WARM SPRINGS K-8

JEFFERSON COUNTY SCHOOL DISTRICT

PROJECT MANUAL - VOLUME 1 OF 2

SPECIFICATIONS DIVISIONS 01 - 14

100% CONSTRUCTION DOCUMENTS

JANUARY 18, 2023

BBT ARCHITECTS

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Warm Springs K-8 Academy – Classroom Addition

50 Chukar Rd

Warm Springs, Oregon 97701

OWNER

Confederated Tribes of Warm Springs

1233 Veterans Street

Warm Springs, Oregon 97761

Jefferson County School District

445 SE Buff St.

Madras, Oregon 97741

PROJECT MANAGER

Tiller's Schoolhouse

Phone: (541) 550-9431

Contact: Mike Tiller

Email: mike.tiller@tillersschoolhouse.com

ARCHITECTS

BBT Architects, Inc.

1140 SW Simpson Ave., Suite 200

Bend, OR 97702

Phone: (541) 382-5535

Principal in Charge: Renée Alexander

Email: ralexander@bbtarchitects.com

Project Contact: Odessa Cleavenger

Email: ocleavenger@bbtarchitects.com

CIVIL ENGINEER

DOWL

963 SW Simpson Ave., Suite 200

Bend, OR 97702

Phone: (541) 382-5535

Contact: Steve Hannas

Email: shannas@dowl.com

LANDSCAPE ARCHITECT

Cameron McCarthy

120 SW Crowell Way, Suite 300

Bend, OR 97701

Phone: (458) 234-6361

Contact: Jay Battleson

Email: jbattleson@cameronmccarthy.com

STRUCTURAL ENGINEER

Walker Structural Engineering

2863 NW Crossing Dr #201

Bend, OR 97703

Phone: (541) 330-6869

Contact: Jonny Walker

Email: jwalker@walkerse.com

MECHANICAL/ PLUMBING

Morrison-Maierle

1001 SW Disk Dr., Suite 110

Bend, OR 97702

Phone: (541) 699-5438

Contact: Eric Webber

Email: ewebber@m-m.net

ELECTRICAL/ TECHNOLOGY ENGINEER

Connetix Engineering, Inc.

1430 N 16th Ave., Suite A

Yakima, WA 98902

Phone: (509) 594-0080

Contact: Mike Garretson

Email: mpg@coneng.com

END OF SECTION 00 00 12

JEFFERSON COUNTY SCHOOL DISTRICT 509J
Warm Springs K-8 Academy
50 Chukar Road
Warm Springs, OR 97761
Six Classroom Addition and Restrooms
February 21, 2023, 2:00 PM Current Local Time
Invitation to Bid

Sealed bids will be received by Simon White, Director of Operations, Jefferson County School District 509J, at the Administration Building, 445 SW Buff Street, Front Desk, Madras, Oregon, 97741, by the time and date listed above. The bids will then be publicly opened and read aloud. 1st Tier Subcontractor Disclosure Statements are due by 4:00 PM on the above date in order for bids to be considered for award. Bids and 1st Tier Subcontractor Disclosure Statement received after the required time and date time will not be considered.

The scope of work for this bid includes, but is not limited to the following:

- Construction of a six classroom addition with restrooms

A **MANDATORY** pre-bid meeting will be held on Tuesday, February 7, 2023, at 1:00 PM prevailing local time at the project location.

Bidding documents are those prepared by BBT Architects, 1140 SW Simpson Ave, Suite 200, Bend, Oregon 97702 and (541) 382-5535. Bidding documents may be obtained from the following link: https://colbisecurebids.com/o/509j/0100-23 and Central Oregon Builders Assoc. (COBA), 1051 NE 4th St., Bend OR 97703, 541-389-1058 or online at: www.coba.org. Bidding documents will be available for examination during the bidding period at Jefferson County School District's Administration Office and at BBT Architects.

This project is a PREVAILING WAGE project therefore no bid will be received or considered unless the Bid contains a statement by the bidder, as part of the bid, that "Contractor agrees to be bound by and will comply with the applicable provisions of 279C.838, 279C.840 or 40 U.S.C. 3141 to 3148."

Publish Date: January 23, 2023

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1.1 SUBMISSION OF BIDS AND BID OPENING:

A. In accordance with ORS 279C.365, bids will be received by Simon White, Director of Operations, Jefferson County School District 509J for the Warm Springs K-8 Academy Six Classroom Addition and Restrooms, and will be opened and read aloud at the times and places set forth in the Advertisement for Bids. Bidders, or their representatives, and other interested persons may be present at the opening of proposals.

B. The envelope containing the Bid form and required attachments must be sealed and addressed to Jefferson County School District 509J, Jefferson County, Oregon, 445 SW Buff Street, Madras, Oregon 97741, and marked on the outside: "Warm Springs K-8 Academy Six Classroom Addition and Restrooms", with name of the Bidder and its Oregon State Construction Contractor's Board Registration Number. A similar, separate envelope shall be used to submit the First-Tier Subcontractor Disclosure Statement at the time and location identified in the Advertisement for Bids.

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

1.2 BIDDING DOCUMENTS:

A. Bidding Documents include the Advertisement for Bids, Instructions to Bidders, Bid Form, First Tier Subcontractor Disclosure Statement, the Bid Bond, Affidavit of Non Collusion-, the Statement of Qualifications, and the proposed Contract Documents, including any Addenda issued prior to receipt of bids. All requirements and obligations of the Bidding Documents are hereby incorporated by reference into the Contract Documents and are binding on the Successful Bidder upon award of the Contract.

B. Bidders may obtain complete sets of the Bidding Documents as designated in the Advertisement for Bids. Bidders are responsible for all costs of reproduction.

C. Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the District or the Architect shall assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

D. The District, in making copies of the Bidding Documents available on the above terms, does so only for the purpose of obtaining Bids on the Work and does not confer a license or grant authority for any other use.

1.3 DEFINITIONS**:**

A. THE BID:

A. Bid is a complete and properly signed offer to do the work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

B. BASE BID:

The Base Bid is the sum stated in the Bid for which the Bidder offers to perform all the Work shown and described in the Bidding Documents as a lump sum bid, to which Work may be added or deducted for the sums stated in Alternate Bids, if any.

C. ALTERNATES:

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 by the District. Any or all Alternates may be accepted or rejected in any order.

1.4 QUALIFICATIONS OF BIDDERS**:**

A. Before the Bid is considered for award, the District shall review the bidder qualification form submitted with Bidder's Bid. Bidder qualifications to be listed upon the qualification form will include as a minimum, a listing of Bidder's previous contracts of a nature similar with technical complexity,

operations and size to that being bid upon; a listing of Bidder's staff to include managerial, technical, and laboring positions; summary of Bidder's plan for completion of the Work and equipment available for use in the execution of the Contract; and the listing of the projects to which Bidder is currently obligated or anticipates being obligated during this Work. The District reserves the right to request the Bidder submit the following additional information within seventy-two (72) hours after Bid opening: (1) references, to include a listing of previous and current projects, (2) financial statements indicating current financial status, prepared in accordance with generally accepted accounting principles, by a Certified Public Accountant licensed to do business in the State of Oregon, and (3) Contractor's Drug Testing policy in accordance with ORS 279C.505(2). The District reserves the right to reject the Bid of any Bidder who fails to furnish promptly and properly all the information called for as aforesaid when notified to do so.

B. Pursuant to ORS 279C.440, a Bidder may be disqualified from consideration for award of District contracts if any of the following conditions appear:

1. Bidder has been convicted of a criminal offense as an incident to obtaining or attempting to obtain a public or private contract or subcontract, or in the performance of such contract or subcontract.
2. Bidder has been convicted under state or federal statutes of embezzlement, theft, forgery, bribery, falsification or destruction of records, receiving stolen property or any other offense indicating a lack of business integrity or business honesty that currently, seriously and directly affects the Bidder's responsibility as a contractor.
3. Bidder has been convicted under state or federal antitrust statutes.
4. Bidder has committed a violation of a contract provision that is regarded by the District or the Construction Contractors Board to be so serious as to justify disqualification. A violation may include but is not limited to a failure to perform the terms of a contract or an unsatisfactory performance in accordance with the terms of the contract. However, a failure to perform or an unsatisfactory performance caused by acts beyond the control of the Bidder may not be considered to be a basis for disqualification.
5. Bidder does not carry workers' compensation or unemployment insurance as required by statute.

C. Bidder's representations concerning its qualifications will be construed as a covenant under the Contract. Should it appear that Bidder has made a material misrepresentation, District shall have the right to terminate the Contract for Contractor's breach, and District may then pursue such remedies as exist elsewhere under this Contract, or as otherwise are provided at law or equity.

D. The District shall issue a written decision to disqualify a Bidder under ORS 279C.440. Such decision will identify the reasons why the Bidder is disqualified. The Bidder may appeal its disqualification pursuant to ORS 279C.445.

1.5 BIDDER'S REPRESENTATIONS**:** Each Bidder by submitting its Bid represents that:

A. Bidder has read and understands the Bidding Documents and its Bid is made in accordance therewith; and Bidder agrees to be bound by the terms and requirements set forth in the Bidding and Contract Documents.

B. Bidder has visited the site, has familiarized itself with the local conditions under which the Work is to be performed in accordance with Paragraph 12 herein, and has correlated its observations with the requirements of the proposed Contract Documents.

C. Its Bid is based upon the materials, systems and equipment required by the Bidding Documents without exception.

D. Bidder has the capability, in all respects, and the moral and business integrity, reliability, technical ability, financial resources, physical plant, management, superintendence, equipment and materials

which will assure effective and efficient good-faith performance in full compliance with the Contract Documents and with any and all schedules and completion dates required by the District.

E. The Bidder acknowledges and represents that it has made allowances for normal inclement weather indigenous to the Project Site, in its estimating, planning and scheduling of the Work.

F. The Bidder further acknowledges that the Contract Documents are, in its opinion, appropriate and adequate for completing this project and for the construction of sound and suitable work.

G. The Bidder hereby certifies that the Work shall be completed, in place, in full accordance with the Contract Documents, within the time limits specified.

1.6 PREPARATION AND SUBMITTAL OF BID FORM**:**

A. Bids shall be submitted utilizing the Bid Form provided with the Bidding Documents, and shall be complete in every respect. The total Bid amount shall be entered in words and figures in the space provided. Where applicable, the unit price of lump sum items, and their extensions, shall be entered in figures in the respective columns provided for each bid item. All entries shall be typewritten or printed in ink. The signatures of all persons shall be in longhand. Any entry of an amount that appears on the face of the bid to have involved an erasure, deletion, whiteout, substitution and/or other such change or alteration shall be initialed by the person signing the bid and show the date of the change or alteration. A failure to comply with this requirement may be cause for disqualification of the Bid.

B. For lump sum Bids, in the event of a discrepancy between the Bid amount in writing and that in figures, the written value shall govern.

C. Bids shall not contain any restatement or qualifications of work to be done, and alternate bids will not be considered unless called for. No oral, email, facsimile or telephonic bids or modifications will be considered.

D. Bids shall be delivered to the District on or before the day and hour set for the receipt of bids, enclosed in a sealed, opaque envelope and bearing the title of the work, name of the Bidder and Bidder's CCB Registration Number.

1.7 BID SECURITY**:**

A. Each Bid must be accompanied by bid security in the form of: (1) an irrevocable letter of credit; or (2) a cashier's check or a Certified Check of the Bidder, made payable to the District; or (3) a surety bond on the Bid Bond Form provided herein or on a similar form which in every respect materially complies with said Bid Bond. Bid security shall be in the amount of ten percent (10%) of the Base Bid plus any positive alternate amounts. Any Bid Bond shall be issued by a Surety company licensed to conduct business in the State of Oregon and be acceptable to the District. The Surety signing the Bid Bond shall be registered with the Oregon State Insurance Commissioner, and the Surety's name shall appear in the current Authorized Insurance Company list in the State of Oregon published by the office of the Insurance Commissioner. Each Surety's name must also appear on the United States Treasury Department's list of authorized sureties, circular 570, as amended.

B. The Bid security is given as a guarantee that the Bidder will enter into a Contract if awarded the Work and, in the case of refusal or failure to so enter into said Contract, the security shall be declared forfeited to the District, in accordance with ORS 279C.385. Such security shall be returned to all but the three (3) lowest Bidders within seven (7) days after the opening of the Bids and the remaining securities will be returned within forty-eight- (48) hours after the District and the successful Bidder have executed the Contract. If no Contract has been awarded or the Bidder has not been notified of the acceptance of its Bid, within thirty (30) days of the Bid opening, the Bidder may withdraw its Bid and request the return of its Bid security. If, at the District's request, the Bidder agrees to extend and maintain its' Bid beyond the specified thirty (30) days, its Bid security will not be returned until after the District and the Successful Bidder have executed the Contract.

1.8 INSURANCE BINDER**:**

A. Each Bid shall be accompanied by a letter or form from the Bidder's insurance company stating that upon award of the Contract the types and amount of insurance required elsewhere in these specifications will immediately become effective.

1.9 UNIT PRICES**:**

A. The Bidder shall include in the spaces provided on the Bid Form a Bid for each unit price.

B. The District may accept or reject any or all of these unit prices and include them in the Contract. The District is not obligated to use these unit prices and may require the Contractor to provide a complete breakdown of costs listed therein.

1.10 STATEMENT OF QUALIFICATIONS:

Each bid shall be accompanied by a Statement of Qualification completed on the form included herein or on a similar form, which materially includes the information requested.

1.11 LIQUIDATED DAMAGES (Forfeiture of Security Deposit):

The successful Bidder, upon its failure or refusal to execute the Contract within ten (10) days after it has received a Notice of Intent to Award, shall forfeit to the District the security deposited with its Bid, as liquidated damages for such failure or refusal.

1.12 SITE CONDITIONS AND CONDITIONS OF THE WORK:

A. Each Bidder must acquaint itself thoroughly as to the character and nature of the Work to be done and the conditions under which the work will be performed. Each Bidder furthermore must make a careful examination of the site of the Work and inform itself fully as to the difficulties to be encountered in the performance of the Work, the facilities for delivering, storing and placing materials and equipment, existing and available services and utilities, environmental and access constraints, permit requirements and other conditions relating to construction and labor.

B. The Successful Bidder, subject to Paragraph 12.6 of the General Conditions, Section 00 7000, entitled "Differing Site Conditions", assumes all risk as to the nature and behavior of the soil or subsurface conditions which underlie the Work or is adjacent thereto, or difficulties that may be due to any unfavorable conditions that may be encountered in the Work, whether apparent on surface inspection or disclosed after construction begins.

C. No plea of ignorance of conditions that exist or may hereafter exist on the site of the Work, or difficulties that may be encountered in the execution of the Work, as a result of failures to make necessary investigations and examinations, will be accepted as an excuse for any failure or omission on the part of the Successful Bidder to fulfill in every detail all the requirements of the Contract Documents and to complete the Work for the consideration set forth therein, or as a basis for any claim whatsoever.

D. Insofar as possible, the Successful Bidder, in carrying out its work, must employ such methods or means as will not cause interruption of or interference with the Work of the District or any separate Contractor.

E. The Contract includes excavation on an unclassified basis. The cost of all excavation and backfill required under this Contract is a part of the Base Bid. No distinction will be made insofar as payment is concerned between earth and rock.

F. ☐ If box is checked, either Bidder or a subcontractor must be licensed under ORS 468A.720 regarding asbestos abatement.

1.13 BIDDER'S QUESTIONS, ADDENDA AND INTERPRETATIONS:

A. Bidders and Sub Bidders- shall promptly notify the District of any ambiguity, inconsistency or error which they may discover upon examination of the Bidding and Contract Documents or of the site and

local conditions. No interpretation of the meaning of the drawings, specifications or other Contract Documents will be made to any Bidder orally.

B. Every request for such technical and design interpretation shall be in writing addressed to BBT Architects, 1140 SW Simpson Ave, Suite 200, Bend, OR 97702. To be given consideration the request must be received by the Architect at least seven (7) calendar days prior to the date fixed for the opening of the Bids.

C. Any and all such interpretations and any supplemental instruction will be in the form of written addenda to the Bidding Documents which, if issued, will be mailed or transmitted via email to all prospective Bidders (to the respective addresses and email addresses furnished for such purposes) not later than seventy-two (72) hours prior to the date and time fixed for the opening of the Bids. (Each Bidder wishing to receive notice of addenda shall register as a prime bidder with Central Oregon Builders Association (COBA) 1051 NE 4th Street, Bend, Oregon 97703. The District will be responsible for any other explanations or interpretations of the proposed documents. Failure of any Bidder to receive any such addendum or interpretation shall not relieve any Bidder from any obligation under its Bid as submitted. All addenda so issued shall become a part of the Contract Documents.

D. If the Bidder (or any person bidding to Bidder and/or subsequently in contract with the Bidder, relating to the subject project) knows, or should have known, that an ambiguity, discrepancy, error, omission or conflicting statement exists in the Bidding or Contract Documents, said Bidder (or sub-bidder) has an obligation to seek a clarification thereof from the District prior to the Bid. The District will welcome such a clarification request, and, if deemed necessary by the District, the District will issue a written addendum clarifying the matter in question. Change orders presented at the initial meeting between the District and the Contractor will be presumed to have been the proper subject of a clarification and will be disallowed.

E. Each Bidder shall ascertain prior to submitting its Bid that it has received all Addenda issued and shall acknowledge receipt and inclusion in its Proposal of all Addenda.

1.14 PROTEST PROCESS:

A. A Bidder may protest the Specifications or Contract terms and conditions by delivering a written protest on those matters to the District not less than ten (10) days prior to the date fixed for the opening of the Bids. All protests of Specifications or Contract terms and conditions must be in writing, and must comply with OAR 137-049-0260(3).

B. A Bidder may submit to the District a written protest of the District's intent to award the Contract within seven (7) days after the District's issuance of the notice of intent to award the Contract. A Bidder may submit a protest of the award only as allowed by, and only in compliance with, OAR 137-049-0450(4).

1.15 SECURITY FOR FAITHFUL PERFORMANCE:

The Successful Bidder shall furnish a Performance Bond and Payment Bond, each in an amount equal to one hundred percent (100%) of the Contract sum, as security for the faithful performance of this Contract and also as security for the payment of all persons performing labor and furnishing materials under this Contract. The Performance and Payment Bonds shall be acceptable to the District, in accordance with State law and shall be delivered to the District not later than the date of execution of the Contract. The Surety signing the Bidder's Bond shall be registered with the Oregon State Insurance Commissioner, and the Surety's name shall appear in the current Authorized Insurance Company list in the State of Oregon published by the office of the Insurance Commissioner. Each Surety's name must also appear on the United States Treasury Department's list of authorized sureties, circular 570, as amended. No Work shall commence at the project site until approved Bonds are received by the District. Both bonds shall be in compliance with ORS Sections 279C.375, 279C.625 and 701.430.

1.16 TIME FOR COMPLETION:

The time for completion of this Contract shall be as listed in the Bid Form, Specification Section 00 4100 noted as "Milestone Dates List" for Substantial Completion, and as fixed in the Owner-Contractor- Agreement.

1.17 LOCATION OF THE WORK:

The site of the proposed work is on District owned property, public streets, easements and/or other right-of-way's, as shown on the drawings.

1.18 LIABILITY INSURANCE AND WORKER'S COMPENSATION:

The Successful Bidder will be required to carry public liability and worker's compensation and other insurance in the amounts and under the terms stipulated under the General Conditions. No Work shall commence at the project site until approved Certificates are received by the District.

1.19 BIDDERS REFERRED TO LAWS:

A. The attention of the Bidders is called to the provisions of all Local, State and Federal laws, regulations, ordinances and resolutions applicable to the work, as well as laws, regulations, ordinances, resolutions and permits relating to obstructing streets, maintaining signals, storing and handling of explosives, preserving safety or affecting the Bidder, or its employees or its work hereunder in its relation to the District or any other person. The Bidder shall obey all such laws, regulations, ordinances, permits or resolutions applicable to the Work or controlling or limiting Contractors while engaged in the execution of the Work under this Contract.

B. The provisions of this Contract shall be interpreted in accordance with the laws of the State of Oregon and in accordance with the laws, ordinances, regulations, permits and resolutions of the City of Madras and Jefferson County.

C. The District will not receive or consider a Bid for a Public Improvement Contract unless the Bidder is registered with the Construction Contractors Board, or is licensed by the State Landscape Contractors Board, as specified in OAR 137-049-0230, as applicable.

1.20 TAXES:

Contractor shall include in its Bid and pay for all applicable taxes. Refer to General Conditions regarding further discussion.

1.21 RIGHT TO REJECT BIDS:

The District may reject any Bid not in compliance with all prescribed public contracting procedures and requirements, including the requirement to demonstrate the Bidder's responsibility under ORS 279C.375(3)(b), and may reject for good cause all Bids after finding that doing so is in the public interest. The District reserves the right to cancel the solicitation at any time in its sole discretion and to waive minor informalities and irregularities, in accordance with applicable law, when it deems necessary or advisable, in its sole discretion.

1.22 MODIFICATION OR WITHDRAWAL OF BID:

A. Prior to the time and date designated for receipt of Bids, any Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder, and must be received by the District on or before the date and time set for receipt of Bids, and it shall be so worded as not to reveal the amount of the original Bid.

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

C. After Bid opening, the District may permit a Bidder to withdraw its Bid, based on one or more clerical errors in the Bid, only if the Bid shows with objective proof and by clear and convincing evidence:
   1. The nature of the error;
   2. That the error is not a minor informality under this subsection or an error in judgment;

3. That the error cannot be corrected or waived under DJ-AR 49-0350;
4. That the Bidder acted in good faith in submitting a Bid that contained the claimed error and in claiming that the alleged error in the Bid exists;
5. That the Bidder acted without gross negligence in submitting a Bid that contained a claimed error;
6. That the Bidder will suffer substantial detriment if the Contracting Agency does not grant the Bidder permission to withdraw the Bid;
7. That the Contracting Agency's or the public's status has not changed so significantly that relief from the forfeiture will work a substantial hardship on the Contracting Agency or the public it represents; and
8. That the Bidder promptly gave notice of the claimed error to the Contracting Agency.

D. Bid security, if any is required, shall be in an amount sufficient for the Bid as modified or resubmitted.

E. A decision denying withdrawal of Bid pursuant to Article 21.A herein shall be final and conclusive unless the Bidder appeals the decision within ten (10) days after receipt of the decision.

F. If, upon appeal, it is determined that the decision refusing withdrawal of the Bid was arbitrary or capricious, the sole relief shall be withdrawal of the Bid and return of the Bid security.

1.23 DISCLOSURE AND SUBSTITUTION OF FIRST-TIER SUBCONTRACTORS

A. Within two (2) working hours after the date and time of the deadline when the bids are due to the public contracting agency, for any Public Improvement project exceeding $100,000, all Bidders shall submit to the Agency a disclosure form, included in the Bid Form (Section 00 4100), identifying any first-tier subcontractors (those Entities that would be contracting directly with the prime contractor) that will be furnishing labor and/or materials on the contract, if awarded, whose subcontract value would be equal to or greater than:
1. Five percent (5%) of the total Contract Price, but at least $15,000; or
2. $350,000, regardless of the percentage of the total Contract Price.

B. Bidders are required to disclose the following information about each required first-tier subcontractor:
1. The subcontractor’s name and address,
2. The category of Work that the subcontractor would be performing,
3. The subcontractor’s Construction Contractor Board (CCB) registration number, if one is required, and
4. The subcontract dollar value.

C. The District must reject a bid if the Bidder fails to submit the disclosure form with this information by the stated deadline. (DJ-AR 49-0360) If there are no subcontractors or suppliers required to be disclosed, Bidder must provide the required disclosure form, noting on the completed form “None”. Compliance with the disclosure and submittal requirements of ORS 279C.370 and this rule is a matter of Responsiveness. Bids which are submitted by Bid Closing, but for which the separate disclosure submittal has not been made by the specified deadline, are not Responsive and shall not be considered for Contract Award. A First Tier Subcontractor Disclosure Form which has no subcontractors or suppliers and is completed with the word “None” must be submitted separately and be properly marked in the same manner as any other first-tier subcontractor disclosure form.

D. Substitution of affected first-tier subcontractors shall be made only in accordance with ORS 279C.585.

1.24 DETAILED BID BREAKDOWN:

A. Upon notification from the District to the Bidder that it has submitted the apparent lowest responsive Bid, the Bidder shall, within twenty-four (24) hours, provide a detailed breakdown of its Bid in a form acceptable to the District.

B. The breakdown may be used by the District to verify accounting requirements, and to determine whether the Bidder has grossly misjudged the requirements of any area.

C. The Bidder's failure to provide the requested detailed breakdown in the specified time may result in rejection of the Bid Proposal in the sole discretion of the District.

1.25 AWARD OF CONTRACT:

If the District determines that a contract is to be awarded, it will award the contract to the lowest responsive and responsible Bidder. The "lowest responsible bidder" will be the lowest bidder who has substantially complied with all bidding requirements and procedures and who has not been disqualified by the District under ORS 279C.440. In determining the lowest responsible bidder, the District shall add a percentage increase of the bid of nonresident bidder as required by ORS 279A.120. In the event that all Bids exceed the District's cost estimate, the District may negotiate with the lowest responsive and responsible Bidder in accordance with ORS 279C.340 to solicit value engineering and other options to attempt to bring the contract within the contracting agency's cost estimate.

A. The Lowest Bidder is determined by the aggregate amount of the Base Bid, plus any Alternates selected by the District.

B. A Responsive Bidder shall mean a Bidder who has submitted a Bid which conforms, in all material respects, to the Bidding Documents.

C. A Responsible Bidder shall mean a Bidder who has the capability, in all respects, to perform fully the Contract requirements and the moral and business integrity and reliability which will assure good faith performance. In determining responsibility, the District must determine that the Bidder:

1. Has available the appropriate financial, material, equipment, facility and personnel resources and expertise, or ability to obtain the resources and expertise, necessary to meet all contractual responsibilities;
2. Has completed previous contracts of a similar nature with a satisfactory record of performance. A satisfactory record of performance means that, to the extent the costs associated with and time available to perform a previous contract were within the Bidder's control, the Bidder stayed within the time and budget allotted for the procurement and otherwise performed the contract in a satisfactory manner. A Contracting Agency should carefully scrutinize a Bidder's record of contract performance if the Bidder is or recently has been materially deficient in contract performance. In reviewing the Bidder's performance, the Contracting Agency should determine whether the Bidder's deficient performance was expressly excused under the terms of contract, or whether the Bidder took appropriate corrective action. The Contracting Agency may review the Bidder's performance on both private and Public Contracts in determining the Bidder's record of contract performance. The Contracting Agency shall make its basis for determining that a Bidder is not responsible under this paragraph part of the Solicitation file;
3. Has a satisfactory record of integrity. A Bidder may lack integrity if a Contracting Agency determines the Bidder demonstrates a lack of business ethics such as violation of state environmental laws or false certifications made to a Contracting Agency. A Contracting Agency may find a Bidder not Responsible based on the lack of integrity of any Person having influence or control over the Bidder (such as a key employee of the Bidder that has the authority to significantly influence the Bidder's performance of the Contract or a parent company, predecessor or successor Person). The standards for Conduct Disqualification under DJ-AR 49-0370 may be used to determine a Bidder's integrity. A Contracting Agency may find a Bidder non-responsible based on previous convictions of offenses related to obtaining or attempting to obtain a contract or subcontract or in connection with the Bidder's performance of a contract or subcontract. The Contracting Agency shall make its basis for determining that a Bidder is not responsible under this paragraph part of the Solicitation file;
4. Is legally qualified to contract with the Contracting Agency; and

5. Has supplied all necessary information in connection with the inquiry concerning responsibility. If the Bidder fails to promptly supply information requested by the Contracting Agency concerning responsibility, the Contracting Agency shall base the determination of responsibility upon any available information, or may find the Bidder not responsible.

D. The ability of the low Bidder to provide the required bonds will not of itself demonstrate responsibility of the Bidder.

E. The District reserves the right to defer award of this Contract for a period of thirty (30) days after the due date of the Bids. During this period of time, the Bidder shall guarantee the prices quoted in its Bid.

1.26 SUBCONTRACTORS:

A. All Subcontractors proposed for the Work must be acceptable to the District.

B. The District reserves the right to request the proposed Subcontractors to complete qualification forms and/or current financial statements prepared by a Certified Public Accountant. These forms will be similar to those required of a Bidder under the Instructions to Bidders.

1.27 MINIMUM WAGE RATES:

Labor required for the construction of this project is subject to the minimum wage rates as provided in the Supplementary General Conditions. No Bid will be received or considered by the District unless the Bid contains a statement by the Bidder as a part of its Bid that "Contractor agrees to be bound by and will comply with the provisions of 279C.838, 279C.840 or 40 U.S.C. 3141 to 3148."

1.28 PRE-BID CONFERENCE (MANDATORY):

A Mandatory Pre-Bid Conference will be conducted by the District at the time indicated in the Advertisement for Bids to afford Bidders the opportunity to question the District and the Architect. The meeting will be held at the location identified in the Advertisement for Bids. (If no time is given in the Advertisement for Bids, no Pre-Bid Conference will be held.) Any statements made by the District's representatives at the conference are not binding upon the District unless confirmed by written addendum.

1.29 MILESTONE DATES AND SCHEDULE:

A. A list of Milestone Dates is included in the Bidding Documents. Each Bidder shall submit the list of Milestone Dates, in its original form, with its bid and, in so doing, will attest that the Bidder intends to complete the Work and other aspects of the Project within the Milestone Dates. The Bidder may not condition its Bid on the acceptance District of delayed Milestone Dates.

B. Within seven (7) calendar days after issuance of Notice to Proceed, the Contractor shall deliver to the District a detailed construction schedule for review and acceptance by the District and shall thereafter be referred to as the Schedule. The Schedule shall be, in form and content, acceptable to the District.

C. The Bidder's attention is drawn to Division 1, Section 01 3200 of the General Requirements entitled "Schedule and Reports" for additional requirements.

1.30 SUBSTITUTIONS:

The attention of potential bidders and other interested parties is called to the conditions set forth in Division 1, Section 01 2500 of General Requirements, "Substitutions", regarding approval and product options for substitutions.

1.31 CONTRACTOR'S DRUG TESTING PROGRAM

Per ORS 279C.505(2), prior to Contract Award, Contractor shall certify to the District that it has a drug testing program in place for its employees that includes, at a minimum, the following:

A. A written employee drug-testing policy.

B. Required drug testing for all new Subject Employees or alternatively, required testing of all Subject Employees every 12 months on a random selection basis, and

C. Required testing of a Subject Employee when the Contractor has reasonable cause to believe the Subject Employee is under the influence of drugs.

1.32 BACKGROUND CHECKS

A. No Unsupervised Contact with Students. Unsupervised contact with students means contact with students that provide the person opportunity and probability for personal communication or touch when not under direct supervision. Contractor will ensure that Contractor, any subcontractors, and their officers, agents and employees will have no direct unsupervised contact with students while on District property. Contractor will work with the District to ensure compliance with this requirement. If Contractor is unable to ensure through a security plan that none of its officers, agents or employees will have direct, unsupervised contact with students in a particular circumstance or circumstances, Contractor shall so notify the District prior to beginning any Work that could result in such contact. Contractor authorizes District to obtain information about Contractor and Contractor's history and to conduct a criminal background check, including fingerprinting, of any officer, agent or employee of Contractor that will have unsupervised contact with students. Contractor also agrees to cause Contractor's employees and/or subcontractors, if any, to authorize District to conduct such background checks. Contractor shall pay all fees assessed by Oregon Department of Education and by the District's background check vendor for processing the background check. District may deduct the cost of such fees from a progress of final payment to the Contractor under this contract, unless the Contractor elects to pay such fees directly.

1.33 PERMITS & FEES

The Owner shall coordinate and obtain all permits necessary to obtain the general building permit for the Project. The Owner will pay for the general building permits (including right of way permits, grading and drainage, foundation, mechanical, plumbing and electrical as necessary to initially begin construction), utility connection fees, system development charges and related inspections. The Contractor will be responsible to obtain and pay for all other permits, assessments, penalties, charges, licensing and re-inspection fees required for the proper execution of the Work which are legally required at the time the bids are received or thereafter as a consequence of the Contractor's acts or omissions. The Contractor is responsible for coordinating and obtaining all required inspections and approval signatures. The Contractor is required to submit all inspection records to the District at the completion of the project and as a prerequisite for final payment. Contractor shall not be entitled to any additional time for performance because of its failure to secure or coordinate with the Owner for procurement of any required permits on a timely basis. The contractor will be required to maintain the permit documents at the site as required by the governing authority.

END OF SECTION

REFERENCE:

1. The Form of Agreement between the Owner and the Contractor shall be in the following form:

* * * * * * * * * *

OWNER-CONTRACTOR AGREEMENT

DATE OF CONTRACT:

CONTRACT NUMBER:

PROJECT NUMBER: 0100-23

THIS AGREEMENT, made this day of , 2023.

By and Between

Jefferson County School District 509J
445 SE Buff Street
Madras, OR 97741

And

(Contractor)
(Mailing Address)

All correspondence, submittals and notices relating to or required under this Contract shall be sent in writing to the above addresses or fax numbers; unless either party is notified in writing by the other, of a change in address.

WITNESSETH

WHEREAS, it is the intention of the Owner to obtain the services of the Contractor in connection with the Warm Springs K-8 Academy Six Classroom Addition and Restrooms, Hereinafter referred to as the "Project" or the "Work"; and

WHEREAS, the Contractor desires to perform such construction in accordance with the terms and conditions of this Agreement,

NOW, THEREFORE, in consideration of the promises made herein and other good and valuable consideration, the following terms and conditions are hereby mutually agreed to, by and between the Owner and the Contractor:

Article 1
DEFINITIONS

1.1 Capitalized terms used but not defined in this Agreement shall have the meanings given such terms in the Information for Bidders and the General Conditions, as applicable.

1.2 The Contract Documents are as defined in the General Conditions. Such documents form the Contract, and all are as fully a part thereof as if attached to this Agreement or repeated herein.

1.3 The Drawings and Specifications referred to in the Contract Documents have been prepared by BBT Architects for the Jefferson County School District 509J, Jefferson County, Oregon and are entitled, Jefferson County School District: Warm Springs K-8 Academy Six Classroom Addition and Restrooms.

1.4 The Construction Project Manager is Mike Tiller, Tiller's Schoolhouse Consulting, Inc.

Article 2
STATEMENT OF THE WORK

2.1 The Contractor shall provide and pay for all materials, tools, equipment, labor and professional and non-professional services, and shall perform all other acts and supply all other things necessary to fully and properly perform and complete the Work as required by the Contract Documents.

2.2 The Contractor shall further provide and pay for all related facilities described in any of the Contract Documents, including all work expressly specified therein and such additional work as may be reasonably inferred therefrom, saving and excepting only such items of work as are specifically stated in the Contract Documents not to be the obligation of the Contractor. The totality of the obligations imposed upon the Contractor by this Article and by all other provisions of the Contract Documents, as well as the structures to be built and the labor to be performed, is herein referred to as the "Work".

Article 3
ARCHITECT

3.1 The Architect (as defined in the General Conditions) shall be:

BBT Architects
1140 SW Simpson Ave, Suite 200
Bend, OR 97702

The Owner may, without liability to the Contractor, unilaterally amend this Article from time to time by designating a different person or organization to act as its Architect and so advising the Contractor in writing, at which time the person or organization so designated shall be the Architect for purposes of this Contract.

Article 4
TIME OF COMMENCEMENT AND COMPLETION

4.1 The Contractor shall commence the Work promptly upon the date established in the Notice to Proceed.

4.2 Time is of the essence. The Contractor shall achieve Substantial Completion(s) and Final Completion, within the time periods stated hereunder taken from the date of Notice to Proceed and Contractor's Bid.

SPECIFIC DATES:

Substantial Completion	December 1, 2023
Final Completion	December 28, 2023

4.3.1 The liquidated damages incurred by the Owner due to the Contractor's failure to Substantially Complete the Warm Springs K-8 Academy Six Classroom Addition and Restrooms within the Contract Time, including any extensions thereof, shall be Zero dollars ($0) per day.

4.3.2 The amount of liquidated damages for failure to meet any of the above noted Final Completion dates are in addition to the amount of liquidated damages for failure to Substantially Complete the Work.

4.4 The Contractor agrees said sums are agreed upon as a reasonable and proper measure of damages which the Owner will sustain per day by failure of the contractor to complete the Work within time as stipulated, it being recognized by the Owner and the Contractor that the injury to the Owner which could result from a failure of the contractor to complete on schedule is uncertain and cannot be computed exactly. In no way shall costs for liquidated damages be construed as a penalty on the Contractor.

4.5 The amount of liquidated damages set forth in Article 4.3 hereinabove shall be assessed cumulatively. This provision for liquidated damages does not bar the Owner's rights to enforce other rights and remedies against the contractor, including but not limited to, specific performance or injunctive relief. The amount of liquidated damages relates only to the Owner's inability to do the Work; and it does not limit the Owner from recovering, in addition, costs incurred for extended administration or additional services relating to or arising out of a delay completion.

4.6 If Final Completion is not achieved through no fault of the contractor, the Owner may process final payment under ORS 279C.570 and withhold one hundred percent (100%) of the value of the uncompleted work. This value shall be determined by the Construction Project Manager.

Article 5
CONTRACT SUM

5.1 Provided that the Contractor shall strictly and completely perform all of its obligations under the Contract Documents, and subject only to additions and deductions by modification or as otherwise provided in the Contract Documents, the Owner shall pay to the Contractor, in current funds and at the times and in the installments hereinafter specified, the sum of_____ _____Dollars ($_____) (herein referred to as the "Contract Sum").

5.2 The Contract Sum is based upon the following alternates and unit prices, if any, which are set forth in the Contract Documents and which are hereby accepted by the Owner:

(Alternates accepted and applicable unit prices to be listed here in executed contract)

Article 6
PROGRESS PAYMENTS

6.1 The Contractor hereby agrees that on the date established for updates for every month during the performance of the Work he will deliver to the Construction Project Manager an Application for Payment in accordance with the provisions of the General Conditions and Section 01 2900. This date may be changed upon mutual agreement, stated in writing, between the Owner and Contractor. Payment under this Contract shall be made as provided in the General Conditions.

6.2 Past-due progress payments shall bear interest at the statutory rate in accordance with ORS 279C.570.

Article 7
OTHER REQUIREMENTS

7.1 The Contractor shall submit the Performance Bond, Payment Bond, Certificates of Insurance, and Certificate of Compliance with Oregon tax laws, as required by the Contract Documents, prior to commencement of the Work.

7.2 The Contractor shall perform at least five percent (5%) of the total Work with forces that are in the direct employment of the Contractor's organization.

7.3 Subcontracting requirements shall be in accordance with ORS 279A.105, and as further described in the General Conditions and Supplementary Conditions (if any).

7.4 The Contractor shall comply with the Prevailing Wage Rates of the State of Oregon, effective, January 1, 2023, and as amended, attached by reference, governing all covered workers for all work on this project.

7.5 The Contractor agrees to comply with Title VI of the Civil Rights Act of 1964, and with Section V of the Rehabilitation Act of 1973, and ORS Chapters 659 and 659a.

IN WITNESS WHEREOF, the parties execute this Agreement as of the day and year first written above.

OWNER Jefferson County School District 509J
Jefferson County, Oregon

By: _____

Date: _____

CONTRACTOR

(Seal)
By: _ (Title)

Date: _____

CERTIFICATE OF COMPLIANCE WITH OREGON TAX LAWS

By signature on the Contract, I, the undersigned being authorized to represent _____ hereby certify that _____ is not, to the best of my knowledge, in violation of any Oregon tax law described in ORS 305.380(4). For the purposes of this certification, "Oregon tax laws" are ORS 320.005 to 320.150 and 403.200 to 403.250 and ORS chapters 118, 314, 316, 317, 318, 321 and 323 and the elderly rental assistance program under ORS 310.630 to 310.706 and local taxes administered by the Department of Revenue under ORS 305.620.

_____

Signature Date

END OF SECTION

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SECTION 00 6113

PERFORMANCE & PAYMENT BOND

Bond No. _____

Amount: $ _____

KNOW ALL MEN BY THESE PRESENTS that, we , as Principal (Contractor), and _____, a corporation organized and existing under the laws of the State of Oregon_____, and duly authorized to transact a SURETY business in the State of Oregon, as SURETY, are held and firmly bound unto JEFFERSON COUNTY SCHOOL DISTRICT 509J, JEFFERSON COUNTY, OREGON, in the sum of _____DOLLARS, ($), lawful money of the United State of America, for the payment whereof well and truly to be made, we and each of use, jointly and severally, bind ourselves, our and each of our heirs, executors, administrators, successors and assigns firmly by these presents.

THE CONDITIONS of this obligation are such that, whereas the above Principal did on the_____ day of _____, 2023 enter into a Contract with Jefferson County School District 509J, Jefferson County, Oregon for the construction required for the Warm Springs K-8 Academy Six Classroom Addition with Restrooms, which Contract is made a part hereof as if fully copied herein;

NOW, THEREFORE, if the said Principal faithfully, punctually and completely performs and abides by all covenants and conditions of said Contract, and with all laws, ordinances, regulations, and orders of the State of Oregon, and Jefferson County, and the agencies and bureaus thereof, directly or indirectly governing or applicable to the Principal's performance under the said Contract, including but not limited to the requirements of Oregon Revised Statutes Chapter 279A and 279C relating to public contracts, which hereby is made a part hereof as if fully copied herein, and shall make payment promptly, as due to Jefferson County School District 509J, Jefferson County, Oregon and to all other public entities as may be required, and to all subcontractors and to all persons supplying to the Principal or his (its) subcontractors' equipment, supplies, labor, or materials for the prosecution of the work or any part thereof, provided for in said Contract, then this obligation shall be null and void, otherwise to be in full force and effect.

Surety agrees (1) that any extension of time allowed said Principal for completion of work or for delivery under the said Contract shall not impair this obligation or reduce any period of maintenance or warranty provided in said Contract; (2) that any change made in the terms or provisions of said Contract increasing the price to be paid to Principal, without notice to the SURETY shall not impair this obligation, but any such change shall automatically increase the obligation of the SURETY hereunder in a like amount, PROVIDED that such increase shall not exceed twenty-five percent (25%) of the original amount of this obligation without consent of the SURETY; and (3) that this obligation shall continue to bind the said Principal and SURETY notwithstanding successive payments made hereunder for successive breaches, until the full amount of the said obligation is exhausted.

IN WITNESS WHEREOF, the Principal and Surety have caused these presents to be executed on this day of _____, 2023.

_____
Principal

By:_____

Title_____

_____
Surety

By:_____
Attorney in Fact

COUNTERSIGNED:

_____
Oregon Resident Agent

_____
Address

_____

N O T E

If Principal is operating under an assumed business name, there must also be set forth in the first paragraph of the bond, the names of all the partners or the individuals owning the business, and the bond must be executed by one of them.

If the Principal is a corporation, the bond must be executed by one of the officers authorized to execute bonds, showing his official title and the seal of the corporation.

The bond must be executed by an attorney-in-fact for the surety company, showing on the face thereof the Oregon agent for service, and bear the seal of the surety company. Where the bond is executed by a person outside the state of Oregon, his authority to execute bonds should be shown.

The bond must be furnished by a surety company authorized to do business in Oregon, and in an amount equal to the full contract price.

END OF SECTION

SECTION 00 6240

OUT OF STATE ITEMS

In accordance with ORS 279A.120:

1. The District shall prefer goods or services that have been manufactured or produced in this state if price, fitness, availability and quality are otherwise equal.
2. The District shall add a percent increase to the bid of a nonresident bidder equal to the percent, if any, of the preference given to the bidder in the state in which the bidder resides.
3. When a public contract is awarded to a nonresident bidder and the contract price exceeds $10,000, the bidder shall promptly report to the Department of Revenue, on forms to be provided by the Department, the total contract price, terms of payment, length of contract and such other information as the Department may require before the bidder may receive final payment on the contract. The District shall satisfy itself that the requirement of this subsection has been complied with before the District issues final payment on a public contract.
4. For purposes of this subsection, a “nonresident bidder” means a bidder who is not a resident bidder. “Resident bidder” means a bidder that has paid unemployment taxes or income taxes in Oregon during the 12 calendar months immediately preceding submission of the bid, has a business address in Oregon, and has stated in its bid whether the bidder is a “resident bidder” under ORS 279A.120.

END OF SECTION

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SECTION 00 7000 GENERAL CONDITIONS OF THE CONTRACT

REFERENCES:

1. The General Conditions shall be "General Conditions of the Contract and/or Construction, Jefferson County School District 509J, Jefferson County, Oregon," bound herein.

SUPPLEMENTS:

1. Supplements may modify, change, delete, or add to the General Conditions. Where any article of the General Conditions is modified or any paragraph deleted, subparagraph or clause thereof is modified, or deleted by these supplements, the unaltered provisions of such article, paragraph, subparagraph or clause shall remain in effect. The General Conditions and the Supplementary General Conditions are applicable to all of the Work under this Contract and shall apply to one Contractor and all Subcontractor's and Sub-subcontractors.

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SECTION 00 7000 GENERAL CONDITIONS OF THE CONTRACT

ARTICLE 1
GENERAL PROVISIONS

1.1 DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Owner-Contractor Agreement, the Conditions of the Contract (General, Supplementary and Special), the Drawings, the Specifications, and all Addenda issued prior to execution of the Contract, written amendments to the Contract signed by the Owner and the Contractor, Change Orders, a written interpretation or clarification issued by the Architect pursuant to Subparagraph 3.2.17 or a written order issued by the Construction Project Manager pursuant to Subparagraph 12.1.2, the Bidding Documents, such as the Advertisement or Invitation to Bid and the Instructions to Bidders, and the Contractor's Proposal.

1.1.2 THE CONTRACT

The Contract is the sum of all the Contract Documents. This Contract represents the entire and integrated agreement between the Owner and the Contractor and supersedes all prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by (1) a written amendment to the Contract signed by the Owner and the Contractor, (2) a Change Order, (3) a written interpretation or clarification issued by the Architect pursuant to Subparagraph 3.2.17, or (4) a written order issued by the Construction Project Manager pursuant to Subparagraph 12.1.2.

1.1.3 THE WORK

The Work comprises the completed construction required by the Contract Documents and includes all labor necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.

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 or by separate contractors.

1.1.5 PLANS OR 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 SPECIFICATIONS

The Project Manual is 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. These are written to, and for, the Contractor, with guidance and reference given to suppliers and subcontractors in separate sections. It is the responsibility of the Contractor to ensure that all construction items in each section are implemented.

1.1.7 PROJECT MANUAL

The Project Manual is a volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

1.1.8 AS SHOWN, AS INDICATED, AS DETAILED

These words, and words of like implication, refer to information contained in the drawings describing the Work, unless explicitly stated otherwise in other Contract Documents.

1.1.9 BIDDER

Any individual, company, corporation, partnership, or joint venture who submits a bid to the Owner for the Work as distinct from a sub-bidder who submits a bid to a Bidder. "Lowest responsible bidder" and "resident bidder" are as defined in ORS 279C.375 and ORS 279A.120.

1.1.10 BIDDING DOCUMENTS

The Invitation to Bid, Instructions to Bidders, Sample Forms, Proposal, all Conditions of the Contract, Specifications, Drawings and Addenda issued prior to receipt of bids by Owner.

1.1.11 DIRECTED, REQUIRED, ACCEPTABLE

When these words refer to the Work or its performance, "directed," "required," "permitted," "ordered," "designated," "prescribed," and words of like implication, mean "by direction of," "requirements of," "permission of," "order of," "designation of," or "prescription of" the Architect. Likewise, "acceptable," "satisfactory," "in the judgement of," and words of like import, mean "recommended by," "acceptable to," "satisfactory to," or "in the judgement of" the Architect.

1.1.12 MANUFACTURER

An individual, company, or corporation who manufactures, fabricates, or assembles a standard product. A standard product is one that is not made to special design and is furnished by either direct sale or by contract to the Contractor, Subcontractor or Vendor.

1.1.13 MATERIAL SUPPLIER OR VENDOR

A person or organization who supplies, but who is not responsible for the installation of, materials, products and equipment of a standard nature that are not specifically fabricated for this particular contract.

1.1.14 PRODUCT

The term "product" includes materials, systems and equipment.

1.1.15 PROPOSAL

A complete and properly signed document (whether entitled “bid” or “proposal”) whereby a Bidder proposes to do the Work or designated portion thereof for the sums stipulated therein, supported by data called for by the bidding requirements.

1.1.16 PROVIDE

As a directive to the Contractor, "provide" means "furnish and install completely".

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 The Contract Documents are complementary, and what is required by anyone shall be as binding as if required by all. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. Work not covered in the Contract Documents will not be required unless it is consistent therewith or is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings unless otherwise specifically defined herein.

1.2.2 The organization of the Specifications into division, sections and articles, and the arrangement of the 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 If any portion of the Contract Documents shall be in conflict with any other portion, the various documents comprising the Contract Documents shall govern in the order of precedence as herein set forth according to their latest date of execution; written interpretation or clarification by the Architect issued pursuant to Subparagraph 3.2.18 or by the Construction Project Manager pursuant to Subparagraph 12.1.2; Change Orders; written amendments to the Owner-Contractor Agreement; the Owner-Contractor Agreement; Addenda; Special Conditions; Supplementary Conditions; General Conditions; Specifications; Drawings; Bidding Documents; Contractor's Proposal. The Specifications take precedence over Drawings for the specific type or quality of materials or the quality of installation; the Drawings take precedence over the Specifications with regard to quantities, locations or detail of installation; as between schedules and general notes given on Drawings, the general notes shall take precedence; as between general notes given on the Drawings and specific, detailed notes, the latter shall take precedence; as between large-scale Drawings and small-scale Drawings, the larger scale shall take precedence. Specifications having greater detail or specificity; and details take precedence over general drawings.

1.2.4 The Contractor agrees that nothing contained in the Contract Documents or any Contract between the Owner and the Construction Project Manager or the Owner and the Architect shall create any contractual relationship between the Construction Project Manager and the Contractor, the Architect and the Contractor, the Architect and the Construction Project Manager, or between the Owner, Architect and Construction Project Manager and any Subcontractor or Sub-subcontractors. The Contractor acknowledges and agrees that this Agreement is not intended to create, nor shall any provision be interpreted as creating any contractual relationship between the Owner or Contractor and any third parties.

1.2.5 Any material or operation specified by reference to published specifications of a manufacturer, a society, an association, a code, or other published standard, shall comply with requirements of the listed document which is current on date of receipt of Proposals. In case of a conflict between referenced document and Project Specifications, Project Specifications shall govern. In case of a conflict between referenced documents, the one having more stringent requirements or higher value shall govern.

1.2.6 The Contractor, if requested, shall furnish an affidavit from manufacturer certifying that a material or product delivered to job meets requirements specified.

1.2.7 By executing the Contract, the Contractor represents that Contractor has visited the site, familiarized itself with the local conditions under which the Work is to be performed, and correlated Contractor's observations with the requirements of the Contract Documents.

1.2.8 The Contract Documents may be executed in counterparts, each of which shall be deemed an original, but all of which shall constitute one and the same instrument.

1.3 OWNERSHIP AND USE OF DRAWINGS AND SPECIFICATIONS

1.3.1 Unless otherwise provided in the Contract Documents, the Contractor will be furnished one copy of the Contract Documents. Any reproduction and use of the Contract Documents shall be solely and exclusively for the execution of the Work and may not be used on other projects of for additions to this Project outside the scope of the Work without the specific written consent of the Owner and Architect.

1.3.2 After Bid Award, electronic copies containing simplified versions of the electronic construction drawings will be forwarded to the general contractor for the general contractor's use and distribution as base drawings for the preparation of the general contractor's shop drawings. The Architect, or the Architect's consultants, will not issue electronic drawing files of any nature to anyone other than the Contractor. The electronic copies may contain the following simplified drawings, as deemed appropriate by the Architect: Civil Site Plan(s), Base Floor and Reflected Ceiling Plans from architectural, structural, mechanical, electrical and other specialty consultants, General Building Sections.

The electronic copies will not contain the following items: Addenda issued during bidding, Specifications, Details, Schedules, or other items issued in the Project Manual.

Electronic drawings will generally be in AutoCad format, unless other formats are used by the Architect or their consultants. The Architect will not convert the formats provided to the Contractor, from other formats.

1.3.3 All Drawings, Specifications and copies thereof furnished to, or made by, the Contractor are and shall remain property of the Architect and the Owner. With the exception of one contract set for each party to the Contract, such documents are to be returned or suitably accounted for to the Owner on request at the completion of the Work. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the common law copyright or other reserved rights of the holder thereof.

ARTICLE 2
OWNER

2.1 DEFINITION

2.1.1 The Owner is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number. The term Owner means the Owner or its authorized representatives or agents.

2.2 CONSTRUCTION PROJECT MANAGER

2.2.1 The Construction Project Manager is the Owner's exclusive representative and agent to the Contractor with respect to this Project during construction and until the issuance of the final Certificate of Payment. The Owner's communications with the Contractor and Architect shall be exclusively through the Construction Project Manager. The Construction Project Manager will have full authority to act on behalf of the Owner with regard to all aspects of this Project except that the Owner must approve all Change Orders and payments to the Contractor. All of the Construction Project Manager's actions with regard to this Project will be as an agent and representative of the Owner. If no Construction Project Manager is designated in the Owner-Contractor Agreement, all references to the “Construction Project Manager” shall be deemed to refer to the Owner.

2.2.2 The Construction Project Manager is not authorized to revoke, alter, enlarge, relax or release any requirements of the Contract Documents, nor to approve or accept any portion of the Work not executed in accordance with, nor to issue instructions contrary to the Contract Documents.

2.3 INFORMATION, SERVICES AND RIGHTS OF THE OWNER

2.3.1 The Owner, through the Construction Project Manager, will provide administration of the Contract as hereinafter described.

2.3.2 The Owner and the Construction Project Manager shall at all times have access to the Work whenever it is in preparation or progress. The Contractor shall provide safe facilities for such access.

2.3.3 The Owner and the Construction Project Manager shall not be responsible for or have control or charge of the construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work and will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

2.3.4 The Owner and Construction Project Manager will not be responsible for the failure of the Contractor to plan, schedule and execute the Work in accordance with the approved schedule or the failure of the Contractor to meet the Contract completion dates or the failure of the Contractor to schedule and coordinate the Work of Contractor’s own trades and Subcontractors or to coordinate and cooperate with other separate Contractors.

2.3.5 The Owner and Construction Project Manager will not be responsible for the acts or omissions of the Architect, the Contractor, any other contractor, or any subcontractor, or any other contractor's or subcontractor's agents or employees, or any other persons performing any of the Work.

2.3.6 The Construction Project Manager has authority to disapprove, condemn or reject work on behalf of the Owner when, in the Construction Project Manager's opinion, the Work does not conform to the Contract Documents. Whenever in the Construction Project Manager's reasonable opinion it is considered necessary or advisable to ensure the proper implementation of the intent of the Contract Documents, the Construction Project Manager shall have the authority to require special inspection or testing of any work in accordance with the provisions of the Contract Documents whether or not such work is then fabricated, installed, or completed.

2.3.7 The Construction Project Manager will have authority to require special inspection or testing of the Work in accordance with Subparagraph 2.3.6 whether or not such Work is then fabricated, installed or completed. However, neither the Construction Project Manager's authority to act under Subparagraphs 2.3.6 and 2.3.7, nor any decision

made by the Construction Project Manager in good faith either to exercise or to not exercise such authority, shall give rise to any duty or responsibility of the Construction Project Manager to the Contractor, any Subcontractor, any of their agents or employees, or any other person performing any of the Work.

2.3.8 The Construction Project Manager shall have the authority and discretion to call, schedule and conduct job meetings to be attended by the Contractor, Subcontractor representatives and the Architect to discuss such matters as procedures, progress, problems and scheduling.

2.3.9 The Construction Project Manager will establish procedures to be followed for processing all shop drawings, catalogs and other Project reports and other documentation, test reports and maintenance manuals.

2.3.10 The Construction Project Manager will review all requests for changes and shall implement the processing of Change Orders including applications for extensions of time.

2.3.11 The Construction Project Manager will review and process all applications for payment by the Contractor, including final application for payment and will consult with the Architect as appropriate.

2.3.12 The Owner will furnish all surveys in its possession describing the physical characteristics, legal limitations and utility locations for the site of the Project. The Contractor shall carefully review this data since the Owner makes no warranty as to accuracy or completeness of such surveys.

2.3.13 The Owner will secure and pay for easements for permanent structures or permanent changes in existing facilities.

2.3.14 Information or services under the Owner's control will be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.

2.4 OWNER'S RIGHT TO STOP THE WORK

2.4.1 If the Contractor fails to correct defective Work as required by Paragraph 4.6 or persistently fails to carry out the Work or supply labor or material in accordance with the Contract Documents, the Construction Project Manager, by a written order, may instruct the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Construction Project Manager to stop the Work on behalf of the Owner shall not give rise to any duty on the part of the Construction Project Manager to exercise this right for the benefit of the Contractor or any other person or entity.

2.4.2 The Construction Project Manager may order the Contractor in writing to suspend, delay, or interrupt all or any part of the Work for such period of time as it may determine to be appropriate for the convenience of the Owner.

ARTICLE 3
ARCHITECT

3.1 DEFINITION

3.1.1 The Architect is the person or organization lawfully licensed to practice architecture or engineering, or any entity lawfully practicing architecture or engineering, and identified as such in the Owner-Contractor Agreement, and is referred to throughout the Contract Documents as if singular in number. The term Architect means the Architect and its architects and engineers, whether under contract or within its own organization, or its authorized representatives.

3.1.2 Communications between the Contractor or subcontractors and Architects, employees or subconsultants, shall be limited to matters of information; but in no case shall such communications relate to or authorize changes in the Work or give rise to claims for additional Work. The Architect, its architects, engineers, and their employees must communicate with the Contractor only through the Architect's authorized representative and through the Construction Project Manager as provided elsewhere in these contract documents.

3.2 SERVICES OF THE ARCHITECT

3.2.1 The Architect will provide certain services as hereinafter described.

3.2.2 The Architect shall at all times have access to the Work whenever it is in preparation or progress. The Contractor shall provide safe facilities for such access so the Architect may perform its functions under the Contract Documents.

3.2.3 The Architect is not the agent of the Owner and has no authority to agree on changes in the Contract Sum or Contract Time on the Owner's behalf. The Architect will not be responsible for or have control or charge of the construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Architect will not be responsible for the acts or omissions of the Contractor, any Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

3.2.4 The Architect shall review Shop Drawings, Product Data and Samples, and other submissions of the Contractor as well as the Work performed by the Contractor but only for conformance with the design concept of the Project and for general compliance with the Contract Documents. The review of submittals shall be accomplished by the Architect within fifteen (15) calendar days from date of receipt except when authorized otherwise by the Construction Project Manager.

3.2.5 The Construction Project Manager will establish with the Architect, procedures to be followed for review and processing of all Shop Drawings, catalog submissions, Project reports, test reports, maintenance manuals, and other necessary documentation, as well as requests for changes and applications for extensions of time.

3.2.6 The Architect shall, when requested by the Construction Project Manager, prepare Change Orders.

3.2.7 Should errors, omissions or conflicts in the Drawings, Specifications or other Contract Documents by the Architect be discovered, the Architect will prepare such amendments or supplementary documents, and provide consultation as may be required.

3.2.8 The Architect will make such periodic visits to the Project site as may be necessary to familiarize itself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. On the basis of such on-site observations, the Architect shall endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor. The Architect and its consulting engineers shall not be required to make exhaustive or full-time on-site inspections to check the quality or quantity of the Work, but shall make as many inspections as may be reasonably required to fulfill the Architect's obligations to the Owner.

3.2.9 The Architect will render written field reports to the Construction Project Manager in the form required by the Construction Project Manager relating to the periodic visits and inspections of the Project required by Subparagraph 3.2.8.

3.2.10 The Architect shall consult with the Construction Project Manager regarding the Contractor's Applications for Payment and shall sign the Certificates of Payment as provided in Subparagraph 9.4.2.

3.2.11 If the Architect observes any work that does not conform to the Contract Documents, the Architect shall report this observation to the Construction Project Manager.

3.2.12 The Architect has authority to disapprove, condemn or reject work on behalf of the Owner when, in the Architect's opinion, the Work does not conform to the Contract Documents. Whenever in the Architect's reasonable opinion it is considered necessary or advisable to ensure the proper implementation of the intent of the Contract Documents, the Architect will have the authority to require special inspection or testing of any Work in accordance with the provisions of the Contract Documents whether or not such Work is then fabricated, installed or completed.

3.2.13 The Architect will prepare on a regular basis, a "deficiency list" of items during the process of construction that are not in conformance with the Contract Documents. The Construction Project Manager will transmit such lists to the Contractor for corrections.

3.2.14 The Architect will prepare and submit to the Construction Project Manager "punchlists" at Substantial Completion of Work of the Contractor which are not in conformance with the Contract Documents. The Construction Project Manager will transmit such lists to the Contractor for correction or completion thereof.

3.2.15 The Architect and Construction Project Manager shall conduct observations to determine the dates of Substantial Completion and Final Completion and will jointly issue a final Certificate for Payment.

3.2.16 The Architect will prepare a set of reproducible Record Drawings showing significant changes in the Work made during the construction process, based on the as-built drawings and other data furnished by the Contractor. The Architect will also transmit the as-built drawing in electronic format.

3.2.17 The Architect will provide the Owner assistance in the original operation of any equipment or system such as initial start-up, testing, adjusting and balancing.

3.2.18 As required, the Architect will render to the Construction Project Manager, within a reasonable time, interpretations or clarifications of requirements of the Contract Documents. The Architect will make all interpretations consistent with the intent of, and reasonably inferable from, the Contract Documents. The Architect's decisions in matters relating to artistic effect shall be final if consistent with the intent of the Contract Documents.

3.2.19 All communications, correspondence, submittals and documents exchanged between the Architect and the Contractor in connection with the Project shall be through the Construction Project Manager or in the manner prescribed by the Construction Project Manager.

3.2.20 If the Owner terminates the employment of the Architect, the Owner may appoint a new Architect. Status of the new Architect under the Contract Documents shall be that of the former Architect.

3.2.21 The Architect is not bound to define the limits of any subcontract, and will not enter into disputes between the Contractor and its employees, including Subcontractors. Notwithstanding any provision of the Contract Documents to the contrary, all decisions, order and certificates of Architect are advisory only and not binding upon Owner until approved by Owner.

ARTICLE 4
CONTRACTOR

4.1 DEFINITION

4.1.1 The Contractor is the person or organization identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number. The term Contractor means the Contractor or its authorized representatives, who shall have authority to bind the Contractor in all matters pertinent to this Contract.

4.1.2 The service or services to be rendered under this Contract are those of an independent contractor. Contractor is not an officer, employee or agent of the Owner as those terms are used in ORS 30.265.

4.1.3 Contractor is not a contributing member of the Public Employees' Retirement System and will be responsible for any federal or state taxes applicable to payment received under this Contract. Contractor will not be eligible for any benefits from these contract payments of federal Social Security, employment insurance, workers' compensation or the Public Employees' Retirement System, except as a self-employed individual.

4.1.4 If this payment is to be charged against federal funds, Contractor certifies that it is not currently employed by the federal government. This does not preclude the Contractor from holding another contract with the Federal Government. Contractor certifies he/she is not an employee of the Jefferson County School District 509J, Jefferson County, Oregon for purposes of performing work under this Contract.

4.1.5 Contractor shall certify that all subcontractors performing Work described in ORS 701.005(2) (i.e., construction work) will be 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.

4.2 REVIEW OF CONTRACT DOCUMENTS

4.2.1 Before submitting a Proposal to the Owner, and continuously after the execution of this Agreement, the Contractor shall carefully study and compare the Contract Documents and shall at once report to the Owner through the Construction Project Manager, any error, inconsistency or omission the Contractor may discover including any requirement which may be contrary to any law, ordinance, rule, regulation or order of any public authority bearing on the performance of the Work. By submitting a Proposal for this Agreement and the Work under it, the Contractor agrees that the Contract Documents, along with any supplementary written instructions issued by or through the Construction

Project Manager that have become a part of the Contract Documents, appear accurate, consistent, and complete insofar as can reasonably be determined. If the Contractor has reported in writing an error, inconsistency or omission and has promptly stopped the affected Work until instructed, and otherwise followed the instructions of the Owner, the Contractor shall not be liable to the Owner or the Architect for any damage resulting from failing to report to the Owner or the Architect of any such errors, inconsistencies or omissions in the Contract Documents. The Contractor shall do no Work without Contract Documents and, when required, approved Shop Drawings, Product Data or samples for such portions of the Work.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The Contractor shall supervise and direct the Work, using its best skill and attention. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

4.3.2 The Contractor shall be responsible to the Owner for the acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing any of the Work.

4.3.3 The Contractor shall not be relieved from its obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Architect or the Construction Project Manager in their administration of the Contract, or by inspections, tests or approvals (or the lack thereof) required or performed under Paragraph 4.22 by persons other than the Contractor.

4.3.4 The Contractor shall employ a competent Superintendent and necessary assistants who shall be in regular attendance at the Project site during all phases of the progress of the Work. The Superintendent shall represent the Contractor and all communications given to the Superintendent shall be as binding as if given to the Contractor. As soon as practicable after Contract award, the Contractor shall provide a management chart and a list of personnel which shall constitute the superintending staff. All references to the Superintendent below shall be taken to mean superintending staff. 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.

4.3.5 The Superintendent shall remain on the Project not less than eight hours per day, five days a week unless the job is closed down due to a general strike, conditions beyond the control of the Contractor, termination of the Contract in accordance with the Contract Documents, or until Final Completion. The Superintendent shall not be employed on any other project during the course of this Work. The Superintendent that is assigned to the Project by the Contractor shall not be relieved of his position until after the Project has had its Final Completion with the Punchlist complete in its entirety, all the O & M Manuals complete, as-built drawings complete and accepted, and all demonstrations have been delivered.

4.3.6 If the Owner and/or Architect object to the Contractor's Project Team (i.e, Superintendent, Project Manager, etc.) that has been assigned to the Project, the Owner will reply in writing within seven (7) days after bid. Contractor will then assign different members to perform the Work acceptable to both Owner and Architect.

4.3.7 Before starting work, the Contractor shall locate all general reference points. The Contractor shall employ a registered surveyor (licensed by the State of Oregon) to perform such work. The Contractor shall take such steps as are necessary to prevent the dislocation or destruction of the reference points, and shall be responsible for the accuracy of the site and building layout and elevations for the work.

4.4 LABOR AND MATERIALS

4.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the execution and completion of the Work in accordance with the Contract Documents and any applicable code, regulation or statute, whether or not specifically required thereby as long as the same is reasonably inferable therefrom as being necessary to produce the intended results, and whether temporary or permanent, and whether or not incorporated or to be incorporated in the Work.

4.4.2 All work under this Contract shall be performed in a skillful and workmanlike manner.

4.4.3 The Contractor shall at all times enforce strict discipline and good order among its employees and Subcontractors, and shall not employ on the Work any unfit person or anyone not skilled in the task assigned. The Owner may, in writing, require the Contractor to remove from the Work any employee the Owner deems incompetent, careless or otherwise objectionable.

4.5 WARRANTY

4.5.1 The Contractor warrants to the Owner and the Architect that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All work not conforming to these requirements, including substitutions not properly approved and authorized, is hereby deemed defective. If required by the Construction Project Manager or the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

4.5.2 If, within one year after the Date of Final Completion of the Work or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so. This obligation shall survive Termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

4.5.3 Nothing contained in this Paragraph 4.5 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Paragraph 4.6 hereof. The establishment of the time period of one year after the Date of Final Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which its 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 its obligations other than the obligation to correct the Work in accordance with this Paragraph 4.5.

4.5.4 The warranties set forth in Paragraph 4.5 and elsewhere in the Contract Documents shall survive final acceptance under Paragraph 9.9.

4.6 UNCOVERING AND CORRECTION OF WORK

4.6.1 If any portion of the Work should be covered contrary to the request of the Owner, the Architect or the requirements specifically expressed in the Contract Documents, it must be, if required in writing by the Owner, uncovered for observation and shall be replaced at the Contractor's expense.

4.6.2 If any other portion of the Work has been covered which the Architect or the Owner has not specifically requested to observe prior to being covered, either may request to see such Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it be found that this condition was caused by the Owner or a separate contractor as provided in Article 6, in which event the Owner shall be responsible for the payment of such costs.

4.6.3 The Contractor shall promptly correct all Work rejected by the Construction Project Manager or the Architect as defective or as failing to conform to the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including compensation for the Architect's and the Construction Project Manager's additional services made necessary thereby.

4.6.4 The Contractor shall, unless removal is waived by the Owner, remove from the site all portions of the Work which are defective or non-conforming, or if permitted or required, shall correct such Work in place by and at the expense of the Contractor promptly after notice, and such rejected Work shall not thereafter be tendered for acceptance unless the Contractor gives notice that the Work was subject to former rejection or requirement of correction.

4.6.5 If the Contractor does not proceed with the correction of such defective or non-conforming Work within a reasonable time fixed by written notice from the Owner, the Owner may either (1) by contract or otherwise replace or

correct such Work and charge the Contractor the cost occasioned the Owner thereby and remove and store the materials or equipment at the expense of the Contractor; or (2) terminate this Contract for default as provided in Paragraph 13.3.

4.6.6 The Contractor shall bear the cost of restoring any work of the Owner or separate contractors destroyed or damaged by such correction or removal.

4.6.7 If the Owner prefers to accept defective or non-conforming Work, it may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable. If the amount is determined after final payment, it shall be paid to the Owner by the Contractor.

4.7 TAXES

4.7.1 The Contractor shall pay all consumer, use, and other similar taxes for the work or portions thereof provided by the Contractor, which are legally enacted at the time the bids are received, whether or not yet effective. Compliance with all Oregon tax laws shall be certified by the Contractor.

4.8 PERMITS, FEES AND NOTICES

4.8.1 The Owner shall coordinate and obtain all permits necessary to obtain the general building permit for the Project. The Owner will pay for the general building permits (including right of way permits, grading and drainage, foundation, mechanical, plumbing and electrical as necessary to initially begin construction), utility connection fees, system development charges and related inspections. The Contractor will be responsible to obtain and pay for all other permits, assessments, penalties, charges, licensing and re-inspection fees required for the proper execution of the Work which are legally required at the time the bids are received or thereafter as a consequence of the Contractor's acts or omissions. The Contractor is responsible for coordinating and obtaining all required inspections and approval signatures. The Contractor is required to submit all inspection records to the District at the completion of the project and as a prerequisite for final payment. Contractor shall not be entitled to any additional time for performance because of its failure to secure or coordinate with the Owner for procurement of any required permits on a timely basis. The contractor will be required to maintain the permit documents at the site as required by the governing authority.

4.8.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations or orders of any public authority bearing on the performance of the Work.

4.8.3 If the Contractor performs any of the Work knowing it to be contrary to any laws, ordinances, rules, regulation or orders of any public authority bearing on the performance of the Work, and does so without reasonable notice to the Construction Project Manager of same, Contractor shall assume full responsibility therefor and shall bear all costs attributable thereto.

4.8.4 The Contractor and its subcontractors shall comply with the provisions of ORS 757.541 through 757.571 relating to notice prior to excavation.

4.9 ALLOWANCES

4.9.1 Allowances will not be used under this contract.

4.10 CONTRACTOR'S CONSTRUCTION SCHEDULE

4.10.1 The Contractor, immediately after being awarded the Contract, shall prepare and submit, for the Construction Project Manager's approval, a Construction Schedule for the Work which shall provide for expeditious and practicable execution of the Work for completion within the Contract Time. This schedule shall be coordinated with the entire Project Construction Schedule to the extent required by the Contract Documents. The Construction Schedule shall be revised as required by the conditions of the Work and the Project, subject to the Construction Project Manager's approval.

The Contractor's Construction Schedule shall conform to the requirements of Division 1, Section 01 3200.

4.11 RESPONSIBILITY FOR COMPLETION

4.11.1 The Contractor shall furnish such manpower, services, materials, facilities and equipment and shall work such hours, including night shifts, overtime operations, Sundays and holidays, as may be necessary to ensure the

prosecution and completion of the Work or specified portions thereof within the specific dates of the Contract. If it becomes apparent to the Construction Project Manager from progress on the current Construction Schedule that the Work will not be completed within the Contract Time, the Contractor agrees that it will, as necessary, take some or all of the following actions, at no additional cost to the Owner, to improve the progress:

1. increase manpower in such quantities and crafts as will substantially eliminate, in the judgment of the Construction Project Manager, the backlog of work;
2. increase the number of working hours per shift, shifts per working day, working days per week or the amount of equipment, or any combination of the foregoing, sufficiently to substantially eliminate, in the judgment of the Construction Project Manager, the backlog of work; and
3. reschedule activities to achieve maximum practical concurrency of accomplishment of activities.

In addition, if any of the conditions noted under paragraph 4.11.2 should occur, the Construction Project Manager may require the Contractor to submit a Recovery Schedule demonstrating the Contractor's proposed plan to make up lag in scheduled progress and to ensure completion of the Work within the Contract Time. If the Construction Project Manager finds the proposed plan not acceptable, it may require the Contractor to submit a new plan. If the actions taken by Contractor or the second plan proposed are not satisfactory, the Construction Project Manager may require Contractor to take any of the actions set forth in this Paragraph 4.11, without additional cost to the Owner, to make up the lag in scheduled progress.

4.11.2 In the event any of the following conditions exist, the Contractor shall, at no additional cost to the Owner, require that its' Superintendent, workers, and all subcontractors affecting the progress of the work be at the job site not less than ten (10) hours per day, six (6) days per week:

1. should Substantial Completion not be accomplished on schedule;
2. should Final Completion not be accomplished on schedule;
3. should the Project schedule indicate the Contractor to be ten (10) or more work days behind schedule at any time during construction up until twenty (20) days prior to scheduled Substantial Completion;
4. should the Project schedule indicate the Contractor to be five (5) or more work days behind schedule at any time during the last twenty (20) days prior to scheduled Substantial Completion.

4.11.3 Failure of the Contractor to substantially comply with the requirements of this Paragraph 4.11 may be considered grounds for a determination by the Owner, pursuant to Subparagraph 13.3.1, that the Contractor is failing to prosecute the Work with such diligence as will ensure its completion within the time specified.

4.12 DOCUMENTS AND SAMPLES AT THE SITE

4.12.1 The Contractor shall maintain in a safe place at the site for the Owner one record copy of all Drawings, Specifications, Addenda, Change Orders, amendments and written interpretations and clarifications, in good order and marked currently to record all changes applicable to the Work made during construction and approved Shop Drawings, Product Data and Samples. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work certified in writing by the Contractor to show complete and exact "as-built" conditions, stating sizes, kind of materials, vital piping, conduit locations and similar matters.

4.13 SHOP DRAWINGS AND SAMPLES

4.13.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

4.13.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor which illustrate a material, product or system for some portion of the Work.

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

4.13.4 The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any separate contractor, all Shop Drawings, Product Data

and Samples required by the Contract Documents. Contractor shall submit all shop drawings, samples, product data in the quantity and format specified in Division 1, Section 01 3300.

4.13.5 By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that it has determined and verified all materials, field measurements, and field construction criteria related thereto, and that it has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Contractor shall adhere to any supplementary processing and scheduling instructions, pertaining to Shop Drawings, as may be issued by the Construction Project Manager.

4.13.6 The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Architect's review of Shop Drawings, Product Data or Samples under Subparagraph 3.2.4 unless the Contractor has received a Change Order for same. Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Architect's review thereof.

4.13.7 The Contractor shall make any corrections required by the Architect and shall resubmit the corrected copies of Shop Drawings or new Samples. Resubmittal of Shop Drawings necessitated by required corrections shall not be a cause for extension of time. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than the corrections requested on previous submittals.

4.13.8 No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been reviewed by the Architect as provided in Subparagraph 3.2.4. All such portions of the Work shall be in accordance with approved submittals.

4.13.9 Shop Drawings and Samples shall be dated and bear: Project name; description or names of equipment, materials and items; and complete identification of locations at which materials or equipment are to be installed.

4.13.10 Submission of Shop Drawings, Product Data or Samples shall be accompanied by transmittal letter containing Project name, Contractor's name, number of drawings and samples, titles and other pertinent data.

4.13.11 Each Shop Drawing and Product Data submittal shall bear the Contractor's stamp or seal stating that the submittal has been reviewed by the Contractor and that it conforms to the requirements of the Contract Documents.

4.14 USE OF SITE

4.14.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site or access to the site with any materials or equipment.

4.14.2 The Contractor shall coordinate all of its operations with and secure approval from the Owner before using any portion of the site.

4.14.3 The Contractor shall not occupy the site nor commence work thereon until deemed by the Construction Project Manager to be in compliance with all bond and insurance requirements.

4.15 CUTTING AND PATCHING OF WORK

4.15.1 The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the Work or to make its several parts fit together properly.

4.15.2 The Contractor shall not damage or endanger any portion of the Work of the Owner or any separate contractors by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate contractor except with the written consent of the Owner and of such separate contractor. The Contractor shall not unreasonably withhold its consent to cutting or otherwise altering the Work from the Owner or any separate contractor.

4.15.3 Existing structures and facilities, including but not limited to buildings, utilities, topography, streets, curbs, walks, etc., that are damaged or removed due to required excavations or other construction work, shall be patched, repaired or replaced by the Contractor to the satisfaction of the Construction Project Manager, the Architect, the owner of such structures and facilities and authorities having jurisdiction. In the event the local jurisdictional authorities require that such repairing and patching be done with their own labor and materials, the Contractor shall abide by such regulations and pay for such work.

4.16 CLEANING UP

4.16.1 The Contractor at all times shall keep the premises and streets or areas used for access thereto free from accumulation of waste materials or rubbish caused by its operations. At the completion of the Work, the Contractor shall remove all its waste materials and rubbish from and about the Project as well as all tools, construction equipment, machinery and surplus materials.

4.16.2 If the Contractor fails to clean up during or at the completion of the Work, the Owner may do so as provided in Paragraph 6.3 and the cost thereof shall be charged to the Contractor.

4.17 COMMUNICATIONS

4.17.1 The Contractor shall forward all communications, whether to the Architect or Owner, only through the Construction Project Manager. Similarly, all communications to the Contractor from the Owner and Architect will be through the Construction Project Manager.

4.18 ROYALTIES AND PATENTS

4.18.1 The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringement of any patent rights and shall indemnify and hold the Owner, Construction Project Manager and Architect harmless from loss on account thereof, except that the Owner shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified, but if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, it shall be responsible for such loss unless it promptly gives notice of such infringement to the Construction Project Manager.

4.19 INDEMNIFICATION

4.19.1 To the fullest extent permitted by law, the Contractor shall at its sole cost and expense, indemnify, defend, satisfy all judgments and hold harmless the Owner, the Construction Project Manager and the Architect, and their respective directors, officers, agents, representatives, and employees, from and against all claims, actions, judgments, costs, penalties, liabilities damages, losses and expenses, including but not limited to attorney's fees arising out of or resulting from the performance of the Work, provided that any such claim, action, judgment, cost, penalty, liability, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and (2) is caused in whole or in part by any negligent or other wrongful act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Paragraph 4.19. If any provision herein could be read to require a type or degree of indemnification or insurance not permitted by Oregon law, it is hereby expressly restricted to require only that type or degree of indemnification or insurance which is permitted by Oregon law. Without limitation, to the extent required under ORS 30.140, no provision of this Agreement shall require Contractor, or its surety or insurer to indemnify another against liability for damage arising out of death or bodily injury to persons or damage to property caused in whole or in part by negligence of the indemnitee, provided this paragraph shall not affect any provision of this Agreement that requires Contractor or Contractor’s surety or insurer to indemnify against liability for damage arising out of death or bodily injury to persons or damage to property to the extent that the death or bodily injury to persons or damage to property arises out of the fault of the indemnitor, or the fault of the indemnitor’s agents, representatives or subcontractors.

4.19.2 In any and all claims against the Owner, the Construction Project Manager or the Architect or any of their agents, representatives or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.19 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' workmen's compensation acts, disability acts or other employee benefit acts.

4.19.3 No provision of this Paragraph 4.19 shall give rise to any duties on the part of the Construction Project Manager, the Architect or the Owner or their agents, representatives or employees.

4.19.4 It is the intent of this contract to require the Contractor to indemnify the Owner, Construction Project Manager, and the Architect and their agents, representatives and employees, to the fullest extent permitted by Oregon Revised Statutes as it now exists or is hereafter amended. It is specifically intended that the Contractor's indemnity shall cover allegations of concurrent negligence of indemnitor and indemnitee, their agents or employees; and that the duty to so indemnify shall cover all costs of defense of such claims. The Contractor's indemnity obligations shall not cover allegations or adjudicated determinations that the liability arises from the sole negligence of an indemnitee. The Contractor shall provide insurance covering such indemnity obligations subject to the terms and conditions provided in Article 11 including the naming of Owner, Construction Project Manager and Architect as additional insured upon such policy.

4.19.5 The provisions of Subparagraph 4.19 shall survive the completion, termination or expiration of this Contract.

4.20 PERSONS AUTHORIZED TO SIGN DOCUMENTS

4.20.1 The Contractor shall, within five (5) days after Notice to Proceed or execution of the Contract, whichever is earliest, file with the Construction Project Manager a list of all persons who are authorized to sign documents such as contracts, certificates, and affidavits, on behalf of the Contractor and to fully bind the Contractor to all the conditions and provisions of such documents, except that in the case of a corporation it shall file with the Construction Project Manager a certified copy of a resolution of the Board of Directors of the corporation in which are listed the names and titles of the corporation’s personnel who are authorized to sign documents on behalf of the corporation and to fully bind the corporation to all the conditions and provisions of such documents.

4.21 CONDITIONS AFFECTING THE WORK

4.21.1 The Contractor shall be responsible for having taken all steps necessary to ascertain the nature and location of the Work, and the general and local conditions and legal requirements which can affect the Work or the cost thereof. Failure by Contractor to fully acquaint itself with conditions which may affect the Work, including, but not limited to, conditions relating to transportation, handling, storage of materials, availability of labor, utility services, roads, weather, topographic and subsurface conditions, other separate contractors, applicable provisions of law, and the character and availability of equipment and facilities needed prior to and during the prosecution of the Work, shall not relieve Contractor of its responsibilities under the Contract Documents and shall not constitute a basis for an equitable adjustment under any circumstances. The Owner assumes no responsibility for any understanding or representations concerning conditions made by the Contractor, any of its officers, agents, employees or Subcontractors prior to the execution of this Contract, unless such understanding or representations are expressly stated in the Contract Documents.

4.21.2 If in the execution of the Work any valuable items or materials of any kind are discovered buried or hidden within the Work, such items or materials shall be the property of the Owner. The Contractor shall take reasonable precautions to prevent any persons from removing or damaging such items or materials and shall, immediately upon discovery thereof and before removal, acquaint the Construction Project Manager or the Architect with such discovery and carry out, at the expense of the Owner, the Construction Project Manager's orders as to disposal of the same.

4.22 TESTS

4.22.1 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall arrange for such inspection, testing or approval, and shall give the Construction Project Manager timely notice of its readiness so the Architect and the Construction Project Manager may observe such inspection, testing or approval. The Owner shall bear all costs of such inspections, tests or approvals.

4.22.2 If the Architect or the Construction Project Manager determines that any Work requires special inspection, testing, or approval which Subparagraph 4.22.1 does not include, the Construction Project Manager will instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in Subparagraph 4.22.1. If such special inspection or testing reveals a failure of the Work to comply (1) with the requirements of the Contract Documents, or (2) with respect to the performance of the Work, with laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, the Contractor shall bear all costs thereof, including compensation for the Architect's and the Construction Project Manager's additional services made necessary by such failure. If such special inspection or testing reveals that the Work is in compliance with all applicable requirements, the Owner shall bear all costs thereof.

4.22.3 Inspections and tests required to establish compliance with the Contract Documents, as provided for in the Contract Documents, will be made by a pre-qualified, independent testing agency approved by the Owner. The cost of services of such agency will be paid by the Owner. When the initial tests indicate non-compliance with the Contract Documents, any subsequent retesting occasioned by non-compliance shall be performed by the same agency and the cost thereof borne by the Contractor. Representatives of the testing agency shall have access to the Work at all times. The Contractor shall provide facilities for such access in order that the agency may properly perform its functions.

4.22.4 Inspections or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

4.22.5 The independent testing agency shall prepare the test reports, logs, and certificates applicable to the specific inspections and tests and promptly deliver the specified number of copies of same to the designated parties. Certificates of inspection, testing or approval required by public authorities shall be secured by the Contractor and delivered to it by the Owner, in such time as to not delay progress of the Work or final payment therefor.

4.22.6 Inspection and laboratory testing shall be provided as called for in the General Requirements and Technical Specifications by an independent testing consultant retained by the Owner.

4.23 ENVIRONMENTAL POLLUTION

4.23.1 Unless disposition of environmental pollution is specifically a part of this Contract, Contractor shall immediately notify Owner of any hazardous substance(s) which Contractor discovers or encounters during performance of the work required by this Contract. "Hazardous substance(s)" are those substances, materials, or wastes regulated in 40 CFR, Part 261 and defined as hazardous in 40 CFR S 261.3. In addition to notifying Owner of any hazardous substance(s) discovered or encountered, Contractor shall immediately cease working in any particular area of the project where a hazardous substance(s) has been discovered or encountered if continued work in such area would present a bona fide risk or danger to the health or well being of Contractor's or any subcontractor's work force.

4.23.2 Upon being notified by Contractor of the presence of hazardous substance(s) on the project site, Owner shall arrange for the proper disposition of such hazardous substance(s).

4.24 SPILL RESPONSIBILITY

4.24.1 Contractor will be responsible for any and all releases of hazardous substances during performance of the Contract which occur as a result of, or are contributed by, actions of its agents, personnel, or subcontractors. Contractor agrees to promptly dispose of such spills or leaks to satisfaction of the Owner and proper regulatory agencies in a manner that complies with applicable federal, state, and local laws and regulations. Cleanup shall be at no cost to the Owner.

4.24.1.1 Contractor shall obtain the Owner's written consent prior to bringing onto the work site any (i) environmental pollutants or (ii) hazardous substances or materials, as the same or reasonably similar terms are used in any applicable federal, state, or local statutes, rules or ordinances. Notwithstanding such written consent from the Owner, the Contractor, at all times, shall:

.1 properly handle, use and dispose of all environmental pollutants and hazardous substances or materials brought onto the work site, in accordance with all applicable federal, state, or local statutes, rules, or ordinances;

.2 be responsible for any and all spills, releases, discharges, or leaks of (or from) environmental pollutants or hazardous substances or materials which Contractor has brought onto the work site; and

.3 promptly clean up, without cost to the Owner, such spills, releases, discharges, or leaks to the Owner's satisfaction and in compliance with all applicable federal, state, or local statutes, rules or ordinances.

4.24.1.2 Contractor shall be liable for any and all costs, expenses, damages, claims, and causes of action, or any of them, related to or arising out of a spill, release, discharge, or leak of (or from) any environmental pollutant or hazardous substance or material, to the extent such spill, release, discharge, or leak was caused or contributed to by Contractor's (i) negligence or (ii) failure to perform in accordance with the Contract Documents. Nothing in this paragraph 4.24 shall limit Contractor's liability or responsibility under paragraph 4.19 of the General Conditions.

4.24.2 Contractor shall report all reportable quantity releases to applicable federal, state, and local regulatory and emergency response agencies. Reportable quantities are found in 40 CFR, Part 302, Table 302.4 for hazardous substances and in OAR 340-142 for petroleum products. Upon discovery, regardless of quantity, Contractor must telephonically report all releases to the Owner. A written follow-up report shall be submitted to Owner within 48 hours of the telephonic report. Such written report shall contain, at a minimum:

4.24.2.1 Description of items released (identity, quantity, manifest no., and all other documentation required by law).

4.24.2.2 Whether the quantities released require EPA/DEQ reporting, and, if so, when it was reported.

4.24.2. Exact time and location of release, including a description of the area involved.

4.24.2.4 Containment procedures initiated.

4.24.2.5 Summary of communications about the release Contractor has had with members of the press or State officials other than Owner.

4.24.2.6 Description of cleanup procedures employed or to be employed at the site, including disposal location of spill residue.

4.24.2.7 Personnel injuries, if any, resulting from, or aggravated by, the release.

4.25 ENVIRONMENTAL CLEAN-UP

4.25.1 As part of the Final Completion Notice, or as a separate written notice submitted with or before the Notice of Final Completion, the Contractor shall certify to the Owner that all environmental pollution clean-up which was performed as part of this Contract has been disposed of in accordance with all applicable rules, regulations, laws, and statutes of all agencies having jurisdictions over such environmental pollution. The notice shall indemnify and hold the Owner harmless from any claims resulting from the disposal of the environmental pollution including removal, encapsulation, transportation, handling, and disposal.

ARTICLE 5
SUBCONTRACTORS

5.1 DEFINITION

5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the Work at the site. The term Subcontractor is referred to throughout the Construction Documents as if singular in number and means a Subcontractor or its authorized representatives. The term Subcontractor does not include any separate contractor or its subcontractors.

5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform any 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 its authorized representatives.

5.1.3 Nothing contained in the Contract Documents is intended to nor shall it create any contractual relationship between the Owner, the Construction Project Manager, the Architect or any of their agents, employees or representatives and any Subcontractor or Sub-subcontractor.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 Within five (5) days of receipt of a Notice to Proceed, the Contractor shall furnish to the Construction Project Manager in writing for review and acceptance by the Owner the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The Construction Project Manager will promptly reply to the Contractor in writing stating whether or not the Owner, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Construction Project Manager to reply promptly shall constitute notice of no reasonable objection. The Contractor understands and agrees that it alone is responsible to the Owner for all of the Work under this Agreement and that any

review of Subcontractors or Sub-subcontractors by Owner or the Construction Project Manager will not in any way make the Owner responsible to nor for the actions or failures of any Subcontractor or Sub-subcontractor.

5.2.2 The Contractor shall not contract with any such proposed person or entity to whom the Owner has made reasonable objection under the provisions of Subparagraph 5.2.1.

5.2.3 If the Owner, the Construction Project Manager or the Architect, has reasonable objection to any such proposed person or entity, the Contractor shall submit a replacement to whom the Owner, the Construction Project Manager and Architect, have no reasonable objection, and the Contract Sum shall be increased or decreased by the difference in cost occasioned by such replacement and an appropriate Change Order shall be issued; however, no increase in the Contract Sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting names as required by Subparagraph 5.2.1 or if the Construction Project Manager stated said objection in writing before the submission by the Contractor of the accepted proposal or if the proposed subcontractor is unable to enter into and carry out its work under its proposed subcontract, or if the Subcontractor fails to comply with all applicable laws, or if the proposed subcontractor is not an on-going business in the field of its proposed subcontract, or if the proposed subcontractor does not have a labor force and the means of supply compatible with the scope of the subcontract.

5.2.4 If the Owner requires a change of any proposed subcontractor or person or organization previously accepted by it the Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued.

5.2.5 The Contractor shall make no substitution for any Subcontractor, person or entity previously selected if the Owner, the Construction Project Manager or the Architect, makes objection to such substitution.

5.3 SUBCONTRACTUAL RELATIONS

5.3.1 By an 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 in terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner. Said agreement shall preserve and protect the rights of the Owner under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with its Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph 5.3, and shall identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Documents available to its Sub-subcontractors.

5.4 PREPARATORY WORK

5.4.1 Before starting each section of Work, the Contractor shall ensure that the responsible Subcontractor has carefully examined all preparatory work that has been executed to receive its work. The Subcontractor shall check carefully, by whatever means are required, to ensure that the work and adjacent related work will finish to proper contours, planes, and levels. The Subcontractor shall promptly notify the Contractor who shall notify the Construction Project Manager in writing of any defects or imperfections in preparatory work which will, in any way, affect satisfactory completion of the Work. Absence of such notification will be construed as an acceptance of preparatory work and later claims of defects therein will not be recognized.

5.4.2 Under no conditions shall a section of Work proceed prior to preparatory work having been completed, cured, dried, and otherwise made satisfactory to receive such related work. Responsibility for timely installation of all materials and equipment rests solely with the Contractor, who shall maintain coordination control at all times.

ARTICLE 6

WORK BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

6.1.1 The Owner reserves the right to perform work related to the Project with its own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under any contract terms and conditions which the Owner, in its sole discretion, may require.

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

6.2 MUTUAL RESPONSIBILITY

6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall connect and coordinate its Work with theirs as required by the Contract Documents.

6.2.2 If any part of the Work depends for proper execution or results upon work of the Owner or any separate contractor, the Contractor shall, prior to proceeding with the Work, carefully inspect and promptly report to the Owner any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and promptly report shall constitute an acceptance of the Owner's or separate contractors' work as fit and proper to receive its Work, except as to latent defects which Contractor could not have reasonably discovered by its inspection.

6.2.3 Any costs caused by defective or ill-timed work shall be borne by the party responsible therefor.

6.2.4 Should the Contractor wrongfully cause damage to work or property of the Owner, or to other work on the site, the Contractor shall promptly remedy and be wholly responsible for such damage.

6.2.5 Should the Contractor wrongfully cause damage to the work or property of any separate contractor, the Contractor shall upon due notice promptly attempt to settle with such other contractor by agreement, or otherwise to resolve the dispute at law. If such separate contractor sues or initiates a proceeding against the Owner, the Construction Project Manager and/or the Architect on account of any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor who shall defend such proceedings at its own expense, and if any judgment or award against the Owner, the Construction Project Manager and/or the Architect arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the Owner, the Construction Project Manager and/or the Architect for all attorneys' fees and court or arbitration costs which the Owner, the Construction Project Manager and/or the Architect have incurred.

6.2.6 In the event there is more than one contractor engaged on the Project, each such contractor shall be responsible to the other for damages to work, injury to any person or persons, or for any loss, cost, claims or damages arising out of or in connection with the work required by each contract with the Owner or any loss, cost, expense or damage caused by separate contractor's neglect or failure to finish or satisfactorily complete its part of the Work within the time prescribed. In all events the provisions of Paragraph 4.19 shall be applicable.

6.2.7 Whenever the Contractor receives items from a separate contractor or from the Owner for storage, erection or installation, the Contractor receiving such items shall give receipt for items delivered, and thereafter will be held responsible for care, storage and any necessary replacing of item or items received.

6.2.8 When certain items of equipment and other work are indicated as "NIC" (not in contract), or to be furnished and installed under other contracts, any requirements for preparation of openings, provision of backing, etc., for receipt of such "NIC" work will be furnished upon written request of the Contractor who shall properly form and otherwise prepare its work in a satisfactory manner to receive such "NIC" work.

6.3 OWNER'S RIGHT TO PERFORM DISPUTED WORK

6.3.1 If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up as required by the Contract Documents, for accomplishing coordination or doing required cutting, filling, excavating or patching as required by the Contract Documents, the Owner may carry out such work and charge the cost thereof to the several contractors responsible therefor as the Owner shall determine to be just.

ARTICLE 7
MISCELLANEOUS PROVISIONS

7.1 GOVERNING LAW

7.1.1 This Contract shall be governed by the laws of the State of Oregon, without giving effect to any conflict-of-law principle that would result in the laws of any other jurisdiction governing this Contract.

7.1.2 If any of the provisions of this Contract shall be held invalid or unenforceable in any respect, the enforceability of the provision in any other respect and of the remaining provisions of this Contract will not be impaired, if the essential terms and conditions of this Contract remain, valid, binding, and enforceable.

7.2 SUCCESSORS AND ASSIGNS

7.2.1 The Owner and the Contractor each binds itself, its partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. The Contractor shall not assign the Contract or sublet it in whole or part without the written consent of the Owner, nor shall the Contractor assign any monies due or to become due to it hereunder, without the prior written consent of the Owner.

7.3 WRITTEN NOTICE

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or entity or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party who gives the notice.

7.4 CLAIMS AND DAMAGES

7.4.1 Claims by either the Owner or Contractor must be initiated by written notice to the other party, with a copy sent to the Architect. Claims by either party must be initiated within 7 days after occurrence of the event giving rise to such claim or within 7 days after the claimant first recognizes the condition giving rise to the claim, whichever is later.

7.5 PERFORMANCE BOND, LABOR AND MATERIAL PAYMENT BOND

7.5.1 Contractor shall secure, include costs therefore in the Proposal, and pay for a performance bond and payment bond in compliance with ORS 279C.380 and other applicable Oregon Revised Statutes issued by a bonding company licensed to transact business in the State of Oregon.

Liability under <u>each</u> bond shall be:

100% of Contract sum for (1) performance of the Contract and (2) labor and material payment.

7.5.2 The Contractor shall deliver the required bonds to the Owner not later than three (3) days following the date the Owner-Contractor Agreement is entered into.

7.5.3 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 the power of attorney.

7.5.4 The Contractor shall commence no work on site until satisfactory compliance with Subparagraph 7.5.1. through 7.5.3. Failure to obtain such bonds in a timely manner shall not be a basis of claim for extension in time.

7.6 RIGHTS AND REMEDIES

7.6.1 The duties and obligations of the Contractor imposed by the Contract Documents and the rights and remedies of the Owner available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law or equity.

7.6.2 The failure of the Owner, the Construction Project Manager or the Architect to insist in any one or more instances upon the strict performance of any one or more of the provisions of this Contract, or to exercise any right herein contained or provided by law, shall not be construed as a waiver or relinquishment of the performance of such

provision or right(s) or of the right to subsequently demand such strict performance or exercise such right(s), and the rights shall continue unchanged and remain in full force and effect.

7.6.3 Contractor agrees that it can be adequately compensated by money damages or time extensions for any breach of this Contract which may be committed by the Owner and hereby agrees that, no default, act, or omission of the Owner, the Construction Project Manager or the Architect, except only for failure to make payments as required by the Contract Documents, shall constitute a material breach of the Contract entitling Contractor to cancel or rescind the provisions of this Contract or (unless the Owner shall so consent or direct in writing) to suspend or abandon performance of all or any part of the Work. Contractor hereby waives any and all rights and remedies to which it might otherwise be or become entitled, saving only its right to money damages or time extensions pursuant to the terms of this contract.

7.7 DISPUTE RESOLUTIONS

7.7.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract shall be subject to mediation as a condition precedent to binding dispute resolution. Mediation shall be before the Arbitration Service of Portland, Inc. The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in Madras, Oregon, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

7.7.2 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 then-current rules of the Arbitration Service of Portland, Inc. in effect on the date of the Contract. 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. 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. 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. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Contract shall be specifically enforceable under applicable law in any court having jurisdiction thereof. Each party consents and submits to the jurisdiction of the state courts located in Jefferson County, Oregon.

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

ARTICLE 8
TIME

8.1 DEFINITIONS

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

8.1.2 The date of commencement of the Work is the date established in the Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Owner-Contractor Agreement or such other date as may be established therein.

8.1.3 The Date of Substantial Completion of the Work or designated portion thereof is the date certified by the Architect and the Construction Project Manager when the Work has sufficiently progressed, in accordance with the Contract Documents, so the Owner can fully occupy and utilize the Work or designated portion thereof for the use which it is intended, with all of the parts and systems operable as required by the Contract Documents and where all work is

complete, accessible, operable and usable by the Owner. Only incidental corrective work under "punchlists" and final cleaning (if required) beyond cleaning needed for the Owner's full use may remain for Final Completion.

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

8.2 PROGRESS AND COMPLETION

8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

8.2.2 The Contractor shall begin the work on the date of commencement as defined in Subparagraph 8.1.2. It shall carry the Work forward expeditiously with adequate forces and shall achieve Substantial and Final Completion within the Contract Dates stated in the Contract Documents.

8.2.3 If a date or time of completion is included in the Contract, it shall be the Date of Substantial Completion as defined in Subparagraph 8.1.3, including authorized extensions thereto, unless otherwise provided.

8.2.4 Attention is directed to the fact that the Work is urgently needed by the Owner and that time is of the essence. For this reason, it shall be agreed that the Contractor will substantially complete the Work, or designated portions thereof, under the Contract, within the time and dates established in the Contract Documents for such completion, and that it will complete the Contract in all its details for final acceptance as specified after Substantial Completion.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 Except as specifically provided under Paragraph 2.4 (Owner's Right to Stop Work) or Paragraph 12.1 (Changes in the Work), Contractor shall not be entitled to payment or compensation of any kind from the Owner for direct, indirect, or impact damages, including but not limited to costs of acceleration, arising because of reasonable hindrance or delay from any cause whatsoever, whether such hindrance or delay be foreseeable or unforeseeable or avoidable or unavoidable provided however, that this provision shall not preclude recovery by Contractor for damages for unreasonable delays or hindrances caused by the acts or omissions of the Owner or persons acting for the Owner. Notwithstanding the foregoing, under no circumstances shall Contractor be entitled to delay damages attributable to a delay in Owner’s execution of the Contract unless the Owner executes the Contract after the time provided for in the Contract Documents. The Contractor shall not in any event be entitled to damages arising out of actual or alleged loss of efficiency; morale, fatigue, attitude, or labor rhythm; constructive acceleration; home office overhead; expectant underrun; trade stacking; reassignment of workers; concurrent operations; dilution of supervision; learning curve; beneficial or joint occupancy; logistics ripple; seasons change; extended overhead; profit upon damages for delay; impact damages; or similar damages. Except as provided in this subparagraph, the Contractor's sole remedy for delays shall be an extension of time.

8.3.2 The Contract Time shall be adjusted only for Changes in the Work (pursuant to Paragraph 12.1), Owner's Rights to Stop Work (pursuant to Subparagraph 2.4) and Excusable Delays (pursuant to Subparagraph 8.3.3). In the event the Contractor requests an extension of the Contract Time, it shall furnish such justification and supporting evidence as the Owner may deem necessary for a determination as to whether the Contractor is entitled to an extension of time under the provisions of this Contract. The Owner, after receipt of such justification and supporting evidence, shall make its findings of fact and decision thereon and shall advise the Contractor in writing thereof. If the Owner finds that the Contractor is entitled to any extension of the Contract Time, the Owner's determination as to the total number of days' extension shall be based upon the currently approved schedule and on all data relevant to the extension. Such data will be included in the next monthly updating of the schedule. The Contractor acknowledges and agrees that actual delays (due to said changes, suspension of Work or excusable delays) in activities which, according to the schedule, do not affect the Contract Time or Specific Dates, will not be the basis for an extension of the Contract Time or Specific Dates.

8.3.3 Subject to other provisions of this Contract, Contractor may be entitled to an extension of the Contract Time (but no increase in the Contract Sum) for delays arising from unforeseeable causes beyond the control and without the fault or negligence of the Contractor or its Subcontractors as follows:

8.3.3.1 Labor strikes (including strikes affecting transportation), that do, in fact, directly and critically affect the progress of the Work; however, an extension of Contract Time on account of an individual labor strike shall not exceed the number of calendar days of said strike;

8.3.3.2 Acts of God, tornado, fire, hurricane, blizzard, earthquake, typhoon, or flood that damage completed work or stored materials, provided that an act of neglect by the Contractor did not contribute to such damage;

8.3.3.3 Abnormal inclement weather; however

1. Contractor agrees that it shall not be entitled to a time extension for normal inclement weather which can be expected at the Project locale due to precipitation **or** temperature, based upon actual data from the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) for the locale of the Project.
2. Contractor agrees that the measure of abnormal inclement weather due to precipitation **or** temperature during the period covered by this Contract shall be the number of days in excess of the average of the previous 10 years as shown in the NOAA weather data, in which precipitation exceeded the average by 0.10 inch (or in the case of snow or ice pellets, 1 inch or more), or in which the highest temperature was 32 degrees F. or below. Either precipitation **or** temperature will be used for the entire month in question.
3. No extension of time will be made for abnormal inclement weather after the principal portions of the Work are enclosed except for site work which critically affects the Contract Time or Specific Dates. For the purpose of this Paragraph 8.3, the term "enclosed" is defined to mean when the Work is sufficiently closed in (exterior walls up and roof in place) so as to permit any structure, or major portion thereof which is part of the Work, to be adequately heated so as to allow the various trades to perform their work. The Construction Project Manager shall determine when the structure is "enclosed" and shall issue, upon the request of Contractor, a letter certifying the date the Work became enclosed for the purposes thereof.

4. If the total calendar days lost due to inclement weather, from the start of the Work at the Project site by the Contractor until the principal portions of the Work are enclosed, exceeds the total number of days to be expected for the same period, a time extension, if granted, shall only be the number of calendar days needed to equal the excess number of calendar days lost due to such abnormal inclement weather.

8.3.3.4 Acts of the public enemy, acts of the State, Federal or local Government in its sovereign capacity, and acts of another contractor in the performance of a contract with the Owner relating to the Project.

8.3.4 All claims for extensions of time shall be made in writing to the Construction Project Manager no more than seven (7) days after the beginning of the delay; otherwise all such claims are waived by the Contractor. In the case of a continuous cause of delay only one written claim is necessary. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the Work.

8.3.5 If no schedule or agreement is made stating the dates upon which written interpretations as set forth in Subparagraph 3.2.17 shall be furnished, then no claim for delay shall be allowed on account of failure to furnish such interpretations until fifteen (15) days after demand is made for them, and not then unless such claim is reasonable.

ARTICLE 9
PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

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

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Owner a Schedule of Values allocated to the various portions of the Work, as set forth in Division 1, Section 01 2973 of the General Requirements entitled "Schedule of Values," and supported by such data to substantiate its accuracy as the Construction Project Manager and the Owner may require. This schedule, unless objected to by the Owner, shall be used only as a basis for the Contractor's Applications for Payment.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 On or about the dates specified in the Contract Documents, Contractor shall meet with the Construction Project Manager and submit a completed Progress Report, in accordance with the requirements of Contract Documents, supported by such data substantiating the Contractor's right to payment as the Owner or Construction Project Manager may require. Contractor shall also certify that it has paid all due and payable amounts for which previous certificates for payment were issued and payments received from the Owner. Each application for payment thereafter shall include the Contractor's statement that prevailing wages have been paid in accordance with ORS 279C.800 through 279C.870.

9.3.1.1 The submission and approval of the Construction Schedule and monthly updates thereof as required by the Contract Documents shall be an integral part and basic element of the Application upon which progress payment shall be made. The Contractor shall be entitled to progress payments only upon substantial compliance with all the requirements of this Article 9, which compliance shall be a condition precedent to the processing of Contractor's Applications.

9.3.2 Retainage shall be in accordance with ORS 279C.550 through 279C.570.

9.3.2.1 The Owner shall make progress payments on the contract monthly as work progresses on the Work. Payments shall be based upon estimates of work completed that are approved by the Architect and the Owner. A progress payment shall not be considered acceptance or approval of any work or waiver of any defects therein. The Owner shall pay to the Contractor interest on the progress payment, not including retainage, at a rate equal to three times the discount rate on 90-day commercial paper in effect at the Federal Reserve Bank in the Federal Reserve district that includes Oregon on the date that is 30 days after receipt of the invoice from the contractor or 15 days after the payment is approved by the contracting agency, whichever is the earlier date, but the rate of interest may not exceed 30 percent. The interest shall commence 30 days after the request for payment is made by the Contractor or 15 days after the payment is approved by the Owner, whichever is the earlier date.

9.3.2.2 The Owner shall reserve as retainage from any progress payment on this Contract an amount not to exceed five percent of the payment.

9.3.2.3 The retainage held by the Owner shall be included in and paid to the Contractor as part of the final payment of the Contract Sum. The Owner shall pay to the Contractor interest at the rate of one and one-half percent per month on the final payment due the Contractor, interest to commence 30 days after the work under the contract has been completed and accepted and to run until the date when the final payment is tendered to the Contractor. The Contractor shall notify the Owner in writing when the Contractor considers the work complete and the Owner shall, within 15 days after receiving the written notice, either accept the work or notify the Contractor of work yet to be performed on the Contract. If the Owner does not within the time allowed notify the Contractor of work yet to be performed to fulfill contractual obligations, the interest provided by this subparagraph shall commence to run 30 days after the end of the 15-day period.

9.3.3 Payments may be made by the Owner at its sole discretion, on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site by the Contractor. Materials once paid for by the Owner become the property of the Owner and may not be removed from the Project site without the Owner's written permission.

9.3.4 The Contractor warrants that title to all Work (including all materials and equipment) within the scope of an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor from Owner, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances (hereinafter referred to in this Article 9 as "liens"); and that no Work, materials or equipment covered by Application for Payment will have been acquired by the Contractor, or by any other person performing or furnishing any

portion of the Work for Contractor, subject to an agreement under which a security interest therein or any other encumbrance thereon is retained by the seller or supplier, or is otherwise imposed thereon by Contractor or such other person.

9.3.5 Everything charged to the Contractor by the Owner under the provisions of the Contract shall be paid to the Owner within three (3) days of written demand. Such charges may be deducted by the Owner from monies due or to become due under the Contract. The Owner may recover such charges from the Contractor or its surety.

9.4 CERTIFICATES FOR PAYMENT

9.4.1 The Construction Project Manager after receipt of the Contractor's Application for Payment, will within a reasonable time issue a Certificate of Payment to the Owner, with a copy to the Contractor, for such amount as the Construction Project Manager and Architect, determine is properly due, or notify the Contractor in writing of the reasons for withholding a Certificate as provided in paragraph 9.6.

9.4.2 The signing of a Certificate for Payment will constitute a representation by the Construction Project Manager or Architect to the Owner, that based upon observations at the site, pursuant to their agreements with the Owner, and the data comprising the Application for Payment, the Work has progressed to the point indicated and that, to the best of their knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to: an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion; the results of any subsequent tests required by or performed under the Contract Documents; minor deviations from the Contract Documents correctable prior to completion; and any specific qualifications stated in the Certificate for Payment); and that the Contractor is entitled to payment in the amount certified. However, by signing a Certificate for Payment, the Construction Project Manager and Architect shall not thereby be deemed to represent that either has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, or that either has reviewed the construction means, methods, techniques, sequences or procedures, or that either has made any examination to ascertain how or for what purpose the Contractor has used the monies previously paid on account of the Contract Sum.

9.5 PROGRESS PAYMENTS

9.5.1 After a Certificate for Payment has been issued, the Owner shall make payment in the manner and within the time provided in Division 1, Section 01 2900.

9.5.1.1 Prior to the twenty-fifth (25th) day of each month, the Contractor shall submit to the Architect and the Construction Project Manager a draft Application for Payment. The Application shall be on the forms required by Division 1, Section 01 2900 and shall be accompanied by such other certificates as may be required by the Owner. On or before the last day of each month, the Contractor shall submit to the Architect and the Construction Project Manager an Application for Payment that has been corrected from the draft Application. No Application for payment will be accepted after the date of Substantial Completion until the Request for Final Payment, except that if extensions in the contract Time total thirty (30) calendar days or more there shall be additional progress payments for each full thirty (30) calendar days of the Contract Time extension.

9.5.1.2 The Owner shall make payment on or before the fourteenth (14th) day of the month following Application submittal. Progress payments shall bear interest at the statutory rate established in ORS 279C.570, thirty days (30) after the request for payment is made by the Contractor or fifteen days (15) after the payment is approved by the Owner, whichever is the earlier date. Interest, if any, on a final payment due and unpaid shall commence upon expiration of the applicable time period under Article 13.

9.5.2 The Contractor shall pay each Subcontractor (including material suppliers and laborers) performing labor or furnishing material for the Work within seven (7) days of receipt of payment from the Owner out of the amount paid to the Contractor on account of the Work of such Subcontractor, material supplier, or laborer, the amount which said Subcontractor is entitled as required by Oregon Revised Statutes, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Work. The Contractor shall, by an appropriate agreement with each Subcontractor, also require each Subcontractor to make payments to its Sub-subcontractors in similar manner. The Contractor or Subcontractor may withhold payment of not more than 5% from the monies earned by any Subcontractor or any Sub-subcontractor or supplier in accordance with ORS 701.410 to 701.440 as it now exists or may hereafter be amended except as provided in ORS 279C.580.

9.5.3 The Owner may, on request and at its discretion, furnish to any Subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the Construction Project Manager on account of Work done by such Subcontractor.

9.5.4 Neither the Owner, the Construction Project Manager nor the Architect shall have any obligation to pay, nor to see to the payment of, any monies to any Subcontractor except as may otherwise be required by law.

9.5.5 No Certificate for a progress payment, nor any progress payment, nor any partial or entire use or occupancy of the Project by the Owner, shall constitute an acceptance of any Work which is not in accordance with the Contract Documents.

9.5.6 Contractor agrees to keep the Work and the site(s) on which Work is to be performed free and clear of all liens and claims of liens on materials furnished pursuant to the Contract Documents. Contractor hereby waives any right it may have in connection with the Work to file any liens, mechanics or otherwise. Notwithstanding anything to the contrary contained in the Contract Documents, if any such lien is filed or there is any reason to believe that any lien may be filed at any time during the progress of the Work or the duration of this Contract, the Owner may refuse to make any payment otherwise due the Contractor or withhold from any payment due to Contractor a sum sufficient in the opinion of the Owner to pay all obligations and expenses necessary to satisfy such lien or claim and completely indemnify the Owner against any such lien or claim unless and until Contractor shall furnish satisfactory evidence that the indebtedness and the lien in respect thereof, if any, has been satisfied, discharged and released of record or that the Contractor has caused such lien to be released of record if and as provided by law pending the resolution of any dispute between Contractor and the person filing such lien; and if such evidence is not furnished by Contractor to the Owner within a period of five (5) days after demand to do so, the Owner may discharge such indebtedness and deduct the amount required therefore, together with any and all losses, costs, damages and attorney's fees suffered or incurred by the Owner from any sum payable to Contractor under the Contract Documents. Final Payment to Contractor may be withheld until the Work and the site(s) on which the Work is to be performed are free and clear of any and all liens or rights thereto arising because of Work performed or materials furnished under the Contract Documents. This Subparagraph 9.5.6 shall be specifically included in all subcontracts and Purchase Orders entered into by Contractor.

9.5.7 Pursuant to Oregon Revised Statutes ORS 279C.505, the Contractor shall make prompt payment, as due, to all persons supplying to the Contractor labor or material for the prosecution of the work provided for herein, pay all contributions or amounts due the State Industrial Accident Fund from the Contractor incurred in the performance of the contract herein, not permit any lien or claims to be filed or prosecuted against the Owner on account of any labor or material furnished, and to pay the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.

9.5.8 Pursuant to ORS 279C.515, if the Contractor fails, neglects or refuses to make prompt payments of any claim for labor or services furnished to the Contractor or a subcontractor by any person in connection with a "public contract", as defined in ORS 279A, as such claim become due, the proper official representing the Owner may pay such claim to the person furnishing the labor or services and charge the amount of the payment against funds due or to come due the Contractor by reason of this Contract, but the payment of a claim in the manner authorized herein shall not relieve the Contractor or its surety from its or its obligation with respect to any unpaid claims.

9.6 PAYMENTS WITHHELD

9.6.1 The Construction Project Manager and Architect may decline to certify payment and may withhold the Certificate in whole or in part, to the extent necessary to protect the Owner, if in their opinion they are unable to make representations to the Owner as provided in Subparagraph 9.4.2. If the Construction Project Manager and Architect are unable to make representations to the Owner as provided in Subparagraph 9.4.2 and to certify payment in the amount of the Application, they will notify the Contractor as provided in Subparagraph 9.4.1. If the Contractor, the Architect and the Construction Project Manager cannot agree on a revised amount, the Construction Project Manager and Architect will promptly issue a Certificate for Payment in the amount for which they are able to make such representations to the Owner. The Construction Project Manager and Architect may also decline to certify payment or any part thereof or, because of subsequent observations, they may nullify the whole or any part of any Certificate for Payment previously issued, to such extent as may be necessary in their opinion to protect the Owner from loss because of:

1. defective work not remedied;

2. third party claims filed or reasonable evidence indicating probable filing of such claims;
3. failure of the Contractor to make payments as required by the Contract 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 another contractor;
6. reasonable evidence that the Work will not be or has not been completed within the Contract Time or Specific Dates;
7. failure to carry out the Work in accordance with the Contract Documents;
8. liens filed or reason to believe it is probable a lien will be filed for any portion of the Work, as more specifically provided in Subparagraph 9.5.6; or
9. failure or refusal of the Contractor to fully comply with Division 1, Section 01 3200 of the General Requirements entitled "Schedules and Reports."

9.6.2 When the above grounds in Subparagraph 9.6.1 are removed, payment shall be made for amounts withheld because of them.

9.7 FAILURE OF PAYMENT

9.7.1 If the Owner does not make payment to the Contractor within the time provided for elsewhere in the Contract Documents, or if no time is stated, within a reasonable time, after receipt of the Contractor's approved Application for Payment from the Construction Project Manager; and if the Contractor is not responsible for such failure; and if the Owner is otherwise not entitled under the Contract Documents or applicable law to withhold payment, Contractor shall give Owner written notice thereof within seven (7) days of such failure to make payment. Should the Owner fail, within fourteen (14) days of receipt of such notice from the Contractor, to make payment to Contractor or to specify, in writing, the justification for withholding or not making payment, Contractor may stop the Work until payment of the amount owing according to the Contract Documents has been received. In such event, the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, which shall be effected by appropriate Change Order as provided herein. Should Owner specify to Contractor, within the fourteen (14) day period stated above, the basis for the Owner's refusal to make payment, such decision of the Owner shall be final and binding upon the Contractor unless the Contractor, within seven (7) days of the receipt of such writing from the Owner, notifies the Construction Project Manager.

9.8 SUBSTANTIAL COMPLETION

9.8.1 When the Contractor considers that the Work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Subparagraph 8.1.3, the Contractor shall prepare for the Owner a list of items to be completed or corrected and request in writing that the Work be inspected for Substantial Completion determination. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Architect and the Construction Project Manager, on the basis of an inspection, jointly determine that the Work or designated portion thereof is substantially complete, they will then prepare a Certificate of Substantial Completion, state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, and fix the time within which the Contractor shall complete the items listed therein. Warranties required by the Contract Documents shall not commence until the Date of Final Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion or the Contract Documents. The Certificate of Substantial Completion shall be submitted to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.

9.8.2 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Construction Project Manager and the Architect, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or such portion thereof, as provided in the Contract Documents.

9.8.3 Should the Architect and the Construction Project Manager determine that the Work or the portion thereof designated by Contractor pursuant to Subparagraph 9.8.1 is not substantially complete, they shall provide the Contractor a written notice stating why the Work or designated portion thereof is not Substantially Complete. The Contractor shall expeditiously complete the Work and shall re-request in writing that the Architect and the Construction

Project Manager perform a Substantial Completion inspection. Contractor shall pay Owner for all costs associated with such re-inspection by the Construction Project Manager and Architect.

9.8.4 The acceptance of Substantial Completion payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the Application for Payment for the Substantial Completion payment, and except for the sum due for Final Completion and the retainage sum due after Final Completion.

9.9 FINAL COMPLETION AND FINAL PAYMENT

9.9.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect and the Construction Project Manager will promptly make such inspection and, when they find the Work acceptable under the Contract Documents and the Contract fully performed, they will jointly issue a final Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor, and noted in said final Certificate, is due and payable. The final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Subparagraph 9.9.2 have been fulfilled.

9.9.1.1 For Final Completion of the Work or designated portion thereof to be achieved, (1) Substantial Completion of the Work or designated portion thereof must have been achieved, (2) the Owner must have received a final certificate of occupancy and all other governmental approvals necessary and required for the Owner to occupy or utilize the Work or designated portion thereof for its intended purpose, or a temporary certificate of occupancy if Contractor is not responsible for the non-issuance of a final certificate of occupancy,(3) the Contractor must have submitted all warranties, operating and maintenance manuals, as-built drawings and Specifications, keys and other submittals required for the Work or designated portion thereof, and (4) the Contractor otherwise must have fully performed and completed all of its other obligations required for Final Completion under the Contract Documents with respect to the Work or designated portion thereof.

9.9.2 Neither final payment nor the remaining retained percentage shall become due until the Work is free and clear of any and all liens as required by Subparagraph 9.5.6 and the Contractor submits to the Owner (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or its property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment, (3) valid waivers of all construction lien claims by the Contractor and each Subcontractor in a form acceptable to the Owner, and (4) 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 any 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 any loss. If any such lien or claim remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the Owner may be compelled to pay in discharging such lien or claim, including all costs and attorneys' fees. The Owner may withhold from final payment any sum that the Owner has reason to believe may be needed to satisfy any lien, claim or threat of lien arising out of the Work. The Owner may deduct from final payment an amount equal to any costs, expenses and attorneys' fees incurred by the Owner in removing or discharging any liens arising out of the Work. Payment of the retained percentage shall be in accordance with and subject to the conditions as set forth in ORS 279C.570.

9.9.3 If Owner, after a substantial portion of the work has been completed, finds that an unreasonable delay will occur in the completion of the remaining portion of the contract for any reason not the result of a breach thereof, it may, if the Contractor agrees, delete from the contract the remaining work and accept as final the improvement at the stage of completion then attained and may make payment in proportion to the amount of work accomplished.

9.9.4 The making of Final Payment shall not constitute a waiver of any claims by the Owner against the Contractor.

9.9.5 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final Application for Payment.

9.10 LIQUIDATED DAMAGES

9.10.1 Should the Contractor fail to substantially complete the Work on or before the date stipulated for Substantial Completion (or such later date as may result from extension of time granted by Owner), it shall pay the Owner, as liquidated damages, the sum specified in the Contract for each consecutive calendar day that terms of the contract remain unfulfilled beyond the date allowed by the Contract, which sum is agreed upon as a reasonable and proper measure of damages which the Owner will sustain per day by failure of the Contractor to complete the Work or designated portion thereof within time as stipulated; it being recognized by the Owner and the Contractor that the injury to the Owner which could result from a failure of the Contractor to complete on schedule is uncertain and cannot be computed exactly. In no way shall costs for liquidated damages be construed as a penalty on the Contractor.

9.10.2 For each consecutive calendar day that the Work remains incomplete after the date established for Final Completion, the Owner will retain from the compensation otherwise to be paid to the Contractor the sum specified in the Contract. This amount is the minimum measure of damages the Owner will sustain by failure of the Contractor to complete all remedial work, correct deficient work, clean up and other miscellaneous tasks as required to complete all work specified. This amount is in addition to the liquidated damages prescribed above.

9.10.3 For the purposes of Liquidated Damages, the date of Final Completion shall be the date as stated in the Architect's letter to the Owner that the Project is finally complete.

9.11 OWNER'S RIGHT TO OCCUPY INCOMPLETE WORK

9.11.1 Should the Work, or any portion thereof, be incomplete for Substantial Completion or Final Completion at the scheduled date or dates, the Owner shall have the right to occupy any portion of the Work. In such an event, the Contractor shall not be entitled to any extra compensation on account of said occupancy by the Owner or by the Owner's normal full use of the Work, nor shall the Contractor interfere in any way with said normal full use of the Work. Further, in such an event, the Contractor shall not be entitled to any extra compensation on account of the Owner's occupancy and use of the Work, nor shall the Contractor be relieved of any responsibilities of the Contract including the required times of completion. Such occupancy by the Owner does not, by itself, constitute Substantial Completion nor Final Completion.

ARTICLE 10
PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Owner, the Construction Project Manager and the Architect, or their agents, employees or representatives, are not responsible for the means, methods, techniques, sequences or procedures utilized by the Contractor, or for safety precautions and programs in connection with the Work. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

10.1.2 Any notice given to the Contractor by the Owner, the Construction Project Manager or the Architect of a safety or property protection violation will not; (1) relieve the Contractor of sole and complete responsibility for the violation and the correction thereof, or of sole liability for the consequences of said violation; (2) impose any obligation upon Owner, Construction Project Manager or Architect to inspect or review Contractor's safety program or precautions or to enforce Contractor's compliance with the requirements of this Article 10; and (3) impose any continuing obligation upon Owner, Construction Project Manager or Architect to provide such notice to Contractor or any other person or entity.

10.2 SAFETY OF PERSONS AND PROPERTY

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

1. all employees on the Work and all other persons who may be affected thereby;

2. all the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of its Subcontractors of Sub-subcontractors; and
3. other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavement, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the 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 progress of the Work, all 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 utilities.

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

10.2.5 The Contractor shall promptly remedy all damage or loss to any property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, any Subcontractor, and Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Contractor is responsible under Clause 10.2.1.2 and 10.2.1.3, except damage or loss caused by the acts or omissions of the Owner or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to its obligations under Paragraph 4.19.

10.2.6 The Contractor shall designate a responsible member of its organization at the site whose duty shall be the prevention of accidents and monitoring of the Work to insure compliance with all applicable laws, ordinances, rules, regulations and lawful orders of public authority bearing on the safety of persons or protection of property. This person shall be the Contractor's Superintendent unless otherwise designated by the Contractor in writing to the Owner.

10.2.7 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.

10.3 EMERGENCIES

10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at its discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 12 for Changes in the Work.

ARTICLE 11
INSURANCE

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase and maintain such insurance as will protect it, the Owner, the Construction Project Manager and the Architect and their agents, representatives and employees from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by itself or by any Subcontractor or 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 (with Workers' Compensation and Employers Liability Insurance in an amount not less than those necessary to meet the statutory requirements of the state(s) having jurisdiction over any portion of the Work;
2. claims for damages because of bodily injury, occupational sickness or disease, or death of persons performing work or services or supplying materials for the Work;
3. claims for damages because of bodily injury, sickness or disease, or death of any person other than its employees;

4. claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person;
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; and
6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
7. Without limiting the above, during the term of the Contract, the Contractor shall, at its own expense, purchase and maintain the following insurance with companies licensed to do business in the jurisdiction in which the Project is located and satisfactory to the Owner.

1. Workers' Compensation with limits as required by law.
2. Employer's Liability (Stop Gap) $ 1,000,000
3. Commercial General Liability Insurance covering bodily injury and property damage on an "occurrence" form. This coverage shall include contractual liability insurance for the indemnity provided under this contract. The $2,000,000 Each Occurrence limit can be met by any combination of underlying General Liability and Umbrella or Excess coverage limits to meet the below requirements:

   The following limits of insurance will be carried:

   a.

Coverage	**Limit**
Each Occurrence	$2,000,000
General Aggregate	$4,000,000 *
Products-Completed Operations Aggregate	$4,000,000*
Personal & Advertising Injury	$2,000,000
Fire Damage (Any one Fire)	$100,000
Medical Expense	$5,000

   *To apply on a per location basis

4. Comprehensive Automobile Liability covering all owned, non-owned, and hired automobiles ("Symbol 1"):

   a. Combined Single Limit $ 1,000,000

5. Umbrella coverage will also be required, and will apply over all primary liability policies including but not limited to coverages outlined in 2, 3, & 4 above.

   a. Occurrence/Aggregate Limit Insert the greater of $5,000,000 or dollar value equal to 25% of the Construction Budget

6. Jefferson County School District 509J, its officers, directors, employees, Construction Project Manager, and Architect shall be named as additional insured on all liability policies, by endorsement. This additional insured coverage shall include completed operations.
7. There shall be no cancellation, material change, exhaustion of aggregate limits or intent not to renew insurance coverage without 30 days written notice the Jefferson County School District. Any failure to comply with this provision will not affect the insurance coverage provided to the District.
8. As evidence of the insurance coverage required by this contract, including additional insured endorsement, the contractor shall furnish a Certificate of Insurance to Jefferson County School District 509J. No contract shall be effected until the required certificates have been received and approved by the District. A renewal certificate will be sent to the District 10 days prior to coverage expiration. Where noted above, copies of policy endorsements must be attached to all Certificates of Insurance. Note that certificates cannot change, modify or endorse insurance policies.

11.1.2 The insurance required by Subparagraph 11.1.1 shall be primary and noncontributing to any insurance possessed or procured by the Owner, and limits of liability shall not be less than those set forth in the Special Conditions of this Contract.

11.1.3 The insurance required by Subparagraph 11.1.1 shall include contractual liability insurance applicable to the Contractor's obligations under Paragraph 4.19.

11.1.4 The insurance required by Subparagraph 11.1 shall be written for not less than any limits of liability specified in the Contract Documents or required by law, whichever is greater.

11.1.5 Before signing this Contract, or commencing work on any project or allowing any Subcontractor to commence work, the Contractor shall obtain all insurance required under this subparagraph. The Contractor shall maintain this insurance until Final Completion. Proof of insurance will be required prior to performing work under the warranty.

11.1.6 The service or services to be rendered under this contract are those of an independent contractor in accordance with ORS 670.600 and 670.605. Contractor is not an officer, employee or agent of the Owner as those terms are used in ORS 30.265.

11.1.7 The Contractor, its subcontractors, if any, and all employees providing work, labor or materials under this Contract are subject employers under the Oregon Workers' Compensation Law and shall comply with ORS 656.017, which requires them to provide worker's compensation coverage that satisfies Oregon law for all their subject workers. Out-of-state employers must provide Oregon worker's compensation coverage for their workers who work at a single location within Oregon for more than thirty days (30) in a calendar year. Contractors who perform the work without the assistance or labor of any employee need not obtain such coverage. This shall include Employers Liability Insurance with coverage limits of not less than $1,000,000 each accident.

11.1.8 Coverages provided by the Contractor must be underwritten by an insurance carrier deemed acceptable by the Owner. The Owner reserves the right to reject any or all insurance carrier(s) with an unacceptable financial rating.

11.2 - PROPERTY INSURANCE

11.2.1 Unless otherwise provided, the Owner shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. This insurance shall include the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work and shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss or damage including, without duplication of coverage, theft, vandalism and malicious mischief. All contractors, subcontractors, and sub-subcontractors will be financially responsible for their own equipment, tools, machinery, and supplies during the course of this project. If not covered under the all risk insurance or other wise provided in the Contract Documents, the Contractor shall effect and maintain similar property insurance on portions of the Work stored off the site or in transit.

11.2.2 Any loss insured under Subparagraph 11.2.1 is to be adjusted with the Owner and made payable to the Owner as trustee for this insured, as their interests may appear, subject to the requirements of any applicable mortgagee clause and of Subparagraph 11.2.8. The Contractor shall pay each Subcontractor a just share of any insurance monies received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require each Subcontractor to make payments to its Sub-subcontractor in similar manner.

11.2.3 The Owner and Contractor waive all rights against each other for damages caused by fire or other perils to the extent covered by insurance obtained pursuant to this Paragraph 11.2 or any other property insurance applicable to the Work, except such rights as they may have to the proceeds of such insurance held by the Owner as trustee. The Contractor shall require, by appropriate agreement, written where legally required for validity, similar waivers in favor of the Owner and the Contractor by Subcontractors and Sub-subcontractors. With respect to the waiver of rights of recovery, the term Owner shall be deemed to include, to the extent covered by property insurance applicable thereto, its consultants, employees and agents, including the Construction Project Manager and the Architect and their consultants, officers, employees and agents. The Contractor waives as against any separate contractor described in Article 6 all rights for damages caused by fire or other perils in the same manner as is provided above as against the Owner. The Owner shall require, by appropriate agreement, written where legally required for validity, similar waivers in favor of the Contractor by any separate contractor and its Subcontractors and Sub-subcontractors.

11.2.4 If required in writing by any party in interest, the Owner as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of its duties. It shall deposit in a separate account any money so received, and it shall distribute it in accordance with such agreement as the parties in interest may reach, or in accordance with a court order or award. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate Change Order.

11.2.5 The Owner as trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within five days after the occurrence of loss to the Owner's exercise of this power, and if such objection be made, the matter shall be decided by a court of competent jurisdiction or as the parties in interest otherwise agree. The Owner as trustee shall, in that case, make settlement with the insurers in accordance with the directions of such arbitrators. If distribution of the insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

11.2.6 If the Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion thereof, Contractor shall obtain the consent of the insurance company or companies providing the property insurance, by endorsement to the policy or policies. No insurance required by this Article 11 shall be canceled or lapsed on account of such partial occupancy or use.

11.2.7 In the event Contractor neglects, refuses or fails to provide the insurance required under the Contract Documents, or if such insurance is canceled for any reason, the Owner shall have the right but not the duty to procure the same, and the cost thereof shall be deducted from monies then due or thereafter to become due to Contractor.

11.2.8 Contractor will be responsible for a deductible carried by the Owner on Property Insurance policies referenced in 11.2.1. This deductible level will be $25,000 per occurrence.

11.3 EFFECT OF SUBMISSION OF CERTIFICATES

11.3.1 The Owner and Construction Project Manager shall be under no obligation to review any Certificates of Insurance provided by the Contractor or to check or verify the Contractor's compliance with any and all requirements regarding insurance imposed by the Contract Documents. The Contractor is fully liable for the amounts and types of insurance required herein and is not excused should any policy or certificate of insurance provided by the Contractor not comply with any and all requirements regarding insurance imposed by the Contract Documents.

11.4 FAILURE OF COMPLIANCE

11.4.1 Should the Contractor fail to provide and maintain in force any and all insurance, or insurance coverage required by the Contract Documents or by law, or should a dispute arise between Owner and any insurance company of Contractor over policy coverage or limits of liability as required herein, the Owner shall be entitled to recover from the Contractor all amounts payable, as a matter of law, to Owner or any other parties, including but not limited to the Construction Project Manager and the Architect, had the required insurance or insurance coverage been in force. Said recovery shall include, but is not limited to interest for the loss of use of such amounts of money, plus all attorney's fees costs and expenses incurred in securing such determination and any other consequential damages arising out of the failure of the Contractor or insurance company to comply with the provisions of the Contract Documents, or any policy required hereby, or any other requirements regarding insurance imposed by law. Nothing herein shall limit any damages for which Contractor is responsible as a matter of law.

ARTICLE 12
CHANGES IN THE WORK

12.1 CHANGES IN THE WORK

12.1.1 The Owner may, at any time, without notice to the sureties and without invalidating the Contract, by written order designated or indicated to be a Change Order, make any Change in the Work within the general scope of the Contract, including, but not limited to Changes:

1. in the Specifications and the Drawings,
2. in the sequence, method or manner of performance of the Work,

3. in the Owner-furnished facilities, equipment, materials, services or site, or
4. directing acceleration in the performance of the Work.

12.1.2 Any other written order (which terms as used in this Subparagraph shall include direction, instruction, interpretation or determination) from the Owner, the Construction Project Manager or the Architect which causes any such change, shall be treated as a Change Order under this subparagraph, provided that the Contractor gives the Construction Project Manager prompt, written notice stating the date, circumstances and source of the order and that the Contractor regards the order as a Change Order.

12.1.3 Except as provided in Subparagraphs 12.1.1 and 12.1.2, no order, statement, or conduct of the Owner, the Construction Project Manager or the Architect shall be treated as a change or entitle the Contractor to an equitable adjustment hereunder.

12.1.4 If any change under this Paragraph 12.1 causes an increase or decrease in the Contractor's cost of, or the time required for the performance of any part of the Work under this Contract, including work not affected directly by the change, an equitable adjustment shall be made and the Contract modified in writing accordingly; provided, however, that except for claims based on defective Specifications, no claim for any Change under Subparagraph 12.1.2 shall be allowed for any costs incurred more than seven (7) days before the Contractor gives the Construction Project Manager written notice as therein required.

12.1.5 If the Contractor intends to assert a claim for an equitable adjustment under this Article, it must, within twenty (20) days after receipt of a written Change Order under Subparagraph 12.1.1 above or the furnishing of a written notice under Subparagraph 12.1.2, submit to the Construction Project Manager a written statement setting forth the general nature and approximate cost of such claim, unless this period is extended by the Construction Project Manager. The statement of claim hereunder may be included in the notice under Subparagraph 12.1.2 above.

12.1.6 No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after Final Payment under this Contract.

12.1.7 The cost or credit to the Owner resulting from a Change in the Work shall be determined in one or more of the following ways (subject to DJ-AR 49-0910):

1. by mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data as the Construction Project Manager may require to permit evaluation. At a minimum, the Contractor shall submit an itemized breakdown of the cost and/or time required by the Change in the Work including, but not limited to, the following:
   a. Material quantities and costs.
   b. Direct labor hours and hourly rates for specific work or operation to be performed.
   c. Equipment costs or rental charges.
   d. Specified overhead and profit markup as identified in Subparagraph 12.1.10.
2. by unit prices stated in the Contract Documents or subsequently agreed upon;
3. by cost to be determined in a manner agreed upon by the parties plus a stipulated fixed or percentage fee; or
4. by the method provided in Subparagraph 12.1.12.

12.1.8 For the purposes of Subparagraph 12.1.7, cost shall be limited to the following: cost of materials and equipment, including cost of delivery; cost of in-field labor not including project staff or supervision, including Social Security, payroll taxes, fringe benefits, unemployment insurance and workers' compensation insurance; rental rate of and fuel for power tools and equipment not normally on the project.

12.1.9 For the purposes of Subparagraph 12.1.7, overhead shall include the following: project insurance, bond premiums, general administration, supervision which includes project managers and staff not completing direct material work in the field, superintendence, general foremen, wages of time-keepers, watchmen and clerks, small tools, incidentals, general office expense, home office overhead, project office overhead and expenses, and all other expenses not included in “cost.”

12.1.10 For the purposes of Subparagraph 12.1.7, combined overhead and profit included in the total cost to the Owner for any Change shall not exceed the rates set forth in the following schedule:

1. for the Contractor, for work performed by its own forces, 15% of cost;
2. for each Subcontractor involved, work performed by Subcontractor forces, 15% of the cost; and
3. for the Contractor, for work performed by Subcontractors;

   9% of total subcontractor costs if total subcontractor costs are less than $5,000, and

   7% of total subcontractor costs if total subcontractor costs are equal to or greater than $5,000

   This shall also apply for overhead and profit to the Subcontractor for its Sub-subcontractors.

12.1.11 If the net value of a Change results in a credit from the Contractor or Subcontractor, the credit given shall be the net cost without overhead or profit. The cost as used herein shall include all items of labor, materials and equipment.

12.1.12 If none of the methods set forth in Subparagraph 12.1.7.1, is agreed upon, the Contractor, provided it receives a written order signed by the Construction Project Manager, shall promptly proceed with the Work involved. The cost of such Work shall then be determined subject to DJ-AR 49-0910 by the Construction Project Manager on the basis of the reasonable expenditures and savings of those performing the Work attributable to the change, including, in the case of an increase in the Contract Sum, the stipulated allowance for overhead and profit. In such case, and also under Subparagraphs 12.1.7.3 and 12.1.7.4 above, the Contractor shall keep and present, in such form as the Construction Project Manager may prescribe, an itemized accounting together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following: cost of materials, including cost of delivery; cost of labor, including social security, payroll taxes, unemployment insurance, and fringe benefits required by agreement or custom; workers' or workmen's compensation insurance; and rental value of equipment and machinery. Pending final determination of cost by the Owner, payments of account shall be made on the Certificate for Payment issued by the Construction Project Manager and the Architect.

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

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

12.1.15 Nothing in this Article shall excuse the Contractor from proceeding with the Contract as changed.

12.1.16 The amount payable to the Contractor under this Contract, the Contract Time and the date required for performance of any part of the Work may be changed only by a written Change Order to this Contract.

12.1.17 In the event that the Contractor fails to submit its proposal within the designated period of time or in the event that the parties are unable to agree as to the reasonable cost and time to perform the Change in or addition to the Work based upon the Contractor's Proposal and the Construction Project Manager and Owner do not elect to have the Change in the Work performed on a time and material basis, the Owner and Construction Project Manager shall make a unilateral determination of the reasonable cost and time to perform the Change in the Work, based upon their own estimates, the Contractor's submission or a combination thereof. A Change Order shall be issued for the amounts of cost and time determined by the Construction Project Manager and the Owner and shall become binding upon the Contractor unless the Contractor submits its protest in writing to the Owner within twenty (20) days of the issuance of the Change Order. Owner has the right to direct in writing the Contractor to perform the Change in the Work, which is the subject of such Change Order. Failure of the parties to reach agreement regarding the cost and time of the performing the Change in the Work and/or any pending protests, shall not relieve that Contractor from performing the Change in the Work promptly and expeditiously.

12.2 CLAIMS FOR ADDITIONAL COST

12.2.1 If the Contractor wishes to make a claim for an increase in the Contract Sum, it shall give the Construction Project Manager written notice thereof within seven (7) days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency

endangering life or property in which case the Contractor shall proceed in accordance with Paragraph 10.3. No claim shall be valid unless so made. Contractor hereby waives all claims not so made. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order, subject to DJ-AR 49-0910.

12.2.2 If the Contractor claims that additional cost is involved because of, but not limited to, any written interpretation pursuant to Subparagraph 3.2.17, the Contractor shall make such claim as provided in Subparagraph 12.2.1.

12.3 DISPUTES REGARDING CHANGES.

12.3.1 If any dispute should arise between the parties with respect to an increase or decrease in the Contract Sum or an expansion or contraction in the Contract Time as a result of a Change in the Work, the Contractor shall not suspend performance of a Change in the Work or the Work itself unless otherwise so ordered by the Owner in writing. The Owner shall, however, pay to the Contractor up to the Owner's reasonable estimated value of the Change in the Work, regardless of the dispute if said Change in the Work results in an increase in the Contract Sum; and the Owner shall have the right to decrease the Contract Sum up to the Owner's reasonable estimated value of the Change in the Work, regardless of the dispute, if said Change in the Work results in a decrease in the Contract Sum.

12.4 AUDIT RIGHTS

12.4.1 With respect to any Change in the Work resulting in an increase in the Contract Sum, the Contractor shall afford (and shall require its Subcontractors to afford) access to the Owner at all reasonable times to any books, correspondence, instructions, receipts, vouchers, memoranda and records of any kind relating thereto, all of which shall be maintained by the appropriate parties for a period of at least two (2) years from and after the date the Owner makes payment on account of such Change in the Work. The Contractor authorizes the Owner (and shall require its Subcontractors to authorize the Owner) to check directly with any suppliers of labor and material with respect to any item chargeable to the Owner under this Article, to confirm balances due and to obtain sworn statements and waivers of lien, all if the Owner so elects.

12.5 MINOR CHANGES IN THE WORK

12.5.1 The Owner shall have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension to the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be affected by written order, and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

12.6 DIFFERING SITE CONDITIONS

12.6.1 Should the Contractor encounter subsurface and/or latent conditions at the site materially differing from those shown on the drawings or indicated in the specifications, it shall immediately give notice to the Construction Project Manager of such conditions before they are disturbed. The Construction Project Manager and the Architect shall thereupon promptly investigate the conditions and if it finds that they materially differ from those shown on the drawings or indicated in the specifications, the Architect shall at once make such changes in the drawings and/or specifications as it may find necessary. Any increase or decrease of cost resulting from such changes shall be adjusted in the manner provided herein for adjustments as to extra and/or additional work and changes. However, neither the Owner, Construction Project Manager nor the Architect shall be liable or responsible for additional work, costs or changes to the Work due to material differences between actual conditions and any geotechnical, soils and other reports, surveys and analyses made available for the Contractor's review.

12.7 GENERAL PROVISIONS RELATED TO CHANGES

12.7.1 The Contractor shall not be entitled to any amount of indirect costs, damages or expenses of any nature, including, but not limited to, so-called "impact" costs, labor inefficiency, wage, material or other escalations beyond the prices upon which the proposal is based and to which the parties have agreed pursuant to the provisions of Article 12, and which the Contractor, its Subcontractors or Sub-subcontractors or any other person may incur as a result of reasonable delays, interferences, suspensions, changes in sequence or the like, arising from the performance of any and all changes in the Work performed pursuant to this Article 12. It is understood and agreed that the Contractor's sole and exclusive remedy in such event shall be recovery of its direct costs as compensable hereunder and an extension of the Contract Time, but only in accordance with the provisions of the Contract Documents. This provision shall not preclude recovery by Contractor for damages for unreasonable delays, interferences, suspensions, changes

in sequence or the like that are caused by the acts or omissions of the Owner or persons acting for the Owner pursuant to the provisions of the Contract.

ARTICLE 13
TERMINATION OF THE CONTRACT

13.1 TERMINATION BY THE CONTRACTOR

13.1.1 The Contractor shall have the right to terminate the contract only upon those conditions and with such rights as are set forth in ORS 279C.

13.2 TERMINATION FOR CONVENIENCE OF OWNER

13.2.1 The Owner may, at any time upon ten days' written notice to the Contractor and Contractor's surety, terminate (without prejudice to any right or remedy of the Owner) the whole or any designated portion of the Work for the convenience of the Owner.

13.3 DEFAULT TERMINATION

13.3.1 The Owner may, upon ten (10) days' written notice to the Contractor, terminate (without prejudice to any right or remedy of the Owner or any subsequent buyer of any portion of the Work) the whole or any portion of the Work required by the Contract Documents in any one of the following circumstances:

1. if the Contractor refuses or fails to prosecute the Work or any separable part thereof with such diligence as will ensure the Substantial Completion of the Work within the Contract Time;
2. if the Contractor is in material default in carrying out any provisions of this Contract for a cause within its control;
3. if the Contractor is adjudged a bankrupt, makes a general assignment for the benefit of its creditors, or if a receiver is appointed on account of its insolvency;
4. if the Contractor fails to supply a sufficient number of properly skilled workers or proper materials;
5. if the Contractor fails to make prompt payment to Subcontractors or for materials or labor;
6. if the Contractor persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction; or
7. if the Contractor substantially violates any provision of the Contract Documents.

The right of the Contractor to proceed shall not be so terminated under this Paragraph 13.3 because of any delays in the completion of the Work due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor or its Subcontractors as set forth in Subparagraph 8.3.3.

13.3.2 If, after Contractor has been terminated for default pursuant to this Paragraph 13.3, it is determined that none of the circumstances set forth in Subparagraph 13.3.1 exist, then such termination shall be considered a termination for convenience pursuant to Paragraph 13.2.

13.4 ALLOWABLE TERMINATION COSTS

13.4.1 If the Owner terminates the whole or any portion of the Work pursuant to Paragraph 13.2, then the Owner shall only be liable to Contractor for those costs reimbursable to Contractor in accordance with Subparagraph 13.4.2, plus a markup of ten percent on the actual fully accounted costs recovered under 13.4.2; provided, however, that if it appears that the Contractor would have sustained a loss on the entire Contract had it been completed, no profit shall be included or allowed hereunder and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss.

13.4.2 If the Owner terminates the whole or any portion of the Work pursuant to Paragraph 13.2, the Owner shall pay the Contractor the amounts determined by the Construction Project Manager as follows:

1. an amount for supplies, services, or property accepted by the Owner pursuant to Subparagraph 13.5.1.6 (or sold or acquired pursuant to Subparagraph 13.5.1.7) and not heretofore paid for, and to the extent provided in the Contract such amount shall be equivalent to the aggregate price for such

supplies or services computed in accordance with the Price or Prices specified in the Contract, appropriately adjusted for any saving of freight or other charges; and

2. the total of:
   (1) the cost incurred in the performance of the Work terminated, including initial costs and preparatory expense allocable thereto, but exclusive of any costs attributable to supplies or services paid or to be paid for under Subparagraph 13.4.2.1 or 13.4.2.2(2),
   (2) the cost of settling and paying claims arising out of the termination of Work under subcontracts or orders, pursuant to Subparagraph 13.5.1.5, which are properly chargeable to the terminated portion of the Contract (exclusive of amounts paid or payable on account of completed items of equipment delivered or services furnished by subcontractors or vendors prior to the effective date of the Notice of Termination), which amounts shall be included in the costs payable under (1) above, and
   (3) the reasonable costs of settlement, including accounting, legal, clerical and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the Contract and for the termination and settlement of subcontracts thereunder, together with reasonable storage, transportation and other costs incurred in connection with the protection or disposition of property allocable to this Contract.

13.4.3 The total sum to be paid to the Contractor under this Paragraph 13.4 shall not exceed the Contract Sum as reduced by the amount of payments otherwise made, by the Contract Price of Work not terminated and as otherwise permitted by this Contract. Except for normal spoilage, and except to the extent that the Owner shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor, as provided in this Subparagraph 13.4.3, the fair value, as determined by the Construction Project Manager, of property which is destroyed, lost, stolen or damaged so as to become undeliverable to the Owner or to a buyer pursuant to Subparagraph 13.5.1.7.

13.4.4 If the Owner terminates in whole or in any part of the Work pursuant to Paragraph 13.3, then the Owner may procure, upon such terms and in such manner as the Construction Project Manager may deem appropriate, supplies or services similar to those so terminated, and the Contractor shall be liable to the Owner for any excess costs for such similar supplies or services. The Contractor shall continue the performance of this Contract to the extent not terminated hereunder.

13.5 GENERAL TERMINATION PROVISIONS

13.5.1 After receipt of a Notice of Termination from the Owner, pursuant to Paragraph 13.2 or 13.3, and except as otherwise directed by the Construction Project Manager, the Contractor shall:

1. stop Work under the Contract on the date and to the extent specified in the Notice of Termination;
2. place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the Work under the Contract as is not terminated;
3. terminate all orders and subcontracts to the extent that they relate to the performance of Work terminated by the Notice of Termination;
4. assign to the Owner in the manner, at the times and to the extent directed by the Construction Project Manager, all of the right, title and interest of the Contractor under the orders and subcontracts so terminated, in which case the Owner shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;
5. settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Construction Project Manager, to the extent it may require, which approval or ratification shall be final for all the purposes of this clause;
6. transfer title and deliver to the entity or entities designated by the Owner, in the manner, at the times and to the extent, if any, directed by the Construction Project Manager, and to the extent specifically produced or specifically acquired by the Contractor for the performance of such portion of the Work as had been terminated:
   (1) the fabricated or unfabricated parts, Work in process, partially completed supplies and equipment, materials, parts, tools, dies, jigs and other fixtures, completed Work, supplies and

other material produced as part of, or acquired in connection with the performance of, the Work terminated by the Notice of Termination, and

(2) the completed or partially completed plans, drawings, information and other property related to the Work;

7. use its best efforts to sell, in the manner, at the times, to the extent and at the price or prices directed or authorized by the Construction Project Manager, any property of the types referred to in Subparagraph 13.5.1.6; provided, however, that the Contractor:
   (1) shall not be required to extend credit to any buyer, and
   (2) may acquire any such property under the conditions prescribed by and at a price or prices approved by the Construction Project Manager; and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Owner to the Contractor under this Contract or shall otherwise be credited to the price or cost of the Work covered by this Contract or paid in such other manner as the Construction Project Manager may direct;

8. take such action as may be necessary, or as the Construction Project Manager may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the Owner has or may acquire an interest.

13.5.2 The Contractor shall, from the effective Date of Termination until the expiration of three years after final settlement under this Contract, preserve and make available to the Owner, at all reasonable times at the office of the Contractor, but without direct charge to the Owner, all books, records, documents and other evidence bearing on the costs and expenses of the Contractor under this Contract and relating to the Work terminated hereunder, or, to the extent approved by the Construction Project Manager, photographs, micro-photographs or other authentic reproductions thereof.

13.5.3 In arriving at any amount due the Contractor pursuant to Paragraph 13.4, there shall be deducted:

1. all unliquidated advance or other payments on account theretofore made to the Contractor applicable to the terminated portion of this Contract;
2. any claim which the Owner may have against the Contractor;
3. such claim as the Construction Project Manager determines to be necessary to protect the Owner against loss because of outstanding or potential liens or claims; and
4. the agreed price for, or the proceeds of sale of any materials, suppliers or other things acquired by the Contractor or sold, pursuant to the provisions of Subparagraph 13.5.1.7, and not otherwise recovered by or credited to the Owner.

13.5.4 If the termination, pursuant to Paragraph 13.2, be partial, the Contractor may file with the Construction Project Manager a claim for an equitable adjustment of the price or prices specified in the Contract relating to the continued portion of the Contract (the portion not terminated by the Notice of Termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices. Any claim by the Contractor for an equitable adjustment under this clause must be asserted within six months from the effective date of the Notice of Termination.

13.5.5 The Contractor shall refund to the Owner any amounts paid by the Owner to the Contractor in excess of costs reimbursable under Paragraph 13.4.

13.5.6 The Owner may, at its option and Contractor's expense, have costs reimbursable under Paragraph 13.4 audited and certified by independent certified public accountants selected by the Owner.

13.5.7 The Contractor shall be entitled to only those damages and that relief from termination by the Owner as specifically provided in Article 13.

END OF SECTION

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SECTION 00 7300 SUPPLEMENTARY GENERAL CONDITIONS OF THE CONTRACT

REFERENCE:

"GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," consist of the General Conditions of the Contract (Section 00 7000) and are further revised and supplemented by the provisions of these Supplementary General Conditions of the Contract, hereinafter called the "Supplementary General Conditions." The General Conditions and the Supplementary General Conditions are applicable to all of the Work under this Contract and shall apply to the Contractor, and to all Subcontractors and Sub-subcontractors.

SUPPLEMENTS:

The following supplements modify, change, delete, or add to the General Conditions.

PUBLIC CONTRACTING PROVISIONS

In accordance with OAR 137-049-0200, the following contract provisions are required by Oregon law:

(1) Contractor shall make payment promptly, as due, to all persons supplying to the Contractor labor or materials for the performance of the work provided for in this agreement. [ORS 279C.505(1)(a)]

(2) Contractor shall pay all contributions or amounts due the Industrial Accident Fund from the Contractor or Subcontractor incurred on the performance of the agreement. [ORS 279C.505(1)(b)]

(3) Contractor shall not permit any lien or claim to be filed or prosecuted against the state or a county, school district, municipality, municipal corporation or subdivision thereof, on account of any labor or materials. [ORS 279C.505(1)(c)]

(4) Contractor shall pay to the Department of Revenue all sums withheld from employees under ORS 316.167. [ORS 279C.505(1)(d)]

(5) Contractor shall demonstrate that an employee drug testing program is in place. [ORS 279C.505(2)]

(6) For demolition, Contractor shall salvage or recycle construction and demolition debris, if feasible and cost-effective. [ORS 279C.510(1)]

(7) For lawn and landscape maintenance, Contractor is required to compost or mulch yard waste material at an approved site, if feasible and cost-effective. [ORS 279C.510(2)]

(8) If Contractor fails, neglects or refuses to make prompt payment of any claim for labor or services furnished to the Contractor or Subcontractor by any person in connection with the agreement as the claim becomes due, the proper office or officers representing the state or county, school district, municipality, municipal corporation or subdivision thereof, as the case may be, may pay such claim to the person furnishing the labor or services and charge the amount of the payment against funds due or to become due the Contractor by reason of this agreement. [ORS 279C.515(1)]

(9) If Contractor or a first-tier Subcontractor fails, neglects or refuses to make payment to a person furnishing labor materials in connection with the public improvement agreement within 30 days after receipt of payment from the contracting agency or a contractor, the Contractor or Subcontractor shall owe the person the amount due plus interest charges commencing at the end of the 10-day period that payment is due under ORS 279C.580 (4) and ending upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest on the amount due is nine percent per annum. The amount of interest may not be waived. [ORS 279C.515(2)]

(10) If Contractor or Subcontractor fails, neglects or refuses to make payment to a person furnishing labor or materials in connection with the agreement, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The payment of a claim in the manner authorized in this section does not relieve the Contractor or the Contractor's surety from obligation with respect to any unpaid claims. [ORS 279C.515(3, 4)]

(11) A person may not be employed for more than 10 hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency or when the public policy absolutely requires it, and in such cases, except in cases of agreements for personal services as defined in ORS 279C.100, the employee shall be paid at least time and a half pay:

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

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

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

[ORS 279C.520 (1)]

(12) Employer must give notice in writing to employees either at the time of hire or before commencement of work on the agreement, or by posting a notice in a location frequented by employees, of the number of hours per day and days per week that the employees may be required to work. [ORS 279C.520 (2)]

(13) Contractor shall promptly, as due, make payment to any person, copartnership, association or corporation furnishing medical, surgical and hospital care services or other needed care and attention, incident to sickness or injury, to the employees of the Contractor, of all sums that the Contractor agrees to pay for the services and all moneys and sums that the Contractor collected or deducted from the wages of employees under any agreement for the purpose of providing or paying for the services. [ORS 279C.530 (1)]

(14) All employers, including Contractor, that employ subject workers who work under this Contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its subcontractors complies with these requirements. [ORS 279C.530 (2)]

(15) The specifications contain the existing state prevailing rate of wage and, if applicable, the federal prevailing rate of wage required under the Davis-Bacon Act (40 U.S.C. 276a) that must be paid to workers in each trade or occupation required for the public works employed in the performance of the agreement either by the Contractor or Subcontractor or other person doing or contracting to do the whole or any part of the work contemplated by this agreement. [ORS 279C.830 (1)(a)]

(16) Workers shall be paid not less than the specified minimum hourly rate of wage in accordance with ORS 279C.838 and ORS 279C.840. Current prevailing wage rates can be viewed at http://www.oregon.gov/boli/WHD/PWR/Pages/pwr_state.aspx [ORS 279C.830(1)(c)]

(17) The Contractor and every Subcontractor must have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836 (7) or (8).

(a) Contractor must have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836 (4), (7), (8), or (9).

(b) Contractor must require each Subcontractor to have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836 (7) or (8).

[ORS 279C.830 (2)]

(18) Contractor must include in each subcontract for property or services the Contractor enters into with a first-tier subcontractor, including a material supplier:

(a) A payment clause that obligates the Contractor to pay the first-tier subcontractor for satisfactory performance under the subcontract within 10 days out of amounts the District pays to the Contractor under the contract.

(b) A clause that requires the Contractor to provide a first-tier subcontractor with a standard form that the first-tier subcontractor may use as an application for payment or as another method by which the subcontractor may claim a payment due from the Contractor.

(c) A clause that requires the Contractor, except as otherwise provided in this paragraph, to use the same form and regular administrative procedures for processing payments during the entire term of the subcontract. A Contractor may change the form or the regular administrative procedures the Contractor uses for processing payments if the Contractor:

(A) Notifies the subcontractor in writing at least 45 days before the date on which the Contractor makes the change; and

(B) Includes with the written notice a copy of the new or changed form or a description of the new or changed procedure.

(d) An interest penalty clause that obligates the Contractor, if the Contractor does not pay the first-tier subcontractor within 30 days after receiving payment from the District, to pay the first-tier subcontractor an interest penalty on amounts due in each payment the Contractor does not make in accordance with the payment clause included in the subcontract as required above.

(e) A clause that requires the first-tier subcontractor to include, in all of the first-tier subcontractor's subcontracts with each lower-tier subcontractor or supplier, payment and interest penalty clauses that conform to the standards of paragraphs (a)-(d) of this Section (18). [ORS 279C.580(3)]

(19) Contractor, or a first-tier subcontractor, is not obligated to pay an interest penalty if the only reason that Contractor or the first-tier subcontractor did not make payment when payment was due is that Contractor or the first-tier subcontractor did not receive payment from the District or Contractor, as applicable, when payment was due. The interest penalty:

(a) Applies to the period that begins on the day after the required payment date and that ends on the date on which the amount due is paid; and

(b) Is computed at the rate of nine percent per annum. [ORS 279C.580(3)]

(20) A person claiming to have supplied labor or materials for the performance of the work under this contract has a right of action on Contractor's payment bond only if the person gives written notice of the claim to Contractor and the District as provided in ORS 279C.605. [ORS 279C.605]

LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

In accordance with ORS 279C.525, the following is a list of federal, state and local agencies of which the Owner has knowledge that have enacted ordinances or regulations relating to environmental pollution and the preservation of natural resources that may affect the performance of the Work.

1 Federal Agencies
- Agriculture, Department of Forest Service
- Soil Conservation Service
- Defense, Department of Army Corps of Engineers
- Energy, Department of Federal Energy Regulatory Commission
- Environmental Protection Agency
- Health and Human Services, Department of
- Housing and Urban Development, Department of Solar Energy and Energy Conservation Bank
- Interior, Department of
  - Bureau of Land Management
  - Bureau of Indian Affairs
  - Bureau of Reclamation
  - Geological Survey
  - U.S. Fish and Wildlife Service
- Labor, Department of
  - Mine Safety and Health Administration
  - Occupation Safety and Health Administration
- Transportation, Department of
  - Federal Highway Administration
  - Coast Guard

2 State Agencies
- Agriculture, Department of Soil and Water Conservation Districts
- Energy, Department of Environmental Quality,
- Department of Fish and Wildlife, Department of Forestry, Department of
- Geology and Mineral Industries,
- Department of Human Services,
- Department of Insurance Division (Department of Consumer and Business Services)
- Land Conservation and Development Commission
- Parks and Recreation,
- Department of State Engineer, State Lands, Department of Water Resources Department

3 Local Agencies
- City Councils
- County Courts

SECTION 00 7300 SUPPLEMENTARY GENERAL CONDITIONS OF THE CONTRACT

County Commissioners, Board of Design Commissions
Historical Preservation Commission
Planning Commissions

END OF SECTION

SECTION 01 1000 SUMMARY OF THE WORK

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. General Requirements.

B. Work Covered by Contract Documents.

C. Contractor Use of Premises.

D. Related Work by Owner.

E. Owner Furnished Products.

F. Contractor Designed Elements.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. General

1. The Work shall be providing all supplies, tools, equipment, scaffolding, transportation, utilities, service, superintendence, labor, and the furnishing of all materials, items, and accessories needed for the Warms Springs K-8 Academy Six Classroom Addition and Restrooms.
2. The intent of the Contract Documents is that a single Contractor completes the project including the furnishing of all supervision, material, labor and equipment to provide complete and operative systems.
3. All on-site work, including demolition, installation and final cleaning is required to be completed during the regularly scheduled hours. Contractor is to coordinate work to accommodate the continuous operation of the adjacent streets and utilities, without interruption or hindrance.

B. Description

1. Jefferson County School District 509J: The Project Consists of construction of a six classroom addition including restrooms.
2. The Contractor shall provide for all scheduling, coordination, cutting and patching and all other items required by the contract Documents to complete the Work and provide complete operational systems.

C. No officer or employee of Jefferson County School District 509J has any authority to place any interpretation, either verbal or written, upon the contents and description of work included in the Contract Documents.

D. Prior to bidding, the Contractor shall visit the site and fully inform himself of the areas in which work is to take place, including the limits of area allowed for working conditions, the areas limited for access to the work, and the areas available for the delivery and storage of new material. Access to each site is to be coordinated by, and at the convenience of, the Owner and the building occupants. To arrange access to the site, please call Mike Tiller, Tiller's Schoolhouse Inc., (541) 550-9431.
:

E. The Contractor represents that he has carefully examined prior to bidding, all Contract Documents and site conditions, understanding the character, quality and quantity of work called for and all conditions of the contract.

1.03 CONTRACTOR'S USE OF PREMISES

A. The Contractor's work limits are as indicated on the Drawings.

C. Contractor shall limit his use of premise for Work and for storage to allow for:

1. Owner occupancy and operations.

2. Public use.
3. Coordinated use of premises under direction of the Owner.
4. Full responsibility for protection and safekeeping of products under this Contract stored at Site.
5. Moving stored products, under Contractor's control, which interfere with operations of Owner or separate Contractor.
6. Obtaining and paying for use of additional storage or work areas needed for operations.
7. Conformance to fire/life/safety requirements and fire equipment access.
8. Worker vehicle parking on-site.
9. Storage of all materials required for the project on-site.

D. Construction Operations:

1. Do not unreasonably encumber Site and Structure with materials or equipment.
2. Do not load structure with weight that will endanger structure.
3. Contractor shall direct all construction vehicle and delivery traffic along an access route as approved by the Owner.

1.04 EXCESSIVE NOISE

A. Minimize noise during working hours. Notify Owner at least 24 hours prior to any necessary excessive noise. Comply with Owner's instructions.

1.05 OWNERS SALVAGED MATERIALS

A. The owner may salvage selective items in good condition that are removed during the demolition phase. Contractor to schedule a pre-demolition walk-thru with the Owner, including the maintenance and technology departments, is to allow the Owner the opportunity to review demolished materials and equipment to determine which items are to be salvaged.

B. Contractor is to relocate salvaged items to an on-site storage location as directed by the Owner for reclamation by Jefferson County School District 509J.

C. Contractor is to dispose off-site all materials and equipment not selected by the Owner for salvage, in a manner approved and authorized by all State, County, City and all other Governing Agencies.

1.06 RELATED WORK BY OWNER OR OTHERS

A. NIC & OFOI Items: If applicable, items designated on the Drawings and/or described in the Project Manual as "NIC" (Not in Contract) or "OFOI" (Owner Furnished and Owner Installed) are not included in the Contract.

B. Contractor's Responsibilities:

1. Designate delivery date for each portion of the Work in the Progress Schedule.
2. Storage of products if requested.
3. Coordinate installation with the Progress Schedule.
4. Provide all preparatory work necessary for proper installation including blocking and backing and finish work including caulking, grouting, furring, preparation of subfloors for finish flooring materials, and painting adjacent surfaces as required for NIC or OFOI equipment.

1.07 OWNER-FURNISHED PRODUCTS

A. OFCI Items: If applicable, items designated on project Drawings and/or described as "OFCI" (Furnished by Owner and installed by Contractor).

B. Owner's Responsibilities for OFCI Equipment:

1. Arrange for delivery of shop drawings, product data, samples, manufacturer's instructions, and certificates to Contractor.
2. Deliver supplier's bill of materials to Architect for review.
3. Arrange and pay for delivery to site in accordance with Progress Schedule.
4. Inspect deliveries jointly with Contractor.
5. Submit claims for transportation damage.
6. Arrange for replacement of damaged, defective, or missing items.
7. Arrange for manufacturers' field services; arrange for and deliver manufacturers' warranties and bonds to Contractor.

C. Contractor's Responsibilities:

1. Designate submittals and delivery date for each product in Progress Schedule.
2. Review shop drawings, product data, samples, and other submittals. Submit to Architect with notification of any observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
3. Receive and unload products at site.
4. Inspect deliveries jointly with Owner, record shortages and damaged or defective items.
5. Handle products at site, including uncrating and storage.
6. Protect products from damage and from exposure to elements.
7. Coordinate, provide and install appropriate backing for connections.
8. Assemble, install, connect, adjust, and finish products as stipulated in respective specification sections.
9. Provide installation inspections required by public authorities.
10. Clean, repair, or replace items damaged by Contractor.
11. Remove and dispose of crating and packing materials for Owner-furnished materials and equipment delivered to the site.

1.08 CONTRACTOR DESIGNED ELEMENTS

A. Where work of this Contract requires bidder design, comply with following requirements.

1. Submit Shop Drawings and Calculations to Architect for review.
2. Submit Shop Drawings and Calculations to City or County for approval and permits.
3. All Shop Drawings and Calculations shall be stamped by Registered Architect or Engineer licensed in State of Oregon.

1.09 EXISTING UTILITIES

A. Utilities of record are shown on the Drawings insofar as possible to do so. These, however, are shown for convenience only and the Owner and Architect assume no responsibility for improper locations or failure to show utility location on the Drawings. The Contractor is responsible for determining the location of all existing utilities (whether shown or not) prior to commencing work. At Contractor's expense, immediately repair and restore operation of any utilities damaged during construction; conform to utility company's repair requirements.

1.10 OBJECTIONS TO APPLICATION OF PRODUCTS

A. All Contractors submitting a bid for this Project shall thoroughly familiarize themselves with specified products and installation procedures and submit to Design Consultant any objections (in writing) no later than seven (7) days prior to Bid Date. Submittal of Bid constitutes acceptance of products and procedures specified.

1.11 MISCELLANEOUS

A. Work includes, but is not limited to:

1. Maintaining pedestrian and vehicular access to and around existing facilities.

2. Not encumbering site access with materials or equipment.
3. Obtaining and paying for use of additional storage or work areas needed for operations.
4. Contractor is responsible for controlling dust, sedimentation, and erosion on site. Wind born dust is to be controlled by continuous watering of disturbed ground. Erosion and sedimentation control are to be provided in compliance with City of Madras ordinances and Department of Environmental Quality regulations. Sedimentation is not allowed to leave the site. Standing water is not to be allowed in such a capacity to hinder construction operations or emergency vehicle access and operations.

PART 2 – PRODUCTS
Not Used

PART 3 – EXECUTION
Not Used

END OF SECTION

PART 1 GENERAL

1.01 ALTERNATIVE BID ITEMS – NOT APPLICABLE TO THIS PROJECT

A. Alternates are described throughout the Contract Documents (Drawings and Specifications). Procedures for recording and noting alternate bid items are indicated in Sections 00 2113 and 00 4100 of the General Conditions. Contractor shall note description of alternate bid items and provide an individual separate price, which includes all costs necessary to add or deduct the cost of said bid item from the Base Bid price. Both additive and deductive bid alternates are indicated on the Drawings and Specifications.

B. The Owner reserves the right to accept any one, all, or none of the alternate bid items. The determination of the lowest bonafide bid will include an evaluation of alternates to be accepted by the Owner.

C. In preparing his price for each alternate bid item, the Contractor shall include all costs necessary to provide and install complete and in operating order in accordance with Contract Documents, and as indicated in the General Requirements and General Conditions, all component parts necessary to add or deduct each alternate bid item individually.

D. Bidding Requirements:

1. Refer to the Bid Form (Section 00 4100) to list all appropriate costs attributed to the alternates described in this section.
2. The alternate bid items are clearly described in the Contract Documents. It is the responsibility of the bidding Contractor to realize that described or inferred adjustments may be necessary due to the acceptance or rejection of alternate bid items. All alternate bids are to be complete bids.
3. Additive alternates are all inclusive of the additional work described.
4. Deductive alternates include all work necessary to provide and install materials necessary to finish the affected system or area.

E. Following are the descriptions of the alternate bid items. The Contractor shall note on the Bid Form clearly whether each individual item is additive or deductive in the space provided:

1.02 DESCRIPTION OF ALTERNATES

A. ALTERNATE NO. 1 - N/A

B. ALTERNATE NO. 2 - N/A

C. ALTERNATE NO. 3 - N/A

1.03 DESCRIPTION OF UNIT PRICES

Not Used

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01 2500 SUBSTITUTIONS

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Substitutions During Bidding: Instructions to Bidders.

B. Shop Drawings, Product Data, Samples: General Conditions and Section 01 3300.

1.02 CONTRACTOR'S OPTIONS

A. For products specified only by reference standards, select any product meeting standards, by any manufacturer.

B. For products specified by naming several products or manufacturers, select any product and manufacturer named.

C. For products specified “Basis of Design,” use the product specified or follow the procedure outlined below for approval of different products.

D. If products or manufacturers are not named in the specified sections, contractors shall follow the procedure outlined below for approval.

1.03 SUBSTITUTIONS

A. During bidding, the Architect will consider requests for substitutions only when received on the form provided as pages 01 2500-3 & 4. No request will be considered unless received seven (7) days prior to the time and date set for the receipt of bids. Requests for substitutions after the bid date will be only considered if in conformance to specified section 01 2500-1.06. All Substitution Requests shall be submitted electronically.

B. In connection with the use of any substitute item approved by the Architect it shall be in the Contractor's responsibility to see that such items meet all space requirements, and that any alterations to connecting items necessitated by use of the alternate items are properly made, at no increase in cost to the Owner.

C. Specific reference in the specifications to any article, device, product, materials, form or type of construction, etc., by name, make or catalog number, shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition.

D. In making request for substitution, Bidder/Contractor represents:
   1. They have personally investigated proposed product or method, and determined that it is equal or superior in all respects to that specified.
   2. They will provide the same guarantee for substitution as for product or method specified.
   3. They will coordinate installation of accepted substitution into Work, making such changes as may be required for Work to be complete in all respects at no additional cost to Owner.
   4. They waive all claims for additional costs or time extensions related to substitution which consequently becomes apparent.
   5. They will reimburse Owner for review or redesign services associated with re-approval by authorities.

E. In order to allow the fullest competition, consistent with the Owner's interests, the Architect will give consideration, prior to submission of proposals, to requests for approval of products and materials competitive with and similar to those specified by proprietary name.

F. To be considered and in order to facilitate review of requests for approval of substitutions for specified products or materials, all such requests shall be made in writing on the form included as a part of this section.

G. Should any proposed product substitution require any redesign work to accommodate the substitute product, costs for such re-design work shall be included in the Bid amount and shall be paid to the Owner in the required re-design work.

1.04 ARCHITECT'S OPTIONS

A. Architect will be sole judge of acceptability of any proposed substitution – unless products have been specifically designated as non-substitutable by the Owner.

B. Only listed products in this Project Manual or approved substitutions may be used on Contract Work.

C. Each request for substitution approval shall include:

1. Identity of product for which substitution is requested; include specification page and paragraph number.
2. Identity of substitution; include complete product description, drawings, photographs performance and test data, and any other information necessary for evaluation.
3. Quality comparison of proposed substitution with specified product.
4. Changes required in other work because of substitution.
5. Effect on construction progress schedule.
6. Cost comparison of proposed substitution with specified product.
7. Any required license fees or royalties.
8. Availability of local maintenance service.
9. Source of replacement materials.

1.05 DURING BIDDING PERIOD

A. No request for substitution approval will be considered unless a written request in triplicate has been submitted on Standard Form bound hereinafter, and has been received by Architect seven (7) days prior to the time and date set for receipt of bids.

B. Request submitted without self-addressed- and stamped envelope will not be individually acknowledged.

1.06 AFTER CONTRACT AWARD

A. Approval will be granted by the Owner only when:

1. Specified product cannot be delivered without project delay, or
2. Specified product has been discontinued, or
3. Specified product has been replaced by superior product, or
4. Specified product cannot be guaranteed as specified, or
5. Product will not perform properly, or
6. Specified product will not fit within designated space, or
7. Specified product does not comply with governing codes or regulations, or
8. Substitution determined by the Owner to be in his best interest.

TO: **BBT Architects**
1140 SW Simpson Ave, Suite 200
Bend, OR 97702

PROJECT NAME: Warm Springs K-8 Academy Six Classroom Addition and Restrooms

We hereby submit for consideration, the following product instead of specified item for above project:

Section: _____ Paragraph: _____

Specified Item _____

Proposed Substitution: _____

_____

Attach complete dimensional information and technical data including laboratory tests, if applicable.

Include complete information on changes to Drawings and/or specifications, which proposed substitution will require for its proper installation.

Submit with request all necessary samples and substantiating data to provide equal quality, performance, and appearance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance. Differences in quality of materials and construction shall be indicated.

The undersigned states that the following paragraphs, unless modified on attachments, are correct:

1. The proposed substitutions do not affect dimensions shown on drawings.

2. The undersigned will pay for changes to the building design, including engineering design, detailing and construction costs caused by the requested substitution.

3. The proposed substitution will have no adverse effect on other trades, the construction schedule, or specified warranty requirements.

4. Maintenance and service parts will be locally available for the proposed substitution.

5. The proposed substitution will have no effect on applicable codes.

6. The manufacturer's guarantee or warranties of proposed product is equivalent to; or exceeds that of the specified product.

7. Proposed substituted item will match all sizes, profiles, specifications and colors of item originally specified.

List of names and location of three similar projects on which product was used, date of installation, and Architect's name and phone number.

Project No. 1: _____

Project No. 2: _____

Project No. 3: _____

SECTION 01 2500

SUBSTITUTIONS

CERTIFICATION OF EQUAL PERFORMANCE AND ASSUMPTION OF LIABILITY FOR EQUAL PERFORMANCE

UNDERSIGNED ATTESTS THAT

FUNCTION AND QUALITY ARE

EQUAL TO OR SUPERIOR TO SPECIFIED ITEMS.

FOR USE BY ARCHITECT:

_____Accepted _____Accepted as Noted
_____Not Accepted_____Received Too Late

By: _____

Date: _____

Remarks: _____
_____

Submitted By: _____ _____

Signature : _____ _____

Title: _____ _____

Firm: _____ _____

Address: _____ _____

_____ _____

Telephone: _____ _____

Date : _____ _____

Signature: _____

Above signature must be by person having authority to legally bind his firm to the above terms.

END OF SECTION

SECTION 00 9300 REQUESTS FOR INTERPRETATION

1.01 GENERAL

A. In addition to requirements stipulated in General Conditions the following shall apply to this Contract:

1. In event that the Contractor or a Subcontractor, at any tier, determines that some portion of the Drawings, Specifications, or other Contract Document require clarification or interpretation, the Contractor shall submit a Request for Interpretation (RFI) to the Architect.
2. The RFI shall clearly and concisely set forth the issues for which the clarification or interpretation is sought, and why a response is needed. The RFI shall also set forth the Contractor's interpretation or understanding of the issues.
3. Prior to submitting a RFI from a Subcontractor, the General Contractor shall review the RFI for appropriateness and completeness and, if needed, obtain clarifications from the Subcontractor.
4. The Architect will review each RFI, and determine whether or not the document qualifies as a Request for Interpretation as defined below. If the Architect determines that the document is not a legitimate RFI, it will be returned to the Contractor unreviewed as to content.
5. The Architect will respond to RFI's within 5 working days of receipt from the Contractor, unless a longer time will be required to provide an adequate response. If a longer time is determined necessary, the Architect will, within 5 working days, notify the Contractor of the anticipated response time. An extension to the Contract Time will not be considered unless the Contractor submits a written request for extension to the Architect within 5 working days thereafter.
6. Unless specifically noted to the contrary, RFI responses from the Architect will not alter requirements of the Contract Documents. If the Contractor believes that an Architect's response does affect the Contract Sum or Contract Time, the Contractor shall, within 5 working days, submit a written notice to the Architect, stating proposed changes and documenting the reasons for such changes. Failure to give such notice shall waive the Contractor's right to seek additions to the Contract Sum or extensions to the Contract Time under the Changes Article of the General Conditions.

1.02 UNACCEPTABLE RFI CLAIMS

A. The Owner will not authorize increases to the Contract Sum or extensions to the Contract Time caused by Contractor's additional field or office staffing, project delays, decreased labor productivity, etc. when such claims are caused by any or all of the following:

1. Project Communications:
   a) Routine communications between the Owner, Architect, and Contractor, including correspondence, memos, field-reports, test-reports, telephone calls, faxed messages, E-mail, etc.
2. Substitution Requests:
   a) Requests by Contractor to substitute products or methods of construction.
   Shop Drawings & other Submittals:
   a) Contractor prepared drawings, product data, samples, etc. submitted for Architect's review to ascertain that Contractor clearly understands Project design intent and Contract Document requirements.
3. Value Engineering Requests:

a) Communications regarding Contractor-originated Value Engineering requests.

4. Non-conforming Work:

a) Communications regarding Work that has not been performed in compliance with the Contract Documents.

5. Finding Existing Information:

a) Directing Contractor where to locate requested information within Drawings, Specifications, or other Contract Documents.

1.03 REQUESTS

A. Requests may be submitted only when Requestor cannot obtain interpretations or information through research, Contract Documents review, or other reasonable means.

B. Requests shall include the following information:

1. Sequential Request Numbers
2. Sender's & Receiver's names, firm names, and related addresses
3. Request Issue Date
4. Requested Reply Date
5. Request Description
6. References & Attachments
7. Sender's Recommendations
8. Space for Receiver's Response

C. Submissions of Requests shall be through the Electronic Management Procedures, Section 01 3000.

END OF SECTION

SECTION 01 2663 CHANGE ORDER PROCEDURES

PART 1 - GENERAL

1.1 RESPONSIBLE PARTIES

A. Immediately following Contract execution, Owner will and Contractor shall identify who, within their respective organizations, will be responsible for executing Change Orders. Architect, Contractor and Owner shall each separately maintain a log of all COR's, RFP's and RFI log, however, Contractor will maintain the official COR's, RFP's and RFI log.

1.2 RELATED SECTIONS

A. General and Supplementary Conditions

B. Section 01 2500: Product Substitutions

C. Section 01 3000: Electronic Management Procedures

D. Section 01 3200: Construction Progress Schedules

E. Section 01 7800: Contract Closeout

F. Section 01 7839: Project Record Documents

1.3 DEFINITIONS

A. Proposal Request:

1. Means request from Architect to Contractor for changes to Contract sum and/or Contract Time for proposed changes to the Work.

B. Change Order:

1. See General Conditions.

C. Construction Change Directive:

1. Means written order to Contractor executed on AIA Form G713 or other similar form designated by the Owner, and signed by Owner and Architect, which amends Contract Documents as described, and authorizes Contractor to proceed with change affecting Contract Sum and/or Contract Time, for inclusion in subsequent Change Order.

D. Architect's Supplementary Instructions

1. Means written order, instruction, or interpretation to Contractor, executed on AIA Form G710 or other similar form designated by Architect, and signed by Architect, which authorizes minor changes in Work not altering Contract Sum and/or Contract Time.

E. Request for Interpretation (RFI):

1. See Section 00 9300: Requests for Interpretation

1.4 OWNER OR ARCHITECT INITIATED CHANGES

A. Requests will include:

1. Detailed description of change, including change location and products.
2. Supplementary or revised Drawings and Specifications.
3. When appropriate, projected time span for making change, and specific statement as to whether or not overtime work is authorized.
4. When appropriate, specific time period during which request price will be considered valid

B. Such request is for information only, and is not an instruction or authorization to execute the change or an order to stop Work in progress.

1.5 CONTRACTOR INITIATED CHANGES

A. Requests shall include

1. Description of proposed change
2. Statement of reason for making change
3. Statement of effect upon Contract Sum and Contract Time
4. Statement of effect upon work of other Contractors
5. Statement of effect upon work by Owner
6. Documentation supporting any change to Contract Sum and/or Contract Time

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. In lieu of Proposal Request, Architect may issue Construction Change Directive for Contractor to proceed with change for subsequent inclusion in future Change Order.

B. Directive will describe Work changes with attachments of revised Contract Documents defining details of change, and designating any changes in Contract Sum and/or Contract Time.

C. Owner and Architect will sign and date Construction Change Directive as authorization for Contractor to proceed with changes.

D. Upon receipt of the Construction Change Directive the Contractor shall proceed with the work as directed.

1.7 DOCUMENTATION OF PROPOSALS & CLAIMS

A. Support quotation for each Proposal with sufficient substantiating data to allow Architect to evaluate quotation.

B. When requested by Architect, submit the following Cost and Time data:

1. Labor required
2. Equipment required
3. Products required
   a. Quantity required
   b. Purchase source
   c. Unit cost
4. Credit for deleted Work, similarly documented
5. Overhead and profit
6. Justification for any change in Contract Time

C. Support each claim for additional cost, and for work done on time-and-material/force account basis with documentation as required for lump-sum proposal, plus the following information:

1. Name of Owner's authorized agent who ordered work, and date of order.
2. Dates and times of work performed, and by whom.
3. Time records, including summary of hours worked, and hourly rates paid.

D. Support all costs of Requests or Claims as outlined in Article 12 of the General Conditions of the Contract.

1.8 PREPARATION OF CHANGE ORDERS

A. Architect will prepare each Change Order.

B. Change Order Form: AIA Document G-701.

C. Change Order will describe Work changes with attachments of any revised Contract Documents, which define Change details.

D. Change Order will adjust Contract Sum and/or Contract Time.

1.9 LUMP-SUM/FIXED PRICE CHANGE ORDERS

A. Change Order contents will be based on, either:

1. Architect's Proposal Request and Contractor's responsive Proposal as mutually agreed between Owner and Contractor.
2. Contractor's Change Proposal as recommended by Architect, and as mutually agreed between Owner and Contractor.

B. Owner and Architect will sign and date Change Order as authorization for Contractor to proceed with Changes.

C. Contractor shall sign and date Change Order to indicate agreement with specified terms.

1.10 UNIT PRICE CHANGE ORDERS

A. Change Order contents will be based on, either:

1. Architect's definition of required changes.
2. Contractor's Change Proposal as recommended by Architect
3. Survey of completed work.

B. Unit Price amounts shall be, either:

1. Those stated in Agreement, if any.
2. Those mutually agreed upon between Owner and Contractor.

C. When quantities of Items affected by Change Order can be determined prior to start of work:

1. Owner and Architect will sign and date Change Order as authorization for Contractor proceed with changes.
2. Owner and Architect will sign and date Change Order to indicate agreement with specified terms.

D. When quantities of Items affected by Change Order cannot be determined prior to start of work:

1. Architect or Owner will issue Construction Change Authorization directing Contractor to proceed with change on basis of unit prices, and will cite applicable unit prices.
2. At change completion, Architect will determine work cost based upon agreed unit prices and quantities used.
3. Contractor shall submit documentation to establish quantities of units or each Item and any claim for change in Contract Time.
4. Owner and Contractor will sign and date Change Order to indicate their agreement with specified terms.

1.11 TIME & MATERIAL & FORCE ACCOUNT CHANGE ORDERS

A. Architect and Owner will issue Construction Change Authorization directing Contractor to proceed with changes according to the process defined in the General Conditions.

B. At Change completion, Contractor shall submit itemized accounting of change with supporting data as specified above in "Documentation of Proposals and Claims."

C. Architect will determine allowable cost of such work, as provided in Contract Conditions.

D. Architect will sign and date Change Order to establish change in Contract Sum and/or Contract Time.

E. Owner and Contractor will sign and date change order to indication their agreement with specified terms.

1.12 CORRELATION OF CHANGE ORDERS WITH CONTRACTOR'S OTHER SUBMITTALS

A. Revise Schedule of Values and subsequent Request for Payment Forms to record each Change as separate item of work, and to record adjusted Contract Sum.

B. Revise Construction Schedule to reflect each change in Contract Time.

C. Revise Sub schedules to show changes for other items of Work affected by Changes.

D. Upon completion of Change Order Work, record pertinent changes in Record Documents.

END OF SECTION

SECTION 01025 APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.01 RELATED SECTIONS

A. Section 00 7000: General Conditions

B. Section 00 7300: Supplementary Conditions

C. Section 01 1000: Summary of Work

D. Section 01 2973: Schedule of Values

E. Section 01 3100: Electronic Management Procedures

F. Section 01 7800: Contract Closeout

1.02 ANTICIPATED PAYMENT AMOUNTS

A. To assist Owner in establishing his Construction Financing and budget cash flows, the Contractor, prior to submitting his first Application for Payment, shall deliver to Architect a schedule of anticipated payment amount to be requested with each subsequent application.

1.03 FORMAT AND DATA REQUIRED

A. Submit itemized applications typed on AIA Document G702, Application and Certificate for Payment, together with Continuation Sheets AIA Document G703 or similar form approved by the Architect.

1.04 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

A. Application Form:

1. Fill in required information.
2. Fill in summary of dollar values to agree with respective totals indicated on Continuation Sheets.
3. Execute certification with signature of responsible officer of Contracting Firm.

B. Continuation Sheets:

1. Identify each major item of Work by number and title matching those listed in Table of Contents of this Project Manual.
2. Fill in scheduled Dollar Value for each Item.
3. Fill in Dollar Value in each Column for each scheduled Line Item when Work has been performed or Products stored.
4. Round off Values to nearest dollar.
5. List each Change Order, executed prior to date of submission, at end of Continuation Sheets. Include Change Order Number and brief description.

1.05 SUBSTANTIATING DATA

A. Submit, when requested by Architect, to justify Line Item amounts.

1.06 APPLICATION SCHEDULE

A. Refer to the General Conditions for schedule.

1.07 SUBMITTAL PROCEDURE

A. Submit Applications for Payment to Architect at times stipulated.

B. Submit Application electronically.

C. When Architect finds Application properly completed and correct, he will transmit Certificate for Payment to Owner, with copy to Contractor.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 2973 SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. Change Order Procedures: Section 01 2663.

1.2 SCHEDULE FORMAT

A. Type Schedule on AIA Document G-703, Application for Payment, Continuation Sheet or similar form approved by the Architect.

B. Forms can be obtained from:

1. AIA Service Corp., Publications Div., 1735 New York Avenue, Washington D. C. 20006.

2. Portland Chapter AIA Office, 403 NW 11th Avenue, Portland, Oregon 97209 (503-223-8757).

1.3 SCHEDULE HEADINGS

A. Identify each major Work Item by number and title.

B. Coordinate Headings with Construction Progress Schedule.

1.4 CONTENT

A. As basis for computing Progress Payment values, separately list installed value of each of the following:

1. Each major Work Item.

2. Each Subcontracted Work Item. For each major Subcontractor, list products and operations of that Subcontract as separate Line Items.

3. Any Products to be stored, for which separate payments will be requested.

B. Include directly proportional amount of Contractor's Overhead and Profit in each Component Listing.

C. Round off Values to nearest Dollar.

D. Sum of Values listed shall equal total Contract Sum.

1.5 SUBMITTAL REQUIREMENTS

A. Submit 3 copies of Schedule at least 5 days prior to first Application for Payment.

B. Form and content shall be acceptable to Architect.

1.6 SUBSTANTIATING DATA

A. When requested by Architect, submit justifying Substantiating Data on Line Item Amounts in question.

END OF SECTION

SECTION 01 3100 PROJECT COORDINATION

PART 1 GENERAL

1.01 RELATED SECTIONS

A. General and Supplementary General Conditions
B. Section 01 1000: Summary of Work.
C. Section 01 3119: Meetings.
D. Section 01 3000: Electronic Management Procedures.
E. Section 01 3200: Schedules and Reports.
F. Section 01 3300: Shop Drawings, Product Data, and Samples.
G. Section 01 5000: Temporary Facilities.
H. Section 01 7329: Cutting and Patching.
I. Section 01 7413: Cleaning.
J. Section 01 7800: Contract Closeout.

1.02 CONSTRUCTION ORGANIZATION AND START-UP

A. Establish on-site lines of authority and communications including the following:

1. Attend Pre-construction Meeting and Progress Meetings as required by the Architect or Owner.

B. Comply with procedures for intra-project communications including:

1. Submittals
2. Reports and records
3. Recommendations
4. Coordination drawings
5. Schedules
6. Resolution of conflicts

C. Contract Documents Interpretation:

1. Consult with Architect to obtain interpretation.
2. Assist in resolution of questions and conflicts that may arise.
3. Transmit written interpretations to Subcontractors, and to other concerned parties.
4. Permits and Approvals:
   a. Verify in writing to Architect within thirty (30) days after Notice to Proceed that Subcontractors have obtained required permits and inspections for work and for temporary facilities.

D. Control Use of Site:

1. Supervise field engineering and Project layout.
2. Allocate field office and storage space and work and storage area for use of each Subcontract or Contractor.

E. Access to the Site and Contractor Responsibilities:

1. Access to the site is to occur via the existing roads onto School grounds from City of Warm Springs public access streets. Contractor is to coordinate and maintain existing (or establish safe temporary alternative) student drop off areas, whether by bus or private vehicle and maintain access to building for delivery activities of the School District. Contractor is to maintain safety barricades as appropriate for the work being conducted and control of traffic on public streets.

1.03 COORDINATING SUBCONTRACTORS' WORK

A. Coordinate the Work of all Subcontractors and make certain that, where the Work of one trade is dependent upon the Work of another trade, the Work first installed is properly placed, installed, aligned, and finished as specified or required to properly receive subsequent materials applied or

attached thereto.

B. Direct Subcontractors to correct defects in substrates they install when Subcontracts of subsequent materials have a reasonable and justifiable objection to such surfaces.

C. Do not force Subcontractors to apply or install products to improperly finished product.

D. Coordinate changes to assure that:

1. Requirements of Contract Documents are fulfilled.
2. Changes in Contract requirements of all affected trades are reflected in executed Change Orders.

E. Scheduling and Installation Sequence:

1. Coordinate scheduling, submittals, and Work of various sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

2. Schedule work in accordance with current Project construction schedule.

a. Coordinate schedules of all trades.
b. Verify timely deliveries of products for installation by other trades.
c. Verify that labor and equipment are adequate for work and schedule.
d. Verify that material deliveries are adequate to maintain schedule.

F. Space Requirements:

1. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings.
2. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building.
3. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

G. Concealed Services:

1. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction.
2. Coordinate locations of fixtures and outlets with finish elements.

H. Ascertain need for cutting and patching, and coordinate with work of other trades, and the Architect.

I. Completion and Clean Up:

1. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner occupancy.

J. Start-Up, Inspection, and Acceptance of Equipment:

1. Verify that manufacturer's representative is present.
2. Verify that utilities, specified connections, and safety devices are complete and equipment is ready to operate.
3. Verify that equipment has been tested, adjusted, and balanced, is cleaned, repainted as required, and operational prior to inspection.
4. Coordinate and comply with requirements for Start-up Functions, Training, and Equipment Inspections with Owner’s Commissioning Agent.

K. Access for Corrective Work:

1. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract

Documents, to minimize disruption of Owner's activities.

1.04 COORDINATING UTILITIES

A. The Contractor shall be responsible for coordination of all utilities to be installed for service to the project and shall cooperate with all utility agencies. Utilities may include, but are not limited to, water, sewer, natural gas, telephone, electrical, fiber optic, and cable. The Contractor shall maintain communication with the utilities in order to coordinate time and requirements of the utilities' installation.

B. The Contractor shall provide all work necessary to comply with the requirements of the Contract Documents for work by the utility company that does not meet the Contract Document requirements, or for work that is disturbed by the utility installation.

C. The Contractor shall be responsible to locate and protect existing utilities.

D. The Contractor shall comply with ORS 757.541 through 757.571 relating to notice prior to excavation.

1.05 CLOSE-OUT DUTIES

A. At completion of Work of each subcontract, conduct inspection to assure that:

1. Work is acceptable and in compliance with the requirements of the Contract Documents.

2. Assist the Architect in inspection.

3. Temporary facilities and debris have been removed from Site.

B. Substantial Completion:

1. Conduct inspection and prepare list of work to be completed or corrected.

2. Assist Architect in inspection.

3. Supervise correction and completion of Work as established in Architect’s inspection reports and "punchlists".

4. Obtain all approvals from governing authorities, including the Certificate of Occupancy.

C. Final Completion:

1. Submit and obtain approval of all contract close-out documents.

2. Assist Architect and Owner in inspection.

1.06 OWNER'S NOTICE

A. The Contractor shall give the Owner, forty-eight (48) hours advance notice of his intention to work overtime, nights, Sundays or holidays, or anytime outside the usual working hours. In no case will the Contractor do any such work without first notifying the Owner to permit arrangements for proper inspection. Unless of an emergency nature, compensation for work performed in violation of this paragraph will not be made.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

SECTION 01 3100

PROJECT COORDINATION

Not Used

END OF SECTION

SECTION 01 3119 MEETINGS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work included:

1. In general, project meetings will be held weekly at the job site, or in a mutually agreed upon location, in accordance with a mutually acceptable schedule. The Owner in conjunction with the Architect will conduct project meetings throughout the construction period.
2. The purpose of the project meetings is to enable orderly review of progress during construction and to provide for systematic discussion and analysis of problems that might arise between the Owner, Architect and/or Contractor relative to execution of the Work.

1.02 RELATED SECTIONS

A. Section 01 3000: Electronic Management Procedures

1.03 AUTHORITY DESIGNATION

A. Persons designated by the Contractor to attend and participate in project meetings shall have all required authority to commit the Contractor to solutions as agreed upon in the project meetings.

1.04 SUBMITTALS

A. Agenda Items: To the maximum extent possible, advise the Owner at least twenty-four (24) hours in advance of the project meeting regarding all agenda items to be discussed.

1.05 AGENDA

A. Pre-construction Meeting

1. The Owner in conjunction with the Architect will conduct this meeting within ten (10) days after date of Notice to Proceed with work at the Project Site.
2. Location: To be determined.
3. Attendance:
   a. Owner and his representatives
   b. Architect and his Professional Consultants
   c. Contractor's Project Manager and Superintendent
   d. Major Subcontractors
   e. Major Suppliers, as appropriate
   f. Others, as appropriate
4. Suggested Agenda:
   a. Distribution (by Contractor) and discussion of:
      1) List of major Subcontractors and Suppliers
   b. Critical Work sequencing
   c. Major Equipment deliveries and priorities
   d. Project Coordination
   e. Designation of responsible personnel
   f. Procedures and processing of:
      1) Field decisions
      2) Proposal requests
      3) Submittals
      4) Change Orders
      5) Applications for Payment
      6) Schedules and Reports
   g. Procedures for maintaining Record Documents
   h. Use of premises:

1) Office, work, and storage areas
2) Owner's requirements

i. Construction facilities, controls, and construction aids
j. Temporary utilities
k. Safety and first aid- procedures
l. Security procedures
m. Housekeeping procedures

B. Project Meetings

1. The Owner in conjunction with the Architect will conduct weekly meetings at the Project Site, during the course of the installation, in the job trailer required under Division 01 5000, to coordinate the Work, answer questions, and resolve problems.
2. Suggested Meeting Agenda:
   a. Attendees:
      List of attendees and company they represent.
   b. Minutes Review:
      Corrections, additions and/or deletions to previous minutes
   c. Outstanding Action Items:
      Review of items not resolved from previous meeting
   d. Technical Concerns:
      Discussion of technical aspects of the project including problems to be resolved under the following categories:
      Civil/Landscape
      Mechanical
      Electrical
      Architectural
      Technology/Data
   e. As-Built Review:
      Confirm results of the as-built review
   f. Shop Drawings:
      Confirm results of shop drawing review; list those not submitted by Contractor that are due and shop drawings not returned by Architects or Engineers.
   g. RFI's:
      Confirm approved and outstanding RFI's.
   h. RFP's:
      Confirm approved and outstanding RFP's.
   i. Schedule Review:
      Confirm status of work, areas of concern and general status of work as of the meeting date.
   j. Projection of Work:
      Discussion of anticipated concentration of work for the next period.
   k. Procurement:
      Verify and update status of procurement activities.
   l. Other Concerns:
      Any other items to be discussed
   m. Review of all Action Items:
      Each action item will be consolidated with item, action person responsible and date to be resolved.
   n. Summary:
      Confirmation of next meeting date, location and time, plus those requested to be in attendance.

3. All items to be discussed shall be brought up at the time the appropriate agenda item is discussed. All attendees shall familiarize themselves with the agenda and be prepared in advance with their items for discussion.

C. Special Meetings: The Owner may call special meetings at the project site or at other locations to coordinate the work, answer questions, and resolve problems.

1.06 PREINSTALLATION CONFERENCES

A. When required in individual Specification Sections and/or as requested, convene pre-installation conference at work Site prior to commencing work of Section.

B. Require attendance of parties directly affecting, or affected by, work of specific Section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda, preside at conference, record minutes, and distribute copies within two days after conference to participants, with electronic copy to Architect.

E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

1.07 MINUTES

A. The Contractor will compile minutes of each project meeting and will distribute copies to all interested parties within seven (7) days after the meeting. Items in the minutes shall be numbered consecutively and grouped under divisions and sections. Each item shall be carried forward until resolved.

B. The minutes compiled by the Contractor will be the official record minutes and all clarifications and/or corrections shall be transmitted in writing to the Owner within fourteen (14) days of date of receipt of the minutes or unless noted during the next schedule meeting under the appropriate agenda item. Transmitted corrections shall be legibly submitted on company letterhead.

C. One (1) bound volume of all minutes or access to them through the electronic management procedures shall be maintained by the Contractor in the job office until project completion.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

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SECTION 01 3000 ELECTRONIC MANAGEMENT SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Construction Administration communication shall be transmitted to each project entity in electronic (PDF) format using construction management software, specifically designed for transmitting construction communications between project team members.

B. The intent of electronic communication is to increase collaboration, expedite the construction process by reducing paperwork, improving information flow, and decreasing turnaround time.

C. The Documentation created and tracked in the construction management software and transmitted electronically shall include the following:

1. RFI's
2. ASI's
3. APR's
4. Change Orders
5. Submittals

Plans and specifications and any updates thereto will be reviewable within this system.

D. Definitions:

1. RFI – Request for Interpretation
2. GC – General Contractor
3. QC – Quality Control

1.02 PROCEDURES

A. RFI (Requests for Interpretation) Procedure – GC's RFI's will be reviewed via the construction management software website. Subcontractors RFI's will be reviewed by the GC before the Architect or Architect's Consultants. Once the GC review is complete, the GC will either respond with an answer or forward the RFI to the Architect for a formal response. All responses to RFI's will be emailed to the Contractor via (PDF) with a link to the construction management software website embedded in the (PDF) for reference.

B. Submittal Procedure – GC's submittals will be reviewed via the construction management software website with the exception of physical samples. The submittals will be posted on the website for the review. Once the submittal review is completed by the GC, the GC will email the reviewed submittal via construction management software to the Architect for review.

1. Submittal Documents to be submitted via the construction management software for the Architect manual upload included but not limited to:

   a. Design Document Submittals
   b. Shop Drawings
   c. Product Data
   d. Warranty and Closeout Documentation

2. Submittals to be physically submitted include but are not limited to. Note that although these submittals are handled physically, their status will be tracked within the construction management software:

   a. Product finishes and color selection samples
   b. Product finishes and color verification samples
   c. Finish/color boards
   d. Physical samples of materials

3. Administrative Submittals to be created and submitted using the construction management software include but are not limited to:

    a. List of product substitutions.
    b. List of contact personnel.
    c. Notices for roadway interruption, work outside regular hours, and utility cut over's.
    d. Plans for safety, demolition, environmental protecting, and similar activities.
    e. Quality Control Plan(s).
    f. Daily Photographs.

4. Compliance Submittals to be created and submitted using the construction management software include but are not limited to:

    a. Field Test Reports
    b. Quality Control certifications
    c. Manufacturer's documentation and certifications for quality of products and materials provided.
    d. Record and Closeout Submittals

C. Plans and Specifications along with Architects forms (APR's, ASI, and CCDs) will be distributed via email from the construction management software website. These documents will be openly available in a shared folder under the documents tab on the website to all contractors and Suppliers.

1.03 COSTS

A. All costs of construction management software services, throughout the complete project, will be included in the Bid Price.

1.04 AUTOMATED SYSTEM NOTIFICATION

A. Review comments made (or lack thereof) by any party via the construction management software shall not relieve the GC from compliance with requirements of the Contract Documents. The GC is responsible for managing, tracking and documenting the Work to comply with the requirements of the Contract Documents. Owner and Architect acceptance/review acknowledgement via automated system notifications extends only to the face value of the submitted documentation in question and constitutes validation of the GC's specific submitted information only.

END OF SECTION

SECTION 01 3200 SCHEDULES & REPORTS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. The work under this Contract will be planned, scheduled, executed and reported pursuant to the provisions of Article 4.10 of the General Conditions CONTRACTOR'S CONSTRUCTION SCHEDULE, and Article 4 of the Owner-Contractor Agreement ("Time and Commencement and Substantial Completion").

B. If the Contractor should desire or intend to complete the Work earlier than any required Milestone or Completion date, the Owner or Architect not be liable to the Contractor for any costs or other damages should the Contractor be unable to complete the Work before this earlier date. The duties, obligations and warranties of the Owner to the Contractor shall be consistent with and applicable only to the completion of the Work on the Milestone and Completion dates required in the Owner-Contractor Agreement, unless Owner and the Contractor otherwise agree in writing.

1.02 CONSTRUCTION SCHEDULE - BAR CHART

A. The Construction Schedule shall be in the form of a bar chart and shall consist of horizontal lines, or bars, plotted along a daily time scale. The time-scale shall indicate all required Milestone and Completion dates as set forth in the Owner-Contractor Agreement. The horizontal bar(s) shall indicate the start and finish dates as well as the total time period of performance for each activity. The Contractor shall arrange the chart so as to show the activities which are necessary to fulfill each and every Milestone and Completion date requirement.

1.03 POST AWARD ACTIVITIES

A. The Contractor shall perform the following immediately after receipt of the Notice to Proceed:

1. Prepare a detailed Construction Schedule that represents the Contractor's best judgment on how he shall prosecute and complete the Work in compliance with the Contract Milestone Dates and any Specific Dates stipulated in the Supplementary Conditions.

B. Within (10) calendar days following Notice to Proceed, submit to the Owner and Architect a draft of the Construction Schedule for review and comment. Before the first Application for Payment, the Contractor shall submit to the Owner and Architect a Schedule of Values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Owner and Architect may require. This schedule, unless objected to by the Owner or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

C. The Construction Schedule shall indicate completion date for the project that is not later than the project's required completion date. All activity durations shall be given in calendar days.

D. It is to be understood and agreed by the Contractor is an estimate to be revised from time to time as progress proceeds, and that the Owner does not guarantee that Contractor can start work activities on the start dates or complete work activities on the finish date shown in the schedule, or as same may be updated or revised; nor does the Owner guarantee that Contractor can proceed at all times in the sequence established by said schedule.

E. The Owner and Architect will review the Contractor's Schedule. If required, a meeting will be held between the Owner and the Contractor to resolve any conflicts between the Contractor's schedule and the overall Project Construction. The Contractor shall revise his schedule as required by the Owner to support the Project Construction and shall submit his revised schedule to the Owner and Architect within five (5) days for final review and approval.

F. The Contractor is required to adhere to the Milestone Dates as set forth in the Bid Form.

1.04 RECOVERY SCHEDULE

A. Should any conditions exist, such that certain activities shown on the Contractor's Detailed Construction Schedule fall behind schedule to the extent that any of the mandatory Milestone Dates or Completion Dates are in jeopardy, the Contractor shall be required to, at no cost to the Owner, prepare and submit to the Owner and Architect, a supplementary Recovery Schedule, in a form and detail appropriate to the need, to explain and display how he intends to reschedule those activities to regain compliance with the Detailed Construction Schedule during the immediate subsequent pay period.

B. The Contractor, Owner and Architect shall do the following after determination of the requirement for a Recovery Schedule:

1. Within three (3) calendar days, the Contractor shall present to Owner and Architect the Recovery Schedule. The Recovery Schedule shall represent the Contractor's best judgment as to how he shall reorganize his work so that he may return to the approved Construction Schedule within the immediate subsequent pay period. The Recovery Schedule shall be prepared to a similar level of detail as the Construction Schedule.

C. Five (5) calendar days prior to the expiration of the Recovery Schedule, the Owner, Architect and the Contractor will meet at the job site to determine whether the Contractor has regained compliance with the Construction Schedule. At the direction of the Owner, one of the following will happen:

1. If, in the opinion of the Owner, the Contractor is still behind schedule, the Contractor in conjunction with the Owner and Architect will prepare another Recovery Schedule, at the Contractor's expense, pursuant with 2.02 (B) of this Section, to take effect during the immediate subsequent pay period.
2. If, in the opinion of the Owner, the Contractor has sufficiently regained compliance with the Construction Schedule, the use of the Construction Schedule will be resumed.

1.05 FLOAT TIME

A. Float or slack time is not for the exclusive use or benefit of either the Contractor or the Owner. Contractor's work shall proceed according to start dates, and the Owner shall have the right to reserve and apportion float time according to the needs of the project. The Contractor acknowledges and agrees that actual delays, effecting paths of activities containing float time, will not have any affect upon Contract Completion times, providing that the actual delay does not exceed the float time associated with those activities.

B. Extensions of time will be granted only to the extent that the activity or activities affected exceed the total float or slack along the path of activities affected at the time of Notice to Proceed of a Change Order or the commencement of any delay or condition for which an adjustment is warranted under the Contract Documents.

1.06 COORDINATION

A. The Contractor shall coordinate his work with activities of the Owner and shall cooperate fully with the Owner in maintaining orderly progress toward completion of the work as scheduled. The Owner’s decisions regarding priority between the Contractor's work and the activities of the Owner at the site shall be final and shall not be cause for extra compensation or extensions of time, except where extensions of time is granted because of delay for which Contractor is otherwise entitled to an extension of time under the Contract Documents.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

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SECTION 01 3300 SHOP DRAWINGS, PRODUCT DATA AND SUBMITTALS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Submit to the Architect shop drawings, product data and samples required by Specifications Sections or as specifically requested by Owner or Architect.

B. The Contractor shall prepare and submit with the Construction Schedule, an incorporated schedule listing dates for submission and approval times allowed for all required shop drawings, product data and samples, tied into Construction Schedule with appropriate logic.

1.02 RELATED SECTIONS

A. Section 01 3000: Electronic Management Procedures

B. Section 01 3200: Schedule and Reports

C. Section 01 7800: Contract Closeout: Record Documents

1.03 SHOP DRAWINGS

A. Original drawings, prepared by Contractor, subcontractor, manufacturer, supplier or distributor, which illustrate some portion of the Work showing fabrication, layout, setting or erection details.

B. Shop drawings shall be prepared for this particular project. Drawings prepared specifically for other projects and revised for this project will be rejected.

C. When necessary, base shop and setting drawings upon actual measurements taken at site and other job conditions. Show any variations and revisions to Contract Documents that are necessary for proper installation of work. Fabrication or installation of work shall not be started until shop or setting drawings have been checked and returned with "furnish as submitted" or "furnish as corrected" indicated by Architect.

D. Identify details by reference to sheet and detail numbers shown on Contract Drawings.

E. Submit shop drawings, required by Contract Documents for execution of the Work, to the Architect no later than 15 days prior to contemplated or actual need in shop or at site, and earlier where more time may be required for review and/or procurement by Contractor.

F. Provide shop drawings with cross-reference to drawing and detail numbers on Contract Drawings to facilitate review.

G. Provide shop drawings which demonstrate to Architect that:

1. Contractor understands design concept of certain portions of Work.
2. Equipment and material to be provided meet design and technical requirements of Contract Documents.
3. Methods of fabrication and installation.

H. After review, reproduce and distribute in accordance with Article on Procedures above and for Record Documents described in Section 01 7839.

1.04 PRODUCT DATA

A. Manufacturer's standard schematic drawings:

1. Modify drawings to delete information, which is not applicable to project.
2. Supplement standard information to provide additional information applicable to project.

B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance chart, illustrations and other standard descriptive data.

1. Clearly mark each copy and identify pertinent materials, products or models.
2. Show dimensions and clearances required.
3. Show performance characteristics and capacities.
4. Show wiring diagrams and controls.

C. Submit product data required by Contract Documents for execution of the Work, to the Architect no later than 15 days prior to contemplated or actual need in shop or at site, and earlier where more time may be required for review.

D. Provide product data with cross-reference to Specifications Section of Project Manual to facilitate review.

E. Provide PDFs of product data to Architect/Engineer via electronic management procedures.

F. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 01 7839 - Record Documents.

1.05 SAMPLES

A. Physical examples to illustrate materials, equipment or workmanship and to establish standards by which completed work is judged.

B. Office Samples: Of sufficient size and quantity to clearly illustrate:

1. Functional characteristics of product or material, with integrally related parts and attachment devices.
2. Full range of color samples.
3. Include identification on each sample, with full Project information.
4. Submit samples in ample time for review or selection, as applicable, so as to not delay Work.
5. Take into account delivery time of all manufactured items when submitting samples.

C. Submit samples of size and quantity specified, or, if not specified, of sufficient size and quantity to illustrate functional and aesthetic characteristics of Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work. Submit samples of finishes from full range of manufacturers' standard colors, or in specified custom colors, textures, and patterns, for Architect's selection.

D. Field Samples:

1. Construct each sample complete, including work of all trades required in finished Work.
2. A copy of each sample shall stay onsite for review by the Architect and Owner.

1.06 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for Product Data.

B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.07 MANUFACTURER'S CERTIFICATES

A. When specified in individual specification Sections, submit manufacturers' certificate to Architect/Engineer for review, specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.08 REQUIRED SUBMITTAL QUANTITIES TO ARCHITECT AND OWNER

A. Construction Schedule – Provide bond copies on paper no larger than 11x17". Provide one paper copy each to Owner and Architect plus electronic version.

B. Shop Drawings – Provide drawings electronically unless specifically required by Mechanical and Electrical Sections. Submit Shop Drawings in accordance with Section 01 3000 Electronic Management Procedures.

C. Product Data – Submit Product Data in accordance with Section 01 3000 Electronic Management Procedures.

D. Office Samples – See specific section covering product or material.

E. Field Samples – See section covering specific system.

1.09 CONTRACTOR RESPONSIBILITIES

A. Review shop drawings, product data and samples prior to submission. Contractor shall review and verify shop drawings, product data and samples prior to submission to Architect. Submittals will not be reviewed if Contractor has not reviewed and stamped the data for approval.

B. Verify:
1. Field measurements.
2. Field Construction criteria.
3. Catalog numbers and similar data.

C. Coordinate each submittal with requirements of Work and Contract Documents.

D. Contractor's responsibility for errors and omissions in submittals is not relieved by Architect's review.

E. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Architect's review of submittals.

F. Notify the Owner and Architect, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.

G. Begin no work which requires submittals until return of submittals with Architect's stamp and initials or signature indicating review.

H. After Architect's review, distribute copies.

1.10 SUBMITTAL REQUIREMENTS

A. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for review, for securing necessary approvals, for possible revision and resubmittals and for placing orders and securing delivery. Submission of all shop drawings shall be through the Contractor.

B. Unless otherwise specifically permitted by the Architect, make all submittals in groups containing all associated items. Partial submittals will be rejected, unless prior accommodations have been made.

C. Accompany submittals with transmittal letter, in duplicate, containing:

1. Date
2. Project title and number
3. Contractor's name and address
4. The specification section number of each shop drawing, product data and sample submitted.
5. Notification of deviations from Contract Documents.

D. Submittals shall include a separate cover sheet attached to each copy containing the following information:

1. Date and revision dates
2. Project title and number
3. The name of:
   a. Architect
   b. Contractor
   c. Subcontractor
   d. Supplier
   e. Manufacturer
   f. Separate detailer when pertinent
4. Identification of product or material
5. Relation to adjacent structure or materials
6. Field dimensions, clearly identified as such
7. Specifications section number
8. Applicable standards, such as ASTM number or Federal Specification
9. A blank space, for Architect review stamp
10. Identification of deviations form Contract Documents
11. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.

1.11 RESUBMITTAL REQUIREMENTS

A. Shop Drawings:

1. Revise initial drawings as required and resubmit as specified for initial submittal.
2. Indicate on drawings any changes which have been made other than those requested by Architect.
3. Product data and samples: Submit new data and samples as required for initial submittal.

1.12 ARCHITECT'S DUTIES

A. Review submittals with reasonable promptness as mutually agreeable among the various parties.

B. Review for:

1. Design concept of project.
2. Information given in Contract Documents.

C. Review of separate item does not constitute review of an assembly in which item functions.

D. Affix stamp and initials or signatures certifying the review of submittal.

E. Return submittals to Contractor for distribution.

F. Send copy of reviewed item, to the Owner

G. The Architect or Owner may immediately reject any item without further review if it is not:

1. Accompanied by a transmittal letter containing the required information.
2. Stamped "approved" by the Contractor.

H. The review will be for conformance to the design concept and compliance with information given in the Contract Documents. The Architect will make notations directly on the electronic submittal.

I. The review is intended to foresee unacceptable products and to avoid the possibility of their rejection at the site. The review shall not be construed as:

1. Permitting a departure from the Contract Documents, unless specifically so noted.

2. Relieving the Contractor of the responsibility for errors or omissions.
3. Acceptance of an assembly in which an approved item is a part.
4. Approval of variations from previously approved items.
5. Approval of dimensions.

J. The Architect will review all samples. Such review will be for appearance only. Compliance with all other requirements is the responsibility of the Contractor.

K. Where the Contract Documents require the design of structural, mechanical or electrical systems or components of systems by a supplier, or where a Contractor initiates a change in the design of a system or component thereof, such systems or components shall be designed by a registered professional engineer and all calculations submitted to the Architect for his records, prior to starting fabrication or installation of the Work. The Architect will not be responsible for the designs of such other professional engineers.

1.13 VARIATIONS FROM CONTRACT DOCUMENTS

A. If the Architect determines a variation from the Contract Documents is in the best interest of the Owner, and it does not involve change in the Contract price or item, the Architect with the Owner's concurrence, may permit such variation.

B. Unless the Architect receives immediate written notification, he will assume the Contractor approves any variation shown.

C. If the Contractor fails to mention variations from the Contract Documents, he will not be relieved of the responsibility for executing the Work in accordance with the Contract Documents.

D. When a variation from the Contract Documents is permitted and such variation involves corresponding adjustment in an adjacent or related item, the responsibility for making and paying all costs for such adjustment rests with the Contractor requesting the original variation.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

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SECTION 01 4000 QUALITY CONTROL

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Quality assurance and control of installation.
2. References.
3. Field samples.
4. Mock-up.
5. Inspection and testing laboratory services.
6. Contractor's inspection and testing responsibilities.
7. Testing laboratory responsibility.
8. Owner's responsibility.
9. Manufacturers' field services and reports.

1.02 RELATED SECTIONS:

A. Section 01 3000: Electronic Management Procedures.
B. Section 01 3300 - Submittals: Submission of Manufacturers' Instructions and Certificates.
C. Section 01 6600 - Delivery, Storage and Handling.

1.03 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturer’s instructions, including each step in sequence.

C. Should manufacturer’s instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.04 REFERENCES

A. Conform to reference standard by date of issue current on date of Contract Documents.

B. Obtain copies of standards when required by Contract Documents.

C. Should specified reference standards conflict with Contract Documents, request clarification for Architect before proceeding.

D. Contractual relationship of parties to Contract shall not be altered from Contract Documents by mention or inference otherwise in any reference document.

1.05 FIELD SAMPLES

A. Install field samples at site as required by individual specifications Sections for review.

B. Acceptable samples represent acceptable quality level for Work.

C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Architect.

1.06 MOCK-UP

A. Contractor to construct a building mock-up large enough to provide and show all of the systems required as noted in individual sections.

1.
a. Roofing – valleys, eaves, fascia, gutters, downspouts and all associated flashings.
b. Windows and Storefronts – attachment methods, sill pans with end dams, flashings.
c. Weather Resistive Barriers – weather resistant barrier attachments, layering, fenestration flashing wraps.

B. Wood and Sheet Metal siding and trim.

C. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.

D. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.

E. Room Mock-ups: Coordinate installation of materials, products, and assemblies as required in Specification Sections; finish according to requirements. Provide required lighting and any supplemental lighting where required to enable Architect to evaluate quality of the mock-up.

Notify Architect fifteen (15) working days in advance of dates and times when mock-ups will be constructed.

F. Tests will be performed under provisions identified in this section and individual product sections.

G. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, finishes.

H. Where mock-up is specified in individual Sections to be removed, clear area after mock-up has been accepted by Architect unless directed otherwise.

1.07 INSPECTION AND TESTING LABORATORY SERVICES

A. Owner will appoint, employ, and pay for services of independent firm to perform inspection and testing.

1.08 CONTRACTOR'S INSPECTION AND TESTING RESPONSIBILITIES

A. Cooperate with independent firm:

1. Furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
2. Provide access to work and manufacturer's operations.
3. Notify Architect and independent firm 24 hours prior to expected time for operations requiring services.
4. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
5. Furnish copies of mill test reports.
6. Furnish casual labor and facilities.
   a. To provide access to work to be tested.
   b. To obtain and handle samples at site.
   c. To facilitate inspections and tests.
   d. For laboratory's exclusive use for storage and curing of test samples.

7. Arrange with laboratory and pay for additional samples and tests required for Contractor's convenience.

B. Re-testing:

1. Re-testing required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Architect.
2. Should initial tests indicate non-compliance with Contract Documents, costs for both initial tests and subsequent re-testing occasioned by non-compliance, and all other related costs, including additional Architect's services made necessary by such failure will be charged to Contractor by deducting such costs from Contract Sum/Price.

C. Notification: Contractor shall notify Testing Lab, Owner and Architect a minimum of 24 hours in advance of any operations scheduled for inspection and/or testing specified herein, to allow for laboratory assignment of personnel and scheduling of test. Work requiring inspections and testing by testing laboratory will not be performed without their qualified technician on the job site. If, after giving notice to the testing lab, the work requiring inspection and/or testing is not performed and the testing lab must make a second trip to the job site, the Contractor shall reimburse Owner for technician's time and travel expense. Where tests are required prior to Contractor starting work, Contractor shall arrange for testing far enough in advance so as not to delay the project or cause inconvenience to the testing lab.

D. Contractor's Responsibility: The testing laboratory service provided by the Owner shall not relieve the Contractor of his responsibility for compliance with the requirements of the Contract Documents. Testing laboratory services are provided for the sole and exclusive benefit of the Owner in monitoring the quality and performance of the Contractor's work. Results of tests made by the Owner's testing laboratory will be made available to the Contractor and shall be a basis for rejection of non-conforming or defective work. Additional tests/inspections required by the Owner shall not be the basis for any claim by the Contractor for additional compensation.

1.09 TESTING LABORATORY RESPONSIBILITY

A. General: Testing laboratory shall inspect, test and document work performed on this project as described hereinbefore.

B. Test Reports: Promptly furnish test reports, via email, of materials and work tested to the Owner, Architect, Contractor, and Building Department. Test reports shall include the name of the project, General Contractor, applicable Subcontractor, and Testing Laboratory, the locations, dates, and time samples were taken and tested, type of test, identification of sample, location in which the work sample was taken, record of weather conditions, evaluation of test results, conformance or non-conformance of test results with Contract Documents, name and signature of technician taking sample and performing tests, and any other information required by Architect.

C. Inspection Reports: Furnish inspection reports for each site visit documenting activities, observations, and inspections of work; include observations on weather conditions, time and date, conditions and/or status of the work being inspected, actions taken, and recommendations or evaluation of the work. In addition to written reports, immediately notify Architect and Contractor of any portions of the work found to be in nonconformance with the Contract Documents.

D. Codes: Conform to the requirements of the Oregon Structural Specialty Code (latest edition), Section 306 and other applicable sections and the Oregon Structural Specialty Code standards, and any special requirements of the local Authority Having Jurisdiction (AHJ).

E. Limits of Authority: Testing laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of the Contract Documents.

2. Approve or accept any portion of the work (as relates to the Contractor's obligation to conform to the Contract Documents.)
3. Perform any duties of the Contractor.

1.10 OWNER'S RESPONSIBILITY:

The Owner shall not be held liable for the actions (or lack of action) of the testing laboratory(s). The commencement of work by the Contractor shall indicate his understanding and agreement that all disputes or claims which may develop between the Owner's testing laboratory(s) and the contractor will be resolved directly between those two parties without involvement or responsibility on the part of the Owner, unless prior agreement is made in writing. Contractor shall advise the Owner of faulty inspections or tests performed by the testing laboratory but Owner shall not be held responsible for problems, damages, delays, replacement of defective work, etc. which may occur as result of the testing laboratory(s) faulty work in which case the Contractor's sole recourse shall be against the testing laboratory or other party at fault, but not against the Owner. Nothing in these specifications shall be construed as preventing the Contractor from hiring a separate testing laboratory to perform testing laboratory services, however, the Owner's testing laboratory inspections and tests shall be the basis for acceptance or rejection of the work by the Owner unless such inspection or tests are proven to be in error.

1.11 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. Submit qualifications of observer to Architect 30 days in advance of required observations. Observer subject to approval of Architect and Owner.

B. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.

C. Observers shall report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Submit report within 30 days of observation to Architect for review.

PART 2 – PRODUCT

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 01 4200 ABBREVIATIONS AND DEFINITIONS

PART 1 – GENERAL

1.01 ABBREVIATIONS:

Not Used.

1.02 DEFINITIONS:

A. Certain terms used generally throughout the specifications (and drawings) are hereby defined as follows:

1. Indicated: A cross reference to details, notes or schedules on the drawings, other paragraphs or schedules in the specifications, and similar means of recording requirements in the Contract Documents. Where terms such as "shown", "noted", scheduled", and "specified" are used in lieu of "indicated", it is for the purpose of helping the reader accomplish the cross reference, and no limitation of location is intended except as specifically noted.
2. Directed, Requested, etc.: Unless otherwise explained, terms such as "directed", "requested", "authorized", "selected", "approved", "required, "accepted", and "permitted" mean "directed by the Architect", "requested by the Architect" , etc. However, no such implied meaning will be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.
3. Installer: The person or entity engaged by the Contractor or his Subcontractor or Sub subcontractor for the performance of a particular unit of work at the project site, including installation, erection, application, and similar required operations. It is a general requirement that Installers be recognized experts in the work they are engaged to perform-.
4. Approve: Where used in conjunction with the Architect's or Engineer's response to requests, applications, inquiries, reports, and claims by the Contractor, the meaning of the term "approved" will be held to the limitations of the Architect's responsibilities and duties as specified in the General and Supplementary Conditions. In no case will "approval" by the Architect be interpreted as an assurance to the Contractor that the requirements of the Contract Documents have been fulfilled.
5. Furnish: Except as otherwise defined in greater detail, the term "furnish" is used to mean "...supply and deliver to the project site, ready for unpacking, assembly and installation...".
6. Provide: Except to the extent further defined, the term "provide" means to furnish and install, complete and ready for the intended use.
7. Guarantee and Warranty: "Warranty" is generally used in conjunction with products manufactured or fabricated away from the project site, and "guarantee" is generally used in conjunction with units of work which require both products and substantial amounts of labor at the project site. The resulting difference is that warranties are frequently issued by manufacturers and frequently supported (partially) by product guarantees from manufacturers.

1.03 DRAWINGS, DIMENSION, AND MEASUREMENTS:

A. Where on any of the drawings a portion of the work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to all other portions of the work.

B. Wherever a detail is referenced and developed for a specific condition, same or similar detail shall apply to identical or similar conditions elsewhere on project even though not specifically referenced.

C. Where the word "similar" occurs on the drawings, it shall be interpreted in its general sense and not as meaning identical, and all details shall be worked out in relation to their location and their connection with other parts of the work.

D. The figured dimensions on the drawings or noted indicating dimensions shall be used instead of measurements of the drawings by scale, and shall be strictly complied with.

E. No scale measurements shall be used as a dimension to work with except on "full size" drawings not dimensioned.

1.04 SPECIFICATION EXPLANATION:

A. The specifications are divided into Divisions and Sections for the convenience of writing and using. The titles of these are not intended to imply a particular meaning nor to fully describe the work of each division or section, and are not an integral part of the text which specifies the requirements. The Architect is not bound to define the limits of any subcontract, and will not enter into disputes between the Contractor and his employees, including subcontractors.

B. These specifications are of the abbreviated, or "streamlined" type, and include incomplete sentences.

C. Omissions of words or phrases such as "the Contractor shall" "in conformity therewith", "shall be", "as noted on the drawings", "according to the plans", "a", "an", "the", and "all" are intentional.

D. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the drawings.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 4510 SAFETY

PART 1 – GENERAL

1.01 PRELIMINARY WORK

A. Prior to the start of and during the course of the Work (above and below ground) the Contractor shall make a thorough survey of the entire work site to determine all potential hazards. Workmen shall be made aware of those hazards and shall be instructed in procedures and the use of equipment for their protection. The Contractor shall verify the location and condition ("live" or "dead") of all utilities on and near the work site and take precautions to protect his employees, the general public, and the property.

1.02 IMMINENT DANGER

A. The Contractor shall be wholly responsible for any accidents (including death) occurring at any time during the progress of the work and until the final acceptance of the work by the Owner which may happen to any of his workmen or those of any Subcontractor employed on the building or the Owner, Architect and their representatives, or for any damage or injuries (including death) which his work and operations may cause to the work being constructed, or to existing buildings, or to any tenants and occupants of the property, or of the adjoining properties, or to the public or to any public or private property.

1.03 SAFETY

A. The Contractor shall ensure that all employees, visitors, subcontractor's employees, and suppliers' employees, while on the work site, comply with the requirements of OSHA, these requirements and the safety precautions contained in the several Specifications Sections. The Contractor shall promptly and fully comply with, execute and , without separate charge thereof to the Owner, shall enforce compliance with the Occupational Safety and Health Act requirements.

B. The Contractor shall immediately advise the Owner of inspections conducted by OSHA, at the work site, and shall transmit copies of citations and violations to the Owner and Architect.

1.04 SAFETY RESPONSIBILITIES

A. Contractor shall be responsible to:

1. Ensure compliance with these requirements, OSHA requirements, and other safety requirements.
2. Authorize immediate action to correct substandard safety conditions.
3. Review and act to ensure compliance with safety procedures with his supervisors, subcontractors, and suppliers.
4. Make through daily safety inspections of the work site and immediately act to eliminate unsafe acts and unsafe conditions.
5. Investigate work-site accidents and recommend immediate corrective action.
6. Assist in the preparation of accident investigation and reporting procedures.
7. Be responsible for the control, availability, and use of safety equipment, including employee personal protective equipment.

1.05 REQUEST FOR VARIANCES

A. Requests for variances to deviate from OSHA requirements must follow the current established procedures by that Agency.

1.06 FAILURE TO COMPLY

A. If the project is shut down due to the Contractor's failure to comply with the requirements of OSHA or other applicable safety requirements, no part of the time loss due to any such suspension of operations or stop orders shall be made the subject of a claim for extension of time or for increased cost or damage by the Contractor.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 01 5000 CONSTRUCTION FACILITIES & TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water and sanitary facilities.
2. Temporary Controls: Barriers, enclosures and fencing, protection of the Work and water control.
3. Construction Facilities: Access roads, parking, progress cleaning, and temporary buildings.
4. Removal: Utilities, facilities, and controls.

1.02 RELATED SECTIONS:

A. Section 01 5526: Traffic Control.
B. Section 01 7413: Final Cleaning.

1.03 TEMPORARY UTILITIES

A. Temporary Electricity:

1. Owner will provide electrical services from existing facilities.
2. Furnish and install as necessary temporary wiring, associated equipment and special power needs. Upon completion of the work, remove all temporary wiring and equipment.
3. Furnish and install additional power distribution cords, area distribution boxes so located that the individual trades may use their own construction-type cords to obtain power and provide artificial lighting at all points where required by inspectors and for safety.
4. Ascertain where electrical service is available; provide required connections and extend system to work area as required.
5. Periodic lack of electrical power to all or portions of the building shall not be an allowable reason for schedule delay.

B. Temporary Lighting:

1. Provide and maintain lighting for construction operations to achieve minimum lighting level of 15-foot candles. Provide additional lighting for finish work where and when needed, or as required by the Contract Documents.
2. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails and lamps as required.
3. Maintain lighting and provide routine repairs.

C. Temporary Heat:

1. Provide and pay for heat devices and heat as required to maintain specified conditions for construction operations. Comply with codes, agencies, and regulations regarding usage of temporary space heaters.
2. Use of temporary individual propane heaters are not allowed to dry out or heat the building.

D. Temporary Ventilation:

1. Ventilate enclosed areas to:

a. Assist cure of materials.
b. Dissipate humidity.
c. Prevent accumulation of dust, fumes, vapors, or gases.
d. Provide local exhaust ventilation to prevent harmful dispersal of hazardous substances into atmosphere at all times.

E. Temporary Telephone Service:

1. Provide telephone service to field office at time of project mobilization.
2. Maintain services from start of work through building occupancy.

F. Temporary Water Service:

1. Water service will be available for contractor's use at the building site. Contractor shall be prudent about use and coordinate with building managers. Contractors are required to provide their own means of water distribution to suit their requirements.
2. Do not allow existing or new drains to become clogged with construction debris, plaster, paint, glues or other substances – either during the demolition phase or the new construction phase.
3. Contractor to provide water and water truck for dust control.

G. Temporary Sanitary Facilities:

1. Provide and maintain adequate number of required facilities and enclosures for use of all persons and trades employed on Work during construction period.
   a. Toilet facilities.
   b. Washing facilities.

H. Temporary First Aid Facilities: Provide adequate first aid facilities for construction personnel.

I. Temporary Fire Protection:

1. Take all precautions to prevent possibility of fire resulting from construction operations. Particularly avoid hazardous accumulations of rubbish and unsecured flammable materials.
2. Provide emergency fire extinguishing equipment of adequate type and quantity, readily available and properly maintained.
3. Keep local Fire Department's telephone number prominently displayed near telephone.

1.04 TEMPORARY CONTROLS

A. Barriers and Fencing

1. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
2. Provide barricades and covered walkways required by governing authorities for public rights-of-way.
3. Protect non-owned vehicular traffic, stored materials, site and structures from damage.
4. Provide temporary commercial grade chain link fencing at the limits of construction for the duration of the project, until Project has been accepted or occupied by Owner. Maintain site fencing as needed and equip with vehicular gates with locks.

B. Water Control:

1. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
2. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
3. Exercise care in cleaning out equipment, etc., so as to prevent materials from clogging catch basins and yard drains.
4. Maintain during construction and leave all drainage items clean and in proper working condition.
5. Maintain public streets daily. Clean and remove any dirt, mud or debris.

C. Pollution Control:

1. Burning or burying of rubbish and waste materials on Site is prohibited. Provide dump box for collection of waste materials.
2. Disposal of volatile fluid wastes (such as mineral spirits, oil or paint thinner) in storm or sanitary sewer systems is prohibited.
3. Keep Site and surrounding areas clear of accumulations of waste material and rubbish resulting from operations under this Contract. Remove waste from Site immediately upon completion of Work. Do not allow any debris or rubbish to drift on to play fields or neighboring properties.

D. Construction Waste Management

1. Prior to the start of construction, submit to the Owner a Construction Waste Management Plan (CWMP) that includes at a minimum:
    1. A listing of materials or material categories that will be generated during demolition and construction and whether materials will be salvaged, recycled, or landfilled.
    2. The processes and procedures that the Contractor will implement to ensure construction waste will be diverted from the landfill to sources for reuse or recycling according to the CWMP.
    3. The records that will be kept tracking quantities by weight of material that is landfilled, salvaged, or recycled.
2. The Owner has established that this Project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.
3. Of the waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills or incinerators shall be minimized, thereby reducing disposal costs.
4. Salvage/Recycle Requirements: Salvage and recycle as much non-hazardous demolition and construction waste as possible.

E. Protection of Installed Work:

1. Protect installed Work and provide special protection where specified in individual specification Sections.
2. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.
3. Provide and maintain temporary shoring and lateral bracing of structure during erection to resist all loads including:
   a. Wind
   b. Seismic
   c. Construction
   d. Materials
   e. Moving equipment
4. Do not remove temporary bracing and shoring until adequate permanent connections or structural elements are in final position and positively anchored.
5. Provide protective coverings at walls, projections, jambs, sills and soffits of openings
6. Protect finished floors, stairs and other surfaces from traffic, dirt, wear, damage or movement of heavy objects, by protecting with durable sheet materials such as Tyvek.
7. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
8. Prohibit traffic from landscaped areas.

F. Vegetation Damage Control:

1. Protect all existing trees and vegetation to remain on site from foliage, trunk, and root damage.
2. Provide barricades and maintain same around all trees, shrubs or other landscaped areas adjacent to work of this Contract to protect such areas from damage of any nature caused by construction operations.
3. Replace any plantings damaged or destroyed with plants of equivalent size, type and nature as approved by Architect.

G. Exterior Enclosures:

1. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection of Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification Sections, and to prevent entry of unauthorized persons.
2. Provide access doors with self-closing hardware and locks.
3. Provide temporary roofing as required.

H. Interior Enclosures:

1. Provide temporary partitions and ceilings as required to separate work areas from owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment.
2. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces in accordance with ASTM E90 (maximum Flame Spread Rating of 75) and in accordance with ASTM E84.

I. Security:

1. Provide security and facilities to protect Work from unauthorized entry, vandalism or theft.
2. Provide temporary locks at all exterior doors after building is enclosed.
3. Coordinate with Owner's Security program.

1.05 CONSTRUCTION FACILITIES

A. Access Roads

1. Construct and maintain temporary access to public thoroughfares to serve construction area.
2. Relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.
3. Provide and maintain access to fire hydrants, free of obstructions.
4. Provide means of removing mud from vehicle wheels before entering streets. Any dirt, mud or other debris tracked onto streets must be removed immediately.
5. Provide barricades, warning signs, flagmen or other traffic regulators which may become necessary for protection of public, construction personnel and property.

B. Parking:

1. Arrange for temporary parking areas to accommodate construction personnel, project visitors and Owner's Employees.
2. When site space is not adequate, provide additional off-site parking as allowed by the local jurisdiction.
3. Do not allow construction personnel vehicle or equipment parking on existing pavement.
4. Designate adequate parking spaces for the Owner and Architect and their representatives during on-site visits.

C. Project Identification:

1. Provide one 4 x 8 foot project sign of MDO exterior grade plywood and wood frame construction, painted with exhibit lettering by professional sign painter to Architect's design and colors. Design supports, framing and surfaces to resist a minimum of 50 mph wind velocity.
2. List title of project and logo, names of Owner, Architect, and Contractor as defined by the Architect's design.
3. Erect on the site at location established by the Construction Program Manager.
   a. Comply with requirements of authorities having jurisdiction.
   b. Obtain and pay for any required permits.
4. No other signs will be allowed without the Owner's permission except those signs required by law.

D. Field Offices and Sheds:

1. General: Furnish and install field office building(s) adequate in size and accommodation for all Contractor's offices, job site meetings, superintendent's office, supply room and tool room.
2. The Contractor will provide a conference room (200 square feet minimum) in Contractor’s trailer or in a separate job site trailer for use by the Architect and Owner and may be used to conduct job meetings.
   For the duration of the project construction (Substantial Completion), provide this office and conference space with:
   a. Adequate light, heating, air conditioning, ventilation and 110V electrical service.
   b. A conference room table with 12 chairs, one 4' x 8' white marker board.
   c. Weekly clean trailer.
   d. Contractor's copy machine.
3. The above referenced facilities shall be completed in total and fully operational for use not later than ten (10) days after mobilization by the Contractor.
4. Sheds: Provide the following facilities in temporary buildings used for material and equipment storage:
   a. Ventilation: Where required for materials being stored.
   b. Fire Extinguisher: One ABC type portable fire extinguisher.

c. Temperatures: As required for materials being stored.

E. Temporary Vertical Transportation:

1. Provide and maintain all essential temporary vertical transportation for use of all persons and trades employed on Work during construction. Be responsible for all costs incurred.

1.06 AIR QUALITY DURING CONSTRUCTION

A. HVAC Protection

1. Protect all air handling and distribution equipment, and air supply and return ducting during construction.
2. Adequately cover and protect all exposed air inlets and outlets openings, grilled, ducts, plenums, etc. to prevent water, moisture, dust, and other contaminate intrusion.
3. Apply protection immediately after installation of equipment and ducting.
4. Ducting runs that require more than a single day to install be protected at the end of each day's work.

B. Source Control

1. Protect stored on-site or installed absorptive or porous materials such as batt insulation and drywall from exposure to moisture.
2. Provide adequate ventilation of packaged dry products prior to installation. Remove from packaging and ventilate in s secure, dry, well-ventilated space free from strong contaminant sources and residues. Do not ventilate within limits of Work unless otherwise approved by the Architect.

C. Housekeeping

1. Minimize accumulation of dust, fumes, vapors, or gases in the building.
2. Suppress dust with wetting agents or sweeping compounds.
3. Clean-up dust using a wet rag or damp mop.
4. Increase the cleaning frequency when dust build-up is noted.
5. Remove spills or excess applications of solvent-containing products as soon as possible. Remove accumulated water and keep work areas as dry as possible.
6. Vacuum using HEPA filtered vacuum cleaners.
7. Store volatile liquids, including fuels and solvents, in closed containers and outside of the building when not in use.
8. Keep volatile liquid containers closed when the container is inside the building and not in use.

1.07 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore Owner's property, and adjacent private and public property damages or used during construction, to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01 5526 TRAFFIC CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION OF THE WORK

A. The Contractor shall retain the responsibility for the traffic operations. The Contractor shall cooperate with the Owner so that traffic flow is least impeded by the execution of the work under this Contract. In the event of conflict, the Owner shall be the sole judge of the adequacy of the Contractor's protective measures to assure the flow of traffic.

B. The Contractor understands the special requirement of maintaining the Site and surrounding Facilities in full operation concurrent with the construction activity, and shall provide continuous and safe access by the Owner to all areas of the site not specifically designated for work by the contractor. The Contractor's access shall be limited to the work, staging, delivery and parking areas indicated on the drawings unless otherwise authorized by the Owner.

C. Whenever the contractor's activity affects vehicular or pedestrian traffic the Contractor shall install and maintain lighted barriers, signals, separators, etc. for the safety of the public.

1.02 SUBMITTALS

A. Prior to starting any work the contractor shall submit to the Owner and Architect a detailed plan of his proposed method for controlling traffic. The proposed traffic control plan shall show and describe the proposed locations and time durations covering the following:

1. Vehicular traffic routing.
2. Traffic blockage anticipated to be caused by the work under this Contract.

1.03 TRAFFIC MAINTENANCE FACILITIES

A. Other than as shown on the approved traffic control plans, at no time shall the contractor's operations interfere with the safe and orderly operation of Owner-occupied areas of the facility or the neighborhood. Encroachment by the Contractor's operations will not be permitted.

B. For the duration of the Contract, the Contractor shall immediately repair or replace any and all appurtenances damaged or destroyed in the performance of work included herein.

C. Upon completion of the work, temporary traffic maintenance items furnished by the contractor shall remain his property and shall be removed from the site by the Contractor.

D. The Contractor shall utilize water application or other methods approved by the Oregon Department of Environmental Quality to control dust on access streets and the project site to the satisfaction of the Owner and Architect. Power sweepers shall be used to clean streets of dirt along haul routes.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used.

END OF SECTION

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SECTION 01 57 22 - CONSTRUCTION INDOOR AIR QUALITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section describes Construction Indoor Air Quality (IAQ) goals and includes administrative and procedural requirements for the development and execution of a construction air quality management plan.

B. Related Requirements:

1. Section 01 25 00 "Submittal Procedures" for required submittal procedures.
2. Section 01 50 00 "Temporary Facilities and Controls" requirements for installation, maintenance and removal of temporary utilities, controls, and facilities during construction.
3. Section 01 60 00 “Product Requirements” procedures for storage of interior materials to prevent exposure to moisture and pollutants.
4. Division 23 “Heating Ventilating and Cooling” sections for duct cleaning procedures.

1.3 INDOOR AIR QUALITY MANAGEMENT

A. The Owner has established that the contractor shall prevent indoor air quality problems resulting from the construction process, to sustain long term installer and occupant health and comfort.

B. Protect the ventilation system components during construction and clean contaminated components after construction is complete.

C. Control sources of potential IAQ pollutants by controlling selection of materials and processes used in project construction.

1.4 SUBMITTALS

A. IAQ Management Plan for the construction and pre-occupancy phases of the project.

B. Photographs documenting construction IAQ management measures implemented during construction such as duct protection measures and measures to protect on-site stored or installed absorptive materials from moisture.

C. Cut sheets of filtration media used during construction with MERV values highlighted.

1.5 CONSTRUCTION AIR QUALITY MANAGEMENT PLAN

A. Develop a Draft Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

1. During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition 2007, ANSI/ SMACNA 008-2008 (Chapter 3).
2. Protect stored on-site or installed absorptive materials from moisture damage.

B. The SMACNA IAQ Guidelines for Occupied Buildings under Construction provides an overview of air pollution associated with construction, control measures, construction process management, quality control, communicating with occupants, and case studies. These guidelines can be accessed at www.smacna.org. Chapter 3 of the SMACNA Guidelines

recommends Control Measures in five areas: HVAC protection, source control, pathway interruption, housekeeping, and scheduling. Review the applicability of each Control Measure and include those that apply in the Draft IAQ Management Plan.

1. HVAC Protection: Shut down the return side of the HVAC system whenever possible during heavy construction. If the system must remain operational during construction include the following strategies that apply:
    a. Fit the return side of the HVAC system with temporary filters with a Minimum Efficiency Reporting Value (MERV) of 8.
    b. Isolate the return side of the HVAC system from the surrounding environment as much as possible (e.g., place all tiles for the ceiling plenum, repair all ducts and air handler leaks).
    c. Damper off the return system in the heaviest work areas and seal the return system openings with plastic.
    d. Upgrade the filter efficiency where major loading is expected to affect operating HVAC system.
    e. Clean permanent return air ductwork per National Air Duct Cleaning Association standards upon completion of all construction and finish installation work.
    f. Replace all filtration media prior to occupancy.
2. Source Control: Propose the substitution of non-toxic formulations of materials that are generally the responsibility of the contractor such as caulks, sealants, and cleaning products.
3. Pathway Interruption: Prevent contamination of clean spaces. Include the following strategies that apply:
    a. Use 100 percent outside air ventilation (when outside temperatures are between 55 deg F and 85 deg F and humidity is between 30 percent and 60 percent) with air exhausted directly to the outside during installation of finishes and other VOC emitting materials.
    b. Erect some type of barrier between work areas or between the inside and outside of the building to prevent unwanted airflow from dirty to clean areas.
4. Housekeeping: Reduce construction contamination in the building prior to occupancy through HVAC and regular space cleaning activities.
    a. Store building materials in a weather tight, clean area prior to unpacking for installation.
    b. Check for possible damage to building materials from high humidity.
    c. Clean all coils, air filters, and fans before testing and balancing procedures are performed.
5. Scheduling: Specify construction sequencing to reduce absorption of VOC's by materials that act as sinks or contaminant sources. Complete application of wet and odor-emitting materials such as paints, sealants, and coatings before installing sink materials such as ceiling tiles, carpets, insulation, gypsum products, and fabric-covered furnishings are installed.
    a. Protect stored on-site or installed absorptive materials from exposure to moisture through precipitation, plumbing leaks, or condensation from the HVAC system to prevent microbial contamination.

C. Draft IAQ Management Plan Review Meeting: Once the Owner and Architect have reviewed the Draft IAQ Management Plan and prior to construction at the site, schedule and conduct a meeting to review the Draft IAQ Management Plan and discuss procedures, schedules and specific requirements for IAQ during the construction and pre-construction phases of the building. Discuss coordination and interface between the Contractor and other construction activities. Identify and resolve problems with compliance to the requirements. Record minutes of the meeting, identify all conclusions reached and matters requiring further resolution.

1. Attendees: The Contractor and related Contractor personnel associated with the work of this section, including personnel to be in charge of the IAQ management program, Architect, Owner and such additional personnel as the Architect or Owner deem appropriate.

D. Final IAQ Management Plan: Make any revisions to the Draft IAQ Management Plan agreed upon during the meeting identified in item (C) above and incorporate resolutions agreed to be made subsequent to the meeting. Submit the revised plan to the Owner and Architect for approval within 10 calendar days of the meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 IMPLEMENTATION OF IAQ MANAGEMENT PLAN

A. Manager: The Contractor shall designate an on-site party (or parties) responsible for instructing workers and overseeing and the IAQ Management Plan for the Project.

B. Progress Meetings: Construction related IAQ procedures shall be included in the pre-construction and construction progress meeting agendas.

C. Distribution: The Contractor shall distribute copies of the IAQ Management Plan to the Job Site Foreman, each Subcontractor, the Owner, and the Architect.

D. Instruction: The Contractor shall provide on-site instruction of the IAQ procedures and ensure that all participants in the construction process understand the importance of the goals of the IAQ Management Plan.

END OF SECTION

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SECTION 01 61 16 - DELEGATED DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. General: This Section specifies administrative and procedural requirements for delegated design indicated in the various Sections of these Specifications.

B. Section Includes: Structural and other design requirements for delegated design components, otherwise known as fabricator-designed, bidder-designed or bidder design-build components.

C. This Section applies to Technical Specification Sections, and supplements requirements indicated in the General and Supplementary Conditions.

D. Delegated design does not mean deferred submittal. See Drawings for deferred submittals.

E. Related Requirements:

1. Refer to the following sections for specific delegated design requirements with deferred submittal:

   a. Section 05 50 00 “Metal Fabrications” for equipment supports, ships’ ladders, and other applications where required by Code and not detailed in Structural Drawings.

   b. Section 05 52 13 “Pipe and Tube Railings”.

   c. Section 06 17 53 “Shop-Fabricated Wood Trusses”.

   d. Section 06 41 00 “Architectural Casework” for steel framing and supports for countertops.

   e. Section 07 42 15 “Formed Metal Wall and Soffit Panels” for attachment of cladding support.

   f. Section 08 41 13 “Aluminum-Framed Entrances and Storefronts”.

   g. Section 08 51 13 “Aluminum Windows”.

   h. Section 08 91 19 “Fixed Louvers”.

   i. Section 09 51 13 “Acoustical Panel Ceilings” for large areas of suspended ceiling where required by Code.

   j. Section 10 28 00 “Restroom Accessories” for grab bars.

   k. Section 11 81 29 “Fall Protection”.

   l. Division 21 “Fire Suppression” Sections for hangers, supports, vibration controls for plumbing piping and equipment.

   m. Division 22 “Plumbing” Sections for hangers, supports, vibration controls for plumbing piping and equipment.

   n. Division 23 “HVAC” Sections for hangers, supports, vibration controls for HVAC equipment.

   o. Division 26 “Electrical” Sections for hangers, supports, vibration controls for electrical and low-voltage equipment.

2. Refer to sections indicated for specific bidder-design requirements without deferred

submittal:

a. Section 07 84 13 “Penetration Firestopping”.

b. Section 09 22 16 “Non-Structural Metal Framing”.

1.3 DEFINITIONS

A. Contractor Design Requirements: Where occurs, same meaning as Delegated Design Requirements.

B. Delegated Design Work: Design services and certifications provided by a Professional Engineer registered as such in the State where the Project is located related to systems, materials or equipment required for the Work to satisfy design and performance criteria established by the Contract Documents. Delegated Design does not include professional services the Contractor needs to fulfill their responsibilities under the Contract including but not limited to construction means, methods and sequence.

C. Seal: Certification that builder design plans, computations and specifications were designed and prepared under the direct supervision of the Architect or Engineer whose name appears thereon.

D. Approval Stamp: Certification obtained by the Contractor that the Building Official has reviewed a submittal, and finds it acceptable with respect to applicable regulatory requirements.

E. Bidder-Design: Design services provided by an installer or manufacturer complying with quality assurance, performance requirements and design requirements indicated and established by the Contract Documents. Bidder-design does not include Professional Engineering unless indicated otherwise.

1.4 DELEGATED- AND BIDDER-DESIGN SERVICES

A. Where referenced in these specifications, Delegated Design components and their attachments to the structure shall comply with the currently adopted edition of all applicable state and local ordinances, with parameters as specified in this individual sections.

B. Where referenced in these specifications, Bidder-Design components and installation shall comply with the currently adopted edition of all applicable state and local ordinates, with parameters specified in this and individual sections.

C. Permitting Agency Requirements: Follow the requirements for permits current at the time of submission. The General Contractor is responsible to coordinate and submit all material required, so the permitting agency’s review will not adversely affect the construction schedule. At or near time of application, the General Contractor shall meet with the permitting agency to identify Delegated Design components and how they are to be submitted and processed for permits.

D. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.5 SUBMITTALS

A. General: Submit complete Delegated Design Submittals to meet permitting agency requirements for permits. Include drawings and calculations for that portion of the Work signed and sealed by a State of Oregon registered engineer. Incomplete submittals or submittals not previously reviewed and so stamped by General Contractor will not be accepted for review by the Architect or Engineer of Record.

B. These submittal requirements are in addition to other submittal requirements stated elsewhere in the contract documents.

1.6 QUALITY ASSURANCE

A. Where referenced in these specifications, Delegated Design components and their attachments to the structure shall comply with the currently adopted edition of all applicable state and local ordinances, with parameters as specified in this section.

B. Permitting Agency Requirements: Follow the requirements for permits current at the time of submission. The General Contractor is responsible to coordinate and submit all material required, so the permitting agency's review will not adversely affect the construction schedule. At or near time of application, the General Contractor shall meet with the permitting agency to identify Delegated Design components and how they are to be submitted and processed for permits.

1.7 INSURANCES

A. Refer to General Conditions for Insurance and Bonds.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 WORK INCLUDED

A. General: Certain of the components of the Work under this project are Delegated Design. It is the General Contractor's responsibility to coordinate and assume or assign to subcontractors the complete responsibility for the design, calculations, submittals, fabrication, transportation and installation of the Delegated Design portions or components as required in this Section.

B. The General Contractor is responsible to submit all documents required by the permitting agency for the separate approval and permit for each Delegated Design item. Delegated Design components of this Work are defined as complete, operational systems, provided for their intended use.

C. All permit plan review and permit fees for Delegated Design items are the responsibility of the submitting General Contractor.

3.2 DOCUMENTS REQUIRED

A. General: Delegated Design documents and related permits issuance must be completed prior to fabrication. The General Contractor must complete and submit a Contractor Design Summary Sheet listing Delegated Design Subcontractors and their registered engineer's names and phone numbers prior to submission of the Delegated Design documents for review.

B. Scope of Documents: Delegated Design components are shown in the Contract Documents for design intent. The purpose is to have the General Contractor responsible to provide, coordinate and install each Delegated Design component.

1. Delegated Design components attached to the structural frame or supplemental to the structural frame shall be designed for the anticipated loads as outlined in the Contract Documents. These Delegated Design components are all to be coordinated with appropriate subcontractors.

2. Load reactions at the interface between the Delegated Design components and the structural frame shall be clearly defined to allow for a review by the Architect and Engineer of Record.

C. Component Certification: Certify that mechanical and electrical components comply with the structural provisions of all applicable codes.

1. Shop Drawings: Submit shop drawings for all attachments to the structure for all elements requiring structural design per these specifications. These attachments include, but are not limited to, structural bracing for equipment, conveyances, and architectural

components; seismic restraints of vibration isolation systems; and details of lateral bracing and attachment systems designed to accommodate differential movement between building levels.

2. Shop Drawings shall be sealed by the structural engineer responsible for their design.

D. Quality Assurance Plan: Submit a quality assurance plan for the designated structural system of all elements requiring structural design per these specifications. Quality assurance plan shall comply with Owner's requirements and all applicable codes.

END OF SECTION

SECTION 01 6600 DELIVERY, STORAGE & HANDLING

PART 1 - GENERAL

1.01 REQUIREMENTS

A. Provide for expeditious transportation and delivery of products to project site undamaged, on a schedule to avoid delay of the work.

B. Provide equipment and personnel at the site to unload and handle products in a manner to avoid damage to products.

C. Provide secure storage and protection for products to be incorporated into the work, and maintenance and protection for products after installation and until completion of the work.

1.02 ENERGY & ENVIRONMENTALLY SENSITIVE PRODUCTS

A. Prior to installation, Contractor shall submit MSDS (Material Safety Data Sheets) for all Paint, Adhesive, Sealant, Plywood, Particle Board, Carpet and other products which could negatively impact the Project environment. Only those products that satisfy the Sustainable Design Requirements may be used in the Project Work.

1.03 DELIVERY

A. Arrange deliveries of products in accord with construction schedules and in ample time to facilitate inspection prior to installation.

B. Coordinate deliveries to avoid conflict with work and conditions at site.

1. Work of other contractors, or Owner.
2. Limitations of storage space.
3. Availability of equipment and personnel for handling products.

C. Deliver products in undamaged condition in original containers or packaging, with identifying labels intact and legible.

D. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts and to facilitate assembly.

E. Immediately upon delivery, inspect shipment to assure:

1. Product complies with requirements of Contract Documents and reviewed submittals.
2. Quantities are correct.
3. Containers and packages are intact, labels are legible.
4. Products are properly protected and undamaged. Minor damages may be repaired, provided the finish items are equal in all respects to new work.

1.04 PRODUCT HANDLING

A. Provide equipment and personnel necessary to handle products, including those provided by Owner, by methods to prevent soiling or damage to products or packaging.

B. Provide additional protection during handling as necessary to prevent scraping, marring, or otherwise damaging products or surrounding surfaces.

C. Handle products by methods to prevent bending or overstressing.

D. Lift heavy components only at designated lifting points.

1.05 STORAGE

A. Store products immediately on delivery, and protect until installed in the work. Store in accord with manufacturer's instructions, with seals and labels intact and legible.

B. Store products subject to damage by elements in substantial weather-tight enclosures.

1. Maintain temperatures within ranges required by manufacturer's instructions.
2. Provide humidity control for sensitive products, as required by manufacturer's instructions.
3. Store unpacked products on shelves, in bins, or in neat piles, accessible for inspection.

C. Exterior Storage:

1. Provide substantial platforms blocking, or skids to support fabricated products 4" above ground, prevent soiling or staining.
2. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Avoid use of non-vented plastic or canvas shelters that could create humidity chambers. Provide adequate ventilation to avoid condensation.
3. Store loose granular materials on solid surfaces such as paved areas, or provide plywood or sheet materials to prevent mixing with foreign matter.

a. Provide surface drainage to prevent flow or ponding of rainwater.
b. Prevent mixing of refuse or chemically injurious materials or liquids.

D. Arrange storage in manner to provide easy access for inspection.

1.06 MAINTENANCE OF STORAGE

A. Maintain periodic system of inspection of stored products on schedules basis to assure that:

1. State of storage facilities is adequate to provide required conditions.
2. Required environmental conditions are maintained on continuing basis.
3. Surfaces of products exposed to elements are not adversely affected. Any weathering of products, coatings, and finishes is not acceptable under requirement of Contract Documents.

1.07 PROTECTION AFTER INSTALLATION

A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.

B. Control traffic to prevent damage to equipment and surfaces.

C. Provide coverings to protect finished surfaces from damage.

1.08 DAMAGED PRODUCTS

A. Damaged or deteriorated materials shall be removed from the premises. Replace materials that have been damaged.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01 0500 CONSTRUCTION STAKING

PART 1 GENERAL

1.01 CONTRACT CONDITIONS

A. Work of this Section is bound by the General Conditions, Supplementary Conditions, and Division 1 bound herewith in addition to this Specification and accompanying Drawings.

1.02 WORK INCLUDED

A. Provide survey work by an Oregon State registered land surveyor for the execution of Project.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 7839, Project Record Documents.

1.04 QUALITY CONTROL

A. Before starting work, the Contractor shall locate all general reference points. The Contractor shall employ a registered surveyor (licensed by the State of Oregon) to perform such work. The Contractor shall take such steps as are necessary to prevent the dislocation or destruction of the reference points, and shall be responsible for the accuracy of the site and building layout and elevations for the work.

1.05 SURVEY REFERENCE POINTS

A. Existing Points: See Drawings.
   B. Locate existing points prior to starting site work, and preserve during construction.
   C. Make no Changes to existing points without Owner and Architect approval.
   D. Notify Owner and Architect when any point is lost, destroyed or requires relocation.

1.06 PROJECT LAYOUT

A. Establish existing control points.
B. Record benchmark locations with horizontal and vertical dimensions on Project Record Drawings.
C. Using survey instruments, establish lines and levels for the following:
   1. Stakes for grading, fill, and all earthwork.
   2. Building foundation, floor elevations and similar elements.

D. Re-establish control points as required due to construction activity.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

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SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Cutting and patching.
4. Installation of the Work.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Requirements:

1. Section 01 10 00 "Summary" for coordination of Owner-furnished products, Owner's separate contracts, and limits on use of Project site.
2. Section 01 31 00 "Project Management and Coordination" for requirements for requests for information.
3. Section 01 33 00 "Submittal Procedures" for submitting surveys.
4. 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, replacing defective work, and final cleaning.
5. Section 02 41 19 "Selective Demolition":
6. Section 07 84 13 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.3 PREINSTALLATION MEETINGS

A. Cutting and Patching Conference: Conduct conference at Project site.

1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:

a. Contractor's superintendent.

b. Trade supervisors responsible for cutting operations.

c. Trade supervisors responsible for patching of each type of substrate.

d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations.

2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

B. Layout Conference: Conduct conference at Project site.

1. Prior to establishing layout of new and existing perimeter and structural column grid(s), review building location requirements. Review benchmark, control point, and layout and dimension requirements. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with Project layout to attend, including the following:

a. Contractor's superintendent.

b. Individual responsible for performing Project surveying and layout.

c. Individual responsible for performing site survey serving as basis for Project design.

2. Review meanings and intent of dimensions, notes, terms, graphic symbols, and other layout information indicated on the Drawings.

3. Review requirements for including layouts on Shop Drawings and other submittals.

4. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.4 SUBMITTALS

A. Qualification Data: For land surveyor or Professional Engineer.

B. Certified Surveys: Submit two copies signed by land surveyor or Professional Engineer. Provide electronic Portable Document Format (PDF) of certified surveys to the Architect.

C. Certificates: Submit certificate signed by land surveyor or Professional Engineer, certifying that location and elevation of improvements comply with requirements.

D. Cutting and Patching Plan: Submit plan describing procedures at least 10 working days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.

2. Identify how plan will comply with indoor air quality requirements and sound and vibration control for occupants in existing and nearby buildings.

3. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.

4. Products: List products to be used for patching and firms or entities that will perform patching work.

5. Dates: Indicate when cutting and patching will be performed.

6. Existing Utilities Services and Plumping, Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

E. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.5 CLOSEOUT SUBMITTALS

A. Final Property Survey: Submit 2 copies showing the Work performed and record survey data. Provide a PDF file to the Architect of final property survey.

1.6 QUALITY ASSURANCE

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

B. Professional Engineer Qualifications: Refer to Section 01 40 00 "Quality Requirements."

C. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect immediately of locations and details of cutting and await directions from Architect before proceeding.

a. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, unsatisfactorily reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of 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, gas service, water-service, electrical service, and any other utilities.

2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for utilities and systems to verify actual locations of connections before equipment and fixture installation.

2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

3. Verify compatibility with and suitability of surfaces and substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.

2. List of detrimental conditions, including substrates.

3. List of unacceptable installation tolerances.

4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces, substrates and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utilities 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 component. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements prior to fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically in Drawings.

D. Review of Contract Documents and Field Conditions: Immediately upon discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Architect promptly.

B. Engage a land surveyor or professional engineer experienced in laying out the Work, using the following accepted surveying practices:

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.

2. Establish limits on use of Project site.

3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.

4. Inform installers of lines and levels to which they must comply.

5. Check the location, level and plumb, of every major element as the Work progresses.

6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

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

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.

2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two (2) 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.

D. Certified Survey: When required by Owner or authorities having jurisdiction, upon completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

E. Final Property Survey: When required by Owner, engage a land surveyor or professional engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor or professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

2. Recording: When required by Owner, at Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb, and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

4. Maintain minimum headroom clearance of 8 feet in occupied spaces and 7 feet 6 inches in unoccupied spaces, unless otherwise indicated in Drawings.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.

F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that

adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.

3.6 CUTTING AND PATCHING

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of Work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 01 10 00 "Summary."

F. Existing Utility Services and Mechanical/ Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/ systems prior to cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.

5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

a. Clean piping, conduit, and similar features before applying paint or other finishing materials.

b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.

3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

a. Use containers intended for holding waste materials of type to be stored.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls." and Section 01 74 19 "Construction Waste Management and Disposal."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 91 13 "General Commissioning Requirements."

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

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

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

A. Repair or remove and replace damaged, defective, or nonconforming Work. Restore damaged substrates and finishes.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.

C. Restore permanent facilities used during construction to their specified condition.

D. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

F. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

SECTION 01 7329 CUTTING & PATCHING

PART 1 – GENERAL

1.01 DEFINITION

A. "Cutting and Patching" is defined to include the cutting and patching of nominally completed concrete, steel, wood and miscellaneous metal structures; piping and pavement, in order to accommodate the coordination of WORK, or the installation of other facilities or structures or to uncover other facilities and structures for access or inspection, or to obtain samples for testing, or for similar purposes.

B. SECTION INCLUDES
1. Provide cutting, fitting and patching. The following are included:
a. Make component parts fit together.
b. Uncover work to provide for installation of out-of-sequence work.
c. Remove and replace new work not conforming to Project requirements.
d. Provide penetrations of nonstructural surfaces for installation of electrical conduits, plumbing, ductwork and other penetrations.
e. Restore the integrity of fire rated construction at cutting and patching work.

1.02 RELATED SECTIONS

A. Section 01 1000: Summary of Work

B. Individual Specifications Sections:

1. Cutting and patching incidental to work of the Section.
2. Advance notification to other Sections of openings required in work of those Sections.
3. Limitations on cutting structural members.

1.03 SUBMITTALS

A. Submit written request for cutting approval to Architect well in advance of any cutting which affects:

1. Work of Owner or any separate Contractor.
2. Structural value or integrity of any completed or existing work.
3. Waterproof value or integrity of any weather-exposed or moisture resistant work.
4. Efficiency, operational life, maintenance, or safety of any completed or existing work.
5. Visual qualities of any sight-exposed work.

B. Request shall include:

1. Project identification.
2. Location and Description of affected work.
3. Necessity for cutting, alteration, or excavation.
4. Effect on Owner's or separate Contractor's work.
5. Effect on structural or weatherproof integrity on completed or existing work.
6. Description of proposed work including:
a. Extent of cutting, patching, alteration, or excavation.
b. Trades who will execute work.
c. Products proposed for use.
d. Extent of required refinishing.
7. Alternative to cutting and patching.
8. Cost proposal, when applicable.

C. Submit written notice to Owner and Architect designating date and time work will be performed.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Products similar to those specified elsewhere in this Project Manual:

1. Follow those Specifications.

B. Other Products:

1. Follow Architect's instructions.

C. Change in Materials:

1. For any change in materials, submit request for substitution under provisions of Section 01 2500.

PART 3 – EXECUTION

3.01 EXTENT OF WORK

A. Perform all cutting, fitting, and patching, including attendant excavation and backfill, required to complete work or to:

1. Make work fit properly together.
2. Uncover work for installation of ill-timed work.
3. Remove and replace defective work and work not conforming to Contract Documents.
4. Remove samples of installed work for testing.
5. Provide penetrations through non-structural surfaces for mechanical and electrical work.

3.02 EXISTING CONDITIONS

A. Inspect existing conditions and identify work subject to damage or movement caused by proposed cutting and patching.

B. After uncovering work, inspect conditions affecting products installation or performance.

C. Report unsatisfactory and questionable conditions to the Owner and Architect in writing; do not proceed with work until Architect provides further instructions.

D. Beginning of cutting and patching implies acceptance of existing conditions.

3.03 PREPARATION

A. Maintain adequate temporary support necessary to assure structural integrity of affected work; provide devices and methods to protect other portions of project from damage.

B. Protect work exposed by cutting against damage and discoloration.

C. Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

3.04 PERFORMANCE

A. Provide proper surfaces for repairs.

B. Employ qualified installer or fabricator to perform cutting and patching of:

1. Weather exposed or moisture resistant surfaces.
2. Sight exposed finished surfaces.

C. Restore cut or removed work with new products to provide work complete in accordance with Contract Documents. At penetrations of fire-rated wall, ceiling, or floor construction, completely seal voids with fire-rated material, full thickness of the construction element. Provide required fire-resistant rating.

D. Fit work air-tight to pipes, sleeves, ducts, conduits, and other surface penetrations.

E. Where patching occurs, refinish entire surface to provide even finish to match adjacent work as follows:

1. Continuous surfaces: refinish to nearest intersection.
2. Assemblies: refinish entire un

3.05 CUTTING STRUCTURAL FRAMING

A. Exposed members, including any columns and posts:

1. Not permitted, unless shown on Drawings or otherwise approved.

3.06 CLEANING AND REPAIRING

A. Including work of other Sections, clean, repair, and touchup, or replace when directed, products which have been soiled, discolored, or damaged by work of this Section.

B. Remove debris from Project Site upon work completion or sooner, if required by Owner.

END OF SECTION

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SECTION 01 7413 CLEANING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Work included: Throughout the construction period, maintain the project site where work is carried out in a standard of cleanliness as described in this section.

B. Related work described elsewhere: In addition to standards described in this Section, comply with all requirements for cleaning as described in other various Sections of these Specifications.

1.02 QUALITY ASSURANCE

A. Inspection: Conduct daily inspection, and more often if necessary, to verify that requirements of cleanliness are being met.

B. Codes and Standards: In addition to the standard described in this section, comply with all pertinent requirements of governmental agencies having jurisdiction.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

A. Provide all required personnel, equipment, and materials needed to maintain specified standard of cleanliness.

PART 3 EXECUTION

3.01 PROGRESS CLEANING

A. General:

1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.
2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
3. Provide adequate storage for all items, awaiting removal from the job site, observing all requirements for fire prevention and protection of the ecology.
4. Comply with the cleaning requirements of other sections in the Project Manual.
5. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces and other closed and remote spaces prior to enclosing the space.
6. Broom and vacuum clean interior areas prior to the start of surface finishing and continue cleaning to maintain a dust-free space during the finishing operations.
7. Prior to painting, remove all dust accumulation on walls.

B. Site:

1. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site; restack, tidy, or otherwise service. All arrangements to meet the requirements of paragraph 3.01, A.1. above.
2. Maintain the site in a neat and orderly condition at all times to the satisfaction of the Construction Program Manager.
3. Remove waste materials, debris, and rubbish from site periodically and dispose off-site.

3.02 DUST CONTROL

A. Maintain continuous cleaning and wetting procedures to control dust pollution at project site and hauL routes as required by governing authorities and the Contract Documents. Use power sweepers for street cleaning as necessary. Maintain dust control operations to prevent flying dust from leaving the project site.

B. Schedule cleaning so that resultant dust and contaminants will not fall on wet or newly coated surfaces.

C. Erect dust proof barriers at the interior of building to control the spreading of construction generated dust and debris to areas of the building not affected by renovation work.

D. Provide dampened or tacky walk-off mats at dust proof barriers that are also used to access other areas of the building to prevent tracking of dust and debris to areas of the building not affected by renovation work. Provide progress cleaning as required.

3.03 CLOSEOUT CLEANING

A. Closeout cleaning shall be limited to those areas in which construction occurred and also the on-site sanitary facilities used by the contractor.

B. Provide final cleaning of Work prior to Substantial Completion and Architect's "Punch List." Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to condition expected from normal commercial building cleaning and maintenance program. Comply with manufacturer's recommendations. Complete following cleaning operations before requesting Owner review for Certification of Substantial Completion:

1. Clean equipment and fixtures to sanitary condition.
2. Replace filters of operating equipment.
3. Clean debris from roofs, gutters, downspouts, and drainage systems.
4. Clean mechanical and electrical equipment and spaces, including tops of pipes, ducts, equipment, etc.
5. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels and other foreign matter from sight exposed interior and exterior surfaces.
6. Hose-clean exterior paved surfaces, rake clean other surfaces of grounds.
7. For all new exterior construction, power wash entire exterior of building to remove all dirt and dust - care shall be taken around new landscaping.
8. Final clean all glazing. Exterior glazing to be cleaned after building is power washed.
9. Re-clean areas or equipment, after final inspection, if dirtied as result of Contractor's work in preparing for final inspection or completion of punch list.
10. Restore landscape damaged as a result of construction of this project including removal of ruts caused by vehicle traffic, removal of construction debris, replacement of damaged or contaminated soils and mulches, reseeding of damaged lawns, restoration of sidewalks or pathways damaged during construction and other landscaping repairs required as a result of construction activity as directed by the Owner's Representative.

B. Removal of protection: Except as otherwise indicated or requested by Owner, remove temporary protection devices and facilities which were installed during course of Work to protect previously completed Work during remainder of construction period or to protect public.

C. Compliance:

1. Comply with safety standards and governing regulations for cleaning operations.
2. Do not burn waste materials at Site.
3. Do not bury debris or excess materials on Owner's property.
4. Do not discharge volatile or other harmful or dangerous materials into drainage systems.
5. Remove waste materials from Site and dispose of in lawful manner.

END OF SECTION

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:

1. Section 02 41 19 “Selective Demolition”.
2. Section 04 22 00 “Concrete Unit Masonry” for disposal requirements for masonry waste.

1.3 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner’s property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

1.5 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within thirty (30) calendar days of date established for the Notice of Award.

1.6 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:

1. Material category.
2. Generation point of waste.

3. Total quantity of waste in tons.
4. Quantity of waste salvaged, both estimated and actual in tons.
5. Quantity of waste recycled, both estimated and actual in tons.
6. Total quantity of waste recovered (salvaged plus recycled) in tons.
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. Qualification Data:

1.7 QUALITY ASSURANCE

A. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of each contractor and waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of site-clearing, demolition and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation

procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work in compliance with Section 02 41 19 "Selective Demolition".
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

D. Cost/ Revenue Analysis: Indicate total cost of waste disposal as if there were no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:

1. Total quantity of waste.
2. Estimated cost of disposal (cost per unit). Include transportation and tipping fees and cost of collection containers and handling for each type of waste.
3. Total cost of disposal (with no waste management).
4. Revenue from salvaged materials.
5. Revenue from recycled materials.
6. Savings in transportation and tipping fees by donating materials.
7. Savings in transportation and tipping fees that are avoided.
8. Handling and transportation costs. Include cost of collection containers for each type of waste.
9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total nonhazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

1. Demolition Waste:
   a. Asphalt paving.
   b. Concrete.
   c. Concrete reinforcing steel.
   d. Brick.
   e. Concrete masonry units.

f. Wood studs.
g. Wood joists.
h. Plywood and oriented strand board.
i. Wood paneling.
j. Wood trim.
k. Structural and miscellaneous steel.
l. Rough hardware.
m. Roofing.
n. Insulation.
o. Doors and frames.
p. Door hardware.
q. Windows.
r. Glazing.
s. Metal studs.
t. Gypsum board.
u. Acoustical tile and panels.
v. Carpet.
w. Carpet pad.
x. Demountable partitions.
y. Equipment.
z. Cabinets.
aa. Plumbing fixtures.
bb. Piping.
cc. Supports and hangers.
dd. Valves.
ee. Sprinklers.
ff. Mechanical equipment.
gg. Refrigerants.
hh. Electrical conduit.
ii. Copper wiring.
jj. Lighting fixtures.
kk. Lamps.
ll. Ballasts.
mm. Electrical devices.
nn. Switchgear and panelboards.
oo. Transformers.

2. Construction Waste:
   a. Masonry and CMU.
   b. Lumber.
   c. Wood sheet materials.
   d. Wood trim.
   e. Metals.
   f. Roofing.
   g. Insulation.
   h. Carpet and pad.
   i. Gypsum board.
   j. Piping.
   k. Electrical conduit.
   l. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
      1) Paper.
      2) Cardboard.
      3) Boxes.
      4) Plastic sheet and film.
      5) Polystyrene packaging.
      6) Wood crates.
      7) Wood pallets.
      8) Plastic pails.
   m. Construction Office Waste: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following construction office waste materials:
      1) Paper.
      2) Aluminum cans.
      3) Glass containers.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
   1. Comply with operation, termination, and removal requirements in Section 01 50 00 "Temporary Facilities and Controls."

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within three days of submittal return.

2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.

2. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Comply with requirements in Section 02 41 19 "Selective Demolition" for salvaging demolition waste.

B. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.

2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.

3. Store items in a secure area until installation.

4. Protect items from damage during transport and storage.

5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

C. Salvaged Items for Sale and/ or Donation: Not permitted.

D. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:

1. Clean salvaged items.

2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.

3. Store items in a secure area until delivery to Owner.

4. Transport items to Owner's storage area designated by Owner.

5. Protect items from damage during transport and storage.

E. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

F. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

G. Plumbing Fixtures: Separate by type and size.

H. Lighting Fixtures: Separate lamps by type and protect from breakage.

I. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING CONSTRUCTION AND DEMOLITION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.

4. Store components off the ground and protect from the weather.

5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.4 RECYCLING DEMOLITION WASTE

A. Asphalt Paving: Grind asphalt to maximum 1-1/2-inch size.

B. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.

C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum 1-1/2-inch size.

D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

1. Clean and stack undamaged, whole masonry units on wood pallets.

2. Pulverize damaged masonry units to maximum 1-1/2-inch size.

E. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

F. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.

2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

G. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

H. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

J. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.

K. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet and pad in a closed container or trailer provided by carpet reclamation agency or carpet recycler.

L. Carpet Tile: Remove debris, trash, and adhesive.

1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet reclamation agency or carpet recycler.

M. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.

N. Conduit: Reduce conduit to straight lengths and store by material and size.

O. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.

2. Polystyrene Packaging: Separate and bag materials.

3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.

4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.

2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

D. Paint: Seal containers and store by type.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner’s property.

C. Burning: Do not burn waste materials.

END OF SECTION

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SECTION 01 7800 CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Description of Requirements.
2. Closeout Procedures.
3. Record Document Submittals.
4. Closeout Cleaning.
5. Testing.
6. Operation & Maintenance Instructions.
7. Prerequisites to Substantial Completion.
8. Final Acceptance.
9. Evidence of Payments and Release of Liens.
10. Final Adjustment of Accounts.
11. Submittal of Statement of Compliance.
12. Submittal of Certification of No Asbestos.

1.02 RELATED SECTIONS

A. Section 01 1000 - Summary of Work.

1.03 DESCRIPTION OF REQUIREMENTS

A. Definitions: Project Closeout is the terminology used to describe certain collective project requirements, indicating completion of Work, that shall be fulfilled near end of Contract time in preparation for Final Acceptance and occupancy of Work by the Owner, as well as final payment to Contractor and normal termination of Contract.

B. Time of Contract Closeout is directly related to "Substantial Completion"; therefore, time of closeout may be either single time period for entire Work or series of time periods for individual elements of Work that have been certified as substantially complete at different dates. This time variation, if any, shall be applicable to other provisions of this Section.

1.04 CLOSEOUT PROCEDURES

A. Contractor will initiate the close-out period by providing a written statement to the Owner and Architect stating that the Contract Documents have been reviewed, Work has been inspected and approved by the Contractor, and that Work is complete in accordance with Contract Documents and ready for Architect's review.

B. Provide submittals to Architect that are required by governing or other authorities indicating that all work has been inspected and approved by the appropriate authorities.

C. Submit written request for Final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.05 RECORD DOCUMENT SUBMITTALS

A. Submit Record Documents in accordance with Specification Section 01 7839.

1.06 CLOSEOUT CLEANING

A. Complete closeout cleaning in accordance with Specification Section 01 7413.

1.07 TESTING – Unless specified elsewhere in these specifications, the following testing procedures will be followed:

A. Operating equipment and systems shall be tested in presence of Owner to demonstrate compliance with specified requirements.

1. Notify Owner, in writing, seven (7) days prior to tests scheduled under requirements of this Section.
2. Testing shall be conducted under specified design operating conditions as recommended or approved by Owner and Owner's Representative.
3. Provide copies of all test reports and records to Owner.

B. All elements of systems shall be tested to demonstrate that total systems satisfy all requirements of these Specifications. Testing shall be accomplished on hierarchical basis. Test each piece of equipment for proper operation, followed by each subsystem, followed by entire system, followed by inter-ties to other major systems.

C. All special testing materials and equipment shall be provided by Contractor.

D. Owner-Witnessed Contractor's Tests:

1. System shall be checked for proper installation, shall be adjusted, and shall be calibrated to verify that it is ready to function as specified.
2. All system elements shall be checked to verify that they have been installed properly and that all connections have been made correctly.
3. All discrete elements and sub-systems shall be adjusted and shall be checked for proper operation.
4. Operational Tests shall be complete prior to starting Functional Acceptance Tests.
5. Provide copies of all test reports and records to Owner.

E. Owner-Witnessed Functional Tests:

1. Objective of these tests is to demonstrate that system is operating and complying with specified performance requirements.
2. Owner-witnessed Functional Acceptance Test shall be performed on complete system. Each function shall be demonstrated to satisfaction of Owner on paragraph-by-paragraph basis of Contractor's written test procedure, developed to demonstrate conformance to requirements of Contract Specifications.
3. Functional acceptance test shall be witnessed and signed off by Owner upon satisfactory completion.
4. Actual testing program shall be conducted in accordance with prior approved procedures and shall be documented as required hereinafter.
5. Notify Owner at least two weeks prior to date of Functional Acceptance Test.
6. Test systems independent of, and prior to, tie into off-site systems.

F. Performance Period:

1. Upon successful completion of Owner-Witnessed Functional Test, Performance Period (30 consecutive calendar days) shall commence on first day following performance test. This period shall be completed prior to final acceptance of the project. The commencement of the warranty period is scheduled from the beginning date of the performance period which has been successfully completed. In event of failure to meet standard of performance during any initiated performance period, it is not required that one 30-calendar day period expire in order for another performance period to begin.
2. If equipment or system operates so as to demonstrate continuing compliance with specified requirements for period of 30 consecutive calendars days from commencement date of performance period, it shall be deemed to have met standard of performance. In addition, equipment or systems shall operate in conformance with all Contract Specifications and with Contractor's bid and published Specifications in effect on date Contract is executed, provided such specifications are equal to or better than specifications submitted with Contractor's bid.
3. Equipment shall not be accepted by Owner, and final payment shall not be made by Owner, until standard of performance is met.

4. Systems shall be first tested as independent building systems to meet the building substantial completion requirements followed by successful tests of systems tied into Owner's systems which include but are not limited to, one off-site security/alarm monitoring agency.

G. Test Procedure Development and Test Documentation:

1. Within thirty (30) days after Award of Contract, Contractor shall prepare and submit to Owner's Representative and to Owner for review, detailed descriptions of tests procedures which Contractor proposed to perform to demonstrate conformance of completed systems of instrumentation and controls to these Specifications.
2. Decision of Owner's Representative upon acceptability of test procedures shall be final.
3. Equipment shall not be accepted by Owner, and final payments shall not be made by Owner until standard of performance is met.

H. Operational Tests:

1. Contractor shall prepare checkoff sheet(s) for each system. These checkoff and data sheets shall form basis for these operational tests and this documentation.
2. Each checkoff sheet shall cite following information and shall provide spaces for signoff on individual items and on completed systems by Owner and Owner's Representative.
   a. Project name.
   b. For each element: tag number, description, manufacturer and model number, installation bulletin, and specification sheet number.
   3. Each Instrument Calibration sheet shall provide adequate information and space for signoff on individual items and on completed units by Contractor.

1.08 OPERATION & MAINTENANCE INSTRUCTIONS

A. INSTRUCTION OF OWNER'S PERSONNEL

1. After Substantial Completion and prior to Final Inspection or Full Acceptance of the Project, Contractor shall provide qualified personnel for conducting full operation and maintenance training and instructions in the operation, adjustment and maintenance of all operating equipment and systems to Owner's designated personnel; include all general, mechanical and electrical operating systems and equipment. Provide a minimum of 40 hours of such training and instructions, conducted to Owner's satisfaction.
2. Except as otherwise specified, arrange for each installer of work requiring continuing maintenance or operation, to meet with Owner's personnel, at project site, to provide basic instructions needed for proper operation and maintenance of entire work. Include instructions by manufacturer's representatives where installers are not expert in the required procedures.
3. Use operating and maintenance manuals as the basis for instruction. Review contents of Manual with personnel in full detail to explain all aspect of operations and maintenance; include as a minimum record documentation, tools, spare parts and materials, lubricants, fuels, identification system, control sequences, hazards, cleaning and renewal of finishes, and similar procedures and facilities.
4. For operational equipment, demonstrate start-up, shut-down, emergency operations, noise and vibration adjustments, safety, economy/efficiency adjustments, and similar operations. Review maintenance and operations in relation with applicable warranties, agreements to maintain, bonds and similar continuing commitments.
5. All equipment operation and maintenance instructions and training shall be video taped by the Contractor and the edited film delivered to the Owner.
6. For additional requirements for operations instruction, see respective Specification

Sections.

1.09 PREREQUISITES TO SUBSTANTIAL COMPLETION

A. Complete following before requesting Architect's review for certification of Substantial Completion, either for entire Work or for portions of Work. List known exceptions in request.

1. In progress payment request that coincides with, or is first request following date Substantial Completion is claimed, show either 100% completion for portion of Work claimed as "substantially complete", or list incomplete items, value of incomplete Work, and reason for Work being incomplete.
2. Include supporting documentation for completing Work noted as incomplete as indicated in these Contract Documents.
3. Submit statement showing accounting of changes to Contract Sum.
4. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.
5. Deliver tools, spare parts, extra stock of material and similar physical items to Owner.
6. Complete start-up testing of systems, Performance Periods, and instruction to Owner’s operating and maintenance personnel. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools and facilities mock-ups and similar elements.
7. Complete final cleanup requirements, including touch-up painting of blemished surfaces.
8. Test fire and life safety systems in presence of Owner, Architect and City/County/State officials.
9. Obtain Approvals as required from Authorities Having Jurisdiction.
10. Complete major punchlist items.
11. Contractor shall submit copy of Contractor's Punchlist to Architect, clearly stating that building is ready for review with exception of items noted in Contractor's Punchlist.

B. Review procedure: Upon receipt of Contractor's request for review, Architect will either proceed with review or advise Contractor of unfulfilled prerequisites.

C. Following initial review, Architect will either prepare Certificate of Substantial Completion or will advise Contractor of Work that must be performed before Certificate will be issued.

D. Results of completed review will form initial "punchlist" for final acceptance.

1.10 FINAL INSPECTION

A. When Contractor considers Work complete, he shall submit written certification that:

1. Contract Documents have been reviewed.
2. Contractor has inspected Work for compliance with Contract Documents.
3. Work has been completed in accordance with Contract Documents.
4. The Project, properties, and streets are finally cleaned of debris and dirt caused by Contractor operations.
5. Work is complete and ready for final inspection.

B. Architect will inspect Work to verify completion status as soon as possible after receipt of Contractor's certification.

C. Should Architect consider Work incomplete or defective:

1. Architect will promptly notify Contractor and Owner in writing, listing incomplete or defective work.

2. Contractor shall immediately remedy deficiencies, and send second written certification to Architect that Work is complete.
3. Architect will reinspect Work.

D. When Architect and Owner find Work acceptable under Contract Documents, they will jointly request Contractor to make closeout submittals.

1.11 REINSPECTION FEES

A. Should Architect or Engineer be required to make more than two Substantial inspections or one Final inspection due to Contractor's failure to correct specified deficiencies, the Contractor shall bear all costs (including compensation for the Architect's, Engineer’s, and Construction Program Manager's additional services) made necessary thereby.

1.12 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

A. Contractor shall submit to the Owner the following:

1. Contractor's Affidavit of Payment of Debt and Claims (AIA Documents G706, or similar form approved by the Owner).
2. Contractor's Affidavit of Release of Liens (AIA Documents G706A or similar form approved by the Owner) including the following:
   a. Contractor's Release or Waiver of Liens.
   b. Separate releases or Waivers of Lien for each Subcontractor, supplier, and others with lien rights against Owner's property, together with list of those parties.
3. Consent of Surety to Final Payment. Contractor to provide AIA Document G707 or similar form.

B. Duly sign and execute all submittals, before delivery to Owner.

1.13 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit final statement of accounting to the Owner, including the following:

1. Original Contract Sum.
2. Additions and deductions resulting from:
   a. Previous Change Orders.
   b. Deductions for incomplete Work. (if any)
   c. Deductions for Liquidated Damages. (if any)
   d. Deductions for Reinspection Payments (if any)
3. Total Contract Sum, as adjusted.
4. Previous Payments
5. Sum remaining due.

B. The Owner will prepare and issue final Change Order, reflecting approved adjustments to Contract Sum not previously made by Change Orders.

1.14 SUBMITTAL OF STATEMENT OF COMPLIANCE

A. Contractor shall complete and submit the Statement of Compliance form bound herein, prior to Final Payment.

1.14 SUBMITTAL OF CERTIFICATION OF NO ASBESTOS

A. Contract shall complete and submit the Certification of No Asbestos form bound herein, prior to Final Payment.

1.15 FINAL APPLICATION FOR PAYMENT

A. Follow procedures specified in General and Supplementary General Conditions.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

STATEMENT OF COMPLIANCE

No payment shall not be made until the Contractor shall file with the Owner, prior to acceptance of the Work, a notarized Certification of Compliance in the following form:

* * * * * * * * * *

The Contractor does hereby certify that all work has been performed and materials supplied in accordance with the drawings, specifications and Contract Documents for the above Work, and that:

No less than the prevailing rates of wages as ascertained by the governing body of the Contracting agency has been paid to laborers, workmen and mechanics employed on this Work;

There have been no unauthorized substitutes of Subcontractors; nor have any subcontractors been entered into without the names of the Subcontractors having been submitted to the Owner prior to the start of such subcontracted work;

No subcontract was assigned or transferred or performed by any Subcontractor other than the original Subcontractor, without prior notice having been submitted to the Owner together with the names of all Subcontractors;

All claims for material and labor and other service performed in connection with these specifications have been paid;

All monies due the State Industrial Accident Fund, the State Unemployment Compensation Trust Fund, the State Tax Commission, Hospital Associates and/or others have been paid.

In WITNESS WHEREOF, the undersigned has signed and sealed this instrument this _____ day of

_____,2023.

Firm Name _____

Signature _____

Title _____

(Attest) _____
(SEAL IF BIDDER IS A CORPORATION)

As determined necessary, evidence of compliance may be required to be submitted with and made a part of this Certificate of Compliance.

CERTIFICATION OF NO ASBESTOS

Final payment shall not be made until the Contractor shall file with the Owner, prior to acceptance of the Work, a notarized Certification of Compliance in the following form:

* * * * * * * * * *

"TO THE BEST OF MY KNOWLEDGE NO ASBESTOS CONTAINING MATERIAL WAS USED IN THE CONSTRUCTION OF THIS PROJECT. MATERIAL SAFETY DATA SHEETS WILL BE PROVIDED AS REQUESTED BY THE OWNER FOR ALL MATERIALS WHICH MAY BE QUESTIONED IN THE FUTURE."

In WITNESS WHEREOF, the undersigned has signed and sealed this instrument this
_____day of_____, 2023.

Firm Name_____

Signature_____

Title_____

(Attest)_____

(SEAL IF BIDDER IS A CORPORATION)

As determined necessary, evidence of compliance may be required to be submitted with and made a part of this Certificate.

END OF SECTION

SECTION 01 7823 OPERATION & MAINTENANCE DATA

PART 1 GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. Forms of Submittal
2. Operation Instruction and Maintenance Manual

1.02 RELATED SECTIONS

A. Section 01 7800: Contract Closeout

1.03 GENERAL REQUIREMENTS

A. DESCRIPTION

1. Coordinate related requirements specified in other parts of the Project Manual.
2. Compile product data and related information appropriate for Owner's maintenance and operation.
3. Prepare operating and maintenance data specified in this Section and referenced in other Sections.
4. Prior to Owner's acceptance, instruct Owner's personnel in maintenance, equipment, and systems operation.
5. For additional data requirements see respective Specifications Sections.
6. Operation and maintenance manuals as specified herein, for all equipment for the total Project, shall be submitted per the submittal schedule at the end of this section.

B. FORMS OF SUBMITTALS

1. Prepare data in instructional form for use by Owner's personnel.
2. Format:
   a. Size: 8-1/2" x 11".
   b. Paper: 20 pound minimum, white for typed pages.
   c. Text: Manufacturer's printed data, or neatly type written.
   d: Drawings:
      1) Provide reinforced punched binder tab, bound in with text.
      2) Fold larger drawings to text page size.
   e. Provide fly-leaf for each separate product, or each piece of operating equipment.
      1) Provide typed description of product, and major component parts of equipment.
      2) Provide indexed tabs.
   f. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
      1) Title of Project.
      2) Identity of general subject matter covered in the Manual.
3. Binders:
   a. Commercial quality stiff cover, metal-hinged three-ring binders with durable and cleanable plastic covers; binders shall be Wilson Jones #344 Series or equivalent, as approved by the Owner.
   b. Minimum ring size: 1".
   c. When multiple binders are used, correlate data into related consistent groupings.

1.04 OPERATING INSTRUCTIONS & MAINTENANCE MANUALS

A. CONTENTS OF OPERATING INSTRUCTION & MAINTENANCE MANUALS FOR OPERATIONAL EQUIPMENT

1. General: For all operational equipment installed, including general, mechanical and electrical operational equipment, Contractor shall submit operation and maintenance manuals as specified herein. Manuals shall have a neatly typewritten table of contents for each volume, arranged in a systematic order.
   a. Contractor, name of responsible principal, address and telephone number.
   b. A list of each product required to be included, indexed to content of volume.
   c. List, with each project, the name, address and telephone number of:
      1) Subcontractor or Installer.
      2) Maintenance Contractor, as appropriate.
      3) Identify the area of responsibility for each.
      4) Local source of supply for parts and replacement.
   d. Identify each product by name and other identifying symbols as set forth in Contract Documents.
2. Product Data:
   a. Product data shall contain detailed information, where applicable, relative to the following:
      1) Equipment functions, operating characteristics, and limiting conditions.
      2) Assembly, installation, alignment, adjustment and checking instructions.
      3) Operating instructions for start-up, routine and normal operation, regulation and control, shutdown, and emergency conditions.
      4) Detailed lubrication and routine and preventative maintenance instruction, including a schedule of recommended checks.
      5) List of all parts and components of equipment stating catalog number and size of part used in or on equipment.
      6) Safety precautions and safety features.
      7) Outline, cross-section and assembly drawings, engineering data, and wiring diagrams.
      8) Test data and performance curves.
   b. Include only sheet pertinent to specific product.
   c. Annotate each sheet to:
      1) Clearly identify specific product or part installed.
      2) Clearly identify data applicable to installation.
   d. Delete references to inapplicable information.
3. Drawings:
   a. Supplement product data with drawings as necessary to clearly illustrate relations of component parts of equipment and system.
   b. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
4. Supplement product/installation data with written text:
   a. Organize in consistent format under separate headings for different procedures.
   b. Provide logical sequence of installations for each procedure.
5. Warranties, Bonds and Service Contracts: Copy of each warranty, bond and service contract issued, signed over to the Owner and exercisable by Owner. Provide information sheet for Owner's personnel indicating:
   a. Proper procedures in event of failure.
   b. Instances which might affect validity of warranties and bonds.
   c. Assemble Warranties and Bond in a separate notebook.
6. Submit 2 copies of complete manual in final form along with electronic format.

B. CONTENTS OF MAINTENANCE MANUALS FOR NON-OPERATIONAL ITEMS

1. Submit 2 copies of complete manual in final form along with electronic format.
2. For all architectural non-operational products, applied materials and finish items installed. Contractor shall submit maintenance manuals as specified herein. Each manual shall contain detailed information, where applicable, relative to the following:
   a. Manufacturer's data, given full information on products.
      1) Catalog number, size, composition.
      2) Color and texture designations.
      3) Information required for re-ordering special manufactured products.
      4) Parts Lists.
   b. Instructions for care and maintenance:
      1) Manufacturer's recommendation for types of cleaning agents and methods.
      2) Cautions against cleaning agents and methods which are detrimental to the product.
      3) Recommended schedule for cleaning and maintenance.
      4) Instructions and recommendations for repair of finish.
3. For additional requirements for maintenance data, see respective Specification Sections.

1.05 SUBMITTALS

A. SUBMITTAL SCHEDULE

1. Submit to the Architect one (1) copy of preliminary drafts of proposed formats and outlines of contents 60 days prior to date of Substantial Completion for each phase of work. Architect will review and return with comments.
2. Submit to the Architect one (1) copy of completed data in final form thirty (30) days prior to date of Substantial Completion, for each phase of work. After review, copy will be returned with accompanying comments.
3. Make corrections based on copy returned and submit specified number of copies of approved data in final form fourteen (14) days prior to Substantial Completion for each phase of work. The Architect will be the sole judge of the completeness of the manual.
4. After receipt of the Architect's approval, the Contractor shall prepare and transmit to the Owner two (2) final copies of each of the above manuals, along with electronic format, not later than ten (10) days following the receipt of the Architect's approval.

END OF SECTION

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SECTION 01 7839 RECORD DOCUMENTS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Section 01 3300: Shop Drawings, Product Data, and Samples.

1.02 MAINTENANCE OF DOCUMENTS

A. Maintain at job site, one copy of:
1. Contract Drawings
2. Specifications
3. Addenda
4. Change Orders
5. Requests for Interpretation (RFI's)
6. Requests for Proposal (RFP's)
7. Other Modifications to Contract
8. Field Test Records
9. Truck tickets for all imported material
10. Current Construction Schedule

B. Store Documents in approved location, apart from documents used for construction.

C. Maintain documents in clean, dry, legible condition.

D. Do not use record documents for construction purposes.

E. Make documents available at all times for inspection by Owner and Architect.

F. Record documents must be updated with all required information prior to approval of application for payment.

1.03 RECORDING

A. The Contractor and/or Subcontractors under his direction shall record on set of clean, new prints each and every change that is made from general drawings at time it is made. This includes any changes that are made in partitions, doors, or otherwise in arrangement of construction of buildings as well as a complete record of exact manner in which electrical and mechanical work, piping, etc., are installed. Dimensions shall be included where necessary to accurately locate piping and other items that will be concealed underground or in finished building that may later be necessary to service.

B. Contract Drawings: Legibly mark to record actual construction:
1. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
2. Field changes of dimensions and detail.
3. Changes made by Change Order, RFI, and Shop Drawing variations.
4. Details not on original Contract Drawings.

C. Shop Drawings: Not Required.

D. Specifications and Addenda: Legibly mark up each section to record:

1. Changes made by Change Order.
2. Other matters not originally specified.

E. Label each document "PROJECT RECORD" in ½ " high printed letters.

F. Keep record documents current.

G. Do not permanently conceal any work until required information has been recorded.

1.04 SUBMITTAL

A. Upon completion of the Project, and prior to final payment, the Contractor shall submit Project Record Documents to Architect for approval.

B If not approved by Architect, records of changes shall be revised and resubmitted by the Contractor.

C. Accompany submittal with transmittal letter to Architect containing:

1. Date
2. Project title and number
3. Contractor's name and address
4. Title and number of each record document
5. Certification that each document as submitted is complete and accurate.
6. Signature of Contractor, or his authorized representative.

D. Do not use Record Documents for construction purposes. Protect from deterioration and loss.

1. Owner will monitor Record Documents and compare to Contractor's payment application on monthly basis.
2. Up-to-date Record Documents are prerequisite to Final Acceptance and approval of Final Payment Request.

E. Record Drawings:

1. Maintain record set of prints of Contract Drawings and Shop Drawings in clean, undamaged condition. Accurately indicate depth of all concealed mechanical items, buried piping, locations of cleanouts, etc., from walls and centerlines utilizing standard industry practice. Provide to acceptance of the completed project one complete set of construction documents revised to show "As-Installed" conditions, including addenda and change order items.
2. Mark-up set of Record Drawings to show actual installation where installed work varies substantially from work as originally shown.
3. Mark whichever Drawing (Contract Drawings or Shop Drawings), most appropriate and most capable of showing actual "field" condition fully and accurately. Consolidate information on complete systems or units of work on minimum number of Drawing Sheets required to properly document changes.
4. Give particular attention to concealed work that would be difficult to measure and record at later date.
5. Mark record set with red erasable pencil and where feasible, use other color to distinguish between variations in separate categories of Work.
6. Show all backing material and other embedded or concealed items required for installation of future work by Owner.
7. Organize Record Drawing sheets into manageable sets, separated by construction discipline, and bind with durable cover sheet. Print suitable titles, dates and other identification on cover of each set.

D. Record Specifications:

1. Maintain one complete copy of Project Manual, including Specifications and Addenda and one copy of other written Construction Documents such as change orders, supplemental instructions and similar modifications issued in printed form during construction.
2. Mark these documents to show substantial variations in actual Work performed in comparison with text of Specifications and modifications issued.
3. Note related Record Drawing information and Product Data, where applicable.
4. Upon completion of Work, submit Record Specifications to Owner’s Representative for Owner's records.

E. Record Product Data:

1. Maintain one copy of each Product Data submittal approved for Project.
2. Mark documents to show significant variations in actual work performed in comparison with submitted information.
3. Include both variations in products as delivered to Site and variations from manufacturer's instructions and recommendations for installation.
4. Give particular attention to concealed products and portions of Work which cannot otherwise be readily discerned at later date by direct observation.
5. Note related change orders and markup of product data accordingly.
6. Upon completion of mark-up, and no later than Final Acceptance of the Project, provide written verification that all Record Product Data has been transmitted to Owner’s Representative for Owner's records.

F. Record Sample Submittal:

1. Immediately prior to date or dates of Substantial Completion, Contractor shall meet at Site with Owner to determine which, if any, of submitted Samples that have been maintained by Contractor during progress of Work, shall be submitted to Owner for record purposes.
2. Comply with delivery to Owner's designated location.

G. Miscellaneous Record Submittals:

1. Refer to other Sections of these Specifications for requirements of miscellaneous record-keeping and submittals in connection with actual performance of work.
2. Immediately prior to date or dates of Substantial Completion complete miscellaneous records and place in good order, properly identified and bound and filed, ready for continued use and reference.
3. Submit for Owner's records.

PART 2 PRODUCTS:

Not Used

PART 3 EXECUTION:

Not Used

END OF SECTION

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SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: For facilitator and instructor.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Date of video recording.

2. Transcript: Prepared and bound in format matching Operation and Maintenance (O&M) Manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.

a. Electronic Copy: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project

and date of video recording on each page.

3. Training Manual: At completion of training, submit complete Training Manual(s) for Owner's use prepared in same paper and electronic file formats required for Operation and Maintenance (O&M) Manuals specified in Section 01 78 23 "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.

D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.

2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.

3. Review required content of instruction.

4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.7 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

1. Various individual Specification Sections include requirements for demonstration and training. Refer to applicable Sections and requirements for development of instruction program.

2. Provide training from the installing contractor for Mechanical, Electrical, Plumbing, Low voltage systems and HVAC Controls.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or

component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.
2. Documentation: Review the following items in detail:
    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.
    i. Operating procedures for emergencies.
    j. Operating procedures for system, subsystem, or equipment failure.

k. Seasonal and weekend operating instructions.

l. Required sequences for electric or electronic systems.

m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.

b. Checking adjustments.

c. Noise and vibration adjustments.

d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.

b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.

b. Types of cleaning agents to be used and methods of cleaning.

c. List of cleaning agents and methods of cleaning detrimental to product.

d. Procedures for routine cleaning.

e. Procedures for preventive maintenance.

f. Procedures for routine maintenance.

g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.

b. Repair instructions.

c. Disassembly; component removal, repair, and replacement; and reassembly instructions.

d. Instructions for identifying parts and components.

e. Review of spare parts needed for operation and maintenance.

9. Proficiency: Include the following as recommended by systems' manufacturers, where applicable:

a. Evaluation of level of proficiency of participants after instruction.

b. Percentage of participants passing evaluation test.

1.8 PREPARATION

A. Training Manual: Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a Training Manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to

coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.

2. Owner will furnish an instructor to describe Owner's operational philosophy.

3. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Construction Manager, with at least five working days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

1. If Project circumstances make training for certain components unfeasible or undesirable, make arrangements for training at a remote location or via remote video conference.

2. Coordinate with requirements for scheduling of operation and maintenance data and demonstration and training.

E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral, written or demonstration performance-based test, as appropriate.

F. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode with vibration reduction technology.

1. Submit video recordings by uploading to web-based Project software site. Provide a copy on CD-ROM or DVD-ROM.

2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.

3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.

4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

a. Name of Contractor/Installer.

b. Business address.

c. Business phone number.

d. Point of contact.

e. Email address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

a. Produce segments to present a single significant piece of equipment per segment.

b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.

c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

E. Narration: Describe scenes on video recording by either audio narration by microphone while recording video or dubbing audio narration off-site after video recording is recorded, as appropriate. Include description of items being viewed.

F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 9000 UTILITY LOCATION REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION

A. It is the responsibility of the Contractor to locate and mark all public and private utilities on the school district property or public property, prior to commencement of work.

B. Upon notification from any of the public agencies, utilities, or District that the Contractor has caused damage to any facility, equipment or installation of the agency or Owner, and the Contractor failed to request a utility locate service from said utility at least two (2) normal business days prior to the damage, or if the locate service was properly requested and the damage was not caused by an error in the locate service, the Owner will withhold from forthcoming or accrued Contract payment, including advances, a sum sufficient to protect the agency of utility from loss.

C. Upon receipt of a release of claim by the notifying utility or upon judgment of a court having jurisdiction in the matter and having established that the contractor is liable for a lesser amount or is not liable for a lesser amount or is not liable for the damage, the Owner will release the excess funds to the Contractor. Funds withheld pursuant to this provision shall not bear interest. Upon receipt of satisfactory evidence against the Contractor in a court of competent jurisdiction within sixty (60) days after discovery of the damage, the Owner shall release the funds withheld pursuant to this provision.

1.02 PROTECTION OF UTILITIES

A. Any pipes or other utilities encountered in the excavation shall be shored up and cared for by the Contractor as to leave them in a proper working condition until such times as the Owner shall determine what shall be done with them.

B. Any utilities mislocated or inadequately located by the appropriate utility company which is damaged by the contractor shall not constitute reimbursement or time extension to the Contractor from the Owner for repair(s) of work that the Contractor performs.

C. No underground utility or structures shall be backfilled until they are inspected and approved by the Owner. The Contractor shall give the Owner twenty-four (24) hours notice of his intention to backfill or cover his work. Any work covered up without approval or proper required inspection shall, upon request of the Owner, be uncovered for inspection at the expense of the Contractor. If the law or ordinance of any public authority requires any work to be tested, approved, or inspected, the Contractor shall arrange an appointment and a fixed date for such inspection.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01 91 13

GENERAL COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section describes work associated with commissioning of selected systems including commissioning meetings, construction checks, equipment start-up, functional testing, operations and maintenance manuals, and operator training.

B. Work Provided Under Separate Contract: Owner's Commissioning Administrator (CA) will supervise commissioning activities and provide the following commissioning services:
1. Develop commissioning plan.
2. Assist Contractor to incorporate commissioning activities into Project Construction Schedule.
3. Conduct commissioning meetings.
4. Review project submittals.
5. Develop Construction Checklists and Functional Test Plans.
6. Observe Construction checks and start-up of selected equipment.
7. Review testing, adjusting, and balancing (TAB) reports.
8. Supervise and document functional testing.
9. Review O&M manuals and as-built documents.
10. Coordinate operator training.
11. Prepare final commissioning report.

C. Contractor shall provide the following services:
1. Assign individuals representing Contractor and mechanical, electrical, controls, and low voltage subcontractors as members of Commissioning Team.
2. Incorporate commissioning activities in Contractor's construction schedule.
3. Assist CA in development of Construction Checklists.
4. Execute Construction Checklists.
5. Perform Equipment Start-up.
6. Perform contractor directed verification of automatic controls.
7. Assist CA in development of Functional Test Plans.
8. Assist CA with Functional Testing.
9. Provide Operations & Maintenance documentation.
10. Provide draft and final TAB reports to CA
11. Perform operator training and supervise training performed by manufacturer's representative.
12. Provide submittals, product data, shop drawings, controls sequences, points list, wiring diagrams, schematics, and design documents and to assist in commissioning documentation development.

D. Contractor shall provide related services as directed, including, but not limited to:
1. Access to the Work
2. Incidental labor, facilities, and equipment to assist CA in conducting commissioning activities.
3. Completion of required submittals.

4. Coordination of Work with activities of CA.

1.02 RELATED SECTIONS

A. 22 08 00 – COMMISSIONING OF PLUMBING

B. 23 08 00 – COMMISSIONING OF HVAC

C. 23 05 93 - TESTING, ADJUSTING, AND BALANCING

D. 26 08 00 – COMMISSIONING OF ELECTRICAL

1.03 DEFINITIONS

A. CA: Commissioning Administrator (CA) is the Individual responsible for supervising commissioning work.

B. Construction Phase Commissioning Plan: Document prepared by the CA that guides commissioning work through construction, verification, and warranty periods. The plan will include a listing of commissioning team members, systems to be commissioned, narrative description of the commissioning tasks and responsibilities, and a draft copy of the commissioning forms to be executed by the Contractor.

C. Construction Phase: Phase of the project during which the facility is constructed and equipment is installed and started. During the Construction Phase, the Contractor completes construction checklists, performs equipment start-up, performs TAB work, submits O&M manuals, and performs control system verification. The Construction Phase generally ends at Substantial Completion.

D. Verification Phase: Phase of the project during which functional testing and operator training is performed. The Verification Phase generally begins at Substantial Completion and ends at Final Completion.

E. Online Commissioning System: The CA will maintain an online commissioning system, which serves as a central location for accessing commissioning documents such as the Owner's Project Requirements, Commissioning Plan, status reports, design reviews, submittal reviews, schedules, and Issues Log. The online system provides current project information to authorized project team members through general internet access. The site URL is TO BE DETERMINED. The Issues Log portion of the site allows for the Owner's Construction Manager, Architect, and General Contractor to provide comments, document actions, and indicate resolutions.

1.04 SUBMITTALS

A. Designated Commissioning Team Representatives: Submit list of names and contact information for individuals representing Contractor and Subcontractor as members of Commissioning Team.

B. Construction Schedule: Submit updated project construction schedule to CA monthly. Incorporate time and duration of Commissioning activities, as provided by CA, into the construction schedule

C. Construction Submittals and Shop Drawings: Provide as required to perform commissioning work.
   1. Contractor to provide CA a copy of submittal log. CA will review log and identify submittals that are associated with equipment and systems being commissioned and required to be submitted to the CA.
   2. Contractor to provide an electronic copy of each submittal or shop drawing to the Owner's Representative, including all resubmissions required by the CA at the same time submittals are provided to the Design Team. CA will review submittals concurrently with the Design Team and provide review comments to the Design Team. The Design Team will consolidate review comments into a single submittal review response to be provided to the Contractor.
   3. Contractor to provide a copy of Design Team submittal review comments to the CA.

D. Engineering Data: Provide shop drawings, product data, performance data, engineering data, installation and start-up data, operation and maintenance information, schematics, wiring diagrams, programming manuals, and similar information as necessary for completion of the Work of the Section in accordance with Commissioning Schedule.

E. Construction Checklists: Complete and submit to CA for certification. Attach copies of all manufacturers' field or factory performance and start-up test documentation provided for associated equipment or systems.

F. Control Verification Reports: The Contractor shall provide complete Control Verification Reports to the CA.

   1. Complete reports developed by CA and submit to CA for certification.
   2. Contractor to provide the CA with sample point-to-point verification forms that the Contractor will use during initial start-up and verification of systems. The CA will review the forms and provide comments as necessary to the Contractor.

G. Operator Training Schedule: Contractor shall submit training schedule listing all required training sessions as specified and in accordance with Training Plans. Training schedule shall include date and time of training, location, and name and qualification of trainer, and facilities needed for training. Training Schedule to be submitted to Owner's Authorized Representative four weeks prior to substantial completion.

H. Testing, Adjusting and Balancing: Contractor to provide draft and final TAB reports to CA for review.

I. Operations and Maintenance Manuals: Furnish a copy of draft and final Operations and Maintenance Manuals for review by CA. CA will provide review comments to Commissioning Team upon completion of CA review.

1.05 QUALITY ASSURANCE

A. Provide qualified mechanics and technicians to provide required commissioning services. Technicians shall have knowledge of the Work and experience with installation and operation of the general systems and components involved to assist in commissioning activities. Individuals shall be adequately equipped to effectively assist the CA as necessary. Upon request submit names and qualifications of technicians to CA for approval.

B. Provide qualified instructors to perform operator training. Instructor shall be knowledgeable in the specific equipment and systems involved. Upon request submit names and qualifications of technicians to CA for approval.

1.06 DUTIES OF TESTING ADJUSTING AND BALANCING CONTRACTOR IN COMMISSIONING

A. Balancing Contractor shall attend a pre-balancing coordination meeting with the Owner, Engineer, CA, and General Contractor. Meeting shall be attended by Project Supervisor. Pre-balancing meeting shall be conducted four weeks prior to start of balancing.
Meeting agenda shall include:
1. Balancing schedule.
2. General balancing procedures.
3. Special balancing procedures.
4. Coordination with General Contractor.
5. Coordination with Control Contractor.
6. Review of BAS control parameters to be determined by Balancing Contractor.

B. Document and log inconsistencies or deficiencies in system operations and system compliance. Provide report to CA, Contractor, Architect, and Owner's Authorized Representative.

C. Provide weekly status reports after balancing has started to the CA, Contractor and Owner's Authorized Representative. Reports shall include a summary of work completed, abnormal or deficient conditions encountered, and updated schedule of work.

1.07 SEQUENCING

A. Schedule adequate time as determined by CA for execution of Commissioning Plan.

B. CA will conduct a Commissioning Process Meeting approximately 30 days after Contractor received Notice-to-Proceed and after all subcontractors are identified.

C. CA will prepare a Construction Phase Commissioning Plan approximately 30 days after Commissioning Process Meeting.

D. Provide construction submittals and shop drawings to CA as described above in SUBMITTALS.

E. Provide engineering data as required by CA to prepare Construction Checklists within four weeks after date of approved submittal.

F. CA will conduct an initial commissioning coordination meeting approximately 30 days before equipment begins to arrive at the project site to coordinate commissioning activities and execution of construction checklists. Additional commissioning coordination meetings

will be scheduled as necessary throughout the process to discuss commissioning schedule and coordination among trades.

G. Perform Construction Checks as equipment is received, installed, and placed in operation. Construction checks shall be performed as work is completed. For example, equipment inspection shall be performed upon receipt of equipment on site, installation inspection shall be performed when equipment is set in place and anchored, and so on.

H. Submit schedule for operator training to Owner's Authorized Representative and CA four weeks prior to Substantial Completion. Schedule shall include time and duration of each required training session.

I. Submit control verification reports three weeks after Substantial Completion.

J. Functional testing will be scheduled after construction checklists; testing, adjusting, and balancing report; and control verification reports have been submitted and accepted. Contractor shall provide written notice that systems are completely operational and ready for functional testing. Functional testing may proceed prior to acceptance if the CA and Owner's Authorized Representative determines that deficiencies will not significantly affect system performance and timing is critical. The CA will provide notification to Contractor, Architect, and Owner's Authorized Representative a minimum of one week prior to performing functional testing.

K. Submit draft operations and maintenance manuals to Owner's Authorized Representative 30 days prior to substantial completion.

L. Operator training shall be performed within a 30-day period following Substantial Completion.

M. Troubleshooting, corrections, and retesting shall be completed within 3 months of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide specialized test equipment including manufacturer's proprietary test equipment, as necessary for commissioning of mechanical, plumbing and electrical systems and components. Comply with requirements of individual technical Sections of Division 22, 23, 26. Common test equipment such as temperature, pressure, speed, and electrical power measuring devices shall be provided by CA.

PART 3 - EXECUTION

3.01 APPLICATION

A. Commissioning Meetings: Commissioning Team shall attend meetings as required by CA including Commissioning Process Meeting, submittal review meetings, and coordination

meetings prior to construction checks; adjusting and balancing; and functional testing. Commissioning team shall attend troubleshooting meetings as required to resolve issues identified in submittal reviews and commissioning reports.

B. Construction Checklists:
1. Provide equipment installation, start-up, and operating information requested by the CA as required to develop Construction checklists.
2. Perform construction checks for all equipment being commissioned as described in Construction Checklists prior to equipment start-up. The Contractor shall designate responsibility for completing construction checks among subcontractors. The designated subcontractor shall initial and date each item on checkout sheets as completed and submit executed forms to CA for certification. All items listed in the Construction Checklists shall be complete prior to certification unless the incomplete item does not affect safe and reliable equipment operation. If such an item is identified, a description of the incomplete work must be attached to the Construction Checklists. Equipment requiring construction checkout shall not be started until the Construction Checklists are fully executed by the Contractor.
3. Contractor shall maintain "Cx Submittal Status Report". CA will furnish Excel status report spreadsheet that will be used to monitor completion of construction checklists.
4. Contractor shall startup equipment as described in construction checklists. Where required, provide manufacturer's agent to perform start-up as specified in Divisions 22, 23, and 26.
5. Fully executed Construction Checklists shall be submitted to the CA for certification.
6. CA will document unresolved issues in a project Issues Log. The Issues Log documents status, responsibility, and required action for each unresolved issue.
7. CA shall perform a recheck of selected equipment. If minor discrepancies are identified, Contractor shall recheck all similar systems and resubmit Construction Check forms for certification. If major discrepancies are identified, CA shall perform Construction Checks, and Contractor shall compensate Owner for additional commissioning costs by Contract modification.

C. Control Verification Reports:
1. Perform control system verification and prepare verification reports as specified in Divisions 23. Verification shall be performed by manufacturer's authorized installation contractor. Verification report shall include a description of the incomplete work.
2. Submit completed Control Verification Reports to the CA for acceptance.
3. CA will document unresolved issues in a project Issues Log. The Issues Log documents status, responsibility, and required action for each unresolved issue.

D. Functional Tests:
1. Assist CA in performing Functional Tests, which shall generally include operating equipment and systems as necessary for testing. The CA will record test measurements and documentation of results.
2. CA will document all unresolved issues in a project Issues Log. The Issues Log documents status, responsibility, and required action for each unresolved issue.
3. CA shall retest selected systems once to verify that corrective work is complete. Retests will be performed after notification from the Contractor that work is complete. If corrective work is not complete and additional retesting is required, Contractor shall compensate Owner for costs of additional CA testing sessions by Contract modification.

E. Operations & Maintenance Manuals: Contractor shall provide complete operation and maintenance information for all equipment and systems being commissioned. Information shall be suitably bound, organized, and comprehensive. CA will review and provide written review comments to the Owner's Authorized Representative.

F. Operator Training: Instruct Owner's operating personnel in operation and maintenance of mechanical and electrical equipment and all systems being commissioned.
1. Instruct Owner in proper operation and maintenance of equipment and systems. Instruction shall generally include topics listed in manufacturer's operations and maintenance manual. Operator instructions shall cover all aspects of manual, automatic, and safety controls. Contractor shall also instruct the Owner in the general configuration of systems and location of equipment and components. Equipment shall be fully operational prior to instruction.
2. Contractor shall furnish training by equipment manufacturers where specifically required. Manufacturer's field start-up and adjustment will not fulfill manufacturer's training requirement.
3. Contractor shall coordinate operator training with the Owner's Authorized Representative and CA as follows:
   a. Training Plan: The CA shall develop an Operator Training Plan, which provides details regarding the type and amount of training required. The plan will include a Training Record and an Evaluation section to be executed at the completion of each training session.
   b. Training Schedule: Contractor shall develop a training schedule for approval by the Owner's Authorized Representative.
   c. Training Record and Evaluation Section: The Training Record and Evaluation section included on the Training Plan provide documentation of the attendees, duration, and quality of each training session. The Contractor shall complete Training Record after each training session. The Owner's Authorized Representative will complete the evaluation section of the Training Plan and the completed plan shall be returned to the CA. Training will not be accepted until the Training Plan is returned to the CA with the Record and Evaluation sections fully executed.

G. Issues Resolution: Unresolved issues will be listed in the project online Issues Log. Refer to Online Commissioning System in Article 1.03, Definitions above. Each issue will be identified with an identification number. The Issues Log will include a description of the unresolved condition, identify the responsible individual(s), and describe suggested corrective action. The Contractor will periodically access the On-line Commissioning System to monitor the status of commissioning issues, and shall diligently complete all tasks that are identified as the responsibility of the Contractor. The Contractor shall modify on-line issue status when each item is completed and provide a description of corrective action performed. Contractor and related subcontractors shall attend commissioning meetings to review the Issues Log and coordinate resolution of issues as required by the CA.

3.02 QUALITY CONTROL

A. Provide mechanics that are experienced with the Work and installed components of each system to assist in completion of the commissioning activities.
1. Work necessary to provide systems complying with performance requirements of the contracts is the Contractor's responsibility.

B. Manufacturer's Field Services: Provide manufacturer's representatives with expertise in components and systems. Where required, manufacturer's representative shall perform start-up, testing, and maintenance training of Owner's facilities staff including classroom and onsite instruction.

3.03 ACCESS TO WORK

A. Contractor shall provide facilities and access for CA to perform work including but not limited to:
1. Keys, security passes, passwords, codes, etc.
2. Ladders
3. Lifts where work is more than 12 feet above floor level
4. Removal of ceiling tiles, partitions, panels, or other fixed construction necessary for completion of work
5. Proprietary programming and metering equipment

END OF SECTION

SECTION 02 3200 GEOTECHNICAL INVESTIGATION

PART 1 GENERAL

1.01 DESCRIPTION

A. The geotechnical engineering report is provided for information to bidders by the Owner.

1. The information is titled “Geotechnical Investigation & Site Specific Seismic Hazards Study, Warm Springs k-8 Academy, 50 Chukar Road, Warm Springs, Oregon" prepared by Carlson Geotechnical., dated August 31, 2022.
2. The “Geotechnical Investigation” is available for review upon request. Neither the Owner nor Project Manager is responsible for any conclusions that the bidder may draw from the report.

B. Reports were prepared during the schematic design phase of the project. Review contract drawings for exact building and site plan configurations.

C. Owner is not responsible for variations at locations other than those given or for changes after test pits were excavated.

D. Related work specified in other sections:

1. Quality Control, Section 01 4000.
2. Site Work, specified in Divisions 31, 32, and 33.
3. Concrete foundations, Section 03 3000.
4. Trenching for Mechanical and Electrical work in Divisions 22 and 26.

1.02 RELATED SECTIONS:

A. Section 01 4000: Quality Control.

B. Trenching for Mechanical and Electrical work in Divisions 22 and 26.

C. Concrete foundations, Section 03 3000.

D. Site Work, specified in Divisions 31, 32, and 33.

1.03 BIDDER’S RESPONSIBILITY

A. Bidder agrees to the following provisions:

1. Bidder has examined the complete reports.
2. Bidder assumes responsibility for any conclusions bidder may draw from the geo-technical report.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not used

END OF SECTION

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SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure, and affected or adjacent site elements, where new construction is to connect to the remainder.
2. Demolition and removal of selected portions of above- and below-grade utilities and site improvements not affected by or related to demolition of a building or structure.
3. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 01 11 00 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 01 50 00 “Temporary Facilities” for temporary protection, controls and utilities.
3. Section 01 57 22 “Construction Indoor Air Quality”.
4. Section 01 74 19 “Construction Waste Management and Disposal”.
5. Section 02 41 13 “Selective Site Demolition”.
6. Division 31 for site clearing and backfilling requirements.

1.3 DEFINITIONS

A. Demolish: Detach items from existing construction or site and dispose of them off-site unless indicated to be salvaged or reinstalled. Protect adjacent structures and materials to remain.

B. Salvage for Owner: Detach items from existing construction or site, in a manner to prevent damage, and store and then deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction or site, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Salvage for Project Reuse: Detach items from existing construction or site, in a manner to prevent damage, mill or modify for reuse or new construction as indicated.

E. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled. Protect in place.

F. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 EXISTING CONDITIONS

A. Representations of existing conditions are based on best available information and observations and are meant as information to define scope. Unless noted otherwise by detail or dimension the composition and exact location of existing elements are assumed or approximate and subject to verification by the Contractor.

B. Contractor to review and familiarize himself with any and all existing conditions prior to initiating work

C. Contractor to notify Architect of any significant deviations of or conflicts within the information provided.

1.5 UTILITIES

A. Locations of all utilities shown are approximate.

B. Contractor is responsible for any required investigation and testing to accurately determine the location and depth of any underground installations, including but not limited to those required by local governmental or other Agencies of Jurisdiction

C. Exercise extreme caution in in excavation and trenching to avoid intercepting existing piping or conduits.

D. Immediately notify Architect and Owner of any discovered unidentified conditions.

1.6 HAZARDOUS MATERIALS

A. Immediately notify the Architect and Owner of any discovery of any previously unidentified regulated hazardous materials.

1.7 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.8 PREDEMOLITION CONFERENCE

A. Predemolition Conference: Conduct conference at Project site. Coordinate with preinstallation conference specified in Division 31 “Earthwork” Sections for site clearing.

1. Inspect and discuss condition of construction to be selectively demolished.

2. Review structural load limitations of existing structure.

3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.

4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

5. Review areas where existing construction is to remain and requires protection.

1.9 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Engineering Survey: Submit engineering survey of condition of building.

C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

D. Predemolition engineering survey of required areas of remediation.

E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

F. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.10 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.11 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with the following:

1. EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of Authorities Having Jurisdiction.

2. ANSI A10.6 “Safety & Health Program Requirements for Demolition Operations.”

3. NFPA 241: “Safeguarding Construction, Alteration, and Demolition Operations.”

4. Applicable local codes for demolition work, safety of structure, and dust control.

B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

C. Record Drawings: Comply with Section 01 7000 “Execution and Closeout Requirements”. Identify and accurately show locations of capped utilities and other subsurface structural, electrical and mechanical conditions.

1.12 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's pool and ventilation operations will not be disrupted.

1. Ensure Owner's on-site operations are uninterrupted. Confirming temp power needs for pool area to remain.

2. Within overall construction schedule, indicate the following:

a. Dates and duration that utility services will be interrupted.

b. Coordination for shutoff, capping, and continuation of utility services.

c. Use of elevator and stairs.

d. Coordination of Owner's continuing occupancy or keep running of portions of existing site and of Owner's partial occupancy of completed Work.

3. Do not perform coring and sawing of concrete and masonry from 8:00 AM to 5:00 PM on weekdays in occupied buildings without permission from Owner.

B. Before selective demolition, Owner will remove the following items:

1. Loose furnishings in demolition areas.

C. Notify Owner of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: Removed by Owner prior to start of Work.

1. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents. Notify Owner immediately upon discovery of hazardous materials.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.13 INADVERTENT DISCOVERY PLAN (IDP)

A. The Confederated Tribes of Warm Springs Bureau of Natural Resources (BNR) must be notified at least 24 hours in advance of all project ground disturbing effects. The BNR will provide a project specific IDP for ancestral remains, items of cultural patrimony, and intact archeological deposits. This office will also provide a training/ briefing for construction crews regarding the contents and importance of the IDP prior to project implementations.

1. Contact: Coordinator, Michael Leecy; Michael.leecy@ctwsbnr.org, 541-553-8218.

1.14 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

2.2 MATERIALS

A. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer complying with MPI #23 (surface-tolerant, anticorrosive metal primer).

B. Contractor shall notify Architect on questions regarding materials as indicated in drawings/ material schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Provide destructive investigations as needed in areas of demolition to confirm utility and building systems.

C. Review Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Record Documents.

D. Contractor shall Perform and Engage a professional engineer to perform an engineering survey of condition of building or structure to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Survey prepared according to Occupational Health and Safety Administration (OSHA) Standard 29 CFR 1926.850(a).

2. Perform supplemental surveys as the Work progresses to detect hazards resulting from selective building or structure demolition activities.

E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

F. Survey of Existing Conditions: Record existing conditions by use of by 360 imaging or photographs in areas to remain where work is to occur.

1. Show existing conditions of adjoining construction or site, including finish surfaces and vegetation, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.

a. Provide photographs or video date stamped and recorded at exposure and resolution sufficient to show details.

2. Inventory and record the condition of items to be removed and salvaged. Show conditions that might be misconstrued as damage caused by salvage operations.

3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 PREPARATION

A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of Authorities Having Jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/ Systems to be Removed, Relocated, or Abandoned:

1. Contractor shall arrange and coordinate with Owner to prearranged shut-off of utilities with service providers and utility companies. Provide Owner 72 hours' notice before shut off is required.

2. Contractor shall arrange and coordinate with Owner to shut off indicated services/systems when requested by Contractor.

3. Contractor shall arrange and coordinate with Owner to shut off utilities with service providers and utility companies.

a. Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

4. If services/systems are required to maintain continuity of services/systems to other parts of building or site, provide temporary services/systems that bypass work areas.

5. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.

c. Equipment to Be Removed: Disconnect and cap services and remove equipment.

d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.

e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

3.4 PROTECTION

A. Temporary Protection: Comply with requirements specified in Section 01 5700 “Temporary Controls”. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and park facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.

2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.

3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

4. Cover and protect furniture, furnishings, and equipment that have not been removed.

5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 5200 "Temporary Construction Facilities."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of trench or excavation walls, construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Shoring design shall be provided by the contractor.

2. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION OF BUILDINGS OR STRUCTURES, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to protect in place areas and items to remain, and complete the work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least 4 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 "Construction Waste Management and Disposal."

B. Existing Structures to be demolish, unless as indicated:
1. North-facing exterior wall of existing school building.

C. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, other adjacent occupied and used facilities, trees and planted areas.

D. Removed and Salvaged Items:
1. General:
a. Carefully remove items indicated to be salvaged.
b. Clean salvaged items.
c. Pack or crate items after cleaning. Identify contents of containers.
d. Store items in a secure area until delivery to Owner.
e. Transport items to Owner's storage area designated by Owner.
f. Protect items from damage during transport and storage.
2. Existing storefront double doors at north-facing exterior wall to be salvaged for storage by Owner.

E. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Owner, items may be removed to a suitable, protected storage location during selective demolition cleaned, reinstalled where indicated in the Drawings, and if painted/ chipped material shall be repainted after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION OF SITE IMPROVEMENTS

A. Coordinate Exterior Work with:

1. Division 31 “Earthwork” for site clearing and backfilling requirements.

2. Division 32 “Exterior Improvements” for exterior improvements.

B. Remove existing above- and below-grade improvements, and protect utilities and services as indicated to remain and as necessary to facilitate new construction.

C. Remove subsurface slabs, stumps stumps with trunk remainders larger than 6 inches and other obstacles as indicated and as necessary to facilitate new construction, to a minimum depth of 36 inches.

D. Remove concrete slabs on grade, paving, curbs, gutters, and aggregate base as indicated. Saw-cut perimeter of area to be demolished, and then break up and remove.

E. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

F. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.7 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

D. Concrete Slabs-on-Grade, Walks, Curbs: Saw-cut perimeter of area to be demolished, and then break up and remove.

E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."Do not use methods requiring solvent-based adhesive strippers.

F. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section 07 31 13 “Asphalt Shingles” for new roofing requirements.

1. Remove existing roof membrane, flashings, copings, and roof accessories.

2. Remove existing roofing system down to substrate.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 01 7419 "Construction Waste Management and Disposal."

1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.9 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

1. Provide and repairs of adjacent surfaces, repaint of chipped, worn , or damaged items being reintsalll or adjacent to demolished/ new work.

2. Clean roadways of debris caused by debris transport.

END OF SECTION

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SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. The General Structural Notes in Structural Contract Documents for structural design criteria shall be used in conjunction with this specification. The General Structural Notes shall supersede items in this specification when discrepancies exist.

1.2 SUMMARY

A. Section Includes:

1. Concrete formwork.
2. Concrete equipment bases.
3. Slabs on grade.
4. Footings.
5. Foundation walls.
6. Concrete walls at ramps.
7. Concrete reinforcement.
8. Joint devices associated with concrete work.
9. Underslab vapor barrier.
10. Miscellaneous concrete elements, including equipment pads, light pole bases, flagpole bases, thrust blocks, manholes, and athletic field equipment footings.
11. Concrete curing.

B. Related Requirements:

1. Section 03 35 43 “Polished Concrete Finishing” for densifiers, hardeners, applied coatings, and polishing.
2. Section 07 11 13 “Bituminous Dampproofing” for coordination of waterproofing at slabs on grade.
3. Section 07 21 00 “Thermal Insulation” for rigid insulation board installed below grade at exterior face of the foundation wall.
4. Section 07 92 00 “Joint Sealants” for products and installation for sealants at saw cut joints and isolation joints in slabs.

1.3 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).

C. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).

E. ACI 305R - Hot Weather Concreting; 2010.

F. ACI 306R - Cold Weather Concreting; 2010.

G. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).

H. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2016).

I. ACI 347R - Guide to Formwork for Concrete; 2014.

J. ACI 347.3R - Guide to Formed Concrete Surfaces

K. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.

L. ASTM C94 - Standard Specification for Ready-Mixed Concrete; 2015.

M. CPC - Concrete Polishing Council, Specialty Council of the American Society of Concrete Contractors.

1.4 SUBMITTALS

A. See Section 01 33 00 “Submittal Procedures” for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.

C. Mix Design: Submit proposed concrete mix designs for each concrete mixture a minimum of 15 days prior to the start of work.

1. Identify all materials and admixtures and the proportions of each; indicate mix design for use at areas of concrete flatwork to remain exposed, including areas to receive a polished concrete finish.

2. Water-cement ratio, slump, and aggregate grading.

3. Indicate proposed mix designs complies with requirements of ACI 301, Section 4 - Concrete Mixtures.

4. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing, and Placing. Include substantiating test data to show compliance with ACI 3189 Chapter 5.

5. Indicate materials sources for principal constituents.

6. For exact mixes, including all constituents, for use at areas of concrete flatwork to remain exposed, including areas to receive a polished concrete finish, provide text data demonstrating compliance with shrinkage or initial crack requirements of Part 2 - Concrete Mix Design in this Section.

7. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

8. Air entrainment

9. Hot and cold weather procedures

10. Location and intended use.

D. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

E. Embedment Shop Drawings: Provide placement drawings for all steel embeds.

F. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

G. Field quality-control test and inspection reports, including top of steel survey results at column and masonry embed locations prior to elevated deck erection.

H. Samples: Submit samples of underslab vapor retarder.

1.5 QUALITY ASSURANCE

A. Perform work of this section in accordance with the following unless superseded by more stringent requirements of the Contract Documents.

1. ACI 117, Specifications for Tolerance for Concrete Constructions and Materials.

2. ACI 301, Specifications for Structural Concrete, Sections 1 through 5.

3. ACI 318, Building Code Requirements for Structural Concrete

4. ACI 347.3R, Guide to Formed Concrete Surfaces

B. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

1. Installer shall have a minimum of 10 years and 5 similar sized projects with the same scope performing polished concrete on both slabs-on-grade and elevated slab-on-metal deck.

C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94 requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

D. Follow recommendations of ACI 305R when concreting during hot weather.

E. Follow recommendations of ACI 306R when concreting during cold weather.

F. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 for testing indicated, as documented according to ASTM E548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

G. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

H. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

I. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

J. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination" and as follows:

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of final concrete work. Require representatives of each

entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.

b. Independent testing agency responsible for concrete design mixtures.

c. Ready-mix concrete manufacturer.

d. Concrete subcontractor, including supervisor.

e. Concrete Floor Finisher subcontractor, including supervisor

f. Architect

g. Owner representative

h. Structural Engineer

2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures and any other mitigation strategies for inclement weather or delays, curing procedures, construction contraction and isolation joints, and joint-filler strips, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, steel reinforcement installation, concrete repair procedures, and concrete protection and coordination with Section 03 35 43 “Polished Concrete Finishing” for work of this Section indicated to receive polished concrete finish.

1.6 MOCK-UP

A. Construct and erect mock-up panel for concrete surfaces indicated to receive indicated to receive polished concrete finish.

1. Formed Surfaces shall remain exposed.

a. As specified by ACI 347.3R and Article 1.05.C.4, as directed by the Owner and Architect.

2. Slabs to receive a polished concrete finish: As indicated in Section 03 35 43 “Polished Concrete Finishing”.

3. Build panel approximately 200 sq. ft. for slab-on-grade slabs in the location indicated or, if not indicated, as directed by Architect.

4. Approved panels may become part of the completed Work if undisturbed at time of Substantial Completion.

a. Number of Panels: Two for slabs on grade and three for elevated slabs.

b. Locations: As determined at Pre-Installation Conference.

B. Concrete slab mock-ups will occur 14 days prior to remaining slabs being poured.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1.8 WARRANTY

A. See Section 01 77 00 “Closeout Procedures”, for additional warranty requirements.

PART 2 - PRODUCTS

2.1 FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork

that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

C. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. High-density overlay, Class 1 or better at areas exposed to view but not board formed.

b. B-B (Concrete Form), Class 1 or better; mill-oiled and edge sealed at areas not exposed to view.

D. Forms for Cylindrical Columns, Blockouts, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

F. Chamfer Strips: Wood, metal, or rubber strips, 3/4 by 3/4 inch.

G. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

H. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.

2.2 REINFORCEMENT

A. Reinforcing Steel: Refer to General Structural Notes.

B. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.3 CONCRETE MATERIALS

A. Cement: ASTM C150, Type II - Moderate Portland type.

1. Acquire all cement for entire project from same source.

2. 100 percent at all floor slabs (slab on grade and elevated).

B. Normal-Weight Aggregates: ASTM C33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years'

satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Fly Ash: ASTM C618, Class F. Content 40 percent at footings and foundation walls.

D. Blast-Furnace Slag: ASTM C989, Grade 100 or 120.

E. Silica Fume: ASTM C1240, amorphous silica, except where disallowed by the specifications.

F. Water: Clean and not detrimental to concrete. ASTM C94 and potable.

2.4 CONCRETE MATERIALS FOR POLISHED CONCRETE SLABS

A. Normal-Weight Aggregates: ASTM C33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

2.5 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260.

1. Interior Flatwork exposed to freeze-thaw cycles: 2 - 4 percent of volume.
2. Exterior Flatwork: 4 - 7 percent of volume.

C. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494, Type A.
2. Crack Reducing Admixture: BASF, MasterLife CRA 007.
   a. Locations: Provide crack-reducing admixtures to concrete for all slabs indicated to be exposed and/or to receive polished concrete finish.
   b. Dosage amount: provide as per manufacturer's recommendations.

D. High Range Water Reducing and Retarding Admixture: ASTM C494 Type G.

E. High Range Water Reducing Admixture: ASTM C494 Type F.

F. Water Reducing and Accelerating Admixture: ASTM C494 Type E.

G. Water Reducing and Retarding Admixture: ASTM C494 Type D.

H. Accelerating Admixture: ASTM C494 Type C.

I. Retarding Admixture: ASTM C494 Type B.

J. Water Reducing Admixture: ASTM C494 Type A.

1. Shall not increase concrete shrinkage or promote water bleeding.

K. Shrinking Reducing Admixture: Meeting ASTM C494, Type S.

1. Approved Product: Eclipse by GCP Applied Technologies; www.gcpat.com.

L. Crack Reducing Admixture: Meeting ASTM C494, Type S.

1. Approved Product: MasterLife CRA 007 by Master Builders Solutions, div. of BASF; www.master-builders-solutions.basf.us.

2.6 ACCESSORY MATERIALS

A. Underslab Vapor Barrier: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with ASTM E1745, Class B; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.

1. Installation: Comply with ASTM E1643.

2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor retarder.

3. Approved Products:

a. Moistop Ultra 15 by Fortifiber Building Systems Group; www.fortifiber.com.

b. Yellow guard 15 Mils by Husky; www.yellowguard.com.

c. Vapor Block 15 by Raven Industries Inc.; www.ravenind.com.

d. Griffolyn Type-105 by Reef Industries, Inc.; www.reefindustries.com.

e. Stego Wrap, 15 mils by Stego Industries, LLC; www.stegoindustries.com.

f. Perminator Class A 15 Mils by W.R. Meadows, Inc.; www.wrmeadows.com.

4. Locations: Beneath interior slabs as indicated in Drawings.

2.7 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex or styrene butadiene, complying with ASTM C1059, Type II.

B. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.

C. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

D. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with minimum 1 inch diameter holes for conduit or rebars to pass through at 6 inches on center; ribbed steel stakes for setting.

1. Location: at slab cold pour joints

2.8 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.

C. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid surface moisture evaporation from fresh concrete; intended for application immediately after concrete placement.

1. Products:

a. AquaFilm Concentrate J74 by Dayton Superior Corp.; www.daytonsuperior.com.

b. VaporAid by Kaufman Products Inc.; www.kaufmanproducts.com

c. SikaFilm by Sika Corp., Inc.; usa.sika.com.

d. SpecFilm Concentrate or SpecFilm RTU by SpecChem, LLC; www.specchem.com.

e. Certi-Vex Envio Assist by ChemMasters, Inc. (formerly by W.R. Meadows, Inc.; www.chemmasters.net.

D. Water: Potable.

E. Curing Compound, Non-dissipating: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C309, Type 1, Class B. Certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Vehicle: Water-based.

2. Manufacturers:

a. AH Clear Cure WB by Anti-Hydro International, Inc.; www.anti-hydro.com.

b. Safe-Cure & Seal 20 by ChemMasters; www.chemmasters.net.

c. Cure and Seal WB by SpecChem; www.specchem.com.

d. Cure & Seal 309 J18 by Dayton Superior Corp.; www.daytonsuperior.com.

e. Aqua Cure VOX by Euclid Chemical Co.; www.euclidchemical.com.

f. Krystal 15 Emulsion by Kaufman Products Inc.; www.kaufmanproducts.net.

g. Dress & Seal WB by L&M Construction Chemicals, Inc., div. of Laticrete International, Inc.; www.laticrete.com.

h. VOCOMP-20 by W.R. Meadows, Inc.; www.wrmeadows.com.

i. Clearseal WB 150 by Euclid Chemical Co. (formerly by Tamms Industries, Inc.); www.euclidchemical.com.

3. Extent of Work: All interior exposed concrete surfaces.

2.9 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C219.

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.

4. Compressive Strength: Not less than 4,100 psi at 28 days when tested according to ASTM C109.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C219.

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.

4. Compressive Strength: Not less than 5,000 psi at 28 days when tested according to ASTM C109.

2.10 CONCRETE MIX DESIGN

A. Prepare design mixtures for each type and strength of concrete proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301 and in accordance with the following:

1. Except as otherwise noted, proportion constituents in accordance with ACI 211.1 recommendations and as recommended by admixture manufacturers.

a. Use shrinkage-reducing admixture or crack-reducing admixture as needed to meet shrinkage or initial crack width limitations indicated below at concrete slabs.

2. Except as otherwise noted at concrete flatworks/slabs, comply with ACI 211.1 recommendations.

a. For All Footings and Foundations: Provide 40 percent fly ash, Class F, per ASTM C618.

b. For All Interior Concrete Work: Provide a minimum of 5-1/2 sacks of cement per cubic yard of mix.

3. Compressive Strength: Refer to Structural Drawings.

4. Maximum Water-Cementitious Materials Ratio: Refer to Structural Drawings, except as otherwise noted.

5. Air Content: At exterior horizontal surfaces permanently exposed to weather or where concrete flatwork may be subjected to freeze/thaw temperatures in a temporary condition, add air entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows:

a. Interior concrete: 2 percent to 4 percent (volume).

b. Exterior concrete: 4 percent to 7 percent (volume).

6. Slump: 4 in. maximum, unless otherwise noted below.

B. At Slabs Indicated to Receive a Polished Concrete Finish: Use only one mix design for all such slabs. Inclusions of admixtures, plasticizers, slag, silica fume, fly ash, or other products replacing portions of the Portland cement in this mix is not permitted.

1. Concrete at slabs indicated to receive a polished concrete finish shall exhibit a maximum shrinkage of 0.035 percent at 28 days when tested in accordance with ASTM C157.

a. Alternatively, instead of the maximum shrinkage limitation, concrete used in this application shall exhibit a maximum initial crack width of 0.010 inch when tested in accordance with ASTM C1581.

b. Testing for shrinkage and/ or initial crack width testing shall be completed by a qualified laboratory.

2. Slump Limit: 5 inches plus or minus inch.

3. Maximum Water-Cementitious Material Ratio: 0.45.

2.11 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94 and

ASTM C1116, and furnish batch ticket information; mixing and delivery time shall not exceed 90 minutes.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time, not to exceed 75 minutes.
2. When air temperature is above 90 deg F, reduce mixing and delivery time, not to exceed 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

1. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
2. Construct forms tight enough to prevent loss of concrete mortar.
3. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
   a. Install keyways, reglets, recesses, and the like, for easy removal.
   b. Do not use rust-stained steel form-facing material.
4. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
5. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
6. Chamfer exterior corners, accent strips, and edges as shown on Drawings of permanently exposed concrete.
7. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
8. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
9. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
10. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

B. Where new concrete is indicated to be bonded to previously placed concrete, prepare existing surface by roughening surface to 1/4 in. amplitude, cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.

2. Use latex bonding agent only for non-load-bearing applications.

3.3 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

C. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.4 UNDERSLAB VAPOR BARRIER INSTALLATION

A. Plastic Vapor Barriers: Place, protect, and repair vapor barriers according to ASTM E1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape. Seal around all pipe penetrations with recommended tape.

2. At slab edges, extend vapor barrier minimum of 6-inches above top of slab and tooled slab edge. Cut vapor barrier at tooled edge after slab cure for joint sealant application.

3.5 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

1. Leave formwork for beam soffits, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.

2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.6 SHORES AND RESHORES

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. Plan sequence of removal of shores and re-shore to avoid damage to concrete. Locate and

provide adequate reshoring to support construction without excessive stress or deflection.

3.7 PLACING CONCRETE

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Prior to attachment of metal deck at elevated floors, survey top of steel elevation at all columns to assure compliance with field erection tolerances noted in AISC 303-16 "Code of Standard Practice for Steel Buildings and Bridges". Correct any variations as required prior to concrete pour to assure floor flatness and levelness requirements noted are achieved.

C. Notify the Architect and Engineer a minimum of 48 hours prior to commencement of work.

D. Maintain records of concrete placement, including date, location, quantity, air temperature, and test samples taken.

E. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer. Where approved, record amounts of water added and provide with special inspection reports.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

F. Place concrete in accordance with ACI 304R.

G. Place concrete for floor slabs in accordance with ACI 302.1R.

H. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.

2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

I. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Maintain reinforcement in position on chairs during concrete placement.

3. Screed slab surfaces with a straightedge and strike off to correct elevations.

4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

J. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

K. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from

physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

L. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

M. Protect all uncovered interior concrete flatwork where polished concrete finishes are scheduled from wind by providing barriers.

N. Finish floors shall be level and flat, unless otherwise indicated, within the tolerances specified below.

3.8 SLAB JOINTING

A. Locate joints in slabs-on-grade as indicated on the drawings If not shown on drawings joints shall be no further than 10 feet on-center for covered slabs and 7 feet on-center for exposed and polished slabs.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.

D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch blade and cut to depth as shown on the Structural Drawings.

1. Contraction Joint Saw: Early-entry, dry-cut saw.
   a. Approved Equipment: Soff-Cut System with Skid Plate by Husqvarna AB (formerly Soff-Cut); www.husqvarnaconstruction.com.
2. Comply with the equipment manufacturer’s instructions for the equipment manufacturer’s system, except as noted below.
3. Remove debris in path of cut and under Skid Plate before cutting. Skid plate must remain flat on surface.
4. Use equipment manufacturer’s recommended blades and skid plates, using a new skid plate with each new blade.
5. Install equipment manufacturer’s recommended joint protector at saw-cut intersection prior to crosscut.
6. Remove dry powder without disturbing finish.
7. Avoid traffic across saw cut until sufficient strength is gained to protect edges.

8. Coordinate with Work of Section 03 35 43 “Polished Concrete Finishing” for coordination of contraction joints placement within areas to receive a polished finish.

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

1. Place perpendicular to main reinforcement. Continue reinforcement across construction joints only as noted in the structural drawings.

2. Form keyed joists as indicated. Embed keys at least 1 1/2 in. into the concrete.

F. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

G. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

H. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.9 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired

areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

8. Refer to Section 03 35 43 “Polished Concrete Finishing” for repair of surfaces to receive a Polished Concrete Finish.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar. Except as otherwise noted in Section 03 35 43 “Polished Concrete Finishing” for surfaces to receive a Polished Concrete Finish.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.10 FLOOR FLATNESS AND LEVELNESS

A. An independent testing agency, as specified in Section 01 40 00 “Quality Requirements” will inspect finished slabs for conformance to specified tolerances.

B. Minimum FF (Floor Flatness) and FL (Floor Levelness), Slabs on-Grade: Values shall be as follows:

1. Slabs Exposed to View and Foot Traffic: FF of 20 and FL of 15, except as otherwise noted.

2. Slabs Below Thick-Bed Mortar at Tile Floor Finish: FF of 20 and FL of 15.

3. Slabs Below Carpeting and Entry Mats: FF of 25 and FL of 20.

4. Slabs Below Resilient Flooring and Thinset Tile: FF of 35 and FL of 25.

5. Slabs Indicated to Receive a Polished Concrete Finish:

a. Overall global value FF of 40 and FL of 30. Minimum local value FF of 35 and FL of 25.

C. Minimum FF (Floor Flatness) and FL (Floor Levelness), Elevated Slabs: Values shall be as follows; includes slabs-on-metal deck:

1. Slabs Indicated to Receive a Polished Concrete Finish:

a. Overall global value FF of 25 and FL of 20. Minimum local value FF of 17 and FL of 15.

D. Measure FF and FL in accordance with ASTM E1155 within 48 hours after slab installation; report

both composite overall values and local values for each measured section.

E. Correct defects by grinding if affected area is not exposed. If area is indicated to be exposed, removal and replacement of the defective work may be required, subject to assessment by the Architect and Owner.

3.11 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Comply with concrete surface category (CSC) 1 as defined by ACI 347.3R.

C. Exposed Form Finish: Coordinate finishes of all as-cast concrete with construction of formwork in accordance with ACI 117 and ACI 347.3R.

1. Smooth Rubbed Finish: Comply with concrete surface category (CSC) 3 as defined by ACI 347.3R.

D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:

1. Surfaces to receive Thick Floor Coverings, including quarry tile and full bed setting system ceramic tile: "Wood float" as described in ACI 302.1R.

2. Surfaces to receive Thin Floor Coverings, including thin set ceramic tile, thin set quarry tile, resilient flooring, resilient athletic flooring, carpeting and entry mat: "Steel Trowel" as described in ACI 302.1R.

3. Surfaces to receive Wood Athletic Flooring: "Smooth Steel Trowel" as described in ACI 302.1R.

4. Exterior Steps, Ramps and Platforms: "Broom Finish". Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate final finish with Architect before application.

5. Surfaces to receive a Polished Concrete Finish: Trowel as described in ACI 302.1R; use steel-reinforced plastic trowel blades instead of steel blades to avoid black burnished marks; decorative exposed surfaces include surfaces indicated to be stained or dyed and surfaces indicated to receive polished concrete finish.

a. For surfaces to receive a polished concrete finish as defined in Section 03 35 43 “Polished Concrete Finishing”, provide timely additional troweling passes using either a hand trowel or mechanical troweling machine, with or without the subsequent use of wax or resins, to create a dense, smooth, hard surface free of troweling marks.

b. The addition of water to the surface during finishing shall not be permitted.

c. Refer to Section 03 35 43 “Polished Concrete Finishing”.

6. Other Surfaces Indicated to be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other defects.

7. Slabs-on-Metal Deck: Account for deflection of metal deck during placement of wet concrete such that top of slab elevation is screeded off level between adjacent deck supports. See deck manufacturer’s literature for approximate deck deflection values. Notify Structural Engineer if deck deflections exceed 3/4-inch. At cambered supports, set screed pins along each support to a uniform height based on the specified slab thickness.

3.12 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the

Work.

B. Equipment Bases: Provide concrete pads under mechanical equipment as indicated in Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.13 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

1. Normal Concrete: Total curing period not less than 7 days.

2. High early strength Concrete: Total curing period not less than 4 days.

3. At areas to receive a Polished Concrete Finish: Total curing period not less than 14 days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations in an effort to inhibit excessive or rapid free water (bleedwater) loss. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

E. Surfaces Not in Contact with Forms:

1. Slabs and Floors to Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials are used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.

2. Initial Curing: Start as soon as free water (bleedwater) 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.

3. Final Curing: Begin after initial curing but before surface is dry. Retain for a duration such that total curing period (initial plus final) is not less than that indicated above in Section B.

F. Cure concrete according to ACI 308.1, by one or a combination of the following methods.

1. Moisture Curing:

a. Ponding: Maintain 100 percent coverage of water over floor slab areas.

b. Continuous water-fog spray.

c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

a. Cure concrete surfaces to receive floor coverings with a moisture-retaining that the manufacturer certifies will not interfere with bonding of floor covering used on

Project.

3. Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.14 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements. Testing Agency will be retained by the Owner.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Inspections: As indicated in the Structural Drawings and below:

1. Placement of Vapor Retarder: Inspection by governing agency.

D. Concrete Tests: As indicated in the Structural Drawings and below:

1. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7, 14, and 28-day tests.

2. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

3. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42 or by other methods as directed by Architect.

4. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

5. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.

6. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

3.15 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.16 PROTECTION

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

B. For concrete floors indicated to remain exposed to view, protect to prevent damage, including staining, gouges and scratching by construction traffic and activities.

1. Inspect tires for debris prior to use on slab. Remove embedded items which may cause damage to the floor slab.

2. Clean up spills on slab immediately.

C. Develop a concrete protection procedure which addresses the following:

1. Communication of protection plan to subcontractors and vendors.

2. Procedures for cleaning spills, including use of and availability of cleaning chemicals and absorptive materials at site.

D. Refer to 03 35 43 “Polished Concrete Finishing” for protection of slabs indicated to receive a polished concrete finish.

END OF SECTION

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SECTION 03 35 43 - POLISHED CONCRETE FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Multi-step grinding, chemical treatment for hardening, multi-step polishing, and finishing treatment for protection for concrete slabs (POL-1).
2. Penetrating liquid floor treatments for polished concrete finish (CON-1).
3. Patching and repair prior to polishing.

B. Related Requirements:

1. Section 03 30 00 "Cast-in-Place Concrete" for concrete materials, coordination of mix design, aggregates, protection materials, placement procedures, and curing requirements for concrete slabs indicated for polished concrete finish.
2. Section 07 19 00 “Water Repellents” for penetrating water-repellent and stain-resistant treatment.

1.3 DEFINITIONS

A. Design Reference Sample: Sample designated by Architect in the Contract Documents that reflects acceptable surface quality and appearance of polished concrete.

1.4 COORDINATION

A. Coordinate polishing requirements with Section 03 30 00 “Cast-in-Place Concrete”.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Before Work, submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with polished concrete to attend, including the following:
   a. Contractor's superintendent.
   b. Independent testing agency responsible for concrete design mixtures.
   c. Cast-in-place concrete repair subcontractor.
   d. Polished concrete finishing Subcontractor.
2. Review curing procedures, construction joints, joint finishing, concrete repair procedures, concrete finishing, and protection of polished concrete.

1.6 SUBMITTALS

A. Product Data: For each type of product.

B. Polishing Schedule: Submit plan showing polished concrete surfaces and schedule of polishing operations for each area of polished concrete before start of polishing operations. Include

locations of all joints, including construction joints.

1. Sequencing: Polish and protect concrete floors prior to installation of wall framing.

C. Samples for Initial Selection: For each type of product requiring color selection.

D. Qualification Data: For Installer.

E. Material Certificates: For each of the following, signed by manufacturers:

1. Repair materials.

2. Liquid floor treatments.

1.7 QUALITY ASSURANCE

A. Special Finish Concrete Work: Performed by expert entity having in-depth knowledge of a wide variety of finish methods and equipment suitable for the type of finish in the locations required for the Work. Applicator shall be approved by the manufacturer of the required finishing system and have a successful record of experience with this finish process and the equipment proposed for the Work. Submit documentation for five previous projects including equipment and methods used and the name of the equipment operator(s), complete information on the finishing process and photographic documentation of finishing from original surface to completion.

1. Individual in Responsible Control: For work of this Section have ACI Craftsman Certification as Commercial/Industrial Flatwork Specialist - High Tolerance; individual shall be always on site work is actively in progress.

B. Field Sample Panels: Produce field sample panels to demonstrate the approved range of selections made under Sample submittals. Produce a minimum of three sets of full-scale panels, approximately 48 by 48 inches minimum, to demonstrate the expected range of finish, color, and appearance variations.

1. Locate panels as indicated or, if not indicated, as directed by Architect. Include patching for review, prior to polishing.

2. Maintain field sample panels during construction in an undisturbed condition as a standard for judging the completed Work.

3. Demolish and remove field sample panels when directed.

C. Mockups: Before casting concrete, build mockups to verify selections made under Sample submittals and to demonstrate typical joints, surface finish, tolerances, and standard of workmanship. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.

2. Demonstrate curing, finishing, and protecting of polished concrete.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 POLISHED CONCRETE FLOORS, POL-1

A. General: Polished concrete surfaces shall match Architect’s Design Reference Sample. Installer

is responsible for coordinating concrete mix designs, placement, finishing procedures and any other concrete related items impacting finishing for concrete floors to receive polished concrete finishing.

B. Polish Level: Provide polished concrete surfaces meeting the following criteria, as determined by Concrete Sawing and Drilling Assoc. (CSDA) standard CSDA-ST-115 Measuring Concrete Micro Surface Texture:

1. Final Grit: Level 2, Satin sheen, 100-400 grit.

C. Aggregate Level: Provide polished concrete surfaces meeting the following criteria, as determined by Concrete Polishing Assoc. of America. (CPAA) standard:

1. Class B: 1/16-inch approximate depth of cut.

2. Fine Aggregate: Fine aggregate exposure with little or no medium aggregate exposure at random locations (salt and pepper).

D. Clarity and Gloss: Provide polished concrete surfaces meeting the following criteria, as determined by Concrete Polishing Assoc. of America. (CPAA) standard:

1. Clarity/ Gloss Level: Level 2 to 3, dependent upon approved mockup.

2. Reflective Clarity: Not less than 50 as tested per ASTM D5767.

E. Finished Surface Coefficient of Friction: Not less than 0.60 Static Coefficient of Friction (SCOF) and 0.40 Dynamic Coefficient of Friction (DCOF) on non-sloped surfaces as tested per ANSI/ NFSI B101.1 and B101.3.

F. Stain-Resistant: Shall provide stain resistance as defined in ASTM D1308.

2.2 LIQUID FLOOR TREATMENTS FOR POLISHED CONCRETE FLOORS

A. Penetrating Liquid Floor Treatments for Polished Concrete Finish: Clear, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and is suitable for polished concrete surfaces.

B. Installation of reactive co-polymerizing solids (RCS), waterborne solution of inorganic materials that are odorless, colorless that penetrates, hardens, and densifies concrete surfaces when applied at time of refinement and polishing.

C. Stain-Resistant Concrete Sealer, CON-1:

1. Clear, chemical-resistant, aliphatic urethane concrete sealer, with added non-slip aggregate. Verify compatibility of sealer with polishing liquid hardener.

2. Basis-of-Design Product: TD.455, AUS-V Aliphatic Urethane Coating by Elite Crete Systems; www.elitecrete.com.

3. Other approved coating products:

a. Ameripolish SR^2 Stain Resistor by Ameripolish; www.ameripolish.com.

b. Permaguard SPS by L&M Construction Chemicals; www.lmcc.com.

c. Or approved substitution.

4. For Stain- and Slip-Resistant Concrete Sealer, add H&C Sharkgrip Slip-Resistant Additive by H&C Concrete; www.hcconcrete.com to the Stain-Resistant Concrete Sealer.

2.3 ACCESSORY MATERIALS

A. Expansion and Isolation Joint Filler: ASTM D4819 Type II, 1/2-inch-thick closed cell polyethylene backer rod.

B. Joint Sealant, SEALANT 9: As specified in Section 07 92 00 “Joint Sealants.”

C. Repair Material: Patching compound utilizing multiple concrete binders with on-site color matching capabilities, sample accepted by Architect.

1. Basis-of-Design Product: Spal-Pro RS 88 by Metzger/McGuire; www.metzgermcguire.com.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to starting work identify FF values of slab in each area where diamond polish finish is required and verify compliance with requirements in Section 03 30 00 “Cast-in-Place Concrete”. Correct areas that deviate beyond specified tolerance until they are brought into compliance.

1. Utilize grout mortar forced into the pore structure of the concrete substrate to fill cracks and surface imperfections.

2. Provide coordination with subsequent work to ensure finished concrete is without damage and deterioration at Substantial Completion.

B. Joints: Coordinate joint location and installation with work of Section 03 30 00 “Cast-in-Place Concrete”; provide for joint treatments as work of this Section.

1. Utilize compressible joint Filler to fill joints to prevent the infiltration of debris and provide support for sealants applied to the exposed surface; refer to Section 07 92 00 “Joint Sealants” for requirements.

3.2 POLISHING

A. General:

1. Perform polishing to completion before starting wall framing. Protect POL-1 for remainder of construction.

2. Avoid hand tools to greatest extent possible for consistent finish and control. Grind, hone and polish using grits required to achieve approved finish.

B. Apply penetrating liquid floor treatment to cured and prepared slabs to match approved mockup.

C. Machine grind floor surfaces to receive polished finishes level and smooth and to depth required to reveal aggregate to match approved mockup.

1. Perform finishing operations in as continuous an operation as possible. Provide uniform appearance throughout the finished Work.

2. Provide edge grinding at floor and ramp perimeters and at stair treads and risers, where indicated.

D. Apply penetrating liquid floor treatment for polished concrete in polishing sequence and according to manufacturer's written instructions, allowing recommended drying time between successive coats.

E. Continue polishing with progressively finer-grit diamond polishing pads to finish level specified, to match approved mockup.

1. Provide edge polishing at floor and ramp perimeters and stair treads and risers.

2. Control and dispose of waste products produced by grinding and polishing operations.

3. Neutralize and clean polished floor surfaces.

F. Apply liquid floor sealer to ground, treated and polished slabs to match approved mockup.

3.3 FIELD QUALITY CONTROL

A. Provide measuring and evaluation of Texture of concrete micro surface texture in accordance with CSDA-ST-115 Measuring Concrete Micro Surface Texture as Work of this Section.

B. Slip Resistance Traffic surface: Evaluate finished flatwork per ANSI B101.1 Static Coefficient of Friction and B101.3 Dynamic Coefficient of Friction for compliance with requirements.

1. Flatness and Level: FF 50 and FL 30 with minimum values not less than FF 35 and FL 20; evaluated per ACI 117 and ASTM E1155.

2. Reflective Clarity and Gloss: Evaluate per ASTM D5767 and ASTM D523 following surface refinement and prior to and additional work other than the specified Finish Treatment.

C. Review recommendation of the manufacturer of the specified Finish System materials for the finish floors including products, procedures and frequency.

3.4 CLEANING AND PROTECTION

A. Clean and protect floor finishes from damage during remaining construction period. Lay protection material over entire exposed area of complete polished floor.

B. Coordinate subsequent work to ensure finished concrete is free from damage and deterioration at Substantial Completion.

END OF SECTION

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SECTION 03 54 13 - GYPSUM CEMENT UNDERLAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Nonstructural, self-leveling, gypsum cement underlayment for application below interior floor coverings.
2. Acoustical/ sound mat.

B. Related Requirements:

1. Section 06 16 00 “Sheathing” for coordination of subfloor.
2. Section 07 92 00 “Joint Sealants”.
3. Section 09 29 00 “Gypsum Board” for coordination of installation at wall base at floors to receive gypsum underlayment.
4. Section 09 65 00 “Resilient Flooring” for coordination of overlayment floor finish.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project Site.

1.4 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.

1. Include perimeter section details showing termination and expansion provisions.
2. Include locations requiring blocking for other work, pour stops and transitions.

C. Acoustical Data: Sound assembly testing indicating compliance with indicated requirements. Refer to Drawings for assembly requirements.

D. Qualification Data: For Installer.

E. Test Reports:

1. For fire-resistant ratings, from a qualified testing agency.
2. For STC-rated assemblies, from a qualified testing agency.
3. For IIC-rated assemblies, from a qualified testing agency.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.

1. Place gypsum cement underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Compressive Strength: Not less than 2500 psi tested in accordance with ASTM C472.

B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

C. STC-Rated Assemblies: For STC-rated 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. IIC-Rated Assemblies: For IIC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E492 and classified according to ASTM E989 by an independent testing agency.

2.2 MANUFACTURERS

A. Source Limitations for Gypsum Cement Underlayment: Obtain gypsum cement underlayment materials, primers, and accessories from single source or materials approved by underlayment manufacturer.

2.3 GYPSUM CEMENT UNDERLAYMENTS

A. Gypsum Cement Underlayment: Self-leveling, gypsum cement product that can be applied in minimum uniform thickness of 1/8 inch to match adjacent floor elevations.

1. Approved Manufacturers:

a. Ardex; www.ardex.com.

b. Formulated Materials LLC.; www.formulatedmaterials.com.

c. Maxxon Corp.; www.maxxon.com.

d. USG Corp.; www.usg.com.

2. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C219.

3. Fiber-Reinforcement: Manufacturer’s standard integral fiber-reinforcement as required for depth.

4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.

B. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.

C. Water: Potable and at a temperature of not more than 70 deg F.

D. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

E. Corrosion-Resistant Coating: Recommended in writing by underlayment manufacturer for metal substrates.

F. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

G. Sand Aggregate: As recommended by manufacturer.

2.4 ACCESSORIES

A. Acoustical Mat, Resilient Underlayment: As required to meet STC and ICC rating, manufactured by or approved for use by underlayment manufacturer.

1. Basis-of-Design Product: Acousti-Mat 3/8 Premium by Maxxon, Inc.; www.maxxon.com.

2. Thickness: 3/8 inch.

3. STC: STC required to meet target for total floor assembly.

B. Perimeter Isolation Strips: Manufacturer’s foam isolation strips for perimeter and penetrations.

C. Repair Overlayment: Manufacturer’s recommended patching compound to correct damaged and uneven surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance of the Work.

B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Prepare and clean substrate according to manufacturer's written instructions.

1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.

2. Fill substrate voids to prevent underlayment from leaking.

B. Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust.

1. Install underlayment reinforcement recommended in writing by manufacturer.

C. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

D. Sound Control Mat: Install sound control materials according to manufacturer’s written instructions.

1. Do not install mechanical fasteners that penetrate through the sound control materials.

E. Install perimeter isolation strips at all walls where underlayment abuts at base, and around all penetrations. Comply with manufacturer’s installation details.

F. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

G. Sound Control Mat: Install sound control materials according to manufacturer’s written instructions.

1. Do not install mechanical fasteners that penetrate through the sound control materials.

3.3 APPLICATION

A. General: Mix and apply underlayment components according to manufacturer's written instructions.

1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.

2. Coordinate application of components to provide optimum adhesion to substrate and between coats.

3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.

4. Install as accordance with ASTM F2419.

5. Install to depths indicated.

B. Apply underlayment to produce uniform, level surface.

1. Apply a final layer without aggregate to product surface.

C. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.

D. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

E. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

F. Repair damaged surfaces with patching compound.

G. Apply surface sealer at rate recommended by manufacturer. Coordinate requirements with floor covering installers.

H. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer. Coordinate with Work of other Sections.

3.4 PROTECTION

A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION

SECTION 04 22 00 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. The General Structural Notes in Structural Contract Documents for structural design criteria shall be used in conjunction with this specification. The General Structural Notes shall supersede items in this specification when discrepancies exist.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units (CMU-1, CMU-2 and CMU-3).
2. Mortar and grout.
3. Steel reinforcing bars.
4. Miscellaneous masonry accessories.

B. Related Requirements:

1. Section 03 30 00 “Cast-in-Place Concrete”.
2. Section 07 19 00 “Water Repellants” for anti-graffiti coating.
3. Section 07 62 00 “Sheet Metal Flashing and Trim”.
4. Section 07 92 00 “Joint Sealants”.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
3. Location of control joints, dimensioned.

C. Samples for Verification: For the following:

1. Exposed CMUs.

D. Material Certificates: For each type and size of the following:

1. Masonry units.

   a. Include data on material properties.

2. Cementitious materials. Include name of manufacturer, brand name, and type.

3. Mortar admixtures.

4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

5. Grout mixes. Include description of type and proportions of ingredients.

6. Reinforcing bars.

7. Joint reinforcement.

8. Anchors, ties, and metal accessories.

E. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109 for compressive strength, ASTM C1506 for water retention, and ASTM C91 for air content.

2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

F. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

G. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C093 for testing indicated.

B. Mockups: Build mockups to verify selections made, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups for each type of exposed unit masonry construction of typical wall area as shown on Drawings but not less than 50 square feet.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Immediately upon delivery, remove factory bound polyethylene shipping wrap to allow masonry units to release retained moisture.

B. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. Wrap units in a manner to keep weather out but allow ventilation to keep units dry. If units become wet, do not install until they are dry.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

E. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

F. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 FIELD 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.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

F. Wet-Weather Requirements: Work may only be performed under cover to prevent units from becoming wet.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.3 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

2. Provide square-edged units for outside corners unless otherwise indicated.

B. CMUs, General: ASTM C90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi, or as indicated.

2. Density Classification: Normal weight, unless otherwise indicated.

3. Size: Manufactured to dimensions 3/8 inch less-than-nominal dimensions.

4. Type: Provide the following types as indicated in Drawings.

a. Exterior Structural and Veneer CMU, CMU-1:

1) Dimensions: As indicated in Drawings.

2) Exposed Faces: As indicated on Exterior Finish Legend in Drawings; provide texture matching the range represented by Architect's sample.

3) Color: As selected by Architect from manufacturer's full range of colors, including custom or special colors to match adjacent CMU block at existing building.

4) Applications: As indicated in Drawings.

b. Exterior Structural and Veneer CMU Accent, CMU-2:

1) Dimensions: As indicated in Drawings.

2) Exposed Faces: As indicated on Exterior Finish Legend in Drawings; provide texture matching the range represented by Architect's sample.

3) Color: As selected by Architect from manufacturer's full range of colors, including custom or special colors to match adjacent CMU block at existing building.

4) Applications: As indicated in Drawings.

c. Exterior CMU for Wall and Sill Cap, CMU-3:

1) Dimensions: As indicated in Drawings.

2) Exposed Faces: As indicated on Exterior Finish Legend in Drawings; provide texture matching the range represented by Architect's sample.

3) Color: As selected by Architect from manufacturer's full range of colors, including custom or special colors to match adjacent CMU block at existing building.

4) Applications: As indicated in Drawings.

C. Integral Water Repellent: Provide concrete masonry units made with factory mix integral water repellent for exposed units. Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive according to ASTM E 514, with test period extended to 24 hours, show no visible water or leaks on the back of test specimen.

1. Approved Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Rheopel Plus by BASF Corp.; www.master-builders-solutions.basf.us.

b. Dry-Block by Grace Construction Products, W. R. Grace & Co. - Conn., a div. of Standard Industries; www.grace.com.

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C91.

E. Mortar Cement: ASTM C1329.

F. Aggregate for Mortar: ASTM C144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

G. Aggregate for Grout: ASTM C404.

H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

I. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

J. Water: Potable.

2.5 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A615 or ASTM A996, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

C. Masonry Joint Reinforcement for Veneer Masonry: Provide ladder or truss type with single pair of side rods.

2.6 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or urethane.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Weep/ Vent Products: Use the following, unless otherwise indicated:

1. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard.

a. Available Products:

1) Mortar Net USA, Ltd.; Mortar Net Weep Vents.

D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Provide one of the following configurations:

a. Strips, full-depth of cavity and 10 inches wide, with dovetail shaped notches 7 inches deep that prevent mesh from being clogged with mortar droppings.

2. Approved Products:

a. Archovations, Inc.; CavClear Masonry Mat.

b. Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarStop.

c. Mortar Net USA, Ltd.; Mortar Net.

2.7 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

2. Use portland cement-lime, masonry cement or mortar cement mortar unless otherwise indicated.

3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Mortar for Unit Masonry: Comply with ASTM C270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

1. For reinforced masonry, use Type M or S; as indicated.

C. Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.

2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.

3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143.

2.8 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.

1. Galvanized Steel Sheet: ASTM A653, Commercial Steel, G60 zinc coating.

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

C. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:

a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.

2. Seismic Masonry-Veneer Anchors: Units consisting of a metal anchor section and a connector section designed to engage a continuous wire embedded in the veneer mortar joint.

a. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, 2-3/4 inches wide by 3 inches high; with projecting tabs having slotted holes for inserting vertical leg of connector section.

b. Connector Section: Rib-stiffened, sheet metal bent plate with down-turned leg designed to fit in anchor section slot and with integral tabs designed to engage continuous wire. Size connector to extend at least halfway through veneer but with at least 5/8-inch cover on outside face.

c. Fabricate sheet metal anchor sections and other sheet metal parts from 0.067-inch- thick, steel sheet, galvanized after fabrication.

d. Fabricate wire connector sections from 0.188-inch diameter, hot-dip galvanized, carbon steel wire.

e. Approved Products:

1) D/A 213S by Dur-O-Wal, div. of Dayton Superior Corporation; www.dur-o-wal.com.

2) DW-10-X-Seismiclip by Hohmann & Barnard, Inc.; www.h-b.com.

3) RJ-711 with Wire-Bond clip by Wire-Bond; www.wirebond.com.

2.9 FLASHINGS

A. Stainless Steel/ Polymer Fabric Flashing: ASTM A240; 2 mil type 304 stainless steel sheet bonded on one side to one sheet of polymer fabric.

1. Manufacturers:

a. Mighty-Flash SA, Self-Adhering Stainless Steel Fabric Flashing by Hohmann & Barnard.

b. York 304 SA, Self-Adhering Stainless Steel Flashing by York Manufacturing, Inc; www.yorkmfg.com.

2. Accessories: Provide Manufacturer's standard performed inside/outside corner and end dam sections.

2.10 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Approved Manufacturers:

a. Diedrich Technologies, Inc.; www.diedrichtechnologies.com.

b. EaCo Chem, Inc.; www.eacochem.com.

c. Prosoco, Inc.; www.prosoco.com.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

2. Verify that foundations are within tolerances specified.

3. Verify that reinforcing dowels are properly placed.

4. Verify that substrates are free of substances that would impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Build chases and recesses to accommodate items specified in this and other Sections.

B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.

2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.

3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.

7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.

2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.

4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern indicated; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Fill voids in entirety below grade, with mortar or grout.

H. Provide a 1-inch soft joint at ends of above grade CMU walls intersecting concrete columns and walls.

I. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

J. CMU walls to be grouted solid unless noted otherwise.

K. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.

2. Fasten partition top anchors to structure above as indicated on Structural Drawings.

3. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 13 "Penetration Firestopping".

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.

2. Bed webs in mortar in all courses of piers, columns, and pilasters.

3. Bed webs in mortar in grouted masonry, including starting course on footings.

4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.

D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

1. Where CMU walls are to receive weather barrier, strike joints flush, do not tool.

E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

F. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 CONTROL AND EXPANSION JOINTS

A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:

1. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.
2. Install preformed control-joint gaskets designed to fit standard sash block.

3.7 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.8 FLASHING, WEEP HOLES, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. Extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under water-resistive barrier, lapping at least 4 inches. Fasten upper edge of flexible flashing to sheathing through termination bar.
3. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 07 92 00 "Joint Sealants" for application indicated.
5. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 07 92 00 "Joint Sealants" for application indicated.
6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.

7. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
8. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

D. Install weep holes in head joints of first course of masonry immediately above embedded flashing.

1. Use specified weep/ vent products to form weep holes.
2. Space weep holes 24 inches o.c. unless otherwise indicated.

E. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

3.9 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: Verification of materials based on unit strength method in accordance with TMS 602/ACI 530/ ASCE 5 section 1.4 B.

3.10 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.11 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

END OF SECTION

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SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. The General Structural Notes in Structural Contract Documents for structural design criteria shall be used in conjunction with this specification. The General Structural Notes shall supersede items in this specification when discrepancies exist.

1.2 SUMMARY

A. Section Includes:

1. Structural steel including tube steel columns at mechanical mezzanine and knife-type base plates for glued-laminated exterior columns.
2. Grout.

B. Related Requirements:

1. Section 01 40 00 "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Section 05 50 00 "Metal Fabrications" for other steel items not defined as structural steel.
3. Section 09 96 00 "High-Performance Coatings" for painting requirements.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.

C. Welding certificates.

D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

E. Source quality-control reports.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/ D1.1M, "Structural Welding Code – Steel" and WABO (or approved equal) requirements.

B. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.

2. Clean and relubricate bolts and nuts that become dry or rusty before use.

3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F1852 fasteners and for retesting fasteners after lubrication.

1.7 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.8 REDESIGN

A. Redesign or Departures from Requirements of the Contract Documents Initiated by Contractor:

1. Obtain written acceptance from the Architect and Architect’s consultants.

2. Bear costs for Contractor-initiated or construction error-caused changes to type, form, system, or details of construction from those indicated by the contract documents.

3. Pay fees required by Architect and Architect’s consultants for review of such changes.

1.9 EXCEPTIONS TO AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES

A. Revise Section 7.14, Correction of Errors, as follows:

1. “The correction of minor misfits by moderate amounts of reaming or grinding, and the drawing of elements into line with drift pins, shall be considered to be normal erection operations. Errors that cannot be corrected using the foregoing means, or that require welding, cutting or changes in member or Connection configuration, shall be promptly reported to the Owner’s Designated Representatives for Design and Construction and the Fabricator by the Erector, to enable the responsible entity to either correct the error or approve the method of correction to be used by others.”

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Refer to Structural Drawings for requirements.

2.2 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A992/ A992M or ASTM A572/ A572M, Grade 50 (345).

B. Channels, Angles, M-Shapes and S-Shapes: ASTM A36/ A36M or ASTM A572/A 572M, Grade 36 (250).

C. Plate and Bar: ASTM A36/ A36M or ASTM A572/ A572M, Grade 50 (345).

D. Corrosion-Resisting Structural-Steel Shapes, Plates, and Bars: ASTM A588/ A588M, Grade 50 (345).

E. Cold-Formed Hollow Structural Sections: ASTM A500/ A500M, Grade B, structural tubing.

F. Steel Pipe: ASTM A53/ A53M, Type E or Type S, Grade B.

1. Weight Class: As indicated.

2. Finish: Black except where indicated to be galvanized.

G. Steel Castings: ASTM A216/ A216M, Grade WCB with supplementary requirement S11.

H. Steel Forgings: ASTM A668/ A668M.

I. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, heavy-hex steel structural bolts; ASTM A563, Grade C, (ASTM A563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F436 (ASTM F436M), Type 1, hardened carbon-steel washers; all with plain finish.

1. Direct-Tension Indicators: ASTM F959, Type 325 (ASTM F959M, Type 8.8), compressible-washer type with plain finish.

B. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH (ASTM A563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F436 (ASTM F436M), Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip or mechanically deposited zinc coating.

2. Direct-Tension Indicators: ASTM F959, Type 325 (ASTM F959M, Type 8.8), compressible-washer type with mechanically deposited zinc coating, baked epoxy-coated finish.

C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F1852, Type 1, heavy-hex head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.

1. Finish: Mechanically deposited zinc coating.

D. Shear Connectors: ASTM A108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/ D1.1M, Type B.

E. Headed Anchor Rods: ASTM F1554, Grade as indicated on Structural Drawings.

1. Nuts: ASTM A563 (ASTM A563M) heavy-hex carbon steel.

2. Plate Washers: ASTM A36/ A36M carbon steel.

3. Washers: ASTM F436 (ASTM F436M), Type 1, hardened carbon steel.

4. Finish: Hot-dip zinc coating, ASTM A153/ A153M, Class C or Mechanically deposited zinc coating, ASTM B695, Class 50.

F. Threaded Rods: ASTM A36/ A36M.

1. Nuts: ASTM A563 (ASTM A563M) heavy-hex carbon steel.

2. Washers: ASTM A36/ A36M carbon steel.

3. Finish: Hot-dip zinc coating, ASTM A153/ A153M, Class C or Mechanically deposited zinc coating, ASTM B695, Class 50.

G. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A108, Grade 1035.

H. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A108, Grade 1030.

I. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A108, Grade 1018.

2.4 PRIMER

A. Primer: Comply with Section 09 91 00 "Painting," and Section 09 96 00 "High-Performance Coatings."

B. Primer at Locations Exterior of the Building Envelope: SSPC-Paint 25, Type II zinc oxide, alkyd, linseed oil primer.

C. Primer at Locations Within or Interior of the Building Envelope: SSPC-Paint 23, latex primer.

D. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.5 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/ C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time with minimum 6000 psi compressive strength.

2.6 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

1. Camber structural-steel members where indicated.

2. Fabricate beams with rolling camber up.

3. Identify high-strength structural steel according to ASTM A6/ A6M and maintain markings until structural steel has been erected.

4. Mark and match-mark materials for field assembly.

5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/ D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/ D1.1M and manufacturer's written instructions.

F. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural-steel frame. Straighten as required to provide uniform, square, and true members in completed wall framing. Build up welded framing, weld exposed joints continuously, and grind smooth.

G. Welded Door Frames: Build up welded door frames attached to structural-steel frame. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure

removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches (250 mm) o.c. unless otherwise indicated.

H. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.

2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened, Pretensioned or Slip critical, as indicated in The Structural Drawings.

B. Weld Connections: Comply with AWS D1.1/ D1.1M and AWS D1.8/ D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.8 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar including tops of beams with metal deck or metal deck with concrete topping. Extend priming of partially embedded members to a depth of 2 inches (50 mm).

2. Surfaces to be field welded.

3. Surfaces of high-strength bolted, slip-critical connections.

4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).

5. Galvanized surfaces.

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. At non-exposed structural steel locations, provide SSPC-SP 3, "Power Tool Cleaning."

2. At exposed structural steel locations, provide SSPC-SP 10/ NACE No. 2, "Near-White Blast Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

D. Painting: Prepare steel and apply a one-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils (0.038 mm).

2.9 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A123/ A123M.

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.

2. All structural steel exposed to weather or placed beyond the exterior weather resistance barrier shall be hot-dip galvanized.

3. Galvanize lintels, shelf angles and welded door frames attached to structural-steel frame and located in exterior walls.

2.10 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections as required. Reference requirements of structural drawings and Statement of Special Inspections within the structural drawings for all required inspections and testing in addition to this specification.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Bolted Connections: Inspect shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."

C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/ D1.1M and the following inspection procedures where required, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E165.

2. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.

3. Ultrasonic Inspection: ASTM E164.

4. Radiographic Inspection: ASTM E94.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Base Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.

2. Weld plate washers to top of baseplate.

3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.

4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces at a 45 degree angle; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection.

G. Do not enlarge unfair holes in members by burning or using drift pins. Light drifting will be permitted to draw the parts together, but drifting to match unfair holes will not be permitted. Any enlargement of holes necessary to make connections in the field shall be done by reaming with twist drills, care being taken not to weaken the adjoining metal. If, in the opinion of the Architect, the extent of the reaming is such that holes cannot be properly filled or accurately adjusted after reaming, the faulty member shall be discarded and replaced with a new one, and all costs and expenses resulting shall be paid by the Contactor.

H. No cutting of sections, either flanges, webs, stems or angles, shall be done by the Contractor without the consent of the Architect, unless this cutting is particularly specified or shown on the drawings.

I. Corrective Measures

1. Any errors in locations or inaccuracies in the setting of anchor bolts, base plates, bearing plates, or other items of attachment or support for steel work shall be reported to the Architect, and shall be corrected in a manner subject to the approval of the Architect.

2. Any misfits due to errors in fabrication shall be reported immediately to the Architect, along with proposed method of correction of same and Architect approval obtained before proceeding with corrective measures.

3. No members shall be cut or burned without specific approval in writing.

4. Bolted or welded connections, joints, or fastenings, which are classified as defective in the opinion of the Architect, shall be corrected by the Contractor in a manner subject to the Architect’s approval.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and all other required steel special inspections as required per the Statement of Special Inspections within the Structural Drawings.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.5 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A780.

B. Touchup Painting: Cleaning and touchup painting are specified in Section 09 91 00 “Painting” and Section 09 96 00 “High-Performance Coatings”.

END OF SECTION

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. The General Structural Notes in Structural Contract Documents for structural design criteria shall be used in conjunction with this specification. The General Structural Notes shall supersede items in this specification when discrepancies exist.

1.2 SUMMARY

A. Section Includes:

1. Steel framing and supports, including but not limited to the following:
   a. For applications where framing and supports are not specified in other Sections.
   b. For mechanical and electrical equipment.
2. Loose bearing and leveling plates for applications where they are not specified in other Sections.
3. Steel pipe downspouts.
4. Metal bollards.
5. Ships' ladders.
6. Delegated design for steel framing and supports for mechanical and electrical equipment and other applications where framing and supports are not specified in other Sections, and ships' ladders.

B. Products furnished, but not installed, under this Section include the following:

1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Requirements:

1. Section 01 61 16 “Delegated Design Requirements”.
2. Section 05 12 00 “Structural Steel Framing”.

1.3 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.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. 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.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Grout.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for all items specified in this Section, including but not limited to all items indicated in “Summary” Article above.

C. Shop Drawings for Delegated Design Components: Submit shop drawings and calculations for all attachments to the structure for all elements requiring delegated design, including structural bracing for equipment, and architectural components, and details of lateral bracing.

1. For all attachments to the structure, shop drawings and calculations shall be sealed by the structural engineer responsible for their design.

2. These attachments include, but are not limited to the following:

a. Steel framing and supports for mechanical and electrical equipment.

b. Steel framing and supports for applications where framing and supports are not specified in other Sections.

c. Metal ships' ladders.

D. Samples for Verification: For each type and finish where not field painted.

E. Delegated-Design Submittal: For ladders, framing and supports indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

F. Qualification Data:

1. For professional Engineer.

G. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with requirements.

H. Welding certificates.

I. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

J. Research/ Evaluation Reports: For post-installed anchors, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Engineer Qualifications: Qualified professional engineer responsible for delegated design, licensed in the jurisdiction in which Project is located.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/ D1.1M, "Structural Welding Code - Steel."

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/ D1.1M, "Structural Welding Code - Steel."

2. AWS D1.2/ D1.2M, "Structural Welding Code - Aluminum."

3. AWS D1.6/ D1.6M, "Structural Welding Code - Stainless Steel."

1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 61 16 "Delegated Design Requirements," to design items requiring design and attachment to structure, including, but not limited to the following:

1. Ship's ladders.

2. Mechanical and electrical support framing.

B. Structural Performance, Ladders: Ladders shall withstand the effects of loads and stresses within limits under conditions specified in ASNI A14.3.

C. Seismic Performance: Metal fabrications shall withstand the effects of earthquake motions determined according to ASCE/ SEI 7 and as indicated.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A36 or A529 GR.50 as indicated in structural drawings.

C. Stainless-Steel Sheet, Strip, and Plate: ASTM A240 or ASTM A 666, Type 304 at interior locations, Type 316L at exterior locations.

D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304 at interior locations, Type 316L at exterior locations.

E. Steel Tubing: ASTM A500, cold-formed steel tubing.

F. Steel Pipe: ASTM A53, Standard Weight (Schedule 40) unless otherwise indicated.

G. Slotted Channel Framing (Unistrut): Cold-formed metal box channels (struts) complying with MFMA-4.

1. Size of Channels: Size and configuration as required.

2. Material, Exterior and Garage and Other Unconditioned/ Uncontrolled Humidity Locations: Galvanized steel, ASTM A653, structural steel, Grade 33, with G90 coating; thickness indicated.

3. Material, Interior (Conditioned/ Controlled Humidity) Locations: Cold-rolled steel, ASTM A1008/ A1008M, structural steel, Grade 33; with G40 coating; thickness indicated.

4. Recycled Content: 25 percent minimum post-consumer recycled content.

H. Aluminum Plate and Sheet: ASTM B209, Alloy 6061-T6.

I. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.

J. Aluminum-Alloy Rolled Tread Plate: ASTM B632, Alloy 6061-T6.

K. Aluminum Castings: ASTM B26, Alloy 443.0-F.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941, Class Fe/ Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum and stainless steel.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.

C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 2 (A4).

D. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

E. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488/ E488M, conducted by a qualified independent testing agency.

F. Post-Installed Anchors: As indicated on Structural Drawings.

G. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/ Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

A. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

E. Shop Primer: Zinc-rich, compatible with Section 09 91 00 “Painting” system for steel substrates.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish to NOMMA's "Voluntary Joint Finish Standards" for Finish No. 3: Partially dressed weld with spatter removed. No roughness or burrs permitted. Weld appearance shall be consistent and even.

a. Finish, at ladders exposed to view, exposed welds and surfaces smooth and blended so no roughness shows after finishing, to NOMMA's Finish No. 1 welds: no evidence of a welded joint.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Evidence of grinding on surfaces is not permitted on fabrications. Surfaces shall match adjacent base surface without imperfections.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.

2. Furnish inserts for units installed after concrete is placed.

C. Galvanize miscellaneous framing and supports where indicated.

D. Prime miscellaneous framing and supports with primer specified where indicated.

2.7 STEEL SHAPES

A. Fabricate from steel angles and shapes of size indicated. Fabricate in single lengths unless otherwise indicated. Weld adjoining members together where indicated.

B. Galvanize and prime steel located in exterior walls.

1. Prime steel items located in exterior walls with zinc-rich primer.

2.8 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

C. Galvanize and prime exterior miscellaneous steel trim.

2.9 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize plates.

C. Prime plates with zinc-rich primer.

2.10 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.11 STEEL DOWNSPOUTS

A. Steel Pipe Downspout: ASTM A53, Standard Weight (Schedule 40); provide downspouts with inlets of size and shape to suit downspouts; provide steel downspout support brackets as indicated.

1. Height: As indicated in Drawings.

2. Size: 4-inch, round.

3. Finish: As selected by Architect.

a. Prime steel items, including brackets and fasteners, with zinc-rich primer.

4. Outlet: Refer to Drawings for cleanouts and connection to drainage systems.

2.12 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe and steel shapes as required.

1. Cap bollards with 1/4-inch thick minimum plate, grind joint smooth.

2. Finish all welds smooth.

B. Surface-Mounted: Fabricate bollards with 3/8-inch-thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch anchor bolts.

1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

C. Cast-in Bollards: Fabricate bollards to height indicated and extending 24 inches below top of finished slab elevations for cast-in concrete.

D. Galvanize exterior bollards and shop prime with primer compatible with topcoat in Section 09 91 00 “Painting”.

E. Field-paint installed bollards with topcoat specified.

2.13 METAL SHIPS’ LADDERS

A. Provide metal 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. Treads shall be not less than 5 inches exclusive of nosing or less than 8-1/2 inches including the nosing, and riser height shall be not more than 9-1/2 inches.

2. Width: As required by Code and OSHA.
3. Fabricate ships' ladders, including railings from steel.
4. Fabricate treads and platforms from plank grating.
5. Comply with applicable railing requirements in Section 05 52 13 "Pipe and Tube Railings."
6. Prime interior ladders, including brackets and fasteners, with zinc-rich primer.

2.14 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.15 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153 for steel and iron hardware and with ASTM A123 for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items not indicated to be galvanized or shop-finished unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with universal shop primer indicated or as indicated in Section 09 91 00 “Painting”.

D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/ NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/ NACE No. 3, "Commercial Blast Cleaning."
3. Items Indicated to Receive Primers Specified in Section 09 91 00 "Painting": SSPC-SP 6/ NACE No. 3, "Commercial Blast Cleaning."
4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.16 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface. Finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds: no evidence of a welded joint.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.

2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for ceiling hung toilet partitions, operable partitions, aluminum-framed folding storefront system, and overhead doors securely to, and rigidly brace from, building structure.

C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.

1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 INSTALLING STEEL DOWNSPOUTS

A. Support to building with steel connections, weld and grind smooth.

3.5 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil, dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 91 00 “Painting".

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

3.6 FIELD QUALITY CONTROL

A. Tests and Inspections: The owner will employ the services of an independent testing laboratory for performing test and to conduct inspection services on all shop fabricated and on-site structural welding and bolting plus expansion anchor, grouted anchor, and adhesive anchor placement required for this construction and as required per the Statement of Special Inspections within the Structural Drawings.

END OF SECTION

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SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe and tube handrails at exterior concrete ramps.
2. Pipe and tube handrails at interior floor openings.
3. Delegated design.

B. Related Requirements:

1. Section 01 61 16 “Delegated Design Requirements”.

1.3 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.

B. Coordinate installation of anchorages for handrails. 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.

C. Schedule installation so wall attachments are made only to completed walls. Do not support handrails temporarily by any means that do not satisfy structural performance requirements.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected handrails.
2. Handrail brackets.
3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

1. Sections of each distinctly different linear handrail member, including handrails, top rails, posts, and balusters.
2. Fittings and brackets.

D. Delegated-Design Submittal: For handrails 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. Qualification Data:

1. For testing agency.

2. For Professional Engineer.

F. Welding certificates.

G. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.

H. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

I. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

J. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Engineer Qualifications: Qualified professional engineer responsible for delegated design, licensed in the jurisdiction in which Project is located.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 61 16 “Delegated Design Requirements” to design handrails, including attachment to building construction.

B. Structural Performance: Handrails, including attachment to building construction, 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.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

2.3 STEEL AND IRON

A. Tubing: ASTM A500 (cold formed) or ASTM A513.

B. Pipe: ASTM A53, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

C. Plates, Shapes, and Bars: ASTM A36.

2.4 FASTENERS

A. General: Provide the following:

1. Provide exposed fasteners with finish matching appearance, including color and texture, of handrails.

B. Fasteners for Anchoring Handrails to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring handrails to other types of construction indicated and capable of withstanding design loads.

C. Fasteners for Interconnecting Handrail Components:

1. Provide concealed fasteners for interconnecting handrail components and for attaching them to other work, unless otherwise indicated.

2. Provide concealed fasteners for interconnecting handrail components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for handrails indicated.

3. Provide Phillips, square or hex socket flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

1. Stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594. Provide alloy Group 1 where Type 304 stainless-steel is required; alloy Group 2 where Type 316 stainless-steel is required.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

1. For stainless-steel handrails, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout

complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

C. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: At exterior locations and where indicated provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.6 FABRICATION

A. General: Fabricate handrails to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Shop assemble handrails to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate handrails with welded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove flux immediately.

4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

J. Form Changes in Direction as Follows:

1. For stainless-steel handrails: As detailed.

K. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

L. Close exposed ends of handrail members with prefabricated end fittings.

M. 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.

N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect handrail members to other work unless otherwise indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

O. Provide inserts and other anchorage devices for connecting handrails to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by handrails. Coordinate anchorage devices with supporting structure.

P. For handrail posts set in concrete, provide stainless-steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.

Q. Finish:

1. Interior: Shop-primed and field-painted; refer to Steel Finishes Articles.

2. Exterior: Hot-dip galvanize, including fasteners, after fabrication.

2.7 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153 for steel and iron hardware and with ASTM A123 for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items not indicated to be galvanized or shop-finished unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with universal shop primer indicated.

2. Shop prime with primer indicated in Section 09 91 00 “Painting” where finish is indicated to be high-performance or at exterior steel fabrications.

D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/ NACE No. 3, "Commercial Blast Cleaning."

2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/ NACE No. 3, "Commercial Blast Cleaning."

3. Items Indicated to Receive Primers Specified in Section 09 91 00 "Painting": SSPC-SP 6/ NACE No. 3, "Commercial Blast Cleaning."

4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing handrails. Set handrails accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of handrail components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.

2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.

3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

D. Adjust handrails before anchoring to ensure matching alignment at abutting joints.

E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing handrails and for properly transferring loads to in-place construction.

3.3 HANDRAIL CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting handrail components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of handrails.

B. Welded Connections: Use fully welded joints for permanently connecting handrail components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.4 ANCHORING POSTS

A. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Cover anchorage joint with flange of same metal as post, attached to post with set screws.

C. Leave anchorage joint exposed with 1/8-inch buildup, sloped away from post.

D. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:

1. For stainless-steel pipe handrails, weld flanges to post and bolt to supporting surfaces.

E. Provide removable portions of handrails as sections in slip-fit metal sockets or other means to provide access, as follows:

1. Welded to steel plate, anchored securely to building structure.

2. Applications: At Mechanical Mezzanine, as indicated.

3.5 ATTACHING HANDRAILS

A. Anchor handrail ends at walls with round flanges anchored to wall construction and welded to handrail ends.

B. Anchor handrail ends to metal surfaces with flanges bolted to metal surfaces and welded to handrail ends.

C. Attach handrails to wall with wall brackets, except where end flanges are used. Locate brackets as indicated or, if not indicated, at regular, equal spacing required to support structural loads.

3.6 ADJUSTING AND CLEANING

A. Clean steel by washing thoroughly with clean water and soap and rinsing with clean water.

B. 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.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

3.7 PROTECTION

A. Protect finishes of handrails from damage during construction period with temporary protective coverings approved by handrail manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION

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SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. The General Structural Notes in Structural Contract Documents for structural design criteria shall be used in conjunction with this specification. The General Structural Notes shall supersede items in this specification when discrepancies exist.

1.2 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Rooftop equipment bases and support curbs.
4. Wood blocking, cants, and nailers.
5. Wood furring and grounds.
6. Wood sleepers.
7. Plywood backing panels.

B. Related Requirements:

1. Section 06 16 00 “Sheathing” for sheathing, subflooring, and underlayment.
2. Section 06 17 53 “Shop-Fabricated Wood Trusses” for wood trusses made from dimension lumber.
3. Section 06 18 00 “Glued-Laminated Construction”.

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.

C. Exposed Framing: Framing not concealed by other construction.

D. OSB: Oriented strand board.

E. Timber: Lumber of 5 inches nominal size or greater in least dimension.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include

physical properties of treated materials based on testing by a qualified independent testing agency.

3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.

4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Fastener Patterns: Full-size templates for fasteners in exposed framing.

C. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

D. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.

2. Fire-retardant-treated wood.

3. Engineered wood products.

4. Power-driven fasteners.

5. Post-installed anchors.

6. Metal framing anchors.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.

3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less; 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2. Exposed Engineered Wood Products Indicated to Remain Exposed in Final Construction: Hand-select material for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, splits, torn grain, and wane.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat all rough carpentry items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.

4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.

5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

A. Load-Bearing and Non-Load-Bearing Exterior Walls and Interior Partitions: Construction or No. 2 grade.

1. Species:

a. Hem-fir (north); NLGA.

b. Southern pine or mixed southern pine; SPIB.

c. Spruce-pine-fir; NLGA.

d. Hem-fir; WCLIB, or WWPA.

e. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

B. Ceiling Joists: Construction or No. 2 grade.

1. Species:

a. Hem-fir (north); NLGA.

b. Douglas fir-larch; WCLIB or WWPA.

c. Douglas fir-larch (north); NLGA.

d. Southern pine or mixed southern pine; SPIB.

e. Spruce-pine-fir; NLGA.

f. Hem-fir; WCLIB or WWPA.

g. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

C. Joists, Rafters, and Other Framing Not Listed Above: Construction or No. 2 grade.

1. Species:

a. Hem-fir (north); NLGA.

b. Douglas fir-larch (north); NLGA.

c. Douglas fir-larch; WCLIB or WWPA.

d. Southern pine or mixed southern pine; SPIB.

e. Spruce-pine-fir; NLGA.

f. Hem-fir; WCLIB or WWPA.

g. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.4 ENGINEERED WOOD PRODUCTS

A. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.

B. Laminated-Veneer Lumber (LVL): Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.

1. Extreme Fiber Stress in Bending, Edgewise: As indicated in Structural Drawings.

2. Modulus of Elasticity, Edgewise: As indicated in Structural Drawings.

C. Parallel-Strand Lumber (PSL): Structural composite lumber made from wood strand elements with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.

1. Extreme Fiber Stress in Bending, Edgewise: As indicated in Structural Drawings.

2. Modulus of Elasticity, Edgewise: As indicated in Structural Drawings.

D. Wood I-Joists: Prefabricated units, I-shaped in cross section, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Comply with material requirements of and with structural capacities established and monitored according to ASTM D5055.

1. Web Material: Either OSB or plywood, complying with DOC PS 1 or DOC PS 2, Exposure 1, Plywood, complying with DOC PS 1 or DOC PS 2, Exposure 1, or Plywood, complying with DOC PS 1, Exterior grade, as required.

2. Structural Properties: Depths and design values not less than those indicated.
3. Comply with APA PRI-400. Factory mark I-joists with APA-EWS trademark indicating nominal joist depth, joist class, span ratings, mill identification, and compliance with APA-EWS standard.

E. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research or evaluation report for I-joists.

1. Manufacturer: Provide products by same manufacturer as I-joists.
2. Material: All-veneer product, glued-laminated wood or product made from any combination solid lumber, wood strands, and veneers.
3. Thickness: 1 inch.
4. Comply with APA PRR-401, rim board plus grade. Factory mark rim boards with APA-EWS trademark indicating thickness, grade, and compliance with APA-EWS standard.

2.5 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:

1. Hem-fir (north); NLGA.
2. Southern pine or mixed southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.7 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153 or of Type 304 stainless steel.

2. For projects utilizing exposed mass timber structural members, utilize only Type 304 stainless steel fasteners.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe.

2. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2.

2.8 METAL FRAMING ANCHORS

A. Approved Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Simpson Strong-Tie Co., Inc.; www.strongtie.com.

2. Cleveland Steel Specialty Co.; www.clevelandsteel.com.

3. MiTek Industries, Inc.; www.mitek-us.com.

4. Tamlyn; www.tamlyn.com.

B. Allowable design loads, as published by manufacturer, shall meet or exceed those indicated in Drawings. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653; structural steel, high-strength low-alloy steel Type A, or high-strength low-alloy steel Type B; G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

E. Stainless Steel Sheet: ASTM A240 or ASTM A666, Type 304.

1. Exception: For exterior locations within 10 miles of ocean provide Type 316.

F. Refer to General Notes in Structural Drawings for component requirements, including hangers, bridging, post bases, joist ties, tie-downs, hold-downs, and bracing.

2.9 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

B. Flexible Flashing: Refer to Division 07 Air and Weather Barriers Sections.

C. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

D. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

E. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

F. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

G. Do not splice structural members between supports unless otherwise indicated.

H. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

I. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.

2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.

3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.

4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

J. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

K. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.

2. Use copper naphthenate for items not continuously protected from liquid water.

L. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

M. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with ICC-ES evaluation report for fastener and one of the following, or as indicated in Drawings:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).

2. Table R602.3, "Fastener Schedule for Structural Members," and Table R602.3, "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.

N. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

O. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

1. Comply with indicated fastener patterns where applicable. Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.

2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

1. Blocking shall be required for all surface applied items and equipment, i.e. door hardware, marker boards, tack boards, casework, etc., not attached to framing.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 INSTALLATION OF WOOD FURRING

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal-size furring horizontally and vertically at 24 inches o.c.

C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal-size furring vertically at 16 inches o.c.

3.4 INSTALLATION OF WALL AND PARTITION FRAMING

A. General: Provide single bottom plate and double top plates using members of 2-inch nominal (38-mm actual) thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions and for load-bearing partitions where framing members bearing on partition are located directly over studs. Fasten plates to supporting construction unless otherwise indicated. Refer to Drawings for sizes and spacing.

1. Provide continuous horizontal blocking at midheight of partitions more than 96 inches high, using members of 2-inch nominal thickness and of same width as wall or partitions.

B. Construct corners and intersections with three or more studs, except that two studs may be used for interior non-load-bearing partitions.

C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.

3.5 INSTALLATION OF FLOOR JOIST FRAMING

A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches of bearing on wood or metal, or 3 inches on masonry. Attach floor joists as follows:

1. Where supported on wood members, by using metal framing anchors.

2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers.

B. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches.

C. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than one-third depth of joist; do not locate closer than 2 inches from top or bottom.

D. Provide solid blocking of 2-inch nominal thickness by depth of joist at ends of joists unless nailed to header or band.

E. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches or securely tie opposing members together. Provide solid blocking of 2-inch nominal thickness by depth of joist over supports.

F. Provide solid blocking between joists under jamb studs for openings.

G. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.

1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.

H. Provide bridging of type indicated below, at intervals of 96 inches o.c., between joists.

1. Steel bridging installed to comply with bridging manufacturer's written instructions.

2. Solid blocking of same material and depth as joists.

3.6 INSTALLATION OF CEILING JOIST AND RAFTER FRAMING

A. Ceiling Joists: Install with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.

1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate, and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal-size or 2-by-4-inch nominal-size stringers spaced 48 inches o.c. crosswise over main ceiling joists.

B. Rafters: Notch to fit exterior wall plates and use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.

1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafters.

2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafter.

C. Provide collar beams (ties) as indicated or, if not indicated, provide 1-by-6-inch nominal-size boards between every third pair of rafters, but not more than 48 inches o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.

D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions if any.

3.7 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet enough that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 06 16 00 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. The General Structural Notes in Structural Contract Documents for structural design criteria shall be used in conjunction with this specification. The General Structural Notes shall supersede items in this specification when discrepancies exist.

1.2 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Subflooring.
3. Roof sheathing.
4. Underlayment.
5. Sheathing joint and penetration treatment.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for plywood backing panels.
2. Section 07 25 00 "Weather Barriers" for water-resistive barrier applied over wall sheathing.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

B. For Plywood: Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.

1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
2. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5516.
3. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

C. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated plywood.
2. Fire-retardant-treated plywood.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that

periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS

A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

C. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat all plywood unless otherwise indicated.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.

2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.

3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201/ D3201M at 92 percent relative humidity. Use where exterior type is not indicated.

C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.

D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.

E. Application: As indicated or required by Code.

2.5 WALL AND PARAPET SHEATHING

A. Exterior Plywood Wall Sheathing: DOC PS1, APA Rated Exposure 1, Structural 1 sheathing; FR treated within 48 inches of fire walls.

1. Span Rating: Not less than 32/16.

2. Nominal Thickness: As indicated, but not less than 15/32 inch.

3. Edge Profile: Square.

2.6 ROOF SHEATHING

A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2, APA Rated Exposure 1 sheathing; FR treated.

1. Span Rating: Not less than 32/16.

2. Nominal Thickness: 5/8 inch.

3. Edge Detail: Square.

2.7 SUBFLOORING AND UNDERLAYMENT

A. Plywood Combination Subfloor-Underlayment: DOC PS 1, single-floor panels.

1. Basis-of-Design Product: Plywood Sturd-I-Floor Quick-Fit Tongue & Groove by Boise Cascade Wood Products, LLC; www.bc.com.

2. Span Rating: Not less than 24.

3. Nominal Thickness: As indicated on Drawings.

4. Edge Detail: Tongue and groove.

B. Applications: Plywood floor sheathing at wood-framed floors and concrete topping; as indicated in Drawings.

2.8 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Screws for Fastening Sheathing to Wood Framing: ASTM C1002.

2.9 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with APA AFG-01

that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

1. Adhesives shall have a VOC content of 50 g/L or less.
2. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated within the drawings, where not indicated, at a minimum, comply with the following:

1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.

D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate wall and sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD SHEATHING INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Wall, Parapet and Roof Sheathing:
   a. Fasten panels to framing as indicated on Structural Drawings.
   b. Space panel 1/8 inch apart at edges and ends.
2. Floor Sheathing:
   a. Fasten panels to framing as indicated on Structural Drawings.
   b. Space panel 1/8 inch apart at edges and ends.
   c. At seams other than tongue and groove joints, provide continuous blocking at all seams.

END OF SECTION

SECTION 06 17 53 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. The General Structural Notes in Structural Contract Documents for structural design criteria shall be used in conjunction with this specification. The General Structural Notes shall supersede items in this specification when discrepancies exist.

1.2 SUMMARY

A. Section includes:

1. Wood roof and girder trusses.
2. Delegated design.

B. Related Requirements:

1. Section 01 61 16 “Delegated Design Requirements”.
2. Section 06 10 00 “Rough Carpentry”.
3. Section 06 16 00 “Sheathing”.

1.3 DEFINITIONS

A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.4 SUBMITTALS

A. Product Data: For wood-preservative-treated lumber, fire-retardant-treated lumber, metal-plate connectors, metal truss accessories, and fasteners.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification from treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification from treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to truss fabricator.

B. Shop Drawings: Show fabrication and installation details for trusses.

1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
2. Indicate sizes, stress grades, and species of lumber.

3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
6. Show splice details and bearing details.

C. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Qualification Data: For metal connector-plate manufacturer, professional engineer and fabricator.

E. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.

F. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.

G. Evaluation Reports: For the following, from ICC-ES:
1. Wood-preservative-treated lumber.
2. Fire-retardant-treated wood.
3. Metal-plate connectors.
4. Metal truss accessories.

1.5 QUALITY ASSURANCE

A. Engineer Qualifications: Qualified professional engineer responsible for delegated design, licensed in the jurisdiction in which Project is located.

B. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

C. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.

D. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
1. Store trusses flat, off ground, and adequately supported to prevent lateral bending.
2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.

3. Provide for air circulation around stacks and under coverings.

B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 61 16 "Delegated Design Requirements," to design metal-plate-connected wood trusses.

B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.

1. Design Loads: As indicated within the Structural Drawings.

2. Maximum Deflection under Design Loads: Vertical live load deflection of 1/360 of span. Vertical total load deflection of 1/240 of span. However, the maximum deflection under total loads shall not exceed 1-inch. More stringent deflection criteria may exist at trusses supporting MEP equipment.

3. Accommodate for forces and attachments of tie-off anchors in Section 11 81 29 “Facility Fall Protection.”

C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.

D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

E. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to authorities having jurisdiction.

2.2 DIMENSION LUMBER

A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.

3. Provide dressed lumber, S4S.

4. Provide dry lumber with 19 percent maximum moisture content at time of dressing.

B. Minimum Chord Size for Roof Trusses: 2 by 6 inches nominal for both top and bottom chords.

C. Minimum Specific Gravity for Top Chords: 0.50.

D. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 06 10 00 "Rough Carpentry."

2.3 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in

contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

2. For exposed trusses indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed trusses indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat trusses where indicated on Drawings.

2.4 FIRE-RETARDANT-TREATED WOOD

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products according to test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.

2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.

3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use for interior locations where exterior type is not indicated.

4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664, and design value adjustment factors shall be calculated according to ASTM D6841. For enclosed roof framing and framing in attic spaces, and where high-temperature fire-retardant treatment is indicated, provide material with adjustment factors of not less than 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for Project's climatological zone.

C. Kiln-dry lumber after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

1. For exposed trusses and bracing indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

E. For exposed trusses indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

F. Application: Treat items indicated on Drawings and the following:

1. Wood trusses in fire-rated attic and roof construction.

2.5 METAL CONNECTOR PLATES

A. General: Fabricate connector plates to comply with TPI 1.

B. Hot-Dip Galvanized-Steel Sheet: ASTM A653; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A653; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

D. Stainless-Steel Sheet: ASTM A666, Type 304, and not less than 0.035 inch thick.

1. Use for exterior locations and where indicated.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.

2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F1667.

2.7 METAL FRAMING ANCHORS AND ACCESSORIES

A. Allowable design loads, as published by manufacturer, shall comply with or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/ A653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A653; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

D. Stainless-Steel Sheet: ASTM A666, Type 304.

1. Use for exterior locations and where indicated.

E. Connectors: All connectors shall be manufactured by Simpson Strong-Tie.

2.8 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 92 percent zinc dust by weight.

2.9 FABRICATION

A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.

B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.

C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

2.10 SOURCE QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections indicated within this Specification and in the Statement of Special Inspections within the Structural Drawings.

1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.

2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.

B. Correct deficiencies in Work that special inspections indicate do not comply with the Contract Documents.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.

B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to TPI recommendations and as indicated.

E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.

G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.

H. Securely connect each truss ply required for forming built-up girder trusses.

1. Anchor trusses to girder trusses as indicated.

I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

1. Install bracing to comply with Section 06 10 00 "Rough Carpentry."

2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.

J. Install wood trusses within installation tolerances in TPI 1.

K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.

L. Replace wood trusses that are damaged or do not comply with requirements.

1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

3.2 REPAIRS AND PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

C. Repair damaged galvanized coatings on exposed surfaces according to ASTM A780 and manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections to verify that temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package.

END OF SECTION

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SECTION 06 18 00 - GLUED-LAMINATED CONSTRUCTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. The General Structural Notes shall be used in conjunction with this specification. The General Structural Notes shall supersede items in this specification when discrepancies exist.

1.2 SUMMARY

A. Section Includes:

1. Structural glued-laminated timber.
2. Non-structural glued-laminated timber for exterior fascia.
3. Fasteners and connectors.
4. Factory finishing.
5. Factory installed hardware.

B. Related Requirements:

1. Section 03 30 00 “Cast-in-Place Concrete” for coordination of placement of baseplates and other embedded components.
2. Section 05 12 00 “Structural Steel Framing” for coordination with structural steel frame.
3. Section 06 10 00 "Rough Carpentry" for dimension lumber items associated with structural glued-laminated timber.

1.3 DEFINITIONS

A. Fabricated Structural Glued-Laminated (Glulam) Timber: An engineered, stress-rated timber product assembled from selected and prepared wood laminations bonded together with adhesives and with the grain of the laminations approximately parallel longitudinally, pre-cut in a factory with pre-installed hardware components.

1. AOR: Architect of Record hired by the project owner or the Design-Build General Contractor.
2. SEOR: Structural Engineer of Record hired by the Architect or Design-Build General Contractor.

1.4 REFERENCES

A. AITC 110 – Standard Appearance Grades for Structural Glued Laminated Timber; 2001.

B. ANSI 117 – Standard Specification for Structural Glued Laminated Timber of Softwood Species; 2020.

C. ANSI A190.1 – Standard for Wood Products – Structural Glued Laminated Timber; 2017.

1.5 SUBMITTALS

A. Product Data: For each type of product.

1. Include data on lumber, adhesives, fabrication, and protection.
2. For connectors. Include installation instructions.

B. Shop Drawings: Provide for general building construction.

1. Provide floor and roof plans that identify the extent of all glued-laminated timber floor roof and wall framing members, in relation to building gridlines, relevant structural trades and finish conditions found in Contract.

2. Indicate species, lamination combinations, camber, adhesive type, and other variables in required Work.

3. Enlarge details to indicate fabrication and installation tolerances in accordance with relevant Specifications Sections.

C. Certificates of Conformance: Issued by a qualified testing and inspecting agency indicating that structural glued-laminated timber complies with requirements in AITC A190.1.

A. Weather Protection Plan: Submit proposed coverings and removal sequence and standing water mitigation plan during construction, as applicable. Include recommendations for repairing stained or otherwise damaged areas.

B. Research/ Evaluation Reports: For structural glued-laminated timber and timber connectors, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide factory-glued structural units produced by an AITC- or APA-licensed firm.

1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA-EWS trademark. Place mark on surfaces that will not be exposed in the completed Work.

B. Quality Standard: Comply with AITC A190.1.

C. Fabricators Qualifications.

1.7 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with provisions in AITC 111.

B. Protect glued-laminated timber framing members during delivery, storage and handling with water-resistant covering, in accordance with Weather Protection Plan.

1. Individually wrap members using plastic-coated paper covering with water-resistant seams.

PART 2 - PRODUCTS

2.1 STRUCTURAL GLUED-LAMINATED TIMBER

A. General: Provide structural glued-laminated timber that complies with ANSI A190.1 and ANSI 117 or research/evaluation reports acceptable to authorities having jurisdiction.

1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA-EWS trademark except for fully exposed glulam columns. Place mark on surfaces that are not exposed in the completed Work.

2. Provide structural glued-laminated timber made from solid lumber laminations, except with specific manufacturers tested assemblies.

3. Provide structural glued-laminated timber made with wet-use adhesive complying with ANSI A190.1.

B. Species and Grades for Beams and Purlins:

1. Species and Beam Stress Classification: Refer to General Structural Notes.

2. Lay-up: Refer to General Structural Notes.

C. Species and Grades for Columns:

1. Species and Column Stress Classification: Refer to General Structural Notes.

D. Appearance Grade: Complying with AITC 110.

1. Framing: Suitable for non-visual applications. Planned as necessary to meet width requirements and non-sanded.

2. Industrial: Suitable for construction when appearance is not the primary concern. Planned on two sides and non-sanded.

3. Architectural: Suitable for visual applications. Fill voids as required by AITC 110. Planned on two sides with smooth visual sides.

E. Adhesives: Provide adhesive products in compliance with ANSI A190.1, DIN 68141 and EN301 and EN302 to grade of service required in accordance with NDS 2012.

1. Color: White/ clear.

2. Basis-of Design Product: Purbond HB E452 by Henkel Corp.; na.henkel-adhesives.com.

a. Certification: UL Greenguard Gold Certificate no. 9313-420.

3. Other Approved Manufacturer: Akzo Nobel; www.azkonobel.com.

2.2 FASTENERS AND CONNECTORS

A. Fasteners: As required or as indicated in Structural Drawings.

1. Provide bolts, 3/4 inch unless otherwise indicated, complying with ASTM A307, Grade A; nuts complying with ASTM A563; and, where indicated, flat washers.

B. Metal Connectors: Unless otherwise indicated, fabricate from the following materials:

1. Structural-steel shapes, plates, and flat bars complying with ASTM A36.

2. Round steel bars complying with ASTM A575, Grade M 1020.

3. Hot-rolled steel sheet complying with ASTM A1011, Structural Steel, Type SS, Grade 33.

4. Stainless steel flat bars complying with ASTM A666, Type 304.

5. Stainless steel bars and shapes complying with ASTM A276, Type 304.

6. Stainless steel plate, sheet, and strip complying with ASTM A240 or ASTM A666, Type 304.

C. Finish steel assemblies and fasteners with rust-inhibitive primer, 2-mil dry film thickness.

1. Primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A123 or ASTM A153.

2.3 MISCELLANEOUS MATERIALS

A. Wrapping Material: Weatherproof and lightproof material to protect mass timber members from moisture and light damage that will not adversely affect members.

2.4 FABRICATION

A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.

1. Finish exposed surfaces to remove planing or surfacing marks and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.

B. Camber: When camber is designed per the SEOR, fabricate horizontal and inclined members of less than 1:1 slope with either circular or parabolic camber equal to the amount specified through design. Do not provide camber if camber is not specifically indicated within the structural drawings. Any camber shall be indicated on the shop drawing submittal

C. End-Cut Sealing: After end cutting each member to final length, and prior to installing any hardware, apply two saturation coats of end sealer to ends and other cross-cut surfaces.

D. Seal Coat: Apply a heavy saturation coat of penetrating sealer on surfaces of each unit after the manufacturing, planning, and sanding (if required per visual grade specification).

E. Fabrication Tolerances: Comply with ANSI A190.1, unless otherwise agreed to between purchaser and manufacturer.

2.5 SEALERS AND FINISHES

A. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.

1. Ultraviolet (UV) Light Protection and Water- and Stain-Repellent:

a. Basis-of-Design Product: KP-12 UVW by Sansin Corp.; www.sansinfactoryfinish.com.

B. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.

1. Ultraviolet (UV) Light Protection and Water- and Stain-Repellent:

a. Basis-of-Design Product: KP-12 UVW by Sansin Corp.; www.sansinfactoryfinish.com.

C. Sealers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Shop-Applied Finishes:

1. Stain and/ or Coatings: Apply shop installed stain and/ or coatings as specified by the AOR. When a shop installed stain and/ or coating is specified, the shop sealer may be omitted if all sides of the glulam are finished.

E. Field-Applied Final Finishes, Exterior and Interior Applications: Coordinate with final field-applied finish stain and seal in accordance with Section 09 91 00 “Painting”.

F. Steel Connector Finish: Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish

1. Color and Gloss: As selected by AOR from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to site erection, examine site conditions and ensure acceptable conditions for erection. Report any discrepancies to SEOR or Architect.

B. Examine substrates in areas to receive structural glued-laminated timber, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Refer to APA R540 for storage and protection prior to install.

3.3 INSTALLATION

A. General: Erect structural glued-laminated timber true and plumb and with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.

1. Handle and temporarily support glued-laminated timber to prevent surface damage, compression, and other effects that might interfere with indicated finish.

B. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.

1. Predrill for fasteners using timber connectors as templates.

2. Coat cross cuts with end sealer.

C. Install timber connectors as indicated.

1. Unless otherwise indicated, install bolts with same orientation within each connection and in similar connections.

2. Install bolts with orientation as indicated or, if not indicated, as directed by Architect.

3.4 ADJUSTING

A. Structural Material Tolerances:

1. Glulam and Steel: 1/2-inch gap between glulam and structural steel elements, except in bearing conditions.

2. Glulam and Concrete: 1/2-inch gap between glulam and concrete elements, except in bearing conditions.

3. Allow extra bearing in adjacent materials and simplify connections for easy field trim of timber elements to allow for coordination of industry standards tolerances at interface.

B. Repair damaged surfaces and finishes after completing erection. Replace damaged structural glued-laminated timber if repairs are not approved by Architect.

3.5 PROTECTION

A. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose, including protection from weather, sunlight, soiling, and damage from work of other trades.

1. Coordinate wrapping removal with finishing work. Retain wrapping where it can serve as a painting shield.

2. Slit underside of wrapping to prevent accumulation of moisture inside the wrapping.

END OF SECTION

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SECTION 06 20 23 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wood window sills (WD-1).

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
2. Section 07 92 00 “Joint Sealants”.
3. Section 09 91 00 “Painting”.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

1. Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.
2. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.

B. Samples for Verification:

1. For each species and cut of lumber products with nonfactory-applied finish, with half of exposed surface finished, 50 sq. in. (300 sq. cm) for lumber.
2. For each finish system and color of lumber products with factory-applied finish, 50 sq. in. (300 sq. cm) for lumber.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

B. Mockups: Build sample mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

C. Overage: Ensure appropriate amount of overage to account for quality requirement; for all WD-# types allow for approximately 25 percent additional materials to allow sorting and rejecting to meet quality requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's Board of Review. Grade lumber by an agency certified by the American Lumber Standard Committee's Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.

2.2 WOOD SILL, WD-1

A. Architectural Woodwork Standards Grade: Custom.

B. Materials: Solid-stock lumber trim.

1. Species: Poplar.

2. Grade: Stain grade, C and Better; NLGA, WCLIB or WWPA.

3. Finish: Clear; refer to Finishes articles in this Section.

C. Thickness: 5/8 inch, or as detailed.

D. Depth: 6 inches, or as detailed.

E. Application: Interior sill at exterior Classroom windows.

2.3 MISCELLANEOUS MATERIALS

A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.

B. Low-Emitting Materials: Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.

D. Multipurpose Construction Adhesive: Formulation complying with ASTM D3498 that is recommended for indicated use by adhesive manufacturer.

2.4 FABRICATION

A. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

2.5 FINISHES

A. Preparation for Finishing: Comply with Architectural Woodwork Standards, Section 5 for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.

B. Interior Architectural Woodwork for Transparent Finish: Shop-prestaining; one coat water repellent penetrating sealer.

1. Sealer: Interior, water-based (low-VOC) clear sealer.

a. Basis-of-Design Product: Benmore Stays Clear by Benjamin Moore; www.benjaminmoore.com.

b. Sheen: As selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.

B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.

2. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.

4. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.

1. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.

2. Install trim after gypsum-board joint finishing operations are completed.

3. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 ADJUSTING

A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.6 CLEANING

A. Clean interior finish carpentry on exposed and semiexposed surfaces. Restore damaged or soiled areas and touch up factory-applied finishes if any.

3.7 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 06 41 00 - ARCHITECTURAL CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. The General Structural Notes in Structural Contract Documents for structural design criteria shall be used in conjunction with this specification. The General Structural Notes shall supersede items in this specification when discrepancies exist.

1.2 SUMMARY

A. Section Includes:

1. Plastic-laminate cabinets (PL-1, PL-2, PL-3 and PL-4).
2. Plastic-laminate countertops.
3. Plastic-laminate wainscot panels.
4. Shop finishing of interior woodwork.
5. Cabinet hardware.
6. Delegated design for steel framing and supports for countertops.

B. Related Requirements:

1. Section 01 61 16 “Delegated Design Requirements”.
2. Section 06 10 00 “Rough Carpentry” for support framing, grounds, and concealed blocking.
3. Section 08 80 00 “Glazing” for glass for casework.

1.3 REFERENCE STANDARDS

A. AWI/ AWMAC / WI (NAAWS) - North American Architectural Woodwork standards, U.S. Version 3.1 2017.

1.4 SUSTAINABILITY REQUIREMENTS

A. Composite Wood Products Regulation: Composite wood products shall be documented to have low formaldehyde emissions that meet California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

B. Volatile Organic Compounds (VOCs) Regulation: All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications , as analyzed by the methods specified in Rule 1168. The provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.

1.5 SUBMITTALS

A. Refer to Section 01 33 00 “Submittal Procedures” for submittals requirements.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

1. Minimum Scale of Detail Drawings: 3 inch per foot.
2. Provide the information required by AWI/ AWMAC / WI (NAAWS).

3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
4. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers and other items installed in architectural woodwork.
5. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.

C. Product Data: Provide data for panel products, high-pressure decorative laminates, adhesives for bonding plastic laminates, cabinet hardware and accessories, and finishing materials and processes.

D. Samples:

1. Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
2. Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.

E. Delegated-Design Submittal: For framing and supports indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

F. Qualification Data:

1. For professional Engineer.
2. For Installer.
3. For fabricator.

G. Maintenance Data: For inclusion in maintenance manual required by Section 01 78 23 “Operation and Maintenance Data”.

1.6 QUALITY ASSURANCE

A. Engineer Qualifications: Qualified professional engineer responsible for delegated design, licensed in the jurisdiction in which Project is located.

B. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood veneers and wood doors with face veneers that are sequence matched with woodwork and transparent-finished wood doors that are required to be of same species as woodwork.

D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.7 MOCK-UP

A. Provide built mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories for one typical classroom for review prior to fabrication of remaining work.

2. Locate where directed.

3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

B. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.9 FIELD CONDITIONS

A. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

B. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

1.10 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 61 16 "Delegated Design Requirements," to design items requiring design and attachment to structure.

2.2 CABINETS

A. Quality Standard: Provide the following grades, in accordance with NAAWS, unless noted otherwise.

1. Plastic-Laminate Cabinets: Premium Grade.

2. Plastic-Laminate Countertops: Premium Grade.

3. Plastic-Laminate Wainscot Panels: Premium Grade.

B. General: Construction of the cabinetry shall be high-pressure laminate over no added urea formaldehyde (NAUF) plywood sheathing.

1. Particle board or MDF are not allowed in the cabinet or shelving construction, unless indicated or directed otherwise.

2. Alternate Core Material to Plywood: PureBond Classic Core by Columbia Forest Products;

www.columbiaforestproducts.com.

C. AWI Type of Cabinet Construction: Reveal overlay.

D. Reveal Dimension: 1/2 inch.

E. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

1. High-Pressure Decorative Laminate Grades:

a. Vertical Surfaces: Grade HGS.

1) Grain Direction: Perpendicular to floor.

b. Horizontal Surfaces Other Than Tops: Grade HGS.

1) Grain Direction: Parallel to cabinet fronts.

2. Edges: Biopolymer edgebanding, 3 mm thick. Polyvinylchloride (PVC) edgebanding is not allowed.

a. Approved Products:

1) BioEdge Edgebanding by BioPlastic Solutions; www.bioplasticsolutions.com.

2) BioEdge Edgebanding by Rams Industries; www.ramsindustries.com.

b. Color: As selected by Architect from manufacturer's full range of colors, including custom or special colors.

F. Materials for Semi-exposed Surfaces:

1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade HGS.

2. Edges of Plastic-Laminate Shelves: Biopolymer edgebanding, 3 mm thick. Polyvinylchloride (PVC) edgebanding is not allowed.

a. Approved Products:

1) BioEdge Edgebanding by BioPlastic Solutions; www.bioplasticsolutions.com.

2) BioEdge Edgebanding by Rams Industries; www.ramsindustries.com.

b. Color: As selected by Architect from manufacturer's full range of colors, including custom or special colors.

3. For semi-exposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade HGS.

4. Drawer Sides and Backs: Thermoset decorative panels.

5. Drawer Bottoms: Thermoset decorative panels.

G. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL.

H. Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

2.3 COUNTERTOPS

A. Quality Standard: Provide Premium Grade, in accordance with NAAWS, unless noted otherwise.

B. High-Pressure Decorative Laminate Grade: HGS.

1. Grain Direction: Parallel to cabinet fronts.

C. Core Material: Plywood.

1. Exception: For core material at sinks, provide exterior-grade plywood.

D. Backer Sheet: Provide plastic-laminate backer sheet, Grade BKL, on underside of countertop substrate.

E. Edges: Biopolymer edgebanding, 3 mm thick. Color of edgebanding shall be custom to match the laminate. Polyvinylchloride (PVC) edgebanding is not allowed.

1. Approved Products:

a. BioEdge Edgebanding by BioPlastic Solutions; www.bioplasticsolutions.com.

b. BioEdge Edgebanding by Rams Industries; www.ramsindustries.com.

2. Color: As selected by Architect from manufacturer's full range of colors, including custom or special colors.

F. Corner Treatment: Round exterior corners of tops to 2 inch radius.

G. Backsplashes: Provide of same material and composition as countertops, bonded to countertop. Provide backsplashes where work surfaces abut walls and at other locations indicated in Drawings.

1. Backsplash Height: 4 inches.

2.4 LAMINATE MATERIALS, PL-1, PL-2, PL-3 AND PL-4

A. Plastic Laminate Surfaces, General:

1. Horizontal and Vertical Surfaces, HGS: 0.48 inch nominal thickness; through-body color.

2. Provide manufacturers, patterns, colors, textures and finishes as scheduled on Interior Finish Legend and Schedule in Drawings.

B. Approved Manufacturers:

1. Formica Corp.; www.formica.com.

2. Nevamar, div. of Panolam Industries International, Inc.; www.panolam.com.

3. Panolam Industries International, Inc.; www.panolam.com.

4. Wilsonart LLC; www.wilsonart.com.

C. Laminate Cladding for Exposed Surfaces: PL-1, PL-2, PL-3 and PL-4:

1. Basis-of-Design Product: As indicated on Interior Finish Legend in Drawings.

2. Color: As indicated on Interior Finish Legend in Drawings.

3. Applications: As indicated on Interior Finish Legend in Drawings

2.5 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

2.6 HARDWARE

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets. Meeting BHMA A156.9, types as indicated for quality grade specified.

B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for pin supports and coordinated shelf rests, for nominal 1-inch spacing adjustments. Meeting BHMA A156.9, B04071 with shelf rests B0408.

1. Finish: BHMA 625/ US26, bright polished chrome plated on steel.

C. Back Mounted Pulls: "U" shaped wire pull, solid metal.

1. Dimensions: 5 inches long, 5/16-inch diameter.

2. Finish: BHMA 626/ US26D, brushed satin finish on steel.

D. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with brushed satin finish.

1. Door Locks: BHMA A156.11, E07121.

2. Drawer Locks: Meeting BHMA A156.11, E07041.

a. Basis-of-Design Product: Model no. 100DR by Olympus Lock, Inc.; www.olympuslock.com.

3. All cabinet door and drawer locks shall be keyed the same.

E. Catches: Magnetic; meeting BHMA A156.9, B03141.

F. Drawer Slides: Meeting BHMA A156.9, B05091; side-mounted, full-extension type; zinc-plated steel ball-bearing slides.

1. Rating: Heavy Duty; Grade 1HD-200 at file drawers, Grade 1HD-100 at all others.

2. Keyboard Slides: Grade 1HD-100; for computer keyboard shelves.

G. Hinges: Meeting BHMA A156.9, B04071.

1. Size: 2-3/4-inch, 5-knuckle steel hinges made from 0.095-inch thick metal.

2. Type: Butt type, semi-concealed hinges for overlay doors.

3. Finish: BHMA 625/ US26, bright polished chrome plated on steel.

H. Countertop Supports:

1. Basis-of-Design Manufacturer: Rakks, div. of Rangine Corp.; www.rakks.com.

2. Types:

a. At Countertops: Provide for maximum of 25 in. depth.

1) Basis-of-Design Product: Model no. EH-1818 Surface Mount EH Counter Support Bracket by Rakks.

2) Size: 18 by 18 inches.

3) Finish: Shop-primed for field-painting.

b. At Countertops: Provide for maximum of 18 in. depth.

1) Basis-of-Design Product: Model no. EH-1212 Surface Mount EH Counter Support Bracket by Rakks.

2) Size: 12 by 12 inches.

3) Finish: Shop-primed for field-painting.

I. Door Casement Adjuster: Provide at doors that are in conflict with items that impede 180 degree openings.

1. Basis-of-Design Product: Model no. 71 Casement Adjuster by Ives.

J. Wall Bumper: Provide at cabinet doors that are in conflict with items that impede 180 degree

openings.

1. Basis-of-Design Product: Model no. WS404CVX (Convex) Wall Bumper by Ives.

K. Grommets for Cable Passage through Countertops: 2-inch O.D., molded-plastic grommets and matching plastic caps with slot for wire passage, color to be selected.

1. Location: Shall be installed minimum of 5-feet on-center spacing; locations will be determined after casework installation and coordinated with Owner.

L. Exposed Hardware Finishes:

1. Provide finish indicated, complying with BHMAA156.18 for BHMA finish number indicated.

2. Finish for Items without Indicated Finish: Provide one of the following, complying with BHMAA156.18, as appropriate for substrate:

a. BHMA 626/ US26D, brushed satin finish on steel.

b. BHMA 630, satin stainless steel.

M. Concealed Hardware Finish: Provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.7 FABRICATION

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

1. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

2. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.

3. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

B. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

1. Seal edges of openings in countertops with a coat of varnish.

C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.

2. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.

D. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

E. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

F. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

G. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Do not locate counter butt joints less than 24 inches from sink cut-outs.

2.8 SHOP FINISHING

A. Grade: Provide finishes of same grades as items to be finished.

B. General: Finish architectural woodwork at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.

C. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.2 PREPARATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.3 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

E. Secure cabinets to floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.

2. Secure backsplashes to walls with adhesive.

3. Caulk space between backsplash and wall with sealant specified in Section 07 92 00 "Joint Sealants."

4. Grommets: Locate where directed by Owner.

H. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

I. Install cabinet door so that the gap between doors and doors, doors and drawers are 1/16 inch.

J. Provide magnetic catches on all cabinet doors.

3.4 ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

C. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

3.5 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures. Touch up shop-applied finishes to restore damaged or soiled areas.

B. Clean, lubricate and adjust hardware.

END OF SECTION

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SECTION 07 11 13 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Cold-applied, emulsified-asphalt dampproofing.

B. Related Requirements:

1. Section 03 30 00 “Cast-in-Place Concrete” for substrate preparation coordination for surfaces to receive dampproofing.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for method of application, primer, number of coats, coverage or thickness, and protection course.

B. Material Certificates: For each product, signed by manufacturers.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain primary dampproofing materials and primers through one source from a single manufacturer. Provide secondary materials recommended by manufacturer of primary materials.

B. Compatibility: Dampproofing shall be compatible with all substrates and materials in contact with bituminous dampproofing.

1.5 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt dampproofing to be performed according to manufacturers' written instructions.

B. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has thoroughly cured.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide auxiliary materials recommended in writing by manufacturer of primary materials.

2.2 PRODUCTS

A. Cold-Applied, Emulsified-Asphalt Dampproofing:

1. Trowel Coats: ASTM D1227, Type II, Class 1.
2. Fibered Brush and Spray Coats: ASTM D1227, Type II, Class 1.
3. Brush and Spray Coats: ASTM D1227, Type III, Class 1.

B. Basis-of-Design Product: MasterSeal 610, 614 and 615 by BASF Corporation Construction Systems; www.master-builders-solutions.basf.us.

C. Other Approved Products:

1. Dehydratine 75 or 85 Emulsified Asphalt Dampproofing Compounds by Euclid Chemical Co., The; www.euclidchemical.com.

2. 789 Fibered Asphalt Emulsion Damp Proofing by Henry Co.; www.henry.com.

3. 220 Fibered Emulsion Dampproofing by Karnak Corp.; www.karnakcorp.com.

4. Sealmastic Emulsion-Type Dampproofing by Meadows, W. R., Inc.; www.wrmeadows.com.

5. Graywall Waterproofing by Rubber Polymer Corp.; www.rpcinfo.com.

2.3 AUXILIARY MATERIALS

A. Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.

B. Emulsified-Asphalt Primer: ASTM D1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

C. Patching Compound: Epoxy or latex-modified repair mortar or asbestos-free fibered mastic of type recommended in writing by dampproofing manufacturer for application.

D. Protection Course: Provide one of the following, and compatible with materials in contact with:

1. ASTM D6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners.

2. Smooth-surfaced roll roofing complying with ASTM D6380, Class S, Type III.

E. Drainage Mat: Composite mat with drainage core, filter fabric and protective polymeric film, as recommended by the waterproofing manufacturer for application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Applicator present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.

B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes, drains and other openings.

B. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

C. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for dampproofing application.

D. Apply patching compound to patch and fill tie-holes, honeycombs, reveals, and other imperfections

3.3 APPLICATION, GENERAL

A. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.

1. Apply primer as recommended by manufacturer.

2. Apply additional coats if recommended by manufacturer or required to achieve coverages indicated.

3. Allow each coat of dampproofing to cure 24 hours before applying subsequent coats.

B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.

1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.

2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where indicated as "reinforced," by embedding an 8-inch-wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Concrete Foundations: Apply two brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat or one trowel coat at not less than 4 gal./100 sq. ft.

B. Unexposed Face of Concrete Retaining Walls: Apply one brush or spray coat at not less than 1.25 gal./100 sq. ft.

3.5 PROTECTION COURSE INSTALLATION

A. Install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.

1. Install protection course within 24 hours of dampproofing installation (while coating is tacky) to ensure adhesion.

B. Install drainage mat and accessories extended down to perimeter drains.

3.6 CLEANING AND PROTECTION

A. Remove dampproofing materials from surfaces not intended to receive dampproofing.

B. Correct dampproofing that does not comply with requirements; repair substrates, and reapply dampproofing.

C. Do not backfill at areas with dampproofing without protection course.

END OF SECTION

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SECTION 07 19 00 - WATER REPELLENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Penetrating water-repellent and stain-resistant treatment for exposed exterior concrete masonry units (CMU) and exterior concrete flatwork.

B. Related Requirements:

1. Section 03 30 00 “Cast-In-Place Concrete” for coordination of substrate preparation.
2. Section 04 22 00 “Concrete Unit Masonry” for coordination of substrate preparation.

1.3 SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's printed statement of VOC content.
2. Include manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat.

B. Samples: For each type of water repellent and substrate indicated, 12 by 12 inches in size, with specified water-repellent treatment applied to half of each Sample.

C. Qualification Data: For Applicator.

D. Product Certificates: For each type of water repellent.

E. Preconstruction Test Reports: For water-repellent-treated substrates.

F. Field quality-control reports.

G. Sample Warranty: For special warranty.

1.4 QUALITY ASSURANCE

A. Mockups: Prepare mockups of each required water repellent on each type of substrate required to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Provide in-place mockup at location selected by Contractor, for review and approval prior to proceeding with the Work.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 FIELD CONDITIONS

A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:

1. Concrete surfaces and mortar have cured for not less than 28 days.
2. Building has been closed in for not less than 30 days before treating wall assemblies.
3. Ambient temperature is above 40 deg F and below 100 deg F and will remain so for 24 hours.
4. Substrate is not frozen and substrate-surface temperature is above 40 deg F and below 100 deg F.
5. Rain or snow is not predicted within 24 hours.
6. Not less than 24 hours have passed since surfaces were last wet, or as required by manufacturer.
7. Windy conditions do not exist that might cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree to repair or replace materials that fail to maintain water repellency specified in "Performance Requirements" Article within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer:

1. Evonik Corp. USA; www.protectosil.com.

B. Other Approved Manufacturer:

1. L&M Construction Chemicals; div. of Laticrete International, Inc.; www.laticrete.com.
2. Prosoco Inc.; www. prosoco.com.
3. Sinak Corporation; www.sinak.com.

2.2 PENETRATING WATER REPELLANT AND STAIN-RESISTANT TREATMENT

A. Concrete Surface Penetrating Water Repellent and Stain-Resistant Treatment: Low-odor, VOC-compliant, colorless, non-staining, penetrating graffiti control treatment for vertical concrete surfaces, containing 100 percent silane, for low temperature applications.

1. Formulation: Polymeric fluorosilane.
2. VOC: Less than 25 g/L.
3. Basis-of-Design Product: Protectosil Aqua-Trete SG by Evonik.
4. Other Approved Product: Blok-Guard and Graffiti Control by Prosoco.

B. Exterior Concrete Surface Penetrating Water Repellant and Stain Treatment: Provide treatment over all exposed surfaces of exterior concrete flatwork.

1. Basis-of-Design Product: Model S-102 by Sinak.

2. Applications: At all exterior concrete unit masonry (CMU), as indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.

1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements. Check moisture content in three representative locations by method recommended by manufacturer.

2. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.

3. Verify that required repairs are complete, cured, and dry before applying water repellent.

B. Test pH level according to water-repellent manufacturer's written instructions.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Allow concrete and other cementitious materials to age before application of water repellent, according to repellent manufacturer's written instructions.

B. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product according to substrate and water-repellent manufacturer's written instructions.

C. Protect adjoining work, including mortar and sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass. Cover live vegetation.

D. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those required.

3.3 APPLICATION

A. Manufacturer's Field Service: Engage a factory-authorized service representative.

B. Apply coating(s) of water repellent on surfaces to be treated per the manufacturer's written instructions for application procedure unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Testing of Water-Repellent Material: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when water repellent is being applied:

1. Owner will engage the services of a qualified testing agency to sample water-repellent material being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.

2. Testing agency will perform tests for compliance of water-repellent material with product requirements.

3. Owner may direct Contractor to stop applying water repellents if test results show material being used does not comply with product requirements. Contractor shall remove

noncomplying material from Project site, pay for testing, and correct deficiency of surfaces treated with rejected materials, as approved by Architect.

B. Coverage 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. Reapply water repellent until coverage test indicates complete coverage.

3.5 CLEANING

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Correct damage to work of other trades caused by water-repellent application, as approved by Architect.

B. Comply with manufacturer's written cleaning instructions.

END OF SECTION

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board insulation.
2. Polyisocyanurate foam-plastic board insulation.
3. Glass-fiber blanket insulation.
4. Mineral-wool board insulation.
5. Loose-fill insulation.
6. Sound attenuation insulation.
7. Insulation for miscellaneous voids.
8. Vapor retarder.
9. Insulation fasteners.
10. Acoustical putty pads for sound walls.

B. Related Requirements:

1. Section 03 30 00 "Cast-in-Place Concrete" for vapor barriers vapor/ radon barriers installed as components of concrete slabs-on-grade assemblies.
2. Division 07 “Thermal and Moisture Protection” Sections for insulation and vapor retarder installed as components of roofing assemblies.
3. Section 07 22 16 “Roof Board Insulation” for polyisocyanurate nailable base and glass-mat faced roof insulation.
4. Section 07 54 23 “Thermoplastic Polyolefin (TPO) Roofing” for insulation at TPO roofing system.
5. Section 09 29 00 “Gypsum Board” for acoustic insulation installed as components of sound attenuation assemblies.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Extruded polystyrene foam-plastic board insulation.
2. Polyisocyanurate foam-plastic board insulation.
3. Glass-fiber blanket insulation.
4. Mineral-wool blanket insulation.
5. Loose-fill insulation.
6. Insulation for miscellaneous voids.
7. Vapor retarder.

8. Insulation fasteners.
9. Acoustical putty pads for sound walls.

B. Installer's Certification: As required by the International Energy Conservation Code for loose-fill insulation, listing type, manufacturer, and thermal resistivity (R-value) of insulation installed in each element of the building thermal envelope.

1. For blown-in fiberglass loose-fill insulation, indicate initial installed thickness, settled thickness, settled R-value, installed density, coverage area, and number of bags installed.
2. Sign, date, and post the certification in a conspicuous location on Project site.

C. Product Test Reports: For each product, for tests performed by a qualified testing agency.

D. Research Reports: For foam-plastic insulation, from ICC-ES.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal Transmittance (U-Factor)/ Thermal Resistance (R-Value) Requirements: Provide adequate thickness to meet the following thermal transmittance/ thermal resistance requirements.

1. Framed Exterior Wall Cavity Insulation:
   a. Exterior Walls: R-value as indicated.
   b. Ceilings at Attics or Unconditioned Spaces: R-value as indicated.
   c. Exterior Soffits: R-value as indicated.
   d. Floors Above Exterior or Unconditioned Spaces: R-value as indicated.
2. Continuous Exterior Insulation:
   a. Exterior Walls: R-value as indicated.
   b. Exterior Soffits: R-value as indicated.
3. Roof Assemblies: For insulation installed as components of roofing assemblies, refer to Section 07 22 16 “Roof Board Insulation”.

2.2 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

A. Extruded Polystyrene (XPS) Board Insulation:

1. ASTM C578, Type IV, 25-psi minimum compressive strength; unfaced.
2. Basis-of-Design Product: Foamular (HBCD-Free) by Owens Corning; www.owenscorning.com.
3. Other Approved Products:
   a. Styrofoam by Dow; www.dowbuildingsolutions.com.

B. Extruded Polystyrene (XPS) Board Insulation, Drainage Panels:

1. ASTM C578, Type IV, 25-psi minimum compressive strength; unfaced; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

2. Basis-of-Design Product: Provide Foamular NGX Insul-Drain (HBCD-Free) by Owens Corning; www.owenscorning.com
3. Other Approved Products:
   a. Styrofoam by Dow; www.dowbuildingsolutions.com.

C. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.

D. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.

E. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

F. Thermal Resistivity: Stable R-value 4.7 minimum at 1-inch thickness per ASTM C518.
1. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

G. Vapor Permeance: 1.5-perm maximum at 1-inch thickness per ASTM E96.

H. Applications: Continuous exterior insulation at walls and below-grade insulation at foundation wall assemblies as indicated.

2.3 POLYISOCYANURATE FOAM-PLASTIC BOARD INSULATION

A. Polyisocyanurate Board Insulation, Foil Faced: ASTM C1289, foil faced, Type I, Class 1 or 2.
1. Basis-of-Design Product: Provide Thermasheath-3 by Rmax; www.rmax.com.
2. Other Approved Product:
   a. Thermamax (ci) Exterior Insulation by Dow; www.dowbuildingsolutions.com.

B. Compressive Strength: 25-psi minimum per ASTM D1621.

C. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

D. Thermal Resistivity: R 5.7 minimum stable R-value at 1-inch thickness per ASTM C518.
1. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

E. Joint Closure: Tape or seal all joints between boards, using manufacturer's recommended product.
1. Basis-of-Design Product: As recommended by Rmax.
2. Other Approved Product: LiquidArmor Sealant and Flashing by DuPont de Nemours.

F. Thickness: As indicated in Drawings.

G. Applications: Continuous, external insulation at exterior wall and soffit assemblies as indicated.

2.4 GLASS-FIBER BLANKET INSULATION

A. Glass-Fiber Blanket Insulation, Unfaced: ASTM C665 Type I, Class A (unfaced); passing ASTM E136 for combustion characteristics.
1. Applications:
   a. Exterior, framed wall and ceiling assemblies where separate vapor retarder is indicated.
   b. Framed floor assemblies above exterior or unconditioned spaces.

B. Glass-Fiber Blanket Insulation, Kraft Faced: ASTM C665, Type II (nonreflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier).
1. Water Vapor Permeance: 1.0 perm, maximum.

2. Applications:

a. Exterior, framed wall and ceiling assemblies where separate vapor retarder is NOT indicated.

C. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.

D. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.

E. Thermal Resistivity: R 3.0 minimum stable R-value at 1-inch thickness per ASTM C518.

1. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

F. Basis-of-Design Product: EcoTouch Pink Fiberglass Insulation by Owens Corning; www.owenscorning.com.

G. Other Approved Products:

1. Formaldehyde-Free Fiberglass Insulation by Johns Manville; www.johnsmanville.com.

2. EcoBatt by Knauf; www.knaufinsulation.us.

2.5 MINERAL-WOOL BLANKET INSULATION

A. Mineral-Wool Blanket Insulation, Unfaced: ASTM C665, Type I, Class A (blankets without membrane facing); consisting of fibers; passing ASTM E136 for combustion characteristics.

B. Thermal Resistivity: R 4.3 minimum stable R-value at 1-inch thickness per ASTM C518.

1. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

C. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.

D. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.

E. Basis-of-Design Product: Comfortbatt by Rockwool; www.rockwool.com.

F. Thickness:

1. Walls: 3-in., minimum.

2. Floor and Ceiling: 6 in., minimum.

G. Applications: Provide at all interior walls and ceilings as indicated as sound attenuation batt insulation on Drawings.

2.6 LOOSE-FILL INSULATION

A. Glass-Fiber Loose-Fill Insulation: ASTM C764, Type I for pneumatic application or Type II for poured application.

1. Flame-Spread Index: Not more than 5 when tested in accordance with ASTM E84.

2. Smoke-Developed Index: Not more than 5 when tested in accordance with ASTM E84.

3. Recycled Content: 50 percent recycled content minimum.

4. Approved Products:

a. Climate-Pro Formaldehyde-Free Blow-In Loose-Fill Fiber Glass Insulation by Johns Manville; www.johnsmanville.com.

b. ThermaGlas Fiber Glass Loosefill Insulation by Owens Corning; www.owenscorning.com.

B. Thermal Resistivity: R 3.0 minimum stable R-value at 1-inch thickness per ASTM C518.

1. Installer's Certification: Refer to Submittal Requirements in this Section.

2.7 ACOUSTIC INSULATION

A. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

2. Basis-of-Design Product: Safe'n'Sound by Rockwool; www.rockwool.com.

a. Thickness: As required to fill stud cavity in friction-fit application.

B. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

2. Basis-of-Design Product: QuietZone Acoustic Batts with PureFiber Technology by Owens Corning; www.owenscorning.com.

a. Thickness: As required to fill stud cavity in friction-fit application.

C. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

D. Thickness: Fill stud cavity; friction fit.

E. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

F. Basis-of-Design Product: Owens Corning EcoTouch by Owens Corning; www.owenscorning.com.

G. Other Approved Manufacturer: QuietZone Acoustic Batts by Owens Corning; www.owenscorning.com.

H. Thickness: As required to fill stud cavity in friction-fit application.

2.8 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

1. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.

2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.

B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

1. Angle: Formed from 0.030-inch- thick, perforated, galvanized carbon-steel sheet with each leg 2 inches square.

2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.

C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely

in place, but not less than 1-1/2 inches square or in diameter.

1. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
   a. Crawl spaces.
   b. Ceiling plenums.
   c. Attic spaces.

D. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space as indicated, but not less than 1 inch between face of insulation and substrate to which anchor is attached.

E. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

2.9 VAPOR RETARDERS

A. Polyamide Vapor Retarders: Concealed applications.

1. Water Vapor Permeance: Material shall have a variable permeance based on environmental conditions and permeability shall increase or decrease within range indicated based on those conditions.
   a. ASTM E86, dry cup method: Maximum of 1.0 perm.
   b. ASTM E86, wet cup method: Minimum of 10.0 perms.
2. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes of 20 and 55, respectively, per ASTM E84.
3. Basis-of-Design Product: MemBrain by CertainTeed, Div. of Saint Gobain; www.certainteed.com.
4. Application: Interior face of framed exterior walls and ceilings where unfaced, vapor-permeable insulation is installed in wall and ceiling framing cavities.

B. Vapor Retarder Accessories:

1. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
2. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.
3. Sealant for Vapor Retarder: Manufacturer-approved sealant/ caulk; silicone-based sealants conforming to ASTM C920 or ASTM C834.
4. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

2.10 ACCESSORIES

A. Insulation for Miscellaneous Voids: Provide closure throughout framed portions of the project to prevent air movement and to prevent access by insects and rodents to interior spaces, both occupied and not-occupied. This includes at openings created for the passage of piping, wiring, or other work which creates openings that could provide movement of air and access to vermin. Do not provide insulation closure where screening or other means has been indicated to allow air movement while preventing access to vermin.

1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.

2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

1. Application: For insulation adhesively bonded to substrates.

C. Acoustical Putty Pads: Provide 1/8 inch thick, size as required to be completely cover electrical boxes and to create a tight seal to backside of gypsum board wall finish. Malleable non-hardening, permanently resilient, putty pads. Install at all electrical and low voltage outlets and any other penetrations in interior walls scheduled to have insulation.

D. Putty Pad Sealant: At acoustic rated partitions and fire-rated partitions in order to provide noise transmission resistance and fire resistance at electrical boxes and other penetrations.

1. Approved Products:

a. Fire Barrier Moldable Putty Pads MPP+ by 3M; www.3m.com.

b. Firestop Putty Pad by Acoustical Solutions; www.acousticalolutionss.com.

c. CP 617 Firestop Putty Pad by Hilti North America; www.hilti.com.

d. Fire-Rated Putty Pads by Metacaulk; www.metacaulk.com.

2. Coordinate with Division 26 “Electrical” Sections for fire-rated sealant at electrical boxes.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Install insulation with manufacturer's R-value label exposed after insulation is installed.

D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF FOUNDATION WALL INSULATION

A. Butt panels together for tight fit.

B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions.

2. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application.

3. Apply insulation standoffs to each spindle to create cavity width indicated in Drawings between concrete substrate and insulation.

4. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.

5. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.4 INSTALLATION OF CAVITY-WALL INSULATION

A. Mineral-Wool Board Insulation: Install insulation fasteners 4 inches from each corner of board insulation, at center of board, and as recommended by manufacturer.

1. Fit courses of insulation between obstructions, with edges butted tightly in both directions, and with faces flush.

2. Press units firmly against inside substrates.

3.5 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

5. For wood-framed construction, install blankets according to ASTM C1320 and as follows:

a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

6. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

a. Exterior Walls: Set units with facing placed toward insulation, or as indicated on Drawings.

b. Interior Walls at High-Humidity Areas: At areas such as shower rooms and swimming pools, set units with facing placed toward the area of high humidity.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

C. Loose-Fill Insulation: Apply according to ASTM C1015 and manufacturer's written instructions.

1. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.

3.6 INSTALLATION OF MISCELLANEOUS MATERIALS

A. Putty Pad Installation: Provide installation of acoustic Putty Pads around all electrical and low voltage boxes in schedule Sound Walls prior to installation of drywall. Pads shall be hand-formed around boxes, and around conduits. Fold and press pads into boxes.

3.7 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

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SECTION 07 22 16 – ROOF BOARD INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Polyisocyanurate board insulation, glass-fiber-mat faced.
2. Polyisocyanurate vented nail base insulation.
3. Insulating sheathing accessories.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for plywood backing panels.
2. Section 06 16 00 “Sheathing” for roof sheathing.
3. Section 07 21 00 “Thermal Insulation” for other insulation types.
4. Section 07 25 00 "Weather Barriers" for water-resistive barrier applied over wall sheathing.
5. Section 07 31 13 “Asphalt Shingles” for roofing membrane and roof insulation.
6. Section 11 81 29 “Fall Protection”.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5516.
4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Shop Drawings showing tapered insulation layout and cross sections with crickets.

C. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated plywood.
2. Fire-retardant-treated plywood.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that

periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.

2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.

3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS:

A. Source Limitations: Obtain each type of building insulation through one source.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Surface-Burning Characteristics: One of the following standards shall apply:

a. ASTM E84 "Standard Test Method for Surface Burning Characteristics of Building Materials".

2. Fire-Resistance Ratings: One of the following standard shall apply:

a. ASTM E119 "Standard Test Methods for Fire Tests for Building Construction and Materials".

b. ISO 834 - Parts 1 and 3-9 “Fire Resistance Tests - Elements of Building Construction”.

3. Combustion Characteristics: One of the following standards shall apply:

a. ASTM E 136 "Standard Test method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees Celsius"

2.2 POLYISOCYANURATE FOAM-PLASTIC BOARD INSULATION

A. Polyisocyanurate Board Insulation, Glass-Fiber-Mat Faced: ASTM C1289, glass-fiber-mat faced, Type II, Class 2.

1. Basis-of-Design Product: Provide Durasheath by Rmax; www.rmax.com.

2. Other Approved Product: Thermamax (ci) Exterior Insulation by DuPont de Nemours, Inc. (formerly by The Dow Chemical Co.); www.dupont.com.

B. Compressive Strength: 25-psi minimum per ASTM D1621.

C. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

D. Thermal Resistivity: R 5.7 minimum stable R-value at 1-inch thickness per ASTM C518.

1. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

E. Joint Closure: Tape or seal all joints between boards, using manufacturer’s recommended product.

1. Basis-of-Design Product: As recommended by Rmax.

2. Other Approved Product: LiquidArmor Sealant and Flashing by DuPont de Nemours.

F. Thickness: 4 in., as indicated in Drawings.

G. Applications: Provide beneath vented nailable base roof insulation, as indicated.

2.3 POLYISOCYANURATE NAIL BASE

A. Nailable Vented Polyisocyanurate Board Insulation: Preformed roof insulation boards manufactured or approved by asphalt shingle roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated. ASTM C 1289, Type V Rigid, Cellular, Polyisocyanurate Board, Glass-Fiber-Mat Faced with a wood structural panel of plywood conforming to APA PS 1, Exposure 1 (CDX).

B. Performance Criteria:

1. Flame Spread Index and Smoke Contribution of foam core and facer per ASTM E84:

a. Flame: 25 to 60.

b. Smoke: 75 to 160.

2. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.

3. R-Value: R-5.7 per inch minimum, or as required for thermal efficiency of assembly indicated.

4. Compressive Strength: Grade 3; 20 psi minimum; per ASTM D1621.

5. Nailable Panel Material and Thickness:

a. Fire-Retardant-Treated Plywood, Exposure 1: 5/8-inch.

C. Basis-of-Design Product: Nailable Base-3 by Rmax, div. of Sika Corporation; www.rmax.com.

D. Other Approved Product: ACFoam Nail Base by Atlas Roofing Corporation; www.atlasrwi.com.

E. Vent Space Depth: 1 in.

F. Overall Thickness: 3-5/8 in.

G. Application: Provide single layer of vented nail base insulation at roof assembly, as indicated in Drawings.

2.4 ACCESSORIES:

A. Roof Insulation Accessories, General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.

1. Fasteners: Factory-coated steel fasteners and metal or plastic plates designed for fastening roof insulation and cover boards to substrate and acceptable to roofing system manufacturer.

2. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to

attach roof insulation to substrate or to another insulation layer as follows:

a. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.

b. Or, full-spread spray-applied, low-rise, two-component urethane adhesive.

3. Nailboard Fasteners: Engineered for attaching nail base roof panels to wood and metal framing and structural decks.

a. Large-diameter, low profile pancake head, case hardened and tempered carbon steel, epoxy e-coat to comply with governing standards for use with treated wood including fire-retardant-treated wood.

1) Basis-of-Design Product: SIP TP fasteners by Altenloh, Brinck & Co. US, Inc.; trufast.com.

4. Insulation Tape: Provide insulation manufacturer's standard or recommended tape for sealing joints, fasteners, seams, and minor facer repair penetrations through the insulation layer.

a. Basis-of-Design Product: R-SEAL 3000 by Rmax.

5. Insulation Flashing: Provide insulation manufacturer's standard or recommended flashing for sealing at corners, ceiling and floor transitions, windows, doors, rough openings, control joints, and other through wall penetrations.

a. Basis-of-Design Product: R-SEAL 6000 by Rmax.

6. Insulation Liquid Flashing: Provide insulation manufacturer's standard or recommended liquid flashing for sealing joints, fasteners, seams, sealing at corners, ceiling and floor transitions, windows, doors, rough openings, other through wall penetrations, and minor facer repair penetrations through the insulation layer.

a. Basis-of-Design Product: R-SEAL 2000 LF by Rmax.

7. Insulation Caulk: Provide insulation manufacturer's standard or recommended caulk for sealing small penetrations and anchors.

a. Basis-of-Design Product: R-SEAL 2000 LF by Rmax.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation, or that interfere with insulation attachment.

3.2 INSTALLATION OF POLYISOCYANURATE FOAM-PLASTIC BOARD INSULATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:

1. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

2. Or, set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

H. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

I. Mechanically Fastened and Adhered Insulation: Install each layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.

2. Set each subsequent layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.

3. Set each subsequent layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

4. Set each subsequent layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

J. Loosely Laid Insulation: Loosely lay insulation units over substrate.

K. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck.

1. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.3 INSTALLATION OF POLYISOCYANURATE NAIL BASE

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Insulation boards shall be full size except when cutting is required at roof edges and openings. Boards that are broken, cracked, have been exposed to moisture, or are otherwise damaged shall not be used.

D. Securely attach to substrate by fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.

2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

E. Use manufacturer’s recommended nailboard fasteners unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

F. Coordinate roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

G. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

H. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

I. The proper installation and fit of wood nailers, blocking, and other rough carpentry in appropriate locations shall be verified prior to installation of roof insulation.

J. Caution shall be exercised with construction traffic to avoid damage to new insulation. Breaking or crushing of insulation is unacceptable and any damaged insulation shall be replaced at the roofing contractor's expense.

K. Insulation shall be laid with end joints staggered and all joints tight; however, boards shall not be forced into place.

L. No more insulation shall be applied during any work period than can be covered by all plies of roofing during the same work period. At the end of the work period, temporary edge seals shall be installed to protect the roof insulation. Upon resumption of work, they must be removed. Such seals shall consist of strips of roofing felt applied and topcoated with asphalt mastic.

M. Insulation surfaces shall be cleared of all debris before roofing is placed.

END OF SECTION

SECTION 07 25 00 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Building wrap, mechanically fastened.
2. Flexible flashing.

B. Related Requirements:

1. Section 04 22 00 “Concrete Unit Masonry” for attachment to through wall flashings.
2. Section 06 16 00 “Sheathing” for coordination of substrate preparation.
3. Section 07 11 13 “Bituminous Dampproofing” for attachment to below grade water proofing products.
4. Section 07 21 00 “Thermal Insulation” for interior vapor retarders.
5. Section 07 31 13 “Asphalt Shingles” for vapor retarders as part of roofing system assemblies.
6. Section 07 54 23 “Thermoplastic Polyolefin (TPO) Roofing” for vapor retarders as part of roofing system assemblies.
7. Section 07 62 00 “Sheet Metal Flashing & Trim” for sheet metal flashing installed in conjunction with weather barriers.
8. Section 07 92 00 “Joint Sealants” for joint sealants installed in conjunction with weather barriers.

1.3 DEFINITIONS

A. Air Barrier Sheet Membrane: Air-tight barrier made of material that is water vapor permeable to the degree specified, with sealed seams and with sealed joints to adjacent surfaces, to stop passage of air and to provide water vapor resistance at above-grade exterior walls and exterior soffits.

1. Water Vapor Permeance: For purposes of conversion, 57.2 ng/ (Pa sec sq m) = 1 perm.

B. Flexible Flashings: Materials to stop passage of water through above-grade joints between exterior walls and roof, joints around frames of openings in exterior walls, and joints between exterior walls and soffits.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate installation of joint sealants with cleaning of joint sealant substrates and other operations that may impact installation or finished joint sealant work.

B. Preinstallation Conference: Conduct conference at Project Site. Review compatibility letter and chart.

C. Review requirements for air barrier products and installation, project and manufacturer's details, mockups, testing and inspection requirements, and coordination and sequencing of air barrier work with work of other Sections.

D. Review manufacturer's instructions for air barrier application meeting Project requirements for substrates specified, including three-dimensional video model demonstrating proper application of components at wall openings.

1.5 SUBMITTALS

A. Product Data: Provide data on material characteristics.

B. Compatibility Letter and Chart:

1. Provide a compatibility letter certifying physical and chemical compatibility of products in this Section with all other dampproofing, waterproofing, weather barrier, roofing, self-adhered flashing and sealant products in the Project. Coordinate with the following Sections:

a. Section 07 11 13 “Bituminous Dampproofing”.

b. Section 07 31 13 “Asphalt Shingles”.

c. Section 07 54 23 “Thermoplastic Polyolefin (TPO) Roofing”.

d. Section 07 62 00 “Sheet Metal Flashing and Trim”.

e. Section 07 92 00 “Joint Sealants”.

2. Provide input from this Section toward a single Compatibility Chart to be compiled by the General Contractor. Compatibility Chart shall indicate the following:

a. All dampproofing, waterproofing, weather barrier, roofing, self-adhered flashing and sealant products.

b. Which other products from this group they interface (are in contact with) in the Project.

c. The physical and chemical compatibility between those interfaced products.

C. Shop Drawings: Provide drawings of special joint conditions.

D. Manufacturer's Installation Instructions: Indicate preparation.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A firm with minimum three years’ experience in installation of specified products in successful use on similar projects, employing workers trained by manufacturer, including a full-time on-site supervisor with a minimum of three years’ experience installing similar work, able to communicate verbally with Contractor, Architect, and employees.

B. Manufacturer Qualifications: A qualified manufacturer listed in this Section with minimum five years’ experience in manufacture of air barrier membrane as one of its principal products.

C. Mockups: Provide air barrier mockup application within mockups required in other sections, or if not specified, in an area of not less than 150 sq. ft. of wall surface where directed by Architect for each type of backup wall construction. Include examples of surface preparation, crack and joint treatment, air barrier application, and flashing, transition, and termination conditions, to set quality standards for execution.

1. Include intersection of wall air barrier with roof air barrier and with foundation wall intersection.

1.7 FIELD CONDITIONS

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

1.8 DELIVERY, STORAGE AND HANDLING

A. Accept materials on site in manufacturer's unopened original packaging.

B. Store products in weather protected environment, clear of ground and moisture, within temperature ranges recommended by air barrier manufacturer.

C. Construction Waste: Store and dispose of packaging materials and construction waste in accordance with requirements of Section 01 74 19 "Construction Waste Management and Disposal".

1.9 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which air barrier manufacturer agrees to furnish and install air barrier material to repair or replace those materials installed according to manufacturer's written instructions that exhibit material defects or otherwise fail to perform as specified under normal use within warranty period specified.

1. Access for Repair: Owner shall provide unimpeded access to the Project and the air barrier system for purposes of testing, leak investigation, and repair, and shall reinstall removed cladding materials upon completion of repair.

2. Cost Limitation: Manufacturer's obligation for repair or replacement shall be limited to the original installed cost of the work.

3. Warranty Period: 15 years from date of Substantial Completion.

B. Special warranties specified in this article exclude deterioration or failure of air barrier materials from the following:

1. Movement of the structure caused by structural settlement or stresses on the air barrier exceeding manufacturer's written specifications for elongation.

2. Mechanical damage caused by outside agents.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Products produced by a single manufacturer, or certified by the principle manufacturer as compatible with their products, having the properties and performance characteristics to form a contiguous integrated air barrier envelope, and included in the terms of the specified warranty

C. General Performance: Membrane air barrier shall be capable of performing as a continuous vapor-retarding air barrier and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the building exterior. Membrane air barriers shall accommodate substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without moisture deterioration and air leakage exceeding performance requirements.

2.2 MANUFACTURERS

A. Basis-of-Design Manufacturer:

1. Henry Company; www.henry.com.

B. Other Approved Manufacturers:

1. DuPont de Nemours, Inc.; www.dupont.com.

2. Kingspan Group; www.kingspan.com.

2.3 WATER-RESISTIVE BARRIER

A. Building Wrap: ASTM E1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E84; UV stabilized; and acceptable to authorities having jurisdiction.

1. Basis-of-Design Product:

a. WeatherSmart Commercial by Henry Co.

2. Other Approved Products:

a. Tyvek Commercial Wrap D by DuPont.

b. GreenGuard RainDrop 3D Building Wrap by Kingspan.

3. Water-Vapor Permeance: Not less than 14 perms per ASTM E96, Desiccant Method (Procedure A).

4. Air Permeance: Not more than 0.004 cfm/sq. ft. at 0.3-inch wg when tested according to ASTM E2178.

5. Allowable UV Exposure Time: Not less than three months.

6. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285 where required.

B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.4 FLEXIBLE FLASHING

A. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.040 inch.

1. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285 where required.

a. Basis-of-Design Product: FortiFlash 365 by Henry Co.

2. Other Approved Products:

a. CCW-705-TWF by Carlisle Coatings & Waterproofing, div. of Carlisle Construction Materials; www.carlisleccw.com.

b. Perm-A-Barrier by GCP Applied Technologies Inc.; www.gcpat.com.

c. Blueskin TWF by Henry Co.

d. PW 100/40 by Protecto Wrap Co.; www.protectowrap.com.

B. Self-Adhered Membrane Flashings: Provide the following products at vertical applications, as indicated:

1. Basis-of-Design Product: FortiFlash Butyl, 30 mil by Henry Co.; www.henry.com.

2. Approved Products:

a. HE200AM Metal Clad Weather Barrier by Henry Co.

b. Aluma Flash Plus by Poly Wall; www.poly-wall.com.

c. Protecto Seal 45 by Protecto Wrap Co.

d. WaterBlock Foil Faced 40 by Water Block; www.waterblocksystems.com.

2.5 SEALANTS

A. Sealants and Backers: As recommended by weather barrier manufacturer or as indicated.

B. Provide weather barrier manufacturer's standard sealant at transitions and penetrations. Comply with Section 07 92 00 "Joint Sealants."

1. Detail Sealant: Refer to Urethane Joint Sealants articles at Section 07 92 00 "Joint Sealants".

2. Airseal: Interior air seal at all four side of openings.

a. Basis-of-Design Product: Henry 925 BES Sealant by Henry Co.

C. Primers, Cleaners, and Other Sealant Materials: As recommended by sealant manufacturer, appropriate to application, and compatible with adjacent materials.

2.6 ADHESIVES

A. Mastic Adhesive: Compatible with sheet seal and substrate, thick mastic of uniform knife grade consistency.

B. Non-Curing Adhesive: Compatible with sheet seal and substrate, permanently non-curing.

2.7 FASTENERS:

A. Wrap Cap Staples:

1. Basis-of-Design Product: Manufacturer's standard or reccommended.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.

3.3 INSTALLATION

A. Install materials according to air-barrier manufacturer's written instructions and details and according to recommendations in ASTM D6135 to form a seal with adjacent construction and ensure continuity of air and water barrier.

1. When ambient and substrate temperatures range between 25 and 40 deg F (minus 4 and plus 5 deg C), install self-adhering, modified bituminous air-barrier sheet produced for low-temperature application. Do not install low-temperature sheet if ambient or substrate temperature is higher than 60 deg F.

2. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.

3. Mechanical fasteners are to be sealed or Wrap Cap staples are to be used to ensure continuity of weather barrier.

B. Prepare, treat, and seal inside and outside corners and vertical and horizontal surfaces at terminations and penetrations with termination mastic and according to ASTM D6135.

C. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier sheet on same day. Reprime areas exposed for more than 24 hours.

D. Apply and fasten weather barrier sheets over area to receive air barrier. Accurately align sheets and maintain uniform, manufacturer-recommended minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure airtight installation.

1. Apply sheets in a shingled manner to shed water.

2. Roll sheets firmly to enhance adhesion to substrate.

E. Apply continuous air-barrier sheets over accessory strips bridging substrate cracks, construction, and contraction joints.

F. Seal top of through-wall flashings to air-barrier sheet with an additional 6-inch- wide, transition strip of flexible flashing. Ensure weather barrier behind metal flashing extends above the top edge by 2 inches.

G. Seal exposed edges of sheet at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

H. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a continuous air barrier.

1. Coordinate air-barrier installation with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.

2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.

I. Connect and seal exterior wall air-barrier sheet continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

J. At end of each working day, seal top edge of air-barrier material to substrate with termination mastic.

K. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

L. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.

1. Transition Strip: Roll firmly to enhance adhesion.

M. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of air-barrier material with foam sealant.

N. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air-barrier sheet extending 6 inches beyond repaired areas in all directions.

O. Do not cover air barrier until it has been tested and inspected by testing agency.

P. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.4 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.

B. Flexible Flashings/ Self-Adhering Underlayments: Install continuous air-tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

1. Prime substrates as recommended by flashing manufacturer.

2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.

3. Lap flashing over water-resistive barrier at bottom and sides of openings.

4. Lap water-resistive barrier over flashing at heads of openings.

5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

3.5 FIELD QUALITY CONTROL

A. Do not cover installed weather barriers until required inspections have been completed.

3.6 PROTECTION

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

B. Do not leave paper- or felt-based barriers exposed to weather for longer than one week.

END OF SECTION

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SECTION 07 31 13 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes base bid roofing system:

1. Asphalt shingles.
2. Underlayments.
3. Ridge vents and intake vents.
4. Metal flashing and trim.

B. Related Requirements:

1. Section 07 22 16 “Roof Board Insulation” for polyisocyanurate nailable base and glass-mat faced roof insulation.
2. Section 07 25 00 “Weather Barriers” for coordination and compatibility assurance.
3. Section 07 62 00 “Sheet Metal Flashing and Trim”.
4. Section 11 81 29 “Fall Protection” for terminations at tie-offs.

1.3 DEFINITION

A. Roofing Terminology: See ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified.

1. Asphalt Shingles: Full size.
2. Ridge and Hip Cap Shingles: Full size.
3. Exposed Valley Lining: 12 inches square.

C. Samples for Initial Selection: For each type of asphalt shingle indicated.

1. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For the following products, of sizes indicated:

1. Asphalt Shingles: Full size.
2. Ridge and Hip Cap Shingles: Full size.
3. Exposed Valley Lining: 12 inches square.
4. Ridge vents: 12-inch length.

E. Qualification Data: For Installer.

F. Product Test Reports: For each type of asphalt shingle and underlayment product indicated, for tests performed by a qualified testing agency.

G. Evaluation Reports: For synthetic underlayment, from ICC-ES or other testing and inspecting agency acceptable to authorities having jurisdiction, indicating that product is suitable for intended use under applicable building codes.

H. Sample Warranty: For manufacturer's warranty.

I. Maintenance Data: For asphalt shingles to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Asphalt Shingles: 100 sq. ft. of each type, in unbroken bundles.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store roofing materials in a dry, well-ventilated location protected from weather, sunlight, and moisture according to manufacturer's written instructions.

B. Store underlayment rolls on end on pallets or other raised surfaces. Do not double stack rolls.

C. Protect unused roofing materials from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

D. Handle, store, and place roofing materials in a manner to prevent damage to roof deck or structural supporting members.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended in writing by manufacturer.

1.10 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace asphalt shingles that fail within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Manufacturing defects.

2. Material Warranty Period: 40 years from date of Substantial Completion, prorated, with first 10 years non-prorated.

3. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds of up to 80 mph (36 m/s), unless indicated otherwise, for 15 years from date of Substantial Completion.

4. Algae-Resistance Warranty Period: Asphalt shingles will not discolor for 10 years from date of Substantial Completion.

5. Workmanship Warranty Period: Two years from date of Substantial Completion.

B. Roofing Installer's Warranty: On warranty form at end of this Section, signed by Installer, in which Installer agrees to repair or replace components of asphalt-shingle roofing that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Exterior Fire-Test Exposure: Provide asphalt shingles and related roofing materials identical to those of assemblies tested for Class A fire resistance according to ASTM E 108 or UL 790 by Underwriters Laboratories or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

2.2 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

A. Laminated-Strip, SBS-Modified Asphalt Shingles: ASTM D 3462, laminated, multi-ply overlay construction, glass-fiber reinforced, mineral-granule surfaced, and self-sealing; complying with UL 2218, Class 4.

1. Approved Products:

a. Landmark Pro by CertainTeed, a div. of Saint-Gobain; www.certainteed.com.

b. Timberland HD by GAF; www.gaf.com.

c. Northwest XL by Malarkey Roofing; www.malarkeyroofing.com.

d. Duration Premium by Owens Corning; www.owenscorning.com.

2. Butt Edge: As indicated.

3. Strip Size: Manufacturer's standard.

4. Algae Resistance: Granules resist algae discoloration.

5. Color and Blends: As selected by Architect to match color and finish of existing roof.

B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles. Trim each side of lapped portion of unit to taper approximately 1 inch.

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D4869, asphalt-saturated organic felts, nonperforated.

1. Type: Type II.

2. Basis-of-Design Manufacturer: Malarkey Roofing; www.malarkeyroofing.com.

B. Synthetic Underlayment: UV-resistant polypropylene, polyolefin, or polyethylene polymer fabric with surface coatings or treatments to improve traction underfoot and abrasion resistance; evaluated and documented to be suitable for use as a roof underlayment under applicable codes by a testing and inspecting agency acceptable to authorities having jurisdiction.

C. Self-Adhering Membrane Underlayment, Polyethylene Faced: ASTM D1970, minimum of 40 mil. thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release backing; cold applied.

1. Sheet Underlayment Basis-of-Design Products:

a. Grace Ice and Water Shield by GCP Applied Technologies; www.gcpat.com.

b. WinterGuard by CertainTeedCo.; www.certainteed.com.

c. Polyguard Deck Guard HT by Polyguard Products, Inc.; www.polyguardproducts.com.

2. Applications: At perimeters and valleys, as indicated.

2.4 ACCESSORIES

A. Asphalt Roofing Cement: ASTM D4586, Type II, asbestos free.

B. Roofing Nails: ASTM F1667; aluminum, stainless-steel, copper, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch-diameter, sharp-pointed, with a minimum 3/8-inch-diameter flat head and of sufficient length to penetrate 3/4 inch into solid wood decking or extend at least 1/8 inch through OSB or plywood sheathing.

1. Shank: Smooth.

2. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

C. Felt-Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized-steel wire with low-profile capped heads or disc caps, 1-inch minimum diameter.

D. Synthetic-Underlayment Fasteners: As recommended in writing by synthetic-underlayment manufacturer for application indicated.

E. Rigid Ridge Vent: Manufacturer's standard, rigid-section, high-density, UV-stabilized HDPE plastic ridge vent for use under ridge shingles.

1. Basis-of-Design Product: CertainTeed Ridge Vent by CertainTeed Co.; www.certainteed.com.

a. Length: 4-foot sections.

b. Width: 9 or 11-1/4 inches, as required.

c. Thickness: 1-inch-high profile.

d. Features: Nonwoven geotextile filter strips and external deflector baffles.

F. Intake Vent: For 3/12 minimum roof slope.

1. Basis-of-Design Product: CertainTeed Intake Vent by CertainTeed Co.; www.certainteed.com.

2.5 METAL FLASHING AND TRIM

A. General: Comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim."

B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item.

1. Apron Flashings: Fabricate with lower flange a minimum of 4 inches beyond each side of downslope asphalt shingles and 6 inches up the vertical surface.

2. Step Flashings: Fabricate with a headlap of 2 inches and a minimum extension of 4 inches over the underlying asphalt shingle and up the vertical surface.

3. Cricket or Backer Flashings: Fabricate with concealed flange extending a minimum of 18 inches beneath upslope asphalt shingles and 6 inches beyond each side of vertical element and 6 inches above the roof plane.

4. Open-Valley Flashings: Fabricate in lengths not exceeding 10 feet with 1-inch-high, inverted-V profile at center of valley and equal flange widths of 10 inches.

5. Drip Edges: Fabricate in lengths not exceeding 10 feet with 2-inch roof-deck flange and 1-1/2-inch fascia flange with 3/8-inch drip at lower edge.

C. Vent Pipe Flashings: ASTM B749, Type L51121, at least 1/16 inch thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof, and extending at least 4 inches from pipe onto roof.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.

2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provisions have been made for flashings and penetrations through asphalt shingles.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ASPHALT-SHINGLE INSTALLATION

A. General: Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and recommendations in NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."

B. Install starter strip along lowest roof edge, consisting of an asphalt-shingle strip at least 7 inches wide with self-sealing strip face up at roof edge.

1. Extend asphalt shingles 1/2 inch over fasciae at eaves and rakes.

2. Install starter strip along rake edge.

C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.

D. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.

E. Install asphalt shingles by single-strip column or racking method, maintaining uniform exposure. Install full-length first course followed by cut second course, repeating alternating pattern in succeeding courses.

F. Fasten asphalt-shingle strips with a minimum of six roofing nails located according to manufacturer's written instructions.

1. Where roof slope exceeds 21:12, seal asphalt shingles with asphalt roofing cement spots after fastening with additional roofing nails.

2. Where roof slope is less than 4:12, seal asphalt shingles with asphalt roofing cement spots.

3. When ambient temperature during installation is below 50 deg F seal asphalt shingles with asphalt roofing cement spots.

G. Open Valleys: Cut and fit asphalt shingles at open valleys, trimming upper concealed corners of shingle strips. Maintain uniform width of exposed open valley. Widen exposed portion of open valley 1/8 inch in 12 inches (1:96) from highest to lowest point.

1. Set valley edge of asphalt shingles in a 3-inch-wide bed of asphalt roofing cement.

2. Do not nail asphalt shingles to metal open-valley flashings.

H. Hip and Ridge Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.

3.3 UNDERLAYMENT INSTALLATION

A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

1. Provide layer of self-adhering membrane underlayment below felt underlayment at all locations where roof slope is 4:12 or less.

B. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install lapped in direction that sheds water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment within seven days.

1. Prime surfaces to receive self-adhering sheet underlayment per manufacturer’s instructions.

2. Eaves: Extend from edges of eaves 36 inches interior face of exterior wall.

3. Rakes: Extend from edges of rake 36 inches beyond interior face of exterior wall.

4. Valleys: Extend from lowest to highest point 18 inches on each side.

5. Hips: Extend 18 inches on each side.

6. Ridges: Extend 36 inches on each side without obstructing continuous ridge vent slot.

7. Sidewalls: Extend beyond sidewall 18 inches, and return vertically against sidewall not less than 4 inches.

8. Dormers, Chimneys, Skylights, and Other Roof-Penetrating Elements: Extend beyond penetrating element 18 inches, and return vertically against penetrating element not less than 4 inches.

9. Roof Slope Transitions: Extend 18 inches on each roof slope.

C. Ridge Vents: Install ridge vents over asphalt shingles in accordance with manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.

D. Concealed Valley Lining: For closed-cut valleys. Comply with NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems." Install underlayment centered in valley and fastened to roof deck.

1. Lap roof-deck underlayment over valley underlayment at least 6 inches.

2. Install a 36-inch-wide strip of granular-surfaced valley lining, with granular-surface face up, full-width sheet of synthetic underlayment centered in valley. Lap ends of strips at least 12 inches in direction to shed water, and seal with asphalt roofing cement. Fasten to roof deck.

E. Metal-Flashed, Open-Valley Underlayment: Install two layers of minimum 36-inch-wide underlayment centered in valley. Stagger end laps between layers at least 72 inches. Lap ends of each layer at least 12 inches in direction to shed water, and seal with asphalt roofing cement. Fasten each layer to roof deck.

1. Lap roof-deck underlayment over first layer of valley underlayment at least 6 inches.

F. Granular-Surfaced, Open-Valley Lining: Comply with NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems." Install a 36-inch-wide felt underlayment centered in valley. Fasten to roof deck with felt-underlayment or roofing nails.

1. Lap roof-deck felt underlayment over valley felt underlayment at least 6 inches.

2. Install an 18-inch-wide strip of valley lining centered in valley, with granular-surface face down. Install a second 36-inch-wide strip of valley lining centered in valley, with granular-surface face up. Lap ends of each strip at least 12 inches in direction to shed water, and seal with asphalt roofing cement. Stagger end laps between succeeding strips at least 72 inches. Fasten each strip to roof deck with roofing nails.

3.4 METAL FLASHING INSTALLATION

A. General: Install metal flashings and other sheet metal to comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim."

1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."

B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.

C. Step Flashings: Install with a headlap of 2 inches and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.

D. Cricket or Backer Flashings: Install against the roof-penetrating element extending concealed flange beneath upslope asphalt shingles and beyond each side.

E. Open-Valley Flashings: Install centered in valleys, lapping ends at least 8 inches in direction to shed water. Fasten upper end of each length to roof deck beneath overlap.

1. Secure hemmed flange edges into metal cleats spaced 12 inches apart and fastened to roof deck.

2. Adhere 9-inch-wide strip of self-adhering sheet to metal flanges and to self-adhering sheet underlayment.

F. Rake Drip Edges: Install rake drip-edge flashings over underlayment and fasten to roof deck.

G. Eave Drip Edges: Install eave drip-edge flashings below underlayment and fasten to roof sheathing.

H. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.5 ROOFING INSTALLER'S WARRANTY (SAMPLE)

A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("the work") on the following project:

1. Owner:

2. Address:

3. Building Name/Type:

4. Address:

5. Area of the Work:

6. Acceptance Date:

7. Warranty Period:

8. Expiration Date:

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant the work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of the work as are necessary to correct faulty and defective work and as are necessary to maintain the work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to the work and other parts of the building, and to building contents, caused by:

   a. Lightning;

   b. Peak gust wind speed exceeding <Insert wind speed> mph (m/sec);

   c. Fire;

   d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;

   e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;

   f. Vapor condensation on bottom of roofing; and

   g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When the work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to the work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of the work.

4. During Warranty Period, if Owner allows alteration of the work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of the alterations, but only to the extent the alterations affect the work covered by this Warranty. If Owner engages Roofing Installer to perform the alterations, Warranty shall not become null and void unless Roofing Installer, before starting the alterations, notified Owner in writing, showing reasonable cause for claim, that the alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a use or service more severe than originally specified, this Warranty shall become null and void on date of the change, but only to the extent the change affects the work covered by this Warranty.

6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect the work and to examine evidence of such leaks, defects, or deterioration.

7. This Warranty is recognized to be the only warranty of Roofing Installer on the work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of the work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <Insert day> day of <Insert month>, <Insert year>.

1. Authorized Signature:
2. Name:
3. Title:

END OF SECTION

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SECTION 07 42 15 - FORMED METAL WALL AND SOFFIT PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Formed metal wall and soffit panels for exterior applications (MP-1 and LM-1).
2. Metal trim accessories.
3. Delegated design.

B. Related Requirements:

1. Section 01 61 16 “Delegated Design Requirements”.
2. Section 05 50 00 “Metal Fabrications” for mechanical equipment screen framing.
3. Section 07 62 00 “Sheet Metal Flashing and Trim” for shop- and field-formed flashings, formed brake-shape metal wall panels and other sheet metal work.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
6. Review temporary protection requirements for metal panel assembly during and after installation.
7. Review of procedures for repair of metal panels damaged after installation.
8. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.

2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches (1:10).

3. Include details of interfaces with air barrier assembly and other related materials.

C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.

1. Include Samples of trim and accessories involving color selection.

D. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:

1. Metal Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

E. Delegated-Design Submittal: For formed metal panels indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

F. Qualification Data:

1. For testing agency.

2. For professional engineer.

3. For installer.

4. For manufacturer.

G. Coordination Drawings: Exterior elevations shall be drawn to scale and coordinate penetrations and wall-mounted items as the following:

1. Wall panels and attachments.

2. Wall-mounted items including doors, windows, louvers, and lighting fixtures.

3. Penetrations of wall by pips and utilities.

H. Product Test Reports: For each product, for tests performed by a qualified testing agency.

I. Field quality-control reports.

J. Sample Warranties: For special warranties.

K. Maintenance Data: For metal panels to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Engineer Qualifications: Qualified professional engineer responsible for delegated design, licensed in the jurisdiction in which Project is located.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

C. Mockup: Provide mockup wall panel to verify selections made, to demonstrate aesthetic effects, and to set quality standards for materials and execution, for review and approval prior to proceeding.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

1.7 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

A. Special Warranty: Manufacturer’s standard twenty (20) year performance warranty, stating the following:

1. Architectural fluorocarbon finish:

a. Will be free of fading or color change more than 5 Hunter delta-E units as determined by ASTM D2244.

b. Will not chalk more than numerical rating of 8 when measured in accordance with standard procedures specified in ASTM D4214, method D659.

c. Will not peel, crack, chip, or delaminate.

d. Metal substrate will not rupture, fail structurally, or perforate.

B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.

b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer; refer to Section 01 61 16 “Delegated Design Requirements" for requirements.

B. Surface Burning Properties: Zero (0) flame spread and zero (0) smoke developed, when tested per ASTM E84.

C. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

D. Structural Performance: System shall comply with requirements indicated in the Structural Drawings and other requirements indicated in this Section.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

F. Structural Loads: Confirm compliance with manufacturer’s ultimate test pressure data corresponding to framing type, dimensions, fastener type, and attachment clips, and capable as an assembly of withstanding the effects of the following loads, based on testing in accordance with ASTM E1592 and ASTM E330.

1. Minimum lateral deflection: L/120.

2. Wind Loads: As indicated on Drawings.

3. Other Design Loads: As indicated on Drawings.

4. Deflection Limits: For wind loads, no greater than 1/240 of the span.

G. Water Penetration: No water leakage observed into wall cavity when tested to ASTM E331.

2.2 MANUFACTURERS

A. Source Limitations: Obtain all components of metal wall panels from single manufacturer.

B. Approved Manufacturers:

1. AEP Span; www.aepspan.com.

2. Metal Sales Manufacturing Corp; www.metalsales.us.com.

3. Morin Corporation, div. of Kingspan Group; www.morincorp.com.

2.3 METAL PANELS

A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners. Include accessories required for weathertight installation.

B. Metal Wall Panel, MP-1:

1. Approved Products:

a. T3 Wall by Metal Sales Manufacturing.

b. Exposed E-36 by Morin.

2. Steel Sheet: Coil-coated sheet, 22 gauge; yield strength 50,000 psi; with aluminum -zinc alloy coating conforming to ASTM A792, Class AZ50.

3. Profiles: As selected by Architect.

4. Panel Width: As selected by Architect.

5. Side Seams: Self-interlock joint with clip attachment.

6. Surface Finish: Smooth.

7. Panel Size: 36 in.
8. Color: As selected by Architect from manufacturer's standard range to match adjacent siding at existing building.
9. Provide manufacturer's standard concealed fasteners and trim to match.
10. Application: As indicated on Drawings.

C. Metal Soffit Panel, LM-1:

1. Basis-of-Design Product: Flush Panel by AEP Span.
2. Steel Sheet: Coil-coated sheet, 22 gauge; yield strength 50,000 psi; with aluminum -zinc alloy coating conforming to ASTM A792, Class AZ50.
3. Profile: Flat pan.
4. Panel Width: 12 inches.
5. Side Seams: Self-interlock joint with clip attachment.
6. Surface Finish: Smooth; pencil ribs not permitted.
7. Color: As selected by Architect from manufacturer's standard range.
8. Provide manufacturer's standard concealed fasteners and trim to match adjacent soffit panels at existing building.
9. Application: As indicated on Drawings.
10. Ventilation: Provide Manufacturer's standard perforated venting at every other panel.

2.4 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A792, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Mechanical Fasteners for Furring: Self-tapping wood screws for attachment to wood studs, conforming to ICC Legacy Report ER-4780, dual hardener, corrosion-resistant-coated, self-drilling, steel drill screws.

1. Provide self-tapping wood screws with shear capacity equal to the following products:
   a. Dril-Flex by Elco Construction Products; www.elcoconstruction.com.
   b. Kwik-Flex by Hilti, Inc.; www.hilti.com.
2. Applications: At metal-to-metal connections.
3. Head Type: Low-profile, as required for installation.
4. Length: As required for performance and substrates indicated.

C. Welding Electrodes: Comply with AWS standards.

D. Galvanizing Repair Paint: ASTM A780.

E. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

F. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer, but not less than panel thickness.
3. Closure Strips: Closed-cell, expanded, cellular, rubber, or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

G. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

1. Provide factory drilled, factory finished weep holes for all C-Closure trim located at the bottoms of walls, etc. where water can collect and drainage is required.

H. Concealed Fasteners: Climaseal coated or stainless steel. Provide fasteners with gasketed EPDM or PVC sealing washers.

I. Exposed Rivets/Fasteners (Use only if required): Stainless steel, finished to match metal panel.

J. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.5 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profiles as indicated in drawings and to suit system; shop cut and factory mitered to required angles. Mitered internal corners to be back braced with precoated sheet stock to maintain continuity of profile.

C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
   a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

F. Metal Furring:

1. Fabrication Tolerances: Fabricate assemblies' level, plumb, and true to line to a maximum allowable tolerance variation indicated:
   a. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/16 inch in 10 feet.

2.6 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Metal Panels and Accessories:

1. General: AAMA 621. Three-coat fluoropolymer (PVDF) finish containing not less than 70 percent PVDF resin by weight in both 0.2 mil primer and 0.8 mil color topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   a. Approved PVDF Resin Products:
      1) Kynar 500 by Arkema: www.kynar500.com.
      2) Hylar 5000 by Solvay; www.solvay.com.
   b. Approved Fluoropolymer Coating Products:
      1) Duranar XL Coil Coating by PPG IdeaScapes; www.ppgideascapes.com.
      2) Fluropon Classic Coil Coating by Valspar Corp., div. of The Sherwin-Williams Co.; www.valsparcoilextrusion.com.
2. Exposed Finish: Three-coat fluoropolymer (PVDF) finish.
   a. Basis-of-Design Finish: Kynar 500 by Arkema: www.kynar500.com.
   b. Color: As selected by Architect to match existing wall and soffit panels.

3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

1. Examine furring anchorages have been installed within alignment tolerances required by exterior finishes.

2. Examine sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by exterior finish systems manufacturer.

a. Verify that air-, water-resistive and weather barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, FURRING

A. Install furring, and other miscellaneous support members and anchorages according to ASTM C754 and manufacturer’s written instructions.

B. Install support system and securely anchor to supporting structure.

1. Cut furring members by sawing complying with manufacturer’s written instructions; do not torch cut metal substrates.

2. Fasten furring members by screw fastening.

a. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

3. Spacing: Space individual furring members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

4. Shim back of system as required due to uneven substrates for flat, level and plumb installation.

C. Install furring in one-piece lengths unless splice connections are indicated and approved in Shop Drawings.

D. Install temporary bracing and supports to secure furring and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

E. Do not bridge building expansion, control and seismic joints with finish support system. Independently install furring on both sides of joints.

1. Where support system is to be continuous across joints, fasten on one side and provide slip connection on opposite side of joint. Ensure finish attachment does not fasten slip-connection side.

F. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 20 feet and as follows:

1. Space individual furring members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

G. Do not damage weather barriers.

H. Repairs and Protection:

1. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

2. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

3. Weather Barriers: Follow repair procedures specified in Section 07 25 00 “Weather Barriers.”

3.3 METAL PANEL INSTALLATION, GENERAL

A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.

2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.

3. Install screw fasteners in predrilled holes.

4. Locate and space fastenings in uniform vertical and horizontal alignment.

5. Install flashing and trim as metal panel work proceeds.

6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.

7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.

8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior, of type specified above; use stainless steel or galvanized-steel fasteners for surfaces exposed to the interior.

C. Orientation: Install metal panels vertically; as indicated.

D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

E. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

F. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without 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 achieve waterproof 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 waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 METAL SOFFIT PANEL INSTALLATION

A. Comply with requirement of Metal Wall Panel Installation, General articles in this Section.

B. Provide metal soffit panels for full width of soffit; install panels as indicated in Drawings.

C. Flash and seal panel with weather enclosures where metal soffit panels meet walls and at perimeter of all openings.

3.5 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions.

B. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

C. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

D. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.

E. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

F. Protection: Provide to ensure that metal panels are free of marks such as hand and footprints, stains and other damage or deterioration at time of substantial completion. Reclean panels where required.

END OF SECTION

SECTION 07 54 23 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fully adhered thermoplastic polyolefin (TPO) roofing system.
2. Roof insulation.
3. Vapor retarder.
4. Substrate board.

B. Related Requirements:

1. Section 06 16 00 “Sheathing” for parapet sheathing.
2. Section 07 62 00 "Sheet Metal Flashing and Trim" for metal roof flashings and counter flashings.
3. Section 07 92 00 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 COORDINATION

A. Vapor retarder shall be installed prior to installing roof drains and other penetrations through the vapor retarder membrane. The contractor is responsible for sequencing installation of vapor retarder/ temporary roofing prior to installation of other work and shall be responsible for the cost of corrective measures where installation sequencing is not followed.

B. Coordinate penetrations with work of Divisions 21, 22, 23 and 26, and otherwise required for installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, 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.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.

6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.6 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Roof plan showing orientation of steel roof deck and orientation of roofing, fastening spacings, and patterns for mechanically fastened roofing.
4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
5. Project unique details.

C. Sample for Initial Selection: For each exposed product, including TPO membrane and liquid flashings, of all colors available for selection.

D. Samples for Verification: For the following products:

1. Sheet roofing, of color required.

E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of compliance with performance requirements indicating Project specific requirements by roofing manufacturer.
2. Wind Uplift Resistance Submittal: For roofing system, indicating wind uplift requirements, signed by Manufacturer’s technical engineer showing pressures and zones indicated.

F. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.

1. Submit reports from manufacturer indicating compatibility with substrates and other materials in contact with TPO roofing materials.

G. Qualification Data: For Installer and manufacturer.

H. Research/Evaluation Reports: For components of roofing system, from ICC-ES.

I. Field quality-control reports.

J. Sample Warranties: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed and FM Global approved for roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.11 WARRANTY

A. Special Manufacturer’s Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, insulation, walkway products, and other components of roofing system.

2. Warranty Period: Twenty (20) years from date of Substantial Completion.

B. Special Installer’s Warranty: Submit roofing Installer's warranty, signed by Installer, covering Work of this Section.

1. Include all components of roofing system such as roofing membrane, base flashing, fasteners, cover boards, walkway products, and other components of the roofing systems.

2. Warranty Period: Two (2) years from date of Final Acceptance.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.

1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.

2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D3746 or ASTM D4272.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience. Refer to Section 01 83 16 “Exterior Enclosure Performance Requirements” for compatibility documentation requirements.

C. Wind Uplift Resistance: Design roof system to resist the following wind uplift pressures when tested by a qualified testing agency to FM Approvals 4474, UL 580 or UL 1897:

1. Field-of-Roof Uplift Pressure (Zone 1): 47 psf.

2. Perimeter Uplift Pressure (Zone 2): 62 psf.

a. Distance from Edge: 24’-0”.

3. Corner Uplift Pressure (Zone 3): 62 psf.

a. Distance from Edge: 24’-0”.

D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class C; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

E. At bypass framing conditions from roof to parapet transitions and elsewhere, provide manufacturer’s approved deflection detail.

1. Coordinate locations with framing design.

2.2 MANUFACTURERS

A. Source Limitations: Obtain components including roof insulation and fasteners for roofing system and roofing components installed over the roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

B. Basis-of-Design Manufacturer: Carlisle Syntec; www.carlislesyntec.com.

C. Other Approved Manufacturers: Subject to compliance with requirements, provide TPO roofing systems by the following manufacturers:

1. Firestone Building Products Co.; www.firestonebpe.com.

2. GAF; www.gaf.com.

3. Johns Manville; www.jm.com.

2.3 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

A. Fabric-Reinforced TPO Sheet: ASTM D6878, internally fabric- or scrim-reinforced, uniform, flexible fabric-backed TPO sheet.

1. Basis-of-Design Product: Sure-Weld TPO Reinforced Membrane by Carlisle.

2. Thickness: 60 mils, nominal.

3. Exposed Face Color: Manufacturer’s standard “tan”.

4. Installation: Fully adhered.

2.4 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils thick, minimum, of same color as TPO sheet.

C. Round Penetration Flashing: Manufacturer’s standard split-pipe type. With stainless steel termination ring.

D. Bonding Adhesive: Manufacturer's standard, water based.

E. Slip Sheet: Manufacturer's standard, of thickness required for application.

F. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

G. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.

H. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing to substrate, and acceptable to roofing system manufacturer.

I. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.5 SUBSTRATE BOARDS

A. Substrate Board: ASTM C1177/C1177M, glass-mat, water-resistant gypsum board or ASTM C1278/C1278M, fiber-reinforced gypsum board.

1. Thickness: 1/2-inch, unless otherwise indicated.

2. Surface Finish: Unprimed, unless otherwise required by manufacturer for installation of vapor retarder.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.6 VAPOR RETARDER

A. Basis-of-Design Product, Self-Adhering-Sheet Vapor Retarder: VapAirSeal 725TR by Carlisle.

B. Primer: Of type required for application and recommended by vapor-retarder manufacturer.

C. Penetration Sealants: As recommended for application by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

D. Bedding Sealant: As recommended for application by manufacturer for sealing vapor retarder and roof membrane interfaces.

2.7 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by TPO roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Global-approved roof insulation.

B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

1. Basis-of-Design Product: SecurShield by Carlisle.

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per

12 inches (1:48) unless otherwise indicated.

1. Provide taper to achieve 1/2 inch per 12 inches (1:24) to drain at crickets and where indicated.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.8 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.

B. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:

1. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.

2. Full-spread, spray-applied, low-rise, two-component urethane adhesive.

2.9 LIQUID MEMBRANE FLASHING

A. Liquid Applied Flashing: Manufacturer’s standard, two-part two-component liquid flashing system with reinforcing; compatible with roofing membrane. Provide manufacturer’s recommended accessories including primers, reinforcing fabric and transitions.

1. Basis-of-Design Product: Carlisle Liquiseal liquid flashing.

2. Color: White.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:

1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.

2. Verify that blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Coordinate installation and transitions of roofing system components service as an air barrier with Division 07 air barriers and sheet metal flashings.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 SUBSTRATE BOARD INSTALLATION

A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches in adjacent rows.

1. Tightly butt substrate boards together.

2. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.

3. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions for performance indicated.

3.5 VAPOR-RETARDER INSTALLATION

A. Install vapor retarder prior to setting drain bodies and other roof-deck mounted construction.

1. Coordinate installation of other construction penetrating roof membrane. Ensure vapor retarder continuity.

B. Self-Adhering-Sheet Vapor Retarder: Prime substrate if required by manufacturer. Install self-adhering-sheet vapor retarder over area to receive vapor retarder, side and end lapping each sheet a minimum of 3-1/2 and 6 inches, respectively.

1. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.

2. Seal laps by rolling.

C. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.6 INSULATION INSTALLATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

G. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

1. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
2. Trim insulation so that water flow is unrestricted.
3. Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to decks.
    a. Fasten insulation according to requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.
    b. Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
4. At vertical installations, adhere insulation boards to substrates and mechanically attach.
5. Install upper layer of insulation and tapered insulation with joints of each other offset.
    a. Adhere each layer of insulation to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
        1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.7 ADHERED ROOFING INSTALLATION

A. Adhere roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.

B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

C. Accurately align roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer and allow to partially dry before installing roofing. Do not apply to splice area of roofing.

E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing.

F. Apply roofing with side laps shingled with slope of roof deck where possible.

G. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.
    1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
    2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
    3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.

H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

3.8 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 LIQUID FLASHING INSTALLATION

A. Apply liquid flashing following manufacturer’s instructions at roofing penetrations where preformed pipe boots are not utilized and for penetrations with irregular shapes and where specified elsewhere.

B. Prime surfaces as required.

C. Apply liquid flashing around roof tie-off anchors, extending up vertical surface of height required by manufacturer.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.11 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.12 ROOFING INSTALLER'S WARRANTY (SAMPLE)

A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("the work") on the following project:

1. Owner:
2. Address:
3. Building Name/Type:
4. Address:
5. Area of the Work:
6. Acceptance Date:

7. Warranty Period:

8. Expiration Date:

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant the work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of the work as are necessary to correct faulty and defective work and as are necessary to maintain the work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to the work and other parts of the building, and to building contents, caused by:

   a. Lightning;

   b. Peak gust wind speed exceeding <Insert wind speed> mph (m/sec);

   c. Fire;

   d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;

   e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;

   f. Vapor condensation on bottom of roofing; and

   g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When the work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to the work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of the work.

4. During Warranty Period, if Owner allows alteration of the work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of the alterations, but only to the extent the alterations affect the work covered by this Warranty. If Owner engages Roofing Installer to perform the alterations, Warranty shall not become null and void unless Roofing Installer, before starting the alterations, notified Owner in writing, showing reasonable cause for claim, that the alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a use or service more severe than originally specified, this Warranty shall become null and void on date of the change, but only to the extent the change affects the work covered by this Warranty.

6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect the work and to examine evidence of such leaks, defects, or deterioration.

7. This Warranty is recognized to be the only warranty of Roofing Installer on the work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of the work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <Insert day> day of <Insert month>, <Insert year>.

1. Authorized Signature:
2. Name:
3. Title:

END OF SECTION

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SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Manufactured reglets with counterflashing.
2. Formed roof-drainage sheet metal fabrications.
3. Formed low-slope roof sheet metal fabrications.
4. Formed steep-slope roof sheet metal fabrications.
5. Formed wall and fascia sheet metal fabrications.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry".
2. Division 07 “Thermal and Moisture Protection” Sections for coordination of self-adhering underlayments.
3. Section 07 31 13 “Asphalt Shingles” for materials and installation of sheet metal flashing and trim integral with roofing.
4. Section 07 42 15 “Formed Metal Wall and Soffit Panels” for coordination of finishes.
5. Section 07 54 23 “Thermoplastic Polyolefin (TPO) Roofing" for sheet metal flashing and trim integral with metal wall panels.

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 SUBMITTALS

A. Product Data: For each of the following

1. Underlayment materials.

2. Elastomeric sealant.
3. Butyl sealant.
4. Epoxy seam sealer.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts and keyed details. Distinguish between shop- and field-assembled Work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of roof-penetration flashing.
8. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
9. Include details of special conditions.
10. Include details of connections to adjoining work.
11. Detail formed flashing and trim at scale of not less than 3 inches per 12 inches (1:5).

C. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

D. Qualification Data: For fabricator.

E. Sample Warranty: For special warranty.

F. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1. For copings and roof edge flashings that are ANSI/SPRI/FM 4435/ES-1 tested and FM Approvals approved, shop shall be listed as able to fabricate required details as tested and approved.

B. Mockups:

1. Install products in mockups of assemblies specified in other Sections that are indicated to receive products specified in this Section. Use materials and installation methods specified

in this Section.

a. Build mockup of sheet metal assemblies as indicated, including supporting construction cleats, seams, attachments, underlayment, and accessories.

b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations in writing.

c. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

2. Protect stored sheet metal flashing and trim from contact with water.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.8 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.

b. Chalking more than a No. 8 rating when tested in accordance with ASTM D4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: Twenty (20) years from date of Substantial Completion.

B. Contractor’s Quality of Work Warranty: Warrant that all sheet metal flashings are installed n accordance with the Contract Documents and will be free from defective quality of Work and or remain watertight and weatherproof with normal usage for a period of 5 years following Final Acceptance.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with the following:

1. NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing and Condensation and Air Leakage Control".

2. SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure:

1. Design Pressure: As indicated on Structural Drawings.

D. FM Approvals Listing: Manufacture and install copings and roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification as indicated on Structural Drawings. Identify materials with name of fabricator and design approved by FM Approvals.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

2.2 SHEET METALS

A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.

1. As-Milled Finish: Mill.

2. Exposed Coil-Coated Finish: Refer to Finishes articles below.

C. Stainless Steel Sheet: ASTM A240, dead soft, fully annealed; with smooth, flat surface.

1. Applications: Provide stainless steel flashings for all concealed and built-in applications; Type 304 or Type 316, except only Type 316 for locations within 10 miles of ocean shorelines.

2. Finish: ASTM A480, No. 2D (dull, cold rolled) or ASTM A480, No. 2B (bright, cold rolled).

a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

b. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1) Run grain of directional finishes with long dimension of each piece.

2) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

D. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653, G90 coating designation or aluminum-zinc alloy-coated steel sheet in accordance with ASTM A792, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to comply with ASTM A755.

1. Surface: Smooth, flat.

2. Exposed Coil-Coated Finish: Refer to Finishes articles below.

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D226, Type II, asphalt-saturated organic felt; nonperforated.

B. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F; and complying with physical requirements of ASTM D226 for Type I and Type II felts.

1. Source Limitations: Obtain underlayment from single source from single manufacturer.

C. Self-Adhering, High-Temperature Sheet Underlayment: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer in accordance with underlayment manufacturer's written instructions.

1. Coordinate self-adhering underlayments with Division 07 “Thermal and Moisture Protection” Sections.

2. Source Limitations: Obtain underlayment from single source from single manufacturer.

3. Low-Temperature Flexibility: ASTM D1970; passes after testing at minus 20 deg F or lower.

D. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

E. For underlayments at asphalt shingle roofing, refer to Section 07 31 13 “Asphalt Shingles”.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.

b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

3. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.

4. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153 or ASTM F2329.

C. Solder:

1. For Stainless Steel: ASTM B32, Grade Sn60 or Grade Sn96 as appropriate, with acid flux of type recommended by stainless steel sheet manufacturer.

2. For Zinc-Coated (Galvanized) Steel: ASTM B32, with maximum lead content of 0.2 percent.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement. Ensure compatibility with asphaltic and bituminous underlayments and other components.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187. Ensure compatibility with asphaltic and bituminous underlayments and other components.

I. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application. Ensure compatibility with asphaltic and bituminous underlayments and other components.

J. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.

1. Source Limitations: Obtain reglets from single source from single manufacturer.

2. Material:

a. For Stainless Steel Fabrications: Stainless steel, 0.0188 inch thick

b. For Aluminum and Steel Fabrications: Aluminum, 0.024 inch thick or Galvanized steel, 0.022 inch thick.

3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.

4. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.

5. Accessories:

a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.

b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.

6. Finish:

a. Where Concealed: Mill.

b. Where Exposed: Match adjacent metal wall cladding; refer to Section 07 42 15 “Formed Metal Wall and Soffit Panels” for coordination of finishes.

2.5 FABRICATION, GENERAL

A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.

1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.

4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances:

1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

G. Seams:

1. For Non-Factory-Finished Components: Fabricate nonmoving seams with flat-lock seams, or as indicated. Tin edges to be seamed, form seams, and solder.

a. Exception: For seams at aluminum components, fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

2. For Factory-Finished Components: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

H. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters:

1. Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required.

2. Fabricate in minimum 96-inch- long sections.

3. Furnish flat-stock gutter brackets and gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard, but with thickness not less than twice the gutter thickness.

4. Fabricate all gutter components and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.

5. Gutter Profile: SMACNA designation shall be K-Style.

6. Expansion Joints: Lab type; or as recommended by Fabricator..
7. Accessories: Wire-ball downspout strainer.
8. Gutter Width: 5 inches. Fabricate from the following materials:
   a. Prefinished Galvanized Steel: 22 gauge.

B. Downspouts: Fabricate round profile downspouts or as indicated, to dimensions indicated on Drawings, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.
1. Where round or open-face profile downspouts are indicated, refer to Drawings for requirements.
2. Fabricated or Manufactured Hanger Style: As indicated in Drawings in accordance with NRCA’s and/or SMACNA's sheet metal manuals.
3. Fabricate from the following materials:
   a. Galvanized Steel: 0.022 inch thick.
      1) Pre-finished to match gutters.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch- long, but not exceeding 12-foot- long sections. Furnish with 6-inch- wide, joint cover plates. Shop fabricate interior and exterior corners.
1. Joint Style: Overlapped, 4 inches wide or Butted with expansion space and 6-inch- wide, concealed backup plate or Butted with expansion space and 6-inch- wide, exposed cover plate.
2. Fabricate with scuppers spaced 10 feet apart, to dimensions required with 4-inch- wide flanges and base extending 4 inches beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper.
3. Fabricate from the following materials:
   a. Aluminum: 0.050 inch thick.
   b. Stainless Steel: 0.0188 inch thick.
   c. Galvanized Steel: 0.028 inch thick.
   d. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

B. Copings: Fabricate in minimum 96-inch- long, but not exceeding 12-foot- long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, fasten and seal, solder or weld watertight, as appropriate for base material. Shop fabricate interior and exterior corners.
1. Coping Profile: As indicated in Drawings in accordance with SMACNA's "Architectural Sheet Metal Manual."
2. Joint Style: Butted with expansion space and 6-inch- wide, concealed backup plate or Butted with expansion space and 6-inch- wide, exposed cover plate.
3. Fabricate from the following materials:
   a. Aluminum: 0.050 inch thick.
   b. Stainless Steel: 0.0250 inch thick.
   c. Galvanized Steel: 0.040 inch thick.

d. Aluminum-Zinc Alloy-Coated Steel: 0.040 inch thick.

C. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: 0.040 inch thick.
2. Stainless Steel: 0.0188 inch thick.
3. Galvanized Steel: 0.028 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

D. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Stainless Steel: 0.0188 inch thick.
3. Galvanized Steel: 0.022 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

E. Flashing Receivers: Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Stainless Steel: 0.0156 inch thick.
3. Galvanized Steel: 0.022 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

F. Roof-Penetration Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.0188 inch thick.
2. Galvanized Steel: 0.028 inch thick.
3. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

G. Roof-Drain Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.0156 inch thick.

2.8 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Stainless Steel: 0.0156 inch thick.
3. Galvanized Steel: 0.022 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

B. Drip Edges: Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Stainless Steel: 0.0156 inch thick.
3. Galvanized Steel: 0.022 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

C. Eave, Rake, Ridge, and Hip Flashing: Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.

2. Stainless Steel: 0.0156 inch thick.
3. Galvanized Steel: 0.022 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

D. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Stainless Steel: 0.0188 inch thick.
3. Galvanized Steel: 0.022 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

E. Flashing Receivers: Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Stainless Steel: 0.0156 inch thick.
3. Galvanized Steel: 0.022 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

F. Roof-Penetration Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.0188 inch thick.
2. Galvanized Steel: 0.028 inch thick.
3. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

2.9 WALL SHEET METAL FABRICATIONS

A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch- high, end dams. Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Stainless Steel: 0.0156 inch thick.
3. Galvanized Steel: 0.022 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

B. Wall Expansion-Joint Cover: Fabricate from the following materials:

1. Aluminum: 0.040 inch thick.
2. Stainless Steel: 0.0188 inch thick.
3. Galvanized Steel: 0.028 inch thick.
4. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

C. Flashing at Voids: Provide flashings throughout framed portions of the project to prevent access by insects and rodents to interior spaces, both occupied and not-occupied. This includes at openings created for the passage of piping, wiring, or other work which creates openings that could provide access to vermin. Fabricate flashings to close such voids as indicated for other openings in frame construction.

2.10 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.0188 inch thick.

2. Galvanized Steel: 0.028 inch thick.

3. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

2.11 FINISHES

A. Exposed Coil-Coated Finish: Provide the appropriate finish from the following to match adjacent finishes as required or indicated. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions. Where appropriate, provide finishes for seacoast and severe environments.

1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.

2. Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat.

3. Mica Fluoropolymer: AAMA 2605. Two-coat fluoropolymer finish with suspended mica flakes containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.

4. Metallic Fluoropolymer: AAMA 2605. Three-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat.

5. FEVE Fluoropolymer: AAMA 2605. Two-coat fluoropolymer finish containing 100 percent fluorinated ethylene vinyl ether (FEVE) resin in color coat.

B. Color: As indicated or as selected by Architect from manufacturer's full range.

C. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.

2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.

1. Install fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds or sealant.

3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
8. Do not field cut sheet metal flashing and trim by torch.
9. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction. Ensure compatibility of bituminous coatings with asphaltic and bituminous underlayments and other components.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws or substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

E. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated.
   a. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant.
   b. Form joints to completely conceal sealant.
   c. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
   d. Adjust setting proportionately for installation at higher ambient temperatures.
      1) Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter.

1. Pretin edges of sheets with solder to width of 1-1/2 inches; however, reduce pretinning where pretinned surface would show in completed Work.
2. Do not solder metallic-coated steel and aluminum sheet.
3. Do not pretin zinc-tin alloy-coated copper.
4. Do not use torches for soldering.

5. Heat surfaces to receive solder, and flow solder into joint.
   a. Fill joint completely.
   b. Completely remove flux and spatter from exposed surfaces.
6. Stainless Steel Soldering:
   a. Tin edges of uncoated sheets, using solder for stainless steel and acid flux.
   b. Promptly remove acid-flux residue from metal after tinning and soldering.
   c. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

G. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.3 INSTALLATION OF ROOF-DRAINAGE SYSTEM

A. Install sheet metal roof-drainage items to produce complete roof-drainage system in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Hanging Gutters:
   1. Join sections with riveted and soldered joints or joints sealed with sealant as appropriate for material.
   2. Provide for thermal expansion.
   3. Attach gutters at eave or fascia to firmly anchor them in position.
   4. Provide end closures and seal watertight with sealant.
   5. Slope to downspouts.
   6. Fasten gutter spacers to front and back of gutter.
   7. Anchor and loosely lock back edge of gutter to continuous cleat, eave or apron flashing.
   8. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches (600 mm) apart.
   9. Anchor gutter at spacing required for gutter size and type based on SMACNA and/or NRCA standard.
   10. Install gutter with expansion joints as required, but not exceeding, 50 feet apart. Install expansion-joint caps.

C. Downspouts:
   1. Join sections with 1-1/2-inch telescoping joints.
   2. Provide hangers with fasteners designed to hold downspouts securely to walls.
   3. Locate hangers at top and bottom and at approximately 60 inches o.c.
   4. Provide elbows at base of downspout to direct water away from building.
   5. Connect downspouts to underground drainage system.

D. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch below scupper or gutter discharge.

E. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated on Drawings. Lap joints minimum of 4 inches in direction of water flow.

3.4 INSTALLATION OF ROOF FLASHINGS

A. Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.

1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.

2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.

2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

C. Copings:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.

2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated.

a. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 16-inch centers.

b. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.

3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.

1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.

2. Extend counterflashing 4 inches over base flashing.

3. Lap counterflashing joints minimum of 4 inches.

4. Secure in waterproof manner by means of snap-in installation and sealant, interlocking folded seam or blind rivets and sealant, or anchor and washer spaced at 12 inches o.c. along perimeter and 6 inches o.c. at corners areas, unless otherwise indicated.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric or butyl sealant, as appropriate for roofing materials, and clamp flashing to pipes that penetrate roof.

3.5 INSTALLATION OF WALL FLASHINGS

A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.6 INSTALLATION OF MISCELLANEOUS FLASHING

A. Equipment Support Flashing:

1. Coordinate installation of equipment support flashing with installation of roofing and equipment.

2. Weld or seal flashing with elastomeric sealant to equipment support member.

B. Overhead-Piping Safety Pans:

1. Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings.

2. Pipe and install drain line to plumbing waste or drainage system.

3.7 INSTALLATION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.8 CLEANING

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

3.9 PROTECTION

A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.

C. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION

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SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Penetration firestopping systems for the following applications:

a. Penetrations in fire-resistance-rated walls.

b. Penetrations in horizontal assemblies.

c. Penetrations in smoke barriers.

2. Delegated design.

B. Related Requirements:

1. Section 01 61 16 “Delegated Design Requirements”.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

C. Delegated-Design Submittal: For firestopping indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified firestop design professional responsible for their preparation.

D. Qualification Data:

1. For Installer.

2. For firestop design professional.

E. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

F. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An acceptable Firestop Contractor shall be:

1. A firm that has been approved by FM Approval according to FM Approval 4991, "Approval Standard for Firestop Contractors," or

2. A firm that has been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements," or

3. A firm meeting all of the following requirements:

a. Installation personnel shall be trained by the approved firestop manufacturer.

b. The installation firm shall be experienced in installing firestop systems and fire resistive joint systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance.

c. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified tested and listed system requirements.

d. Minimum of three years' experience and shown to have successfully completed not less than five comparable scale projects and provides references.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design where indicated.

B. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.

2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:

a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.

1) UL in its "Fire Resistance Directory."

2) Intertek Group in its "Directory of Listed Building Products."

3) FM Approval in its "Approval Guide."

2.2 MANUFACTURERS

A. Approved Manufacturers:

1. 3M Fire Protection Products; www.3m.com.
2. Hilti; www.hilti.com.
3. International Fireproof Technology Inc. (IFTI); www.painttoprotect.com.
4. National Fireproofing, Inc.; www.natfire.com.
5. Specified Technologies Inc. (STI); www.stifirestop.com.
6. Tremco; www.tremcosealants.com.

2.3 PENETRATION FIRESTOPPING SYSTEMS

A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
3. W-Rating: W-rated sealants may provide protection of floors below the penetration in cases of rainwater intrusion or other uncontrolled source during construction. Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
   a. For new construction projects of three stories or more in such locations, until the roofing membrane and exterior envelope has been fully installed, provide penetration firestopping systems with W-rating at penetrations in horizontal assemblies. This is not required for existing building renovations.

D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.

E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.

F. Manufactured Piping Penetration Firestopping System: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.

4. Wall and Floor Pathways: Enclosed heavy-gauge, galvanized steel pathway lined with intumescent material; tested and approved cable capacities range from 0 to 100 percent visual fill. Fire and smoke sealing system that automatically adjusts to the amount of cables installed and allows cables added or removed without the need to remove or reinstall firestopping materials. May be ganged in multiple units using manufacturer's brackets.

5. Slab Sleeve: Molded-PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.

6. Stack Fitting: ASTM A48, gray-iron, hubless-pattern wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.

7. Special Coating: Corrosion resistant on interior of fittings.

G. Putty Pad Sealant: At fire-rated partitions in order to provide fire resistance at electrical boxes and other penetrations.

1. Approved Products:

a. Fire Barrier Moldable Putty Pads MPP+ by 3M; www.3m.com.

b. Firestop Putty Pad by Acoustical Solutions; www.acousticalolutionss.com.

c. CP 617 Firestop Putty Pad by Hilti North America; www.hilti.com.

d. Fire-Rated Putty Pads by Metacaulk; www.metacaulk.com.

H. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

1. Permanent forming/damming/backing materials.

2. Substrate primers.

3. Collars.

4. Steel sleeves.

2.4 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.

E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.5 MIXING

A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.

2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.

3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Adjacent Surfaces: Use masking tape to prevent through-penetration firestop system from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestops systems materials. Remove tape as soon possible without disturbing firestop system’s seal with substrates.

3.3 INSTALLATION

A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

C. Install fill materials by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.

2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.

B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. 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."

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.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2174.

B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under "Firestop Systems."

C. Where FM Approval-approved systems are indicated, they refer to design numbers listed in FM Approval's "Approval Guide" under "Wall and Floor Penetration Fire Stops."

D. Penetration Firestopping Systems:

1. Provide UL-Classified, Intertek Group-Listed or FM Approval-Approved Systems.
2. F-Rating: As required to achieve rating.
3. T-Rating: As required to achieve rating.
4. L-Rating at Ambient: As required to achieve rating.
5. L-Rating at 400 Deg F: As required to achieve rating.
6. W-Rating: As required; no leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

END OF SECTION

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SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Immersible joint sealants.
5. Mildew-resistant joint sealants.
6. Latex joint sealants.

B. Related Requirements:

1. Section 09 29 00 "Gypsum Board" for acoustical joint sealant at wall and ceiling construction.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. 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.

D. Qualification Data: For qualified testing agency.

E. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.

F. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:

1. Joint-sealant location and designation.
2. Manufacturer and product name.
3. Type of substrate material.
4. Proposed test.

5. Number of samples required.

G. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.

2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

H. 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.

I. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: Qualified according to ASTM C1021 to conduct the testing indicated.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

2. Compatibility Testing: Use ASTM C1087 to determine sealant compatibility when in contact with glazing and gasket materials.

3. Stain Testing: Use ASTM C1248 to determine stain potential of sealant when in contact with stone or masonry substrates.

4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.

5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.

7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

B. 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.

2. Conduct field tests for each kind of sealant and joint substrate.

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 X1.1 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.

1.7 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg.
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
   4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Two (2) years from date of Substantial Completion.
B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Five (5) years from date of Substantial Completion.
C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
   1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
   2. Disintegration of joint substrates from causes exceeding design specifications.
   3. Mechanical damage caused by individuals, tools, or other outside agents.
   4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As indicated or as selected by Architect from manufacturer's full range.

2.2 MANUFACTURERS

A. Approved Manufacturers:

1. BASF Corp.; www.master-builders-solutions.basf.us.
2. Dow Corp.; www.dow.com.
3. GE Construction Sealants; www.siliconeforbuilding.com.
4. Pecora Corp.; www.pecora.com.
5. Sika Corp.; www.sika.com.
6. Tremco, Inc.; www.tremcosealants.com.

2.3 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.

1. Basis-of-Design Product: Spectrem 1 by Tremco, Inc.
2. Other Approved Products:
   a. Dowsil 790 Silicone Building Sealant by Dow Corp.
   b. Pecora 890 NST by Pecora Corp.
3. Applications: Non-porous dissimilar exterior materials, as indicated in Drawings.

B. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.

1. Basis-of-Design Product: Dowsil 756 SMS Building Sealant by Dow Corp.
2. Other Approved Product: Pecora AVB by Pecora Corp.
3. Applications: Above-grade expansion and control joints, as indicated in Drawings.

2.4 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C1248.

B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.

1. Basis-of-Design Product: Spectrem 1 by Tremco, Inc.
2. Other Approved Products:
   a. Dowsil 790 Silicone Building Sealant by Dow Corp.
   b. Pecora 890 NST by Pecora Corp.

3. Applications: As indicated in Drawings.

C. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.

1. Basis-of-Design Product: Spectrem 3 by Tremco, Inc.

2. Other Approved Products:

a. Dowsil 795 Silicone Building Sealant by Dow Corp.

b. Pecora 895 NST by Pecora Corp.

3. Applications: At expansion and control joints, precast concrete panel joints, perimeter caulking, aluminum, and masonry.

2.5 URETHANE JOINT SEALANTS

A. Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses T and NT.

1. Basis-of-Design Product: Dymonic 100 by Tremco, Inc.

2. Other Approved Manufacturer: Sika Corp.

3. Applications: At expansion and control joints, precast concrete panel joints, perimeter caulking, aluminum, and masonry, as indicated in Drawings.

B. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 50, Uses T and NT.

C. Urethane, M, P, 25, T, NT: Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 25, Uses T and NT.

1. Basis-of-Design Product: Pecora Dynatrol II SG by Pecora Corp.

2. Applications: As indicated in Drawings.

2.6 IMMERSIBLE JOINT SEALANTS

A. Immersible Joint Sealants. Suitable for immersion in liquids; ASTM C1247, Class 2; tested in deionized water unless otherwise indicated.

B. Urethane, Immersible, S, NS, 100/50, NT, I: Immersible, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses NT, and I.

1. Basis-of-Design Product: Vulkem 45 SSL by Tremco, Inc.

2. Applications: As indicated in Drawings.

2.7 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

1. Basis-of-Design Product: Tremsil 200by Tremco, Inc.

2. Other Approved Manufacturers:
   a. Dowsil 786 Silicone Sealant by Dow Corp.
   b. GE Construction Sealants.
   c. Sika Corp.
3. Applications: At joints in ceramic tile walls and floor, around equipment and around plumbing fixtures, as indicated in Drawings.

2.8 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
   1. Basis-of-Design Product: Tremflex 834 by Tremco, Inc.
   2. Other Approved Product: Pecora AC-20 +Silicone by Pecora Corp.
   3. Applications: At interior door frames to walls, as indicated in Drawings.

2.9 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.10 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

a. Concrete.

b. Masonry.

c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

a. Metal.

b. Glass.

c. Porcelain enamel.

d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.

2. Do not stretch, twist, puncture, or tear sealant backings.

3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses in each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.

2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

3. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.

4. Provide flush joint profile at locations indicated on Drawings according to Figure 8B in ASTM C1193.

5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C1193.

a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Masonry Expansion Joints: Provide masonry sand broadcast into sealant to match grout joints.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed 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 one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM 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.

3. 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 complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. 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 material, sealant configuration, and sealant dimensions.

5. 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.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

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SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Interior steel doors and frames.
2. Exterior steel doors and frames.
3. Interior steel storefront, windows and borrowed lites.

B. Related Requirements:

1. Section 07 21 00 “Thermal Insulation” for insulation installed in hollow metal doors and frames.
2. Section 08 14 16 “Flush Wood Doors” for wood doors installed in hollow metal frames.
3. Section 08 71 00 "Door Hardware" for coordination with door hardware for hollow-metal doors.
4. Section 09 91 00 “Painting” for coordination of factory-applied primers with field-finishing doors.
5. Division 28 “Electrical Safety and Security” Sections for coordination with access control requirements.
6. Division 28 “Electrical Safety and Security” Sections for coordination with fire detection and alarm system requirements.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to ANSI/SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems and coordination with connections to power supplies and building safety and security systems.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

B. Shop Drawings or Manufacturer's Published Details: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

D. Qualification Data, for Door Inspector: Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

E. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly, windborne-debris impact resistance door and thermally-rated door assemblies for tests performed by a qualified testing agency indicating compliance with performance requirements.

F. Oversize Construction Certification: For assemblies required to be fire-rated and exceeding limitations of labeled assemblies.

G. Field quality control reports.

H. Record Documents: For doors, list any revisions made during construction to door numbers and applicable room name and number to which door accesses.

1.7 QUALITY ASSURANCE

A. Fire-Rated and Egress Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door and egress door assemblies shall meet the qualifications set forth in NFPA 80, section 5.2.3.1, NFPA 101, Section 7.2.1.15.4, and the following:

1. Hold Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification, be an Architectural Hardware Consultant (AHC), or hold other certification acceptable to authority having jurisdiction.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Ceco Door; div. of Assa Abloy; www.cecodoors.com.
2. Curries, div. of Assa Abloy; www.curries.com.
3. Deansteel Manufacturing Co. Inc.; www.deansteel.com.
4. Steelcraft; div. of Allegion; www.steelcraft.com.
5. Stiles Custom Metal, div. of Assa Abloy; www.stilesdoors.com.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
3. Temperature-Rise Limit: Where indicated in the Door Schedule, at vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

B. Windborne-Debris Impact Resistance: Passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for protection within Wind Zone indicated in Structural Drawings.

1. Large-Missile Test: For glazed openings located within 30 feet of grade.

C. Thermally Rated Door Assemblies: Provide exterior door assemblies with U-factor of 0.37 deg Btu/F x h x sq. ft. when tested according to ASTM C518, current Energy Code for Project location, or as required by Project-specific energy model; coordinate with Architect.

2.3 INTERIOR STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule.

1. Doors:
   a. Type: As indicated in the Door and Frame Schedule.
   b. Thickness: 1-3/4 inches.
   c. Face: Uncoated steel sheet, minimum thickness of nominal 18-gauge, 0.042 inch.

d. Edge Construction: Model 2, Seamless.

e. Edge Bevel: Provide manufacturer's standard beveled or square edges.

f. Core: Manufacturer's standard Kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate or vertical steel stiffener.

g. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated and temperature-rise-rated doors, where indicated in Door and Frame Schedule.

2. Frames:

a. Materials: Uncoated steel sheet, minimum thickness of nominal 16-gauge, 0.053 inch.

b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.

c. Construction: Full profile welded.

3. Exposed Finish: Factory primed and painted.

C. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A. At locations indicated in the Door and Frame Schedule.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.

b. Thickness: 1-3/4 inches.

c. Face: Uncoated steel sheet, minimum thickness of nominal 16-gauge, 0.053 inch.

d. Edge Construction: Model 2, Seamless.

e. Edge Bevel: Provide manufacturer's standard beveled or square edges.

f. Core: Manufacturer's standard Kraft-paper honeycomb, polystyrene polyurethane, polyisocyanurate or vertical steel stiffener.

g. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated and temperature-rise-rated doors, where indicated in Door and Frame Schedule.

2. Frames:

a. Materials: Uncoated steel sheet, minimum thickness of nominal 16-gauge, 0.053 inch.

b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.

c. Construction: Full profile welded.

3. Exposed Finish: Factory primed and painted.

2.4 EXTERIOR STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.

b. Thickness: 1-3/4 inches.

c. Face: Metallic-coated steel sheet, minimum thickness of nominal 18 gauge, 0.042 inch, with minimum A60 (ZF180) coating.

d. Edge Construction: Model 2, Seamless.

e. Edge Bevel: Provide manufacturer's standard beveled or square edges.

f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.

g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.

h. Core: Manufacturer's standard polystyrene, polyurethane, or polyisocyanurate insulation.

i. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated doors.

2. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of nominal 16 gauge, 0.053 inch, with minimum A60 (ZF180) coating.

b. Construction: Full profile welded.

1. Exposed Finish: Factory primed and painted.

C. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A. At locations indicated in the Door and Frame Schedule.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.

b. Thickness: 1-3/4 inches.

c. Face: Metallic-coated steel sheet, minimum thickness of nominal 16-gauge, 0.053 inch, with minimum A60 (ZF180) coating.

d. Edge Construction: Model 2, Seamless.

e. Edge Bevel: Provide manufacturer's standard beveled or square edges.

f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.

g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.

h. Core: Manufacturer's standard polystyrene, polyurethane, polyisocyanurate or vertical steel stiffener.

i. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated doors.

2. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of nominal 16-gauge, 0.053 inch, with minimum A60 (ZF180) coating.

b. Construction: Full profile welded.

3. Exposed Finish: Factory-prime for field finish painting.

2.5 STEEL STOREFRONT, WINDOWS AND BORROWED LITES

A. Fabricate of uncoated steel sheet, minimum thickness of 16 gauge ,0.053 inch.

B. Construction: Full profile welded.

C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.

D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.

2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.

3. Postinstalled Expansion Anchor: Minimum 3/8-inch- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.

D. Material: ASTM A879, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008 or ASTM A1011; hot-dip galvanized according to ASTM A153, Class B.

2.7 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A653, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153.

E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

G. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

2.8 FABRICATION

A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Sidelite and Transom Bar Frames: Where required, provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding, or by rigid mechanical anchors.

2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.

b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.

2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.

3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.

4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.9 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.10 LOUVERS

A. Provide louvers for doors, where indicated, which comply with SDI 111, with blades or baffles

formed of 0.020-inch- thick, cold-rolled steel sheet set into 0.032-inch- thick steel frame.

1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
2. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.

B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
   a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
   b. Install frames with removable stops located on secure side of opening.
2. Fire-Rated Openings: Install frames according to NFPA 80.
3. Floor Anchors: Secure with postinstalled expansion anchors.
   a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
4. For doors indicated to provide acoustic performance, solidly pack mineral-fiber insulation inside frames.
5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

3. Smoke-Control Doors: Install doors according to NFPA 105.

D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Fire-Rated Door Inspections: Inspect each fire-rated door according to NFPA 80, Section 5.2.

2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements according to NFPA 101, Section 7.2.1.15.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 REPAIR

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

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SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid-core flush wood veneer-faced doors (DR-1).
2. Factory priming or finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Section 06 10 00 “Rough Carpentry” for coordination with framing and for blocking.
2. Section 08 11 13 “Hollow Metal Doors and Frames” for hollow metal frames.
3. Section 08 71 00 "Door Hardware" for coordination with door hardware for hollow-metal doors.
4. Division 28 “Electrical Safety and Security” Sections for coordination with access control requirements.
5. Division 28 “Electrical Safety and Security” Sections for coordination with fire detection and alarm system requirements.

1.3 COORDINATION

A. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems and coordination with connections to power supplies and building safety and security systems.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 SUBMITTALS

A. Product Data: For each type of product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door louvers.
5. Factory-machining criteria.
6. Factory-priming or finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing

thicknesses.

3. Details of preparation for electrified hardware, access control systems, and security systems.
4. Dimensions and locations of blocking for hardware attachment.
5. Dimensions and locations of mortises and holes for hardware.
6. Clearances and undercuts.
7. Requirements for veneer matching.
8. Doors to be factory primed or finished provide finishing information.
9. Apply AWI Quality Certification or WI Certified Compliance Program label to Shop Drawings.

C. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.

D. Field quality-control reports.

E. Sample Warranty: For special warranty.

F. Special warranties.

G. Quality Standard Compliance Certificates: AWI Quality Certification or WI Certified Compliance Program certificates.

1.6 QUALITY ASSURANCE

A. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program or WI's Certified Compliance Program.

B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies shall comply with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.
2. Where Authority having Jurisdiction (AHJ) requires special inspection, provide the following as applicable to the Project:
   a. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Delamination of veneer.

b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.

c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

3. Warranty Period for Solid-Core Exterior Doors: Five (5) years from date of Substantial Completion.

4. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.

1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

2. Temperature-Rise Limit: If required by AHJ, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.2 MANUFACTURERS

A. Source Limitations: Obtain flush wood doors from single manufacturer.

B. Approved Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Marshfield DoorSystems, Inc., div. of Masonite; www.architectural.masonite.com.

2. Masonite; www.masonite.com.

3. Oregon Door; www.oregondoor.com.

4. Oshkosh Door Co.; www.oshkoshdoor.com.

5. Rogue Valley Door; www.roguevalleydoor.com.

6. Vancouver Door Co.; www.vancouverdoorco.com.

7. VT Industries Inc.; www.vtindustries.com.

2.3 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards".

1. Provide labels and certificates from AWI or WI certification program indicating that doors comply with requirements of grades specified.

a. Contractor shall register the Work under this Section with the AWI Quality Certification Program at www.awiqcp.org or by calling 855-345-0991.

2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.

2.4 SOLID-CORE FLUSH WOOD VENEER-FACED DOORS, DR-1

A. Interior Doors:

1. Performance Grade: ANSI/WDMA I.S. 1A Standard Duty.

2. Faces: Single-ply wood veneer not less than 1/50 inch thick.

3. Transparent Finish Doors:

a. Species and Cut: As indicated on Interior Finish Legend in Drawings.

b. Match between Veneer Leaves: Book match.

c. Assembly of Veneer Leaves on Door Faces: Center-balance match.

d. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.

e. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 10 feet or more.

4. Opaque Finish Doors:

a. Faces: Any closed-grain hardwood.

5. Exposed Vertical and Top Edges: Same species as faces - Architectural Woodwork Standards edge Type A.

a. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

1) Screw-Holding Capability: 550 lbf in accordance with WDMA T.M. 10.

6. Core for Non-Fire-Rated Doors:

a. ANSI A208.1, Grade LD-1 or Grade LD-2 particleboard.

1) Provide doors with glued-wood-stave or WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for doors scheduled to receive exit devices in Section 08 71 00 "Door Hardware."

7. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.

1. Comply with clearance requirements of referenced quality standard for fitting unless

otherwise indicated.

B. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.

2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.

3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.

4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.

5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

2.6 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing.

1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

2. Finish faces, all four edges, edges of cutouts, and mortises.

3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Factory finish doors that are indicated on Drawings to receive transparent finish.

C. Transparent Finish:

1. Architectural Woodwork Standards or ANSI/WDMA I.S. 1A Grade: Premium.

2. Finish: Architectural Woodwork Standards System-10, UV Curable, Water Based.

3. Staining: None required.

4. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.

2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 08 71 00 "Door Hardware."

B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Job-Fitted Doors:

1. Align and fit doors in frames with uniform clearances and bevels as indicated below.

a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.

2. Machine doors for hardware.
3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
4. Clearances:
   a. Provide 1/8 inch at heads, jambs, and between pairs of doors.
   b. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
   c. Where threshold is shown or scheduled, provide1/4 inch from bottom of door to top of threshold unless otherwise indicated.
   d. Comply with NFPA 80 for fire-rated doors.
5. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
6. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 08 31 13 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Access doors and frames.

B. Related Requirements:

1. Division 22 “Plumbing” Sections for coordination with plumbing components.
2. Division 23 “Heating, Ventilation and Air-Conditioning (HVAC)” Sections for coordination with HVAC components.

1.3 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.

1.4 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and as indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Basis-of-Design Manufacturer: Acudor Products, Inc.; www.acudor.com.
2. Other Approved Manufacturers:

a. Activar Construction Products Group, Inc.; www.activarcpg.com.

b. Babcock-Davis; www.babcockdavis.com.

c. JL Industries Inc., div. of Activar Construction Products Group, Inc.; www.activarcpg.com.

d. Karp Associates, Inc.; www.karpinc.com.

e. Larsen’s Manufacturing Co.; www.larsensmfg.com.

f. Milcor, div. of Hart & Cooley, LLC; www.milcorinc.com.

g. Williams Bros. Corp.; www.wbdoors.com.

2.2 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges:

1. Description: Face of door flush with frame, with exposed flange and continuous piano hinge.
2. Optional Features: Door gasketing.
3. Locations: Wall and ceiling.
4. Door Size: As required for items to be accessed.
5. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage, factory primed.
   a. Applications: Masonry walls.
6. Stainless Steel Sheet for Door: Nominal 0.062 inch, 16 gage, ASTM A480 No. 4 finish.
   a. Applications: Tile finished walls.
7. Frame Material: Same material, thickness, and finish as door.
8. Latch and Lock: Cam latch, screwdriver operated or cam latch, key operated as selected by Architect.

2.3 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A36.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879, with cold-rolled steel sheet substrate complying with ASTM A1008, Commercial Steel (CS), exposed.

C. Metallic-Coated Steel Sheet: ASTM A653, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.

D. Stainless Steel Plate, Sheet, and Strip: ASTM A240 or ASTM A666, Type 316. Remove tool and die marks and stretch lines, or blend into finish.

E. Stainless Steel Flat Bars: ASTM A666, Type 316. Remove tool and die marks and stretch lines, or blend into finish.

F. Aluminum Extrusions: ASTM B221, Alloy 6063.

G. Aluminum Sheet: ASTM B209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

H. Frame Anchors: Same material as door face.

I. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153 or ASTM F2329.

2.4 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. Exposed Flanges: Nominal 1 in. wide around perimeter of frame.
2. Provide mounting holes in frames for attachment of units to metal or wood framing.

3. Provide mounting holes in frame for attachment of masonry anchors.

D. Latch and Lock Hardware:

1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.

2. Keys: Furnish two keys per lock and key all locks alike.

E. Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

E. Stainless Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

2. Interior Locations, Polished Finish: ASTM A480 No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.

a. Run grain of directional finishes vertical.

b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

3. Exterior Locations, Bright, Cold-Rolled, Unpolished Finish: ASTM A480 No. 2B.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Fire-Rated Door Inspections: Inspect each fire-rated access door in accordance with NFPA 80, Section 5.2.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated access door indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION

SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Aluminum-framed storefronts for exterior.
2. Manual-swing entrance doors and door-frame units.
3. Delegated design.

B. Related Requirements:

1. Section 01 61 16 “Delegated Design Requirements”.
2. Section 07 25 00 “Weather Barriers” for opening preparation.
3. Section 07 42 15 “Formed Metal Wall and Soffit Panels” for trim profiles.
4. Section 07 62 00 “Sheet Metal Flashing and Trim” for flashings.
5. Section 07 92 00 “Joint Sealants” for installation of joint sealants installed with storefronts and for sealants to the extent not specified in this Section.
6. Section 08 80 00 "Glazing” for glass used in entrance and storefront assemblies.
7. Section 08 51 13 “Aluminum Windows”.
8. Division 28 “Electronic Safety and Security” Sections for coordination with access control requirements.
9. Division 28 “Electronic Safety and Security” Sections for coordination with fire detection and alarm system requirements.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:

a. Joinery, including concealed welds.

b. Anchorage.

c. Expansion provisions.

d. Glazing.

e. Flashing and drainage.

3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

C. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Samples for Initial Selection: For units with factory-applied color finishes.

E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

F. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:

1. Joinery, including concealed welds.

2. Anchorage.

3. Expansion provisions.

4. Glazing.

5. Flashing and drainage.

G. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

H. Qualification Data:

1. For Professional Engineer.

2. For Installer

3. Field testing agency.

I. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.

1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.

J. Product Test Reports: For aluminum-framed entrances and storefronts for tests performed by manufacturer and witnessed by a qualified testing agency.

K. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C1401. Include periodic quality-control reports.

L. Source quality-control reports.

M. Field quality-control reports.

N. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Engineer Qualifications: Qualified professional engineer responsible for delegated design, licensed in the jurisdiction in which Project is located.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

C. Testing Agency Qualifications: Qualified according to ASTM E699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025.

D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 MOCKUPS

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical wall area indicated.

2. Testing shall be performed on mockups according to requirements in "Field Quality Control" Article.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 WARRANTY

A. Special Warranty: Installer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.

b. Noise or vibration created by wind and thermal and structural movements.

c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

d. Water penetration through fixed glazing and framing areas.

e. Failure of operating components.

2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. 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. Warranty Period: 20 years from date of Substantial Completion.

C. Special Installer's Warranty, Sealants: Warranties for installation and materials specified in Section 07 25 00 "Weather Barriers" applies to weathersealing and sealant joints installed in this Section.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer; refer to Section 01 61 16 "Delegated Design Requirements" for requirements.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.

2. Failure also includes the following:

a. Thermal stresses transferring to building structure.

b. Glass breakage.

c. Noise or vibration created by wind and thermal and structural movements.

d. Loosening or weakening of fasteners, attachments, and other components.

e. Failure of operating units.

C. Structural Loads:

1. Wind Loads: As indicated on Drawings.

2. Other Design Loads: As indicated on Drawings.

D. Horizontal Deflection, Interior: For interior storefront assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft.

E. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 11 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 11 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.

a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.

3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:

a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch for spans greater than 11 feet 8-1/4 inches or 1/175 times span, for spans less than 11 feet 8-1/4 inches.

F. Structural: Test according to ASTM E330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.

3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

G. Air Infiltration: Test according to ASTM E283 for infiltration as follows:

1. Fixed Framing and Glass Area:

a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft.

2. Entrance Doors:

a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.

b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.

H. Water Penetration under Static Pressure: Test according to ASTM E331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

I. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

2. Maximum Water Leakage: 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, or water that is drained to exterior.

J. Interstory Drift: Accommodate design displacement of adjacent stories indicated.

1. Design Displacement: As indicated on Drawings.

2. Test Performance: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement and 1.5 times the design displacement.

K. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement and 1.0 times the design displacement.

2. Vertical Interstory Movement: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.7 at design displacement and 1.0 times the design displacement.

L. Energy Performance: Certify and label energy performance according to NFRC as follows, unless otherwise indicated.:

1. Thermal Transmittance (U-factor): In Btu/sq. ft. x h x deg F, as determined according to

NFRC 100:

a. Fixed glazing and framing areas shall have U-factor of not more than value indicated for compliance.

b. Entrance Doors shall have U-factor of not more than value indicated for compliance.

2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than value indicated for compliance, as determined according to NFRC 200.

M. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.

a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.

b. Low Exterior Ambient-Air Temperature: 0 deg F.

c. Interior Ambient-Air Temperature: 75 deg F.

2.2 MANUFACTURERS

A. Source Limitations: Obtain all components of aluminum-framed storefronts, including framing, entrances and accessories, from single manufacturer.

B. Basis-of-Design Manufacturer: Kawneer, div. of Alcoa; www.kawneer.com.

1. Other Approved Manufacturers:

a. EFCO LLC; www.efcocorp.com.

b. Oldcastle Building Envelope; www.obe.com.

c. Vistawall Architectural Products, a div. of Oldcastle Building Envelope Group; www.obe.com.

2.3 STOREFRONT SYSTEMS

A. Basis-of-Design Product: Trifab VersaGlaze 451T Framing System; thermally broken, center glazed.

B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required to support imposed loads without internal steel reinforcement.

1. Construction: Thermally broken.

2. Glazing System: Retained mechanically with gaskets on four sides.

3. Glazing Plane: Center.

4. Finish: Refer to Aluminum Finishes articles in this Section.

5. Fabrication Method: Shop-fabricated stick system.

C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

E. Trim: Aluminum, 0.060-inch thick.

F. Flashings: Provided under Section 07 62 00 “Sheet Metal Flashing and Trim.”

2.4 ENTRANCE DOOR SYSTEMS

A. Basis-of-Design Product, Entrance: 500 Tuffline Entrances by Kawneer; wide stile frame.

1. Stiles and Rails: 2-inches thick; 3/16-inch minimum wall thickness. Welded corners.

2. Door Design: As indicated.

3. Bottom Rail: 10 inches minimum.

4. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.

a. Provide nonremovable glazing stops on outside of door.

2.5 ENTRANCE DOOR HARDWARE

A. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule for each entrance door to comply with requirements in this Section.

1. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 08 71 00 "Door Hardware."

2. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.

3. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

4. Opening-Force Requirements:

a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to set the door in motion and not more than 15 lbf to open the door to its minimum required width.

b. Accessible Interior Doors: Not more than 5 lbf to fully open door.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.

2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

C. Cylinders: As specified in Section 08 71 00 "Door Hardware."

D. Pivot Hinges: BHMA A156.4, Grade 1.

E. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

1. Refer to Section 08 71 00 “Door Hardware” for devices and requirements, as needed.

F. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.

1. Refer to Section 08 71 00 “Door Hardware” for devices and requirements.

G. Concealed Overhead Holders and Stops: BHMA A156.8, Grade 1.

H. Removable Mullions: BHMA A156.3, extruded aluminum.

1. When used with panic exit hardware, provide removable mullions listed and labeled by a testing and inspecting agency acceptable to Authorities Having Jurisdition, for panic protection, basd on testing according to UL 305. Use only mullions that have been tested with exit devices to be used.

I. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.

J. Weather Stripping: Manufacturer's standard replaceable components.

1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.

K. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.

L. Thresholds: BHMA A156.21 raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch. Saddle type where required by floor elevations.

M. Silencers: BHMA A156.16, Grade 1.

2.6 GLAZING

A. Glazing: Type scheduled or indicated otherwise. Comply with Section 08 80 00 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: Comply with Section 08 80 00 "Glazing."

D. Weatherseal Sealants: ASTM C920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with other system components with which it comes in contact; recommended by weatherseal-sealant manufacturers for this use.

1. See Section 07 25 00 “Weather Barriers.” Comply with Section 07 92 00 “Joint Sealant.”

2.7 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B209.

2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.

3. Extruded Structural Pipe and Tubes: ASTM B429.

4. Structural Profiles: ASTM B308.

2.8 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.

2. Reinforce members as required to receive fastener threads.

3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from 300 series stainless steel.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials

and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123 or ASTM A153 requirements.

C. Stool Trims: Provide manufacturer's standard stool trim as indicated.

1. Basis-of-Design Product: Model no. 069264 by Kawneer.
2. Depth: 2-3/4 in., or as indicated.
3. Finish: Match storefront framing finish.

D. Concealed Flashing: Dead-soft, 0.018-inch-thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer.

E. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic. Provide wedge, stackable, u-shaped and tapered and profiles as required for conditions.

F. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.9 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from exterior.
6. Fasteners, anchors, and connection devices are to be concealed from view to greatest extent possible. Exposed fasteners are not permitted unless reviewed by Architect prior to fabrication.
7. Fabricate and assemble components to drain water to the exterior.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Storefront Framing: Fabricate components for assembly to comply with performance requirements.

F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.
2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
2. At exterior doors, provide weather sweeps applied to door bottoms.

H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.10 ALUMINUM FINISHES

A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF or FEVE resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Approved PVDF Resin Products:

a. Hylar 5000 by Solvay; www.solvay.com.

b. Kynar 500 by Arkema: www.kynar500.com.

2. Approved Fluoropolymer Coating Products:

a. Duranar by PPG IdeaScapes; www.ppgideascapes.com.

b. Fluropon by Valspar Corp., div. of The Sherwin-Williams Co.; www.valsparcoilextrusion.com.

3. Exposed Finish: Three-coat fluoropolymer (PVDF) finish.

4. Color: “Dark Bronze”, matching color of entrances and storefronts at existing building.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.

2. Do not install damaged components.

3. Fit joints to produce hairline joints free of burrs and distortion.

4. Rigidly secure nonmovement joints.

5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by

painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.

2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed to produce weathertight installation.

D. Flashings and Trim: Comply with Section 07 62 00.

E. Weather Sealing: Comply with Sections 07 25 00 and 07 92 00.

F. Install components plumb and true in alignment with established lines and grades.

G. Install glazing as specified in Section 08 80 00.

H. Install weatherseal sealant according to Section 07 92 00 and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

I. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.4 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 12 feet; 1/4 inch in 40 feet.

2. Level: 1/8 inch in 12 feet; 1/4 inch in 40 feet.

3. Alignment:

a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.

b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.

c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.

4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Field Quality-Control Testing: Perform the test on representative areas of aluminum-framed entrances and storefronts before installation of interior finishes have begun.

1. Perform tests in each test area as directed by Architect. Perform on mockup and a minimum three tests, prior to 10, 35, and 70 percent completion.

2. Tests shall not evidence water penetrations and shall meet specified air-infiltration requirements.

3. Water-Spray Test: Tested according to AAMA 501.2, at Contractor’s option for initial testing.

4. Air Infiltration: ASTM E783 at a static-air-pressure differential of specified in “Performance

Requirements."

5. Water Penetration: ASTM E1105 at a minimum cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft.

C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.

1. Upon failure, repair or replace defective units as required, and retest opening plus two additional openings at no cost to Owner.

D. Prepare test and inspection reports.

3.6 MAINTENANCE SERVICE

A. Entrance Door Hardware:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

3.7 ENTRANCE DOOR HARDWARE SETS

A. Refer to Section 08 71 00 "Door Hardware."

END OF SECTION

SECTION 08 51 13 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Aluminum windows.
2. Delegated design.

B. Related Sections:

1. Section 01 61 16 “Delegated Design Requirements”.
2. Section 07 25 00 “Weather Barriers” for perimeter joint sealant for weathersealing.
3. Section 07 62 00 “Sheet Metal Flashing and Trim” for flashings and other sheet metal work.
4. Section 07 92 00 “Joint Sealants” for exterior perimeter sealant for “beauty” joints.
5. Section 08 41 13 "Aluminum-Framed Entrances and Storefronts" for coordinating finish among aluminum fenestration units.

1.3 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum windows.

B. Shop Drawings: For aluminum windows.

1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

C. Delegated-Design Submittal: For aluminum windows indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Samples: For each exposed product and for each color specified, 2 by 3 inches in size.

E. Samples for Verification: For aluminum windows and components required, showing full range of color variations for finishes, and prepared on Samples of size indicated below:

1. Exposed Finishes: 2 by 3 inches.
2. Exposed Hardware: Full-size units.

F. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

G. Qualification Data: For manufacturer and Installer.

H. Product Test Reports: For each type of aluminum window, for tests performed by a qualified testing agency.

I. Field quality-control reports.

J. Sample Warranties: For manufacturer's warranties.

1.4 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site.

B. Engineer Qualifications: Qualified professional engineer responsible for delegated design, licensed in the jurisdiction in which Project is located.

C. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.

D. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.

E. Mockups:

1. Window mock-up shall incorporate surrounding construction, including wall assembly fasteners, flashing, and other related accessories installed in accordance with window manufacturer's approved installation methods.

2. Build mockup of typical wall area as shown on Drawings.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver windows materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store windows as recommended by manufacturer.

1.6 WARRANTY

A. Manufacturer standard warranty indicating that the window unit will be free from material and workmanship defects from the date of first product shipment for the time periods indicated below:

1. Window Unit: 10 years

2. Aluminum Finish: 20 years against peeling, checking, cracking caulk or color change

3. Glazing:

a. Insulated Glass: 10 years against seal breakage.

b. Laminated Glass and Specialty Glazing: Five (5) years against delamination.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 61 16 "Delegated Design Requirements," to design aluminum windows.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum windows representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

C. Provide windows capable of complying with requirements indicated, based on testing manufacturer's window that are representative of those specified and that are of test size required by ANSI/AAMA/NWWDA 101 I.S.2/NAFS.

D. Structural Requirements: Provide windows capable of complying with requirements indicated:

1. Design Wind Loads: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.

a. Wind Speed: 120 mpf, ultimate.

b. Exposure Category: B.

c. Importance factor: 1.0 unless indicated otherwise.

E. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Minimum Performance Class: AW.

2. Minimum Performance Grade: 60.

a. Provide higher grade where design pressures exceed minimum indicated.

F. Air Test Performance Requirements:

1. Air infiltration maximum 0.3 cfm per square foot at 6.24 psf pressure differential when tested in accord with ASTM E283.

G. Water Test Performance Requirements:

1. There shall be no water infiltration for fixed windows when tested in accordance with ASTM E547 with a pressure difference of 15.04 psf / 720 Pa. Static water test shall be repeated after application of design test pressures.

H. Structural Test Performance Requirements:

1. Uniform Load Deflection Test:

a. No deflection of any unsupported span L of test unit (framing rails, muntins, mullions, etc.) in excess of L/175 at both a positive and negative load of 70 psf (design test pressure) when tested in accord with ASTM E330.

2. Uniform Load Structural Test:

a. Unit to be tested at 1.5 x design test pressure, both positive and negative, acting normal to plane of wall in accord with ASTM E330.

b. No glass breakage; permanent damage to fasteners, hardware parts, or anchors; damage to make windows inoperable; or permanent deformation of any main frame or ventilator member in excess of 0.2 percent of its clear span.

2.2 MANUFACTURERS

A. Source Limitations: Obtain aluminum windows from single source from single manufacturer.

B. Basis-of-Design Manufacturer: Marlin Windows, Inc.; www.marlinwindows.com.

C. Other Approved Manufacturer: Gerkin Windows & Doors; www.gerkin.com, or approved equal.

2.3 ALUMINUM WINDOWS

A. Basis-of-Design Product: Thermal Break 1505 Series by Marlin.

B. Operating Types: Provide the following operating types in locations indicated in Drawings.

1. Projected, awning.

2. Fixed.

C. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.

1. Thermally Improved Construction: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and

window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.

D. Insulating-Glass Units: ASTM E2190.

1. Glass: ASTM C1036, Type 1, Class 1, q3.

a. Tint: Bronze.

b. Kind: Fully tempered where indicated on Drawings.

2. Filling: Fill space between glass lites with argon.

3. Low-E Coating: Sputtered on surface no. 2.

E. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal, refer to Section 08 80 00 “Glazing” for requirements.

F. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Sash Balance: Concealed, heavy duty, of size and capacity to hold sash stationary at any open position.

2. Exposed Hardware Color and Finish: As selected by Architect to match color of hardware at adjacent windows on existing building.

G. Projected Window Hardware:

1. Hinges**:** Concealed four- or six-bar frication hinge located on each jamb near top rail; two per each operable lite.

2. Lock: Lever handle and cam-action lock with keeper, two per each operable lite.

3. Limit Devices: Concealed friction adjustor, adjustable stay bar limit devices designed to restrict sash opening.

a. Limit clear opening to 4 in. for ventilation; with custodial key release.

H. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

2.4 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.

2. Reinforce members as required to receive fastener threads.

3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from 300 series stainless steel.

4. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

B. Flashing: Refer to Section 07 62 00 “Sheet Metal Flashing and Trim”.

C. Sealants: Refer to Section 07 25 00 “Air Barriers” for weathersealing and Section 07 92 00 “Joint Sealant” for joints.

2.5 INSECT SCREENS

A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.

1. Type and Location: Provide on all operable units. Full, inside for project-out sashes.

B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.

C. Aluminum Wire Fabric: 18-by-16 mesh of 0.011-inch diameter, coated aluminum wire.

1. Wire-Fabric Finish: “Charcoal gray”, to match color of insect screens at adjacent windows on existing building.

2.6 FABRICATION

A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

B. Glaze aluminum windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

F. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.7 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 ALUMINUM FINISHES

A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF or FEVE resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Approved PVDF Resin Products:

a. Hylar 5000 by Solvay; www.solvay.com.

b. Kynar 500 by Arkema: www.kynar500.com.

2. Approved Fluoropolymer Coating Products:

a. Duranar by PPG IdeaScapes; www.ppgideascapes.com.

b. Fluropon by Valspar Corp., div. of The Sherwin-Williams Co.; www.valsparcoilextrusion.com.

3. Exposed Finish: Two-coat fluoropolymer (PVDF) finish.

4. Color: “Dark Bronze”, matching color of adjacent windows on existing building.

PART 3 - EXECUTION

3.1 GENERAL

A. Install windows in accordance with manufacturer’s installation guidelines and recommendations.

3.2 EXAMINATION

A. Inspect window prior to installation.

B. Inspect rough opening for compliance with window manufacturer recommendations. Verify rough opening conditions are within recommended tolerances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Form sheet metal sill pan in accordance with manufacturer’s recommendations.

B. Prepare windows for installation in accordance with manufacturer’s recommendations.

3.4 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Windows to align vertically, horizontally, and in depth as indicated in architectural elevations and section drawings to within 1/8 inch plus/ minus relative to adjacent and adjoining windows in all directions.

D. Insert window into rough opening:

1. Shim side jambs straight.

2. Inspect window for square, level and plumb.

3. Fasten window through nailing fin holes around entire window.

4. Test and adjust for smooth operation of window.

E. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

F. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.5 FIELD QUALITY CONTROL

A. Manufacturers’ Field Services: Field inspections.

B. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.

1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

2. Testing Services:

a. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502-12 and ASTM E1105.

b. Air-Infiltration Testing:

1) Test Pressure: As required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated, but not less than full pressure indicated.

2) Allowable Air-Leakage Rate: 1.0 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.

c. Water-Resistance Testing:

1) Test Pressure: Full test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.

2) Allowable Water Infiltration: No water penetration.

3. Testing Extent: Mock-up and three (3) windows of each type, projected awning and fixed, at locations as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured and all flashings and waterproofing materials have been installed.

a. Test prior to installing exterior finishes and prior to installing interior finishes. If finishes have been installed prior to time of testing, contractor to remove finishes.

C. Windows will be considered defective if they do not pass tests and inspections.

1. Where failures occur, retest opening and an additional two windows until windows pass, at no additional cost to Owner.

D. Prepare test and inspection reports.

3.6 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION

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SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Work under this Section includes the complete finish hardware requirements for the project. Quantities listed are for the contractor's convenience only and are not guaranteed. Items not specifically mentioned, but necessary to complete the work shall be furnished, matching the items specified in quality and finish.

B. Related Requirements:

1. Section 08 11 13 "Hollow Metal Doors and Frames".
2. Section 08 14 16 "Flush Wood Doors".
3. Section 08 42 13 "Aluminum-Framed Entrances and Storefronts".
4. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
5. Division 28 "Electrical Safety and Security" for coordination and connections of door hardware and access control equipment to access control systems.
6. Refer to the Drawings for the coordination of required components and connections.

1.3 QUALITY ASSURANCE

A. Product Qualification:

1. To assure a uniform high quality of materials for the project, it is intended that only specified items be furnished. Comparable products may be accepted upon prior approval of architect.
2. Hardware to be new, free of defects, blemishes and excessive play. Obtain each kind of hardware (Mechanical latch and locksets, exit devices, hinges and closers) from one manufacturer except where specified.

B. Supplier Qualifications:

1. Hardware supplier will be a direct factory contract supplier who employs a certified Architectural Hardware Consultant (AHC) available at all reasonable times during the course of the work for project hardware consultation to owner, architect and contractor.
2. Supplier will be responsible for detailing, scheduling and ordering of finish hardware.
3. Conduct pre-installation conference at jobsite. Initiate and conduct with supplier, installer and related trades. Coordinate materials and techniques and sequence complex hardware items and systems installation.
4. Key Conference shall be initiated and conducted with owner to determine system, keyway(s) and structure.

C. Installer Qualifications:

1. An entity that employs installers and supervisors who are trained and approved by manufacturer, or;

2. Factory trained, certified, and carries a factory-issued card certifying that person as a “Certified Installer”.

1.4 REFERENCES

A. NFPA80 – Fire Doors and Windows

B. NFPA101 – Life Safety Code

C. NFPA105 – Smoke and Draft Control Door Assemblies

D. ANSI A117.1–Accessible and Usable Buildings and Facilities

E. OSSC 2014 – Oregon Structural Specialty Code

1.5 SUBMITTALS

A. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring diagrams: Power, signal and control wiring. By Access Control Provider.

2. Detail interface between electrified door hardware and access control, security and building control system.

3. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

B. Hardware Schedule: Submit digital copies of schedule. Organize vertically formatted schedule into Hardware Sets with index of doors and headings, indication complete designations of every item required for each door or opening. Include the following:

1. Type, style, function, size, quantity and finish of hardware items.

2. Name, part number and manufacture of each item.

3. Fastenings and other pertinent information.

4. Explanation of abbreviations, symbols and codes contained in schedule.

5. Door and frame sizes, materials and degrees of swing.

C. Product Data: Submit digital copies for each product indicated.

D. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 01.

E. Keying Schedule: Prepared by or under the supervision of Hardware Supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

F. Samples: Upon request submit material samples.

G. Door Hardware Sets: Prepared by or under the supervision of Hardware Supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final door hardware sets with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page.

2. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.

3. Content: Include the following information:

a. Identification number, location, hand, fire rating, and material of each door and

frame.

b. Type, style, function, size, quantity, and finish of each door hardware item. Include description and function of each lockset and exit device.

c. Complete designations of every item required for each door or opening including name and manufacturer.

d. Fastenings and other pertinent information.

e. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.

f. Explanation of abbreviations, symbols, and codes contained in schedule.

g. Mounting locations for door hardware.

h. Door and frame sizes and materials.

i. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.

j. List of related door devices specified in other Sections for each door and frame.

4. Submittal Sequence: Submit the final door hardware sets at earliest possible date, particularly where approval of the door hardware sets must precede fabrication of other work that is critical in Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the door hardware sets.

1.6 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, construction keying, and access control with Owner.

D. Access Control System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

F. Direct shipments not permitted, unless approved by Contractor.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle and protect products to project site under provisions of Division 01 and as specified herein.

B. Tag each item or package separately, with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver keys to Owner by registered mail.

1.8 WARRANTY

A. The finish hardware shall have a limited warranty against defects in workmanship and operation for a period of one year from date of substantial completions and the following items are as shown:

1. Closers: Thirty years mechanical, two years electrical.
2. Exit Devices: Three years mechanical, one year electrical.
3. Locksets: Three years mechanical, one year electrical.

1.9 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.1 MATERIAL AND FABRICATION

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies same as those used in the manufacture and installation of original products.

2.2 MANUFACTURERS

A. Approval of products from manufacturers indicated as “Acceptable Manufacturer” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.

ITEM	SCHEDULED MANUFACTURER	OTHER ACCEPTABLE MANUFACTURER
Butts	Stanley (STA)	McKinney
Push/ Pulls	Trimco	Ives
Flush Bolts & Coordinators	Ives (IVE)	DCI
Locksets & Deadlocks	Best	None
Key Switch	SES	Securitron
Exit Devices & Mullions	Von Durpin	LCN, Precision
Electric Strikes	Von Duprin (VON)	HES
Power Supplies	Von Durpin	SES
Cylinders & Keying	Best	None
Closers	LCN	None
Door Position Switch	SES	Sentrol
Magnetic Hold Open	Rixon	LCN

Automatic Operators	LCN	None
Door Trim	Ives (IVE)	[Owner acceptable]
Protection Plates	Ives (IVE)	Tice, Trimco
Wall Stops	Ives (IVE)	Trimco
Floor Stops	Trimco	Ives
Overhead Stops	Glynn-Johnson (GLY)	Rixon
Gasket	Steelcraft	Pemko
Thresholds, Sweeps & Weatherstrip	Pemko	Zero
Silencers	Ives (IVE)	Trimco

2.3 HANGING

A. Conventional Hinges: Hinge open width minimum, but of sufficient throw to permit maximum door swing. Steel or stainless steel pins:

1. Three hinges per leaf to 7 feet, 6-inch height. Add one for each additional 30 inches in height or any fraction thereof.
2. Provide 4-1/2 x 4-1/2 for 1-3/4 inch thick doors up to 35 inches. Provide heavy weight 5 x 4-1/2for 1-3/4 inch thick doors 36 inches and over.
3. Outswinging locked doors to have non removable (NRP) pins.
4. Pin tips, flat button, finish to match leaves.
5. Doors over 36 inches: Heavy weight.
6. Doors up to 36 inches: Standard weight.

2.4 LOCKSETS, LATCHSETS, DEADBOLTS

A. Heavy Duty Mortise Locks and Latches: Owner standard.

1. Provide mortise locks certified as ANSI A156.13, Grade 1 Operational, Grade 1 Security.
2. Provide lock case that is multi-function and field reversible for handing without opening case, and manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
3. Provide locks with standard 2-3/4 inches backset with full 3/4 inch throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1 inch throw, constructed of stainless steel.
4. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
5. Provide electrified options as scheduled in the hardware sets. Provide electrified locksets with micro switch (RX) option that monitors retractor crank, and is actuated when rotation of inside or outside lever rotates retractor hub. Provide normally closed contacts or normally open contacts as required by security system.
6. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
   a. Lever Design: Owner standard.

2.5 EXIT DEVICES

A. Panic Exit Devices: Owner standard.

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1, AND UL listed for Panic Exit Hardware.

2. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.

3. Quiet Operation: Incorporate fluid damper or other device that eliminates noise of exit device operation.

4. Touchpad: Extend minimum of one half of door width, but not the full length of exit device rail. Provide end-cap with two-point attachment to door. Provide compression springs in devices, latches, and outside trims or controls; tension springs prohibited.

5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrical requirements.

6. Concealed Vertical Cable Exit Devices: Cable-actuated concealed vertical latch system in two-point and less bottom latch (LBL) configurations. Vertical rods not permitted.

   a. Cable: Stainless steel core wire in stainless steel with polytetrafluoroethylene (Teflon) liner color-coded to latches and center slides. Conduit and core wire ends snap into latch and center slides without use of tools.

   b. Latchbolts and Blocking Cams: Manufactured from sintered metal low carbon copper- infiltrated steel, with molybdenum disulfide low friction coating.

   c. Top Latchbolt: Minimum 0.382 inch and greater than 90degree engagement with strike to prevent door and frame separation under high static load.

   d. Bottom Latchbolt: Minimum of 0.44 inch engagement with strike.

   e. Product Cycle Life: 1,000,000 cycles.

   f. Latch Operation: Top and bottom latch operate independently of each other. Top latch fully engages top strike even when bottom latch is compromised. Separate trigger mechanisms not permitted.

   g. Latch release does not require separate trigger mechanism.

7. Provide exit devices with manufacturer's approved strikes.

8. Provide exit devices cut to door width and height. Locate exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.

9. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.

10. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion that is removed by use of a keyed cylinder, which is self-locking when re-installed.

11. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.

12. Provide electrified options as scheduled in the hardware sets.

13. Where lever handles are specified as outside trim for exit devices, provide heavy-duty lever trims with forged or cast escutcheon plates. Provide vandal-resistant levers that will travel to 90-degree down position when more than 35 pounds of torque are applied, and which

can easily be re-set.

a. Lever Style: Match lever style of locksets.

2.6 ELECTRIC STRIKES

A. Manufacturers and Products: Owner standard.

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary-resistant.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide fail-secure type electric strikes, unless specified otherwise.
5. Coordinate voltage and provide transformers and rectifiers for each strike as required.

2.7 KEYS, KEYING, AND KEY CONTROL

A. See Keying Requirements in this section.

2.8 CLOSERS

A. Surface Closers: Owner standard.

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2 inch diameter with 3/4 inch diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.9 OTHER HARDWARE

A. Door stops: Provide stops to protect walls, casework or other hardware.

1. Except as otherwise indicated, provide stops (wall, floor or overhead) at each leaf of every swinging door leaf.
2. Where wall or floor stops are not appropriate, provide overhead holders.

B. Weatherstrip and Gasket:

1. Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled.

2. Provide non-corrosive fasteners as recommended by the manufacturer for application indicated.

C. Thresholds:

1. Except as otherwise indicated, provide standard metal threshold unit of type, size and profile as detailed or scheduled.

2. Standard: BHMA A156.21.

3. Accessibility Requirements: Where thresholds are indicated to comply with accessibility requireemetns, comply with ANSI A117.1.

a. Bevel raised thresholds with a slop of not more than 1:2.

b. Provide thresholds not more than 1/2 in. high.

4. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 in. high.

D. Silencers:

1. Interior hollow metal frames, 3 for single doors, 2 for pairs of doors.

E. Kickplates:

1. Four beveled edges, 0.050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.

2.10 HARDWARE FINISHES

A. Provide finishes in “Dark Bronze” matching finishes of existing like components, unless otherwise indicated.

2.11 KEYING REQUIREMENTS

A. All keyed cylinders shall be subject to an existing master key system.

B. Furnish cylinders with construction cores. Following construction, Owner to supply permanent keyed cores.

C. Cylinders to be furnished with visual key control with key code. Stamped on the face of the keys and marked on the back or side of the cylinders.

D. Key Quantities

6 EA Master Keys

4 EA Control Keys

2 EA Construction Control Keys

10 EA Construction Keys

3 EA Change Keys per keyed alike group

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure that walls and frames are square and plumb before hardware installation.

B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes. Notify Architect of any code conflicts before ordering materials.

3.2 INSTALLATION

A. Do not install surface mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation.

B. Locate floor stops not more than 4 inches from the wall.

C. Drill pilot holes for fasteners in wood doors and/or frames.

3.3 ADJUSTING

A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.

B. Hardware damaged by improper installation or adjustment methods to be repaired or replaced to Owner's satisfaction.

3.4 FOLLOW UP INSPECTION

A. Installer to provide letter of agreement to Owner that approximately 6 months after substantial completion, installer will visit project with representative of the manufacturers of the locking devices and door closers to accomplish the following:

1. Re-adjust locks and closers
2. Evaluate maintenance procedures and recommend changes or additions, and instruct Owner's personnel.
3. Identify items that have deteriorated or failed.
4. Submit written report identifying problems and likely future problems.

3.5 DEMONSTRATION

A. Demonstrate electrical, electronic and pneumatic hardware system including adjustment and maintenance procedures

3.6 PROTECTION/CLEANING

A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.

END OF SECTION

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SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Glass for exterior windows, doors, and storefront and entrances.
2. Glass for interior doors and interior borrowed lites.
3. Glazing sealants and accessories.

B. Related Requirements:

1. Section 08 11 13 “Hollow Metal Doors and Frames”.
2. Section 08 14 16 “Flush Wood Doors”.
3. Section 08 41 13 "Aluminum-Framed Entrances and Storefronts".

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.6 SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

C. Glazing Accessory Samples: For sealants and colored spacers, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Qualification Data: For Installer manufacturers of insulating-glass units with sputter-coated, low-E coatings.

F. Product Certificates: For glass.

G. Preconstruction adhesion and compatibility test report.

H. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.

4. Schedule enough time for testing and analyzing results to prevent delaying the Work.

5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.11 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

D. Manufacturer's Special Warranty for Intrusion-Resistant Glass Products: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.

1. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.

2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.

3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Safety Glazing: Where safety glazing is indicated or required by code, provide glazing that complies with 16 CFR 1201, Category II.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

E. Interior Wet-Applied Adhesives, Sealants, Grouts and Primers: Certificate stating compliance with California Department of Public Health (CDPH) Standard Method V1.1-2010, including total volatile organic compounds (TVOC) range.

1. Include product data stating VOC content in g/L.
2. Include volume of material applied per product.

2.2 MANUFACTURERS

A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

C. Basis-of-Design Manufacturer: Vitro Architectural Glass; www.vitroglazings.com.

D. Other Approved Manufacturers:

1. AGC Glass North America; www.agcglass.com.
2. Oldcastle Building Envelope; www.obe.com.
3. Pilkington, a div. of Nippon Sheet Glass Co., Ltd; www.pilkington.com.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."
3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."

B. Safety Glazing Labeling: Where safety glazing is provided, 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.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

1. Minimum Glass Thickness for Exterior Lites: 6 mm (1/4 in).

2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

C. Interspace Content: Where indicated to provide argon-filled interspace, provide the Insulating Glass Manufacturers Association of Canada (IGMAC) accepted standard argon gas fill level of 90 percent argon and 10 percent dry air.

D. Edge Treatment at Monolithic and Laminated Glazing: Where monolithic or laminated glazing is indicated and edges are exposed to view, provide glazing with polished edges and the following edge treatments:

1. At Structural Sealant Butt Joints: Provide flat ground smooth edges.

2. At Exposed Edges: Provide flat polished edges with beveled edges and corners, 1/8 inch (3 mm) at outer edges and corners.

2.5 LAMINATED GLASS

A. Laminated Glass: meeting requirements of ASTM C1172 “Standard Specification for Laminated Architectural Flat Glass”. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with polyvinyl butyral (PVB) interlayer ionomeric polymer interlayer cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written instructions.

2. Interlayer Thickness: Not less than 1.52 mm (0.060 in.) and as required to comply with requirements.

3. Interlayer Color: Clear unless otherwise indicated.

4. Basis-of-Design Product, Clear: SentryGlas by by E.I. DuPont DeNemours & Co., Inc.; www.dupont.com.

2.6 INSULATING GLASS

A. Insulating Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E2190.

1. Perimeter Spacer: Manufacturer's standard spacer material and construction Aluminum with black, color anodic finish.

2. Desiccant: Molecular sieve or silica gel, or a blend of both.

3. Basis-of-Design Manufacturer: Vitro Architectural Glass; www.vitroglazings.com.

2.7 GLAZING TYPES

A. Glazing Type: Exterior double-pane clear IGU.

1. Overall Unit Thickness: 1 inch.

a. Outer Lite: 1/4 inch clear float glass, with low-e coating on no. 2 surface.

1) Low-E Coating Basis-of-Design Product: Solarban 70 by Vitro Architectural Glass; www.vitroglazings.com.

b. Interspace Content: Argon.

c. Inner Lite: Fully tempered 1/4 inch clear float glass.

d. Edge Spacer: Black; warm-edge.

e. R-value: 4.2.

2. Performance Requirements:

a. U-Factor: 0.26 Btu/(hr x sqft x °F).

b. Solar Heat Gain Coefficient (SHGC): 0.40.

c. Visual Light Transmittance (VLT): 70 percent.

3. Provide safety glazing where required.

B. Interior Glazing: Structural, monolithic interior single lites.

1. Fully tempered 1/4 inch (6 mm) clear float glass.

2. Provide safety glazing where required.

2.8 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

2.9 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.

2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.10 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Gaskets: One-piece gaskets with factory-molded corners to prevent shrinkage at mitered corners. Provide gaskets of lengths greater than opening in accordance with manufacturer's requirements to prevent pull-back at corners.

D. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

E. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

F. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

G. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.11 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces Insert temperature change.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.

4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION

SECTION 08 91 19 - FIXED LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fixed, extruded-aluminum louvers.
2. Delegated design.

B. Related Sections:

1. Section 01 61 16 “Delegated Design Requirements”.
2. Section 07 25 00 “Weather Barriers” for air and moisture barrier.
3. Section 07 42 15 “Formed Metal Wall and Soffit Panels” for coordination of finishes.
4. Section 07 62 00 "Sheet Metal Flashing and Trim" for sheet metal trim associated with louver installation.
5. Section 07 92 00 “Joint Sealants” for perimeter sealant.

1.3 SUBMITTALS

A. Product Data.

A. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashings, sealants, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

B. Samples: For each type of metal finish required.

C. Delegated-Design Submittal: For louvers indicated to comply with structural and seismic performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Qualification Data: For Professional Engineer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

F. Windborne-debris-impact-resistance test reports.

G. Sample Warranties: For manufacturer's special warranties.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.2, "Structural Welding Code - Aluminum."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."

3. AWS D1.6, "Structural Welding Code - Stainless Steel."

B. Engineer Qualifications: Qualified professional engineer responsible for delegated design.

1.5 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.6 WARRANTY

A. Special Finish Warranty: Manufacturer agrees to repair or replace components on which finishes fail in materials or workmanship within specified warranty period.

1. 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. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer; refer to Section 01 61 16 “Delegated Design Requirements" for requirements.

B. Structural Performance.

1. Wind Loads: Requirements indicated in Drawings.

C. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Component Importance Factor: 1.5.

D. Louver Performance Ratings.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

F. Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual".

2.2 MANUFACTURERS

A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. Basis-of-Design Manufacturers:

1. Construction Specialties, Inc.; www.c-sgroup.com.

2. Titus; www.titus-hvac.com.

C. Other Approved: Ruskin; www.ruskin.com.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVER

A. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

B. Horizontal Drainable Louver:

1. Basis-of-Design Product: As selected by Architect.

a. Frame: 4 inches deep, or as indicated.

b. Finish: Match adjacent metal wall cladding; refer to Section 07 42 15 “Formed Metal Wall and Soffit Panels” for coordination of finishes.

c. Applications: As indicated.

2.4 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

1. Screen Location for Fixed Louvers: Interior face.

2. Screening Type: Bird screening, unless otherwise indicated; insect screening where indicated.

B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips**.**

2. Finish: Same finish as louver frames to which louver screens are attached.

3. Type: Rewirable frames with a driven spline or insert for securing screen mesh.

D. Louver Screening for Aluminum Louvers:

1. Insect Screening: Stainless steel, 1/16 by 1/16 inch mesh, 0.009-inch wire.

2. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard extruded-aluminum-channel frames, not less than 0.079-inch nominal thickness, with corners mitered and with same finish as panels.

2.5 BLANK-OFF PANELS

A. Uninsulated, Blank-Off Panels: Metal sheet attached to back of louver.

B. Insulated, Blank-Off Panels: Laminated panels consisting of an insulating core surfaced on back and front with metal sheets and attached to back of louver.

2.6 MATERIALS

A. Aluminum Extrusions: ASTM B221, Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Fasteners: Use types and sizes to suit unit installation conditions.

D. Postinstalled Fasteners for Concrete and Masonry: Testing to ASTM E488,

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

2.7 FABRICATION

A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly.

C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

F. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer.

G. Provide subsills made of same material as louvers or extended sills for recessed louvers.

2.8 ALUMINUM FINISHES

A. Finish louvers after assembly.

B. Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

C. High-Performance Organic Finish: Four-coat fluoropolymer metallic finish complying with AAMA 2605 and containing not less than 70 percent PVDF or FEVE resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Start of application is construed as Installer’s acceptance of surfaces within that area.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

F. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 07 92 00 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION

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SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions (ZF-1).
2. Suspension systems for interior gypsum ceilings and soffits.
3. Delegated design.

B. Related Requirements:

1. Section 01 61 16 “Delegated Design Requirements”.
2. Section 06 10 00 “Rough Carpentry” for fire retardant-treated wood blocking and plywood backing.
3. Section 06 41 00 “Architectural Casework” for coordination of wood assemblies supported by interior partition framing.
4. Section 09 29 00 “Gypsum Board”.

1.3 COORDINATION

A. Coordinate opening requirements with Division 08 “Openings” Sections.

B. Coordinate items requiring blocking and for additional support including, but not limited to the following:

1. Casework and cabinets in Section 06 41 00 “Architectural Casework”.
2. Toilet partitions and accessories in Division 10 “Specialties” Sections.
3. Work in soffits and suspended ceilings.

1.4 SUBMITTALS

A. Product Data: For each type of product.

1. Studs and Runners: Provide documentation that framing members' certification is according to SIFA's "Code Compliance Certification Program for Cold-Formed Steel Structural and Non-Structural Framing Members."

B. Shop Drawings: Floor and ceiling plans indicating framing size, thickness and spacing.

1. Section Details: As required for framing conditions indicated.

C. Delegated-Design Submittal: For interior gypsum ceiling and soffit suspension systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Qualification Data:

1. For Professional Engineer.

E. Evaluation Reports: From ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction for the following:

1. For steel studs and runners and firestop tracks.

2. For each ceiling suspension system, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Engineer Qualifications: Qualified professional engineer responsible for delegated design, licensed in the jurisdiction in which Project is located.

B. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Steel Stud Manufacturers Association, the Certified Steel Stud Association or the Steel Framing Industry Association.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer; refer to Section 01 61 16 “Delegated Design Requirements" for requirements.

B. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

C. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E119 by an independent testing agency.

D. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E90 and classified according to ASTM E 413 by an independent testing agency.

E. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft. (240 Pa).

F. Vertical Deflection: For ceiling joists, soffit framing and suspension systems, deflection limited to 1/360 of the span for live loads and 1/240 for total loads of the span.

1. Vertical Loading: 6 lbf/sq. ft.

a. Provide 13 lbf/sq. ft. (480 Pa) at ceilings indicated to have suspended items attached.

G. Spacing:

1. All interior wall and partition framing shall be 16 inches o.c. maximum. No wall assembly scheduled for tile or level 5 gypsum board finishes shall exceed 16 inches o.c. maximum.

2. Wall assemblies concealed to view by cabinet or casework may be 24 inches o.c. maximum except where any portion of the wall is to receive tile finishes.

3. At ceilings scheduled for level 5 finishes, framing shall be 16 inches o.c. maximum.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C645 requirements for metal unless otherwise indicated.

2. Protective Coating: ASTM A653, G60, hot-dip galvanized unless otherwise indicated.

B. Studs and Runners: ASTM C645. Use either steel studs and runners or embossed steel studs and runners.

1. Steel Studs and Runners:

a. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection and span.

b. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to runners while allowing 2-inch minimum vertical movement.

2. Double-Runner System: ASTM C645 top runners, inside runner with 2-inch- deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.

3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Basis-of-Design Product: BlazeFrame by Clark Dietrich Building Systems; www.clarkdietrich.com.

2. Other Approved Manufacturers: SCAFCO Steel Stud Company; www.scafco.com. CEMCO; www.cemcosteel.com.

3. Minimum Base-Metal Thickness: As indicated on Drawings.

E. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch- wide flanges.

1. Depth: As indicated on Drawings.

2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.

F. Hat-Shaped, Rigid Furring Channels: ASTM C645.

1. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection and span.

2. Depth: As indicated on Drawings.

G. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical or hat shaped.

H. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.

1. Depth: As indicated on Drawings.

2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.

3. Tie Wire: ASTM A641, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch- diameter wire.

I. Z-Shaped Furring, ZF-1: Provide thermally improved furring with slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

J. Resilient Isolation Clip: Sound isolation clips for walls and ceiling assemblies.

1. Basis-of-Design Product: IsoMax by Kinetics Noise Control, Inc.; www.kineticsnoise.com.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A641, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

B. Hanger Attachments to Metal Decking: Of type suitable for application and approved by Architect and Engineer.

1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E1190, conducted by a qualified testing and inspecting agency.

C. Wire Hangers: ASTM A641, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

D. Flat Hangers: Steel sheet, size as required for application, with thickness required by performance requirements.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness required by performance requirements and minimum 1/2-inch-wide flanges.

1. Depth: 2 inches; as required or indicated.

F. Spring Hangers:

1. Basis-of-Design Product: ICC Ceiling Spring Hanger by Kinetics Noise Control, Inc.; www.kineticsnoise.com.

a. Other approved Manufacturer: Mason Industries, Inc.; www.mason-ind.com.

2. Spring Hanger:

a. A combination high-deflection steel spring in series with a resilient, molded neoprene noise and vibration isolation pad. The steel spring and neoprene pad shall be incorporated into a stamped steel hanger assembly that resiliently supports the isolated ceiling.

b. Hanger assembly bracket shall allow fifteen (15) degrees of vertical alignment of the suspension member without making metal-to-metal contact between the suspension and hanger assembly members.

c. Hanger bracket shall have an integral spring pre-load bracket selected to minimize change in elevation once a load is applied to the hanger and to hold the isolator assembly steady during attachment of gypsum board. The hanger assembly bracket shall consist of a leveling rod with an attached channel carrier designed to accept 1-1/2” x 1/2”, 16-gauge cold-rolled steel. The isolation hanger deflection shall be selected by the manufacturer to provide a maximum natural frequency of 4.4 Hz. The steel spring element shall have a minimum Kx to Ky of 1 at its 1” rated deflection.

d. Separate resiliently suspended ceilings where non-isolated building components abut. Isolation material shall be 3/8-inch-thick CPT perimeter isolation board. Resiliently suspended ceiling shall be constructed against CPT. Do not penetrate CPT with nail, screw, or similar fastener. Adhere CPT to non-isolated structure using resilient, non-hardening caulk.

G. Furring Channels (Furring Members):

1. Cold-Rolled Channels: Minimum 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.

2. Steel Studs and Runners: ASTM C645.

a. Minimum Base-Metal Thickness: As required by performance requirements for deflection and span.

b. Depth: As indicated on Drawings.

3. Embossed Steel Studs and Runners: ASTM C645.

a. Minimum Base-Metal Thickness: As required by performance requirements for deflection and span.

b. Depth: As indicated on Drawings.

4. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8-inch deep.

a. Minimum Base-Metal Thickness: As required by performance requirements for deflection and span.

5. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.

a. Configuration: Asymmetrical or hat shaped.

b. Basis-of-Design Products: RC Deluxe by Clark Dietrich; www.clarkdietrich.com.

H. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Putty Pad Sealant: At acoustic rated partitions and fire-rated partitions in order to provide noise transmission resistance and fire resistance at electrical boxes and other penetrations. Refer to Section 07 84 13 “Penetration Firestopping”.

C. Isolation Strip at Exterior Walls: Provide the following:

1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8-inch-thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure

have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.

2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

1. Provide cantilevered framing where both sides of joints are to be single-member spanned.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.

2. Multilayer Application: 16 inches o.c. unless otherwise indicated.

3. Tile Backing Panels: 16 inches o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

a. Install two studs at each jamb unless otherwise indicated.

b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.

c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

E. Direct Furring:

1. Screw to framing.

2. Weld or screw attach to structural framing, where permitted by Structural Engineer of Record.

F. Z-Shaped Furring Members: Where indicated or required.

1. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch in 10 feet, measured from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Hangers: 48 inches o.c.

2. Carrying Channels (Main Runners): 48 inches o.c.

3. Furring Channels (Furring Members): 16 inches o.c., or as indicated.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
6. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Gypsum board for walls, ceilings and soffits.
2. Tile backing panels.
3. Trim, joint treatment materials and laminating adhesive.
4. Acoustical joint sealants.

B. Related Requirements:

1. Section 06 16 00 “Sheathing” for gypsum sheathing for exterior walls.
2. Section 09 22 16 “Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
3. Section 09 30 00 "Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Gypsum wallboard, all types.
2. Glass-mat gypsum board, all types.
3. Tile backing panels, all types.
4. Interior trim.
5. Exterior trim.
6. Aluminum trim.
7. Joint treatment materials.
8. Laminating adhesive.
9. Acoustical joint sealants.

B. Samples for Initial Selection: For each type of trim accessory and finish indicated.

C. Samples for Verification: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects

and to set quality standards for materials and execution.

1. Build mockups for the following:
   a. Each level of gypsum board finish indicated for use in exposed locations.
   b. Each texture finish indicated.
2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   1. American Gypsum; www.americangypsum.com.
   2. CertainTeed Gypsum; www.certainteed.com.
   3. Georgia-Pacific Gypsum LLC; www.buildgp.com.
   4. National Gypsum Co.; www.nationalgypsum.com.
   5. PABCO Gypsum; www.pabcogypsum.com.
   6. USG Corp.; www.usg.com.

2.3 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.4 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C1396/C1396M.

1. Thickness: 5/8 inch.

2. Long Edges: Tapered.

B. Gypsum Ceiling Board: ASTM C1396/C1396M.

1. Thickness: 5/8 inch.

2. Long Edges: Tapered.

C. Moisture- (Mold-) Resistant Gypsum Board: ASTM C1396. With moisture- and mold-resistant core and paper surfaces.

1. Core: 5/8 inch, Type X.

2. Long Edges: Tapered.

3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

4. Application: Moisture- (mold-) resistant gypsum board shall be provided in lieu of regular gypsum wall board at all backsplash and surrounding areas of sinks, lavatories, drinking fountains and mop sinks, to a distance not less than 18 inches from edge of sinks, lavatories and mop sinks.

5. Applications: Provide at the following locations and others as indicated:

a. Walls adjacent to water fountains and water coolers.

b. Walls within Janitor or Custodial Closets.

c. Walls adjacent to lavatories and sinks unless tile finish is indicated.

2.5 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. CertainTeed Gypsum; www.certainteed.com.

b. Georgia-Pacific Gypsum LLC; www.buildgp.com.

c. National Gypsum Co.; www.nationalgypsum.com.

d. USG Corp.; www.usg.com.

2. Core: 5/8 inch, Type X.

3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

B. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. C-Cure; www.c-cure.com.

b. CertainTeed Corp.; www.certainteed.com.

c. Custom Building Products; www.custombuildingproducts.com.

d. FinPan, Inc.; www.finpan.com.

e. James Hardie Building Products, Inc.; www.jameshardie.com.

f. National Gypsum Co.; www.nationalgypsum.com.

g. USG Corp.; www.usg.com.

2. Thickness: 1/2 inch.

3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

C. Water-Resistant Gypsum Backing Board: ASTM C1396, with manufacturer's standard edges.

1. Core: 5/8 inch, Type X.

a. Exception: 5/8 inch, Type C as required by fire-resistance-rated assembly indicated on Drawings.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, or paper-faced galvanized-steel sheet.

2. Shapes:

a. Cornerbead.

b. Bullnose bead.

c. LC-Bead: J-shaped; exposed long flange receives joint compound.

d. L-Bead: L-shaped; exposed long flange receives joint compound.

e. U-Bead: J-shaped; exposed short flange does not receive joint compound.

f. Expansion (control) joint.

g. Curved-Edge Cornerbead: With notched or flexible flanges.

h. Base-of-Wall Galvanized Moisture Barrier Trim: Galvanized-steel sheet, 2 inches high.

1) Manufacturers: Subject to compliance with requirements, provide products by the following:

a) VersaDry, LLC; www.versadryllc.com.

B. Exterior Trim: ASTM C1047.

1. Material: Plastic or rolled zinc.

2. Shapes:

a. Cornerbead.

b. LC-Bead: J-shaped; exposed long flange receives joint compound.

c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

C. Aluminum Trim, Interior and Exterior: Extruded accessories for aesthetic and functional uses.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Clark-Dietrich Building Systems LLC; www.clarkdietrich.com.

b. Flannery, Inc; www.flannerytrim.com.

c. Fry Reglet Corp.; www.fryreglet.com.

d. Gordon, Inc; www.gordon-inc.com.

e. Pittcon Industries; www.pittconindustries.com.

f. Tamlyn; www.tamlyn.com.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221 (ASTM B221M), Alloy 6063-T5.

3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

4. Profiles: Provide trim of profiles indicated.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475.

B. Joint Tape:

1. Interior Gypsum Board: Paper.

2. Exterior Gypsum Soffit Board: Paper.

3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.

4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.

2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.

a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use drying-type, all-purpose compound.

4. Finish Coat: For third coat, use drying-type, all-purpose compound.

5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

D. Joint Compound for Exterior Applications:

1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.

2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2. Cementitious Backer Units: As recommended by backer unit manufacturer.

3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.8 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

2. Basis-of-Design Product: Safe’n’Sound by Rockwool; www.rockwool.com.

a. Thickness: As required to fill stud cavity in friction-fit application.

E. Acoustical 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. Basis-of-Design Product: Quiet Seal Pro by Quiet Rock; www.quietrock.com.

2. Other Approved Products:

a. Series AC-20 FTR Acoustical and Insulation Sealant by Pecora Corporation; www.pecora.com.

b. Sheetrock Acoustical Sealant by USG Corporation; www.usg.com.

3. Applications: Provide at all sound walls, acoustical sealant shall be applied at the edge of the stud base prior to installing the drywall and at all penetration and openings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.

2. Fit gypsum panels around ducts, pipes, and conduits.

3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

A. Install interior gypsum board types as indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.

2. On partitions/walls, apply gypsum panels as required by fire-resistance-rated assembly, and minimize end joints.

a. Stagger abutting end joints not less than one framing member in alternate courses of panels.

b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

4. Fastening Methods: Apply gypsum panels to supports with steel drill screws. Nailing of gypsum panels is NOT permitted.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.

2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

4. Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch-long straight sections at ends of curves and tangent to them.

2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 INSTALLATION OF EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

A. Apply panels perpendicular to supports, with end joints staggered and located over supports.

1. Install with 1/4-inch open space where panels abut other construction or structural penetrations.

2. Fasten with corrosion-resistant screws.

3.5 INSTALLATION OF TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install where indicated at locations to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.

B. Cementitious Backer Units: ANSI A108.11, where indicated at locations to receive tile.

C. Water-Resistant Backing Board: Install where indicated with 1/4-inch gap where panels abut other construction or penetrations.

D. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.6 INSTALLATION OF TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.

2. Bullnose Bead: Use where indicated.

3. LC-Bead: Use at exposed panel edges.

4. L-Bead: Use where indicated.

5. U-Bead: Use at exposed panel edges.

6. Curved-Edge Cornerbead: Use at curved openings.

D. Exterior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.

2. LC-Bead: Use at exposed panel edges.

E. Aluminum Trim: Install in locations indicated in Drawings.

3.7 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.

2. Level 2: Panels that are substrate for other applied panel finishes.

3. Level 3: Panels that are substrate for other applied wallcovering finishes.

4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

a. Primer and its application to surfaces are specified in Section 09 91 00 "Painting".

E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 INSTALLATION OF TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written instructions.

3.9 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Ceramic wall tile (CT-1, CT-2, CT-3 and CT-4).
2. Metal edge strips.

B. Related Requirements:

1. Section 07 92 00 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Section 09 29 00 “Gypsum Board”.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified. Refer to Tile Council of North America’s “Handbook for Ceramic, Glass, and Stone and Tile Installations” for additional definitions not included in This specification.

B. Allowance is a quantity of work or dollar amount established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.5 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Initial Selection: For tile, grout, and accessories involving color selection.

D. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 24 inches square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory for each color and finish required.

4. Metal edge strips in 6-inch lengths.

E. Qualification Data: For Installer.

F. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

G. Product Certificates: For each type of product.

H. Product Test Reports: For tile-setting and -grouting products and certified porcelain tile.

I. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Basis-of-Design Manufacturer: Daltile; www.daltile.com.

C. Other Approved Manufacturers:

1. American Olean; www.americanolean.com.

2. Marazzi; www.marazziusa.com.

D. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.

2. Obtain waterproof membrane from manufacturer of setting and grouting materials.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.3 TILE PRODUCTS, CT-1, CT-2, CT-3 AND CT-4

A. Ceramic Tile Type: Wall tile.

1. Basis-of-Design Product: As indicated on Interior Finish Legend in Drawings.

2. Color: As indicated on Interior Finish Legend in Drawings.

3. Size: As indicated on Interior Finish Legend in Drawings.

4. Application: As indicated on Interior Finish Legend in Drawings.

2.4 TILE BACKING PANELS

A. Refer to Section 09 29 00 "Gypsum Board."

2.5 SETTING MATERIALS

A. Modified Dry-Set Mortar (Thinset): ANSI A118.4.

1. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2. For floor applications: Provide waterproofing and crack isolation or uncoupling membrane as required based on requirements, substrate composition, structural support conditions, and manufacturer's published recommendations.

B. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.

1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.

2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.15.

C. Provide mortar manufacturer's recommended product for sloping screeds to drain, compatible with grout.

2.6 GROUT MATERIALS

A. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.

1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

2.7 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A666, 300 Series exposed-edge material.

1. Basis-of-Design Products: As selected by Architect.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

D. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

2.8 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.

3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Wherever available, provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.

3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

G. Joint Widths: As indicated.

H. Lay out tile to dimensions indicated or to next full tile beyond dimensions indicated.

I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

J. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

3.4 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.

2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.5 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Acoustical ceiling tile (ACT-1, ACT-2 and ACT-3).
2. Suspension systems.
3. Trim and miscellaneous accessories.
4. Delegated design.

B. Related Requirements:

1. Section 01 61 16 “Delegated Design Requirements”.
2. Division 21 “Fire Suppression” Sections for coordination with fire suppression sprinklers.
3. Division 23 “Heating, Ventilating and Air Conditioning” Sections for coordination with air diffusers and returns in ceiling.
4. Division 26 “Electrical” Sections for coordination with lighting fixtures in ceiling.
5. Division 27 “Communications” Sections for coordination with audio-visual components in ceiling.
6. Division 28 “Electronic Safety and Security” Sections for coordination with Fire Detection and Alarm System.

1.3 DEFINITIONS

A. AC: Articulation Class.

B. CAC: Ceiling Attenuation Class.

C. LR: Light Reflectance Coefficient.

D. NRC: Noise Reduction Coefficient.

1.4 SUBMITTALS

A. 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.

B. Delegated-Design Submittal: For ceilings indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

1. Acoustical Panel: Set of samples of each type, color, pattern, and texture. Submit full-size

for most panel types; submit partial panel sample may be submitted for 24 x 24 inch for larger panels.

2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch-long Samples of each type, finish, and color.

D. Qualification Data:

1. For Professional Engineer.

E. Maintenance Data: For finishes to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Panels: Full-size panels equal to 2 percent of quantity of each type installed.

2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

3. Hold-Down Clips: Equal to 2 percent of quantity installed.

4. Impact Clips: Equal to 2 percent of quantity installed.

1.6 QUALITY ASSURANCE

A. Engineer Qualifications: Qualified professional engineer responsible for delegated design, licensed in the jurisdiction in which Project is located.

B. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAP-accredited laboratory, with the experience and capability to conduct the testing indicated. NVLAP-accredited laboratories must document accreditation, based on a "Certificate of Accreditation" and a "Scope of Accreditation" listing the test methods specified.

C. Source Limitations:

1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.

2. Suspension System: Obtain each type through one source from a single manufacturer.

D. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels to avoid soiling exposed surfaces or damaging surfaces and edges.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project

when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

B. Sequence work to assure that acoustical ceilings are not installed until building is enclosed, permanent heating system is available, dust generating activities have terminated, wet work is complete and dry, and work above ceilings is complete.

C. Maintain temperature within 15 degrees Fahrenheit (8 degrees C) and relative humidity within 10 percent of design conditions for spaces of installation not less than 48 hours before installation begins and thereafter.

1.9 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.10 WARRANTY

A. Provide manufacturer's standard written thirty (30) year limited warranty for acoustical panels and suspension grid.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 61 16 “Delegated Design Requirements,” to design suspension systems.

B. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance according to one of the following standards, or another testing and inspecting agency acceptable to authorities having jurisdiction:

a. ASTM E119 "Test Methods for Fire Tests of Building Construction and Materials."

b. Underwriters Laboratory (UL) "Fire Resistance Directory."

2. Identify materials with appropriate markings of applicable testing and inspecting agency.

3. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with one of the following:

a. ASTM E1264 "Standard Classification for Acoustical Ceiling Products" for Class A materials as determined by testing identical products per ASTM E 84 "Standard Test Method for Surface Burning Characteristics of Building Materials":

1) Smoke-Developed Index: 450 or less.

C. Acoustic Performance: Refer to Acoustic Performance at individual Product articles below

2.2 MANUFACTURERS

A. Source Limitations: Obtain each type of ceiling and suspension system from a single source from a single manufacturer.

B. Basis-of-Design Manufacturer: Armstrong World Industries, Inc; www.armstrongceilings.com.

C. Other Approved Manufacturers:

1. BPB USA, a div. of Saint-Gobain Gyproc; www.saint-gobain-gyproc.com

2. USG Interiors Inc.; www.usg.com.

2.3 ACOUSTICAL PANELS, GENERAL

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated. Comply with one of the following standards:

1. ASTM E1264 "Standard Classification for Acoustical Ceiling Products."

a. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 16 inches away from test surface per ASTM E795 "Standard Practice for Mounting Test Specimens During Sound Absorption Tests."

B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Appearance characteristics of acoustical panels are indicated by referencing designations of ASTM E1264 "Standard Classification for Acoustical Ceiling Products." Provide products selected by Architect from manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail and size. Products that do not list ASTM E1264 characteristics shall be tested by the product manufacturer's laboratory and shall meet comparable ASTM E1264 standards for country of origin.

C. Coating-Based Antimicrobial Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment consisting of manufacturer's standard formulation with fungicide added to inhibit growth of mold and mildew and showing no mold or mildew growth when tested according to one of the following standards:

1. ASTM D3273 "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber."

2.4 ACOUSTICAL CEILING TILE, ACT-1, ACT-2 AND ACT-3

A. Schedule for Finishes: Except as specified herein, refer to schedule for “Finishes” in Drawings for attributes and description of basis-of-design manufacturers and products to be provided and installed by the Contractor.

B. Classification: Provide fire-resistance-rated panels complying with ASTM E84 for type, form, and pattern as follows:

1. Type and Form: Type XII, Form 2, pattern E; fiberglass base with acoustically transparent painted finish; plant-based binder.

C. Acoustic Performance:

1. Articulation Class (AC): Not less than 190.

2. Light Reflectance Coefficient (LR): Not less than 0.82.

3. Noise Reduction Coefficient (NRC): Not less than 0.55.

4. Ceiling Attenuation Class (CAC): N/A.

D. Basis-of-Design Acoustical Ceiling Systems:

1. Basis-of-Design Product, ACT-1: Model no. 769 Cortega by Armstrong.

a. Thickness: 5/8 in.

b. Size: 24 x 48 in.

c. Panel Color: Manufacturer's standard "White".

d. Material: Mineral fiber.

e. Edge: Angular tegular, size to fit flange of exposed suspension system member; scored at perimeter angle

f. Texture: Medium.

g. Surface Finish: Factory-applied latex paint.

h. Recycled Content: Not less than 40 percent.

i. Applications: As indicated in Drawings.

2. Basis-of-Design Product, ACT-2: 2758 Cortega Second Look by Armstrong.

a. Thickness: 3/4 inch.

b. Size: 24 x 48 in.

c. Panel Color: Manufacturer's standard "White".

d. Material: Mineral fiber.

e. Edge: Angular tegular, size to fit flange of exposed suspension system member; scored at perimeter angle.

f. Texture: Medium.

g. Surface Finish: Factory-applied latex paint.

h. Recycled Content: Not less than 40 percent.

i. Applications: As indicated in Drawings.

3. Basis-of-Design Product, ACT-3: Model no. 607 Fine Fissured Ceramaguard by Armstrong.

a. Thickness: 3/4 inch.

b. Size: 24 x 24 inches.

c. Panel Color: Manufacturer's standard "White".

d. Material: Mineral fiber.

e. Edge: Square lay-in.

f. Texture: Medium.

g. Surface Finish: Factory-applied latex paint.

h. Recycled Content: Not less than 40 percent.

i. Applications: As indicated in Drawings.

E. Suspension and Trim System:

1. Suspension: As selected by Architect.

a. Duty Rating: Heavy Duty.

2. Color: "White", or as selected by Architect.

2.5 METAL SUSPENSION SYSTEMS, GENERAL

A. Recycled Content: Not less than 70 percent.

B. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements of one of the following standards:

1. ASTM C635 "Standard Specification for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings."

C. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

1. High-Humidity Finish: Comply with one of the following standards:

a. ASTM C635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.

D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon-Steel Wire: Comply with one of the following:

a. ASTM A641, "Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire", Class 1 zinc coating, soft temper.

2. Nickel-Copper-Alloy Wire: Comply with one of the following:

a. ASTM B164 "Standard Specification for Nickel-Copper Alloy Rod, Bar and Wire", nickel-copper-alloy UNS No. N04400.

3. Size: Select wire diameter so its stress at three times hanger design load (ASTM C635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.14 inch (3.5-mm-) diameter wire.

E. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

F. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04 inch- (1-mm-) thick, galvanized steel sheet complying with coating designation from one of the following standards; Provide bolted connections and 5/16 inch (8-mm-) diameter bolts.

1. ASTM A653 "Standard specification for Sheet Steel, zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot Dip Process"; Z275.

G. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches (610 mm) o.c. on all cross tees.

H. Impact Clips: Where indicated, provide manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION, GENERAL

A. General: Install acoustical panel ceilings to comply with one of the following:

1. ASTM C636 "Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels" and requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical, or power-actuated fasteners that extend through forms into concrete.

6. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.

C. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

D. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.

2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

3. For reveal-edged panels on suspension system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.

4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

5. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.

6. Install clean-room gasket system in areas indicated, sealing each panel and fixture as recommended by panel manufacturer's written instructions.

7. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.

B. Testing Services: Testing and inspecting of completed installations of acoustical panel ceiling hangers 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.

C. 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.

1. Within each test area, testing agency will select 1 of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 890 N of tension; it will also select one of every 2 postinstalled anchors used to attach bracing wires to concrete and will test them for 1957 N of tension.

2. 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.

D. Remove and replace acoustical panel ceiling hangers where test results indicate that they do not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 65 00 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Vinyl composition tile flooring (VCT-1 and VCT-2).

B. Related Requirements:

1. Section 03 30 00 “Cast-in-Place Concrete” for substrate coordination.
2. Section 03 54 13 “Gypsum Cement Underlayment” for substrate coordination.
3. Section 09 65 13 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet.

1.3 SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches3 square.

C. Samples for Initial Selection: For each type of product indicated.

D. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches300 mm long.

E. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 2 percent of installed area or 1 box for every 50 boxes of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association.

1. Alternatively, Bidders may be considered appropriate for the Project by providing examples and references for three projects of similar scale and type to this Project, for review and approval by the Architect and Owner.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Coordinate mockups in this Section with mockups specified in other Sections.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following periods:

1. 48 hours before installation.

2. During installation.

3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 RESILIENT FLOORING

A. Vinyl Composition Tile Flooring: Resilient vinyl tile, 57 IIC rating per ASTM E492; >0.55 wet/dry slip-resistance, ADA compliant; 1500 psi static load limit; <450 smoke density per ASTM E662; passes ASTM F2199 for dimensional stability; FloorScore/ CDPH 01350 certified for low-VOC emissions; free of ortho phthalates, added urea-formaldehyde and heavy metals; third-party verified carbon neutral; meets NSF/ ANSI 332 certification guidelines for sustainability.

1. Basis-of-Design Product, VCT-1: As indicated on Interior Finish Legend in Drawings.

a. Color: As indicated on Interior Finish Legend in Drawings.

b. Dimensions: 305 x 305 mm.

c. Thickness: 3.2 mm.

d. Installation Pattern: As indicated in Drawings.

e. Applications: As indicated in Drawings.

2. Basis-of-Design Product, VCT-2: As indicated on Interior Finish Legend in Drawings.

a. Color: As indicated on Interior Finish Legend in Drawings.

b. Dimensions: 305 x 305 mm.

c. Thickness: 3.2 mm.

d. Installation Pattern: As indicated in Drawings.

e. Applications: As indicated in Drawings.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less and 60 g/L or less for rubber stair treads.

C. Transition Strips: As specified in Section 09 65 13 “Resilient Base and Accessories”.

D. Floor Polish: Floor polish and protective sealers not permitted.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Flooring: Prepare horizontal surfaces according to ASTM F710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.

4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient products until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT FLOORING INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient flooring.

B. Allow resilient tile to stabilize before cutting and fitting.

C. Lay out resilient flooring as follows:

1. Maintain uniformity of flooring direction.

2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches152 mm away from parallel joints in flooring substrates.

3. Match edges of flooring for color shading at seams.

4. Avoid cross seams.

D. Scribe and cut resilient flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient flooring as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install resilient flooring on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.

H. Adhere resilient flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 RESILIENT BASE AND ACCESSORY INSTALLATION

A. As specified in Section 09 65 13 "Resilient Base and Accessories."

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from surfaces.

2. Sweep and vacuum horizontal surfaces thoroughly.

3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

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SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Resilient base (RB-1).
2. Resilient floor transition.
3. Metal floor transition.

1.3 SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.

C. Samples for Initial Selection: For each type of product indicated.

D. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.

E. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Coordinate mockups in this Section with mockups specified in other Sections.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:

1. 96 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain resilient base and accessories from single source, from single manufacturer.

B. Basis-of-Design Manufacturer: Tarkett USA; www.commercial.tarkett.com.

C. Other Acceptable Manufacturers:

1. Burke Mercer Flooring Products; Division of Burke Industries, Inc.; www.ecoscorefloor.burkeind.com.
2. Flexco; www.flexcofloors.com.
3. Roppe; www.roppe.com.

2.2 RUBBER BASE

A. Basis-of-Design Product: As selected by Architect.

B. Profile: Coved.

C. Height: As indicated on Interior Finish Legend in Drawings.

D. Color: As indicated on Interior Finish Legend in Drawings or to match adjacent existing rubber base.

2.3 METAL FLOOR TRANSITION

A. Provide extruded aluminum metal edges, with mill finish, nominal 2 inches wide, of height required to protect exposed edges of flooring, and in maximum available lengths to minimize running joints.

B. Basis-of-Design Product: Reno-Ramp/-K by Schluter Systems; www.schluter.com.

C. Finish: Satin anodized aluminum.

D. Application: Tile to concrete floor transitions, as indicated in Drawings.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less and 60 g/L or less for rubber stair treads.

C. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.

4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.

b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient products until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from surfaces.

2. Sweep and vacuum horizontal surfaces thoroughly.

3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

SECTION 09 72 12 - FIBERGLASS REINFORCED PLASTIC WALL COVERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fiberglass reinforced plastic panels (FRP-1).
2. Moldings and accessories.

B. Related Requirements:

1. Section 07 92 00 “Joint Sealants”.
2. Section 09 29 00 “Gypsum Board” for panel substrate.

1.3 SUBMITTALS

A. Product Data: For each type of fiberglass reinforced plastic wall covering and accessory.

B. Shop Drawings: Show location and extend of each wall covering. Indicate seams and termination points.

1. Include trim types and locations and section details.

C. Samples for Initial Selection: For each type of fiberglass reinforced plastic wall covering and accessory

D. Samples for Verification: For each type of wall covering and for each color, pattern, texture, and finish specified, 3 inches square in size.

E. Product Schedule: For wall coverings. Use same designations indicated on Drawings.

F. Qualification Data: For testing agency.

G. Product Test Reports: For each wall covering, for tests performed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Applicator shall be experienced in manufacturer’s installation procedures and be approved by the manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver finish materials to job site only when satisfactory conditions for storage can be provided. Maintain materials in manufacturer’s labeled and unbroken packages.

1.7 PROJECT CONDITIONS

A. Acclimate plastic sheet at least 24 hours in temperature and humidity conditions of final environment before beginning Work of this Section.

B. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 75 or less.

b. Smoke-Developed Index: 450 or less.

2.2 MANUFACTURERS

A. Source Limitations: Obtain fiberglass reinforced plastic wall coverings and associated moldings from single source from single manufacturer for each type and finish indicated.

B. Basis-of-Design Manufacturer: Marlite, div. of Nudo Products, Inc.; www.marlite.com.

C. Other Approved Manufacturer: Panolam Industries International, Inc.; www.panolam.com.

2.3 MATERIALS

A. Fiberglass Reinforced Plastic Wainscot Panels, FRP-1:

1. Basis-of-Design Product: Induro FRP by Marlite.

2. Fiberglass reinforced plastic sheet; 0.09-inch thick.

3. Fire Hazard Classification: Class B, as tested per ASTM E84.

4. Color: As indicated on Interior Finish Legend in Drawings.

5. Finish: Smooth or as selected by Architect; standard for product indicated.

B. Adhesive: Low VOC as recommended by plastic sheet manufacturer for laminating over gypsum board substrate.

C. Sealant: Silicone sealant as recommended by plastic sheet manufacturer for sealing edges and installing moldings.

D. Moldings:

1. Material: As confirmed during sample submittals; PVC in matching color; aluminum in finish selected.

2. Manufacturer: By panel manufacturer.

3. Profiles: As selected by Architect for panel splices, inside and outside corners, bottom, top and edge of panel from manufacturer’s standard profiles.

E. Application: As indicated on Interior Finish Legend in Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.

C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.

2. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.

3. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.

4. Painted Surfaces: Not permitted unless confirmed in writing by FRP manufacturer prior to commencement of work.

D. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

E. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 48 hours before installation.

3.3 INSTALLATION

A. Apply adhesive in accordance with the recommendations of the adhesive manufacturer.

B. Handle and install wall covering in conformance with manufacturer’s installation bulletin.

C. Install wall covering to provide a proper symmetrical pattern in each area, with joints straight and true, and all panel edges concealed with appropriate molding for finished appearance; joints sealed with silicone sealant.

3.4 CLEANING AND PROTECTION

A. Carefully clean all surfaces after application using recommended methods. Any stains or defects apparent after cleaning will require replacement of material.

B. Protect wall coverings from damage. Replace damage coverings.

END OF SECTION

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SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes surface preparation and field painting of the following:

1. Exposed exterior items and surfaces.
2. Exposed interior items and surfaces.
3. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural.

1. If the Finish Schedule in Drawings or the Paint Schedules in this Section do not specifically indicate an exposed item, material or a surface, paint the exposed item or surface the same as similar adjacent items, materials or surfaces.
2. If the Finish Schedule in Drawings or the Paint Schedules in this Section do not indicate finish or color, the Architect will select from manufacturers' standard finishes and colors available.
3. Painting includes field-painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed metal work, primed metal surfaces of mechanical and electrical equipment, railings and roof hatches.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, such as grilles, convector covers, finned-tube radiator covers, and similar components are in place. Extend surrounding coatings into these areas, as required to provide a continuous painted appearance, maintain the system integrity, and provide desired protection.

C. Painting is required on the following factory-finished and prefinished items:

1. All rooftop vents and exhaust stacks, including kitchen exhausts.
2. Rooftop mechanical units.
3. Exterior electrical distribution cabinets.
4. Exterior natural gas supply meters.
5. Other items as indicated in Finish Schedule in Drawings.

D. Do not paint prefinished items not indicated above, concealed surfaces, finished metal surfaces, operating parts, and labels, except as indicated otherwise:

1. Prefinished items include the following factory-finished components: Review list of prefinished items below.
   a. Finished mechanical and electrical equipment.
   b. Light fixtures.
2. Finished metal surfaces, include the following:
   a. Anodized aluminum.

b. Stainless steel.

c. Chromium plate.

d. Copper.

e. Bronze and brass.

3. Operating parts and moving parts of operating equipment, including the following:

a. Valve and damper operators.

b. Linkages.

c. Sensing devices.

d. Motor and fan shafts.

4. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

E. Related Sections include the following:

1. Section 05 12 00 "Structural Steel Framing" for coordination with shop-priming.

2. Section 05 50 00 “Metal Fabrications" for coordination with shop-priming.

3. Section 08 11 13 “Hollow Metal Doors and Frames" for coordination with shop-priming.

4. Division 21 “Fire Suppression” Sections.

1.3 DEFINITIONS

A. General: Standard coating terms defined in ASTM D16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.

2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.

3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.

4. Semi-Gloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.

5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.4 SUSTAINABILITY REQUIREMENTS

A. General Emissions Evaluation: Building products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. The default scenario is the private office scenario. The manufacturer’s or third party certification must state the exposure scenario used to determine compliance. Claims of compliance for wet-applied products must state the amount applied in mass per surface area.

B. Manufacturers’ claims of compliance with the above requirements must also state the range of total VOCs after 14 days (336 hours), measured as specified in the CDPH Standard Method v1.1, from the following:

1. Less than 0.5 mg/m3.

2. Between 0.5 and 5.0 mg/m3.

3. Greater than 5.0mg/m3.

1.5 SUBMITTALS

A. Product Data: For each paint system specified. Include block fillers and primers.

1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.

B. Samples for Verification: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.

2. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.

3. Submit Samples on the following substrates for the Architect's review of color and texture only:

a. Concrete Masonry: Provide two 4-by-8-inch samples of masonry, with mortar joint in the center, for each finish and color.

b. Painted Wood: Provide two 12-inch square samples of each color and material on hardboard.

c. Stained or Natural Wood: Provide two 4-by-8-inch samples of natural- or stained-wood finish on actual wood surfaces.

d. Ferrous Metal: Provide two 4-inch- square samples of flat metal and two 8-inch long samples of solid metal for each color and finish.

1.6 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample of each type of coating and substrate required on the Project. Comply with procedures specified in PDCA P5.

D. Duplicate finish of approved prepared samples.

1. The Architect will select one room or surface to represent surfaces and conditions for each type of coating, colors, and substrate to be painted.

a. Wall Surfaces: Provide samples on at least 100 sq. ft. of wall surface for each color and paint type specified.

b. Small Areas and Items: The Architect will designate an item or area as required.

2. After permanent lighting and other environmental services have been activated, apply coatings in this room or to each surface according to the Schedule or as specified. Provide

required sheen, color, and texture on each surface. No painting shall begin until these mock up areas have been approved by the Architect.

a. After finishes are accepted, the Architect will use the room or surface to evaluate coating systems of a similar nature.

3. Schedule review of paint mock-ups directly after the scheduled OAC meetings.

E. Final Coating: Final coat of painting shall not be applied until all major subcontractor work is complete. Coordinate schedule with General Contractor.

F. Pre-Installation Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 “Project Management and Coordination”.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.

2. Product description (generic classification or binder type).

3. Manufacturer's stock number and date of manufacture.

4. Contents by volume, for pigment and vehicle constituents.

5. Thinning instructions.

6. Application instructions.

7. Color name and number.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.8 PROJECT CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F.

1.9 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to the Owner.

B. Quantity: Furnish the Owner with an additional 5 percent, but not less than 1 gal. or 1 case, as appropriate, of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in the paint schedules.

B. Approved Manufacturers: The following manufacturers are referred to in the paint schedules by use of the following shortened versions of their names:

1. Regional Manufacturers:

a. Miller: Miller Paint Co.

b. Rodda: Rodda Paint.

2. Other Manufacturers:

a. Fuller: Fuller-O'Brien Paints.

b. Glidden: Glidden Co.

c. Moore: Benjamin Moore & Co.

d. S-W: Sherwin-Williams Co.

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat 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.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

C. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

D. Colors: Provide colors indicated or as selected by the Architect.

2.3 EXTERIOR PAINT SCHEDULE

A. Paint System 1 for Ferrous Metal, PS-1: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.

1. Semi-Gloss Alkyd Finish: 2 finish coats over a rust-inhibitive primer.

a. Primer: Rust-inhibitive metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils.

1) : P06 Super Spec HP Acrylic Metal primer Moore.

2) Rodda: 708225 Barrier III High Solids Primer

3) S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer B66-310 Series (<100 g/L VOC).

b. First and Second Coat: Semi-Gloss, exterior, Alkyd paint applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils.

1) Rodda: 548901 Multi-Master DTM Enamel Semi-Gloss.

2) S-W: Pro Industrial DTM Semi-Gloss, B66 Series (<50 g/L VOC).

3) Moore: Super Spec HP Alkyd DTM, Semi-Gloss P24.

B. Paint System 2 for Zinc-Coated Metal, PS-2: Provide the following finish system over exterior

zinc-coated metal.

1. Semi-Gloss Finish: 2 finish coats over a galvanized metal 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) Moore: P04 Super Spec HP Acrylic Metal Primer.
      2) Rodda: 508901 Metal Master Primer
      3) S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer B66-310 Series (<100 g/L VOC).
   b. First and Second Coat: Semi-Gloss, exterior, Alkyd paint applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils.
      1) Rodda: 548901 Multi-Master DTM Enamel.
      2) S-W: S-W Pro Industrial DTM Semi-Gloss, B66 Series (<50 g/L VOC).
      3) Moore: P24 Super Spec HP Alkyd DTM.

2.4 INTERIOR PAINT SCHEDULE

A. Paint System 3 for Ferrous Metal, PS-3: Provide the following finish systems over interior ferrous metal:
   1. Semi-Gloss, Waterborne, Enamel Finish: One finish coat over an enamel undercoater and a primer.
      a. Primer: Rust-inhibitive 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) Moore: P06 Super Spec HP Alkyd Metal Primer.
         2) S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer B66-310 Series (<100 g/L VOC).
         3) Rodda: 70623 Ecologic W/B Semi-Gloss Enamel.
      b. Undercoat: Waterborne, Interior enamel undercoat or Semi-Gloss, interior, Alkyd Enamel finish coat, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of no less than 1.2 mils.
         1) Moore: 0792 Advance Primer.
         2) S-W: Pro Industrial Acrylic Semi-Gloss, B66 Series, (<50 g/L VOC).
         3) Rodda: 70623 Ecologic W/B Semi-Gloss.
      c. Finish Coat: Odorless, Semi-Gloss, Waterborne, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils.
         1) Moore: 0793 Advance Interior Waterborne Alkyd.
         2) S-W: Pro Industrial Acrylic Semi-Gloss, B66 Series, (<50 g/L VOC).
         3) Rodda: 70623 Ecologic W/B Semi-Gloss.

B. Paint System 4 for Zinc-Coated Metal, PS-4: Provide the following finish systems over interior

zinc-coated metal:

1. Semi-Gloss, Alkyd Enamel Finish: One finish coat over an undercoat and 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) Moore: P04 Super Spec HP Acrylic Metal Primer.
      2) S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer B66-310 Series (<100 g/L VOC).
      3) Rodda: 508901 Meta Master Primer.
   b. Undercoat: Alkyd, Interior Enamel undercoat or Semi-Gloss, Interior, Alkyd Enamel finish coat, 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 1.2 mils.
      1) Moore: 0792 Advance Primer.
      2) S-W: Pro Industrial Acrylic Semi-Gloss, B66 Series, (<50 g/L VOC).
      3) Rodda: 70623 Ecologic W/B Semi-Gloss.
   c. Finish Coat: Odorless, Semi-Gloss, Alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils.
      1) Moore: 0793 Advance Interior Waterborne Alkyd.
      2) S-W: Pro Industrial Acrylic Semi-Gloss, B66 Series, (<50 g/L VOC).
      3) Rodda: 70623 Ecologic W/B Semi-Gloss.

C. Paint System 5 for Gypsum Board Low-Sheen, PS-5: Provide the following finish systems over interior gypsum board surfaces:
   1. Low-Luster Acrylic-Enamel Finish: 2 finish coats over a primer.
      a. Primer: Latex-based, interior primer applied at a spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
         1) Moore: 534 Ultra Spec 500 Interior Latex Primer Sealer.
         2) Rodda: 502701 Roseal II Primer.
         3) S-W: ProMar 200 Zero VOC Interior Latex Primer B28W02600.
      b. First and Second Coats: Low-Luster (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) Moore: N538 Ultra spec 500 Eggshell Enamel.
         2) Rodda: 523601 Master Painter UL VOC Satin.
         3) S-W: ProMar 200 Zero VOC Int Latex Eg-Shel, B20-2600 Series.

D. Paint System 6 for Gypsum Board High-Sheen, PS-6: Provide the following finish systems over interior gypsum board surfaces:
   1. High Gloss Polyurethane Enamel Finish: 3 coats with total dry film thickness not less than 3.0 mils.
      a. Sealer: Pigmented polyurethane coating under pigmented aliphatic polyurethane-enamel finish.
         1) S-W: ProMar 200 Zero VOC Interior Latex Primer B28W02600.

2) Rodda: 502701 Roseal II Primer.

3) Moore: 534 Ultra Spec 500 Interior Wall Primer Sealer.

b. Intermediate Coat: Epoxy coating under pigmented polyurethane-enamel finish.

1) S-W: Pro Industrial Water Based Catalyzed Epoxy B73 Series (<50 g/L VOC).

2) Moore: No intermediate coat required.

c. First and Second Coats: Moisture-curing pigmented, polyurethane coatings:

1) S-W: Waterbased Acrolon 100 Urethane B65W700 Series (<100 g/L VOC).

2) Rodda: Sierra Performance S-60 Waterbased Epoxy.

3) Moore: V540 Corotech Waterborne Urethane.

E. Paint System 7 for Concrete Masonry Units Low-Sheen, PS-7: Provide the following finish systems over interior concrete masonry block units:

1. Low-Luster Acrylic-Enamel Finish: Two finish coats over a block filler.

a. Block Filler: High-performance, latex-based, block filler applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 5.0 mils.

1) S-W: Preprite Latex Block Filler B25W25, (<50 g/L VOC).

2) Moore: Super Spec Masonry Hi Build Masonry Block Filler 206. 3) Rodda: 501901 Sprayable Smooth Block Filler.

b. First and Second Coats: Low-Luster (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) Moore: Ultra Spec 500 Eggshell Enamel N538.

2) Rodda: 523601 Master Painter UL VOC Primer.

3) S-W: Pro-Mar 200 Zero VOC Interior Latex.

F. Paint System 8 for Concrete Masonry Units High-Sheen, PS-8: Provide the following finish systems over interior concrete masonry block units:

1. High Gloss Polyurethane Enamel Finish: 3 coats with total dry film thickness not less than 3.0 mils over a block filler.

a. Block Filler: High-performance, latex-based, block filler applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 5.0 mils.

1) S-W: Preprite Int/Ext Latex Block Filler B25W25, (<50 g/L VOC).

2) Moore: 206 High Build Block Filler.

3) Rodda: 501901 Sprayable Smooth Block Filler.

b. First and Second Coats: Moisture-curing pigmented, polyurethane coatings:

1) S-W: Waterbased Acrolon 100 Urethane B65W700 Series (<100 g/L VOC).

2) Rodda: Sierra Performance S-60 Water Based Epoxy. 3) Moore: N538 Ultra Spec 500 Interior Eggshell.

G. Paint System 9 for Woodwork and Trim Opaque Finish, PS-9: Provide the following paint finish

systems over new interior wood surfaces:

1. Semi-Gloss, Alkyd Enamel Finish: 2 finish coats over a primer.
   a. Primer: Alkyd or latex-based, interior enamel undercoater applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
      1) Moore: Sure Seal Latex Primer Sealer 027.
      2) S-W: Preprite Problock Latex Primer Sealer B51-600 Series (<50 g/L VOC).
      3) Rodda: 502001 Unique II Undercoater.
   b. First and Second Coats: Odorless, Semi-Gloss, Alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.4 mils.
      1) Moore: Ultra Spec 500 Semi-Gloss 539.
      2) S-W: Pro Industrial Acrylic Semi-Gloss, B66 Series, (<50 g/L VOC).
      3) Rodda: Cloverdale 03113 Renaissance Alkyd Semi-Gloss.

H. Paint System 10 for Woodwork and Trim Stained Finish, PS-10: Provide the following paint finish systems over new interior wood surfaces:

1. Alkyd-Based, Satin-Varnish Finish: Two finish coats of an Alkyd-based, clear-satin varnish over interior wood stain. Wipe wood filler prior to applying stain.
   a. Filler Coat: Paste-wood filler applied at spreading rate recommended by the manufacturer.
      1) Moore: None required.
      2) S-W: Sher-Wood Fast-Dry Filler.
      3) Rodda: Famowood Wood Filler
   b. Stain: Interior wiping stain for wood.
      1) Old Masters: Penetrating Stain.
      2) Color: No. 41404 “Pickling White”.
      3) Tinted Formula: B-18, C-12, L-6, SS-4.
   c. First and Second Finish Coats: Alkyd-Based or polyurethane varnish, as recommended by the manufacturer, applied at spreading rate recommended by the manufacturer.
      1) Moore: Benwood Stays Clear Low Luster Acrylic Polyurethane Varnish N423.
      2) S-W: Minwax PolyCrylic Protective Finish 3333 (<275 g/L VOC).
      3) Rodda: 59314 Water Based Alkyd Urethane Varnish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection prior to surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Prior to applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

2. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

3. Provide barrier coats over incompatible primers or remove and reprime.

4. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.

b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition prior to application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.

c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum prior to painting.

5. Wood/ Particle Board/ Medium Density Fiberboard (MDF), Other Wood-Based Materials: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

a. Sand all nail holes smooth to surrounding surfaces.

b. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer prior to applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.

c. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.

d. For wood surfaces indicated to receive stain and clear coating, putty nail holes after coatings have been completed. Wipe putty wax clean from wood. Putty colors shall be mixed to match wood color.

6. Existing Wall and Ceiling Surfaces: For existing surfaces that are shown to be painted, remove all existing nails, screws, etc. from the surfaces and fill all existing and new holes in areas to be coated.

7. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.

   a. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.

8. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

9. Prefinished Metal Surfaces: Clean all prefinished metal to be free of oil, grease, etc. Acid etch surface with solutions as recommended by paint supplier for adherence of paint system selected. Primer coat can be deleted at prefinished items.

   a. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

10. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

11. Stir material prior to application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material prior to using.

12. Use only thinners approved by paint manufacturer and only within recommended limits.

C. Masking: Carefully mask all areas not receiving paint coatings, including but not limited to: walls to floor coverings and base, doors and window frames, electrical devices, wall coverings, etc.

3.3 APPLICATION

A. General: Apply paint according to manufacturers' written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the schedules.

2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

3. Provide finish coats that are compatible with primers used.

4. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Prior to the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

5. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.

6. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

7. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.

8. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.

9. Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration can occur.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.

2. Omit primer on metal surfaces that have been shop primed and touch up painted.

3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions, unless noted otherwise herein.

1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the substrate material or item being painted.

2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the substrate material and paint texture required.

3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the substrate material and paint texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than indicated thickness. Thickness indicated is measured dry.

E. Fire Suppression, Plumbing, Mechanical, Electrical and Low-Voltage Components: Painting work is limited to interior items exposed to view in public and occupied spaces, equipment and storage rooms, and at all items at exterior locations. Exposed items to be painted include, but are not limited to, the following:

1. Piping, pipe hangers, and supports.

2. Ductwork, hangers, and supports.

3. Motors and mechanical equipment and supports.

4. Accessory items.

5. All wall and ceiling grills and registers unless indicated otherwise.

   a. Grills and Registers shall be painted by spray method only.

   b. Grills and Registers shall match background color unless noted otherwise.

6. Conduit, junction boxes and fittings.

7. Switchgear.

8. Panelboards.

   a. Panelboards shall be painted by spray method only.

b. Panelboards shall match background color unless indicated otherwise.

F. Block Fillers: Apply block fillers to all concrete masonry block at a rate to ensure complete coverage with pores filled.

G. Prime Coats: Prior to applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

H. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

I. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

J. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.

K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 FIELD QUALITY CONTROL

A. The Owner reserves the right to invoke the following test procedures at any time and as often as the Owner deems necessary during the period when paint is being applied:

1. The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.

a. The testing agency will perform appropriate tests for the following characteristics as required by the Owner:

1) Quantitative material analysis.

2) Abrasion resistance.

3) Apparent reflectivity.

4) Flexibility.

5) Washability.

6) Absorption.

7) Accelerated weathering.

8) Dry opacity.

9) Accelerated yellowness.

10) Recoating.

11) Skinning.

12) Color retention.

13) Alkali and mildew resistance.

2. The Owner may direct the Contractor to stop painting if test results show material being used does not comply with specified requirements. The Contractor shall remove noncomplying paint from the site, pay for testing, and repaint surfaces previously coated

with the rejected paint. If necessary, the Contractor may be required to remove rejected paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 TOUCH-UP PAINT

A. Painting surfaces that have been deemed unacceptable due to damage of construction, drywall repair, or lack of sufficient paint shall be touched-up as follows:

1. Lack of paint due to insufficient paint coats: Entire wall (floor-to-ceiling, corner-to-corner) shall be recoated including all hollow steel frames.

2. Touch-up due to wall repairs: Contractor shall apply paint by brush only and feather paint out to match adjoining wall sheen. If sheen cannot be matched, entire wall (floor-to-ceiling, corner-to-corner) shall be recoated.

3.6 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Exercise careful not to scratch or damage adjacent finished surfaces.

3.7 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

END OF SECTION

SECTION 10 11 00 - VISUAL DISPLAY UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Marker boards (MB).
2. Fabric wrapped tackboards (TWS-1).

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and accessories for visual display units.

B. Shop Drawings: For visual display units.

1. Include plans, elevations, sections, details, and attachment to other work.
2. Show locations of panel joints. Show locations of field-assembled joints for factory-fabricated units too large to ship in one piece.
3. Show locations and layout of special-purpose graphics.
4. Include sections of typical trim members.

C. Samples for Initial Selection: For each type of visual display unit indicated, for units with factory-applied color finishes, and as follows:

1. Samples of facings for each visual display panel type, indicating color and texture.
2. Include accessory Samples to verify color selected.

D. Samples for Verification: For each type of visual display unit indicated.

1. Visual Display Panel: Not less than 8-1/2 by 11 inches, with facing, core, and backing indicated for final Work. Include one panel for each type, color, and texture required.
2. Trim: 6-inch-long sections of each trim profile.
3. Display Rail: 6-inch-long section of each type.
4. Rail Support System: 6-inch-long sections.
5. Accessories: Full-size Sample of each type of accessory.

E. Product Schedule: For visual display units. Use same designations indicated on Drawings.

F. Qualification Data: For qualified Installer.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for surface-burning characteristics of tackboards.

H. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For visual display units to include in maintenance manuals. Include cleaning procedures and maintenance schedule for hardware where applicable.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build mockup of typical visual display unit as shown on Drawings. Include accessories.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-fabricated visual display units completely assembled in one piece. If dimensions exceed maximum manufactured unit size, or if unit size is impracticable to ship in one piece, provide two or more pieces with joints in locations indicated on approved Shop Drawings.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install visual display units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of construction contiguous with visual display units by field measurements before fabrication.

1. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

1.9 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Surfaces lose original writing and erasing qualities.

b. Surfaces exhibit crazing, cracking, or flaking.

2. Warranty Period: Life of the building.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of visual display unit from single source from single manufacturer.

B. Approved Manufacturers:

1. Claridge; www. claridgeproducts.com.
2. Platinum Visual Systems; www.pvsusa.com.
3. Magnatag Inc.; www.magnatag.com

C. Other Approved Manufacturers:

1. Alliance; asi-visualdisplayproducts.com.
2. Homesote Company; www.homasote.com.
3. Newline Interactive Inc.; www. newline-interactive.com.
4. Platinum Visual Systems; www. pvsusa.com.

2.2 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Visual Display Board Assembly:
   a. Flame-Spread Index: 75 or less.
   b. Smoke-Developed Index: 450 or less.
2. Fabric Wrapped Tackboards: All panel components shall have a Class A rating.
   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 50 or less.

2.3 VISUAL DISPLAY BOARD ASSEMBLIES, GENERAL

A. Visual Display Board Assembly: Factory fabricated. Provide field-fabricated units where indicated.

1. Provide all required accessories and accessories as selected by Architect for complete installation.

B. Basis-of-Design Product, MB: As selected by Architect.

1. Assembly: Magnetic white boards, as indicated.
2. Corners: Square; as indicated.
3. Width and Height: As indicated.
4. Accessories: As selected by Architect.
5. Mounting: Concealed hanger clips or rail support system; as indicated.
   a. Where adhered, comply with installation requirements in Section 09 72 00 “Wall Coverings.”

C. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch-thick, extruded aluminum; slim size and standard shape and of size and shape indicated on Drawings.

1. Field-Applied Trim: Manufacturer's standard, snap-on trim with no visible screws or exposed joints.
2. Display Rail: Size indicated, and as selected by Architect from manufacturer’s optional profiles.
3. Provide end caps matching trim finish with concealed or inconspicuous fasteners.

4. Aluminum Finish: Anodic or powder-coat finish.
   a. Color: As selected by Architect.

D. Applications: As indicated in Drawings.

E. Combination Assemblies: Provide hidden spline between abutting sections of visual display panels.

F. Hanger Clips: Extruded aluminum with finish to match rails; designed to support independent visual display board assemblies by engaging support rail and top trim of board.

G. Support Rails: Horizontal, wall-mounted, extruded-aluminum rails designed to receive hanger clip and to support visual display boards.

2.4 VISUAL DISPLAY BOARD MATERIALS

A. Porcelain-Enamel Face Sheet: PEI-1002, with face sheet manufacturer's standard two- or three-coat process.

B. Natural-Cork Sheet: Seamless, single-layer, compressed fine-grain cork sheet; bulletin board quality; face sanded for natural finish with surface-burning characteristics indicated.

2.5 FABRIC WRAPPED TACKBOARDS, TWS-1

A. Basis-of-Design Product: As indicated on Interior Finish Legend in Drawings.
   1. Nominal Overall Panel Thickness: As selected by Architect.
   2. Core: Manufacturer’s standard.
   3. Tack Surface and Color: As indicated on Interior Finish Legend in Drawings.
   4. Size: As indicated in Drawings.

B. Mounting: Direct-adhered; manufacturer’s standard low-VOC adhesive.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A32/ A34, Class II, 0.010 mm or thicker.

C. Baked-Enamel or Powder-Coat Finish: AAMA 2603, except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.

B. Examine walls and partitions for proper preparation and backing for visual display units.

C. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances, such as dirt, mold, and mildew, that could impair the performance of and affect the smooth, finished surfaces of visual display boards.

C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display units and wall surfaces.

D. Prime wall surfaces indicated to receive visual display units and as recommended in writing by primer/sealer manufacturer and visual display unit manufacturer.

3.3 INSTALLATION

A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

B. Factory-Fabricated Visual Display Board Assemblies: Adhere to wall surfaces with adhesive as recommended by manufacturer.

3.4 CLEANING AND PROTECTION

A. Clean visual display units according to manufacturer's written instructions. Attach one removable cleaning instructions label to visual display unit in each room.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

C. Cover and protect visual display units after installation and cleaning.

END OF SECTION

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SECTION 10 14 00 - SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general signage for the following signage types:

1. Room-identification signs.
2. Door-identification signs.

1.3 SUBMITTALS

A. Product Data: For each type of product required.

B. Shop Drawings: For signage.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

C. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated.

D. Sign Schedule: Use same designations on Drawings.

E. Qualification Data: For installer.

F. Sample Warranty: For warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices and electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.7 WARRANTY

A. Special Warranty: Manufacturer Warranty Period of Five years.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.

B. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

C. Comply with Portland Public Schools, Signage “Best Practices” Guide, revised 7.2015; by Anderson Krygier, Inc. appended to This Section.

2.2 SIGNS

A. General: Provide signage to match existing.

1. Approved Manufacturers:
2. APCO Graphics Inc. www.apcosigns.com.
3. Best Signs; www.bestsigns.com.
4. Gemini; www.geminimade.com.
5. Grimco Inc.; www.grimco.com.

B. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles.

C. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles.

2.3 PANEL-SIGN MATERIALS

A. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

1. Thickness: 0.080 in. thick.
2. Edge Profile: Square
3. Corner: Rounded; 1/2 in. radius.
4. Mounting: Frameless.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined.

B. Adhesive: As recommended by sign manufacturer.

C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, with adhesive on both sides.

D. Magnetic Tape: Manufacturer's standard magnetic tape with adhesive on one side.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

B. Surface-Engraved Graphics: Machine engrave characters and other graphic devices into panel surface indicated to produce precisely formed copy, incised to uniform depth.

C. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

D. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.

E. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:

F. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.

2.6 GENERAL FINISH REQUIREMENTS

A. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

B. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Verify that signage-support surfaces are within tolerances to accommodate plaques without gaps or irregularities between backs of plaques and support surfaces unless otherwise indicated.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

B. Room-Identification Signs and Other Accessible Signage: Install in locations on walls as indicated and according to accessibility standard.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signage and signage that do not comply with specified requirements. Replace signage with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signage are installed.

C. On completion of installation, clean exposed surfaces of signage according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signage in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION

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SECTION 10 21 13 - PHENOLIC-CORE TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Phenolic-core toilet compartments configured as toilet enclosures (TP).

B. Related Requirements:

1. Section 05 50 00 "Metal Fabrications" for supports that attach floor-anchored compartments to overhead structural system.
2. Section 06 10 00 "Rough Carpentry" for blocking.
3. Section 10 28 00 "Restroom and Custodial Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories mounted on toilet compartments.

1.3 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

B. Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content and salvage material content.

C. Shop Drawings: For toilet compartments.

1. Include plans, elevations, sections, details, and attachment details.
2. Show locations of cutouts for compartment-mounted toilet accessories.
3. Show locations of centerlines of toilet fixtures.
4. Show locations of floor drains.
5. Show ceiling grid, and overhead support or bracing locations.

D. Samples for Initial Selection: For each type of toilet compartment material indicated.

E. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

1. Each type of material, color, and finish required for toilet compartments, prepared on 6-inch-square Samples of same thickness and material indicated for Work.
2. Each type of hardware and accessory.

F. Product Certificates: For each type of toilet compartment.

G. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.

2. Smoke-Developed Index: 450 or less.

B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

2.2 MANUFACTURERS

A. Basis-of-Design Manufacturer: Bradley Corporation; www.bradleycorp.com.

B. Other Approved Manufacturers:

1. Accurate Partitions Corporation; www.asi-accuratepartitions.com

2. AccuTec MFG; www.accutecmfg.com.

3. American Sanitary Partition Corporation; www.am-sanitary-partition.com.

4. Ampco Inc.; www.ampcometal.com.

5. Bobrick Washroom Equipment Inc.; www.bobrick.com.

6. Flush Metal Partition Corporation www.flushmetal.com.

7. General Partitions Mfg. Corporation; www.generalpartitions.com.

8. Global Steel Products Corporation; www.asi-globalpartitions.com.

9. Knickerbocker Partition Corporation; www.knickerbockerpartition.com.

10. Sanymetal Inc.; www.sanymetal.com.

11. Weis-Robart Partitions, Inc.; www.weisrobart.com.

2.3 PHENOLIC-CORE TOILET COMPARTMENTS, TP

A. Basis-of-Design Product: As indicated on Interior Finish Legend in Drawings.

B. See drawings for all toilet room layouts.

C. Toilet-Enclosure Style: Overhead-braced.

D. Door, Panel, and Pilaster Construction: Solid phenolic-core panel material with melamine facing on both sides fused to substrate during panel manufacture (not separately laminated), and with eased and polished edges. Provide minimum 3/4-inch-thick doors and pilasters and minimum 1/2-inch-thick panels.

1. Privacy Configuration: Provide manufacturer’s standard no-sightline system.

E. Pilaster Shoes and Sleeves (Caps): Formed from stainless steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.

F. Brackets (Fittings):

1. Stirrup Type: Ear or U-brackets, stainless steel.

G. Phenolic-Panel Finish:

1. Facing Sheet Finish: One color and pattern in each room.

2. Color and Pattern: As indicated on Interior Finish Legend in Drawings.

3. Edge Color: Manufacturer's standard.

2.4 HARDWARE AND ACCESSORIES

A. Hardware and Accessories: Manufacturer's heavy-duty operating hardware and accessories.

1. Hinges: Manufacturer's minimum 0.062-inch-thick stainless steel continuous, cam type that swings to a closed, for out-swinging accessible stalls, or partially open position, for in-swinging non-accessible stalls, allowing emergency access by lifting door. Mount with through-bolts.

2. Latch and Keeper: Manufacturer's heavy-duty surface-mounted cast-stainless steel latch unit designed to resist damage due to slamming, with combination rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible. Mount with through-bolts.

3. Coat Hook: Manufacturer's heavy-duty combination cast-stainless steel hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories. Mount with through-bolts.

4. Door Bumper: Manufacturer's heavy-duty rubber-tipped cast-stainless steel bumper at out-swinging doors. Mount with through-bolts.

5. Door Pull: Manufacturer's heavy-duty cast-stainless steel pull at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible. Mount with through-bolts.

6. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.5 MATERIALS

A. Aluminum Castings: ASTM B26.

B. Aluminum Extrusions: ASTM B221.

C. Stainless Steel Sheet: ASTM A240 or ASTM A666, Type 304, stretcher-leveled standard of flatness.

D. Stainless Steel Castings: ASTM A743.

2.6 FABRICATION

A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

B. Floor-and-Ceiling-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal

C. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide in-swinging doors for standard toilet compartments and 36-inch-wide out-swinging doors with a minimum 32-inch- wide clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.

1. Confirm location and adequacy of blocking and supports required for installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:

a. Pilasters and Panels: 1/2 inch.

b. Panels and Walls: 1 inch.

2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel.

a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.

b. Align brackets at pilasters with brackets at walls.

B. Floor-and-Ceiling-Anchored Units: Secure pilasters to supporting construction and level, plumb, and tighten. Hang doors and adjust so doors are level and aligned with panels when doors are in closed position.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

SECTION 10 26 00 - WALL PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Corner Guards, CG-1.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.

B. Samples for Initial Selection: For each type of impact-resistant wall protection unit indicated.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

1. Corner Guards: 12 in. long.

D. Warranty: Sample of special warranty.

E. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.

1. Include recommended methods and frequency of maintenance for maintaining optimum condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to plastic finishes and performance.

F. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Corner-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of units installed, but no fewer than two, 4-ft. long units.

B. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain impact-resistant wall protection units from single source from single manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection units and are based on the specific system indicated. Refer to Section 01 40 00 "Quality Requirements."

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with

Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Surface-Burning Characteristics: Provide impact-resistant, plastic wall protection units with surface-burning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another qualified testing agency.

F. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.

2. Keep plastic sheet material out of direct sunlight.

3. Store plastic wall protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.

a. Store covers in a horizontal position.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wall protection units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures.

b. Deterioration of plastic and other materials beyond normal use.

2. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer:

1. Koroseal Interior Products; www.koroseal.com.

B. Other Approved Manufacturers:

1. American Floor Products Company; www.afco-usa.com.

2. Construction Specialties, Inc.; www.c-sgroup.com.

3. IPC Door and Wall Protection Systems, div. of InPro Corporation; www.inprocorp.com.

4. Pawling Corporation; www.pawling.com.

2.2 CORNER GUARDS, CG-1

A. Surface-Mounted, Metal Corner Guards: Fabricated as one piece from formed or extruded metal with formed edges.

B. Surface-Mounted, Plastic-Cover Corner Guards: Manufacturer's standard, PVC-free assembly consisting of snap-on, resilient plastic cover installed over retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.

1. Basis-of-Design Product: As indicated on Interior Finish Legend in Drawings.

2. Finish: As indicated on Interior Finish Legend in Drawings.

C. Applications: Provide at locations indicated in Drawings.

2.3 MATERIALS

A. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

B. Adhesive: As recommended by impact-resistant plastic wall protection manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Adhesive: As recommended by impact-resistant plastic wall protection manufacturer and that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.4 FABRICATION

A. Preform curved semirigid, impact-resistant sheet wall covering in factory for radius and sheet thickness as follows:

1. Sheet Thickness of 0.040 Inch: 24-inch radius.

2. Sheet Thickness of 0.060 Inch: 36-inch radius.

B. Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

C. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

1. For impact-resistant wall protection units attached with adhesive or foam tape, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing impact-resistant wall protection system components.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

1. Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.

a. Provide anchoring devices to withstand imposed loads.

b. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches.

c. Adjust end and top caps as required to ensure tight seams.

3.4 CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard, ammonia-based, household cleaning agent.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION

SECTION 10 28 00 - RESTROOM ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Restroom Accessories.
2. Delegated design for grab bars.

B. Related Requirements:

1. Section 01 61 16 “Delegated Design Requirements”.
2. Section 06 10 00 “Rough Carpentry” for coordination of framing and blocking.
3. Section 09 22 16 “Non-Structural Metal Framing” for coordination of framing and backing.

1.3 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Include electrical characteristics.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.

C. Delegated-Design Submittal: For grab bars indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Qualification Data:

1. For Professional Engineer.

E. Sample Warranty: For manufacturer's special warranties.

F. Maintenance Data: For accessories to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Engineer Qualifications: Qualified professional engineer responsible for delegated design, licensed in the jurisdiction in which Project is located.

1.6 WARRANTY

A. Manufacturer's Functional Warranty: Manufacturer agrees to repair or replace accessories that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Manufacturer’s standard Lifetime Guarantee.

B. Manufacturer's Finish Warranty: Manufacturer agrees to repair or replace chrome and polished nickel accessories that fail in finish performance within specified warranty period.

1. Warranty Period: Five (5) years from date of Substantial Completion.

C. Manufacturer's Commercial Warranty: Manufacturer agrees to repair or replace accessories used in commercial applications that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One (1) year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer; refer to Section 01 61 16 “Delegated Design Requirements" for requirements.

B. Structural Performance: Design accessories and fasteners to comply with the following requirements:

1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.

2.2 MANUFACTURERS

A. Approved Manufacturers:

1. A & J Washroom Accessories Inc.; www.ajwashroom.com.
2. American Specialties Inc.; www.americanspecialties.com.
3. Bradley; www.bradley.com.
4. Bobrick Washroom Equipment, Inc.; www.bobrick.com.
5. General Accessory Manufacturing Co. (GAMCO); www.gamcousa.com.
6. Georgia-Pacific Consumer Products LP; www.gppro.com.
7. Impact Products; www.impact-products.com.
8. McKinney/ Parker Washroom Accessories Corp.; www.mckinneydoor.com.
9. Rubbermaid Commercial Products; www.rubbermaid.com.
10. WCP Solutions; www.wcpsolutions.com.

2.3 OWNER-FURNISHED MATERIALS

A. Owner-Furnished, Contractor-Installed (OFCI) Materials:

1. Soap Dispensers:

a. Basis-of-Design Product: Model no. 9325 Impact Foam-eeze Bulk Foam Soap

Dispenser by Impact.

2. Toilet Tissue Dispensers:

   a. Basis-of-Design Product: Model no. SWDS3039 Small Core Jumbo Tissue Dispenser by WCP Solutions.

   b. Coordinate with Division 10 “Specialties” for units installed at toilet partitions.

3. Toilet Seat-Cover Dispensers:

   a. Basis-of-Design Product: Model no. 57710 Dispn Tissue Seatcover by Georgia-Pacific.

4. Sanitary Napkin Disposal Receptacles:

   a. Basis-of-Design Product: Model no. 6140 Sanitary Napkin Receptacle with Rigid Liner by Rubbermaid.

   b. Coordinate with Division 10 “Specialties” for units installed at toilet partitions.

5. Paper Towel Dispensers:

   a. Basis-of-Design Product: Model no. 54338A Universal Push-Paddle Paper Towel Dispenser by Georgia-Pacific.

2.4 RESTROOM ACCESSORIES

A. Waste Disposal:

1. Basis-of-Design Product: As selected by Architect.

   a. Dimensions: As indicated.

   b. Mounting: Surface mounted.

   c. Finish: Stainless steel.

   d. Applications: As indicated in Drawings.

B. Grab Bars:

1. Basis-of-Design Products: Model B-6806 series by Bobrick.

   a. Dimensions: 1 1/2 inch diameter.

   b. Lengths: As indicated in Drawings.

   c. Type: Type 304, Stainless steel.

   d. Finish: Satin finish.

   e. Applications: As indicated.

C. Stainless Steel Mirrors:

1. Basis-of-Design Products: Model B-1556 by Bobrick.

   a. Dimensions: As indicated in Drawings.

   b. Type: Surface Mounted.

   c. Application: As indicated in Drawings.

2.5 MATERIALS

A. Stainless Steel: ASTM A240 or ASTM A666, Type 304, 0.031-inch-minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B19, flat products; ASTM B16, rods, shapes, forgings, and flat products with

finished edges; or ASTM B30, castings.

C. Steel Sheet: ASTM A1008, Designation CS (cold rolled, commercial steel), 0.036-inch-minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A653, with G60 hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A153, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.

G. Chrome Plating: ASTM B456, Service Condition Number SC 2 (moderate service).

I. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.6 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examination: Review locations to receive accessories; confirm blocking or backing appropriate to requirements is installed prior to proceeding.

B. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Remove temporary labels and protective coatings.

C. Grab Bars: Install to comply with specified structural-performance requirements.

D. Shower Seats: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION

SECTION 10 44 00 - FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:

a. Portable fire extinguishers.

2. Fire extinguishers.

1.3 SUBMITTALS

A. Product Data: For each type of product. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed, semi-recessed, or surface-mounting method and relationships of box and trim to surrounding construction.

B. Shop Drawings: For fire-protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required, prepared on Samples 6 by 6 inches square.

D. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semi-recessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

E. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers required by code are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

B. Electrical Components, Devices, and Accessories: For wired alarms at fire-protection cabinets, listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. NFPA Compliance, Extinguishers: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

D. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FM Global; where required.

E. The Basis-of-Design Product's performance criteria, product properties and attributes, including materials and methods used in fabrication of and/or the manufacturing process of individual components or for entire system, as indicated in manufacturers' current published product literature at the date of the Contract Documents, shall establish the minimum performance requirement for the Project, regardless of inclusion in This Section.

2.2 MANUFACTURERS

A. Basis-of-Design Manufacturer: JL Industries, div. of Activar Construction Products Group, Inc.; www.activarcpg.com.

B. Other Approved Manufacturer: Kidde Fire Safety; www.kidde.com.

2.3 FIRE-PROTECTION CABINET

A. Basis-of-Design Product: Cosmopolitan Series by JL Industries.

1. Door Style: Fully glazed panel with frame.

2. Door Hardware: Manufacturer's standard ADA compliant, door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

a. Provide recessed door pull and friction latch.

b. Provide continuous hinge, of same material and finish as trim permitting door to open 180 degrees.

B. Cabinet Construction: Nonrated, except where indicated otherwise.

1. Fire-Rated Cabinets: Provide fire-rated cabinets where located in fire-rated walls, matching wall rating designation. Rated cabinets shall match basis-of-design product indicated. Provide factory-drilled mounting holes.

C. Semi-recessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

1. Square-Edge Trim: 1-1/4- to 1-1/2-inch backbend depth.

2. Rolled-Edge Trim: 2-1/2-inch backbend depth.

D. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

2. Door Lock: Cylinder lock, keyed alike to other cabinets, where required by AHJ.

3. Identification: No lettering except that required by authorities having jurisdiction for letter style, size, spacing, and location.

a. Identify fire hose valves in fire-protection cabinets.

E. Materials:

1. Cold-Rolled Steel: ASTM A1008, Commercial Steel (CS), Type B.

2. Finish: No. 4 satin stainless steel.

2.4 FIRE EXTINGUISHERS

A. Fire Extinguisher, for cabinets and wall mounted: Multipurpose dry-chemical type, industrial grade external cartridge operated multipurpose A-B-C portable dry chemical fire extinguishers in 10 lb.

size. The extinguishers shall meet or exceed the U.L. ratings.

1. Basis-of-Design Product, Fire Extinguisher: Cosmic 4-A; 60-B:C by JL Industries.
   a. Or product for cabinet selected complying with UL requirements.
2. Wall bracket mount or in cabinet, as indicated. Provide at FEC locations with cabinet.

2.5 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
   1. Weld joints and grind smooth.
   2. Provide factory-drilled mounting holes.
   3. Prepare doors and frames to receive locks.
   4. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
   1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
   2. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for cabinets to verify actual locations of piping connections before cabinet installation.

B. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for recessed and semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: install new fire protection cabinets in locations to be determined:

1. Proved new cabinet locations as indicated in Drawings.
2. Replace existing cabinets with new cabinets at new locations.
3. Relocate cabinets as indicated in Drawings.
4. Refit within current location to become secure and plumb within existing opening and align with proposed wall finish as indicated in Drawings.

B. Mounting Height: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction, but no higher than the following.

1. Fire-Protection Cabinets Installation height: Install at height conforming to NFPA 10.
   a. 54 inches above finished floor to top of cabinet.

C. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
2. Provide inside latch and lock for break-glass panels.
3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 11 81 29 - FALL PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes systems and components to facilitate roof top maintenance where required, including the following.

1. Tie-offs for roof fall protection.
2. Delegated design.

B. Related Requirements:

1. Section 01 61 16 “Delegated Design Requirements” for delegated design for deferred submittal.
2. Section 06 16 00 “Sheathing” for roof sheathing.
3. Section 07 22 16 “Roof Board Insulation” for nailable base.
4. Section 07 62 00 “Sheet Metal Flashing and Trim.”
5. Section 07 92 00 “Roof and Interior Joint Sealants.”

1.3 COORDINATION

A. Coordinate the location of primary support for fall arrest anchors in conjunction with areas on façade of building requiring service and cleaning.

B. Anchorages shall be unobstructed and located behind and in line with equipment or portion of building they are intended to service. Refer to the manufacturer’s recommendations and anchor spacing and outside corner layout diagrams.

1.4 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product proposed, including the following

1. Test report certified by a professional engineer.
2. General product data.
3. Detailed drawings of equipment proposed.

B. Shop Drawings:

1. Fall Arrest Anchors:
   a. Location plan: Fall protection layout drawings are required to be completed prior to steel framing detailing; coordinate with schedule requirements of Section 05 12 00 “Structural Steel Framing”.
   b. Detailed plan and section showing typical anchor installations.
2. Submit scaled shop drawings showing the following:
   a. Location plans of all support equipment: Equipment location plans shall include identification number next to each piece of equipment that are permanently affixed to a structure, including anchors.

b. Drawings detailing all parts and accessories.

1) Field welds shall be indicated on equipment details using AWS symbols and showing length and size. Auxiliary views shall be shown to clarify welding as required.

3. Clearly specify equipment dimensions, materials, fabrication details, hardware, and installation instructions.

4. Include notes with guidelines of proper use of system.

5. Shop drawings shall be prepared under supervision of a registered U.S. Professional Engineer (PE) and shall bear engineer's seal and signature. Registered PE shall be licensed in jurisdiction where project is located. Include Professional Engineer's certified report of tested equipment.

C. Delegated-Design Submittal: For fall protection and maintenance devices indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Field Inspection Report: Include completed inspection logbook in accordance with "Field Quality Control" Article.

1. Laminated Project Record Drawing: Provide two (2) 11x17 inch sheet plastic laminated drawings showing all anchor locations to Owner. Drawing shall include as-installed anchor locations, details, and instructional text in English and Portuguese. One copy will be for placing on interior of roof level door by Owner. The other copy will kept with hardcopy O&M Data to serve as replacement drawing.

E. Installation Instructions: Include guidance on field testing.

F. Quality Assurance Submittal Certificates: Provide documentation verifying company's amount of experience and successful performance in design, fabrication, and installation of permanent support equipment.

1. Submit listing of company's installations representing similar scope and complexity to project requirements for previous ten (10) years. List shall include information as follows:

a. Project name and address.

b. Name of Owner.

c. Name of General Contractor.

d. Name of Architect.

e. Date of completion.

2. Provide documentation verifying that installers have been trained by the manufacturer and are competent.

G. Certification:

1. Fall Arrest Anchors: Letter of certification by registered U.S. Professional Engineer verifying that installed anchors are in compliance with OSHA regulations and ANSI/IWCA standards referenced in "System Description" paragraphs above.

H. O&M Logbook:

1. Provide safety inspection logbook for yearly inspections. Include instructions on verifying compliance with OSHA regulations and ANSI/IWCA standards referenced in "System Description" Article.

2. The O&M Log book shall include a Certification of Compliance Letter. The Certification of Compliance shall state that the Fall Protection System is in compliance with current OSHA regulations and ANSI/IWCA I-14.1-2001 Window Cleaning Safety Standard.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Engineer: Qualified professional engineer responsible for delegated design, licensed in the jurisdiction in which Project is located.

2. Manufacturer: Provide products from company specializing in design, fabrication, and installation of permanent fall restraint equipment with a minimum of ten (10) years of documented experience.

3. Installer: Trained or approved by manufacturer in installation techniques and procedures, with minimum ten (10) years of documented experience installing permanent fall restraint equipment.

4. Inspector: Registered Professional Engineer with experience on fall restraint equipment.

B. Regulatory Requirements:

1. Comply with Occupational Health and Safety Standards: 1910.66 Appendix C (Personal Fall Arrest).

2. Welding shall comply with AWS D1.1 and shall be performed by welders qualified to work in jurisdiction where project is located.

3. Comply with AISC publications:

a. Load and Resistance Factor Design for Structural Steel Buildings

b. Specifications for the Design of Cold-Formed Steel Structural Members

C. Coordination: The General Contractor shall ensure sequencing with adequate schedule for review and approval of fall protection layout drawings prior to steel framing detailing; coordinate with the schedule requirements of Section 05 12 00 “Structural Steel Framing”.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original unopened packaging.

B. Storage and Protection:

1. Store materials in area protected from construction activities, and protected from materials and chemicals that are not compatible with anchors.

2. Before installing, clean bolts that have become dirty.

3. Do not install damaged materials. Ensure that they are removed from project site.

1.7 SEQUENCING AND COORDINATION

A. Contractor is responsible for coordinating submittal process, fabrication, and delivery with construction of building elements receiving anchors.

B. Coordinate anchor installation with parapet construction and coating.

C. Manufacturer shall provide detailed installation instructions and directions for installation of embedded items, welded items, and through-bolted items, etc.

D. Manufacturer shall provide installation assistance during installation of the equipment. However, the responsibility of the installation shall remain with the General Contractor unless equipment is installed and certified by the manufacturer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer to design roof tie-off attachment to building structure and required structural modifications as required for installation; refer to Section 01 61 16 “Delegated Design Requirements" for requirements.

B. Anchorage Design Requirements:

1. Safety anchor design shall comply with ANSI/IWCA I-14.1, “Window Cleaning Safety” and OSHA 1910.66, Appendix C, “Personal Fall Arrest.”

2. Structural Design Requirements:

a. Anchorage shall be capable of sustaining minimum ultimate load of 5,000 lbs in any direction load may be applied, without fracture or failure.

b. Anchorage shall be capable of sustaining minimum proof load of 2,500 lbs in any direction load may be applied, without permanent deformation or damage to anchorage.

c. Anchorage shall be designed with minimum 1,250 lbs in any direction load may be applied.

3. Anchor system shall provide independent fall arrest anchorages in addition to suspension line anchorages for each descent location as required by OSHA and ANSI requirements.

a. Provide fall arrest anchors in parapets in locations identified on Drawings.

2.2 MANUFACTURERS

A. Basis-of-Design Manufacturer:

1. Guardian Fall Protection Inc.; www.guardianfall.com.

B. Other Approved Manufacturers:

1. Pro-Bel Group Ltd.; www.pro-bel.com.

2. Summit Anchor Co.; www.summitanchor.com.

3. Tractel; www.tractel.com.

2.3 PRODUCTS

A. Galvanized Roof Anchor:

1. Basis-of-Design Products: Model no. 00510, Ridge-It 2 D-ring Anchor by Guardian; www.guardianfall.com.

a. Style: For roof type indicated.

b. Height: As indicated on Drawings.

1) As required for minimum roofing membrane Termination. Coordinate with roofing manufacturer.

c. Finish and Material: Hot-dipped galvanized steel

d. Fasteners: As recommended by manufacturer for code compliance, provide fasteners as required for roof type indicated.

2.4 FABRICATION

A. Fabricate work true to dimension, square, plumb, level, and free from distortion or defects detrimental to appearance and performance.

B. Grind off surplus welding material to ensure exposed surfaces are smooth to prevent abrasion to worker's ropes or cables.

C. Welding: Shall be in accordance with the AWS D1.1, "Structural Welding Code."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions:

1. Examine areas and conditions under which permanent fall restraint equipment shall be installed.

2. Report to general contractor any conditions that deviate from shop drawings or any defects in workmanship that would cause an unsafe installation. This report shall be verified in writing to the general contractor and any other responsible party.

B. Correct conditions detrimental to timely and proper execution of work.

C. Do not proceed until unsatisfactory conditions have been corrected.

D. Commencement of installation constitutes acceptance of conditions and responsibility for satisfactory performance by installer.

E. Faults occurring in work of this Section due to acceptance of unsatisfactory conditions shall be corrected at no additional cost to owner.

3.2 INSTALLATION

A. General Requirements:

1. Install fall restraint system equipment in compliance with manufacturer's instructions. Install equipment level, tightly fitted, and flush to adjacent surfaces as needed for proper installation.

2. Coordinate anchor installation with roofing installation to ensure a watertight and warrantable condition of the roofing. Anchors shall be directly flashed into roofing in a manner compatible with roofing system and anchors.

3. When components come into contact with dissimilar metals, surfaces shall be kept from direct contact to prevent corrosion.

4. No wall anchors shall be installed through membrane roofing system without specification detailing such from the Architect or water proofing contractor warranting the roof.

5. Deform a minimum of two threads of tail end of anchor studs after nuts have been tightened to prevent accidental removal or vandalism. Deform threads with 2 mm stainless steel punch

B. Flashings: Deck flange shall be flashed in compliance with National Roofing Contractor Association (NRCA) recommendations.

3.3 REPAIR/ RESTORATION

A. Galvanizing Touch-Up: Immediately following erection, clean field welds and abraded areas. Repair damaged galvanizing areas in compliance with ASTM A780.

3.4 FIELD QUALITY CONTROL

A. Inspection and Site Visits:

1. Perform inspections and site visits while installation of anchors is in progress under supervision of qualified Professional Engineer.

2. Perform on-site inspection of equipment welded to structure by an AWS Certified Welding Inspector verifying, in writing, size and quality of welds. Such an inspection shall be performed on each piece of equipment before roofing material is installed

3. Perform on-site inspection on cast items while they are being tied in with rebar; ensure sufficient time before concrete is poured to allow adjustments to embedded items.

4. Contractor shall be responsible to schedule site visits and inspections with sufficient advanced notice given to the inspection company.

B. Field Tests:

1. All equipment shall be tested on-site in accordance with manufacturer's recommendations, under the supervision of a professional engineer, and ANSI/IWCA I-14.1, "Window Cleaning Safety Standards", before equipment is placed into service.

2. Equipment shall be tested under supervision of qualified Professional Engineer with experience with fall restraint equipment and manufacturers guidelines.

C. Manufacturer shall assist or supervise installation of equipment installed by others.

3.5 ADJUSTING

A. Verify that completed work has been installed correctly and products function properly. Make adjustments where needed to ensure satisfactory operation.

B. Complete inspection logbook to certify the complete system for use. Note any deviations, changes, or corrections from the original shop drawings. Provide as-built anchor layout plan on A3 sheet (11 x 17 in.) paper or larger together with annual inspection logbook.

3.6 DEMONSTRATION

A. Manufacturer's service representative shall train District personnel to operate the equipment, and adjust and test anchors. Refer to Section 01 79 00 "Demonstration and Training."

END OF SECTION

SECTION 12 21 13 - HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Horizontal louver blinds with aluminum slats.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood blocking and grounds for mounting louver blinds and accessories.

1.3 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For horizontal louver blinds, include fabrication and installation details.

C. Samples: For each exposed product and for each color and texture specified, 12 inches long.

D. Samples for Initial Selection: For each type and color of horizontal louver blind.

1. Include Samples of accessories involving color selection.

E. Samples for Verification: For each type and color of horizontal louver blind indicated.

1. Slat: Not less than 12 inches long.
2. Tapes: Full width, not less than 6 inches long.
3. Horizontal Louver Blind: Full-size unit, not less than 16 inches wide by 24 inches long.
4. Valance: Full-size unit, not less than 12 inches wide.

F. Product Schedule: For horizontal louver blinds. Use same designations indicated on Drawings.

G. Product Test Reports: For horizontal louver blinds with polymer slats that have been tested for compliance with NFPA 701, for tests performed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Horizontal Louver Blinds: Full-size units equal to 5 percent of quantity installed for each size, color, texture, pattern, and gloss indicated, but no fewer than two units.

1.6 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Approval of mockups does not constitute approval of deviations from the Contract

Documents contained in mockups unless Architect specifically approves such deviations in writing.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet-work and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain horizontal louver blinds from single source from single manufacturer.

2.2 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

A. Approved Manufacturers:

1. Hunter Douglas; www.hunterdouglas.com.

2. Levolor Inc.; www.levolor.com.

3. Graber a div. of Springs Window Fashions Inc.; www.graberblinds.com.

B. Flame-Resistance Rating: Comply with NFPA 701; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

C. Slats: Aluminum, UV stabilized, colored, opaque, and will not crack or yellow; antistatic, dust-repellent treated.

1. Formulation: Manufacturer's standard.

2. Width: 1 in.

3. Spacing: Manufacturer's standard.

4. Profile: Manufacturer's standard.

5. Features:

a. Lift-Cord Rout Holes: Minimum size required for lift cord and located near back (outside) edge of slat to maximize slat overlap and minimize light gaps between slats.

D. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrail fully

encloses operating mechanisms on three sides and ends.

1. Manual Lift Mechanism:
   a. Lift-Cord Lock: Variable; stops lift cord at user-selected position within full operating range.
   b. Operator: Extension of lift cord(s) through lift-cord lock mechanism to form cord pull.
2. Manual Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.
   a. Tilt: Full.
   b. Tilt: One-direction, positive stop or lockout limited at an angle of 60 degrees from horizontal.
   c. Operator: Clear-plastic wand.
   d. Over-Rotation Protection: Manufacturer's detachable operator or slip clutch to prevent over rotation of gear.
3. Manual Lift-Operator and Tilt-Operator Locations: Manufacturer's standard unless otherwise indicated.

E. Bottom Rail: Secures and protects ends of ladders and lift cords.
   1. Type: Manufacturer's standard.

F. Lift Cord: Manufacturer's standard braided cord.

G. Ladders: Evenly spaced across headrail at spacing that prevents long-term slat sag.
   1. Type: Braided cord.

H. Valance: Manufacturer's standard.

I. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.
   1. Type: As indicated.
   2. Intermediate Support: Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.

J. Hold-Down Brackets and Hooks or Pins: Manufacturer's standard.

K. Colors, Textures, Patterns, and Gloss:
   1. Slats: As selected by Architect.
   2. Components: Provide rails, cords, ladders, and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

2.3 HORIZONTAL LOUVER BLIND FABRICATION

A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for corded, flexible, looped devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
   1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which blind is installed less 1/4 inch per side or 1/2 inch total, plus or minus 1/8 inch. Length equal to head-to-sill dimension of opening in which blind is installed less 1/4 inch, plus or minus 1/8 inch.

2. Outside of Jamb Installation: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.

1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.

D. Mounting and Intermediate Brackets: Designed for removal and reinstallation of blind without damaging blind and adjacent surfaces, for supporting blind components, and for bracket positions and blind placement indicated.

E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to brackets and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.

F. Color-Coated Finish:

1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.

1. Locate so exterior slat edges are not closer than 1 inch from interior faces of glass and not closer than 1/2 inch from interior faces of glazing frames through full operating ranges of blinds.

2. Install mounting and intermediate brackets to prevent deflection of headrails.

3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

3.3 ADJUSTING

A. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

3.4 CLEANING AND PROTECTION

A. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.

B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.

C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by Architect before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain systems.

END OF SECTION

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WARM SPRINGS K-8

JEFFERSON COUNTY SCHOOL DISTRICT

100% CONSTRUCTION DOCUMENTS

JANUARY 18, 2023

BBT ARCHITECTS