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paint Products: Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in Part 2:
 - 1. Coronado Paint (Coronado)
 - 2. Glidden Professional, a product of PPG Architectural Coatings: www.gliddenprofessional.com.
 - 3. Kelly-Moore Paints (Kelly)
 - 4. Miller Paint Co. (Miller).
 - 5. Rhodda Paint Co: www.rhoddavision.com
 - 6. Benjamin Moore & Co: www.benjaminmoore.com.
 - 7. Parker Paint Mfg Co Inc., a Comex Group company: www.parkerpaint.com.
 - 8. PPG Architectural Finishes, Inc: www.ppgaf.com.
 - 9. Pratt & Lambert Paints: www.prattandlambert.com.
 - 10. Sherwin-Williams Company: www.sherwin-williams.com.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Block Fillers: Same manufacturer as top coats.

E. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 4. Supply each coating material in quantity required to complete entire project's work from a single production run.
 5. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Architectural coatings VOC limits of State in which the project is located.
 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Chemical Content: The following compounds are prohibited:
1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.
- E. Flammability: Comply with applicable code for surface burning characteristics.
- F. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- G. Colors: As indicated in Color Schedule
1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.
 2. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color coding scheme indicated.

2.03 REFERENCED GLOSS LEVELS

- A. Some of the following Gloss Level references may be used in the Paint Systems outlined below and are defined here for reference. Gloss units are as measured at 60 degrees from perpendicular, per ASTM D523.
1. Gloss Level 1 a traditional matte finish - flat: maximum 5 units.
 2. Gloss Level 2 a high side sheen flat - a 'velvet-like' finish: maximum 10 units.
 3. Gloss Level 3 a traditional 'eggshell-like' finish: 10-25 units.
 4. Gloss Level 4 a 'satin: 20-35 units.
 5. Gloss Level 5 a traditional semi-gloss: 35-70 units.
 6. Gloss Level 6 a traditional gloss: 70-85 units.

7. Gloss Level 7 a high gloss: more than 85 units.

2.04 PAINT SYSTEMS - EXTERIOR

- A. See High Performance Coatings.

2.05 PAINT SYSTEMS - INTERIOR

- A. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:
1. Eggshell, Acrylic-Enamel Finish: 2 finish coats over a primer.
 - a. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
 - 1) Coronado: SuperKote 5000 Latex Primer Sealer 40-11
 - 2) GP: High Hide 1000 Acrylic Primer Sealer.
 - 3) Kelly: 95-100 Pre-Cote Wallboard & Masonry Primer/Sealer.
 - 4) Miller: 6020 Premium H.B. PVA.
 - 5) Moore: Ultra Spec 500 Primer N534.
 - 6) Parker: UltraTech C152 Latex Primer/Sealer.
 - 7) PPG: 6-2 Speedhide Interior Latex Primer Sealer.
 - 8) Rodda: Heavy Body Scotseal 507801.
 - 9) S-W: Contractors Interior Latex Primer B28WF0162.
 - b. First and Second Coats: Eggshell or satin, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils.
 - 1) Coronado: SuperKote 5000 Interior Latex Eggshell Enamel 30 Line
 - 2) GP: Ultra Hide 1412 Acrylic Eggshell Enamel.
 - 3) Kelly: 1010 KM Professional Interior Acrylic Eggshell Enamel.
 - 4) Miller: 4480 Premium Satin or 3880 Premium Eggshell.
 - 5) Moore: Super Hide Zero VOC Eggshell 357.
 - 6) Parker: UltraTech C106 Latex Eggshell Enamel.
 - 7) PPG: 6-411 Speedhide Latex Eggshell Enamel.
 - 8) Rodda: Lasyn Int. Latex Eggshell Enamel 533001.
 - 9) S-W: ProMar 200 Interior Latex Eg-Shel B20 Series.
 2. Semigloss, Water-Based Epoxy (EP): 2 finish coats over a primer.
 - a. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils.
 - 1) Coronado: SuperKote 5000 Latex Primer Sealer 40-11.
 - 2) GP: None Required.
 - 3) Kelly: Sierra Performance S30 Griptec Sandable Primer.
 - 4) Miller: 6020 Premium High Solids PVA Wall Sealer.
 - 5) Moore: SuperSpec Interior Primer Sealer Undercoater 253.
 - 6) Parker: UltraTech C152 Latex Primer/Sealer.
 - 7) PPG: Speedhide Interior Latex Primer Sealer 6-2.
 - 8) Rodda: Heavy Body Scotseal 507801.
 - 9) S-W: Contractors Interior Latex Primer B28WF0162.
 - b. First and Second Coats: Odorless, semigloss, interior water-based epoxy enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 3 mils.
 - 1) Coronado: Coropoxy Waterborne Acrylic Epoxy 138 Line.
 - 2) Devoe: 4426 Tru-Glaze WB Epoxy Coating <50 g/l VOC.
 - 3) Kelly: Sierra Performance S-16 Epoxy Acrylic Semi-Gloss.
 - 4) Miller: 4200 Water Base Epoxy.
 - 5) Moore: Corotech Waterborne Acrylic Epoxy V450.
 - 6) Parker: UltraTech C145 Pre-Catalyzed Water-Based Epoxy Semi-Gloss.
 - 7) PPG: Pitt-Glaze WB1 Interior Semi-Gloss Pre-Catalyzed Water-Borne Acrylic Epoxy.
 - 8) Rodda: EcoLogic Waterborne Epoxy 70503.

- 9) S-W: Pro Industrial Waterborne Catalyzed Epoxy, B73 Series.
- B. Ferrous Metal: Provide the following finish systems over ferrous metal:
1. Semigloss, Acrylic-Enamel Finish: One finish coat over an enamel undercoater and a primer.
 - a. Primer: Quick-drying, rust-inhibitive, alkyd- or acrylic-based or epoxy-metal primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils.
 - 1) Coronado: Corotech Acrylic Metal Primer V110.
 - 2) Devoe: Devflex 4020 DTM Primer Finish.
 - 3) Kelly: 1725 Acry-Shield 100% Acrylic Metal Primer.
 - 4) Miller: 5000 Acrimetal Primer/Finish.
 - 5) Moore: P04 Acrylic Metal Primer.
 - 6) Parker: UltraTech C309 Universal Water-Based Metal Primer.
 - 7) PPG: 90-912 Series Pitt-Tech Plus DTM Industrial Primer.
 - 8) Rodda: Metal Master Primer 508901.
 - 9) S-W: Pro Industrial Pro-Cryl Universal Primer B66.
 - b. Undercoat: Alkyd, interior enamel undercoat or semigloss, acrylic-latex, interior enamel, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils.
 - 1) Coronado: SuperKote 5000 Interior Latex Semi-Gloss Enamel 32 Line.
 - 2) GP: 1416 Ultra Hide Semi-Gloss.
 - 3) Kelly: 1725 Acry-Shield 100% Acrylic Metal Primer.
 - 4) Miller: 7200 Semi-Gloss Acrinamel.
 - 5) Moore: Super Hide Zero VOC Semi-Gloss 358.
 - 6) Parker: UltraTech C119 Latex Semi-Gloss Enamel.
 - 7) PPG: 6-500 Speedhide Interior Semi-Gloss Latex Enamel.
 - 8) Rodda: Unique II Exterior/Interior Semi-Gloss 542001.
 - 9) S-W: Pro Industrial Pro-Cryl Universal Primer B66.
 - c. Finish Coat: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils.
 - 1) Coronado: SuperKote 5000 Interior Latex Semi-Gloss Enamel 32 Line.
 - 2) GP: 1416 Ultra Hide Semi-Gloss.
 - 3) Kelly: 1685 Dura-Poxy +100% Acrylic Semi-Gloss Enamel.
 - 4) Miller: 7200 Semi-Gloss Acrinamel.
 - 5) Moore: Super Hide Zero VOC Semi-Gloss 358.
 - 6) Parker: UltraTech C119 Latex Semi-Gloss Enamel.
 - 7) PPG: 6-500 Speedhide Acrylic Latex Semi-Gloss Enamel.
 - 8) Rodda: Unique II Exterior/Interior Semi-Gloss 542001.
 - 9) S-W: Pro Industrial Acrylic Semi-Gloss, B66 Series.
- C. Zinc-Coated Metal: Provide the following finish systems over zinc-coated metal:
1. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a primer.
 - a. Primer: Galvanized metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
 - 1) Coronado: Corotech Acrylic Metal Primer V110.
 - 2) Devoe: Devflex 4020 DTM Primer Finish.
 - 3) Kelly: 1725 Acry-Shield 100% Acrylic Metal Primer.
 - 4) Miller: 5000 Acrimetal Primer/Finish.
 - 5) Moore: P04 Acrylic Metal Primer.
 - 6) Parker: UltraTech C309 Universal Water-Based Metal Primer.
 - 7) PPG: 90-912 Series Pitt-Tech Plus DTM Industrial Primer.
 - 8) Rodda: Metal Master Primer 508901.

- 9) S-W: Pro Industrial Pro-Cryl Universal Primer B66.
- b. First and Second Coats: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.
 - 1) Coronado: SuperKote 5000 Interior Latex Semi-Gloss Enamel 32 Line.
 - 2) GP: 1416 Ultra Hide Semi-Gloss.
 - 3) Kelly: 1520 Enviro-Cote Interior Acrylic Semi-Gloss Enamel.
 - 4) Miller: 7200 Semi-Gloss Acrinamel.
 - 5) Moore: Super Hide Zero VOC Semi-Gloss 358.
 - 6) Parker: UltraTech C119 Latex Semi-Gloss Enamel.
 - 7) PPG: 6-500 Speedhide Acrylic Latex Semi-Gloss Enamel.
 - 8) Rodda: Unique II Exterior/Interior Semi-Gloss 542001.
 - 9) S-W: Pro Industrial Acrylic Semi-Gloss, B66 Series.
2. Flat Acrylic Dry Fall Finish: 2 finish coats over a primer.
 - a. Primer: Manufacturer's recommended primer.
 - b. Top Coats: 2 coats of acrylic dry fall coating.
 - 1) Coronado: SuperKote 5000 Latex Dry Fall Flat 110 Line.
 - 2) GP: 1280 Waterborne Dryfall Flat Primer and Finish.
 - 3) Kelly: 480 DRY FOG II Flat Latex Maintenance Finish.
 - 4) Miller: Aqua Fall #624.
 - 5) Moore: Sweep-Up Spray Latex Flat 153.
 - 6) Parker: UltraTech C157 Latex Dry Fall Flat.
 - 7) PPG: Speedhide Interior Super Tech WB Acrylic Flat Dry Fog 6-725XI.
 - 8) Rodda: Water Base Dry Fog Coating 513801x.
 - 9) S-W: Low VOC Waterborne Dryfall (B42W81).
- D. Cotton or Canvas Covering over Insulation: Provide the following finish system on cotton or canvas insulation covering:
 1. Flat Acrylic Finish: 2 finish coats. Add fungicidal agent to render fabric mildewproof.
 - a. First and Second Coats: Flat, latex-based, interior paint applied at spreading rate recommended by the manufacturer.
 - 1) Coronado: SuperKote 5000 Interior Latex Flat Finish 28 Line.
 - 2) GP: 1210 Ultra Hide Flat.
 - 3) Kelly: K-M 485 EZY-COAT Interior Latex Flat Wall Paint Wall Paint.
 - 4) Miller: 6450 Acro Pure Flat, Green Seal (GS-11).
 - 5) Moore: Super Hide Zero VOC Flat 355.
 - 6) Parker: UltraTech C115 Latex Flat.
 - 7) PPG: 6-70 Speedhide Interior Wall Flat Latex Acrylic.
 - 8) Rodda: Master Painter Flat Wall Paint 51310.
 - 9) S-W: ProMar 200 Latex Flat, B30 Series.
- E. Dry-Erase Paint system P6:
 1. "Create" by Ideapaint (distributed by MDC, www.mdcwall.com), or approved.
 2. Number of coats and thickness in accordance with manufacturer's instructions.

2.06 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. 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. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 - 2. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
 - 3. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finished coatings until completion of project.
- B. Touch-up damaged coatings after Substantial Completion.

3.06 SCHEDULE - EXTERIOR PAINT SYSTEMS

- A. Refer to Section 09 96 00 - High-Performance Coating for ferrous metals and zinc-coated metals.

3.07 SCHEDULE - INTERIOR PAINT SYSTEMS

- A. Gypsum Board - Eggshell Acrylic Finish:
 - 1. Provide primer without finish coats at areas indicated to receive fixed equipment, cabinetry and similar fixed items.
 - 2. Provide primer and all finish coats behind wainscots, wall covering, markerboards, tackboards, and tack surfaces
- B. Gypsum Board: Semigloss, Water-Based Epoxy:
 - 1. Walls and ceilings in kitchens, restrooms, food service areas, custodial/janitor closets.
- C. Ferrous Metal - Semigloss, Acrylic-Enamel Finish:

1. Steel joists exposed to view.
 2. Steel floor and roof deck exposed to view.
 3. Steel ladders.
 4. Steel framing and countertop supports.
 5. Access doors, color to match adjacent wall surfaces.
 6. Steel not scheduled to receive High Performance Coating.
- D. Zinc-Coated Metal - Semigloss, Acrylic-Enamel Finish:
1. Steel joists exposed to view.
 2. Steel roof deck exposed to view.
 3. Access doors, color to match adjacent wall surfaces.
- E. Zinc-Coated Metal - Flat Acrylic Dry Fall Finish:
1. Ceiling areas, exposed ductwork, exposed trusses, exposed metal roof or floor deck, exposed piping (protect fire sprinkler heads from paint).
- F. Cotton or Canvas Covering over Insulation: Flat Acrylic Finish.
- G. Dry Erase Paint: Where indicated on drawings.

END OF SECTION

SECTION 09 9600
HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. High performance coatings (HPC or HP) for the following conditions:
 - 1. Exterior Substrates:
 - a. Steel.
 - b. Galvanized steel.
 - 2. Interior Substrates:
 - a. Steel.
 - b. Galvanized steel.
- B. Special preparation of surfaces.

1.02 RELATED REQUIREMENTS

- A. Section 05 12 00 - Structural Steel Framing: Shop priming of metal substrates with primers specified in this Section.
- B. Section 05 50 00 - Metal Fabrications: Shop priming of metal substrates with primers specified in this Section.
- C. Section 05 51 00 - Metal Stairs: Shop priming of metal substrates with primers specified in this Section.
- D. Section 08 11 13 - Hollow Metal Doors and Frames: Shop priming of metal substrates with primers compatible with primers specified in this Section.
- E. Section 09 90 00 - Painting and Coating.

1.03 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- B. ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test.
- C. SSPC-PA 2 - Measurement of Dry Coating Thickness with Magnetic Gages.
- D. SSPC-SP 3 - Power Tool Cleaning; Society for Protective Coatings.
- E. SSPC-SP 6 - Commercial Blast Cleaning; Society for Protective Coatings.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating coating materials.
 - 1. Include printed statement of VOC content and chemical components for interior coatings.
- C. Samples for Verification: For each type of coating system and in each color and gloss of finish coat indicated.
 - 1. Submit Samples on shop primed and galvanized steel, 8 inches square.
- D. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.
- E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and surface preparation requirements.
- F. Maintenance Data: Include cleaning procedures and repair and patching techniques.
 - 1. At project completion, provide an itemized list complete with manufacturer, coating type and color coding for all colors used for Owner's later use in maintenance.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Coating Materials: 1 gallon of each type and color. All extra stock containers are to be new and unopened.

2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.05 PREINSTALLATION CONFERENCE

- A. Preinstallation Conference: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers. Agenda items will include field conditions, substrate conditions, coordination of shop applied primers with finish coatings, application methods, and field quality control testing and inspection.
 1. Bring copies of reviewed color draw-downs for all required colors.

1.06 QUALITY ASSURANCE

- A. Master Painters Institute (MPI) Standards:
 1. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and coating systems indicated.
- B. Surface Preparation: Obtain written confirmation of the specific surface preparation procedures and primers used for all fabricated steel items from the fabricator(s) to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.
- C. Comply with requirements of SSPC-PA 2 for measurement of coating thickness.

1.07 MOCK-UP

- A. Mockups: Apply benchmark samples of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Architect will select one surface to represent surfaces and conditions for application of each type of coating and substrate.
 2. Apply interior benchmark samples after permanent lighting and other environmental services have been activated.
 3. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.08 FIELD CONDITIONS

- A. Do not install materials when temperature is below 55 degrees F or above 90 degrees F.
- B. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.
- C. Provide lighting level of 80 ft candles measured mid-height at substrate surface.
- D. Restrict traffic from area where coating is being applied or is curing.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Products: Provide one of the products listed in Part 2.
- B. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in Part 2:
 1. Carboline Company (Carboline)
 2. Corotech (Corotech)
 3. ICI Devoe (Devoe).
 4. Kelly-Moore Paints (Kelly).
 5. Miller Paint Co. (Miller).
 6. Benjamin Moore & Co. (Moore).
 7. Parker Paint/Comex USA (Parker).
 8. PPG Industries, Inc. (PPG).
 9. Rodda Paint / Cloverdale Paint Co. (Rodda).

10. Sherwin-Williams Co. (S-W).
11. Tnemec Company, Inc. (Tnemec).

C. Substitutions: Not permitted.

2.02 MATERIALS

- A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated.
 1. For shop primed items, omit specified primer if shop primer is compatible with finish coats and in good condition as determined by finish coating manufacturer.
- B. Material Compatibility: Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
- C. Volatile Organic Compound (VOC) Content:
 1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - 1) Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Chemical Content: The following compounds are prohibited at interior applications:
 1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.

2.03 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on appropriately shop-primed items.
 1. Semigloss, Two-Component, Pigmented Aliphatic Acrylic Polyurethane: One finish coat, over intermediate coat and metal primer with total dry film thickness not less than 6.5 mils, unless noted otherwise.
 - a. Prime: Manufacturer's recommended metal primer.
 - 1) Carboline: Carbozinc 859.
 - 2) Devoe: 302H Catha-Coat Reinforced Zinc Primer.
 - 3) Kelly: K-M 15 Chemical Mastic High Build Epoxy.
 - 4) Moore: M18 Epoxy Zinc Rich Primer.
 - 5) Parker: Comex Industrial ZR-20 Inorganic Zinc-Rich Primer.
 - 6) PPG: 95-242/249 Pitt-Guard Rapid Coat D-T-R Primer or 97-699 Durethane MCZ.
 - 7) Rodda: ClovaZinc 3 Organic Zinc Rich Primer 83003.
 - 8) S-W: Zinc Clad II Ethyl Silicate HS B69V3 3.0-6.0 mils.
 - 9) Tnemec: Series 394 PrimePrime at 2.5 to 3.5 mils.
 - b. Intermediate Coat:
 - 1) Carboline: Carboguard 890 High Build Epoxy.
 - 2) Devoe: 224HS Devran High Solids Epoxy.
 - 3) Kelly: K-M 15 Chemical Mastic High Build Epoxy.
 - 4) Moore: Waterborne Urethane Semi-Gloss (P77).
 - 5) Parker: Comex Industrial E-10 High Solids Epoxy Coating.

- 6) PPG: 97-130 Series Aquapon High Build Semi-Gloss Epoxy.
 - 7) Rodda: Clovanguard High Build Epoxy 8310 Series.
 - 8) S-W: Macropoxy 646 Fast Cure Epoxy B58.
 - 9) Tnemec: Series 27 Typoxy WB at 3 to 5 mils.
 - c. Finish Coat:
 - 1) Carboline: Carbothane 133 VOC at 3 to 4 mils.
 - 2) Devoe: 378 Devthane Aliphatic Urethane Semi-Gloss Enamel.
 - 3) Kelly: K-M 375 High Build Gloss Polyurethane Enamel.
 - 4) Moore: Waterborne Urethane Semi-Gloss (P77).
 - 5) Parker: Comex Industrial U-10 High Solids Polyurethane Gloss.
 - 6) PPG: 95-812 Series Pitthane Ultra Gloss Enamel.
 - 7) Rodda: Cloverdale Armour Shield Aliphatic Urethane.
 - 8) S-W: Hi-Solids Polyurethane Semi-Gloss B65 3.4 mils.
 - 9) Tnemec: Series 750 Endura-Shield at 2 to 3 mils.
 - d. Topcoats: Manufacturer's recommended clear topcoat, if any, as required to assure colorfastness of final coating system.
- B. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated (galvanized) metal surfaces:
1. Semigloss, Two-Component, Pigmented Aliphatic Acrylic Polyurethane: One finish coat, over intermediate coat and metal primer with total dry film thickness not less than 6.5 mils, unless noted otherwise.
 - a. Prime: Manufacturer's recommended metal primer.
 - 1) Carboline: Galoseal WB at 0.5 to 1.0 mils DFT.
 - 2) Corotech: Polyamide Epoxy Coating V400 at 2.5 to 3.0 mils.
 - 3) Devoe: 224HS Devran Epoxy Coating.
 - 4) Kelly: K-M 15 Chemical Mastic High Build Epoxy.
 - 5) Moore: Polyamide Epoxy Metal Primer P33
 - 6) Parker: Comex Industrial E-10 High Solids Epoxy Coating.
 - 7) PPG: 97-145 Series Pitt-Guard D-T-R Polyamide Epoxy.
 - 8) Rodda: ClovaPrime 21 Epoxy Primer 83021.
 - 9) S-W: Dura Plate 235 Multi-Purpose Epoxy Primer (High Solids).
 - 10) Tnemec: Series 27 Typoxy WB at 2 to 2.5 mils.
 - b. Intermediate Coat:
 - 1) Carboline: None required.
 - 2) Corotech: Aliphatic Urethane Semi-Gloss V510.
 - 3) Devoe: 378 Devthane Aliphatic Urethane Semi-Gloss Enamel.
 - 4) Kelly: K-M 15 Chemical Mastic High Build Epoxy.
 - 5) Moore: Waterborne Urethane Semi-Gloss (P77).
 - 6) Parker: Comex Industrial U-10 High Solids Polyurethane Gloss.
 - 7) PPG: 95-8800 Series Pitthane High Build Semi-Gloss Urethane.
 - 8) Rodda: ClovaGuard High Build Epoxy 8315 Series.
 - 9) S-W: Hi-Solids Polyurethane Semi-Gloss B65 3-4 mils.
 - 10) Tnemec: None required.
 - c. Finish Coat:
 - 1) Carboline: Carbothane 133 VOC at 3 to 4 mils.
 - 2) Corotech: Aliphatic Urethane Semi-Gloss V510.
 - 3) Devoe: 378 Devthane Aliphatic Urethane Semi-Gloss Enamel.
 - 4) Kelly: K-M 375 High Build Gloss Polyurethane Enamel.
 - 5) Moore: Waterborne Urethane Semi-Gloss (P77).
 - 6) Parker: Comex Industrial U-10 High Solids Polyurethane Gloss.
 - 7) PPG: 95-8800 Pitthane High Build Semi-Gloss Urethane.
 - 8) Rodda: Cloverdale Armour Shield Aliphatic Urethane.
 - 9) S-W: Hi-Solids Polyurethane Semi-Gloss B65 3-4 mils.
 - 10) Tnemec: Series 750 Endura-Shield at 2 to 2.5 mils.

- d. Topcoats: Manufacturer's recommended clear topcoat, it any, as required to assure colorfastness of final coating system.
 - 1) Devoe: Devthane 379 UVA Clear.
 - 2) S-W: DiamondClad Clear B65T105 1 to 2 mils.

2.04 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Ferrous Metal: Provide the following finish systems over interior ferrous metal. Primer is not required on appropriately shop-primed items.
 - 1. Semi-Gloss, Two-Component, VOC Compliant or Waterborne Pigmented Aliphatic Acrylic Polyurethane: One or two finish coats, of two-component, aliphatic acrylic polyurethane coating, over metal primer with total dry film thickness not less than 6.0 mils, unless noted otherwise.
 - a. 1st Coat:
 - 1) Carboline: Carbocrylic 3358 at 2.0 - 3.0 mils DFT.
 - 2) Corotech: Acrylic Metal Primer V100.
 - 3) Devoe: 4030 Tru-Glaze WB Epoxy Primer 193 g/l VOC.
 - 4) Moore: P04 Acrylic Metal Primer.
 - 5) Parker: UltraTech C309 Universal Water-Based Metal Primer.
 - 6) PPG: PPG Aquapon WB Waterborne Epoxy Primer 98-46.
 - 7) S-W: ProCryl Universal Primer, B66-310 Series (110 g/L), (2-4 mils dry)
 - 8) Tnemec: Series 27 Typoxy WB at 2 mils DFT.
 - b. 2nd Coat:
 - 1) Carboline: Carbothane 134 WB.
 - 2) Corotech: Waterborne Urethane V540 <50 g/L.
 - 3) Devoe: 378H Devthane WB Urethane, 100 g/l VOC.
 - 4) Moore: Waterborne Aliphatic Acrylic Urethane V540.
 - 5) Parker: Comex Industrial U-5200 Waterborne Polyurethane Coating.
 - 6) PPG: Amershield VOC.
 - 7) S-W: Acrolon 100 Waterborne Polyurethane.
 - 8) Tnemec: Series 750 Endura Shield.
 - c. 3rd Coat:
 - 1) Carboline: Carbothane 134 WB.
 - 2) Corotech: Waterborne Urethane V540 <50 g/L
 - 3) Devoe: 378H Devthane WB Urethane, 100 g/l.
 - 4) Moore: Waterborne Aliphatic Acrylic Urethane V540.
 - 5) Parker: Comex Industrial U-5200 Waterborne Polyurethane Coating.
 - 6) PPG: Amershield VOC.
 - 7) S-W: Acrolon 100 Waterborne Polyurethane.
 - 8) Tnemec: Not required.
- B. Zinc-Coated Metal: Provide the following finish systems over zinc-coated metal:
 - 1. Semi-Gloss, Two-Component, VOC Compliant or Waterborne Pigmented Aliphatic Acrylic Polyurethane: Two finish coats, of two-component, aliphatic acrylic polyurethane coating, over metal primer with total dry film thickness not less than 6.0 mils, unless noted otherwise.
 - a. 1st Coat:
 - 1) Carboline: Galoseal WB at 0.5 to 1.0 mils DFT.
 - 2) Corotech: Polyamide Epoxy Coating V400 at 2.5 to 3.0 mils.
 - 3) Devoe: Devguard 203 Epoxy Primer.
 - 4) Moore: P04 Acrylic Metal Primer.
 - 5) Parker: UltraTech C309 Universal Water-Based Metal Primer.
 - 6) PPG: PPG Aquapon WB Waterborne Epoxy Primer 98-46.
 - 7) S-W: ProCryl Universal Primer, B66-310 Series (110 g/L), (2-4 mils dry)
 - 8) Tnemec: Series 27 Typoxy WB at 2 mils DFT.
 - b. 2nd Coat:

- 1) Carboline: Carbothane 134 WB.
 - 2) Corotech: Waterborne Urethane V540 <50 g/L.
 - 3) Devoe: 378H Devthane WB Urethane, 100 g/l VOC.
 - 4) Moore: Waterborne Aliphatic Acrylic Urethane V540.
 - 5) Parker: Comex Industrial U-5200 Waterborne Polyurethane Coating.
 - 6) PPG: Amershield VOC.
 - 7) S-W: Acrolon 100 Waterborne Polyurethane.
 - 8) Tnemec: Series 750 Endura Shield.
- c. 3rd Coat:
- 1) Carboline: Carbothane 134 WB.
 - 2) Corotech: Waterborne Urethane V540 <50g/L.
 - 3) Devoe: 378H Devthane WB Urethane, 100 g/l.
 - 4) Moore: Waterborne Aliphatic Acrylic Urethane V540.
 - 5) Parker: Comex Industrial U-5200 Waterborne Polyurethane Coating.
 - 6) PPG: Amershield VOC.
 - 7) S-W: Acrolon 100 Waterborne Polyurethane.
 - 8) Tnemec: Not required.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

3.02 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
 1. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.
 2. At interior steel abrade the top layer of primer, unless otherwise required by coating manufacturer.
 3. At exterior steel, provide surface preparation equivalent to SSPC-SP 6 "Commercial Blast Cleaning."
- D. Steel Substrates: Remove rust and loose mill scale.
 1. Prepare interior surfaces as recommended by coating system manufacturer and according to SSPC-SP 3 "Power Tool Cleaning."
 2. Blast steel surfaces clean as recommended by coating system manufacturer and according to SSPC-SP 6 "Commercial Blast Cleaning," unless otherwise recommended by manufacturer.
 3. Level of surface preparation specified is a minimum. If the coating manufacturer requires a higher degree of preparation, comply with the coating manufacturer's recommendations.
- E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.
- F. Remove finish hardware, fixture covers, and accessories and store.

- G. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.03 PRIMING

- A. Apply primer to unprimed surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

3.04 COATING APPLICATION

- A. Apply coatings in accordance with manufacturer's instructions, to thicknesses specified. Use applicators and techniques suited for coating and substrate indicated.
- B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.
- C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color and appearance.
- D. When the color of a door frame changes from side to side, the change shall be made at the edge of the stop, where the transition is not visible when the door is in a closed position.

3.05 FIELD QUALITY CONTROL

- A. Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to Architect.
 - 1. Brush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, or foreign materials in paint coatings.
 - 2. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners, reentrant angles or similar conditions.
 - 3. Damage due to touching before paint is sufficiently dry or any other contributory cause.
 - 4. Damage due to application on moist surfaces or caused by inadequate protection from the weather.
 - 5. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
- B. Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces:
 - 1. Visible defects are evident on vertical or horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
 - 2. Visible defects are evident on ceilings, soffits and other overhead surfaces when viewed at normal viewing angles.
 - 3. When the final coat on any surface exhibits a lack of uniformity of color, sheen texture and hiding across full surface area.
 - 4. Dry mil thicknesses do not meet manufacturer's recommended thickness or specified thickness.
 - 5. Lack of adhesion. Test surfaces indicating lack of adhesion in accordance with ASTM D3359 or as recommended by coating manufacturer.
- C. Owner will provide field inspection and testing.
 - 1. Painted surfaces will be tested for dry mil thickness for each coat.
 - 2. Shop primers and painted surfaces will be tested for adhesion.
 - 3. Surfaces will be tested at frequency discussed in the preinstallation conference and as deemed appropriate by Owner.

3.06 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.

- C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- D. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.07 PROTECTION

- A. Protect finished work from damage.

3.08 EXTERIOR SCHEDULE

- A. Steel: Semigloss, Two-Component, Pigmented Aliphatic Acrylic Polyurethane:
 - 1. Canopy framing including steel components of entry porch, bike shelters, utility court canopy, and covered play area.
 - 2. Exposed steel deck.
 - 3. Exposed steel joists.
 - 4. Exposed structural steel.
 - 5. Steel bollards.
 - 6. Steel lintels.
 - 7. Pipe downspouts (other than stainless steel).
 - 8. Hollow metal doors and frames.
 - 9. Handrails.
 - 10. Guard rails at balconies.
 - 11. Steel runnel rain water spout
 - 12. Decorative Metal Fences and Gates
 - 13. Steel surround at classroom windows.
 - 14.
 - 15. Other locations where indicated.

3.09 INTERIOR SCHEDULE

- A. Steel: Semigloss, Two-Component, Pigmented Aliphatic Acrylic Polyurethane:
 - 1. Steel stairs.
 - 2. Steel handrails and guardrails.
 - 3. Exposed steel framing below the roof. (Roof deck and roof framing excluded).
 - 4. Hollow metal doors and frames.
 - 5. Other locations where indicated.

END OF SECTION

SECTION 10 1101
VISUAL DISPLAY BOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Markerboards and Tackboards.
- B. Tackable Wall Panels

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Blocking and supports.
- B. Section 09 2216 - Non-Structural Metal Framing: Concealed supports in metal stud walls.
- C. Section 09 9000 - Painting and Coating: Finishing of wood frame and chalkrail.

1.03 REFERENCE STANDARDS

- A. ASTM A424 - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2009a.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, and accessories.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations, special anchor details.
- D. Samples: Submit two samples 6 x 6 inch in size illustrating materials and finish, color and texture of markerboard, tackboard, and tackboard surfacing.
- E. Manufacturer's printed installation instructions.
- F. Maintenance Data: Include data on regular cleaning, stain removal, and _____.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Markerboards:
 - 1. Claridge Products and Equipment, Inc; ____: www.claridgeproducts.com.
 - 2. Polyvision Corporation (Nelson Adams); ____: www.polyvision.com.
 - 3. Greensteel Visual Display Products;
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Tackable Wall Panels:
 - 1. Homasote Company; www.homasote.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MARKERBOARDS

- A. Markerboards: Porcelain enamel on steel, laminated to core.
 - 1. Color: Similar to Claridge #75 LCS-II low-gloss.
 - 2. Steel Face Sheet Thickness: 24 gage, 0.0239 inch .
 - 3. Core: Medium density fiberboard, 7/16 inch thick, laminated to face sheet.

4. Backing: Aluminum foil, laminated to core.
 5. Size: As indicated on drawings.
 6. Frame: Extruded aluminum, with concealed fasteners, full perimeter with 5/8 inch wide face.
 7. Frame Finish: Anodized, natural.
 8. Accessories: Provide marker tray..
- B. Tackboards: TB-1, Fine-grained, homogeneous natural cork.
1. Product: similar to Claridge Cork
 2. Color: Graphite
 3. Frame: Extruded aluminum, 5/8 inch face, mitered corners.
 4. Size: As indicated on drawings.

2.03 TACK SURFACE WALL PANELS

- A. Tack Surface Wall Panels, Frameless, Fabric laminated to fiberboard; TS-1 and TS-2.
1. Substrate: Pinnacle 440 pre-finished interior museum-grade panels manufactured from 100 percent recycled post consumer waste paper material.
 2. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
 3. Fire Rating: Class A, per NFPA.
 4. Thickness: 3/8 inch.
 5. Edge Treatment: Square.
 6. Size: As indicated on drawings.
 7. Fabric: Millenium by Momentum Textiles; www.themomgroup.com.
 - a. Color: As indicated on finish legend.
 8. Fabrication:
 - a. Wrap fabric around edges of panel to backside and laminate to substrate per manufacturer's recommendations.
 - b. Fabricate panels to sizes and shapes indicated.
 - c. Attach fabric facing to cores to produce installed panels with visible surfaces fully covered and free from waves in weave, sags, blisters, seams, and adhesive or foreign matter.
 - d. No exposed fasteners shall be visible.

2.04 MATERIALS

- A. Porcelain Enameled Steel Sheet: ASTM A424, Type I, Commercial Steel, with fired-on vitreous finish.
- B. MDF for Core: Medium-density fiberboard fabricated with no added urea-formaldehyde; see Section 01 6000 for additional requirements.
- C. Foil Backing: Aluminum foil sheet, 0.005 inch thick.
- D. Adhesives: Low VOC or water-based, approved by panel manufacturer, and complying with requirements of Section 01 6116.

2.05 ACCESSORIES

- A. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.
- B. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.
- C. Verify flat wall surface for frameless adhesive-applied boards.

3.02 INSTALLATION

- A. Install boards in accordance with manufacturer's instructions for adhesive installation.
- B. Secure units level and plumb.
- C. Butt Joints: Install with tight hairline joints.
- D. Carefully cut holes in boards for thermostats, wall switches, and other devices.

3.03 CLEANING

- A. Clean board surfaces in accordance with manufacturer's instructions.
- B. Cover with protective cover, taped to frame.
- C. Remove temporary protective cover at date of Substantial Completion.

END OF SECTION

SECTION 10 1400
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cast Metal Letter Signs.
- B. Exterior Electronic Reader board
- C. Room and door signs.
- D. Interior directional and informational signs.
- E. Building identification signs.
- F. Traffic signs.
- G. Monument Signs.
- H. Sign Permit.

1.02 RELATED REQUIREMENTS

- A. Section - 03 1000 - Concrete Forming and Accessories, reinforcing for concrete base.
- B. Section - 03 2000 - Concrete Reinforcing, formwork for concrete base.
- C. Section - 03 3000 - Cast-in-Place Concrete, concrete base.
- D. Section - 07 4113 - Metal Roof Panels, metal roofing at Monument Sign
- E. Section - 07 4233 - Exterior Solid Phenolic Rainscreen Panel, panels at Monument Sign
- F. Section - 07 6200 - Sheet Metal Flashing and Trim, Flashing and trim at Monument Sign
- G. Section - 07 9005 - Joint Sealers, sealants at Monument Sign.
- H. Section 22 0553 - Identification for Plumbing Piping and Equipment.
- I. Section 26 0553 - Identification for Electrical Systems.
- J. Section 26 5100 - Interior Lighting: Exit signs required by code.
- K. Divisions 26 and 27 - Electrical and Data connections and interface with reader board.

1.03 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; Final Rule; current edition; (ADA Standards for Accessible Design).
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- C. UL 1994 - Luminous Egress Path Marking Systems; Current Edition, Including All Revisions.
- D. ATBCB ADAAG - Americans with Disabilities Act Accessibility Guidelines; 2002.
- E. OSSC - Oregon Structural Specialty Code.

1.04 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design monument sign, using experienced designer of similar custom monument signs using performance requirements and design criteria indicated.
- B. Provide design adequate to meet Eugene Sign Code, Oregon Structural Specialty Code requirements for wind load, and Electrical Code for wiring. Wind load design criteria as stated on Structural Drawings.

1.05 WARRANTY

- A. Warrant Reader Board sign parts and factory labor for 5 years. Fully replace damaged or nonfunctional components in place within warranty period.

1.06 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.

- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Shop Drawing: Provide half-size layout drawing, to scale, indicating spacing between letters and words, space around edges, and relationship to mounting substrate.
- D. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - 1. When room numbers to appear on signs differ from those on the drawings, include the drawing room number on schedule.
 - 2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
 - 3. Submit for approval by Owner through Architect prior to fabrication.
 - 4. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
 - 5. Verification Samples: Submit samples showing colors specified.
 - 6. Manufacturer's Installation Instructions: Include installation templates and attachment devices.
- E. Delegated-Design Submittal: Provide design drawings showing exterior appearance, interior construction, supports, mountings, software, reader board, and wiring.
 - 1. Submit submittals in accordance with Section 01 3300. Submit as required to City of Eugene. Obtain Sign Permit. Provide copy of permit to Owner.
 - 2. Submit samples of Readerboard Video AVI clips.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Store tape adhesive at normal room temperature.

1.08 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

1.09 QUALITY ASSURANCE

- A. Manufacturer qualifications: Company specializing in design and manufacturer the products specified in this section with minimum five years of documented experience.

PART 2 PRODUCTS

2.01 SIGNAGE APPLICATIONS - GENERAL

- A. Accessibility Compliance: All signs are required to comply with ADA Standards for Accessible Design and ANSI/ICC A 117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

2.02 ROOM SIGNS

- A. Sign Style: Flat panel, frameless, with applied letters
 - 1. Substrate: ¼ inch thick acrylic panel, back painted, See signage schedule for color.
 - 2. Sign Types B and D to include accommodations for paper insert, see drawings.
 - 3. Fabricate units to configurations and sizes as indicated on drawings and schedule. Edges and surfaces to be straight, smooth, and true.
- B. Lettering:
 - 1. Tactile Letters: Precision cut acrylic letters applied with very high strength adhesive.
 - 2. Vinyl Letters: First surface applied vinyl letters.
 - 3. Character Height: See drawings.

4. Color: See drawings
- C. Braille: Press fit 1/16 inch diameter clear acrylic beads into pre-drilled holes to create Class II Braille. Contractor to provide text translation from English to Class II Braille.
- D. Tactile Symbols: Including but not limited to pictograms. Precision cut acrylic applied with very high strength adhesive. See drawings.
- E. Mounting: VHB tape. Where mounted to glass, provide solid back painted acrylic panel to be mounted to the back side of glass. See drawings for locations.

2.03 2.03 VINYL SUPERGRAPHIC SIGNAGE

- A. Cast vinyl film with permanent, pressure sensitive adhesive and pre-spaced electronically-cut graphics.
- B. Product: Similar to 3M Scotchcal Electrocut Graphic Film #7725
- C. Finish: Matte
- D. Placeholder sizes as noted on drawings. Artwork to be provided by architect at a later date.

2.04 DIMENSIONAL LETTERS

- A. Metal Letters:
 1. Manufacturers:
 - a. ARK Ramos
 - b. Architectural Metal Crafters
 - c. OMC Industries
 - d. Metal Arts
 - e. Substitutions,
 - f. Product: Similar to ARK Ramos Signage Systems.
 2. Materials and Type.
 - a. Material: Aluminum, satin finish face, matte finish edge.
 - b. Mounting: Pin type per Manufacturer's recommendation. Provide 1 inch space between face of mounting surface and back of letter.
 - c. Letter Style: Futura No. 501, all capitals.
 - d. Letter Height and Text: As noted on drawings.
 3. Vinyl Letters: Self-adhering, peel-off vinyl letters, reverse adhesive at interior glass mounting locations.
 - a. Manufacturer: Contractor's choice.
 - 1) Letter Style: Futura No. 501, all capitals.
 - 2) Letter Height: 10 inches tall.
 - 3) Letter Text: Building Address and As noted on drawings.

2.05 MONUMENT SIGN

- A. Concrete base; As indicated on drawings. Work to comply with Sections 03 1000, 03 2000, and 03 3000 covering concrete forming, reinforcing and poured in place concrete.
- B. Where metal roofing or roof panels are shown: Comply with requirements of Section - 07 4113 - Metal Roof Panels, metal roofing at Monument Sign
- C. Where Exterior Phenolic Rainscreen Panels are shown comply with Section - 07 4233 - Exterior Solid Phenolic Rainscreen Panel, panels at Monument Sign
- D. Where metal flashings are shown comply with Section - 07 6200 - Sheet Metal Flashing and Trim, Flashing and trim at Monument Sign.
- E. Interior support materials: Non-corrosive metal framing, fasteners and supports.
- F. Reader Board:
 1. Manufacturer and Brand: Watchfire Signs, Digital Message Center and Ignite Graphics; <http://www.watchfiresigns.com/led-signs/monochrome-signs>
 2. Substitutions: See Section 01 6000 - Product Requirements.
 3. Features:

- a. Exterior rated LED Display, 2 sided.
 - b. 19 mm, 48 x 128 matrix
 - c. Monochrome Red - 4056 Shades
 - d. 90 degree full brightness viewing
 - e. Viewing Range: 60 ft or greater.
 - f. Character Height: 5 inches min.
 - g. Cabinet: Extruded aluminum, solid welded corners
 - h. Color: Bright Red
 - i. On Demand Diagnostics Included
 - j. Module Dimensions: As recommended by manufacturer.
 4. Screen size as shown on drawings
 5. Capable of graphic and animation displays
 6. LED life Minimum: 100,000 hours
 7. Weather resistant: Tested for salt spray, immersion under water, salt spray resistant, temperature rated for operation from minus 40 degrees to 185 degrees fahrenheit.
 8. Power: 120 Volt, single phase
 9. Video Capability: Imported pre-recorded AVI clips
 10. Communications Options: Provide selection of RF Wireless, phone modem, fiber optic, LAN & WAN broadband.
 11. Ventilation: Provide ventilation spaces and pathways as recommended by manufacturer.
 12. Software
 - a. Single program operable from Owner's building management system.
 - b. On screen preview available at Owner's PC.
 - c. Ability to create text and images displayed still or in motion.
 - d. Provide with library of graphics for manipulation by user.
 - e. Training manual
 - f. Similar to IGNITE Graphics Software system by Watchfire.
 13. Metal letters: As specified above.
- G. Fabrication
1. Fabricate sign in compliance with the recommendations of product manufacturers
 2. Minimize exposed fasteners.
 3. Construction to be vandal resistant.

2.06 TRAFFIC CONTROL & ACCESSIBLE PARKING SIGNS

- A. Manufacturer: Contractor's choice.
- B. Material: 18 gage bonderized steel or .080 inch aluminum.
- C. Finish: Baked Enamel - both sides finished
- D. Location: See Drawings
- E. Manufacturing Standards: Comply with Oregon State Highway Department Standard Regulations.
- F. Supports: 2 inch Inside diameter Galvanized Steel Post, unless otherwise shown on drawings.
 1. Provide poles of sufficient length to mount bottom of sign 7 feet above finished grade at base of pole.
 2. Mounting: Cast support post into concrete footing. Through bolt sign to post with tamperproof cadmium-plated fasteners.
- G. Accessible parking Sign Schedule:
 1. Accessible parking stall sign: RESERVED PARKING with international accessibility symbol. Sign color blue with white boarder and figures. Comply with State of Oregon requirements.
 2. Van Accessible parking stall sign: Same as above, provide with added words VAN ACCESSIBLE. Comply with State of Oregon requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.02 TRAINING

- A. Provide training to Owner representatives. Demonstrate operation of software, text and display editing, and other features.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs where indicated:
 - 1. If no location is indicated obtain Owner's instructions.
- D. Protect from damage until Substantial Completion; repair or replace damage items.

END OF SECTION

SECTION 10 2113.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Solid plastic toilet compartments, TC-1.
- B. Urinal and vestibule screens.

1.02 RELATED REQUIREMENTS

- A. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

1.03 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- C. Product Data: Provide data on panel construction, hardware, and accessories.
- D. Samples: Submit two samples of partition panels, 6 x 6 inch in size illustrating panel finish, color, and sheen.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Solid Plastic Toilet Compartments:
 - 1. Ampco Products, Inc: www.ampco.com.
 - 2. Metpar Corp: www.metpar.com.
 - 3. Partition Systems International of South Carolina; PolyLife HDPE Toilet Partitions: www.psisc.com.
 - 4. Scranton Products (Santana/Comtec/Capital): www.scrantonproducts.com.
 - 5. Substitutions: Section 01 6000 - Product Requirements.

2.02 SOLID PLASTIC TOILET COMPARTMENTS

- A. Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), floor-mounted unbraced.
- B. Doors:
 - 1. Thickness: 1 inch.
 - 2. Width: 24 inch.
 - 3. Width for Handicapped Use: 36 inch, out-swinging.
 - 4. Height: 55 inch.
- C. Panels:
 - 1. Thickness: 1 inch (25 mm).
 - 2. Height: 55 inch.
- D. Pilasters:
 - 1. Thickness: 1 inch (25 mm).
 - 2. Width: As required to fit space; minimum 3 inches (76 mm).
- E. Screens: Without doors; to match compartments; mounted to wall with two panel brackets .
- F. Color: White

2.03 ACCESSORIES

- A. Pilaster Shoes: Formed ASTM A666, Type 304 stainless steel with No. 4 finish, 3 in high, concealing floor fastenings.
- B. Pilaster Brackets: Polished stainless steel.
- C. Wall Brackets: Continuous type, polished stainless steel.
- D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
- E. Hardware: Polished stainless steel:
 - 1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
 - 2. Door Latch: Slide type with exterior emergency access feature.
 - 3. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
 - 4. Coat hook with rubber bumper; one per compartment, mounted on door.
 - 5. Provide door pull for outswinging doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

**SECTION 10 2123
CUBICLES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface mounted overhead metal curtain track and guides.
- B. Curtains.

1.02 RELATED REQUIREMENTS

- A. Section 09 51 00 - Acoustical Ceilings: Suspended ceiling system to support track.

1.03 REFERENCE STANDARDS

- A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; National Fire Protection Association.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for curtain fabric characteristics and track.
- C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.
- D. Samples: Submit 12 x 12 inch sample patch of curtain cloth with representative hem stitch detail, heading with reinforcement, and carrier attachment to curtain header.
- E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- F. Maintenance Data: Include recommended cleaning methods and materials and stain removal methods.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept curtain materials on site and inspect for damage.

PART 2 PRODUCTS

2.01 TRACKS AND TRACK COMPONENTS

- A. Track: Extruded aluminum sections; one piece per cubicle track run; dual channel type profile.
 - 1. Structural Performance: Capable of supporting vertical test load of 50 lbs without visible deflection of track or damage to supports, safely supporting moving loads, and sufficiently rigid to resist visible deflection and without permanent set.
 - 2. Track End Stop: To fit track section.
 - 3. Track Bends: Minimum 12 inch radius; fabricated without deformation of track section or impeding movement of carriers.
 - 4. Size: 29/32-inch by 11/16-inch by 0.05-inch extruded 6063-T5 aluminum.
 - 5. Finish on Exposed Surfaces: White enamel finish.
 - 6. Basis-of-Design Product: Series 9600 manufactured by Kirsch.
- B. Curtain Carriers: Nylon roller to accurately fit track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal.

2.02 CURTAINS

- A. All Curtain Materials:
 - 1. Naturally flame resistant or flameproofed; capable of passing NFPA 701 test.
- B. Curtain CCT-1: As indicated in Section 09 00 01 - Finish Legend.
 - 1. Basis-of-Design Manufacturer: Design Tex.
 - 2. Color: As indicated in Section 09 00 01 - Finish Legend.
- C. Open Mesh Cloth: Open weave to permit air circulation; flameproof material, same color as curtain. Edge band with curtain fabric.

- D. Curtain Fabrication:
1. Manufacture curtains of one piece, sized 10 percent wider than track length. Terminate curtain 15 inches from floor.
 2. Include open mesh cloth at top 12 inches of curtain for room air circulation.
 3. Curtain Heading: Triple thickness 2 inches wide, with stitched button holes for carriers 6 inches on center, double fold bottom hem 2 inches wide with lead weights included. Lock stitch seams in two rows. Turn seam edges and lock stitch.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and supports above ceiling are ready to receive work of this Section.
- B. Verify that field measurements are as indicated.
- C. Start of installation indicates installer's acceptance of conditions.

3.02 INSTALLATION

- A. Install curtain track to be secure, rigid, and true to ceiling line.
- B. Install end cap and stop device.
- C. Secure track to ceiling system.
- D. Install curtains on carriers ensuring smooth operation.

END OF SECTION

SECTION 10 2226
FOLDING PANEL PARTITIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Acoustic paired panel operable panel partition, Types R and S.
- B. Ceiling track and operating hardware.

1.02 RELATED REQUIREMENTS

- A. Section 05 50 00 - Metal Fabrications: Overhead track structural support framing.
- B. Section 07 90 05 - Joint Sealers: Acoustical sealant.
- C. Section 08 71 00 - Door Hardware: Lock cylinders for control station.
- D. Section 09 00 01 - Finish Legend: Fabric and plastic laminate selections.

1.03 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- C. ASTM E413 - Classification for Rating Sound Insulation.
- D. ASTM E557 - Standard Guide for Architectural Design and Installation Practices for Sound Isolation between Spaces Separated by Operable Partitions.
- E. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association.
- F. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on partition materials, operation, hardware and accessories, track switching components, and colors and finishes available.
- C. Shop Drawings: Indicate opening sizes, track layout, details of track and required supports, static and dynamic loads, location and details of pass door and frame, adjacent construction and finish trim, and stacking depth.
 - 1. Prepare shop drawings from field-verified framed opening dimensions.
- D. Samples for Review: Submit two samples of surface finish, 12 x 12 inches size, illustrating colors selected.
- E. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention, and installation sequence.
- F. Certificates: Certify that partition system meets or exceeds specified acoustic requirements.
- G. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods. Describe cleaning materials detrimental to finish surfaces and hardware finish.
 - 1. Seals, hardware, track, carriers, and other operating components.
 - 2. Electric operator.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified this section with minimum five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this section with minimum five years of experience and authorized by manufacturer.

1.06 WARRANTY

- A. Provide written warranty by manufacturer of each type of operable partition agreeing to repair or replace any components with manufacturing defects.
- B. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acoustic Paired Panel Operable Panel Partitions:
 - 1. Hufcor, Inc; Product 632 Series: www.hufcor.com.
 - 2. Modernfold, a DORMA Group Company; Product Acousti-Seal 932: www.modernfold.com.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PAIRED PANEL OPERABLE WALL TYPE J AND K

- A. Paired Panel Operable Panel Partition: Side opening; paired panels; center stacking as indicated; manually operated.
 - 1. Type S Operable Wall at Music Room
 - a. Panel Finish: Fabric wall covering.
 - 1) Product: Pixel manufactured by Maharam.
 - 2) Material Content: Osnaburg.
 - 3) Width: 52 inches.
 - 4) Gage: 24 mils.
 - 5) Total Weight: 20.0 oz/ly.
 - 6) Flammability: Class A.
 - 7) Color: As indicated in Section 09 00 01 - Finish Legend.
 - b. Panel Type: Single Panel.
 - 2. Type R Operable Wall at Cafeteria
 - a. Panel Finish: As follows:
 - 1) Bottom 6 feet of wall facing gymnasium: Plastic laminate matching WSCT-1 as scheduled in Section 09 00 01 - Finish Legend.
 - 2) All other surfaces: Wall covering.
 - 3) Product: Pixel manufactured by Maharam.
 - 4) Material Content: Osnaburg.
 - 5) Width: 52 inches.
 - 6) Gage: 24 mils.
 - 7) Total Weight: 20.0 oz/ly.
 - 8) Flammability: Class A.
 - b. Panel Type: Paired Panel.
 - 3. Sound Transmission Class (STC): Minimum 50 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90, on panel size of 100 sq ft.
 - 4. Surface Burning Characteristics of Panel Finish: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84.
 - 5. Installed partition system track capable of supporting imposed loads, with maximum deflection of 1/360 of span.
- B. Panel Construction:
 - 1. Panel Skin: Steel frame with welded and reinforced corners. Sheet steel skin with 1/2-inch backer sheet, roll formed into frame and welded to frame.
 - 2. Core: Fiberglass construction utilizing manufacturer's standard fabrication methods.
- C. Core: 16 gage formed sheet steel frame top, bottom, jambs, and intermediates; welded construction, internally reinforced at suspension points, with acoustical insulation fill.
 - 1. Thickness with Finish: 3 inches.
 - 2. Factory applied surface finish.
 - 3. Trim: Trimless. Wrap surface covering around panel edge and into astragal for fine line panel joint.

4. Hinges: Full leaf butt hinges attached directly to panel with welded hinge anchor plates within panel. Provide reinforcing backer plate welded to frame for attachment of hinges.
 5. Panel to Panel Seals: Grooved and gasketed astragals; continuous flexible ribbed vinyl seal fitted to panel edge construction. Provide wall mounted interlocking jamb at each wall.
- D. Track: Minimum 11 gage roll-formed steel track, supporting the load-bearing surface of the track, connected to structural support by pairs of threaded rods.
1. Exposed Track Soffit: Steel, integral to track, prefinished.
 2. Products:
 - a. Hufcor: #11 Track.
 - b. Modernfold: #17 Track.
- E. Carriers: One all-steel trolley with steel tired ball bearing wheels per panel, except hinged panels.
- F. Acoustic Top and Bottom Seals: 2-inch automatic bottom seals and fixed bulb/two finger top seals. Continuous contact sweep bottom seals are not permitted.
- G. Acoustic Jamb Seals: Flexible acoustic seals at jambs at each wall.
- H. Pass Door at Music Room: ADA compliant, matching panel thickness and construction. STC of door same as panel. No threshold permitted. Provide concealed closers.
1. Door to be locked from Stage side, free exit from Music Room side.
 - a. Install removable core for cylinder provided by Section 08 71 00 - Door Hardware.
 2. Size: 36 inches wide by 84 inches high.
 3. Door Finish: Plastic laminate facing and perimeter trim. Color to match WSCT-1 as specified in Section 09 00 01 - Finish Legend.
 4. Provide self-illuminating exit signs where indicated.
- I. Acoustic Sealant: Specified in Section 07 90 05.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify track supports are laterally braced and will permit track to be level within 1/4 inch of required position and parallel to the floor surface.
- C. Verify floor flatness of 1/8 inch in 10 feet, non-cumulative.
- D. Verify wall plumbness of 1/8 inch in 10 feet, non-cumulative.

3.02 INSTALLATION

- A. Install partition in accordance with manufacturer's instructions and ASTM E 557.
- B. Install electric operator, wiring, and controls. Locate control station(s) as indicated.
- C. Fit and align partition assembly and pass door level and plumb.
- D. Lubricate moving components.
- E. Apply acoustic sealant to achieve required acoustic performance.
- F. Coordinate electrical connections.

3.03 ADJUSTING

- A. Adjust partition assembly to provide smooth operation from stacked to full open position. Do not over-compress acoustic seals.
- B. Visually inspect partition in full extended position for light leaks to identify a potential acoustical leak.
- C. Adjust partition assembly to achieve lightproof seal.

3.04 CLEANING

- A. Clean finish surfaces and partition accessories.

3.05 CLOSEOUT ACTIVITIES

- A. Demonstrate operation of partition and identify potential operational problems.
- B. Training: Provide a minimum of 2 hours of training on operation, maintenance and repair.

END OF SECTION

SECTION 10 2601
WALL AND CORNER GUARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Corner guards.

1.02 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Anchors for attachment of work of this section, concealed in wall.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures for submittal procedures.
- B. Samples: Submit two sections of corner guard, 12 inch long, illustrating component design, configuration, color and finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wall and Corner Guards:
 - 1. Wallguard; Product 2331 Defender Series; www.wallguard.com
 - 2. Inpro; Product ____: www.inprocorp.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS

- A. Corner Guards: Flush mounted, stainless steel, Type 304, number 4 satin finish.
 - 1. Thickness: 16 gage.
 - 2. Locations: See Drawings.
- B. Endwall Guard: Flush mounted, stainless steel, type 304, number 4 satin finish.
 - 1. Size: 2 inch legs.
 - 2. Corners: 1/8 inch radius.
 - 3. Thickness: 16 gage.
 - 4. Length: See drawings.
 - 5. Locations: At Multi-occupant restrooms, see drawings.

2.03 FABRICATION

- A. Fabricate components with tight joints, corners and seams.
- B. Pre-drill holes for attachment.
- C. Form end trim closure by capping and finishing smooth.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.
- B. Position corner guard as indicated on drawings.

3.03 TOLERANCES

3.04 SCHEDULE

END OF SECTION

SECTION 10 2800
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Accessories for toilet rooms and showers.
- B. Installation of Accessories furnished by Owner.
- C. Grab bars.

1.02 RELATED REQUIREMENTS

- A. Section 10 2113.13 - Metal Toilet Compartments.

1.03 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; Final Rule; current edition; (ADA Standards for Accessible Design).
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.
- C. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2004 (Reapproved 2010).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

PART 2 PRODUCTS

2.01 MANUFACTURERS OF CONTRACTOR FURNISHED AND CONTRACTOR INSTALLED ITEMS

- A. Products listed are made by Bobrick Washroom Accessories; www.bobrick.com, unless otherwise noted.
- B. Other Acceptable Manufacturers:
 - 1. American Specialties, Inc: www.americanspecialties.com.
 - 2. Bradley Corporation: www.bradleycorp.com.
 - 3. Substitutions: Section 01 6000 - Product Requirements.
- C. All items of each type to be made by the same manufacturer.

2.02 OWNER FURNISHED AND CONTRACTOR INSTALLED ITEMS

- A. The following items will be furnished by the Owner for installation by the Contractor
 - 1. Electric Hand dryers
 - 2. Toilet paper dispensers
 - 3. Paper towel dispensers
 - 4. Soap dispensers
 - 5. Sanitary napkin disposal
 - 6. Toilet seat cover dispensers

2.03 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Provide two keys for each accessory to Owner; master key all lockable accessories.

- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Adhesive: Two component epoxy type, waterproof, compliant with project VOC limitations.
- E. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type.

2.04 FINISHES

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

2.05 TOILET ROOM ACCESSORIES

- A. Mirrors: Stainless steel framed, 6 mm thick float glass mirror.
 - 1. Size: As indicated on drawings.
 - 2. Frame, where indicated: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; No.4 finish.
 - 3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
 - 4. Product: B-290 manufactured by Bobrick.
 - 5. Mirror M-1:
 - a. Type: Framed.
 - b. Size: as indicated on drawings.
- B. Grab Bars: Stainless steel, nonslip grasping surface finish.
 - 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force, minimum.
 - b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
 - c. Length and Configuration: As indicated on drawings.
 - d. Products:
 - 1) GB-1: 36 inches, similar to Bobrick 5806.
 - 2) GB-2: 42 inches, similar to Bobrick 5806.
 - 3) GB-3: 18 inches, similar to Bobrick 5806.
- C. Wall Hook: Heavy-duty stainless steel, single-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.
 - 1. Product: B-682 manufactured by Bobrick.
- D. Diaper Changing Station: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.
 - 1. Style: Horizontal.
 - 2. Material: Polyethylene.
 - 3. Mounting: Surface.
 - 4. Color: Gray.
 - 5. Minimum Rated Load: 250 lbs.
 - 6. Manufacturers:
 - a. American Specialties, Inc : www.americanspecialties.com.
 - b. Bradley Corporation : www.bradleycorp.com.
 - c. Koala Kare Products : www.koalabear.com.

2.06 CUSTODIAL ROOM ACCESSORIES

- A. Combination Utility Shelf, Mop and Broom Holder: 0.05 inch thick stainless steel, type 304 with 1/2 inch returned edges, 0.06 steel wall brackets.
 - 1. Drying Rod: Stainless steel 1/4 inch diameter.
 - 2. Hooks: Quantity of 4. Size: 0.06 inch stainless steel rag hooks.
 - 3. Mop/Broom Holders: 3 spring loaded rubber holders.
 - 4. Length: 34 inches.
 - 5. Manufacturer and Model: B-239 by Bobrick.

2.07 SHOWER AND TUB ACCESSORIES

- A. Shower Curtain Rod: Stainless steel tube, 1 inch outside diameter, 0.04 inch wall thickness, satin-finished, with 3 inch outside diameter unless otherwise indicated, minimum 0.04 inch thick satin-finished stainless steel flanges, for installation with exposed fasteners.
 - 1. Product: B-6107 manufactured by Bobrick.
 - 2. Length: 36 inches.
- B. Folding Shower Seat: Wall-mounted surface; seat frame, structural support members, hinges and mechanical fasteners of Type 304 stainless steel, L-shaped seat.
 - 1. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of color as selected.
 - 2. Size: ADA compliant.
- C. Wall-Mounted Soap Dish: Heavy duty, seamless stainless steel, surface-mounted with drain holes, without grab bar, satin finish; with concealed mechanical fastening suitable for substrate and backplate.
- D. Robe Hook: Heavy-duty stainless steel, single-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.
 - 1. Product: B-6827 manufactured by Bobrick.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on the drawings.
- B. Install Owner furnished items as recommended by manufacturer and as indicated.
- C. Install plumb and level, securely and rigidly anchored to substrate, in locations indicated on drawings.
- D. Mounting Heights: As indicated on drawings and required by accessibility regulations, unless otherwise indicated.
- E. Mounting Heights and Locations: As required by accessibility regulations, as indicated on drawings, and as follows:

3.04 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

3.05 INSTALLATION OF OWNER-FURNISHED ACCESSORIES

- A. Install the following accessories provided by Owner:
 - 1. Electric hand drier; surface-mount. Provide electrical connection.
 - 2. Paper towel dispenser; surface-mounted.
 - 3. Toilet Paper dispenser; surface-mounted.
 - 4. Soap dispenser, surface-mounted.
 - 5. Toilet seat cover dispenser, surface-mounted.

END OF SECTION

SECTION 10 4400
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.

1.02 REFERENCE STANDARDS

- A. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.

1.03 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate cabinet physical dimensions.
- C. Product Data: Provide extinguisher operational features.
- D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

1.04 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Ansul, a Tyco Business; Cleanguard: www.ansul.com.
 - 2. Pyro-Chem, a Tyco Business; Product ____: www.pyrochem.com.
 - 3. JL Industries, Inc: www.jlindustries.com
 - 4. Larsen's Manufacturing Co: www.larsensmfg.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Fire Extinguishers, Cabinets and Accessories:
 - 1. Ansul, a Tyco Business; Product ____: www.ansul.com.
 - 2. JL Industries, Inc: www.jlindustries.com.
 - 3. Larsen's Manufacturing Co: www.larsensmfg.com.
 - 4. Potter-Roemer: www.potterroemer.com.
 - 5. Pyro-Chem, a Tyco Business; Product ____: www.pyrochem.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 - 1. Provide extinguisher in each cabinet and elsewhere where shown on Drawings.
- B. Multi-Purpose Dry Chemical Type Fire Extinguishers: Heavy duty steel tank, with pressure gage.
 - 1. UL Class: A:B:C.
 - a. 4-A:60B:C, 10 pound (Similar to JL "Cosmic 10E").
 - 2. Finish: Factory powder-coated; Red.
 - 3. Contents: Fluidized and siliconized mono ammonium phosphate powder; nonconductive and nontoxic

2.03 FIRE EXTINGUISHER CABINETS

- A. Similar to JL Industries Cosmopolitan C1837V17.
- B. Cabinet Configuration: Semi-recessed and surface type.
 - 1. Sized to accommodate extinguisher and accessories.

2. Trim: Returned to wall surface, with 2-1/2 inch projection, 1-3/4 inch wide face.
- C. Tub: Primed sheet steel, powder-coated finish.
- D. Door: 0.036 inch thick stainless steel reinforced for flatness and rigidity; latch. Hinge doors for 180 degree opening with continuous piano hinge. Provide nylon catch.
- E. Door Glazing: Glass, clear, 1/8 inch thick tempered. Set in resilient channel gasket glazing.
- F. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.
- G. Weld, fill, and grind components smooth.
- H. Finish of Cabinet Exterior Trim and Door: No. 4.
- I. Finish of Cabinet Interior: White enamel.
- J. Locations: Where Recessed and Surface mounting are indicated.

2.04 FIRE DEPARTMENT LOCK BOX

- A. Manufacturer:
 1. Supra Company, Salem Oregon, 800-547-0252, or approved.
 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. "Supra-Safe" recessed mounted type at building walls, surface mount type elsewhere.
- C. Key to master key system of fire department having jurisdiction at building site.
- D. Mount 60 inches above finished floor or walking surface, where directed by Architect.
- E. Extent of Work, Provide lock boxes at the following locations:
 1. Main entrance doors, east side of doors, 6 feet above ground.
 2. West courtyard utility gate, mount to fence post.
 3. East courtyard utility gate, mount to fence post.
 4. Utility courtyard personnel gate, mount to concrete masonry wall.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level in wall openings, maximum 54 inches from finished floor to inside top of cabinet.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets.

3.03 FIELD QUALITY CONTROL

- A. Ensure that each extinguisher is fully charged, and that inspection of each extinguisher has been performed, as evidenced by the National Association of Fire Equipment Distributors certification tag, just prior to turnover.

END OF SECTION

SECTION 10 5100

LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal lockers.

1.02 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.

1.03 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on locker construction, sizes and accessories.
- C. Shop Drawings: Indicate locker plan layout, numbering plan and combination lock code.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Lockers:
 - 1. Hadrian:
 - 2. Lyon Workspace Products: www.lyonworkspace.com.
 - 3. Penco Products, Inc: www.pencoproducts.com.
 - 4. Republic Storage Systems Co: www.republicstorage.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LOCKER APPLICATIONS

- A. Locker Type A: Two tier metal lockers, free-standing for base indicated on drawings.
 - 1. Width: 12 inches.
 - 2. Depth: 18 inches.
 - 3. Height: 36 inches each locker for a total height of 72 inches.
 - 4. Fittings: Hat shelf, 2 coat hooks.
 - 5. Locking: Padlock hasps, for padlocks provided by Owner.
 - 6. Provide sloped top.

2.03 METAL LOCKERS

- A. Lockers: Factory assembled, made of formed sheet steel, ASTM A653/A653M SS Grade 33/230, with G60/Z180 coating, stretcher leveled; metal edges finished smooth without burrs; baked enamel finished inside and out.
 - 1. Where ends or sides are exposed, provide flush panel closures.
 - 2. Provide filler strips where indicated, securely attached to lockers.
 - 3. Color: To be selected by Architect; allow for 2 different colors; see Color Schedule.
- B. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.
 - 1. Body and Shelves: 24 gage, 0.0239 inch.
 - 2. Base: 20 gage, 0.036 inch.
 - 3. Metal Base Height: 4 inch.
- C. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.
 - 1. Door Frame: 16 gage, 0.0598 inch, minimum.
- D. Doors: Hollow channel edge construction, 1-3/16 inch thick; welded construction, channel reinforced top and bottom with intermediate stiffener ribs, grind and finish edges smooth.
 - 1. Door Outer Face: 18 gage, 0.0478 inch, minimum.

2. Door Inner Face: 20 gage, 0.0359 inch, minimum.
 3. Form recess for ADA-compliant operating handle and locking device.
 4. Provide louvers in door face, top and bottom, for ventilation.
- E. Hinges: Two for doors under 42 inches high; three for doors over 42 inches high; weld securely to locker body and door.
1. Hinge Thickness: 14 gage, 0.0747 inch.
- F. Sloped Top, where indicated: 20 gage, 0.036 inch, with closed ends.
- G. Trim: 20 gage, 0.0359 inch.
- H. Coat Hooks: Stainless steel or zinc-plated steel.
- I. Number Plates: Provide rectangular shaped aluminum plates. Form numbers 1/2 inch high of block font style , in contrasting color.
- J. Provide ADA signage at lockers designated as accessible.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared bases are in correct position and configuration.
- B. Verify bases and embedded anchors are properly sized.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install lockers plumb and square.
- C. Place and secure on prepared base.
- D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lb.
- E. Bolt adjoining locker units together to provide rigid installation.
- F. Install end panels, filler panels, and sloped tops.
- G. Install accessories.
- H. Replace components that do not operate smoothly.

3.03 CLEANING

- A. Clean locker interiors and exterior surfaces.

END OF SECTION

SECTION 10 7500
FLAGPOLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum Flagpoles.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete base and foundation construction.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2013.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pole, accessories, and configurations.
- C. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads.
- D. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules and other relevant instructions.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Design flagpole foundation under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed the State in which the Project is located.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Flagpoles:
 - 1. American Flagpole: www.americanflagpole.com.
 - 2. Bollander and Sons.
 - 3. Concord Industries, Inc: www.concordindustries.com.
 - 4. Pole-Tech Co., Inc: www.poletech.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FLAGPOLES

- A. Flagpoles: Aluminum.
 - 1. Design: Cone tapered.
 - 2. Mounting: Ground mounted type.
 - 3. Outside Butt Diameter: As required to accommodate a 4 x 6 foot flag flying in 90 mph wind at nominal height listed below without failure. 6 inches minimum.
 - 4. Outside Tip Diameter: 3.5 inches inches.
 - 5. Nominal Wall Thickness: As required to accommodate a 4 x 6 foot flag flying in 90 mph wind at nominal height listed below without failure.
 - 6. Nominal Height: 30 ft; measured from nominal ground elevation.
 - 7. Halyard: Interior type .
- B. Performance Requirements:
 - 1. Flagpole With Flag Flying: Resistant without permanent deformation to 90 miles/hr wind velocity; non-resonant, safety design factor of 2.5.

2.03 POLE MATERIALS

- A. Aluminum: ASTM B221 (ASTM B 221M), 6063 alloy, T6 temper.

2.04 ACCESSORIES

- A. Finial Ball: Aluminum, 6 inch diameter.
- B. Truck Assembly: Cast aluminum; revolving, stainless steel ball bearings, non-fouling.
- C. Halyard: 5/16 inch diameter stainless steel aircraft cable.

2.05 OPERATORS

2.06 MOUNTING COMPONENTS

- A. Foundation Tube Sleeve: AASHTO M 36M, corrugated 16 gage steel, galvanized, depth per manufacturer recommendations.
- B. Pole Base Attachment: Flush; steel base with base cover.
- C. Lighting Ground Rod: 48 inch long copper rod, 3/4 inch diameter.
- D. Lightning Ground Cable: Copper No. 6 AWG, soft drawn.

2.07 FINISHING

- A. Concealed Steel Surfaces: Galvanized to ASTM A123/A123M requirements.
- B. Aluminum: Mill finish.
- C. Finial: Spun finish.

PART 3 EXECUTION

3.01 PREPARATION

- A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

3.02 INSTALLATION

- A. Install flagpole, base assembly, and fittings in accordance with manufacturer's instructions.
- B. Electrically ground flagpole installation.
- C. Fill foundation tube sleeve with concrete specified in Section 03 3000.
- D. Install foundation plate and centering wedges for flagpoles base set in concrete base and fasten.

3.03 TOLERANCES

- A. Maximum Variation From Plumb: 1 inch.

3.04 ADJUSTING

- A. Adjust operating devices so that halyard and flag function smoothly.

END OF SECTION

SECTION 11 40 00

FOOD SERVICE EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES: Foodservice Equipment

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 0 and Division 1 Specification Sections apply to this Section.

1.02 RELATED SECTIONS

- A. Refer to General Conditions, Supplementary Conditions, and applicable provisions of Division 1 for additional instructions as may be applicable.
- B. Refer to Divisions 5, 6, and 9 - Interior Design; for applicable provisions and sections regarding interior design finish, applications, details, and special instructions relating to items specified in this Section. Kitchen Equipment Contractor (KEC) shall be responsible for obtaining these Sections and any associated drawings, and coordinating the pertinent information contained in them, with the applicable manufacturers and fabricators.
- C. Refer to Division 23 - Mechanical; for applicable provisions and sections regarding mechanical services, including, but not limited to, rough-ins, grease traps, steam traps, drain traps, atmospheric vents, valves, pipes and pipe fittings, ductwork, and other materials necessary to complete final connections to individual items as specified in this Section; not work of this Section.
- D. Refer to Division 26 - Electrical; for applicable provisions and sections regarding electrical services, including, but not limited to, rough-ins, wiring, disconnects and other materials necessary to complete final connections to individual items as specified in this Section; not work of this Section.
- E. Work included in other Sections - Provision of all wall, floor, and/or ceiling/roof openings, recesses, sleeves, and/or conduits; and equipment pads, as required for installation of items included in this section. Also sealing of these openings, recesses, sleeves, etc., after installation of the equipment items, as required. Not work of this Section.
- F. Work included in other Sections - Disconnection of existing equipment to be relocated and/or reused; and disconnection and removal of existing equipment which will not be reused, shall be as determined and designated by the Halliday Associates, Inc (HAI) in other Sections; not work of this Section. (Applicable to Projects with existing equipment.)

1.03 SYSTEM DESCRIPTION

- A. Delegated Design: Design walk-in cold storage rooms and seismic restraint of equipment, including comprehensive engineering analysis by a qualified professional engineer licensed by the State of Oregon, using performance requirements and design criteria indicated.
- B. Fabricated Equipment: Constructed to configuration, dimension, detail and design as shown with materials and workmanship as specified.
- C. Manufactured Equipment: Mass produced and referenced by manufacturer's name and model number.

- D. Each model number includes the code *H011 as a suffix. This code is known as the Specified Identification System. It is not to be removed by the bidders. Its purpose is to identify the specified to the vendors providing equipment in the event it is necessary to communicate questions, clarifications, and comments, from prior to bid award through the final purchase. It is to be used on all correspondence including fax and e-mail when communicating with manufacturer representatives and factories.

1.04 DEFINITIONS:

- A. Furnish - Supply and deliver to Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- B. Install (set in place) - Work at Project Site including actual unloading, unpacking, assembly, erecting, rigging, placing, anchoring, applying, finishing, curing, protecting, cleaning, and similar operations; ready for final utility connections by other Sections as appropriate.
- C. Coordinate – Relay requested information, by other trades, which is required to ensure the other trades correctly perform their work related to the food service or laundry equipment installation
- D. Provide - Furnish and install complete, ready for intended use.
- E. Kitchen Equipment Contractor (KEC) - All references to the Kitchen Equipment Contractor (KEC) in this Section 114000 shall refer to the Kitchen Equipment Contractor (KEC). Reference to any other Contractor, shall be specific; such as General Contractor, Plumbing Contractor, Electrical Contractor, Architect designated, etc.

1.05 LAWS, ORDINANCES AND STANDARDS:

- A. STANDARDS: Except as otherwise indicated, comply with the following standards as applicable to the manufacture, fabrication, and installation of the work of this Section:
 - 1. Air Conditioning and Refrigeration Institute (A.R.I.): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration system(s), components and installation.
 - 2. American National Standards Institute (A.N.S.I.): Comply with A.N.S.I. Z21-Series standards for gas-burning equipment, and provide labels indicating name of testing agency.
 - 3. American National Standards Institute (A.N.S.I.): Comply with A.N.S.I. B57.1 for compressed gas cylinder connections, and with applicable standards of the Compressed Gas Association for compressed gas piping.
 - 4. American National Standards Institute (A.N.S.I.): Comply with A.N.S.I. A40.4 and A40.6 for water connection air gaps and vacuum breakers.
 - 5. American Society of Heating, Refrigeration and Air Conditioning Engineers (A.S.H.R.A.E.): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration system(s), components and installation.
 - 6. American Society for Testing and Materials (A.S.T.M.): Comply with A.S.T.M. C1036 for flat glass.
 - 7. American Society for Testing and Materials (A.S.T.M.): Comply with A.S.T.M. C1048 for heat-treated flat glass – Kind HS, Kind FT coated and uncoated glass.
 - 8. American Welding Society (A.W.S.): Comply with A.W.S. D1 .1 structural welding code.

9. National Electric Code (N.E.C.): Comply with N.F.P.A. Volume 5 for electrical wiring and devices included with foodservice equipment, A.N.S.I. C2 and C73, and applicable N.E.M.A. and N.E.C.A. standards.
10. National Electrical Manufacturers Association (N.E.M.A.): Comply with N.E.M.A. LD3 for high-pressure decorative laminates.
11. National Sanitation Foundation (N.S.F.): Comply with the latest Standards and Revisions established by N.S.F. for equipment and installation. Provide N.S.F. Seal of Approval on each applicable manufactured item, and on items of custom fabricated work. (UL Sanitation approval and seal may be accepted if acceptable to local code jurisdictions.)
12. Sheet Metal and Air Conditioning Kitchen Equipment Contractor (KEC)'s National Association (S.M.A.C.N.A.): Comply with the latest edition of S.M.A.C.N.A. guidelines for seismic restraint of kitchen equipment, and the applicable local regulatory agencies requirements.
13. Underwriters Laboratories (U.L.): For electrical components and assemblies provide either U.L. labeled products or, where no labeling service is available, "recognized markings" to indicate listing in the UL "Recognized Component Index". (Canadian Standards Association or alternate testing lab's seals may be accepted if acceptable to local code jurisdictions.)
14. American with Disabilities Act (ADA): Comply with requirements, as applicable to this Project.
15. Refrigeration Service Engineers Society (R.S.E.S.): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration system(s), components and installation; and the 1995 requirements of the Montreal Protocol Agreement.
16. All refrigerants used for any purpose shall comply with the 1995 requirements of the Montreal Protocol Agreement, and subsequent revisions and amendments. No CFC refrigerants shall be allowed on this Project.
17. All refrigeration components installation, repairs, and/or associated work on any refrigeration system, self-contained or remote, shall be performed by a Certified Refrigeration Mechanic.
18. Confirm all drawings, specifications, and project documentation meet all federal, state, and local codes and regulations.

1.06 KITCHEN EQUIPMENT CONTRACTOR (KEC) QUALIFICATIONS:

- A. In addition to requirements of Related Paragraphs 1.02. A, submit evidence of compliance with the following qualifications and conditions.
 1. Five (5) years minimum continuous operation under the same company name and ownership.
 2. Evidence of Company financial stability, and financial ability to complete this Project without endangering that stability.
 3. List a minimum of comparable size and scope projects completed in the last five (5) years, with Owner's contact name and telephone number.
 4. Have manufacturer's authorization to purchase, distribute, and install all items specified with this Project.

5. Maintain a staff or have access to personnel with a minimum of five (5) years experience in the installation of comparable size and scope projects, and meeting NSF standards and requirements. (UL Sanitation standards and requirements may be accepted if acceptable to local code jurisdictions.)
6. Maintain or have access to a fabrication shop meeting NSF standards and labeling requirements. (UL Sanitation approval and seal may be accepted if acceptable to local code jurisdictions.) If other than the Kitchen Equipment Contractor (KEC)'s own fabrication shop, they shall have five (5) years minimum experience in the fabrication of comparable size, scope, and level of quality projects; and the Kitchen Equipment Contractor (KEC) shall submit their company name and credentials to the Architect, which shall have the right of approval or disapproval
7. Maintain a staff or have access to personnel experienced in the preparation of professional style shop drawings and submittals.
8. Maintain or have access to manufacturer's authorized service personnel together with readily available stock of repair and replacement parts.
9. Any sub-Kitchen Equipment Contractor employed by Kitchen Equipment Contractor (KEC), for this Project, shall comply with the same qualification requirements.

1.07 SUBSTITUTIONS:

- A. Follow requirement of Section 016000 – Product Requirements.
- B. Submit itemized bids for the specific manufacturer and model specified. Any substitutions submitted shall be itemized at the end of the bid proposal as an "add" or "deduct" amount.
- C. All substitutions and request for substitutions shall comply with conditions and requirements as stated in article 1.08.
- D. If custom fabricated items are submitted and accepted as a substitute to standard manufactured items, these items shall be manufactured to NSF standards and meet the specifications of the specified manufactured items, and in general, the fabrication sections which follows.

1.08 APPROVED SUBSTITUTIONS AND/OR LISTED ALTERNATES:

- A. Substitutions approved as noted in article 1.07, and/or any Listed Alternate Manufacturers listed in these Itemized Specifications, or added by Addendum, may be utilized, in lieu of the primary specified manufacturer with the following conditions and understanding.
 1. The Project Documents are designed and engineered using the primary specified manufacturer and model. The Kitchen Equipment Contractor (KEC) shall assume total responsibility for any deviations required, due to the utilization of a substitution/alternate manufacturer or model; including, but not limited to, fitting alternates into the available space, providing directions for required changes, and assuming any and all associated costs for utility, building, food service design, architectural, or engineering changes directly or indirectly related to the substitution.

2. The Kitchen Equipment Contractor (KEC) shall be responsible for supplying the model, which is equal to the primary specified model in regards to general function, features, options, sizes, accessories, utility requirements, finish, operation, and listing approvals. If it is determined by the Owner or their appointed representative at any time during the construction and installation, and prior to the final acceptance of the Project, that the substitution/alternate model submitted is not equal to the primary specified model, the Kitchen Equipment Contractor (KEC) shall assume all associated cost and implications required to replace the model submitted, with the correct model.
3. The bid proposal shall clearly state any substitutions/alternates, which will be utilized including the manufacturer and model number. The proposal shall also include a data sheet for each substitution/alternate, with any and all deviations between the primary specified manufacturer and the substitution/alternate manufacturer, itemized and listed on the data sheet. Submittal of the manufacturers' cut sheets only shall not be acceptable as the data sheet. Complex alternates such as utility distribution systems, exhaust hoods, ventilators, etc. shall include a shop drawing specific to the Project.
4. Inclusion of an alternate manufacturer in the Itemized Specifications is not intended to indicate that there is an equal alternate unit to match every primary specified unit. It shall be the responsibility of the Kitchen Equipment Contractor (KEC) to insure that the alternate unit submitted matches the primary specified unit; and meets the other conditions, as stated above.
5. Manufacturers not approved as substitutions, or listed as a Listed Alternate will not be permitted, unless submitted for prior approval, as described above and in the General and Supplementary Conditions, and applicable Division-1 Specifications Sections.
6. Submittal of a substitution/alternate manufacturer or model shall indicate agreement to the above stated conditions. Solely at the Owner's discretion, failure to comply with any of these conditions, or to supply complete and correct data information, shall result in the Kitchen Equipment Contractor (KEC) being required to provide the primary specified manufacturer, at no additional cost to the Owner; or to adjust the Contract cost.

1.09 DISCREPANCIES:

- A. Where discrepancies are discovered between the drawings and the specifications, regarding quality or quantity, the higher quality or the greater quantity shall be included in the Bid Proposal. Notify Halliday Associates, Inc (HAI), in writing, of any discrepancies discovered; and await clarification prior to proceeding with the items or areas in question.

1.10 SUBMITTALS:

- A. Comply with Section 013000 – Submittal Procedures.
- B. The Kitchen Equipment Contractor (KEC) shall review all submittals for basic compliance with the Contract Documents, and correct as required; prior to submitting to the Architect for review.
- C. Kitchen Equipment Contractor (KEC)'s use of any Design Team's AutoCAD contract drawing(s) for basis of producing their submittals, shall be with the following conditions and understanding:
 1. Kitchen Equipment Contractor (KEC) assumes total liability and responsibility for accuracy, and for conformance and verification with Architectural, Food Service and Engineering drawings, actual field conditions, and all equipment provided.

2. Kitchen Equipment Contractor (KEC) further assumes responsibility for coordination of their submittals with those of other Contractors and Sub- Contractors, as required.
 3. Submittal(s) shall have Kitchen Equipment Contractor (KEC)'s title block and information
 4. AutoCAD drawing(s) obtained from the Design Team, or from an alternative source, may require payment of a fee for their use, signing of an Agreement or Release Form, or written permission. Contact Team member responsible for producing desired contract drawing(s).
 5. Failure to comply with any of these conditions could result in rejection of the submittal(s), and possible legal action.
- D. Rough-In Drawings:
1. Submit one (1) set in reproducible transparency form for approval. After approval, reproduce and supply the required number of distribution prints for record and construction purposes.
 2. Submit 1/4 inch (1:50) scale rough-in drawings for approval. These drawings shall be dimensioned from grid lines; showing location of ducts, stubs, floor and wall sleeves, for ventilation, plumbing, steam, electrical, refrigeration lines, beverage lines, concrete base and curb dimensions as required for equipment so supported.
 3. Site-verify mechanical, electrical and ventilating rough-in and sleeve locations.
 4. The Kitchen Equipment Contractor (KEC) shall be responsible for the accuracy of the information on their submittals.
 5. In the event rough-ins have been accomplished before award of this contract, the Kitchen Equipment Contractor (KEC) shall check the existing facility and make adjustments to their equipment to suit building conditions and utilities, where possible. If not possible, so state in a letter with reasons, and an alternate method and pricing, to the Owner and Halliday Associates, Inc (HAI).
- E. Shop Drawings:
1. Submit one (1) set in reproducible transparency form for approval. After approval, reproduce and supply the required number of distribution prints for record and construction purposes.
 2. Submit shop drawings for items of custom fabrication included in this contract. Shop drawings shall be submitted at 3/4 inch (1:20) and/or 1-1/2 inch (1:10) scale and shall show dimensions, materials, details of construction, features and options, installation and relation of adjoining work requiring cutting or close fitting. Shop drawings shall also indicate reinforcements, anchorage and related work required for the complete installation of fixtures.
 3. Before proceeding with the fabrication of any item, the Kitchen Equipment Contractor (KEC) shall be responsible for verifying and coordinating all dimensions and details, with site dimensions and conditions.

F. Product Data Submittal Manuals:

1. Submit six (6) bound sets of Product Data Submittal Manuals with a cover sheet and detailed information on every item included in this Section. Detailed information shall include, but not be limited to, item number, description, quantity, model numbers, options and accessories provided, exact utility requirements, manufacturer's cut-sheets, reference to specific shop drawings, and etc. Distribute one additional copy of installation and start-up instructions to the Installer. Mark each data sheet with the applicable project equipment item number. Each data sheet to include N.E.M.A. plug and receptacle configuration for applicable items, where applicable. Every cover sheet and associated detailed submittal shall provide sufficient and complete information to verify that the Kitchen Equipment Contractor (KEC) is providing each item in compliance with the Contract documents.

1.11 OPERATION AND MAINTENANCE DATA MANUALS:

- A. Comply with Section 017823 – Operations and Maintenance Data Manuals
- B. Operation And Maintenance Manuals (Service And Parts Manuals): Three (3) bound sets of manuals shall be furnished for items of standard manufacture on/or before the date of the first event to occur of the following: demo/start-up, start-up for intended use by the Owner/Operator, completion of installation of kitchen equipment contract package, or final acceptance of installation by Owner. Manuals to be in alphabetical order according to manufacturer, include item numbers and include utility option provided of the equipment installed.
- C. Service Agency List: Submit, with the service and parts manuals, a complete list of local service agencies for included manufacturers, complete with telephone numbers for all buy-out equipment installed.
- D. Provide video tapes for maintenance, training, operation, etc where available from the manufacturer.

1.12 AS-BUILT/ RECORD DOCUMENTS:

- A. Comply with Section 017839 – Project Record Documents.
- B. Maintain one record set of Foodservice Equipment Plans with any related corrections, revisions, additions, deletions, changes, etc. noted during construction and installation. Provide an "as-built" set in reproducible transparency form and electronic computer disk form.
- C. Provide one (1) final set of Product Data Submittal Manual with any related corrections, revisions, additions, deletions, changes, etc. noted during construction and installation as a specifications record set.
- D. These documents shall be provided on/or before the date of the first event to occur of the following: demo/start-up, start-up for intended use by the Owner/Operator, completion of installation of kitchen equipment contract package, or final acceptance of installation by Owner.
- E. Provide one (1) final complete set of Submittals to be retained by Halliday Associates, Inc (HAI) as a Record Set.

1.13 SCHEDULE:

- A. General: Time is of the essence in this agreement and acceptance constitutes a guarantee that the Kitchen Equipment Contractor (KEC) can and will obtain materials, equipment and manpower, upon notice to proceed, to permit overall completion of the entire building project on schedule. The Kitchen Equipment Contractor (KEC) shall coordinate their work with the progress schedule, as prepared and updated periodically by the General Kitchen Equipment Contractor (KEC) or Construction Manager.
- B. Anticipated delays, not within the realm of control of the Kitchen Equipment Contractor (KEC), shall be noted in a written notification to the Foodservice Consultant and the Architect, immediately upon the Kitchen Equipment Contractor (KEC)'s realization that delays are imminent.
- C. Failure of manufacturers to meet promised delivery dates will not grant relief to the Kitchen Equipment Contractor (KEC) for failure to meet schedules; unless the Kitchen Equipment Contractor (KEC) can establish, in writing, that orders were received by the manufacturer, with reasonable lead times.
- D. Extra charges resulting from special handling or air shipment in order to meet the schedule will be paid by the Kitchen Equipment Contractor (KEC) if insufficient time was allowed in placing factory orders.

1.14 PRODUCT HANDLING:

- A. Delivery Of Materials: Deliver materials (except bulk materials) in manufacturer's containers fully identified with manufacturer's name, trade name, type, class, grade, size, color, power requirement, if any and item number.
- B. Storage of Materials, Equipment and Fixtures: Kitchen Equipment Contractor (KEC) is responsible for receiving and warehousing of equipment and fixtures, until ready for installation. Store materials, equipment and fixtures in sealed containers. Store off the ground and under cover, protected from damage.
- C. Handling Materials and Equipment: Verify and coordinate conditions at the building site, particularly door and/or wall openings, and passages, to assure access for all equipment. Pieces too bulky for existing facilities shall be hoisted or otherwise handled with apparatus as required. All special handling equipment charges shall be arranged for and paid for by the Kitchen Equipment Contractor (KEC).

1.15 PRODUCT PROTECTION:

- A. The Kitchen Equipment Contractor (KEC) is responsible, during the progress of the project, to protect their equipment against theft or damage, until final acceptance by the Owner. Items delivered to the job site at the Owner's or Contract Manager's request before the site is ready for installation; should be signed for, as delivered by the Owner or Contract Manager.
- B. Use all means reasonable to protect the materials of this Section before, during, and after installation; and to protect the associated work and materials of the other trades.

- C. Pre-fabricated walk-in boxes, on-site and installed in advance of the rest of the equipment, are not to be available for or used as general storage by other trades; and should be locked before leaving the site. Damage and theft resulting from the failure to secure boxes shall be repaired or replaced at Kitchen Equipment Contractor (KEC)'s own expense. Kitchen Equipment Contractor (KEC) to be available as required to open and secure walk-in boxes as needed for the other trades to perform their work related to these walk-in boxes, with-in the other trades schedules, as not to delay the other trades work.
- D. Kitchen Equipment Contractor (KEC) to verify if the flooring is to be acid washed. In the event of this type of cleansing, do not deliver any equipment constructed of stainless steel until a minimum of 24 hours after the final cleansing is completed.

1.16 WARRANTY:

- A. Unless otherwise noted in Related Article 1 .02.A, items furnished shall be fully guaranteed against defects in workmanship and material(s) for 2 years from date of final acceptance of school board. Should a Temporary Certificate of Occupancy be issued for partial completion of work, the items furnished within that designated area shall be under warranty from the date of issue of that Certificate. The Kitchen Equipment Contractor (KEC) or their service agent will make repairs and replacements without charge to the Owner, and within a reasonable time.
- B. Additional Warranty: Refrigeration systems shall include start-up and one-year service and maintenance contract, in addition to the regular one-year warranty as stated above; plus additional four-year warranty on sealed portions of condensing units, including refrigerant lost. This shall include all refrigerators, ice cream makers and cabinets, ice makers, freezers, dispensers, walk-in coolers/freezers compressors, and/or any other items with refrigeration system(s).

PART 2 PRODUCTS

2.01 EQUIPMENT:

- A. Equipment schedule: Refer to schedule on Foodservice Drawings and Part 5 Itemized Specifications for equipment included in this Section.

2.02 MATERIALS:

- A. Metals:
 - 1. Stainless Steel: AISI Type 302/304, hardest workable temper, and No.4 directional polish. Standard gauges are noted in these specifications under Heading 2.04; Section B.1.
 - 2. Galvanized Steel Sheet: ASTM A526, except ASTM A527 for extensive forming; ASTM A525, G90 zinc coating, chemical treatment.
Note: Where painted finish is indicated, provide mill phosphatized treatment in lieu of chemical treatment.
 - 3. Steel Sheet: ASTM A569 hot-rolled carbon steel.
 - 4. Galvanized Steel Pipe: ASTM A53 or ASTM A1 20, welded or seamless, schedule 40, galvanized.
 - 5. Steel Structural Members: Hot rolled or cold formed, carbon steel unless stainless steel is indicated.
Note: Galvanized Finish (G.I.): ASTM A123 hot-dipped zinc coating, applied after fabrication.

6. Aluminum: ASTM B209B221 sheet, plate and extrusions (as indicated); alloy, temper and finish as determined by manufacture / fabricator, except 0.40-mil natural anodized finish on exposed work unless another finish is indicated.
- B. Plastic Laminate: NEMA LD3, Type 2, 0.050" thick, except Type 3, 0.042" for post-forming smooth (non-textured). Color and texture as selected by the Architect/ Interior Designer.
1. Comply with N.S.F. Standard No. 35.
 2. Veneered with approved waterproof and heat proof cement. Rubber base adhesives are not acceptable.
 3. Applied directly over close grained plywood, such as solid Mahogany or solid Birch, of selected, smooth, sanded stock to ensure a smooth ripple-free laminated surface; or commercial grade furniture particle board, Cortron or equal.
 4. If specified plywood or particle board is unavailable, submit specifications and sample of alternate material for approval. If specified for a "wet" area, only marine grade wood products will be approved for these areas.
 5. Exposed faces and edges shall be faced with 1/16 inch (1 .6mm) thick material. Corresponding backs are to be covered with approved backing and balancing sheet material. No unfinished exposed plywood/particle board will be acceptable
- C. Hardwood Work Surfaces: Laminated edge grained hard maple (*Acer saccharum*), NHLA First Grade with knots, holes and other blemishes culled out, kiln dried at 8 percent or less moisture, waterproof glue, machined, sanded, and finished with N.S.F. approved oil-sealer.
- D. Solid Surface Material (SSM): Unless otherwise specified, provide 1/2" thick 100% homogeneous filled acrylic material meeting ANSI Z124.6 Type 6, as manufactured by DuPont Company and known as Corian. Color(s) and pattern(s) as selected by the Architect/ Interior Designer.
1. Comply with N.S.F. Standard No. 51.
 2. Acrylic adhesive shall be used for all joints.
 3. Install directly over 3/4" thick (minimum) substrate of close grained plywood, such as solid Mahogany or solid Birch, of selected, smooth, sanded stock to ensure a smooth ripple-free surface; or commercial grade furniture particle board, Cortron or equal. Additional bracing and support shall be provided as required by the SSM manufacturer.
 4. Fabrication shall be by a fabricator trained by DuPont factory authorized training personnel and Certified as a Commercial Conan Fabricator.
 5. Installation shall be by an installer trained by DuPont factory authorized training personnel and Certified as a Commercial Corian Installer.
 6. All fabrication and installation of Corian, and all components attached to or installed in or through Corian shall be in compliance with manufacturer's instructions and the DuPont Corian Food Service Guidelines and Design Manual. Of particular concern shall be the sections, details, and instructions on the installation of drop-in or built-in hot or cold components.
 7. All other Solid Surface Material (SSM), which may be specified by others to be used in food service areas, must comply with NSF certification and ANSI Standard No. 51.

E. Insulation:

1. For low temperature applications, such as ice bins, cold pans, or fabricated under counter freezers, use urethane, rigid board foam or foamed-in-place; not less than 2 inches (50mm) thick, except that vertical surfaces of cold pans and ice bins may be 1 inch (25mm) thick. Insulation shall be bonded at joints, to prevent condensation on exterior.
2. For refrigerated applications such as fabricated under counter refrigerators, use urethane rigid board foam or foamed-in-place, or Styrofoam rigid board foam 2 inches (50mm) thick, bonded at joints.
3. For heated type applications, such as plate warmers, use block type rock wool, minimum 1 inch (25mm) thick:
4. At counter tops, subject to heat from cooking equipment and refrigeration compressors, use 1 inch (25mm) thick B&Z Products (1-800-999-0890) Marinite I, or equal, to insulate underside of top.
5. Marinite material shall be added between freezer or refrigerator, and 14 gauge (2.0) stainless steel top.
6. All insulation shall be fully encased or enclosed.

F. Joint Materials:

1. Sealants: 1-part or 2-part, polyurethane or silicone based, liquid elastomeric sealant, non-solvent release type, Shore A hardness of 30, except 45 if subject to traffic. Sealants shall be N.S.F. Listed for use in food zones. Installation shall comply with applicable requirements of N.S.F. Standards.
2. Backer Rod: For 3/8 inch or larger joints, shall be polyurethane rod stock, larger than joint width.
3. Gaskets: Solid or hollow (but not cellular) neoprene or polyvinyl chloride; light grey, minimum of 40 Shore A hardness, self-adhesive or prepared for either adhesive application or mechanical anchorage.

G. Paint and Coatings:

1. Provide the types of painting and coating materials which, after drying or curing, are suitable for use in conjunction with foodservice, and which are durable, non-toxic, non-dusting, non-flaking, mildew resistant, and comply with governing regulations for foodservice.
2. Galvanize Repair Paint: MIL-P-21035.
3. Sound Deadener: NSF listed sound deaden material such as latex sound deadener, for internal surfaces of metal work, and underside of metal counters and tables between work top and underbracing.
4. Pretreatment: SSPC-PT2 or PT3, of FS TT-C490.
5. Primer Coating for Metal: FS TT-P-86, type suitable for baking, where indicated.
6. Enamel for Metal: Synthetic type, FA TT-P-491, type suitable for baking, where indicated.

2.03 FABRICATED PRODUCTS:

A. Hardware:

1. General: Manufacturer's standard, but not less than ANSI 156.9 Type 2 (Institutional), satin finish stainless steel or dull chrome finish on brass, bronze, or steel.

2. Hinged Door Hardware: Hinged doors shall be mounted with heavy duty N.S.F. approved hinges with Component Hardware Group, Model No. P62-1010 pulls, or equal. Catches shall be heavy-duty magnetic type, except as otherwise indicated.
 3. Drawer Hardware: Slides to be 200 pounds minimum capacity per pair, 300 series stainless steel, full extension, side-mounting, self-closing type, with stainless steel ball bearings and positive stops; Component Hardware Group Series S52, or equal. Pulls shall be Component Hardware Group, Model No. P62-1 012, or equal.
 4. Sliding Door Hardware: Sliding doors shall be mounted on large, quiet ball bearing rollers in 14-gauge (2.0mm) stainless steel overhead tracks, and be removable without the use of tools. Bottom of cabinet shall have stainless steel guide-pins and not channel tracks for doors.
 5. All hardware shall be identified with manufacturer's name and number, so that broken or worn parts may be replaced.
- B. Casters:
1. Type and size as recommended by caster manufacturer, N.S.F. approved for the type and weight of equipment supported; but not less than 5 inch (127mm) diameter heavy-duty, ball bearing, solid or disc wheel with non-marking grease proof rubber, neoprene or polyurethane tire; unless otherwise specified. Minimum width of tread shall be 1-3/16 inch (30mm). Minimum capacity per caster shall be 250 pound (113.4kg), unless otherwise noted in itemized specifications.
 2. Solid material wheels to be provided with stainless steel rotating wheel guard.
 3. To be sanitary, have sealed wheel and swivel bearings and polished plated finish per N.S.F.
 4. Unless otherwise indicated, equip each item with two (2) swivel-type casters and two (2) fixed casters. Provide foot brakes on two (2) casters on opposite front corners of equipment.
 5. Unless equipment item is equipped with another form of all-around protective bumper, provide circular rotating bumper above each caster, 5 inch (127mm) diameter tire of light grey synthetic rubber (hollow or closed-cell) on cadmium-plated disc.
- C. Plumbing Fittings, Trim and Accessories:
1. General: Where exposed or semi-exposed, provide bright chrome plated brass or polished stainless steel units. Provide copper or brass where not exposed.
 2. Vacuum Breakers: Provide with foodservice equipment as listed in the itemized specifications.
 3. Water Outlets: At sinks and at other locations where water is supplied (by manual, automatic or remote control), furnish commercial quality faucets, valves, dispensers or fill devices, of the type and size indicated, and as required to operate as indicated.
 4. Waste Fittings: Except as otherwise indicated, furnish 2 inch (50mm) remote-lever waste valve, and 3-1/2 inch (89mm) strainer basket.

D. Electrical Materials:

1. General: Provide standard materials, devices and components as recommended by the manufacturer or fabricator, selected and installed in accordance with N.E.M.A. standards and recommendations; and as required for safe and efficient use and operation of the foodservice equipment, without objectionable noise, vibration and sanitation problems.
2. Before ordering equipment, confirm with the serving electrical utility, pertinent electrical requirements, such as actual voltages available, number of phases and number of wires in the system.
3. Electrical work for fabricated equipment shall be completely wired to a junction or pull box, wholly accessible, mounted on the equipment. Wiring shall be labeled for outlet or item served. Verify local requirements for U.L. Listing on complete assembly, and provide if required.
4. Components shall bear the U.L. label or be approved by the prevailing authority.
5. Custom fabricated refrigerator units shall be provided with vapor tight light receptacles, shatterproof lamps and automatic switches. Wiring shall be concealed.
6. Controls and Signals: Provide recognized commercial grade signals, on-off push buttons or switches, and other speed and temperature controls as required for operation; complete with pilot lights and permanent signs and graphics to assist the user of each item. Provide stainless steel cover plates at control and signal electrical boxes. Controls and switches are to be located out of heat zones, easily accessible, and in locations that preclude accidental contact by employees.
7. Internal Wiring of Fixtures and Equipment:
 - a. The Kitchen Equipment Contractor (KEC) shall be responsible for internal wiring of electrical devices, built into or forming an integral part of fabricated equipment items. Wiring to be in metal conduit, to an accessible pull-box or j-box, and tagged for intended use. Refer to Section 16 Specifications for color coding of wiring.
 - b. Each standard item shipped in sections, shall be properly connected internally and verified by the Kitchen Equipment Contractor (KEC).
 - c. Furnish dish washers and conveyors internally wired to junction box or distribution panel as specified; including push button switches, motors, immersion heaters, solenoids, etc.
 - d. Where light fixtures are specified or detailed as part of counters, cases or fixtures; light fixtures, lamps and shields shall be furnished and installed. Warm white lamps shall be provided, unless otherwise specified. If fluorescent light fixtures are specified, ballasts shall be provided and shields shall be included. Shields shall be provided for all light fixtures.
 - e. Wiring for built-in strip heaters or immersion-type elements shall be provided as follows:
 - 1) In heat zone: shall have U.L. approved insulation and be not less than 300-volt rated heat resistant insulation with nickel wire.
 - 2) Connection wiring extended in raceway or conduit to junction or pull box, shall be not less than 600 volt rated heat resistant insulation covered wire, U.L. approved, or equal

- f. Wiring for fabricated refrigerator and freezer cabinets shall be U.L. approved, insulated, cable; from exterior junction box to internal components, within insulation, unless code requires metallic conduit:
 - 1) Conduit shall be Electrical Metallic Tubing, rigid or flexible (Greenfield). For freezer applications, Seal-Tite Flex or approved equal shall be used.
 - 2) Internal wiring shall be U.L. approved rubber covered 600 volt rated conductor, except door heaters, which shall be Nichrome wire with silicone braided jacket, having resistance of 10.4 watts per lineal foot.
 - 3) Convenience outlets, lighting receptacles, (rubber or porcelain) and door switches, shall be mounted in approved boxes. Convenience outlets for evaporators shall be twist lock type. Solid connections, as for freezer evaporators, shall be made vapor tight.
 - g. Exposed flexible steel conduit on kitchen equipment shall be neoprene jacketed Seal-Tite conduit equal to Anaconda type "UA". U.L. approved, complete with approved liquid tight connectors on each end; designed to provide electrical grounding continuity.
 - h. Exposed electrical conduit used in kitchen wet area applications, except for flexible connections, shall be rigid galvanized steel. Thin wall conduit (EMT) shall not be permitted for wet areas. Exposed outlet boxes shall be liquid tight type, with threaded hubs.
8. Convenience and Power Outlets:
- a. Make cutouts and install appropriate boxes or outlets in fabricated fixtures, complete with wiring, conduit, outlet and stainless steel cover plate.
 - b. Outlets and plugs shall conform to N.E.M.A. standards.
 - c. Electrical outlets and devices shall be first quality "Specification Grade".
 - d. GFCI outlets shall be furnished where adjacent to sink compartments, as per the National Electrical Code.
9. Plugs and Cords: Where cords and plugs are provided, they shall comply with National Electrical Manufacturer's Association (N.E. M .A.) requirements. Indicate N.E.M.A. configuration for each applicable item.
10. Heating Equipment:
- a. Electric and heating equipment shall be so installed as to be readily cleanable or removable for cleaning.
 - b. Steam heated custom fabricated equipment shall be a self-contained assembly, complete with control valves located in an accessible position.
11. Motors: Totally enclosed type, except drip-proof type where not exposed to a dust or moisture condition; ball bearings, except sleeve bearings on small timing motors; windings impregnated to resist moisture; horse-power and duty-cycle ratings as required for the service indicated.
12. Power Characteristics: Refer to Section 16 Specifications for project power characteristics. Also, refer to individual equipment requirements, for loads and ratings.

2.04 FABRICATION OF METAL WORK:

A. General Fabrication Requirements:

1. Remove burrs from sheared edges of metalwork, ease the corners and smooth to eliminate cutting hazard. Bend sheets of metal, at not less than the minimum radius required to avoid grain separation in the metal. Maintain flat, smooth surfaces, without damage to finish.
2. Reinforce metal at locations of hardware, anchorages and accessory attachments wherever metal is less than 14 gauge (2.0mm), or requires mortised application. Conceal reinforcements to the greatest extent possible. Weld in place, on concealed faces.
3. Exposed screws or bolt heads, rivets and butt joints made by riveting straps under seams and then filled with solder, will not be accepted. Where fasteners are permitted, provide Phillips head, flat or oval head machine screws. Cap threads with acorn nuts, unless fully concealed in inaccessible construction; and provide nuts and lock washers unless metal for tapping is at least 12 gauge (2.5mm). Match fastener head finish with finish of metal fastened.
4. Where components of fabricated metal work are indicated to be galvanized, and involve welding or machining of metal heavier than 16 gauge (1.6mm), complete the fabrication and provide hot-dip galvanizing of each component, after fabrication, to the greatest extent possible (depending upon available dip-tank sizes). Comply with ASTM A123.
5. Welding and Soldering:
 - a. Materials 18-gauge (1.27mm), or heavier, shall be welded.
 - b. Seams and joints shall be shop welded or soldered as the nature of the material may require.
 - c. Welds must be ground smooth and polished to match original finish.
 - d. Where galvanizing has been burned off, the weld shall be cleaned and touched up with high grade aluminum paint.
6. Provide removable panels for access to mechanical and electrical service connections, which are concealed behind or within foodservice equipment, but only where access is not possible and not indicated through other work.
7. Closures: Where ends of fixtures, splash back's, shelves, etc., are open, fill by forming the metal, or welding sections, if necessary, to close entire opening flush to walls or adjoining fixtures.
8. Rolled Edges: Rolled edges shall be as detailed, with corners bull nose, ground and polished.
9. Coved Corners: Stainless steel foodservice equipment shall have 1/2 inch (13mm) or larger radius coves in horizontal and vertical corners, and intersections, per N.S.F. standards.

B. Metal and Gauges:

1. Except as otherwise indicated, fabricate exposed metalwork of stainless steel; and fabricate the following components from the gauge of metal indicated, and other components from not less than 20 gauge (0.8mm) metal:
 - a. Table and counter tops: 14 gauge.

- b. Sinks and drain boards: 14 gauge.
 - c. Shelves: 16 gauge.
 - d. Front drawer and door panels: 18 gauge (double pan construction).
 - e. Single pan doors and drawer fronts: 16 gauge.
 - f. Enclosed base cabinets: 18 gauge.
 - g. Enclosed wall cabinets: 18 gauge.
 - h. Exhaust hoods and ventilators: 18 gauge.
 - i. Pan-type insets and trays: 16 gauge.
 - j. Removable covers and panels: 18 gauge.
 - k. Skirts and enclosure panels: 18 gauge.
 - l. Closure and trim strips over 4" wide: 18 gauge.
 - m. Hardware reinforcement: 12 gauge.
 - n. Gusset plates: 10 gauge.
- C. Work-Surface Fabrication:
- 1. Fabricate metal work surfaces by forming and welding, to provide seamless construction; using welding rods matching sheet metal, grinding and polishing. Where necessary for disassembly, provide waterproof gasketed draw-type joints with concealed bolting.
 - 2. Reinforce work surfaces 30 inches on center both ways, with galvanized or stainless steel concealed structural members. Reinforce edges, which are not self-reinforced, by formed edges.
- D. Metal Top Construction:
- 1. Metal tops shall be one-piece welded construction, including field joints. Secure to a full perimeter galvanized steel channel frame cross-braced not farther than 2'-6" (760mm) on center. Fasten top with stud bolts or tack welds. If hat sections are used in lieu of channels, close ends.
 - 2. Properly designed draw fastening, trim strip, or commercial joint material to suit requirement shall be used, only if specified.
- E. Structural Framing:
- 1. Except as otherwise indicated, provide framing of minimum 1 inch (25mm) pipe-size round pipe or tube members, with mitered and welded joints and gusset plates, ground smooth. Provide 14 gauge (2.0mm) stainless steel tube for exposed framing, and galvanized steel pipe for concealed framing.
 - 2. Where indicated, flange rear and end edges up to form splashes integrally with top, with vertical and horizontal corners covered of not less than 1/4 inch (6mm) radius, die formed. Turn back splashes 1 inch to wall across top and ends with rounded edge on break, unless otherwise specified.
 - 3. For die-crimped edges, use inverted "V" 1/2 inch (13mm) deep inside and 2 inch (38mm) deep on outside, unless otherwise shown. For straight down flanges, make 1- 3/4 inch (45mm) deep on outside. For bull nose edges, roll down 1-3/4 inch (45mm).
 - 4. Edges: die-formed, integral with top. For rounded corners, form to 1 inch radius, weld, and polish to original finish.

- F. Field Joints: For any field joint required because of size of fixture; butt-joint, reinforce on underside with angles of same material, bolt together with non-corrosive bolts and nuts, field weld, grind and polish.
- G. Pipe Bases: Construct pipe bases of 1-5/8 inch (41mm) diameter 18 gauge (1.2mm) stainless steel tubing. Fit legs with polished stainless steel sanitary adjustable bullet feet to provide for adjustment of approximately 1-1/2 inch (38mm), without exposing threads. Space legs to provide ample support for tops, precluding any possibility of buckling or sagging and in no case more than 6'-0" centers.
- H. Legs and Cross-rails
 - 1. Equipment legs and cross rails shall be 1-5/8 inch (41mm), 16-gauge (1.59mm) stainless steel tubing.
 - 2. Welds at cross rails shall be continuous and ground smooth. Please note; tack welds are not acceptable.
 - 3. Bottom of legs shall be cambered inward and fitted with a stainless steel bullet-type foot with not less than 2 inch (50mm) adjustment. Flanged feet with bolt holes may be required dependent on design applications. Provide proper type feet in compliance with local codes. Stainless steel to be used in all applications.
 - 4. Free standing legs shall be pegged to floor with 1/4 inch (6mm) stainless steel rod.
 - 5. Components:
 - a. Stainless Steel Gusset: Stainless steel exterior to fit 1-5/8 inch (41mm) tubing, with Allen screw for fastening and adjustment. Not less than 3 inches (76mm) diameter at top and 3-3/4 inch (95mm) long. Outer shell 16-gauge (1.6mm) stainless steel, reinforced with 12-gauge (2.5mm) mild steel insert welded interior shell, or approved equal.
 - b. Stainless Steel Low Counter Legs: Stainless steel exterior 5-3/4 inch (146mm) minimum, 7 inch (178mm) maximum length with stainless steel 3- 1/2 inch (89mm) square plate with four counter-sunk holes, welded to top for fastening.
 - c. Stainless Steel Adjustable Foot: Stainless steel 1-1/2 inch (38mm) diameter tapered at bottom to 1 inch (25mm) diameter, fitted with threaded cold rolled rod for minimum 1-1/2 inch (38mm) diameter x 3/4 inch (19mm) threaded bushing plug welded to legs, or approved equal. Push-in foot not acceptable.
 - 6. Legs shall be fastened to equipment with gussets, as follows:
 - a. Sinks: Reinforced with bushings and set screw.
 - b. Metal Top Tables and Dish Tables: Welded to galvanized steel channels, 14- gauge (1.98mm) or heavier, anchored to top with screws through slotted holes.
 - c. Wood Top Tables: Welded to stainless steel channels, 14-gauge (1.98mm) or heavier, anchored to top with screws through slotted holes.
- I. Shelves:
 - 1. Construct solid shelves under pipe base tables of 16 gauge stainless steel, with 1-1/2 inch turned down and under edges on exposed sides, and 2 inch turn up against walls or equipment. Fully weld to pipe legs.
 - 2. In fixtures with enclosed bases, turn up shelves on back and sides with 1/4 inch (6mm) (minimum) radius and feather slightly to ensure a tight fit to enclosure panels.

J. Sinks:

1. Construct sinks of 14 gauge stainless steel with No.4 finish inside and outside.
2. Form back, bottom and front of one piece, with ends and partitions welded into place. Partitions: double thickness, 1 inch minimum space between walls. Multiple compartments shall be continuous on the exterior, without applied facing strips or panels.
3. Cove interior vertical and horizontal corners of each tub not less than 1/4 inch radius, die formed. Outer ends of drain boards to have roll rim risers not less than 3 inches high.
4. Drill faucet holes in splashes 2-1/2 inches below top edge. Verify center spacing with faucet specified.
5. Sink insets shall be deep drawn of 16-gauge (1 .59mm), or heavier, polished stainless steel. Weld into sink drain boards with 1-1/2 inch x 1-1/2 inch x 14 gauge stainless steel angle brackets; securely welded to sinks and galvanized cross angles spot welded to underside of drain boards to form an integral part of the installation.
6. The bottom of each compartment shall be creased such as to ensure complete drainage to waste opening. Slope bottom of sink bowls toward outlet.

K. Drains, Wastes and Faucets:

1. Furnish and install T&S Brass faucets model B-3940-01 stainless steel rotary drain assembly with connected overflow assembly, in die-drawn inset type sinks and bain-marie sinks.
2. Other custom fabricated sinks shall be furnished with T&S Brass faucets model B3940-01 stainless steel rotary drain assembly, with S/S cap nut over overflow outlet. Waste connection shall have 2 inch (50mm) external thread size, with 1-1/2 inch (38mm) internal thread size.
3. Rotary Handle: Of sufficient length to extend to front edge of sink. No riveting, screws or soldering permitted to fit drains to sinks, with all parts of drains easily removable for servicing and replacement. Rotary handle bracket to be provided as part of the sink fabrication.
4. Water pans for steam tables shall be fitted with 1 inch (25mm) drains with chrome-plated brass stand pipes.
5. All faucets furnished with equipment included in this Section shall be lead free and comply with NSF Standard #61, Section #9; such as manufactured by Fisher, Chicago, or T&S. Where the itemized specifications list a faucet by manufacturer and model, the Kitchen Equipment Contractor (KEC) shall verify that the listed faucet complies with this requirement.
6. If the listed faucet does not comply, the Kitchen Equipment Contractor (KEC) shall submit similar model which does comply, from the same manufacturer where available or from one of the above manufacturers.

L. Workmanship:

1. Best quality in the trade. Field verify dimensions before fabricating; conform all items to dimensions of building; neatly fit around pipes, offsets and other obstructions.
2. Fabricate only in accordance with approved shop drawings, showing pipes, obstructions to be built around, and location of utilities and services.

M. Enclosures:

1. Provide enclosures, including panels, housings, and skirts for service lines, operating components and mechanical and electrical devices associated with the foodservice equipment, except as specifically indicated to be "open".
2. Where equipment is exposed to customer view, provide enclosure of service lines, operating components and mechanical and electrical devices.

N. Casework:

1. Enclosure: except as otherwise indicated, provide each unit of casework (base, wall, overhead and free-standing) with a complete-enclosure metal cabinet, including fronts, backs, tops, bottoms, and sides.
2. Bases shall be made of 18-gauge (1.27mm) stainless steel sheets reinforced by forming the metal.
3. Ends, partitions and shelves are stainless steel.
4. Unexposed backs and structural members are galvanized.
5. Vertical ends and partitions are single wall, with a 2 inch (50mm) face.
6. Sides and through partitions are flush with bottom rail, welded at intersections.
7. Shelves: Provide adjustable standards for positioning and support of shelves in casework; except bottom shelf of cabinet mounted on legs or as specified. Turn back of shelf units up 2 inches, and hem. Turn other edges down to form open channel. Reinforce shelf units to support 40 pounds per square foot loading, plus 100 percent impact loading.
8. Bottom front rail of bases set on masonry platform shall be continuously closed and sealed to platform.

O. Doors:

1. Metal doors shall be double-cased stainless steel. Outer pans shall be 18-gauge (1.27mm) stainless steel with corners welded, ground smooth and polished. Inner pan shall be 20-gauge (.95mm) stainless steel fitted tightly into outer pan with a sound-deadening material such as Celotex or Styrofoam used as a core. The two pans shall be tack welded together and joints solder filled. Doors shall finish approximately 3/4 inch (19mm) thick, and be fitted with flush recessed type stainless steel door pulls.
2. Wood doors shall be fabricated as detailed. If Formica or other plastic surfaces are used, sides and backs must be laminated.
3. Hinged doors shall be mounted on heavy-duty N.S.F. approved hinges, or as noted on plans or specifications.

P. Drawer Assemblies:

1. Assemblies shall consist of removable drawer body mounted in a ball bearing slide assembly with fully enclosed housing.
2. Slide assembly consists of one pair of 200 pound stainless steel roller bearing extension slides, with side and back enclosure panels, front spacer angle, two drawer carrier angles, secured to slides and stainless steel front.
3. Drawer bodies for general storage are to be 20 inches x 20 inches (508mm x 508mm), with 18 gauge stainless steel containers.

4. Drawers intended to hold food products shall be removable type with 12 x 20 (305mm x 508mm) stainless steel food pans, in a stainless steel assembly.
 5. Drawer fronts are double cased, 3/4 inch (19mm) thick, with 18 gauge (1.27mm) stainless steel welded and polished front pan. Steel back pan is tightly fitted and tack welded. Sound deaden with rigid insulation material.
 6. Provide drawers with replaceable soft neoprene bumpers or for refrigerated drawers, a full perimeter soft gasket.
- Q. Closed Base: Where casework is indicated to be located on a raised-floor base, prepare casework for support without legs, and for anchorage and sealant application, as required for a completely enclosed and concealed base.
- R. Support from Floor: Equip floor supported mobile units with casters, and equip items indicated as roll-out units, with manufacturer's standard one-directional rollers. Otherwise, and except for closed-base units, provide pipe or tube legs, with adjustable bullet-design feet for floor supported items of fabricated metalwork. Provide 1-1/2 inch adjustment of feet (concealed threading).
- S. Shop Painting:
1. Clean and prepare metal surfaces to be painted; remove rust and dirt. Apply treatment to zinc coated surfaces, which have not been mill phosphatized. Coat welded and abraded areas of zinc coated surfaces, with galvanize repair paint.
 2. Apply 1.5 mil (dry film thickness) metal primer coating, followed by 2, 1.0 mil (dry film thickness) metal enamel finish coatings.
 3. Bake primer and finish coatings in accordance with paint manufacturer's instructions for a baked enamel finish.
- T. Sound Deadening:
1. Sound deaden underside of metal tops, drain boards, under shelves, cabinet interior shelves, etc., above the underbracing/reinforcing/framing only.

2.05 FILTER EXHAUST HOODS, WATER WASH VENTILATOR FABRICATION AND ULTRAVIOLET:

- A. Filter Exhaust Hoods:
1. 18 Gauge type 304 stainless steel external welded construction, in accordance with the latest edition of N.F.P.A. No.96, including all applicable appendices. Exposed welds to be ground and polished.
 2. Grease Removal: U.L. classified, non-adjustable, stainless steel grease filters, with drip-channel gutters, drains and collection basins.
 3. Light Fixtures: Furnish type of fixture specified. Fixtures shall be U.L. listed for hoods, N.S.F. approved, with sealed safety lenses, with stainless steel exposed conduit for wiring.
 4. Exhaust Duct: Furnish welded stainless steel formed duct collars at ceiling or wall duct connections, where exposed. Furnish exposed to view ductwork as specified. Verify size and location of duct connections required in this contract, before fabrication. Other ductwork will be by the Mechanical Section.
 5. Fire Extinguishing System: Pre-piped liquid chemical or water fire suppressant system, as specified; complying with applicable local and N.F.P.A. regulations. Wet chemical fire suppression systems shall comply with UL 300 Standards.

B. Water Wash Ventilator:

1. 18 Gauge type 304 stainless steel external welded construction, in accordance with the latest edition of N.F.P.A. No.96, including all applicable appendices. Exposed welds to be ground and polished.
2. Control panel shall be of same manufacture as ventilator, with time clock control for automatic operation. Provide stainless steel trim strips for recessed control cabinet applications. Provide stainless steel chase for surface mounted control panel, from top of panel to ceiling, full width and depth of panel.
3. Light Fixtures: Furnish type of fixture specified. Fixtures shall be U.L. listed for hoods, N.S.F. approved, with sealed safety lenses, with stainless steel exposed conduit for wiring.
4. Exhaust Duct: Furnish welded stainless steel formed duct collars at ceiling or wall duct connections. Verify size and location of duct connections required in this contract, before fabrication. Other ductwork will be by the Mechanical Section.
5. Fire Extinguishing System: Pre-piped liquid chemical or water fire suppressant system, as specified; complying with applicable local and N.F.P.A. regulations. Wet chemical fire suppression systems shall comply with UL 300 Standards.

C. Ultra-Violet Component Grease Elimination Hood:

1. If applicable for this project, refer to Hood Manufacture's Drawings in the Food Service Design Issue of Construction Set, FS-8 sequence.

2.06 REFRIGERATION EQUIPMENT:

A. General:

1. Furnish either single or multiple compressor units, as specified or recommended by the manufacturer for the sizes and variations between connected evaporator loads as indicated.
2. Furnish units of the capacities indicated, arranged to respond to multiple-evaporator thermostats and defrosting timers. Include coils, receivers, compressors, motors, motor starters, mounting bases, vibration isolation units, fans, dryers, valves, piping, insulation, gauges, winter control equipment and complete automatic control system.
3. Refrigerant: Pre-charge units with type or types recommended by manufacturer for services indicated, with quick-disconnect type connections where specified, ready to receive refrigerant piping runs to evaporators and (where remote) to condensers. All refrigerant and associated components shall comply with the requirements of the Montreal Protocol Agreement. No CFC refrigerants or associated components shall be allowed on this Project. HFC refrigerants and components shall be used where available. HCFC refrigerants and components, with a minimum 2010 phase-out date, and intermediate replacement refrigerants are to be used only when HFC refrigerants are not available. Kitchen Equipment Contractor (KEC) shall be responsible for coordinating with manufacturers. Provide refrigerant leak monitoring devices where required by federal, state, or local codes.

4. The minimum outdoor operating ambient temperature for design of units is -10 degrees Fahrenheit, or as applicable for extreme low local conditions. The maximum indoor design temperature for operation of compressor units is 95 degrees Fahrenheit. The maximum outdoor ambient design temperature shall be determined with prevailing conditions at mounting location(s) of compressor(s), such as sun exposure, limited ventilation, high fences/walls, roof color and materials, local climatic extremes, etc.; but in no case shall it be less than 100 degrees Fahrenheit.
 5. Refrigerant charge is to be based on manufacture and industry standards. Refrigeration Contractor is responsible for correct refrigerant charge during the first year of operation.
- B. Components:
1. Coils: Coils for fabricated refrigerators shall have vinyl plastic coatings, stainless steel housings; and shall be installed in such a manner as to be replaceable.
 2. Expansion Valves: Remote refrigeration system shall be complete with thermostatic expansion valves at the evaporator.
 3. Thermometers:
 - a. Fabricated refrigerated compartments to be fitted minimally with a flush dial thermometers, with chrome plated bezels and to be provided as specified.
 - b. Thermometers shall be adjustable, and shall be calibrated after installation.
 - c. Thermometers shall have an accuracy of ± 2 degrees Fahrenheit (1 degree Centigrade).
 4. Hardware:
 - a. Refrigerator hardware for fabricated refrigerator compartments shall be heavy-duty components.
 - b. Self closing hinges.
 - c. Latches to be magnetic edge mount type, unless specified or detailed otherwise.
 5. Locks:
 - a. Doors and drawers for walk-in coolers/freezers, and reach-in refrigerated compartments, both fabricated and standard, shall be fitted with cylinder locking type latches, and provided with master keys.
- C. Cold Pans: Ice pans, refrigerated pans and cabinets shall be provided with breaker strips, where adjoining top or cabinet face materials, to prevent transfer of cold.
- D. All open top mechanically cooled custom fabricated or standard buy-out refrigerators and/or cold pans shall comply with NSF Standard #7 requirements, as of April 1, 1998. The Kitchen Equipment Contractor (KEC) shall verify that the specified unit complies with this requirement; or shall submit a similar model, which does comply, from the same manufacturer where available.
- E. Ventilation of Refrigerated Equipment:
1. Adequate ventilation shall be provided for custom fabricated equipment with integral refrigeration condensing units, both built-in and drop-in. If flow through ventilation cannot be provided, provide flow direction partitions and an additional fan capable of cooling the condensing unit.

2. If, in the opinion of the Kitchen Equipment Contractor (KEC), additional room ventilation is required to ensure correct operating temperatures of standard buy-out, custom fabricated, or remote refrigeration condensing units, or compressor rack assemblies, they shall so state in a letter to the Architect and Theodore Barber & Company, Inc., for evaluation and direction.

2.07 MISCELLANEOUS MATERIALS:

- A. Nameplates: Whenever possible, locate nameplates and labels on manufactured items, in accessible position, but not within customer's normal view. Do not apply name-plates or labels on custom fabricated work, except as required for compliance with governing regulations, insurance requirements, or operator performance.
- B. Manufactured Equipment Items: Furnish items as scheduled or herein specified. Verify dimensions, spaces, rough-in and service requirements, and electrical characteristics, before ordering. Provide trim, accessories and miscellaneous items for complete installation.
- C. Insert Pans:
 1. General: Cut-outs, openings, drawers, or equipment specified or detailed to hold stainless steel insert pans shall be provided with a full complement of pans as follows:
 - a. One (1) stainless steel, 20-gauge (0.95mm) minimum, solid insert pan for each space, sized per plans, details, or specifications.
 - b. Where pan sizes are not indicated in plans, details, or specifications, provide one full-size pan for each opening.
 - c. Provide maximum depth pan to suit application and space.
 2. Provide 18-gauge (1.27mm) removable stainless steel adapter bars where applicable.
 3. All cut-outs and openings, or equipment specified or detailed to hold stainless steel insert pans, shall be provided with a hinged stainless steel removable night cover.
- D. Tray Slides: Before fabrication of counters with tray slides, verify:
 1. Size and shape of tray. Edge of tray shall not overhang outer support/slider by more than 2". If edge of tray exceeds this dimension, notify Architect and Halliday Associates, Inc (HAI), in writing, for evaluation and adjustment, if necessary.
 2. Configuration of corners, turns, and shape of tray slides for proper support and safe guidance of trays.
 3. Tray slide capable of supporting 200 pounds per linear foot, live load.
- E. Self-leveling dispensers: Verify type and make of ware, dimensions and weight; request samples from Operator and submit to the dispenser manufacturer, for proper sizing and calibration of dispensers.
- F. Carbon dioxide (co') equipment: Where equipment requires connection with compressed co' cylinder for operation, provide proper sized cylinder manifold and control system (integral with equipment) with proper connectors for Department of Transportation (DOT) approved type cylinders, complete with cylinder safety devices and supports.
- G. Reasonable quietness of operation of equipment is a requirement, and the Kitchen Equipment Contractor will be required to replace or repair any equipment producing out-of-the-ordinary intolerable noise. This also includes providing and installing bumpers and gaskets for doors and drawers on fabricated and standard manufactured items and sound insulation where feasible.

2.08 ITEMIZED SPECIFICATIONS

- A. Refer to the following pages for specific specification information on each item included in this Section.

Item 1 AIR CURTAIN: 1 REQUIRED

- A. Berner, model KZN1048-SS *H011 with stainless steel exterior.

Item 2 NOT USED

Item 3 NOT USED

Item 4 JANITOR SINK: 1 REQUIRED

- A. Specified by Plumbing Division.

Item 5 STAFF LOCKERS (HALF SIZE): 1 LOT REQUIRED

- A. Specified by Architectural Division.

Item 6 CORNER/CHANNEL GUARDS: 1 LOT REQUIRED

- A. Fabricate as detailed and construct corner and channel guards of one piece all welded 14 gauge stainless steel. Install in locations shown on Sheet FS101 and per elevations and details sheets. Install with stainless steel screws.
- B. Seal guards to walls and at joints as required.

Item 7 WALK-IN COLD STORAGE ROOMS: 2 REQUIRED

- A. Imperial Manufacturing, modular sandwich panel design Foam-A-Lite cold storage rooms complete in configuration shown on Sheet FS101. Each room shall incorporate the following:
1. Provide one each cooler and freezer walk-in doors and door frames 36 inch x 78 inch stainless steel inside and out with 14 inch x 14 inch insulated glass window (heated for freezer) and 36" high 1/8" polished aluminum diamond treadplate interior and exterior kick plates. Doors hinged as shown on plan. Include Kason #944 deadbolt mortise locksets with interior safety releases, Kason #1229 chrome pull handles, Kason #1094000013 concealed mounting door closers, and Kason #1248 chrome spring assisted hinges. Hinge doors as shown on plans.
 2. Provide 36" high 1/8" polished aluminum diamond treadplate wainscot on exposed exterior face of walk-in cooler.
 3. Exposed exterior, closure panels, and trim strips to adjacent walls and ceiling shall be 20 gauge stainless steel finish. Exposed interior shall be .040 stucco embossed aluminum except ceiling which shall be .040 aluminum with baked white acrylic finish. Unexposed surfaces shall be 26 gauge galvanized steel.
 4. Finished exterior height of 8 foot-4 inches. Interior height of rooms shall be 8 foot-0 inches. All wall and ceiling insulation shall be 4 inch thick foamed in place, Class 1, urethane insulation.. See Sheet FS201 for depression details.
 5. Install surface mounted 4-1/2 inch diameter dial thermometer above each door.
 6. Heated vacuum vent for freezer.
 7. Provide 3/8 inch diameter nylon coil hangers mounted on 3 inch x 3 inch aluminum plates with nuts and retainers to support evaporator hung from ceiling panel.
 8. Furnish penetrations to accommodate all electrical, plumbing, and refrigeration lines. Furnish stainless steel escutcheons.

9. Provide Kason 1810 LED cooler and freezer ceiling light fixtures as noted on Sheet FS104 (two lights per room). Field connections under Division 26. Include lamps.
 10. Provide Kason, model 1908-603 press type switches mounted inside and outside of each room as indicated on electrical plan.
 11. All electrical conduit shall be run concealed within the walk-in walls or above the ceiling panels (coordinate with electrician).
 12. Install in floor depression complete with 6" Class 1 R-Max thermal insulation board and vapor barrier of 15 lb. felt protective slip sheet applied over insulation and flashed up height of cove and joints lapped 6" minimum.
 13. Refer to Architectural Room Finish Schedule for cooler/freezer wearing floor and base material inside and out by Division 9.
 14. Temperature monitor/alarm system provided with Beacon System under Item 8.
- B. Walk-ins shall comply with current state energy codes.
- C. Walk-ins shall be installed by this manufacturer or this manufacturer's certified installer only and must have a minimum 5 years' experience installing Imperial walk-ins.
- D. Walk-in doors are to be secured in the "open" position until the concrete sub-floor cures and until manufacturer states that it is safe to close. Oxidized panels will be replaced at the Contractors' expense.

Item 8 REFRIGERATION SYSTEMS: 2 REQUIRED

- A. System A: Cooler @ +35°F to +40°F
1. Evaporator: Larkin LCA672-ABEC-B; 7,200 BTU at 20°F suction temperature. Include expansion valve, drier strainer, liquid line solenoid, and room thermostat.
 2. Condensing Unit: Larkin LHS008X6B; 7,450 BTU at 90° ambient air temperature. Include crank case heater.
- B. System B: Freezer @ -10°F to +0°F
1. Evaporator: Larkin LCE676BBEC-B; 7,600 BTU at -15°F suction temperature. Include expansion valve, drier-strainer, liquid line solenoid, room thermostat, and electric defrost system.
 2. Condensing Unit: Larkin LHS014L6C; 7,830 BTU at +90°F ambient air temperature. Include crank case heater.
- C. Each system shall incorporate the following:
1. Flexible vibration eliminator in suction line.
 2. Circuit breaker, automatic starting switch, motor protectors and pressure limit switch, all enclosed with interconnecting wire installed in a junction box ready for line connections.
 3. Liquid line dehydrator filter of ample capacity.
 4. Suction line filter of ample capacity.
 5. Thermal expansion valve for evaporator.
 6. Thermostat set to cut-in at -3°F and cut-out at -6°F for freezer. Cut-in at +38°F and cut-out at +34°F for refrigerator.
 7. Suction pressure regulator.

8. Crank case heaters.
 9. Refrigerant Lines: Hard copper type "L" with "Silfos" brazed joints. Use refrigeration service tubing.
 10. Full charge refrigerant and oil.
 11. Condensing units are located outside in the Service Yard as shown on Sheet FS101. Verify exact location with Architectural plans. Raised curb specified by architectural division.
 12. Provide all welded weather-proof rack to all for stacked condensing units. Include means to anchor the rack to the concrete pad. Submit details for approval.
- D. Include Beacon Controller to monitor both refrigeration systems. Install at Kitchen Desk on wall.
 - E. Where refrigerant suction lines are trapped, use next size smaller pipe in vertical portion of the trap than that indicated so as to acquire sufficient gas velocity for proper oil return.
 - F. Provide anti-sweat pipe covering 3/4 inch Armstrong Armaflex or equivalent for suction lines from evaporator to condensing unit.
 - G. Provide painted 1 inch drain tubing from evaporator to nearest indirect drain as shown on Sheet FS102. Trap at outlet end.
 - H. Provide Raychem, model H611250 heating cable with H900 power connection to wrap all drain lines running through freezers.
 - I. Evaporators and condensing units as shown on the Contract Documents shall be installed under the supervision of a licensed Refrigeration Contractor subject to review by the Consultant.
 - J. Provide testing, charging, adjusting, operational testing, and cleaning of equipment and lines.

Item 9 WALK-IN COOLER SHELVING: 1 LOT REQUIRED

- A. InterMetro, Metroseal III *H011 Super Adjustable wire shelving. Shelf sections shall be four tier high using 74-5/8 inch high individual posts with adjustable feet, top caps, and joining clamps. Space shelves equally over plated posts with bottom shelf located 8 inches above finished floor. Install in configuration and sizes as shown on Sheet FS101.
- B. Include one 22" x 48" HP2248PD dunnage rack.
- C. Verify room size before ordering.

Item 10 WALK-IN FREEZER SHELVING: 1 LOT REQUIRED

- A. InterMetro, Metroseal III *H011 Super Adjustable wire shelving. Shelf sections shall be four tier high using 74-5/8 inch high individual posts with adjustable feet, top caps, and joining clamps. Space shelves equally over plated posts with bottom shelf located 8 inches above finished floor. Install in configuration and sizes as shown on Sheet FS101.
- B. Include one 22" x 48" HP2248PD dunnage rack.
- C. Verify room size before ordering.

Item 11 NOT USED

Item 12 NOT USED

Item 13 UTILITY CARTS: 2 REQUIRED

- A. Lakeside, model 243 *H011 with rotating bumpers.

Item 14 CAN RACK: 1 REQUIRED

- A. New Age, model 97294 *H011.

Item 15 DRY STORAGE SHELVING: 1 LOT REQUIRED

- A. InterMetro, Super Erecta Brite super adjustable shelving. Shelf sections shall be five tier high using individual posts with adjustable feet, top caps, and joining clamps equally spaced over 86-5/8 inch plated posts with bottom shelf located 8 inches above finished floor. Install in sizes and configuration as shown on Sheet FS101.
- B. Verify room size before ordering.

Item 16 30-QUART MIXER: 1 REQUIRED

- A. Hobart, model HL300 *H011.
- B. Bowl truck.

Item 17 SUPPORT WORK TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model WKS-8430-A6S *H011 fully welded table with the following accessories:
 - 1. One model SDAS-202006S stainless steel drawer assembly.
 - 2. Model TMSC-8414 cantilever shelf. Install with 18" clear to table top. Trim and seal openings in back splash.
- B. Install assembly complete

Item 18 MOBILE HEATED/PROOFING CABINETS: 3 REQUIRED

- A. Metro, model C599-SDS-U *H011 with perimeter bumper.

Item 19 CUBE ICE MACHINE: 1 REQUIRED

- A. Manitowoc, model IY-0324A *H011. Include model B-320 ice storage bin and Everpure, model InsurIce EV9324-01 single water filtration system.

Item 20 HAND WASHING SINKS: 2 REQUIRED

- A. Advance Tabco, model 7-PS-44 *H011 with model 7-PS-15 (12" high) welded stainless steel side shields.
- B. Seal to wall.
- C. Soap and paper towel dispensers furnished and installed by Owner.

Item 21 MOBILE WASTE RECEPTACLES: 6 REQUIRED

- A. Rubbermaid, model 2632 *H011. Include matching lid and #2640-43 *H011 dolly. Color: gray.

Item 22 VEGETABLE PREP SINK TABLE: 1 REQUIRED

- A. Pacific Stainless Products, model DCS-1824-14-B30L-B42R*H011 Spec Line fully welded custom sink table. Sink table shall incorporate the following:
 - 1. CHG Saniguard, model KN53-1000-BR spray rinse faucet with KN55-10 Adapta faucet. Include wall bracket. Install between sinks.
 - 2. Two Component Group, model DSS-8000 rotary waste assemblies with 14 gauge stainless steel lever waste brackets welded to underside of sink compartments.
 - 3. Model PRSTM-full length table mount potrack with shelf (stop shelf on each side of spray rinse). Trim and seal openings in backsplash.
 - 4. Sound deaden underside of top and sink compartments.

5. Under shelf below right drain board.

B. Install assembly complete. Clip and seal to wall.

Item 23 NOT USED

Item 24 NOT USED

Item 25 NOT USED

Item 26 WORK TABLE: 1 REQUIRED

A. Pacific Stainless Products, model WKS-9030-A6S *H011 fully welded table with the following accessories:

1. One model SDAS-202006S stainless steel drawer assembly.
2. Model TMSC-9014 cantilever shelf. Install with 18" clear to table top. Trim and seal openings in back splash.

B. Install assembly complete

Item 27 SHEET PAN RACKS: 2 REQUIRED

A. New Age, model 1331-PB *H011.

Item 28 CANOPY HOOD WITH FIRE PROTECTION SYSTEM: 1 REQUIRED

A. Gaylord, model ELX-GBD-A-AS-66 *H011, 11'-7-1/2" long x 2'-6" high 18 gauge stainless steel canopy hood. Refer to Factory File #14-0799. The hood shall incorporate the following:

1. U.L. listed damper assembly.
2. Flush LED light fixtures as shown on Gaylord factory drawings. Furnish and install lamps.
3. Model 150-LS light and fan on/off switch. Furnish loose for installation by Division 16.
4. Model TSC Auto-Start Controller.
5. Ansul Piranha-ASEF-T- N-F Wet Agent Fire Protection System furnished and installed by Gaylord. Install in accordance with NFPA bulletin 96, including all current amendments to protect this hood including surface protection as required. All piping and conduit shall be run concealed in walls or above ceiling, except where exposure is necessary for functional reasons. Exposed piping shall be chrome plated or run in stainless steel sleeves. Include reset relays and manual remote pull station. System shall connect to mechanical gas shut-off valve furnished loose by Gaylord. All contactors are furnished by the Electrical Division for shut down of electric supply to all equipment in the event of system activation. System control cabinet shall be installed in location shown.
6. Include 18 gauge stainless steel removable closure panels and trim as required to seal hood to ceiling and walls. Verify ceiling height. Submit shop drawings prior to fabrication.
7. Install hood with 80" clearance from finished floor.

B. Exhaust and supply duct work and fans furnished and installed by Division 23.

Item 29 STAINLESS STEEL WALL FLASHING: 1 LOT REQUIRED

- A. Fabricate 20 gauge stainless steel Number 4 finish wall flashing bonded to gypsum board with heat resistant mastic beginning directly above base tile on wall and terminating 2" above bottom edge of canopy hood. Flashing shall run full length of canopy hood and ends at wall returns.
- B. Install flashing with no exposed fasteners or screws in interlocking sections of equal lengths. Verify that surfaces are flat and smooth with a maximum variation of 1/16" in 10 feet.
- C. Install assembly complete.

Item 30 20-GALLON TILTING KETTLE: 1 REQUIRED

- A. Groen, model TDB-20 *H011 with the following accessories:
 - 1. Lift-off cover with storage hanging device. Mount on wall near kettle.
 - 2. Model TS/9S stainless steel stand with drain drawer.
 - 3. Hot and cold fill faucet with swing spout and mounting bracket.
 - 4. Food strainers.
 - 5. Lip strainer.
- B. Install assembly complete.

Item 31 CONVECTION STEAMER: 1 REQUIRED

- A. Groen, model SSB-3G/GF *H011 with the following accessories:
 - 1. Electronic Timer with Compensating Load Feature.
 - 2. Stainless steel support stand with pan rack kit.

Item 32 OPEN BURNER COOK TOP: 1 REQUIRED

- A. Garland, model MST4S-E *H011 with the following accessories:
 - 1. 48" gas quick disconnect assembly with cable restraint.
 - 2. Swivel casters; two with brakes.
 - 3. Rear gas connection.
 - 4. End caps and covers for gas manifold.
 - 5. T & S, model Posi-Set for rear casters.
- B. Install assembly complete.

Item 33 DOUBLE STACK COMBI-OVEN STEAMERS: 1 REQUIRED

- A. Alto-Shaam, two model 7-14ESG *H011 stacked steamers with the following accessories:
 - 1. Standard controls.
 - 2. Everpure Kleensteam water filtration system. Include two extra filter media per oven (turn over to Owner for inventory).
 - 3. Stacking Kit; stationary.
 - 4. Installation Kit.
 - 5. One extra probe per oven. Turn over to Owner for inventory.
- B. Install assembly complete.

Item 34 HOT FOOD SERVING STATIONS: 2 REQUIRED

- A. Low Temp Colorpoint, model EF4-CP4 *H011 with the following accessories:
 - 1. 34" counter top height.
 - 2. 32" tray slide height.
 - 3. Solid 'V' ridge stainless steel tray slides (double sided).
 - 4. BSI, model ZG9930 with lights full length food guard assembly with glass shelf.
 - 5. Plastic laminate faced base cabinet in color and pattern as selected by the Architect.
- B. Install assembly complete.

Item 35 FLAT TOP SERVING STATION: 1 REQUIRED

- A. Low Temp Colorpoint, model 36-ST *H011 with the following accessories:
 - 1. 34" counter top height.
 - 2. 32" tray slide height.
 - 3. Solid 'V' ridge stainless steel tray slides (double sided).
 - 4. BSI, model ZG9930 with lights full length food guard assembly with glass shelf.
 - 5. Plastic laminate faced base cabinet in color and pattern as selected by the Architect.
- B. Install assembly complete.

Item 36 NOT USED

Item 37 PORTABLE TRAFFIC CONTROL RAILINGS: 1 LOT REQUIRED

- A. Lawrence, model 889T2B *H011 double-tape TensaBarrier System consisting of the following:
 - 1. (8) universal posts (Black Wrinkle finish).
- B. Verify tape color with Owner.
- C. Refer to Sheet FS101 and install in configuration shown.

Item 38 MOBILE DOUBLE-SIDED MILK COOLERS: 1 REQUIRED

- A. True, model TMC-48-S-DS-SS *H011 with corner bumpers.

Item 39 MOBILE DOUBLE-SIDED REFRIGERATED SALAD BAR: 1 REQUIRED

- A. Low Temp Colorpoint, model 66-CFMX-EB *H011 with the following accessories:
 - 1. 34" counter top height.
 - 2. 32" tray slide height.
 - 3. Solid 'V' ridge stainless steel tray slides (double sided).
 - 4. Double sided BSI, model ZG9930-2 with lights full length food guard assembly with glass shelf.
 - 5. Plastic laminate faced base cabinet in color and pattern as selected by the Architect.
- B. Install assembly complete.

Item 40 MOBILE DOUBLE-SIDED FRUIT/VEGIE BAR: 1 REQUIRED

- A. Low Temp Colorpoint, model 66-CFMX-EB *H011 with the following accessories:
 - 1. 34" counter top height.
 - 2. 32" tray slide height.

3. Solid 'V' ridge stainless steel tray slides (double sided).
4. Double sided BSI, model ZG9930-2 with lights full length food guard assembly with glass shelf.
5. Plastic laminate faced base cabinet in color and pattern as selected by the Architect.

B. Install assembly complete.

Item 41 MOBILE DOUBLE-SIDED CASHIER COUNTER: 1 REQUIRED

A. Low Temp Colorpoint, model 28-CSE *H011 with the following accessories:

1. 36" counter top height.
2. 32" tray slide height.
3. Solid 'V' ridge stainless steel tray slides (double sided).
4. Stainless steel bottom shelf.
5. Plastic laminate faced base cabinet in color and pattern as selected by the Architect.
6. Locking cashier drawer.

B. Install assembly complete.

Item 42 POINT OF SALE SYSTEM: 1 REQUIRED

A. Owner furnished and installed.

Item 43 MOBILE POT AND PAN SHELVEING: 1 REQUIRED

A. InterMetro, model X556AGX2 *H011.

Item 44 CLEAN DISHTABLE WITH POTWASHING SINKS: 1 REQUIRED

A. Fabricate as detailed and construct top and back splash of one piece all welded 14 gauge stainless steel. Include an all welded integral stainless steel sinks as shown. Include 14 gauge stainless steel removable rack guides held in place with stainless steel pins at each sink. Reinforce underside of top with enclosed stainless steel hat sections. Sound deaden underside of top and mount on a stainless steel leg stand consisting of circular gussets, tubular legs, and adjustable bullet feet. Reinforce legs with 16 gauge stainless steel shelf and leg braces as shown. Dishtable shall incorporate the following:

1. One CHG Saniguard model KN54-8010-610 splash mount faucet between middle and 30" long sinks.
2. T & S, model MPZ-8WCN-06-Mini pre-rinse faucet. Include wall bracket. Install between center and 18" long sinks.
3. Three Component Group, model DSS-8000 rotary waste assemblies with 14 gauge stainless steel lever waste brackets welded to underside of sink compartments.
4. 16 Gauge stainless steel wall mount shelf as detailed. Install with 14 gauge stainless steel support brackets. Seal to wall.
5. Sound deaden underside of top and sink compartments.

B. Install assembly complete.

C. Clip and seal to walls.

Item 45 WAREWASHER VAPOR EXHAUST DUCTS: 2 REQUIRED

- A. Fabricate two 18 gauge stainless steel steam tight exhaust ducts as detailed and connect to stainless steel vent stacks furnished with Warewasher, Item 49. Extend each duct 4 inches above finished ceiling and trim with stainless steel at ceiling penetrations. Seal all gaps at trim.
- B. Exhaust fan furnished and installed under Division 23.

Item 46 WAREWASHER WITH BOOSTER HEATER: 1 REQUIRED

- A. Hobart, model CL44e-LR *H011 with electric tank heat for left to right operation. Include the following:
 - 1. Stainless steel vent hoods with vent stack and locking type damper.
 - 2. Single point electrical connection.
 - 3. Stainless steel pressure-less 30 KW booster heater.
 - 4. Table limit switch.
 - 5. 6 inch higher than standard chamber.
- B. Install assembly complete.

Item 47 HOSE REEL WITH RECESSED CONTROL CABINET: 1 REQUIRED

- A. Fisher, model 2984 *H011. Include model 1801 reel rinse control box assembly.
- B. KEC is to coordinate recess in wall with General Contractor for cabinet.
- C. Seal assembly to wall.

Item 48 WASTE COLLECTOR: 1 REQUIRED

- A. Salvajor, model S914 *H011 with the following accessories:
 - 1. Additional scrap basket.
- B. Install assembly complete in Item 49 Soiled Dishtable.

Item 49 SOILED DISHTABLE: 1 REQUIRED

- A. Fabricate as detailed and construct top and back splash of one piece all welded 14 gauge stainless steel. Include cut-out and weld-in Item 48 Waste Collector. Reinforce underside of top with enclosed stainless steel hat sections. Sound deaden underside of top and mount on a stainless steel leg stand consisting of circular gussets, tubular legs, and adjustable bullet feet. Reinforce legs with 16 gauge stainless steel shelf and leg braces as shown.
- B. Install assembly complete.
- C. Clip and seal to wall.

Item 50 MOBILE TRAY/TRASH/RECYCLING COUNTERS: 2 REQUIRED

- A. Fabricate as detailed and construct top of one piece all welded 14 gauge stainless steel. Reinforce underside of top and install on a cabinet base constructed of 3/4" marine grade plywood doors with all exposed and accessible surfaces faced with plastic laminate. Include the following:
 - 1. Provide openings in top for Owner furnished plastic bins. Verify size with Owner.
 - 2. Door Hardware: Blum Modul 90-170 hinges; Ives, model Number 2 latches; and Component Hardware, model P46-1012 satin finish stainless steel door pulls.
- B. Install cabinet on 6" high all swivel casters; front two with brakes.

PART 3 EXECUTION

3.01 SUPERVISION:

- A. A competent supervisor, representing the Kitchen Equipment Contractor (KEC), shall be present at all times during progress of the Kitchen Equipment Contractor (KEC)'s work.

3.02 SITE EXAMINATION:

- A. Verify site conditions under the provisions of the General Conditions, Supplementary Conditions and applicable provisions of Division 1 Sections. Notify the Architect, in writing, of unsatisfactory conditions for proper installation of foodservice equipment.
- B. Verify wall, column, door, window, and ceiling locations and dimensions. Fabrication and installation should not proceed until dimensions and conditions have been verified and coordinated with fabrication details.
- C. Verify that wall reinforcement or backing has been provided, and is correct for wall supported equipment. Coordinate placement dimensions with wall construction Section.
- D. Verify that ventilation ducts are of the correct characteristics, and in the required locations.
- E. Verify that utilities are available, of the correct characteristics, and in the required locations.

3.03 INSTALLATION:

- A. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved.
- B. Install items in accordance with manufacturer's instructions.
- C. Set each item of non-mobile and non-portable equipment securely in place, leveled and adjusted to correct height. Anchor to supporting substrate where indicated, and where required for sustained operation and use without shifting or dislocation. Conceal anchorages wherever possible. Adjust counter tops and other work surfaces to a level tolerance of 1/16 inch (maximum offset, and plus or minus on dimension, and maximum variation in 2'-0" run from level or indicated slope). Provide anchors, supports, bracing, clips, attachments, etc., as required to comply with the local seismic restraint requirements. The Guidelines For Seismic Restraint of Kitchen Equipment, as prepared for the Sheet Metal Industry Fund of Los Angeles and endorsed by S.M.A.C.N.A., should be followed.
- D. Complete field assembly joints in the work (joints which cannot be completed in the shop) by welding, bolting-and-gasketing, or similar methods as indicated and specified. Grind welds smooth and restore finish. Set or trim flush, except for "T" gaskets as indicated.
- E. Provide closure plates and strips where required, with joints coordinated with units of equipment.
- F. Provide sealants and gaskets all around each unit to make joints airtight, waterproof, vermin-proof, and sanitary for cleaning purposes.
- G. Joints up to 3/8 inch wide, to be stuffed with backer rod, to shape sealant bead properly, at 1/4 inch depth.
- H. At internal corner joints, apply sealant or gaskets to form a sanitary cove, of not less than 3/8 inch radius.
- I. Shape exposed surfaces of sealant slightly concave, with edges flush with faces of materials at joint.

- J. Provide sealant filled or gasketed joints up to 3/8 inch joint width. Wider than 3/8 inch, provide matching metal closure strips, with sealant application each side of strips. Anchor gaskets mechanically, or with adhesives to prevent displacement.
- K. Treat enclosed spaces, inaccessible after equipment installation, by covering horizontal surfaces with powdered borax at a rate of 4 ounces per square foot.
- L. Insulate to prevent electrolysis between dissimilar metals.
- M. Cut and drill components for service outlets, fixtures, piping, conduit, and fittings.
- N. Coordinate the installation of approved dry pendant sprinkler head in each cooler and freezer. Sprinkler heads should be installed in coolers/freezers only if required by local codes.
- O. Verify and coordinate the mounting heights of all wall shelves and equipment, with equipment located below them, for proper clearances.
- P. Coordinate with the Plumbing and Electrical Divisions, and provide holes in food service equipment for plumbing and electrical service to and through the fixtures, as required. This includes welded sleeves, collars, ferrules, or escutcheons. These services are to be located so that they do not interfere with intended use and/or servicing of the fixture. No alterations of the building are allowed without written permission by the General Contractor and/or Architect. (i.e. – routing refrigerant lines).

3.04 ADJUSTING:

- A. Test and adjust equipment, controls and safety devices to ensure proper working order and conditions.
- B. Repair or replace equipment which is found to be defective in its operation, including units which are below capacity or operating with excessive noise or vibration.

3.05 CLEANING AND RESTORING FINISHES:

- A. After completion of installation, and completion of other major work in foodservice areas, remove protective coverings and clean foodservice equipment, internally and externally.
- B. Restore exposed and semi-exposed finishes, to remove abrasions and other damages; polish exposed metal surfaces and touch-up painted surfaces. Replace work, which cannot be successfully restored.
- C. Polish glass, plastic, hardware and accessories, fixtures and fittings.
- D. Wash and clean equipment, and leave in a condition ready for the Owner to sanitize and use.

3.06 TESTING, START-UP AND INSTRUCTIONS:

- A. Delay the start-up of equipment until service lines have been tested, balanced, and adjusted for pressure, voltage and similar considerations; and until water and steam lines have been cleaned and treated for sanitation.
- B. Make arrangements for demonstration of foodservice equipment operation and maintenance, in advance with the Owner/Operator.
- C. Demonstrate foodservice equipment, to familiarize the Owner and the Operator on operation and maintenance procedures, including periodic preventative maintenance measures required. Include an explanation of service requirements and simple on-site service procedures, as well as, information concerning the name, address and telephone number of qualified local source of service. The individual performing the demonstration shall be knowledgeable of operating and service aspects of the equipment.

- D. Provide a written report of the demonstration, to the Owner, outlining the equipment demonstrated and malfunctions or deficiencies noted. Indicate individuals present at demonstration.
- E. Final Cleaning: After testing and start-up, clean the foodservice equipment, and leave in a condition ready for the Owner to sanitize and use.

3.07 CLEAR AWAY:

- A. Throughout the progress of their work, the Kitchen Equipment Contractor (KEC) shall keep the working area free from debris, and shall remove rubbish from premises resulting from work being done by them. At the completion of their work, the Kitchen Equipment Contractor (KEC) shall leave the premises in a clean and finished condition.

END OF SECTION

**SECTION 11 5213
PROJECTION SCREENS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Front projection screen assemblies.
- B. Power operators and controls.

1.02 RELATED REQUIREMENTS

- A. Section 26 2717 - Equipment Wiring: Electrical supply, conduit, and wiring for electric motor operated projection screens.

1.03 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's catalog cuts and descriptive information on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Operation and Maintenance Data: Provide manufacturer's operation and maintenance instructions.
- D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Experienced in manufacturing products specified in this section.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver projection screens to project site in manufacturer's original unopened packaging. Inspect for damage and size before accepting delivery.
- B. Store in a protected, clean, dry area with temperature maintained above 50 degrees F. Stack according to manufacturer's recommendations.
- C. Acclimate screens to building temperatures for 24 hours prior to installation, or in accordance with manufacturer's recommendations.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for projection screen assembly.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Bretford: www.bretford.com.
- B. Da-Lite Screen Company: www.da-lite.com.
- C. Draper, Inc: www.draperinc.com.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FRONT PROJECTION SCREENS

- A. Front Projection Screens: Factory assembled unless otherwise indicated.
 - 1. Motorized, matte light diffusing fabric screen, exposed housing.
 - 2. Model: Similar to Da-Lite "Large Advantage Electrol".
 - 3. In Gymnasium: Motorized, matte light diffusing fabric screen, horizontally tensioned, ceiling mounted.
 - a. Screen Viewing Area: 133 x 236 inch.

- b. Drop: 8 inches
 - 4. In Cafeteria and Media Center: Motorized, matte light diffusing fabric screen, horizontally tensioned, wall mounted.
 - a. Screen Viewing Area: 106 x 188 inch.
 - b. Drop: 24 inches
 - B. Matte Light Diffusing Fabric: Light diffusing screen fabric; washable, flame retardant and mildew resistant.
 - 1. Material: Matte white vinyl on fiberglass backing, with nominal gain of 1.0 over viewing angle not less than 70 degrees from axis, horizontally and vertically.
 - 2. Seams: No seams permitted in fabric up to 96 inch high by 72 inch wide.
 - C. Exposed Screen Cases: Steel; integral roller brackets.
 - 1. Finish: Baked enamel.
 - 2. Color: White.
 - 3. End Caps: Steel; finished to match case.
 - 4. Provide supports for suspension from ceiling where indicated.
 - 5. Mounting: Wall and ceiling, as indicated on drawings.
 - D. Electrically-Operated Screens:
 - 1. Roller: 2 inch aluminum, with locking device.
 - 2. Vertical Tensioning: Screen fabric weighted at bottom with steel bar with plastic end caps.
 - 3. Horizontal Tensioning: Tab-guided cable system.
 - E. Provide mounting hardware, brackets, supports, fasteners, and other mounting accessories required for a complete installation, in accordance with manufacturer's recommendations for specified substrates and mountings.

2.03 ELECTRICAL COMPONENTS

- A. Electrical Components: Listed and classified by UL as suitable for the purpose specified and indicated.
- B. Motors: Direct drive, 110 V, 60 Hz.
 - 1. Screen Motor: Mounted inside roller; three wire with ground; quick reverse type; equipped with thermal overload cut-off.
 - a. Electrical Characteristics: 2.4 amps.
 - b. Motor mounted on sound absorber.
- C. Controls: 3 position control switch with plate.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate is finished and ready to accept screen installation.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify type and location of electrical connections.
- D. Do not install projection screens until climate control systems are in place and interior painting and other finishes are completed.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions, using manufacturer's recommended hardware for relevant substrates.
- B. Do not field cut screens.
- C. Install screens in mountings as specified and as indicated on drawings.
- D. Install plumb and level.
- E. Install electrically operated screens ready for connection to power and control systems by others.

- F. Adjust projection screens and related hardware in accordance with manufacturer's instructions for proper placement and operation.
- G. Test electrical screens for proper working condition. Adjust as needed.

3.03 PROTECTION

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

END OF SECTION

SECTION 11 6143
STAGE CURTAINS AND RIGGING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Front setting stage curtains, including valance.

1.02 RELATED REQUIREMENTS

- A. Division 26: Coordination of lighting with Work of this Section.

1.03 REFERENCE STANDARDS

- A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

1.04 PERFORMANCE REQUIREMENTS

- A. Flame Resistance Requirements: Provide platform curtains, which are certified to be flame resistant in accordance with requirements of NFPA 701.
 - 1. Permanently attach label to each curtain indicating whether curtain is permanently and inherently flame resistant, or whether it will require retreatment after dry cleaning.

1.05 PREINSTALLATION CONFERENCE

- A. Preinstallation Conference: Conduct a preinstallation meeting one week before starting Work of the Section. Require attendance by all affected installers.

1.06 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's specifications, and general recommendations, including data which substantiates that materials comply with requirements.
- C. Certification: Submit manufacturer's certification that stage curtains comply with requirements for flame resistance.
- D. Shop Drawings: Submit shop drawings, including plans, elevations, and detail sections of typical rigging elements. Show anchors, hardware, operating equipment, and other components included in manufacturer's standard product.
- E. Selection Samples: Submit fabric manufacturer's standard color card, together with 12 inch square physical sample (any color) for each fabric required.

1.07 QUALITY ASSURANCE

- A. Fabricator/Installer Qualifications: Firm with not less than ten years of successful experience in fabrication and installation of stage curtains and rigging similar to that required for this project.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Stagecraft Industries, Inc. Portland, Oregon (503) 286-160.

2.02 MATERIALS

- A. Front Setting Curtain Fabric:
 - 1. Woven Cotton Velour: Napped fabric of 100 percent cotton; 54 inch width minimum; not less than 40 backing ends per inch, 40 pile ends per inch, and 32 picks per inch; 640 pile tufts per square inch; other characteristics as follows:
 - 2. Heavy Weight: Fabric weighing not less than 23 ounces per linear yard before flameproofing, with pile height of approximately 125 mils.
 - 3. Products: Subject to compliance with requirements, provide one of the following heavy weight velour fabrics:
 - a. "Memorable", K&M Fabrics, Inc.
 - b. "Overture", JB Martin, Inc.
 - 4. Color: Black.

B. Metal Products:

1. Steel Tube: 16 gage; 1-1/2 inches unless otherwise indicated. Paint with a flat, rust-inhibitive primer and finish coat paint.
2. Steel Pipe: Schedule 40 1-1/2 inches unless otherwise indicated. Paint with a flat, rust-inhibitive primer and finish coat paint.
3. Supports, Clamps, and Anchors: Steel in manufacturer's standard gages, of adequate size to support loads, painted after fabrication.
4. Support Chain/Aircraft Cable: Chain or aircraft cable of adequate size to support loads. Provide means for adjustment on all suspension points.
5. Inserts, Bolts and Fasteners: Manufacturer's standard units, unless otherwise indicated.

2.03 FABRICATION

A. Curtains:

1. General: Provide not less than 50 percent additional fullness for curtains, unless otherwise indicated. Horizontal seams and fabric less than half-width are not permitted.
 - a. Vertical Hems: Provide vertical hems not less than 2 inches wide, double-stitched and machine-sewn with no salvage material visible from front of curtain.
 - b. Turnbacks: Where specified, provide turnbacks, formed by folding 12 inches of face fabric back at leading edge of panels and securing by sewing across top hem and grommets through both layers of fabric.
 - c. Top Hems: Reinforce top hems by double-stitching 3-1/2 inches wide heavy jute webbing to top edge with minimum 1 inch of face fabric turned under.
 - d. Pleats: Provide fullness in curtains by sewing 6 inches of additional material into box pleats spaced at 12 inch centers along top hem reinforcing. Provide not less than #2 brass grommets spaced at 12 inches and centered on box pleats, for tie lines or "S" hooks.
 - e. Bottom Hems: Except for curtains which hang to floor, provide bottom hems not less than 3 inches deep. For floor-length curtains, provide 5 inch hems with separate interior heavy canvas chain pockets equipped No. 8 jack chain. Stitch chain pocket so chain rides 2 inches above bottom edge of curtain.
2. Front Setting:
 - a. Valance: Fabricate valance of heavy weight cotton velour.
 - b. Front Curtain: Fabricate front curtain of heavy weight cotton velour, with 12 inch turnbacks at leading edge.
3. Curtain Track/Rigging:
 - a. Tracks: Equip tracks of adequate size with live end double pulley and single pulleys of minimum 4 inch diameter. Provide curtain carriers of molded nylon bodies with wheels parallel to body.
 - 1) Provide carriers with neoprene or rubber bumper, heavy-duty swivel eye and trim chain for attachment of curtain snap or "S" hook. Provide end stops for track and adjustable floor block designed to maintain proper tension on 3/8 inch operating line.
 - 2) Products/Manufacturers: Provide one of the following:
 - (a) Atlas Silk Model No. 401.
 - (b) Silent Steel Model No. 280.
 - (c) Stagecraft Model No. 400.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for supporting members, blocking, clearances, and other conditions affecting performance of platform curtain work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Furnish layouts for inserts, clips and other supports required to be installed by other trades for support of tracks and battens.

3.03 INSTALLATION

- A. General: Install materials in accordance with manufacturer's printed instructions and recommendations, and to comply with governing regulations.
- B. Tracks:
 - 1. Ceiling-Mounted: Drill track at intervals not greater than manufacturer's recommended spacing and fasten either directly to structure or other devices which are secure and appropriate to structure, and which will not deteriorate or fail with age or elevated temperatures.
 - 2. Wall-Mounted: Install tracks by suspending from manufacturer's bracket clamps securely mounted to wall construction at recommended spacing.
 - 3. Overlap: For center-parting curtains, provide not less than 2 foot overlap of track sections at center, supported by special lap clamps.
- C. Curtains:
 - 1. Track-Hung: Secure curtains to track carriers with track manufacturer's special heavy-duty "S" hooks or snap hooks
 - 2. Batten-Hung: Secure curtains to pipe battens with minimum 5/8-inch wide x 36 inches long braided soft cotton tie lines.

END OF SECTION

SECTION 11 6623
GYMNASIUM EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Basketball backboards, edge cushioning, safety straps, goals and support framing.
 - 1. Backboard hoists, where indicated.
- B. Gymnasium exercise equipment.
- C. Panelized Rock Climbing Wall System.

1.02 RELATED REQUIREMENTS

- A. Section 05 12 00 - Structural Steel Framing: Structural members supporting basketball systems.
- B. Division 26: Equipment wiring.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- B. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- C. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.
- F. NFPA 70 - National Electrical Code.
- G. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Large Components: Ensure that large components can be moved into final position without damage to other construction.
- B. Electrically Operated Equipment: Coordinate location and electrical characteristics of service connection.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data showing configuration, sizes, materials, finishes, hardware, and accessories; include:
 - 1. Electrical characteristics and connection locations.
 - 2. Fire rating certifications.
 - 3. Structural steel welder certifications.
 - 4. Manufacturer's installation instructions.
- C. Shop Drawings: For custom fabricated equipment indicate, in large scale detail, construction methods; method of attachment or installation; type and gage of metal, hardware, and fittings; plan front elevation; elevations and dimensions; minimum one cross section; utility requirements as to types, sizes, and locations.
 - 1. Indicate cable attachments and cable runs for motorized backstops.
 - 2. Refer to Structural Drawings for structural supports.
- D. Erection Drawings: Detailed dimensional requirements for proper location of equipment.
- E. Selection Samples: Submit samples of backstop cushion molding and wall pad coverings in manufacturer's available range of colors.
- F. Verification Samples: Submit samples of selected colors for backstop cushion molding and wall pad coverings

- G. Operating and maintenance data, for each operating equipment item.
- H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified with minimum five years of experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in manufacturer's original packaging with factory original labels attached.
- B. Store products indoors and elevated above floor; prevent warping, twisting, or sagging.
- C. Store products in accordance with manufacturer's instructions; protect from extremes of weather, temperature, moisture, and other damage.

1.08 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for each piece of equipment.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Gymnasium Equipment:
 - 1. Arizona Courtlines, Inc: www.arizonacourtlines.com.
 - 2. Jaypro Sports LLC: www.jaypro.com.
 - 3. Performance Sports Systems: www.perfsports.com. (Basis-of-Design)
 - 4. Sports Specialties/Spalding: www.sportsspecialties.com.
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Climbing Wall:
 - 1. Eldorado Wall Company: www.eldowalls.com.
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Scoreboards:
 - 1. Daktronics: www.daktronics.com. (Basis-of-Design)
 - 2. Nevco: www.nevco.com.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 GYMNASIUM EQUIPMENT - GENERAL REQUIREMENTS

- A. See drawings for sizes and locations.
- B. Where mounting dimensions or sizes are not indicated, comply with applicable requirements of the following:
 - 1. National Federation of State High School Associations (NFHS) sports rules.
 - 2. United States Olympic association rules for the sport.
- C. Product descriptions for gymnasium equipment are based on listed models manufactured by Performance Sports Systems. Minor dimensional and material variations for other named manufacturers are acceptable subject to compliance to performance requirements and referenced standards.
- D. Provide mounting plates, brackets, and anchors of sufficient size and strength to securely attach equipment to building structure; comply with requirements of contract documents.
- E. Hardware: Heavy duty steel hardware, as recommended by manufacturer.
- F. Electrical Wiring and Components: Comply with NFPA 70; provide UL-listed equipment.

- G. Structural Steel Fabrications: Welded in accordance with AWS D1.1/D1.1M, using certified welders.

2.03 EXTERIOR BASKETBALL

- A. Column-Mounted Backstop Assemblies: Column-mounted; stationary; mounted to exposed column flange; capable of mounting both rectangular and fan-shaped backboards.
1. Products:
 - a. Arizona Courtlines, Inc. Model GN-44.
 - b. Performance Sports Systems Model GN45.
 - c. Sports Specialties Model SS402-800 Out Door Backstop.
 2. Material: 4-1/2 inch o. d. x 0.18 inch wall gooseneck galvanized pipe with mounting plate for direct goal attachment for the backboard.
 - a. Provide 2 braces extending from the upper mounting points of the backboard to the gooseneck extension.
 3. Distance From Column Face: 4 feet.
 4. Framing Color: Galvanized, unpainted.
 5. Installation: Direct burial in concrete with minimum 36 inch extension into concrete.
- B. Backboards: Steel, fan shaped.
1. Products:
 - a. Arizona Courtlines, Inc. Model FBB-ST
 - b. Performance Sports Systems Model 1245T.
 - c. Sports Specialties Model SS413-208.
 2. Material: Minimum 12 gage steel stamped shell with minimum 12 gage formed horizontal mounting channels and a 10 gage formed vertical channel welded to reverse side.
 3. Dimensions: 35 inches high by 54 inches wide
 4. Thickness: 1-1/2 inches.
 5. Markings: Powder coated.
 6. Provide mounting kit.
 7. Color: Manufacturer's standard.
- C. Goals: Steel rim, mounted to backboard, with attached nylon net; complete with mounting hardware.
1. Products:
 - a. Arizona Courtlines, Inc. Model FM-3
 - b. Performance Sports Systems Model 7550.
 - c. Sports Specialties Model SS411-556.
 2. Net Attachment Device: Continuous no-tie ring.
 3. Tested to 1000 lbs. static load.
 4. Finish: Powder coat orange.

2.04 INTERIOR BASKETBALL

- A. Basketball System: Manual side fold backstop assembly for Side Courts:
1. Products:
 - a. Arizona Courtlines, Inc. WMSF-F for fan shaped backboards.
 - b. Jaypro Sports LLC Model 1500 Wall Mounted Side Fold Backstop.
 - c. Performance Sports Systems Model 2500 Adjustable Side Folding Wall Mount Structure for Extensions 4'-0" to 12'-0".
 - d. Sports Specialties Model SS302-600 Wall-Braced Backstop Side Fold.
 2. Wall Attachment: Attach to wall on 2-inch by 7.25 inch clear coated wood pads. Support unit with chain fastened to front of the unit and attached to wood pad mounted on the wall.
 3. Backstop: Construct backstop from four 1-7/8 inch O.D. tubes telescoped inside 2-1/8 inch tubes, spaced at 63 inch centers. Brace the bottom horizontal tubing with diagonal telescoping pipes that lock in playing position. Offset all pivot points to allow maximum fold. All critical fittings shall be malleable iron castings, heavy gage steel stampings or

weldments. Manufacture backstop in accordance with NCAA Rule 1, Section 8, stating that all backboard support systems shall be at least 6 inches behind backboard.

4. Height Adjuster:
 - a. Height adjuster which raises or lowers assembly by 2 feet to adjust goal height.
 - b. Locations of Use: All backboards.
 - c. Products:
 - 1) Arizona Courtlines, Inc. Model HGTADJ-M
 - 2) Jaypro Sports LLC Model AHA-XX Manual Height Adjuster.
 - 3) Performance Sports Systems Model 1130 Manual Height Adjuster Adjust-A-Goal Series.
 - 4) Sports Specialties Model SS313-333 Manual Height Adjuster.
 5. Finish: Black.
 6. Include the following items with each backstop:
 - a. Backboard.
 - b. Goal.
- B. Basketball System: Motorized forward fold backstop assembly for Main Courts:
1. Products:
 - a. Arizona Courtlines, Inc. Model 1D-FFRB.
 - b. Jaypro Sports LLC Model 817-FFRB Basketball Backstop.
 - c. Performance Sports Systems Model 3103 Welded Single Post Rear Braced Front Folding Basketball Structure.
 - d. Sports Specialties Model SS1017 "T" Series Ceiling Suspended Basketball Backstop System.
 2. Support unit from 3-1/2 inch O.D. x 0.120 inch wall ASTM A500 Grade B horizontal and 2-3/8 inch O.D. x 12 gage wall ASTM A513 vertical structural steel tubing secured to the building with heavy gauge steel stampings or weldments (as required by building conditions). When truss span widths exceed 10'-0", use 3-1/2 inch O.D. x Schedule 40 wall ASTM A500 Grade B for the horizontals. Spans over 14'-0" will use welded bridge pipe.
 3. Backstop: Single post design with a main vertical mast made of 6-5/8 inch O.D. x 0.120 inch wall ASTM A500 Grade B structural steel tubing with 2-1/2 inch x 1-1/2 inch x 14 gage wall ASTM A513 rectangular steel tube sway braces miter cut and welded in place to a top horizontal 4 inch x 1-1/2 inch x 0.18 inch web ASTM A36 steel channel. Suspend main mast from superstructure with an offset hanger 3 inches in front of the pivot point. Units with less than 3 inches offset will not be approved as equal. Manufacture backstop to allow 6 inch vertical adjustment for plumbing of the backboard. All fittings shall be heavy gage steel stampings or weldments. A direct goal attachment is used to transfer stress from the goal to the main mast assembly preventing strain on the backboard.
 - a. Rear brace shall be 1-7/8 inch O.D. x 12 gage wall ASTM A513 steel tubing with a slide mechanism and steel bushing for travel on a 1-7/8 inch O.D. slide rod. When truss heights are higher than 27'-0", rear brace shall be 2-3/8 inch O.D. x 12 gage wall ASTM A513 steel tubing. The entire assembly shall be self-aligning and designed to be self-locking and self-releasing. Backstop shall be raised and lowered with 1/4 inch galvanized aircraft cable with a breaking strength of 7000 lbs. Cable automatically retracts by means of 5/16 inch diameter shock cord. Manufacture backstop in accordance with NCAA Rule 1, Section 8, stating that all parts of the backboard support system shall be at least 6 inches behind backboard.
 4. Height Adjuster:
 - a. Height adjuster which raises or lowers assembly by 2 feet to adjust goal height.
 - b. Locations of Use: All backboards.
 - c. Products:
 - 1) Arizona Courtlines, Inc. Model HGTADJ-M
 - 2) Jaypro Sports LLC Model AHA-XX Manual Height Adjuster.
 - 3) Performance Sports Systems Model 1130 Manual Height Adjuster Adjust-A-Goal Series.
 - 4) Sports Specialties Model SS313-333 Manual Height Adjuster.

5. Finish: Black.
 6. Include the following items with each backstop:
 - a. Backboard.
 - b. Goal.
 - c. Backboard safety stop.
 - d. Electric backstop hoist. Provide constant contact key controls.
 - e. Backstop cushion molding.
- C. Backboards: Tempered glass, rectangular shaped.
1. Products:
 - a. Arizona Courtlines, Inc. Model BBG-42.
 - b. Jaypro Sports LLC Model 855-SFB Basketball Backboard.
 - c. Performance Sports Systems Model LXP 4200 Steel Frame.
 - d. Sports Specialties Model SS411-007 Superglass Collegiate Backboard.
 2. Fabricate with steel frame constructed of formed steel angles, formed and fastened together and connected with heavy gage steel mount plates to reinforce corners. Provide lower horizontal frame section with a tubular steel support brace.
 3. Provide cushioning pad between steel mounting plate and glass to protect board against possible breakage.
 4. Glass: 1/2 inch thick, fully tempered with white target lines permanently fused onto the surface.
 5. Finish entire frame and components with powder coat gray finish.
 6. Dimensions: 42 inches high by 72 inches wide
- D. Backboards for Side Courts: Fiberglass, fan shaped.
1. Products:
 - a. Arizona Courtlines, Inc. Model FBB-FG.
 - b. Jaypro Sports LLC Model FFB-54 Basketball Backboard.
 - c. Performance Sports Model 1301B Fan Shaped Fiberglass Backboard with Border and Target.
 - d. Sports Specialties Model SS413-230 Fiberglass Fan Backboard.
 2. Dimensions: 35 inches high by 54 inches wide.
 3. Thickness: 1-1/2 inches.
 4. Markings: Gelcoated.
 5. Color: Manufacturer's standard.
 6. Provide mounting kit.
- E. Goals: Steel rim, mounted to backboard, with attached nylon anti-whip net; complete with mounting hardware.
1. Products:
 - a. Arizona Courtlines, Inc. Model BA-3.
 - b. Jaypro Sports LLC Model GBA-342A Breakaway Goal.
 - c. Performance Sports Systems Model 2000+ Positive Lock Break-Away Goal.
 - d. Sports Specialties Model SS411-508 Slammer Competitor Goal.
 2. Provide official size 18 inch ring of 5/8 inch diameter steel with continuous no-tie net attachment, full wing brace design. Include anti-whip net and hardware.
 3. Construct with positive lock mechanism to hold rim in solid playing position. Design goal to eliminate any possible entrapment areas.
 4. Finish: Powder coat orange.
- F. Backboard Safety Stop:
1. Products:
 - a. Arizona Courtlines, Inc. Model PL1000.
 - b. Jaypro Sports LLC Model PL-1000 Backstop Safety Strap.
 - c. Performance Sports Systems Model 1100 Posilock.
 - d. Sports Specialties Model SS402-865 Lynrus Aut-O-Loc Safety Belt.

2. Designed to prevent free-fall of backstops due to cable, pulley, support fitting or winch failure. Any sudden surge of speed due to failure shall instantly lock the safety stop and hold the backstop in any position. Unit shall lock backstop before it travels 12 inches in a free-fall.
 3. Provide 2 inch wide nylon belt with a 7:1 safety actor that can extend 38 feet. Attach belt to the backstop frame using a buckle connection.
 4. Safety stop shall have an automatic spring-loaded reset and shall not require electricity in order to operate. The safety stop shall lock when a speed of 1.5 ft/s is reached in the belt.
- G. Backboard Hoist:
1. Products:
 - a. Arizona Courtlines, Inc. Model EW-10.
 - b. Jaypro Sports LLC Model TW-2000 Basketball Backstop Winch.
 - c. Performance Sports Systems Model 1194 Electric Backstop Hoist.
 - d. Sports Specialties Model SS402-742 Lynrus QR4000 Electric Winch.
 2. Load Type: Vertical lifting, pulling on a slope or pulling horizontally.
 3. Rope Type: 1/4 inch diameter 7 x 19 galvanized aircraft cable (7000 lb. breaking strength).
 4. Rope Speed: 9 to 12 fpm.
 5. Electrical: 110 volt, 60 cycle or 120 volt, 60 cycle as standard with manufacturer.
 6. Motor: 3/4 to 1 HP, 13 to 14 A (full load amperage). Instant reversing, low maximum current draw design.
 7. Duty Cycle: Standard: 10 minutes ON, 20 minutes OFF.
 8. Gear Reduction: Self lubrication gearing with no oil bath.
 9. Rope Drum: Grooved for accurate winding. Support on large diameter ball bearings with positive, through the drum rope anchoring.
 10. Braking: Double, self-locking worm gearing plus passive uni-directional brake.
 11. Limit switches: Heavy duty upper and lower limit switches, gear driven for high accuracy. Maximum travel of 45 feet.
 12. Provide constant contact key controls keyed to Owner's locks.
- H. Backboard Cushion Edge:
1. Products:
 - a. Arizona Courtlines, Inc. Model BBP-B1.
 - b. Jaypro Sports LLC Model MBBP-6(xx) Bolt-On Backboard Padding.
 - c. Performance Sports Systems Model PMCE Pro Mold Cushion Edge.
 - d. Sports Specialties Model SS413-4XX E-Z Bolt Backboard Padding.
 2. Double sided backboard padding fabricated from 2 inch thick urethane foam. Provide 36-inch long pads that allow for 15 inches to run up the side of the backboard. Each half to be symmetrical to allow the half sections to be used on both right and left sides of the backboard.
 3. Color: As selected from manufacturer's full range of available colors.

2.05 EXERCISE EQUIPMENT

- A. Climbing Rope: Heavy duty rope, hung vertically from ceiling, unsecured at bottom.
1. Products:
 - a. Arizona Courtlines, Inc. Model RC-01 with Model RC-02 Opt. Accessories - Tambourine.
 - b. Jaypro Sports LLC Climbing Rope with 502004 Tambourine.
 - c. Performance Sports Systems Model 103 Climbing Ropes with Model 102 Tambourine.
 2. Rope: Manila or soft-feel polyester.
 3. Diameter: 1-1/2 inches, nominal.
 4. Length: From ceiling attachment point to floor with extra 42 inches length to lie on floor.
 5. End: Whipped.
 6. Provide rope with adjustable tambourine attachment.
 7. Provide 2 climbing ropes.

2.06 CLIMBING WALL

- A. Climbing Panels consisting of 4 foot by 4 foot fiberglass panels cast in rock-realistic molds, 1/4 inch thick.
 - 1. Products:
 - a. Products: SOLIDRock Panels by Eldorado Wall Company. (Basis-of-Design)
 - 2. Coloration: Manufacturer's standard brown coloration with rock-like highlights and staining.
 - 3. Climbing wall system shall provide modular climbing hold attachment locations compatible with 3/8 inch - 16 thread fasteners for surface mount. Securely anchor handhold fasteners to the sub-surface with adhesive. Place fasteners at minimum of 1 per sq. ft. of climbing wall surface area.
- B. Fasteners:
 - 1. Modular Handhold Bolts: 3/8 inch, 16 TPI socket head cap screws or flat head cap screws of appropriate length as recommended and provided by the manufacturer of the climbing wall and handhold manufacturer.
 - 2. Handhold Fasteners (T-nuts or Flange nuts): Glue-on fasteners consisting of 3/8-inch, 16 TPI, 3-inch wide flange with perforations to increase glue bond.
- C. Modular Handholds: Composed of polyurethane.
 - 1. Acceptable Manufacturers:
 - a. Franklin Handholds.
 - b. Egrips.
 - 2. Quantity: Provide 8 handholds with each 4 by 4 foot climbing panel, including handhold bolt of appropriate length.
- D. Climbing Wall Fall Attenuation System: Vinyl coated polyester covered foam padding. Referred to as "flip up wall" or "crash pads".
 - 1. Type; Able to prevent injury resulting from falls from Climbing Wall.
 - 2. Thickness: 3.5 inches.
 - 3. Surface Burning Characteristics: Flame spread of 25 or less, smoke developed of 450 or less, when tested in accordance with ASTM E84 or NFPA 255 as a complete panel.
 - 4. Size: 4 foot by 6 foot pads.
 - 5. Quantity: Adequate to completely cover floor 6 feet out from climbing wall by the length of the climbing wall.
 - 6. Manufacturer: As recommended by Climbing Wall manufacturer.
 - 7. Color: As selected by Architect from manufacturer's full range of available colors.
 - 8. Accessories: Wall mounted hooks for storing Padding. Quantity of hooks as recommended by Pad manufacturer for storage of pads.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Take field measurements to ensure proper fitting of work. If taking field measurements before fabrication will delay work, allow for adjustments within recommended tolerances.
- B. Inspect areas and conditions before installation. Notify Architect in writing of unsatisfactory or detrimental conditions. Do not proceed until conditions have been corrected. Commencing installation constitutes acceptance of work site conditions.
- C. Verify that electrical services are correctly located and of the proper characteristics.

3.02 INSTALLATION

- A. Install in accordance with contract documents and manufacturer's instructions.
- B. Install equipment rigid, straight, plumb, and level.
- C. Secure all equipment with manufacturer's recommended anchoring devices.
- D. Install wall padding securely, with edges tight to wall and without wrinkles in fabric covering.

1. Provide field cuts by trained installers as necessary for outlet and other elements protruding through pads. Install trim kits at all outlets. Finish all other field cuts by trimming cut edges with vinyl matching pad.

E. Separate dissimilar metals to prevent electrolytic corrosion.

3.03 ADJUSTING

- A. Verify proper placement of equipment.
- B. Verify proper placement of equipment anchors and sleeves. Use actual movable equipment to be anchored if available.
- C. Adjust operating equipment for proper operation; remove and replace equipment causing noise or vibration. Lubricate equipment if recommended by manufacturer.

3.04 CLEANING

- A. Remove masking or protective covering from finished surfaces.
- B. Clean equipment in accordance with manufacturer's recommendations.

3.05 PROTECTION

- A. Protect installed products until Substantial Completion.
- B. Replace damaged products before Substantial Completion.

END OF SECTION

**SECTION 11 8227
WASTE COMPACTORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Self Contained Compactor

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories: Placement of anchor bolts and inserts into concrete.

1.03 REFERENCE STANDARDS

- A. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2011.

1.04 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures for submittal procedures.
- B. Product Data: Provide unit capacities, physical dimensions, utility requirements and locations, point loads.
- C. Shop Drawings: Indicate machine location, rough-in and anchor placement dimensions and tolerances, clearances required .
- D. Manufacturer's Installation Instructions: Indicate special installation requirements .
- E. Operation Data: Include description of system operation, adjusting and testing required.
- F. Maintenance Data: Identify system maintenance requirements, servicing cycles, lubrication types required and local spare part sources.
- G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Waste Compactors:
 - 1. Marathon Equipment Co; Product Ramjet PAK'NTAINER MPT FL 4: www.marathonequipment.com. As sold by WESSCO, Portland, OR
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 APPLICATIONS

- A. Compactor Elementary School Utility Court: Stationary type, top intake, ground-fed.
 - 1. Service Conditions: Exterior, under cover.
 - 2. Container Size: 4 cu yd.

2.03 COMPACTORS - GENERAL

- A. Motors: NEMA MG 1.
- B. Control Panels and Remote Equipment Enclosures: NEMA 250 Type 4 enclosures; factory finished; wall-mounted unless otherwise indicated.
- C. Discharge Containers: Heavy duty steel; factory-finished for outdoor use; manufacturer's standard type unless otherwise indicated.
- D. Anchors and Fasteners: Galvanized steel; where embedded in concrete, provide to concrete installer for installation.

2.04 SELF CONTAINED COMPACTORS

- A. Self Contained Compactor:
 - 1. Charge Chamber: 0.5 cubic yard with 22.5 inch long by 46 inch clear feed opening

2. Waste Intake: Rear feed hopper with slide lid
3. Rear feed basket style dumper to work with 44 gallon Rubbermaid Brute containers.
4. Multi-cycle timer
5. Color coded pressure gauge container fullness indicator.
6. Container guides: 3 inch by 3 inch by 3/8 inch angle iron with 6 inch by 6 inch stops.
7. Container; 4 cubic yard, water tight.
8. Safety interlocked gate/door. Compactor will not operate when gate/door is open.
9. Key actuated start and red button stop.
10. Operator: 3 horsepower electric motor, 480 volt 3 phase power.
 - a. Remote stand alone power unit.
 - 1) Controls and Safeties: Fully automatic operation.
 - (a) "On/Off" key switch.
 - (b) Automatic photoelectric sensor start and stop.
 - (c) Emergency stop button.
 - (d) "Container-Full" indicator light.
 - (e) Magnetic door and container interlock.
 - (f) Container removal safety signal.
 - (g) Built-in container stops.
11. Color: Green and Yellow with "Go Ducks" logo.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install unit and inlet hopper in accordance with manufacturer's instructions and with standards required by authority having jurisdiction.
- B. Coordinate with waste chute discharge.
- C. Anchor unit securely in place.
- D. Adjust unit mechanism to achieve specified requirements.

3.02 CLOSEOUT ACTIVITIES

- A. Demonstrate and instruct Owner on unit operation. Describe unit limitations.

END OF SECTION

SECTION 12 2400
WINDOW SHADES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Window shades and accessories.
- B. Electric motor operators.

1.02 REFERENCE STANDARDS

- A. ASTM D4674 - Standard Practice for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environments.
- B. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- C. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.
- D. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems.
- E. WCMA A100.1 - Safety of Corded Window Covering Products; Window Covering Manufacturers Association, (ANSI/WCMA A101.1).

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.04 PREINSTALLATION CONFERENCE

- A. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of all affected installers.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
 - 1. Motorized Shades: Include power requirements and standard wiring diagrams.
- C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.
- D. Shop Drawings - Motorized Shades: Provide schematic system riser diagram indicating component interconnections. Include requirements for interface with other systems.
- E. Window Treatment Schedule: For all roller shades.
 - 1. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
- F. Certificates: Manufacturer's documentation that line voltage components are UL listed or UL recognized.
- G. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- H. Selection Samples: Include fabric samples in full range of available colors and patterns and color selections for metal finishes.
 - 1. Fabric selection samples are only required if fabric different than that specified is proposed.
 - 2. Motorized Shades: Include finish selections for controls.
- I. Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.

1. Mark face of material to indicate interior face.
- J. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- K. Project Record Documents: Record actual locations of control systems and show interconnecting wiring.
- L. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.
 1. Indicate methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.
- M. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than twenty years of documented experience.
- B. Installer Qualifications: Company trained and certified by the manufacturer, specializing in performing work of this type with minimum ten years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening using same room designations indicated on Drawings and in the Window Treatment Schedule.
- B. Do not deliver shades to the project site until all concrete, masonry, and other wet work has been completed and is dry.
- C. Handle and store shades in accordance with manufacturer's recommendations.

1.08 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Install shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.09 WARRANTY

- A. See Section 01 78 00 - Closeout Requirements, for additional warranty requirements.
- B. Provide manufacturer's warranty from the Date of Substantial Completion, covering the following:
 1. Shade Hardware: 25 years.
 2. Electric Motors: Five years.
 3. Electronic Control Equipment: Five years.
 4. Fabric: 25 years.
 5. Aluminum and Steel Coatings: Five years.
 6. Installation: One year.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Roller Shades:
 1. Draper, Inc: www.draperinc.com.
 2. Nysan Shading Systems Ltd: www.nysan.com.
 3. MechoShade Systems, Inc: www.mechoshade.com.
 4. Roll-A-Shade: www.rollashade.com.
 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2.02 WINDOW SHADE APPLICATIONS

- A. Shades at Interior Doors and Relites and at Exterior Openings WS-1:
 - 1. Type: Roller shades.
 - 2. Fabric: Match ThermoVeil Dense Basket Weave, 1500 Series by MechoShade Systems Inc.
 - 3. Openness: 3 percent.
 - 4. Material: 75 percent PVC and 25 percent polyester.
 - 5. Color: Match 1513 Grey by MechoShade.
 - 6. Mounting: Outside (face of jambs).
 - 7. Operation: Manual.

2.03 ROLLER SHADES

- A. Roller Shades: Fabric roller shades complete with mounting brackets, roller tubes, hembars, hardware and accessories; fully factory-assembled.
 - 1. Drop: Regular roll.
 - 2. Size: As indicated on drawings.
- B. Fabric: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 - 1. Refer to Window Shade Applications for material content and openness.
 - 2. Flammability: Pass NFPA 701 large and small tests.
 - 3. No growth, tested to ASTM G21 for ATCC9642, ATCC9348, and ATCC9645.
- C. Roller Tube: As required for type of operation, extruded aluminum with end caps.
 - 1. Dimensions: Manufacturer's standard, selected for suitability for installation conditions, span, and weight of shades.
 - a. Roller tubes less than 2.55 inch in diameter for manual shades and less than 2.55 inches for motorized shades are not acceptable.
 - b. Provide for positive mechanical engagement with drive/brake mechanism.
 - 2. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge.
 - a. Provide removable/replaceable spline mounting without having to remove shade roller from shade brackets.
 - b. Double sided pressure sensitive adhesive tape is not acceptable.
- D. Hembars and Hembar Pockets: Wall thickness designed for weight requirements and adaptation to uneven surfaces, to maintain bottom of shade straight and flat.
 - 1. Style: Thermally sealed fabric pocket covering rectangular steel or aluminum hembar.
 - a. Sewn hems and open hem pockets are not acceptable.
- E. Motor Operation: Motor system housed inside roller tube, controlling shade movement via motor controls indicated; listed to UL 325.
 - 1. Audible Noise: Maximum 46 dBA measured 3 feet from the motor unit; no audible clicks when motor starts and stops.
 - 2. Motors: Size and configuration as recommended by manufacturer for the type, size, and arrangement of shades to be operated; integrated into shade operating components and concealed from view.
 - 3. Basis-of-Design Motor: Quiet Intelligent Encoded Motor and Control System as manufactured by MechoShade Systems, Inc.
 - a. Tubular, asynchronous (non-synchronous) motors with built-in reversible capacitor operating as specified below for Motor Type, thermally protected, totally enclosed, maintenance free, equipped with locking disconnect plug assembly.
 - b. Maximum current draw for each shade motor of 2.3 amps.
 - c. Use motors rated at the same nominal speed for all shades in the same room.
 - d. Total hanging weight of shadeband shall not exceed 80 percent of the rated lifting capacity of the shade motor and tube assembly.

- e. Upper and lower stopping points (operating limits) of shade bands shall be programmed into motors via a hand held removable program module/configurator.
 - f. Intermediate stopping positions for shades shall allow up to three repeatable and precise aligned positions.
 - g. Provide up to 103 available alignment points including 3 user programmable predefined intermediate positions, for a total of 5 defined and aligned positions. All seams on the same switch circuit with the same opening height shall align at each intermediate stopping position.
4. Motor Type: 110v AC single phase 60 HZ, temperature Class A.
 5. Coupling of Multiple Shades: Where possible, minimize number of motors by coupling adjacent shades.
 6. Control Compatibility: Fully compatible with the controls to be installed.

2.04 MOTOR CONTROLS

- A. Motorized shades to be controlled by wall-mounted controls as specified below.
- B. Control Requirements:
 1. Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the control intent indicated.
 2. Capable of assigning shades to groups and subgroups without rewiring.
 3. Capable of storing up to 250 programmable stop points, including open, close, and any other position.
 4. Provide power failure memory for preset stops, open and close limits, shade grouping and subgrouping and system configuration.
 5. Capable of synchronizing multiple units of the same size to start, stop and move in unison.
 6. Provide all components and connections necessary to interface with other systems as indicated.
 7. Capable of providing signal to building Security System for central control.
- C. Wall-Mounted Controls: UV stabilized visible parts meeting ASTM D4674; provided by shade manufacturer.
 1. Control Functions:
 - a. Open: Automatically open controlled shade(s) to fully open position when button is pressed.
 - b. Close: Automatically close controlled shade(s) to fully closed position when button is pressed.
 - c. Raise: Raise controlled shade(s) only while button is pressed.
 - d. Lower: Lower controlled shade(s) only while button is pressed.
 - e. Stop shade(s) in motion by tap on any button.
 - f. Multiple Shade Groups: Provide individual controls for each shade group as indicated.
 2. Finish: To be selected by Architect.
 3. Control Locations: As indicated on architectural drawings and schedules.
- D. Local and Central Control
 1. Provide local control as indicated on Window Shade Schedule.
 2. Elsewhere provide connection to building Security System.

2.05 ACCESSORIES

- A. Fascias: Size as required to conceal shade mounting.
 1. Style: As selected by Architect from shade manufacturer's full selection.
 2. Fascia shall be able to be installed across two or more shade bands in one piece.
 3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
 4. Chain drive shall fall behind the bottom return edge of the fascia without requiring notching of the fascia.
 5. Provide bracket/fascia end caps where mounting conditions expose outside of roller shade brackets.

- 6. Material and Color: To match shade.
- B. Brackets and Mounting Hardware: As recommended by manufacturer for mounting configuration and span indicated.
- C. Fasteners: Non-corrosive, and as recommended by shade manufacturer.

2.06 FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Fabricate shades to fit openings within specified tolerances.
 - 1. Dimensions - Outside Mounting: Extend blind to center of jambs and to stop flush with top of sill.
- C. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch in either direction per 8 feet of shade height due to warp distortion or weave design.
- D. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Battens shall be roll-formed stainless steel or tempered steel, as recommended by manufacturer.
- E. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment acceptable to Architect. Furnish battens in place of plain seams when the width, height or weight of the shade exceeds manufacturer's standards.
- F. Dimensional Tolerances: As recommended in writing by manufacturer.
- G. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

- A. Install level, plumb, square and true in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Installation Tolerances:
 - 1. Maximum Offset From Level: 1/16 inch.
- C. Replace blinds that exceed specified dimensional tolerances at no extra cost to Owner.
- D. Adjust level, projection and shade centering from mounting bracket. Verify there is no telescoping of shade fabric.
 - 1. Adjust and balance roller shades to operate smoothly, easily, safely and free from binding or malfunction throughout entire operational range.

3.04 SYSTEM STARTUP

- A. Motorized Shade System: Provide services of a manufacturer's authorized representative to perform system startup.

3.05 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.

- B. Replace shades that cannot be cleaned to "like new" condition.

3.06 CLOSEOUT ACTIVITIES

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. See Section 01 79 00 - Demonstration and Training, for additional requirements.
- C. Demonstration: Demonstrate operation and maintenance of window shade system to Owner's personnel.
- D. Training: Train Owner's personnel on operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of two hours training by manufacturer's authorized personnel at location designated by the Owner.

3.07 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 12 5210
UPHOLSTERED SEATING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabric wrapped foam cubby seat cushions.

1.02 RELATED REQUIREMENTS

- A. Section 06 4100 - Architectural Wood Casework..
- B. Section 06 2000 - Finish Carpentry, construction of cubbies where cushions are located.

1.03 REFERENCE STANDARDS

- A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the installation of fabric wrapped cushions with size, location and installation of cabinets and wall supports as shown on drawings.

1.05 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's product data for fabric and foam components.
- C. Samples: Submit one sample seat cushion, 12 x 18 inch minimum in size, illustrating construction, fabrication and mounting details. Submit two 12 x 18 inch samples of fabric cover material.
- D. Shop Drawings: Complete, detailed layout with complete dimensioning information for fabrication and installation.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Stock Materials: 10 square feet of each kind of fabric.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fabric wrapped foam cushions to project site in protective wrappers.

PART 2 PRODUCTS

2.01 MATERIALS

- A. General: All materials, construction and finishing shall be of the highest quality to produce movable furniture that is equal or superior to the industry standard.
- B. Adhesives, General: Do not use adhesives that contain urea formaldehyde.
- C. 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).

2.02 FABRIC TYPE: UF-1

- A. Manufacturer: Maharam; www.maharam.com
 - 1. Style: Alloy
 - 2. Style number: 466064
 - 3. Color: As indicated in schedule.
 - 4. Content: 100% Polyurethane.
 - 5. Weight: 25 oz/lin yd
 - 6. Width: 54"

7. Backing: Polyester
8. Finishes: None
9. Repeat:
 - a. Approximate Horizontal: none
 - b. Approximate Vertical: none
10. Performance Data
 - a. Flammability Testing:
 - 1) Pass* - Test Method - California Technical Bulletin 117, Section E.
 - 2) When combined with appropriate components can pass California Technical Bulletin #133, NY and NJ Port Authority and Boston Fire Code assembly tests.
 - b. Durability:
 - 1) 90,000 + Cycles - Test Method - Martindale
 - 2) ASTM 3597 - #10 Cotton Duck Abradant*
 - c. Colorfastness:
 - 1) Light - Class 4 Rating @ 40 hrs.*
 - d. Cleaning Code: W - Clean

B.

2.03 FOAM

- A. Hybrid foam: 50% non-petroleum based Polyols, 50% petroleum-based Polyols. Non-petroleum based content shall be derived from a renewable resource such as soy.
 1. Seats: 2" 22035CFR hybrid foam base, 1" 18024CFR hybrid foam top layer and side layers.

2.04 ACCESSORIES

- A. Concealed Fasteners: Type recommended by fabricator.
- B. Velcro: Type recommended by fabricator.
- C. Adhesive: Type recommended by fabricator and complying with the project's VOC requirements..

2.05 FABRICATION

- A. Tight/monolithic construction; no loose, semi-attached or attached cushions.
- B. Seat and back are foamed and upholstered individually. All exposed surfaces covered with specified fabric.
- C. All seams shall be reinforced, utilizing heavy duty, commercial quality thread of fiber compatible with upholstery fiber compositions.
- D. Long horizontal edges to be gently rounded with no exposed seams along front, back, top and bottom edges. Side edges to be neatly welted with matching fabric.
- E. All horizontal planes shall be parallel and level for full extent, and at 90 degrees with vertical planes for full extent of all intersections.
- F. Foam shall be cut to crown at seams so that a consistent level at all horizontal and vertical planes is maintained upon foam compression with use.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Do not begin installation until spaces to receive cushions have been completed.
- B. Coordinate with casework manufacturer to prepare mounting surfaces using the methods recommended by the cushion fabricator for achieving the best result for the project conditions.

3.03 INSTALLATION

- A. Install in accordance with fabricator's instructions.
- B. Install cushions as indicated on Drawings, level and plumb, with separate units securely anchored.

3.04 PROTECTION

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

END OF SECTION

SECTION 12 9300
SITE FURNISHINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Waste receptacles.
- B. Exterior Gratings.
- C. Tree Gratings.
- D. Skate deterrents.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-In-Place Concrete: Bollard infill and underground encasement.
- B. Section 05 5000 - Metal Fabrications: Anchors to attach site furnishings to mounting surfaces.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2012.
- B. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- C. ASTM A536 - Standard Specification for Ductile Iron Castings; 1984 (Reapproved 2009).
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.

1.04 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures for submittal procedures.
- B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.
- C. Samples: Submit two sets of manufacturer's available colors and finishes for precast furnishings.

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 METAL FURNISHINGS

- A. Metal Furnishings, General:
 - 1. Cast iron components: Ductile iron castings complying with ASTM A536; cleaned, treated, and powder-coated.
 - 2. Steel components: Plates, bars, and shapes complying with ASTM A36/A36M and tubing complying with ASTM A500/A500M; cleaned, treated, and powder-coated.
 - 3. Hardware: Stainless steel.
- B. Gratings
 - 1. Prefab cast iron grating and frame for exterior use.
 - 2. Accessible: Provide type with opening compliant with accessibility code.
 - 3. Size: 18 inches by 24 inches by 1 - 1/2 inch thick.
 - 4. Construction: Grate in one pieces.
 - 5. Finish: Natural.
 - 6. Frame for casting into concrete.
 - 7. Accessories: Attachment to frame with tamper resistant fasteners.
 - 8. Products:
 - a. Iron Age Designs, Model Oblio 18 x 24 Versigrate, www.ironagegrates.com
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. Tree Gratings

1. Prefab cast iron grating and frame for exterior use.
 2. Accessible: Provide type with opening compliant with accessibility code.
 3. Size: 5 feet by 5 feet by 1 - 1/4 inch thickness.
 4. Construction: Grate in 4 pieces.
 5. Tree opening: 12 inch diameter.
 6. Finish: Natural.
 7. Frame for casting into concrete.
 8. Accessories: Attachment to frame with tamper resistant fasteners.
 9. Products:
 - a. Iron Age Designs, Model Oblio Treegrate, www.ironagegrates.com
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- D. Waste Receptacles: Steel frame with steel slats and removable lid.
1. Capacity: 32 gallons.
 2. Shape: Round.
 3. Inserts: Removable plastic containers for waste material.
 4. Type: Rib pattern, side door access to removable container.
 5. Lids:
 - a. Material: Steel.
 - b. Type: Flat top.
 6. Mounting: Surface.
 7. Products:
 - a. Wabash by Northwest Playgorund Equipment, Inc, FR500R with SB105 lid.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 8. Finish: Manufactures standard powder coat.
 9. Color: To be selected from manufacturer's standard colors.

2.02 SKATE DETERRENTS

- A. Skate Deterrents on Concrete:
1. Material: Stainless Steel; ASTM A666 Type 316, Brushed finish.
 2. Shape: Type suitable for conditions of use..
 - a. Ball and stud design for use on concrete or masonry.
 3. Spacing: 32 inches on center unless otherwise indicated on drawings. Space equally..
 4. Accessories: Tamper proof bolts, epoxy setting materials, other items as recommended by manufacturer for conditions of use.
 5. Products:
 - a. Grind to a Halt, Inc. - Grinder Minder, www.grindtoahalt.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that mounting surfaces, preinstalled anchor bolts, or other mounting devices are properly installed; and ready to receive site furnishing items.
- B. See Section 05 5000 - Metal Fabrications for anchors to attach site furnishings to mounting surfaces.
- C. Do not begin installation until unacceptable conditions are corrected.

3.02 INSTALLATION

- A. Install site furnishings in accordance with approved shop drawings, and manufacturer's instructions.
- B. Provide level mounting surfaces for site furnishing items.

END OF SECTION

SECTION 12 9313
BICYCLE RACKS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Bicycle racks.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Mounting surface for bicycle racks.
- B. Section 32 1610 - Concrete Sidewalks: Mounting surface for bicycle racks.

1.03 REFERENCE STANDARDS

- A. ASTM A312/A312M - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes; 2014.

1.04 SUBMITTALS

- A. See Section 01 3300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Outdoor Bicycle Racks:
 - 1. Creative Pipe, Inc, Horseshoe Series Bike Rack, Cycle Style Model WCR02-SF; www.creativepipe.com
 - 2. Bikeparking.com, Welle Circular Rack, Surface Flange: www.bikeparking.com
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 BICYCLE RACKS

- A. Exterior Bicycle Racks: Device allows user provided lock to simultaneously secure one wheel and part of the frame on each bicycle parked or racked.
 - 1. Style: Three quarter round hoop, surface mount.
 - 2. Mounting: Flange
 - 3. Mounting accessories: Vandal resistant fasteners provided by Bicycle Rack manufacturer.
 - 4. Capacity: 2 bicycles each.
- B. Materials:
 - 1. Pipe: Stainless steel, ASTM A312/A312M, Type 304, Schedule 40S.
 - 2. Shape: Round Steel
 - 3. Pipe Size: 2.375 inch outside diameter.
 - 4. Construction: Fully welded.
 - 5. Finish: Brushed Stainless.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive bicycle racks.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Do not begin installation until unsatisfactory substrates have been properly repaired.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install bicycle racks level, plumb, square, and correctly located as indicated on the drawings.

- C. Surface Flange Installation: Anchor bicycle racks securely in place with 1/2 inch by 4 inch anchor bolts through flange holes.
- D. Freestanding installation: Place in location shown on drawings.

3.03 CLEANING

- A. Clean installed work to like-new condition. Do not use cleaning materials or methods that could damage finish.

3.04 PROTECTION

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

END OF SECTION

SECTION 14 2010
PASSENGER ELEVATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Complete elevator systems.
- B. Elevator maintenance.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Elevator machine foundation and pit.
- B. Section 04 20 00 - Unit Masonry: Masonry hoistway enclosure; building-in and grouting hoistway door frames.
- C. Section 05 50 00 - Metal Fabrications:
- D. Section 07 13 00 - Sheet Waterproofing: Waterproofing of elevator pit walls and floor.
- E. Section 09 00 01 - Finish Legend: Color selections for plastic laminate and linoleum.
- F. Section 09 65 00 - Resilient Flooring: Floor finish in cab.
- G. Division 26 - Electrical: Electrical service for elevators to and including fused disconnect switches at machine room and provision for emergency power.
- H. Division 27 - Communications: Telephone service to elevators.
- I. Division 28 - Electronic Safety and Security: Smoke detectors in elevator lobbies to initiate emergency recall operation, heat detectors in shafts and machine rooms to disconnect power from equipment before sprinkler activation, connection to elevator controllers, access control for elevators and coordination with building fire alarm system.

1.03 REFERENCE STANDARDS

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities.
- B. AISC 360 - Specification for Structural Steel Buildings; American Institute of Steel Construction, Inc.
- C. ASME A17.1 - Safety Code for Elevators and Escalators; The American Society of Mechanical Engineers.
- D. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks; The American Society of Mechanical Engineers.
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- F. ASTM B632 / B632M - Standard Specification for Aluminum-Alloy Rolled Tread Plate.
- G. ASTM C1107 / C1107M Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
- H. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- I. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- J. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- L. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.
- M. NFPA 70 - National Electrical Code; National Fire Protection Association.
- N. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.

- O. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.
- P. UL (ECMD) - Electrical Construction Materials Directory; Underwriters Laboratories Inc.

1.04 DEFINITIONS

- A. Defective Elevator Work: Repeated operation or control system failures; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; the need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

1.05 PREINSTALLATION CONFERENCE

- A. Preinstallation Conference: Convene a meeting one week prior to starting work.
 - 1. Review schedule of installation, installation procedures and conditions, and coordination with related work.

1.06 ADMINISTRATIVE REQUIREMENTS

- A. Construction Use of Elevator: Not permitted.

1.07 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate the following information:
 - 1. Show plans, elevations, sections, and large-scale details indicating service at each landing, coordination with building structure, relationships with other construction, and locations of equipment and signals. Indicate variations from specified requirements, maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.
 - 2. Locations of machine room equipment: driving machines, controllers, governors and other component.
 - 3. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
 - 4. Loads on hoisting beams.
 - 5. Locations in hoistway of traveling cables and connections for car light and telephone.
 - 6. Location and sizes of access doors, doors, and frames.
 - 7. Expected heat dissipation of elevator equipment.
 - 8. Applicable seismic design data; certified by a licensed Professional Structural Engineer.
 - 9. Interface with building security system.
 - 10. Electrical characteristics and connection requirements.
 - 11. Show arrangement of equipment in machine room so rotating elements, sheaves, and other equipment can be removed for repairs or replaced without disturbing other components. Arrange equipment for clear passage through access door.
- C. Product Data: Provide data on the following items:
 - 1. Signal and operating fixtures, operating panels, indicators. Include layout for engravings showing font size and style.
 - 2. Cab design, dimensions, layout, and components.
 - 3. Cab and hoistway door and frame details.
 - 4. Electrical characteristics and connection requirements.
- D. Verification Samples: Color and texture for plastic laminate.
- E. Samples: Submit two samples, in manufacturer's standard size illustrating cab interior finishes, cab and hoistway door and frame finishes, and handrail material and finish.
- F. Manufacturer Confirmation: Signed by elevator manufacturer certifying that hoistway and pit layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.
- G. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
- H. Qualification Data: For manufacturer.

- I. Maintenance Contract.
- J. Continuing Maintenance Proposal.
- K. Maintenance Data: Include:
 - 1. Technical information for servicing operating equipment.
 - 2. Legible schematic of hydraulic piping and wiring diagrams of installed electrical equipment and changes made in the Work. List symbols corresponding to identity or markings on machine room and hoistway apparatus.

1.08 QUALITY ASSURANCE

- A. Perform Work in accordance with applicable code and as supplemented in this section.
- B. Designer Qualifications: Design guide rails, brackets, anchors, and machine anchors under direct supervision of a Professional Structural Engineer or manufacturer's engineer experienced in design of work of this type.
- C. Perform structural steel design, fabrication, and installation in accordance with AISC 360, Specification for Structural Steel Buildings. Perform seismic design in accordance with applicable code.
- D. Perform welding of steel in accordance with AWS D1.1.
- E. Fabricate and install door and frame assemblies in accordance with NFPA 80.
- F. Perform electrical work in accordance with NFPA 70.
- G. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.
 - 1. Regularly engages in manufacturing, installing and servicing elevators of the type specified.
 - 2. Manufactures major elevator components in North America.
- H. Installer Qualifications: Elevator manufacturer or an experienced installer approved by elevator manufacturer who has completed elevator installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- I. Products Requiring Fire Resistance Rating: Listed and classified by UL.
- J. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- K. Regulatory Requirements: In addition to local governing regulations, comply with applicable provisions in ASME A17.1, "Safety Code for Elevators and Escalators."
 - 1. Seismic Risk Zone: Project is located in Zone 3 or greater.
- L. Accessibility Requirements: In addition to local governing regulations, comply with ANSI/ICC A117.1 as amended by Chapter 11 of the Oregon Structural Specialty Code (OSSC) and the Oregon Elevator Specialty Code.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Store materials, components and equipment in manufacturer's original protective packaging in a dry protected area.
- B. Handle materials in accordance with manufacturer's recommendations to prevent damage, soiling, or deterioration.

1.10 COORDINATION

- A. Coordinate installation of sleeves, block outs, and items that are embedded in concrete or masonry for elevator equipment. Furnish templates and installation instructions and deliver to Project site in time for installation.
- B. Coordinate locations and dimensions of other work relating to hydraulic elevators including pit ladders, sumps, and floor drains in pits; entrance subsills; and electrical service, electrical outlets, lights, and switches in pits.

1.11 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide one year manufacturer warranty agreeing to repair, restore, or replace defective elevator work for elevator operating equipment and devices.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design; Product Otis Model HydroFit.
- B. Other Acceptable Manufacturers:
 - 1. ThyssenKrupp Elevator: www.thyssenkruppelevator.com.
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- C. All components to be manufactured by same entity, unless otherwise indicated.

2.02 MATERIALS AND COMPONENTS

- A. General: Provide manufacturer's standard elevator systems. Where components are not otherwise indicated, provide standard components, published by manufacturer as included in standard pre-engineered elevator systems and as required for a complete system.
- B. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations. Provide either of the following:
 - 1. Pump, with fan-cooled squirrel-cage induction motor, mounted under oil tank with vibration isolation mounts. Enclose pump and motor in prime-painted steel enclosure lined with 1-inch-thick, glass-fiber insulation board.
 - 2. Submersible pump, with submersible squirrel-cage induction motor, suspended inside tank from vibration isolation mounts.
 - 3. Provide motor with solid-state starting.
- C. Hydraulic Silencers: Provide hydraulic silencer containing pulsation-absorbing material in a blowout-proof housing at pump unit.
- D. Piping: Provide size, type, and weight piping recommended by manufacturer, and provide flexible connectors to minimize sound and vibration transmissions from power unit.
 - 1. Provide isolation couplings between the pump unit and oil line. Provide isolation brackets attached to wall or floor to eliminate sound/vibration from pump unit to building structure. Provide acoustical isolation around piping in hoistway-machine room wall.
 - 2. Provide dielectric couplings between power unit and cylinder units.
 - 3. Casing for Underground Piping: PVC pipe complying with ASTM D1785 joined with PVC fittings complying with ASTM D2466 and solvent cement complying with ASTM D2564.
- E. Shutoff and Safety Valves: Provide shut-off valves in oil lines at pit area and in machine room. Provide safety valve in oil line at pit area. Install safety valve adjacent to hydraulic cylinder inlet-outlet connection. Provide seal on safety valve after adjusting for correct setting.
- F. Hydraulic Oil: Provide hydraulic oil of proper grade in the quantity recommended by manufacturer.
- G. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work where installation of devices is specified in another Specification Section.
- H. Car Frame and Platform: Formed or structural steel members, bolted or welded together.
- I. Finish Materials: Provide the following materials and finishes for exposed parts of elevator car enclosures, car doors, hoistway entrance doors and frames, and signal equipment as indicated:
 - 1. Satin Stainless Steel: ASTM A666, Type 304, with No. 4, directional satin finish.
 - 2. Enameled-Steel: Flush, hollow-metal construction; fabricated from cold-rolled steel sheet. Provide with factory-applied enamel or powder coat finish.
 - a. Colors: As selected by Architect from manufacturer's full range.

3. Plastic Laminate: High-pressure type complying with NEMA LD 3, Type HGS for flat applications.
 - a. Color, texture and pattern to match PL-6 as indicated in Section 09 90 00 - Finish Legend.
4. Aluminum-Alloy Rolled Tread Plate: ASTM B632/B632M, Pattern 1, alloy 6061-T6.

2.03 OPERATION SYSTEMS

- A. Passenger Elevators: Provide manufacturer's standard microprocessor operation system for each elevator or group of elevators as required to provide type of operation system indicated.
 1. Single Elevator: Provide "selective collective automatic operation" as defined in ASME A17.1.
- B. Auxiliary Operations: In addition to primary operation system features, provide the following operational features for elevators where indicated.
 1. Battery-Powered Lowering: When power fails, cars are lowered to the lowest floor, cycle their doors, and shut down with the doors closed. System includes rechargeable battery and automatic recharging system.
 2. Independent Service: Keyswitch in car control station removes car from group operation and allows it to respond only to car calls. Key cannot be removed from Keyswitch when car is in independent service. When in independent service, doors close only in response to constant pressure on the door close button.
- C. Security Features: In addition to above operational features, provide the following security features, where indicated. Security features shall not affect emergency firefighters' service. The main landing will not be locked out from the car to allow access out of the building to the "security level".
 1. Card Key: Hall push buttons are activated and deactivated by security card readers provided by Owner.

2.04 SIGNAL EQUIPMENT

- A. General: Provide signal equipment for each elevator with hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements of acrylic or other permanent, non-yellowing translucent plastic.
- B. Swing-Return Car Control Stations: Provide car control stations fully recessed in hinged return panel adjacent to car door.
 1. Include call buttons for each landing served and other buttons, switches, and controls required for specified car operation.
 2. Mark buttons and switches with manufacturer's standard identification for required use or function that complies with ASME A17.1.
 3. Mount controls at heights complying with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)" and ICC A117.1 as amended by Chapter 11 of OSSC.
 4. Provide engraving for Elevator Number, Elevator Capacity and No Smoking text on car control stations. Submit proposed font size and style for approval by Architect prior to fabrication.
- C. Emergency Communication System: Provide system that complies with ASME A17.1 and the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)." On activation, system dials preprogrammed number of monitoring station and identifies elevator location to monitoring station. System provides two-way voice communication without using a handset and provides visible signals that indicate when system has been activated and when monitoring station has responded. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- D. Car Position Indicator: Provide illuminated-signal type, digital-display type, or segmented type, located above car door or above car control station. Also provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served.
 1. Include travel direction arrows if not provided in car control station.

- E. Hall Push-Button Stations: Provide hall push-button stations at each landing for elevator as indicated.
 - 1. Provide units with flat faceplate for mounting with body of unit recessed in wall.
 - 2. Provide units with direction-indicating buttons; two buttons at intermediate landings; one button at terminal landings.

2.05 DOOR REOPENING DEVICES

- A. Infrared Array: Provide door reopening devices with a uniform array of 40 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more of the light beams shall cause doors to stop and reopen.
 - 1. Nudging Feature: After car doors are prevented from closing for a predetermined adjustable time, through activating door reopening device, a loud buzzer shall sound. When the doors are released, the doors shall begin to close at reduced kinetic energy.

2.06 PASSENGER ELEVATOR CAR ENCLOSURES

- A. General: Provide manufacturer's standard car enclosures with non-removable wall panels, suspended ceiling, trim, accessories, access doors, doors, power door operators, sills (thresholds), lighting, and ventilation.
 - 1. Floor finish is specified in Section 09 65 00 - Resilient Flooring.
 - 2. Plastic-Laminate Wall Panels: Plastic laminate adhesively applied to 1/2-inch fire-retardant-treated particleboard with plastic-laminate panel backing complying with NEMA LD 3, Type BKV. Panels have a flame-spread rating of 75 or less, when tested according to ASTM E84.
 - a. Color, texture and pattern as indicated for PL-10. Refer to Section 09 00 01 - Finish Legend.
 - 3. Enameled Steel Wall Panels: Factory applied enamel finish; colors as selected by Architect from manufacturer's full range.
 - 4. Fabricate car with recesses and cutouts for signal equipment.
 - 5. Fabricate car door frame integrally with front wall of car.
 - 6. Stainless Steel Doors: Flush, hollow-metal construction.
 - 7. Sills: Extruded metal, with groove(s) in top surface, 1/4 inch thick. Provide satin finish on aluminum.
 - 8. Ceiling: Painted white ceiling with 4-LED lights, Otis FC-4.
 - 9. Handrails: Manufacturer's standard 1-1/2 inch diameter tubular handrails, of metal indicated.
 - 10. Bumper Rails: Manufacturer's standard bumper rails matching finish of handrails below each handrail.

2.07 PASSENGER HOISTWAY ENTRANCES

- A. General: Provide manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Provide frame size and profile to coordinate with hoistway wall construction.
 - 1. Provide supports and embeds as required to support sills.
- B. Materials and Fabrication: Provide manufacturer's standards but not less than the following:
 - 1. Enameled-Steel Frames: Formed steel sheet.
 - 2. Enameled-Steel Doors: Flush, hollow-metal construction.
 - 3. Sills: Extruded metal, with groove(s) in top surface, 1/4 inch thick. Provide satin finish on aluminum.
 - 4. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107.

2.08 ELEVATORS

- A. Elevator No. 1: Passenger, holeless.
 - 1. Operation and Controls: Selective collective operation.
 - 2. Additional Service Controls: In addition, provide:
 - a. Independent service.

- b. Battery-powered lowering.
 - c. Security Features: Card Key.
 3. Hoistway Doors and Frames: Stainless steel.
 4. Cab Height: 93 inches.
 5. Hoistway and Cab Entrance Frame Opening Size: 42 x 84 inches.
 6. Door Type: Double leaf.
 7. Door Operation: Horizontal sliding.
 8. Rated Net Capacity: 3500 lbs.
 9. Rated Speed: 100 ft/min.
 10. Clear Net Platform Size: 77 x 65 inches.
 11. Travel Distance: As indicated on drawings.
 12. Number of Stops: 2.
 13. Number of Openings: 2 Front.
 14. Hydraulic Motor and Pump Location: As indicated on Drawings.
- B. Cab Finishes:
1. Front Walls: Satin stainless steel with integral door frames.
 2. Car Fixtures: Satin stainless steel.
 3. Side and Rear Wall Panels: Plastic laminate.
 4. Door Faces: Satin stainless steel.
 5. Door Sills: Aluminum.
 6. Ceiling: White painted with 4-LED lights.
 7. Handrails: Satin stainless steel at side and rear walls.
 8. Bumper Rails: Satin stainless steel below each handrail.
 9. Floor: Prepare to receive linoleum LIN-2.
- C. Hoistway Entrances:
1. Frames: Satin stainless steel.
 2. Doors: Satin stainless steel.
 3. Sills: Aluminum.
- D. Hall Fixtures: Satin stainless steel.
- E. Additional Requirements:
1. Provide inspection certificate in each car, mounted under acrylic cover with satin stainless-steel frame.
 2. Provide protective blanket hooks and one complete set of full-height blankets.

2.09 CONTROLS

- A. Door Controls:
1. Program door control to open doors automatically when car arrives at floor.
 2. Render "Door Close" button inoperative when car is standing at dispatching terminal with doors open.
 3. If doors are prevented from closing for approximately ten seconds because of an obstruction, automatically disconnect door reopening devices, close doors more slowly until obstruction is cleared. Sound buzzer.
 4. Door Safety Devices: Moveable, retractable safety edges, quiet in operation; equip with photo-electric light rays.
- B. Landing Buttons: Stainless steel type, one for originating UP and one for originating DOWN calls, one button only at terminating landings; marked with arrows.
- C. Interconnect elevator control system with building fire alarm, smoke alarm, and security systems.
- D. Provide "Firefighter's Operation" in accordance with applicable code.

2.10 EMERGENCY POWER

- A. Arrange elevator operation to operate under emergency power when normal power supply fails.
- B. Emergency Power Supply: Self-contained battery power.

- C. Provide operational control circuitry for adapting the change from normal to emergency power.

2.11 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Electrical Characteristics:
 - 1. 20 hp.
 - 2. 29 rated load amperes.
 - 3. 480 volts, three phase, 60 Hz.

2.12 MACHINE ROOM FITTINGS

- A. Wiring Diagrams: Provide two sets of standard wiring diagrams. One set shall remain in the elevator machine room and one set shall remain with the building management, physical plant and/or Owner.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that hoistway and pit are ready for work of this section.
- C. Verify hoistway shaft and openings are of correct size and within tolerance.
- D. Verify location and size of machine foundation and position of machine foundation bolts.
- E. Verify that electrical power is available and of the correct characteristics.
- F. For the record, prepare a written report, endorsed by Installer, listing dimensional discrepancies and conditions detrimental to performance.

3.02 PREPARATION

- A. Arrange for temporary electrical power for installation work and testing of elevator components.

3.03 INSTALLATION

- A. Install system components. Connect equipment to building utilities.
- B. Install cylinders plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor.
- C. Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.
- D. Provide conduit, boxes, wiring, and accessories.
- E. Install hydraulic piping between cylinder and pump unit. Install piping above the floor, where possible. Where not possible, install underground piping in Schedule 40 PVC pipe casing assembled with solvent-cement fittings.
- F. Mount machines, motors, and pumps on vibration and acoustic isolators, on bed plate and concrete pad, designed to effectively prevent transmission of vibrations to structure and thereby eliminate sources of structure-borne noise from elevator system. Place on structural supports and bearing plates. Securely fasten to building supports. Prevent lateral displacement.
- G. Accommodate equipment in space indicated.
- H. Install guide rails using threaded bolts with metal shims and lock washers under nuts. Compensate for expansion and contraction movement of guide rails.
- I. Accurately machine and align guide rails. Form smooth joints with machined splice plates.
- J. Coordinate installation of hoistway wall construction.
- K. Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.

- L. Install hoistway door sills, frames, and headers in hoistway walls. Coordinate grouting of sills in place. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.
- M. Coordinate filling hoistway door frames solid with grout in accordance with Section 04 20 00.
- N. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.
- O. Machine Room Components: Clean and degrease; prime one coat, finish with two coats of enamel or factory finish.
- P. Lubricate operating parts of systems as recommended by manufacturer.
- Q. Adjust equipment for smooth and quiet operation.

3.04 ERECTION TOLERANCES

- A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1.
- B. Cab Movement on Aligned Guide Rails: Smooth movement, with no objectionable lateral or oscillating movement or vibration.
- C. Leveling Tolerance: 1/4 inch, up or down, regardless of load and direction of travel.

3.05 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required and recommended by ASME A17.1 and by governing regulations and agencies.
- B. Testing and inspection by regulatory agencies will be performed at their discretion.
 - 1. Schedule tests with agencies and notify Owner and Architect.
 - 2. Obtain permits required to perform tests.
 - 3. Document regulatory agency tests and inspections in accordance with the requirements of Section 01 40 00.
 - 4. Perform tests required by regulatory agencies.
 - 5. Furnish test and approval certificates issued by authorities having jurisdiction.
- C. Perform testing and inspection in accordance with requirements of Section 01 40 00.
 - 1. Perform tests as required by ASME A17.2.
 - 2. Provide two weeks written notice of date and time of tests.
 - 3. Supply instruments and execute specific tests.

3.06 ADJUSTING

- A. Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.
- B. Adjust automatic floor leveling feature at each floor to achieve 1/4 inch from flush.
- C. Make necessary adjustments of operating devices and equipment to ensure elevator operates safely, accurately and smoothly.

3.07 CLEANING

- A. Remove protective coverings from finished surfaces.
- B. Clean surfaces and components ready for inspection.

3.08 PROTECTION

- A. Do not permit construction traffic within cab after cleaning.
- B. Protect installed products until project completion.
- C. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

3.09 DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of operational failure and other building emergencies. Train Owner's personnel in

procedures to follow in identifying sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program.

- B. Make a final check of each elevator operation with Owner's personnel present and before date of Substantial Completion. Determine that operation systems and devices are functioning properly.

3.10 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance service by skilled employees of the elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Provide parts and supplies as used in the manufacture and installation of original equipment.
 - 1. Perform maintenance, including emergency callback service, during normal working hours.
 - 2. Include 24-hour-per-day, 7-day-per-week emergency callback service.
 - a. Response Time: One hour or less.
- B. Continuing Maintenance Proposal: Provide a continuing maintenance proposal from Installer to Owner, in the form of a standard 5 year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.
 - 1. Do not include cost of continuing maintenance proposal in elevator contract.

3.11 MAINTENANCE

- A. See Section 01 70 00 - Execution Requirements, for additional requirements relating to maintenance service.
- B. Provide a separate maintenance contract for specified maintenance service.
- C. Perform maintenance work using competent and qualified personnel under the supervision and in the direct employ of the elevator manufacturer or original installer.
- D. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of Owner.
- E. Provide service and maintenance of elevator system and components for one year from Date of Substantial Completion.
- F. Examine system components monthly. Clean, adjust, and lubricate equipment.
- G. Include systematic examination, adjustment, and lubrication of elevator equipment. Maintain hydraulic fluid levels. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment.
- H. Perform work without removing cars during peak traffic periods.
- I. Provide emergency call back service at all hours for this maintenance period.
- J. Maintain an adequate stock of parts for replacement or emergency purposes locally, near the place of the Work. Have personnel available to ensure the fulfillment of this maintenance service, without unreasonable loss of time.

END OF SECTION