PROJECT MANUAL FOR

SALMON HARBOR MARINA
RV EXPANSION

RESTROOM / LAUNDRY / SHOWER BUILDING

FOR

SALMON HARBOR MANAGEMENT COMMITTEE
DOUGLAS COUNTY
P.O. BOX 1007 / 100 ORK ROCK ROAD
WINCHESTER BAY, OR 97467

MAY 2019
PROJECT #15.68
PROJECT MANUAL FOR:

SALMON HARBOR MARINA - RV EXPANSION
RESTROOM / LAUNDRY / SHOWER BUILDING

SALMON HARBOR MANAGEMENT COMMITTEE / DOUGLAS COUNTY
P.O. BOX 1007 / 100 ORK ROCK ROAD
WINCHESTER BAY, OREGON 97467

PREPARED BY:

HGE, INC., ARCHITECTS, ENGINEERS & PLANNERS
333 SOUTH 4TH STREET
COOS BAY, OREGON 97420
(541)269-1166
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ADVERTISEMENT FOR BIDS

Notice is hereby given that sealed bids for Salmon Harbor Marina’s RV Resort Expansion - Restroom/Laundry/Shower Building will be received by the Salmon Harbor Management Committee (SHMC) until the bid closing time of **2:00 P.M., Local Time, Thursday, July 18, 2019** at the Salmon Harbor Marina Office, 100 Ork Rock Road, Winchester Bay, OR; mailing address is P.O. Box 1007, Winchester Bay, OR 97467. Bids will be publicly opened and read aloud during a scheduled SHMC meeting, which will be held on July 18, 2019 at 2:30 P.M. at the Winchester Bay RV Resort Marina Activity Center, located within the Salmon Harbor Marina complex, 263 Marina Way, Winchester Bay, Oregon. Refer to the Instructions to Bidders within the Bidding Documents for more information.

Work on this Contract consists of an approximately 22 feet by 50 feet, 1172 square foot, single story, wood framed building, with sloped roof and asphalt shingles. Building includes laundry room, men’s and women’s restrooms and shower space, and mechanical/electrical room. This building structure project is part of a 40-space, full hook-up RV expansion for Salmon Harbor Marina. The contractor selected by the SHMC will be required to coordinate and cooperate with the site contractor constructing the RV site improvements, as the work will occur concurrently. All site work around building will be by site contractor.

Bidders must view and obtain solicitation documents from the Douglas County website’s “Bid Documents” webpage: [http://www.co.douglas.or.us/Bid_Documents](http://www.co.douglas.or.us/Bid_Documents). It is the bidder’s responsibility to monitor the website. Contract Documents for this work, including the Instructions to Bidders and Bid Form, may be examined at the following locations: (1) Salmon Harbor Marina Office, 100 Ork Rock Road, Winchester Bay, Oregon 97467; (2) the office of the Architect, HGE INC., Architects, Engineers & Planners, 333 South 4th Street, Coos Bay, Oregon, phone: 541-269-1166, email: general@hge1.com; (3) various Plan Centers throughout the region; and (4) HGE website: [http://www.hge1.com/open-to-bid/](http://www.hge1.com/open-to-bid/). General Contractors are encouraged to contact HGE, INC., by phone or email and register their interest in submitting a bid and to be included in the plan holders’ list. Contractors and sub-contractors that are registered on the plan holders list will receive all bidding information, including any issued addendums.

One set of drawings, specifications and contract documents may be obtained by prime bidders from HGE, INC., upon a refundable deposit of $100.

This project is a public work as defined by ORS 279C.800(6)(a). No bid will be received or considered unless the bid states that the bidder will comply with ORS 279C.800 to 279C.870 concerning payment of prevailing wage rates for public works contracts and unless the bid is accompanied by a surety bond of 10% of the amount bid. Per ORS 279C.385, bid security is to be forfeited as fixed and liquidated damage should the bidder neglect or refuse to enter into a contract and provide suitable insurance certificates, bonds and other required documents for the faithful performance of the work in the event bidder is awarded the contract. No bids will be
considered unless fully completed in the manner provided in the Instructions to Bidders upon the official bid form provided by the Salmon Harbor Management Committee, within the Project Manual.

Pursuant to ORS 279C.836, the contractor and every subcontractor must have a public works bond in the amount of $30,000.00 filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836 (7) or (8).

No bid will be received or considered unless the bidder is registered with the Construction Contractor’s Board pursuant to ORS Chapter 701. A license to perform landscaping work issued by the State Landscape Contractors Board is required. A license for abatement of asbestos issued pursuant to ORS 468A.720 et seq. is not required. A bid must include a statement on whether or not the bidder is a “resident bidder” as defined in ORS 279A.120.

Either the Bidder or a Contractor engaged by the Bidder to perform the Work must be qualified to perform the Work under the criteria stated in ORS 279C.375, and any other Applicable Laws.

**A Mandatory pre-bid meeting and walk-through** of the project will be held at **1:30 P.M. Local Time on Thursday, June 27, 2019**. Contractors shall meet at the Winchester Bay RV Resort Marina Activity Center, 263 Marina Way, Winchester Bay, Oregon to review project scope, bidding requirements, and other items. A tour and walk-through of the project site will immediately follow. The pre-bid meeting and walk-through are mandatory for general contractor bidders.

In accordance with ORS 279C.370, within two (2) working hours after the date and time of the deadline when the bids are due to the SHMC, a bidder shall submit to the Bidding Coordinator a disclosure of the first-tier subcontractors that will be furnishing labor or will be furnishing labor and materials in connection with this public improvement; and that will have a contract value that is equal to or greater than five percent (5%) of the total project bid or $15,000, whichever is greater, or $350,000 regardless of the percentage of the total project bid. The disclosure of first-tier subcontractors shall include the name of each subcontractor, the category of work that each subcontractor will perform and the dollar value of each subcontract.

The SHMC reserves the right to reject any or all bids, to waive technicalities, and to award the contract to the lowest responsive responsible bidder. The SHMC may reject any bid not in compliance with all prescribed public contracting procedures and requirements, and may reject all bids upon a finding that it is in the public interest to do so. No bidder may withdraw its bid after the hour set for the opening thereof until the lapse of thirty (30) days from the bid opening.

By: Paul Stallard, Harbor Manager
    Salmon Harbor Marina – Winchester Bay RV Resort
Published:

The World Newspaper
Coos Bay, Oregon
Date: June 20, 2019

Daily Journal of Commerce
Portland, Oregon
Date: June 21, 2019

The News Review
Roseburg, Oregon
Date: June 20, 2019

The Register-Guard
Eugene, Oregon
Date: June 20, 2019
INSTRUCTIONS TO BIDDERS
SALMON HARBOR MANAGEMENT COMMITTEE

SALMON HARBOR MARINA RV RESORT EXPANSION
RESTROOM/LAUNDRY/SHOWER BUILDING

Douglas County (the County), acting by and through the Salmon Harbor Management Committee (SHMC) is seeking Bids for SALMON HARBOR MARINA RV RESORT EXPANSION.

RESTROOM/LAUNDRY/SHOWER BUILDING

Work on this Contract consists of an approximately 22 feet by 50 feet, 1172 square foot, single story, wood framed building, with sloped roof and asphalt shingles. Building includes laundry room, men’s and women’s restrooms and shower space, and mechanical/electrical room. This building structure project is part of a 40-space, full hook-up, RV expansion project for Salmon Harbor Marina project. The Contractor selected by the SHMC will be required to coordinate and cooperate with the site contractor constructing the RV site improvements, as the work will occur concurrently. All site work around building will be by site contractor.

The construction timeline is: Start August 19, 2019 and be completed by March 8, 2020. Once installation has begun, the Contractor must maintain continuous work to ensure the Project is completed prior to or on March 8, 2020.

Bids will be subject to the following conditions:

1 DEFINITIONS AND INTERPRETATION: Refer to the “Salmon Harbor Management Committee General Conditions for Construction Contracts” for definitions of terms used within these instructions.

2 CONDITIONS THAT AFFECT THE WORK:

2.1. The Bidding Document may include documents within the possession of the SHMC that contain information concerning physical conditions that a Bidder may encounter while performing the Work. Such information may not be complete or accurate. DOUGLAS COUNTY, THE PORT OF UMPQUA (the Port), AND THE SHMC MAKE NO WARRANTIES CONCERNING SUCH INFORMATION.

2.2. Before submitting the Bid a Bidder shall:

2.2.1. Ascertain conditions at the Work Site that may affect the Work;

2.2.2. Ascertain the availability of labor, equipment, and materials that are necessary to perform the Work; and

2.2.3. Correlate the Bidding Requirements with the Bidder’s knowledge of conditions that may affect the Work.
2.3. Failure to take the precautions described in Subsection 2.2 will not invalidate a Bid or excuse the Bidder from complying with the Contract Documents. By submitting a Bid the Bidder will be deemed to waive any claims based on unforeseen conditions that will affect the Work or deficiencies in information described in Subsection 2.1.

3 ADMINISTRATION OF THE BIDDING PROCESS:

3.1. Paul Stallard, Harbor Manager, is the Contract Administrator. The Consultant, HGE, INC. Architects, Engineers and Planners, will administer the bidding process for the SHMC. Questions, objections to the provisions of the Bidding Documents, and other correspondence regarding the Bidding Requirements must be directed to the Consultant. Bidders should not communicate with any other officers, employees, or agents of the County, the Port, or the SHMC regarding the Bidding Requirements unless referred by the Contract Administrator. The Consultant’s address and telephone number are 333 South 4th, Coos Bay, Oregon 97420, (541) 269-1166.

4 OBJECTIONS AND QUESTIONS:

4.1. A Bidder who contends that the Bidding Documents encourage favoritism or substantially diminish competition for the Contract may submit a written objection to the provisions of the Bidding Documents no later than ten (10) days before Bids are due. A Bidder who fails to submit a timely objection cannot subsequently claim that the Bidding Requirements are invalid or violate any provision of law or this Request for Bids.

4.2. A Bidder should not overlook discrepancies in the Bidding Documents or draw inferences concerning any part of the Bidding Documents that the Bidder deems unclear. Any questions concerning the Bidding Documents must be submitted to the Consultant no later than ten (10) days before Bids are due.

4.3. The SHMC and/or the Harbor Manager reserves exclusive discretion to determine whether a question or an objection by a prospective Bidder justifies clarification or corrective action. In consultation with the Harbor Manager, the Consultant will endeavor to reply to all timely questions and objections, but unless an addendum or written reply is issued, objections will be deemed overruled and questions will be deemed immaterial. Objections and questions that are not submitted to the Consultant within the time allowed by this section will not be considered.

5 SCHEDULE OF EVENTS: The following schedule of events shall be followed:

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<th>Date/Time</th>
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<td>Bid Release and Advertisement</td>
<td>June 20 &amp; 21, 2019</td>
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<tr>
<td>Pre-Bid Conference/Walkthrough</td>
<td>June 27, 2019</td>
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<tr>
<td>Written questions and requests for clarifications</td>
<td>July 8, 2019</td>
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<tr>
<td>Deadline to protest Bidding Document provisions</td>
<td>July 8, 2019</td>
</tr>
<tr>
<td>Bid Closing</td>
<td>July 18, 2019, 2:00 PM</td>
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The SHMC and/or the Harbor Manager reserves the right to change the foregoing schedule as it deems necessary or appropriate.

6 ADDENDA: The provisions of the Bidding Documents cannot be modified by oral interpretations or statements, which shall be deemed inadmissible in any protest proceedings. If inquiries or comments by Bidders, or prospective Bidders, raise issues that require clarification by the SHMC and/or the Harbor Manager, or if the SHMC and/or the Harbor Manager elect to revise or modify any part of the Bidding Documents, the Harbor Manager will issue an Addendum on the Douglas County website’s “Bid Documents” webpage, which may be found at: http://www.co.douglas.or.us/Bid_Documents/default.asp. Bidders are advised that no other source is authorized to give information concerning, or to explain or interpret, the Bidding Documents except the Consultant and/or the Harbor Manager.

The Harbor Manager and/or the Consultant will also issue the Addendum to all persons and entities that are known by the Harbor Manager and/or the Consultant to have received the Bidding Documents. Prior to preparing a Bid, a Bidder should verify that it has received all Addenda issued with this Request for Bids. It shall be Bidders’ responsibility to monitor the “Bid Documents” web page regularly while this Bid process is open for addenda and other notices provided in connection with this Bid process.

7 SUBSTITUTIONS:

7.1. The SHMC and/or the Harbor Manager reserve the right to specify Proprietary Products and Sole Source Products and to restrict substitution in accordance with Douglas County’s Local Contract Review Board Rules and other applicable laws.

7.2. Unless the Specifications state otherwise, descriptions of Proprietary Products or Sole Source Products in the Specifications establish the type, function, and quality of the product required for the work. A Bidder may submit a written request for approval of a Substitute to the Contract Administrator no later than ten (10) days before Bids are due. The request shall include the following information:

7.2.1. Technical characteristics of the Substitute;
7.2.2. Past performance and reliability of the Substitute when used for purposes similar to the intended use for the Specified Product;
7.2.3. Advantages and disadvantages of using the Substitute in comparison with the Specified Product;

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7.2.4. Changes in the Work and changes in the Contract Time that would be necessary to use the Substitute;
7.2.5. Costs of providing, using, and maintaining the Substitute; and
7.2.6. Warranties, requirements for maintenance of the Substitute, and availability of maintenance and repair service.

7.3. The Harbor Manager may request additional information that the Harbor Manager deems necessary for evaluation of the proposed Substitute.

7.4. By requesting approval of a Substitute, the Bidder will be deemed to certify that the Substitute is suitable for the intended use of the Proprietary Product or Sole Source Product, will function as well as the Proprietary Product or Sole Source Product, and has been in use without apparent defects for the time and under the conditions required for the Work.

7.5. Although the Contract Documents may allow Substitutes, Bidders should make foreseeable requests for substitution under this section to promote fair comparison of Bids. Substitutions that are requested after the Agreement is signed shall be subject to Section 00120.16 of the 2018 Standard Specifications for Construction.

7.6. The SHMC and/or the Harbor Manager has exclusive discretion to determine whether proposed Substitutes comply with the Specifications. An addendum will be issued to identify any Substitute that the SHMC and/or the Harbor Manager approves.

8 QUALIFICATIONS: Either the Bidder or a Contractor engaged by the Bidder to perform the Work must be registered with the Construction Contractor’s Board pursuant to ORS Ch. 701 and must be qualified to perform the Work under the criteria stated in ORS 279C.375, and any other Applicable Laws.

9 COLLUSION: No Bidder may participate in more than one Bid or engage in collusion with any other Bidders or prospective Bidders to gain an unfair advantage. Collusion includes any material action by a Bidder to influence the Bid Price proposed by another Bidder or to induce a prospective Bidder to refrain from bidding.

10 CANCELLATION OF BIDDING PROCESS: The SHMC may cancel the bidding process at any time if the SHMC determines that cancellation would be in the public interest.

11 COST OF BID PREPARATION: The County, the Port, and/or the SHMC will not reimburse any Bidder for costs incurred in preparation of a Bid.

12 FORM AND CONTENT OF BIDS:

12.1 A Bidder must complete the entire Bid Form. The Bid must be itemized with a total Bid amount for the entire project. All Bids MUST incorporate payment of labor at Prevailing Wage Rates. All blank spaces must be filled with entries that are printed in ink
or typed. Erasures and corrections of entries must be initialed by the person who signs the Bid.

12.2. A Bidder must acknowledge receipt of each Addendum by inserting the number of the Addendum in the Bid Form. Failure to do so may result in Bid disqualification.

12.3. A Bidder must disclose on the Bid Form whether they are or are not a “resident bidder” as defined in ORS 279A.120: A “resident bidder” means a bidder that has paid unemployment taxes or income taxes in this state during the 12 calendar months immediately preceding submission of the bid, has a business address in this state and has stated in the bid whether the bidder is a “resident bidder.”

12.4. A Bidder shall not alter the Bidding Documents, disclaim or contradict any Bidding Requirements, or submit a Bid that is subject to conditions that are not allowed by the Bidding Requirements.

12.5. A Bid must be signed in ink, and the name and title of the person signing the Bid must be typed or printed below the signature.

12.6. First-tier Subcontractors: Within two (2) working hours after the date and time of the deadline when the Bids are due to the SHMC for this public improvement, a Bidder shall submit to the SHMC a disclosure of the first-tier subcontractors that will be furnishing labor or will be furnishing labor and materials in connection with the public improvement; and that will have a contract value that is equal to or greater than five percent (5%) of the total project bid or $15,000, whichever is greater, or $350,000 regardless of the percentage of the total project bid. The disclosure of first-tier subcontractors shall include the name of each subcontractor, the category of work that each subcontractor will perform and the dollar value of each subcontract. Enter “NONE” if there are no subcontractors that need to be disclosed. Failure to submit this form by the disclosure deadline will result in a nonresponsive bid. A nonresponsive bid will not be considered for award.

12.7. A Bid must state the legal name and business address of the Bidder and the name, address, and telephone number of a representative of the Bidder who is authorized to communicate with the Contract Administrator.

12.8. A Bid must state the registration number issued by the Construction Contractors Board and the expiration date for either the Bidder or the Contractor that the Bidder has engaged for the Work.

12.9. If the Bidder is an individual, the Bid must state the Bidder’s social security number.

12.10. If the Bidder is an entity, the Bid must describe the entity (e.g. corporation) and state the Bidder’s federal tax identification number. If the Bidder is a corporation, or if corporation is a participant in a joint venture that submits a Bid, identify the state of incorporation. If the Bidder is a limited liability company, identify the state where the Bidder was formed.
12.11. A Bid submitted by a partnership must be executed in the partnership name and signed by one or more partners or an authorized agent. A general partner must sign for a limited partnership.

12.12. A Bid submitted by a corporation must be signed by a corporate officer or an authorized agent.

12.13. A Bid submitted by a limited liability company must be signed by a member or an authorized agent.

12.14. A Bid submitted by a joint venture must be executed in the name of the joint venture, and must be signed by:

   12.14.1. Each individual participating in the joint venture, and

   12.14.2. For each entity participating in the joint venture, an officer or agent with authority to bind the entity.

12.15. If a Bid is signed by an agent of the Bidder, a current power of attorney authorizing the agent to bind the Bidder must be submitted with the Bid.

12.16. The person signing the Bid shall make all certifications required of the Bidder regarding compliance with ORS 279A.110, ORS 279C.800 to 279C.870, and other Applicable Laws. If the Work will be performed by a Contractor, the Contractor must make the certifications.

12.17. The Bid must detail any cost which may accrue to the SHMC as a result of Bidder’s performance of the work.

12.18. The County, the Port, and/or the SHMC shall not be liable for any costs incurred by Bidders in the preparation, submission, and presentation of its Bid.

13 **BID SECURITY:** Pursuant to ORS 279C.365(5), the Bidder shall submit to the SHMC with the Bid as Bid security a surety bond, an irrevocable letter of credit issued by an insured institution as defined in ORS 706.008, a cashier’s check, or a certified check payable to Douglas County in an amount equal to 10% of the Bid Price (without regard to Alternates). A bond must be issued by a responsible surety company licensed to do business in the State of Oregon. A bond and an irrevocable letter of credit must be valid for not less than 60 days from the date Bids are opened.

14 **TIME, PLACE, AND PROCEDURE FOR SUBMITTING BIDS:**

   14.1. A pre-bid conference/walkthrough for contractors will be held at 1:30 PM on June 27, 2019 at the Winchester Bay RV Resort Marine Activity Center, 263 Marina Way, Winchester Bay, Oregon to discuss the Work. **The pre-bid conference is mandatory.** Prospective Subcontractors and Suppliers are invited and encouraged to attend, as this
conference/walkthrough allows for common questions to be asked and answered by all contractors prior to bid preparation. After reviewing the Bidding Documents, prospective Bidders will examine the Work Site.

14.2 Each Bid must be submitted in a sealed envelope. The name and address of the Bidder and the following information must be typed or printed on the exterior of the envelope:

SALMON HARBOR MARINA RV RESORT EXPANSION
RESTROOM/LAUNDRY/SHOWER BUILDING

SEALED BID DO NOT OPEN

BID DUE: July 18, 2019, 2:00 PM
BID OPENING: July 18, 2019, 2:30 PM

14.3 Bids must be delivered personally, by courier, or by mail to the SHMC, 100 Ork Rock Rd, P.O. Box 1007, Winchester, OR 97467 no later than July 18, 2019, 2:00 PM. The time of delivery will be determined by the clock at the desk of the receptionist in the Marina’s Office. A Bidder mailing a Bid should allow sufficient time for delivery by the postal service to assure timely receipt of the Bid by the SHMC. Bids received after 2:00 P.M. will not be considered. Late Bids will be returned unopened.

BIDS SUBMITTED BY FACSIMILE TRANSMISSION OR EMAIL WILL NOT BE ACCEPTED.

14.4 The SHMC will open and read Bids in a public meeting at the Marina Activity Center, 263 Marina Way, Winchester Bay, OR, which is scheduled for July 18, 2019 at 2:30 P.M.

14.5 By submitting a Bid, the Bidder certifies that:

14.5.1 The Bidder has read and understands the Bidding Documents and the terms of the proposed SHMC contract. After submitting a Bid, the Bidder cannot assert that there was any misunderstanding concerning the requirements of the Contract Documents.

14.5.2 The Bidder is familiar with the conditions that will affect the Bidder’s performance, if the Bidder is selected to contract for this Project.

14.5.3 The Bid has been made independently and is being submitted without any collusion, agreement, understanding, or planned common course of action with any other Bidder.

14.5.4 The Bidder is compliant with all applicable federal, state, and local tax laws.
14.5.5 The Bidder will comply with all federal, state, and local laws, regardless of whether they are specifically identified herein, applicable to participation in this Bidding process.

14.5.6. The Bidder is an equal opportunity employer that presently complies and in the future will comply with all applicable provisions of the Civil Rights Act of 1964, as amended by the Equal Opportunity Act of 1972 (42 U.S.C. § 2000) and all regulations thereunder (e.g., 41 CFR Part 60 et seq.); Executive Orders 11246 and 11375; the Americans With Disabilities Act (42 U.S.C. §12101 et seq.); and all federal and state civil rights laws applicable to Bidder’s operations.

15 WITHDRAWAL AND AMENDMENT OF BIDS: A Bidder may withdraw or amend the Bid by submitting a written request to the Contract Administrator before Bids are opened. The request must be signed by a person who is authorized to sign a Bid under Section 12. A Bid cannot be withdrawn or amended after Bids are opened, unless there is clear evidence of a mistake by the Bidder. All Bids will be irrevocable for 30 days from the date of opening.

16 DISQUALIFICATION OF BIDDERS:

16.1. The SHMC and/or the Harbor Manager may disqualify a Bidder pursuant to ORS 279C.375(3) after conducting an investigation and considering all evidence that the SHMC deems relevant.

16.2. The SHMC and/or the Harbor Manager will disqualify any Bidder if:

16.2.1. The Bidder or the Contractor engaged by the Bidder is not registered with the Oregon Construction Contractors Board pursuant to ORS Chapter 701;

16.2.2. The Bidder or the Contractor engaged by the Bidders has been declared ineligible to bid on public contracts by the Commissioner of the Bureau of Labor and Industries under ORS 279C.860;

16.2.3. The SHMC and/or the Harbor Manager finds that the Bidder has participated in more than one Bid; or

16.2.4. The SHMC and/or the Harbor Manager finds that the Bidder has engaged in collusion among Bidders.

17 REJECTION OF BIDS:

17.1. The SHMC and/or the Harbor Manager will reject a Bid if:

17.1.1. The Bid is incomplete or the Bid Form is incorrectly completed or altered;

17.1.2. The Bid Price cannot be determined;
17.1.3. The Bid does not conform to all material Bidding Requirements or takes exceptions to the Bidding Requirements; or

17.1.4. The Bid is otherwise not responsive.

17.2. The SHMC and/or the Harbor Manager may reject any Bid that contains false information.

17.3. The SHMC reserves the right to reject any Bid for good cause and any or all Bids upon a finding by the SHMC that it is in the public interest to do so.

17.4. A Bidder will be notified in writing if the Bid is rejected when notice of the Award is given.

18 EVALUATION OF BIDS:

18.1. The SHMC and/or the Harbor Manager reserves the right to request information from any Bidder during the evaluation process as necessary to determine the Bidder's qualifications and to resolve other issues concerning the Bid.

18.2. The SHMC and/or the Harbor Manager reserves exclusive discretion to waive defects or irregularities in a Bid that the SHMC and/or the Harbor Manager deem to be minor, and to determine the intent, purpose, and meaning of any provision of the Bidding Documents.

18.3. If the SHMC does not elect to reject all Bids, the SHMC will compare and rank all responsive Bids submitted by responsible Bidders from highest to lowest Bid Price.

18.4 Preference will be given to Goods and Services that are produced in Oregon if price, availability, fitness and quality are otherwise equal.

18.5 The SHMC and/or the Harbor Manager may correct any arithmetical errors in the Bids.

19 AWARD:

19.1. If the SHMC elects to accept a Bid, the Award will be made to the responsible Bidder who submits the lowest responsive Bid subject to the conditions stated in these Bidding Documents. The Award will be made by written order within thirty (30) after Bids are opened. The Contract Administrator and/or the Consultant will notify all Bidders.

19.2. An adversely affected or aggrieved Bidder may submit to the SHMC a written protest of the intent to award within five (5) days after issuance of the notice of intent to award the contract. Protests must be in accordance with specifications in ORS 279A.225 and 279B.410.
19.3. The award of a contract is subject to revocation by, and shall not be binding upon, the SHMC unless and until a written SHMC contract incorporating all material elements of the offer upon which the award decision was based and fulfilling all applicable public contracting laws and material bidding document requirements has been fully executed by the SHMC and the contract award recipient within the time frame specified in the Bid Documents or, if the SHMC and/or the Harbor Manager determines that it is appropriate to change the specified time frame, within such time as the SHMC and/or the Harbor Manager deem to be reasonable.

20 EXECUTION OF CONTRACT:

20.1. The Contract Administrator will send a Contract in the form that is issued with these Instructions to Bidders to the successful Bidder with the notice of Award. Within ten (10) days after receiving the Contract, the Successful Bidder shall sign and return the Contract, insurance certificates, proof of workers’ compensation coverage, other documents required by the Contract Documents, including performance and payment bonds, as well as proof of public works bond filed with Construction Contractors Board.

20.2. If the Successful Bidder does not comply with Subsection 20.1, the SHMC may conclude that the Bidder has abandoned the Award.

20.3. If the SHMC determines that the Bidder initially designated as the Successful Bidder has abandoned the Award or the SHMC and/or the Harbor Manager disqualifies that Bidder, the SHMC may designate the next lowest responsive responsible bidder as the Successful Bidder. The SHMC may repeat the process described in this section until a Contract is formed.

21 EXAMINATION OF RECORDS: Any Bidder may examine public records concerning the bidding process at the Salmon Harbor Marina Office, except for records that the SHMC, through the Office of County Counsel, determines are exempt from disclosure under the Oregon Public Records Law.

22 SUPPLEMENTATION OF INSTRUCTIONS: In addition to these instructions, Bidders shall comply with the “Salmon Harbor Management Committee General Conditions for Construction Contracts" that apply to the bidding process. In the event of a conflict between these instructions and the General Conditions, these instructions shall control.

23 PUBLIC RECORDS:

23.1 This Bidding process is subject to the requirements of the Oregon Public records Law (ORS 192.311 et seq.), and the SHMC may receive public records requests for Bidders’ Bid and contract documents.

23.2 No portion(s) of any Bid is confidential, notwithstanding a Bidders’ clearly and conspicuously designating such portion(s) as confidential, proprietary, or otherwise. Such
designation must include an explanation of the legal basis for exemption of the specific materials from public records disclosure requirements. Materials not clearly marked as exempt from disclosure and/or which lack the required disclosure exemption explanation will be subject to disclosure in response to public records requests.

23.3 Designation of certain Bid or contract documents as proprietary or confidential without further explanation as to why the Bidder believes them to be exempt from the Oregon Public Records Law's disclosure requirements will not satisfy the foregoing requirements.

23.4 The SHMC will endeavor in good faith to honor appropriate requests for exemption from disclosure, but the SHMC, through the Office of County Counsel, reserves the right to make its own determination of whether Bid and contract documents designated as exempt from disclosure requirements are in fact legally exempt. The County, the Port, and/or the SHMC make no representations or assurances to Bidders that Bid and contract documents designated by Bidders as exempt will not be disclosed in response to public records requests.

23.5 By submitting a Bid, the Bidder accepts and agrees to the conditions of this Section and to hold harmless the County, the Port, and/or the SHMC, and its officers, employees, and agents for disclosure of Bid and contract documents that they deem to be required by law.
SUBSTITUTION REQUEST
(During the Bidding Phase)

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

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

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

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

Submitted by:   
Signed by:      
Firm:           
Address:        
Telephone:      

A/E’s REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01330.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by:   Date:   

Supporting Data Attached:  
- Drawings  
- Product Data  
- Samples  
- Tests  
- Reports  

SECTION 00-4100

BID FORM

THE PROJECT AND THE PARTIES

1.01 TO:

Owner: SALMON HARBOR MANAGEMENT COMMITTEE
P.O. BOX 1007 / 100 ORK ROAD
WINCHESTER BAY, OREGON 97467

1.02 FOR: SALMON HARBOR MARINA RV EXPANSION
RESTROOM/LAUNDRY/SHOWER BUILDING

1.03 DATE: __________________________ (BIDDER TO ENTER DATE)

1.04 SUBMITTED BY:

NAME OF FIRM (PLEASE PRINT): ____________________________

1.05 GENERAL

A. The Bidder hereby represents that the Bidder has taken prudent precautions to ascertain conditions at the Premises that may affect the Work; has determined the availability of labor, equipment, and materials that are necessary to perform the Work; has reviewed Applicable Laws that may affect the Work; has examined the Bidding Documents and carefully correlated the Bidding Documents with the Bidder’s knowledge and observation of conditions that may affect the Work; has requested clarification of the provisions of the Bidding Documents or of any aspect of the Work that the Bidder does not understand; and has notified Salmon Harbor Management Committee of any errors, ambiguities, or inconsistencies in the Contract Documents and foreseeable problems with the Work that the Bidder has detected.

B. The Bidder acknowledges that the Contract Documents are sufficient in scope and detail to convey adequate understanding of all conditions for performing the Work, and the Bidder waives any claim that the Bidder is mistaken about any conditions that will affect the Work or the requirements of the Bidding Documents. The Bidder will perform the entire Work in accordance with the Contract Documents.

C. By signing this Proposal, the Bidder certifies that the provisions required by ORS 279C.800 to 279C.870 relating to prevailing wage rates shall be included in this Contract, are understood by the Bidder, and will be complied with during the Work.

D. The Bidder further declares that they are registered with the Construction Contractor's Board as required by ORS 701.35 to 701.55, and possess such additional licenses and certifications as required by law for the performance of the work proposed herein.

E. The Bidder certifies that the Bidder has not and will not discriminate against minority, women or emerging small business enterprises in obtaining subcontracts for the Work pursuant to ORS 279A.110.

F. The subcontractor(s) performing work as described in ORS 701.005(2) will be registered with the Construction Contractors Board in accordance with ORS 701.035 to 701.055 before the subcontractor(s) commence work under the Contract.

G. Pursuant to ORS 279A.120, Bidder hereby certifies the Bidder _______is / ________is not (check one) a Resident Bidder as defined by ORS 279.029.

H. Bidder certifies that the provisions required by ORS 279C.836, unless exempt under Sections (4), (7), (8), or (9), before starting work on this Contract, or any subcontract hereunder, Contractor and all subcontractors shall have on file with the Construction Contractor's Board a public works bond with corporate surety authorized to do business in the State of Oregon in the amount of $30,000.
I. The Bidder agrees that if this Proposal is accepted, the Bidder will, within ten (10) calendar days after receiving contract forms, execute the Agreement between Owner and Contractor as specified, and deliver to the Owner the Performance and Labor and Payment Bonds required herein.

1.06 BIDS:

A. The undersigned bidder, in submitting his bid, authorizes the Owner to evaluate the bid and make a single award per Bid Schedule, on the basis of the bid.

B. After having examined all of the contract documents as prepared by HGE INC., Architects, Engineers, Surveyors & Planners, we do hereby propose to furnish labor and materials to complete the work required by said documents for the following fixed sum (fill in lump sum amount for each bid unit, in written words in space provided, and in numerals within parenthesis):

C. BASIC BID

________________________________________________________________________________________Dollars

and __________________________ Cents ($______________________) complete.

D. ALTERNATE BID

________________________________________________________________________________________Dollars

and __________________________ Cents ($______________________) complete

1.07 CONTRACT DOCUMENTS:

A. Bidder further agrees to be bound by the entire Contract Documents, including:
   Notice to Contractors
   Issued Addenda
   Instructions to Bidders
   Bid Form (this document)
   Subcontractor Disclosure Form
   General Conditions
   Contract for Construction
   Performance and Payment Bonds
   Technical Specifications
   Plans/Drawings
   Issued Change Orders and Architects Supplemental Instructions
   All Applicable State and Federal Laws

1.08 BID SECURITY

A. Bid security in the form of a certified check of Bid Bond in the amount of 10% of the bid amount is enclosed per ORS 279C.385. The undersigned agrees that Bid Security will be left in escrow with the Owner and that the amount thereof is the measure of liquidated damages which Owner will sustain by failure of the undersigned to deliver and execute the Contract or provide Performance and Payment Bonds and may become the property of the Owner at Owner’s option. If this bid is not accepted within thirty (30) days of the time set for the opening of bids or if the undersigned executes and timely delivers said contract and the Performance and Payment Bonds, the Bid Security will be returned.
1.09 COMPLETION DATE AND LIQUIDATED DAMAGES
A. It is understood that time is of the essence in the execution of this Contract in order to avoid undue hardship upon the Owner. It is the desire of the Owner to issue a Notice to Proceed upon successful review of the lower qualified bidder and have the project completed within Two Hundred Thirteen (213) days.
B. The Undersigned agrees that he will have the work Substantially Complete on or before ______________________ calendar days after Notice to Proceed (Contractor to fill in number of days he/she will require to perform the Work and this will be the agreed upon construction time period).
C. The Contractor agrees that said Work shall be prosecuted regularly, diligently, at such rate of progress as will insure Substantial Completion thereof within the time specified. It is expressly understood and agreed, by the Contractor and the Owner, that the time for the completion of the Work described herein is reasonable taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.
D. If said contractor shall neglect, fail or refuse to coordinate the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay to the Owner the sum of THREE HUNDRED DOLLARS ($300), not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the contractor shall be in default after the time stipulated in the contract for substantial completion of the work.

1.10 OWNER RIGHTS
A. The Owner reserves the right to reject any or all bids and to waive all informalities.

1.11 ADDENDA
A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.

1. Addendum # _______ Dated ____________________.
2. Addendum # _______ Dated ____________________.
3. Addendum # _______ Dated ____________________.
4. Addendum # _______ Dated ____________________.
5. Addendum # _______ Dated ____________________.

1.12 BIDDER DATA AND SIGNATURE(S)
A. Name of Firm (please print):____________________________________________________
B. Mailing Address:________________________________________________________________
C. Physical Address (if different):________________________________________________________________
D. Construction Contractor Board Registration Number:____________________________________
E. Telephone Number:____________________________________________________________

F. Fax
   Number:_____________________________________________________________________

G. Email
   Address:_____________________________________________________________________

H. Signature (if bid is by a partnership, one of the partners must sign):
   ___________________________________________________________________________

I. Name and Official Capacity of Signatory (please print):
   ___________________________________________________________________________

J. If Corporation, Attest (Secretary of Corporation):
   ___________________________________________________________________________

K. SEAL (if Corporation):
   ___________________________________________________________________________

END OF BID FORM
BID BOND

We, ____________________________, as “Principal,”

(Name of Principal)

and ____________________________, an __________________ Corporation,

(Name of Surety)

authorized to transact Surety business in Oregon, as “Surety,” hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns to pay unto Salmon Harbor Management Committee (“Obligee”) the sum of ($ )

______________________________________________ dollars.

WHEREAS, the condition of the obligation of this bond is that Principal has submitted its proposal or bid to an agency of the Obligee in response to Obligee’s procurement document (No. ) for the project identified as:

______________________________________________ which proposal or bid is made a part of this bond by reference, and Principal is required to furnish bid security in an amount equal to ten (10%) percent of the total amount of the bid pursuant to the procurement document and ORS 279C.365(4) for competitive bidding or 279C.400(5) for competitive proposals.

NOW, THEREFORE, if the proposal or bid submitted by Principal is accepted, and if a contract pursuant to the proposal or bid is awarded to Principal, and if Principal enters into and executes such contract within the time specified in the procurement document and executes and delivers to Obligee its good and sufficient performance and payment bonds required by Obligee, as well as any required proof of insurance, within the time fixed by Obligee, then this obligation shall be void; otherwise, it shall remain in full force and effect.

IN WITNESS WHEREOF, we have caused this instrument to be executed and sealed by our duly authorized legal representatives this ______ day of ______, 20__.

PRINCIPAL: ____________________________

By ____________________________

Signature

SURETY: ____________________________

BY ATTORNEY-IN-FACT

______________________________

Official Capacity

______________________________

Name

Attest: ____________________________

______________________________

Corporation Secretary

______________________________

Signature

______________________________

Address

______________________________

City

State

Zip

Phone

Fax
FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM

PROJECT NAME: SALMON HARBOR MANAGEMENT COMMITTEE
SALMON HARBOR MARINA RV EXPANSION
RESTROOM/LAUNDRY/SHOWER BUILDING

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

List below the name of each subcontractor that will be furnishing labor or will be furnishing labor and materials in connection with this public improvement; and that will have a contract value that is equal to or greater than five percent (5%) of the total project bid or $15,000.00, whichever is greater, or $350,000.00 regardless of the percentage of the total project bid. The disclosure of the first-tier subcontractors shall include the name of each subcontractor, the category of work that subcontractor will be performing and the dollar value of the subcontract. Enter “NONE” if there are no subcontractors that need to be disclosed. (Attach additional sheets if needed).

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<th>SUBCONTRACTOR NAME</th>
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Salmon Harbor Marina – RV Expansion Building #15.68
May 2019
Failure to submit this form by the disclosure deadline will result in a nonresponsive bid. A nonresponsive bid will not be considered for award.

Form submitted by (bidder name)

Contact name: ___________________________ Phone No.: ___________________________
This agreement #___________ is made on _____________________, between Douglas County ("County") and Port of Umpqua ("Port"), acting by and through the Salmon Harbor Management Committee ("SHMC"), and __________________________ ("Contractor").

CONTRACTOR AND COUNTY AGREE:

1. This agreement is executed pursuant to Bidding Documents issued by the County, acting by and through the SHMC, for the SALMON HARBOR MARINA RV RESORT EXPANSION RESTROOM/LAUNDRY/SHOWER BUILDING, WINCHESTER BAY, OR ("the Work"). Contractor submitted a Bid for the Work which has been accepted by the SHMC. The Contract Documents described below supersede the Bidding Documents.

   1. The following Contract Documents are incorporated in this Agreement:

   - Contractor's Bid dated ________________, in the amount of $ ________________________.
   - Supplemental Contract Terms
   - Payment of Prevailing Wage Sheet
   - Addenda numbered as follows:
     - No. _____
     - No. _____
     - No. _____
     - No. _____
     - No. _____
   - Project Plans, Specifications, and Drawings (issued with the Bidding Documents)
1. All documents contained in the Project Manual (which will be kept on file in Management and Finance and will not be filed with this contract in the Clerk’s Office).

2. Contractor shall perform the entire Work, and SHMC will pay Contractor the Contract Price in accordance with the Contract Documents.

Contractor

By: ____________________________
Title: __________________________
Fed ID#: ________________________
Date: __________________________

Reviewed as to content
By: ____________________________
Title: __________________________

Salmon Harbor Management Committee

By: ____________________________
Title: __________________________
Fed ID#: ________________________
Date: __________________________

Reviewed as to form
By: ____________________________
Date: __________________________

Salmon Harbor Manager

Date: __________________________

Reviewed as to form

By: ____________________________
Date: __________________________

Office of County Counsel

Date: __________________________
Supplemental Contract Terms

SALMON HARBOR MARINA RV RESORT EXPANSION
RESTROOM/SHOWER/LAUNDRY BUILDING

The parties agree to the following Supplemental Contract Terms:

1. CONTRACTOR’S RESPONSIBILITY FOR THE WORK: By executing this Contract, the Contractor acknowledges that the Contractor:
   - Has carefully examined the Contract Documents, other pertinent Documents, and all available information concerning physical conditions at the Work Site;
   - Has determined that labor, construction equipment, and Materials that are needed for the Work are available;
   - Has notified the Contract Administrator of errors, ambiguities, or inconsistencies in the Contract Documents; and
   - Is not relying on representations by any officer, employee, or agent of the County about the Work that are not included in or made pursuant to the Contract Documents.

2. USE OF PREMISES:
   2.1 The SHMC will allow the Contractor to have access to the Work site and use of the Work site as necessary for performance of the Work. The Contractor shall confine the Work to the Work Site and areas that the Contractor is allowed to use for access to the Work Site as described in this Contract.

   2.2 The Contractor shall accommodate regular use of the Premises and provide any temporary facilities necessary for safe use of the Premises. The Contractor shall not unreasonably obstruct use of the Premises or allow debris from the Work to accumulate. Upon completion of the Work, the Contractor shall remove from the Premises all debris resulting from the Work and the contractor’s personal property and leave the Premises clean and ready for use by the Agency.

3. CONTRACT TIME: Construction shall commence August 19, 2019 and be completed by March 8, 2020. Once installation has begun, the Contractor must maintain continuous work to ensure the Project is completed prior to March 8, 2020.

4. PAYMENT OF PREVAILING WAGE RATES: Section 30 of the SHMC General Conditions for Construction Contracts is modified to indicate that this Contract is subject to the 2019 Prevailing Wage Rates.
5. LIABILITY OF COUNTY’S OFFICERS, EMPLOYEES, AND AGENTS: Officers, employees, and agents of the County will not have any personal liability to the Contractor or the successors, principals, Subcontractors, Suppliers, insurers, or sureties of the Contractor for actions taken within the scope of their authority under the Contract Documents.

6. NO AGENCY: The Contractor, Subcontractors, Suppliers, and their principals, officers, employees and agents are not agents of the County as that term is used in ORS 30.265.

7. ADMINISTRATION OF CONTRACT: Paul Stallard, Harbor Manager, is Contract Administrator for this Project.

8. NOTICES:

   8.1 Notices to the County will be directed to the Contract Administrator. SHMC’s address for notices is 100 Ork Rock Road, with mailing address at P.O. Box 1007, Winchester Bay, Oregon 97467.

   8.2 Notices to the Contractor will be delivered to the Contractor’s superintendent at the Work Site or mailed or delivered to the Contractor at the following address: ________________________________.
ORS 279C.505 (2) provides that every public improvement contract contains a condition that the Contractor shall demonstrate that an employee drug testing program is in place. The County’s award of the Contract for which this certificate is required is conditioned, in part, upon the Bidder’s demonstration of compliance with the provisions of ORS 279C.505(2). If the Bidder named above is awarded the Contract, this certificate shall become a part of, and shall constitute a continuing representation and warranty under, the Contract.

To induce the SHMC to award the Contract to the Bidder, the undersigned, as the duly authorized representative of the Bidder, hereby represents and warrants, on behalf of the above named Bidder:

1. That Bidder has and enforces, and at all times during the term of the Contract will have and enforce, a written employee drug testing policy that at a minimum, requires compliance with the Oregon Department of Transportation Commercial Drivers License drug testing regulations;

2. A copy of the Bidder’s current written employee drug testing policy will be available for inspection by the SHMC at any time upon the SHMC’s request; and

3. The Bidder understands and agrees that its representations and warranties herein will become a continuing part of the Contract and that breach of any of the foregoing will be sufficient grounds for disqualification under 279C.440(2)(d).

The SHMC shall not be liable, either directly or indirectly, in any dispute arising out of the substance or procedure of Bidder/Contractor’s drug testing program. Nothing in this drug testing provision shall be construed as requiring Bidder/Contractor to violate any legal, including constitutional, rights of any employee, including but not limited to, selection of which employees to test and the manner of such testing. The SHMC shall not be liable for
Bidder/Contractor’s negligence in establishing or implementing, or failure to establish or implement, a drug testing policy, or for any damage or injury caused by Bidder/Contractor’s employees acting under the influence of drugs while performing work covered by the Contract. These are Bidder/Contractor’s sole responsibilities.

In Witness whereof, the Bidder has caused this document to be executed by its duly authorized representative on the date shown below.

Signature:

_____________________________________

Printed Name, Title:

_____________________________________

Date:

_____________________________________

Salmon Harbor Marina – RV Expansion Building #15.68
May 2019
PAYMENT BOND

The undersigned ________________________________, as principal, hereinafter called Contractor, and ________________________________, as surety, hereinafter called Surety, are held and firmly bound unto SHMC as obligee, in the sum of ___________________________________ Dollars ($__________).

Contractor and SHMC have entered into a written contract, hereinafter called the Contract dated ________________, for the following project: SALMON HARBOR MARINA RV EXPANSION - RESTROOM/LAUNDRY/SHOWER BUILDING

The Contract Documents, as defined in the above referenced contract, are incorporated herein by reference.

The conditions of this bond are:

1. If Contractor faithfully performs the Contract within the time prescribed by the Contract, and promptly makes payment to all claimants, as defined herein, then this obligation is null and void; otherwise it shall remain in full force and effect.

2. If Contractor is declared by SHMC to be in default under the Contract, the Surety shall promptly remedy the default, perform all of Contractor's obligations under the Contract in accordance with its terms and conditions and pay to County all damages that are due under the Contract.

3. This bond is subject to claims under ORS 279C.600 through 279C.625.

4. This obligation jointly and severally binds Contractor and Surety and their respective heirs, executors, administrators, successors.

5. Surety hereby waives notice of modification of the Contract or extension of the Contract time.

6. Nonpayment of the bond premium shall not invalidate this bond.

7. The bond number and the name, address and telephone number of the agent authorized to receive notices concerning this bond are as follows:

Bond Number ________________________________

______________________________

Salmon Harbor Marina – RV Expansion Building #15.68
May 2019
Payment Bond
Page 2

Bond Agent

Address

Telephone

SIGNED this _____ day of ,

WITNESS: Contractor

(Corporate Seal)

By

Title

Legal Address

Attest:

Corporate Secretary

WITNESS: Surety

(Corporate Seal)

By

Title

Legal Address

Attest:

Corporate Secretary

Salmon Harbor Marina – RV Expansion Building #15.68
May 2019
PERFORMANCE BOND

The undersigned ____________________________________________, as principal, hereinafter called Contractor, and ____________________________________________, as surety, hereinafter called Surety, are held and firmly bound unto SHMC, as obligee, in the sum of ___________________________________________________________ Dollars ($_________________________).

Contractor and County have entered into a written contract, hereinafter called the Contract, dated ________________ , for the following project: SALMON HARBOR MARINA RV EXPANSION - RESTROOM/LAUNDRY/SHOWER BUILDING

The Contract Documents, as defined in the above referenced contract, are incorporated herein by reference.

The conditions of this bond are:

1. If Contractor faithfully performs the Contract within the time prescribed by the Contract, then this obligation is null and void; otherwise it shall remain in full force and effect.

2. If Contractor is declared by SHMC to be in default under the Contract, the Surety shall promptly remedy the default, perform all of Contractor's obligations under the Contract in accordance with its terms and conditions and pay to County all damages that are due under the Contract.

3. This obligation jointly and severally binds Contractor and Surety and their respective heirs, executors, administrators, successors.

4. Surety hereby waives notice of modification of the Contract or extension of the Contract time.

5. Nonpayment of the bond premium shall not invalidate this bond.

6. The bond number and the name, address and telephone number of the agent authorized to receive notices concerning this bond are as follows:

Bond Number_______________________________________________
Salmon Harbor Marina – RV Expansion Building #15.68
May 2019

____________________________________________________________
Bond Agent
____________________________________________________________
Address
____________________________________________________________
Telephone

SIGNED this _______ day of , __________

WITNESS: Contractor______________________________

________________________
(Corporate Seal)
By
Title______________________________
Legal Address______________________________

Attest:____________________________________________________________
Corporate Secretary

WITNESS: Surety______________________________

________________________
(Corporate Seal)
By
Title______________________________
Legal Address______________________________

Attest:____________________________________________________________
Corporate Secretary

____________________________________________________________
PAYMENT OF PREVAILING WAGE RATES:

The Contractor shall comply fully with the provisions of ORS 279C.840 to 279C.870 for payment of prevailing wage rates on public works contracts. This requirement to pay not less than the prevailing wage rate shall apply to all workers employed on the project by Contractor, any and all subcontractors employed by Contractor, or other persons doing or contracting to do the whole or any part of the Work required for this project.

Contractor shall incorporate this provision in all subcontracts for the work covered by this Contract.

The existing prevailing rates of wages as established by the Commissioner of the Bureau of Labor and Industries are available from the Oregon Bureau of Labor and Industries and are incorporated into this Contract.

Contractor and any subcontractor engaged in the work shall keep the prevailing wage rates for the work posted in a conspicuous and accessible place in or about the project. The contractor may obtain copies of applicable schedules of prevailing rates from the Bureau of Labor and Industries.

Contractor shall file a Public Works Bond with the Construction Contractor's Board before commencing Work under this contract and shall maintain said bond throughout performance of Work under this contract unless exempt from doing so pursuant to ORS 279C.836.

Prevailing wage rates applicable to this project may be viewed and downloaded at the following site:

SALMON HARBOR MANAGEMENT COMMITTEE
GENERAL CONDITIONS FOR CONSTRUCTION CONTRACTS

1 DEFINITIONS AND INTERPRETATION

1.1 Unless particular provisions of the Contract Documents state otherwise, the following definitions apply to all Contract Documents:

1.1.1 “Addendum” or “Addenda” means a document or documents issued by Salmon Harbor Management Committee before Bids are due that change the Bidding Documents.

1.1.2 “Agreement” means the Contract Document signed by the Parties that incorporates all other Contract Documents by reference.

1.1.3 “Alternate” means a variation in the scope of the Work that is identified as an Alternate in the Bid Schedule and that is either included in or excluded from the Contract Documents by the Agreement.

1.1.4 “Amendment” means a Contract Document executed by Salmon Harbor Management Committee and the Contractor that changes nontechnical provisions of the Contract Document.

1.1.5 “Applicable Laws” means all codes, statutes, regulations, rules, orders, ordinances, and other legal requirements of Governmental Agencies that affect the Work or the Contract Documents.

1.1.6 “Application for Payment” means the completed form and supporting documents that the Contractor must submit to obtain payment.

1.1.7 “As-built Documents” means a version of the Plans and Specifications that is updated as construction proceeds to show changes in the components, constituents, dimensions, and details of the Work as constructed.

1.1.8 “Award” means Salmon Harbor Management Committee’s formal decision accepting a Bid which is made by written order.

1.1.9 “Base Bid” means the amount stated in the Bid Schedule for the basic scope of the Work which may be increased or decreased by Alternates.

1.1.10 “Bid” means the written offer to perform the Work, including all supporting documentation submitted by the Contractor to Salmon Harbor Management Committee.

1.1.11 “Bid Schedule” means that part of the Bid that lists Pay Items, units of measurement, prices, estimated quantities, and the total Bid price. The Base Bid and any Alternates that are added to or deleted from the Base Bid by the Agreement will become the “Contract Price Schedule”.

1.1.12 “Bidding Documents” means all documents issued by Salmon Harbor Management Committee to solicit Bids, including prospective Contract Documents.

1.1.13 “Change in the Work” means a change in the Specifications, Plans, Progress Schedule, and other requirements for the Work which is authorized under the Contract Documents.

1.1.14 “Change Order” means a Contract Document executed by SHMC and the Contractor that authorizes a Change in the Work.
1.1.15 “Claim”, unless modified by “Third-Party”, means a dispute between the Parties concerning this Contract or the Work.

1.1.16 “Construction Method” means any construction means, method, technique, sequence, procedure, or equipment that is used to perform the Work.

1.1.17 “Consultant” means an architect, engineer, or other consultant with professional or technical expertise in a field related to the Work who is engaged by SHMC as an independent contractor to assist the Contract Administrator in administration of the Project.

1.1.18 “Contract Administrator” means the representative of SHMC who is authorized by SHMC to administer the Contract and the Project on behalf of SHMC.

1.1.19 “Contract Documents” means the documents that govern the contractual rights and obligations of the Parties concerning the Work, including these General Conditions, Supplementary Conditions, Specifications, Plans, Drawings, the Contract Price Schedule, the Schedule of Values, the Notice to Proceed, Amendments, change Orders, Work Change Directives, Field Orders, and the Punch List.

1.1.20 “Contract Price” means the total amount payable to the Contractor for the Work as determined by the Contract Documents.

1.1.21 “Contract Time” means the time during which the Contractor must complete the Work as stated in the Contract Documents.

1.1.22 “Contractor” means the person or entity who enters into the Contract with SHMC to perform the Work as the prime contractor.

1.1.23 “County” means Douglas County, Oregon

1.1.24 “County Counsel” means an attorney in the Office of the County Counsel established by Douglas County Code Chapter 2.08.

1.1.25 “Document” means any book, paper, photograph, drawing, model, video or sound recording, electronic record, or other material or record which contains verbal, numerical, or graphic information.

1.1.26 “Environmental Laws” means Applicable Laws pertaining to Hazardous Substances, environmental health hazards, environmental pollution, industrial hygiene, or preservation of natural resources.

1.1.27 “Equipment”, unless preceded by the word “construction” means machinery, equipment, hardware, and other mechanisms that are furnished by the Contractor as components or constituents of the Work.

1.1.28 “Field Order” means a written order which is issued by the Contract Administrator to make a minor Change in the Work.

1.1.29 “Goods” has the meaning stated in ORS 72.1050.

1.1.30 “Governmental Agency” means any federal, state, or local governmental entity, agency, or officer with jurisdiction over any aspect of the Work.

1.1.31 “Hazardous Substance” means any hazardous, toxic, infectious, or radioactive substance which is regulated by an Environmental Law and which may pose a hazard to human health or the environment, including “Hazardous Chemicals” that are described in Subsection 31.5 and “hazardous Substances” as defined in ORS 465.200.

1.1.32 “Improvement” means any structure attached to real property.

1.1.33 “Incidental Work” means a part of the Work that must be provided to
fulfill the intent of the Contract Documents or that is customarily provided in conjunction with a Pay Item, but is not listed as a Pay Item.

1.1.34 “Inspector” means a representative of SHMC who is authorized to inspect the Work and report on the Contractor’s performance.

1.1.35 “Lump Sum” and the abbreviation “L.S.” mean an undivided fixed price for a Pay Item that is not measured by units.

1.1.36 “Marina” means Salmon Harbor Marina.

1.1.37 “Materials” means natural and artificial substances and things that are provided by the Contractor as components, constituents, or elements of the Work, including Equipment.

1.1.38 “Notice to Proceed” means the official written notice from the Contract Administrator to the Contractor that authorizes the Contractor to begin the Work.

1.1.39 “Overhead” means general administrative expenses of operating the Contractor’s business, including compensation for supervisory employees who are not regularly involved in the Work at the Work site, general office expenses, interest and other capital expense, and taxes.

1.1.40 “Party” or “Parties” means SHMC or the Contractor or both.

1.1.41 “Pay Item” means a part of the Work for which a specific Unit Price or Lump Sum is stated in the Contract Price Schedule.

1.1.42 “Plans” means Contract Documents prepared by SHMC or a Consultant which illustrate or delineate the design, location, dimensions, and details of the Work in pictorial or graphic form.

1.1.43 “Port” means Port of Umpqua.

1.1.44 “Premises” means land and Improvements that are owned or occupied by SHMC that contain the Work Site and areas that may be used by Contractor for access to the Work Site.

1.1.45 “Product Data” means illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other documents provided by the Contractor that contain information on Materials.

1.1.46 “Progress Payments” means monthly payments that SHMC is required to make as the Work progresses pursuant to ORS 279C.570(2).

1.1.47 “Progress Schedule” means the schedule approved by the County that identifies and assigns durations to activities that must be completed in order to complete the entire Work within the Contract Time and which is used to measure the Contractor’s performance.

1.1.48 “Project” means a project for a public work, as defined in ORS 279C.800(6)(a), which includes the Work covered by this Contract and may include other work that is performed by SHMC or other prime contractors.

1.1.49 “Proprietary Product” means a Material which is described in the Specifications by brand name or which is held under patent or trademark by a particular person or entity.

1.1.50 “Punch List” means a list of tasks yet to be completed or deficiencies in the Work which must be corrected before final payment.

1.1.51 “Resort” means Winchester Bay RV Resort.

1.1.52 “Samples” means physical examples of Materials or workmanship submitted by the Contractor which illustrate some part of the Work and which will establish standards by which that part of the Work will be judged.
1.1.53 “Schedule of Values” means a written basis for making Progress Payments for Lump Sums that are stated in the Contract Price Schedule.

1.1.54 “SHMC” means Salmon Harbor Management Committee.

1.1.55 “Shop Drawings” means drawings, diagrams, and other documents in graphic or pictorial form which are prepared by the Contractor, a Subcontractor, or a Supplier to depict or delineate details of the Work.

1.1.56 “Sole Source Product” means a Material that comes from a particular source, is supplied by a particular vendor, or is made by a particular manufacturer.

1.1.57 “Specifications” means the written verbal or numerical standards and technical descriptions of the Work that are issued by the Owner as part of the original Contract Documents or are incorporated in a Change Order or Work Change Directive.

1.1.58 “Specified Product” means a Sole Source Product, Proprietary Product, or generic Materials with specific features, components, constituents, elements, or qualities that are described in the Specifications at the time the Agreement is signed.

1.1.59 “Subcontractor” means a person or entity who has a “Subcontract” with the Contractor or with another Subcontractor at any tier for performing part of the Work, other than merely supplying Materials.

1.1.60 “Submittals” means Shop Drawings, Product Data, Samples, and other documents or items that the Contract Documents require the Contractor to submit to the Contract Administrator for approval.

1.1.61 “Substantial Completion” means the point at which the Work (or a part of it, if specified by the Contract Documents) is sufficiently complete that SHMC may occupy and fully use it for its intended purpose without interference by the Contractor.

1.1.62 “Substitute” means a product that the Contractor proposes to use for the Work instead of a Specified Product.

1.1.63 “Supplementary Conditions” means a Contract Document that supplements or modifies these General Conditions.

1.1.64 “Supplier” means a person or entity who provides Materials or other Goods to the Contractor or a Subcontractor for the Work, but does not perform Work at the Work Site.

1.1.65 “Third-Party Claims” means demands, claims, actions, arbitrations, and other adversarial proceedings that are asserted, filed, prosecuted, or appealed against a Party by a person or entity other than a Party and all resulting expenses and liabilities, including damages, penalties, judgments, attorney fees, mediation costs, arbitration costs, and litigation costs.

1.1.66 “Unit Price” means the price for a Pay Item that will vary in quantity. A Pay Item with a Unit Price is referred to as “Unit Price Work”.

1.1.67 “Utilities” means pipelines, conduits, ducts, cables, wires, and other facilities for producing, transmitting, or distributing power, communications, heat, gas, oil, water, wastewater, storm water, or other utility services or products.

1.1.68 “Work” means both the process and the result of the Contractor performing personal services and labor and furnishing Materials and other Goods, tools, construction equipment, utilities, transportation, fuel,
facilities, and documents that are required by the Contract Documents for construction, reconstruction, major renovation, or painting of Improvements that constitute all or part of the Project.

1.1.69 "Work Change Directive" means a Contract Document issued unilaterally by SHMC directing a Change in the Work which may affect the Contract Price or the Contract Time.

1.1.70 "Work Site" means the area where the Work will be performed as designated in the Contract Documents.

1.1.71 "Working Day" means Monday through Friday excluding holidays.

1.2 Generally, unless particular provisions of the Contract Documents state otherwise or unless the context indicates otherwise, the following provisions apply to interpretation of the Contract Documents:

1.2.1 Words defined in the Contract Documents and references to specific sections and subsections will be capitalized.

1.2.2 Words in the present tense include the future and vice versa.

1.2.3 Words and phrases used as nouns include the singular and plural forms.

1.2.4 Words and phrases that are not defined in the Contract Documents will have the definition stated in Applicable Law, and if there is no definition in Applicable Law, the meaning commonly accepted in the construction industry.

1.2.5 "Shall", "will", and "must" signify acts or obligations that are mandatory. "Should" signifies an act that is preferred, but not required. "May" signifies a discretionary or permissive act.

1.2.6 The phrase “without limitation” will be deemed to follow the words “include”, “includes”, and “including” when referring to a list, class, or group of persons, entities, things, conditions, acts, omissions, events, obligations, rights, remedies, or liabilities.

1.2.7 "As shown", "as indicated", and similar phrases in the Specifications mean as shown or indicated on the Plans.

1.2.8 "As directed", "as determined", "as prescribed", "as authorized", "as approved", and similar phrases refer to directives or decisions of the Contract Administrator.

1.2.9 If a sentence uses the imperative mood, “the Contractor” will be inferred as the subject, and the auxiliary verb “shall” will be inferred with respect to the action described.

1.2.10 Modifying words such as “all” and “any” and articles such as “the” and “an”, may be omitted, but including or omitting an article or modifier should not affect the interpretation of a provision of the Contract Documents.

1.2.11 References to sections or subsections that do not expressly identify a specific Contract Document will mean the sections and the subsections of the Contract Document in which the references are made.

1.2.12 References to codes, manuals, standard specifications, or other publications of any Governmental Agency, technical organization, or professional organization mean the latest version in effect in Douglas County, Oregon on the date that the Bidding Documents are issued.
2. **ABBREVIATIONS** The following abbreviations may be used in the Contract Documents for Applicable Laws, specifications, manuals, published standards, Governmental Agencies, technical organizations, and professional organizations:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAMA</td>
<td>Architectural Aluminum Manufacturers Association</td>
</tr>
<tr>
<td>AAN</td>
<td>American Association of Nurserymen</td>
</tr>
<tr>
<td>AASHTO</td>
<td>American Association of State Highway and Transportation Officials</td>
</tr>
<tr>
<td>ABC</td>
<td>Associated Builders and Contractors, Inc.</td>
</tr>
<tr>
<td>ACI</td>
<td>American Concrete Institute</td>
</tr>
<tr>
<td>ACPA</td>
<td>American Concrete Pipe Association</td>
</tr>
<tr>
<td>ACEC</td>
<td>American Consulting Engineers Council</td>
</tr>
<tr>
<td>ADAAG</td>
<td>Americans with Disabilities Act of 1990, Accessibility Guidelines for Buildings and Facilities</td>
</tr>
<tr>
<td>AGC</td>
<td>Associated General Contractors of America</td>
</tr>
<tr>
<td>AIA</td>
<td>American Institute of Architects</td>
</tr>
<tr>
<td>AISC</td>
<td>American Institute of Steel Construction</td>
</tr>
<tr>
<td>AISI</td>
<td>American Iron and Steel Institute</td>
</tr>
<tr>
<td>AITC</td>
<td>American Institute of Timber Construction</td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
</tr>
<tr>
<td>APA</td>
<td>American Plywood Association</td>
</tr>
<tr>
<td>APWA</td>
<td>American Public Works Association</td>
</tr>
<tr>
<td>ASCE</td>
<td>American Society of Civil Engineers</td>
</tr>
<tr>
<td>ASHRAE</td>
<td>American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.</td>
</tr>
<tr>
<td>ASME</td>
<td>American Society of Mechanical Engineers</td>
</tr>
<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
</tr>
<tr>
<td>AWG</td>
<td>American Wire Gauge</td>
</tr>
<tr>
<td>AWPA</td>
<td>American Wood Preservers Association</td>
</tr>
<tr>
<td>AWS</td>
<td>American Welding Society</td>
</tr>
<tr>
<td>AWWA</td>
<td>American Water Works Association</td>
</tr>
<tr>
<td>CBM</td>
<td>Certified Ballast Manufacturers</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>CISCA</td>
<td>Ceiling and Interior Systems Contractors Association</td>
</tr>
<tr>
<td>CRSI</td>
<td>Concrete Reinforcing Steel Institute</td>
</tr>
<tr>
<td>CS</td>
<td>Commercial Standard, Commodity Standards Division, US Dept of Commerce</td>
</tr>
<tr>
<td>CSI</td>
<td>Construction Specifications Institute</td>
</tr>
<tr>
<td>D1.1</td>
<td>AWS Structural Welding Code – Steel</td>
</tr>
<tr>
<td>DEQ</td>
<td>Oregon Department of Environmental Quality</td>
</tr>
<tr>
<td>DOGAMI</td>
<td>Oregon Department of Geology and Mineral Industries</td>
</tr>
<tr>
<td>DSL</td>
<td>Oregon Division of State Lands</td>
</tr>
<tr>
<td>EJCDC</td>
<td>Engineers Joint Contract Documents Committee</td>
</tr>
<tr>
<td>EPA</td>
<td>US Environmental Protection Agency</td>
</tr>
<tr>
<td>FGMIA</td>
<td>Flat Glass Marketing Association</td>
</tr>
<tr>
<td>FM</td>
<td>Factory Mutual Engineering Corporation</td>
</tr>
<tr>
<td>FHWA</td>
<td>Federal Highway Administration</td>
</tr>
<tr>
<td>FS</td>
<td>Federal Specification</td>
</tr>
<tr>
<td>GSA</td>
<td>General Services Administration</td>
</tr>
<tr>
<td>IBC</td>
<td>International Building Code</td>
</tr>
</tbody>
</table>
3. **CONTRACT DOCUMENTS**

3.1 The Contract Documents supersede Bidding Documents that are not expressly incorporated in the Contract Documents by the Agreement. The Contract Documents constitute the entire agreement between the Parties concerning the Work. The Contract Documents are complementary. References to “this Contract” or “the Contract” in any Contract Document will include all Contract Documents.
3.2 SHMC intends that the Contract Documents provide for complete, correct, and timely execution of the Work. If the Contract Documents do not describe all details of the Work, details that are necessary to produce the intended result will be inferred.

3.3 Addenda that modify a Contract Document and exhibits and other documents incorporated by reference in a Contract Document will be integral parts of that Contract Document, and references to that Contract Document will include such addenda, exhibits, and other documents.

3.4 If the Contractor finds inconsistencies in the Contract Documents, or is uncertain about the meaning of the Contract Documents, or contends that the Contract Documents are defective in any way, the Contractor shall immediately notify the Contract Administrator of the problem. If necessary, the Contractor shall stop any Work in question until the Contract Administrator issues a written interpretation of the Contract Documents. Any interpretation will be issued in the same manner as a notice under Section 6 as soon as practicable after the Contract Administrator is notified of the problem. The interpretation should be consistent with Subsections 3.5 and 3.6, and it will be an integral part of the Contract Document that it interprets and will be binding on the Parties, unless it is arbitrary. If the Contractor contends that the interpretation constitutes a Work Change Directive or otherwise affects the cost of the Work or the Contract Time, the Contractor may give notice of a Claim.

3.5 The Contract Administrator should consider the following order of priority in addressing inconsistencies in the Contract Documents (the document named in Subsection 3.5.1 takes priority over all others and so on in descending order):

3.5.1 Change Orders and Amendments.
3.5.2 Work Change Directives.
3.5.3 Field Orders.
3.5.4 Agreement.
3.5.5 Supplementary Conditions.
3.5.6 General Conditions.
3.5.7 Specifications.
3.5.8 Plans.
3.5.9 The Contractor’s Bid.

3.6 Amendments, Change Orders, Work Change Directives, Field Orders, and Addenda of a later date will take priority over those of an earlier date. Numbers in Specifications or on Plans should take priority over scaled measurements. Larger scale Plans should take priority over smaller scale Plans. If Specifications or Plans are inconsistent, the document or provision of a document that will result in the better quality of Work will take priority.

3.7 If a provision of a Contract Document is held by a court to be invalid, it will not affect the validity of other provisions, and the Contract Documents will be interpreted as if the invalid provision did not exist.

3.8 The Contract Documents may be modified only by Amendment, Change Order, Work Change Directive, Field Order, or a written interpretation under Subsection 3.4, and not by any oral understanding, statement, or agreement. Change Orders are subject to the limitations stated in
Subsection 24.2. Amendments must be signed by the Contract Administrator, the County Counsel and SHMC.

4 ADMINISTRATION OF CONTRACT

4.1 The authority of the Contract Administrator, Inspectors, Consultants, and other representatives of SHMC to take actions or make decisions on behalf of SHMC is limited to those actions and decisions delegated by or pursuant to the Contract Documents. By signing the Agreement, SHMC authorizes the Contract Administrator and other representatives of SHMC to take actions that are described in the Contract Documents.

4.2 SHMC has ultimate authority to delegate or restrict the administrative authority of officers, employees, and agents of SHMC. SHMC will notify the Contractor of any decision by SHMC that affects the authority of representatives of SHMC.

4.3 Authority to act on behalf of SHMC that is not properly delegated to others is reserved by SHMC. The Contractor will not rely on any agreement, directive, decision approval, or other action by anyone who is not authorized to act on behalf of SHMC in accordance with the Contract Documents.

4.4 Unless a particular provision of a Contract Document specifically states otherwise, if a Contract Document refers to an action and decision by SHMC, it will be taken or made by the Contract Administrator who is named in the Agreement, a replacement designated by SHMC pursuant to Subsection 4.1, or a person to whom the Contract Administrator has delegated authority pursuant to Subsection 4.1.

4.5 Subject to particular limitations stated in the Contract Documents, the Contract Administrator may delegate authority to other representatives of SHMC to make decisions and take actions on behalf of the Contract Administrator, except for authority to issue Work Change Directives and sign Change Orders, and references in the Contract Documents to the Contract Administrator will be deemed to include such representatives. The Contract Administrator will give the Contractor notice of any delegation under this subsection.

4.6 Subject to the provisions on Claims, the Contract Administrator will decide all issues concerning control of the Work, including:

4.6.1 Approval or rejection of the Progress Schedule, the Schedule of Values, Subcontracts, Materials, Substitutes, Submittals, and Work.
4.6.2 Measurement of Unit Price Work;
4.6.3 Requirements of Field Orders and Work Change Directives;
4.6.4 Acceptability of rates of progress on the Work;
4.6.5 Interpretation of the Plans and Specifications; and
4.6.6 Payments that are due under the Contract Documents.

4.7 Unless otherwise stated, if a provision of the Contract Documents states that an act, thing, or document is subject to the approval or consent of SHMC or the Contract Administrator, both the request for approval or consent and the approval or consent must be written and must be given in the same manner
as notices under Section 6. Approval or consent will not be withheld unreasonably.

4.8 Unless otherwise stated, if a provision of the Contract Documents states that the Contract Administrator may direct the Contractor to take or refrain from taking certain action, the directive should be written and given in the same manner as notices under Section 6.

4.9 The Contractor shall designate, by notice to SHMC, at least one person who is authorized to take actions on behalf of the Contractor that are necessary for efficient administration of the Contract, including execution of Change Orders and Amendments. Any action or decision concerning the Contract Documents that is made by a representative designated by the Contractor pursuant to this subsection will be valid and binding on the Contractor.

5 WAIVER - Unless a particular provision of the Contract Documents provides otherwise, compliance with requirements of the Contract Documents may be waived only by a written waiver signed by the Party waiving its rights. Waiver of compliance with one requirement in one instance will not be deemed to waive compliance with that requirement in any other instance or to waive any other requirement.

6 NOTICES

6.1 Any notice required by the Contract Documents must be written and must be given by personal delivery or mail, unless the Contract provision requiring the notice or Applicable Law allows or requires a different method of notice.

6.2 Notices to SHMC will be directed to the Contract Administrator at the address stated in the Agreement. Notices to the Contractor will be delivered to the Contractor’s superintendent at the Work Site or mailed or delivered to the Contractor at the address stated in the Agreement.

6.3 Each Party shall notify the other of any change of address.

7 ASSIGNMENT The Contractor shall not assign or transfer the Contractor's rights and obligations under this Contract without the prior written consent of SHMC.

8 DOCUMENTS PROVIDED BY SALMON HARBOR MANAGEMENT COMMITTEE

8.1 The Contract Administrator will provide to the Contractor the number of copies of the Contract Documents that the Contract Administrator determines are sufficient for executing the Work. The Contractor may purchase additional copies for the cost of reproduction.

8.2 The Contract Administrator will endeavor to locate and provide to the Contractor all Documents within the possession or control of SHMC that contain information concerning physical conditions that the contractor may encounter at the Work Site. SUCH DOCUMENTS AND INFORMATION MAY NOT BE COMPLETE OR ACCURATE, AND SHMC MAKES NO WARRANTIES CONCERNING SUCH DOCUMENTS AND INFORMATION.

8.3 If necessary for performance of the Work, the Contract Administrator will furnish a legal description of the Work Site and copies of surveys of the work Site possessed by SHMC.
9 **NO REPRESENTATIONS** – No statements, discussions, or representations by any representative of SHMC about the Work, the Work Site, or the requirements of the Contract documents will affect the rights or obligations of the Parties unless they are written and included in the Contract Documents or made in accordance with the provisions of the Contract Documents.

10 **PRECONSTRUCTION CONFERENCE**

10.1 Within ten (10) days after the Contractor signs and returns the Agreement with the proper bonds and insurance certificates, but before Work begins at the Work Site, the Contractor’s representatives, the Contract Administrator, and others designated by SHMC or the Contract Administrator will hold a preconstruction conference to discuss the procedures for handling Submittals, Applications for Payment, and other matters pertaining to administration of the Contract.

10.2 At the preconstruction conference, the Contractor shall submit a proposed Progress Schedule for the Work which will be subject to approval under Subsection 26.3 and a proposed Schedule of Values which will be subject to approval under Subsection 43.2.

11 **CONTRACTOR’S RECORDS**

11.1 The Contractor shall keep current records concerning the Work that are sufficient for evaluating the Contractor’s performance under the contract documents, including financial records, correspondence, records concerning Subcontracts and contracts with Suppliers, Product Data, documentation of Claims, and records required by Applicable Laws.

11.2 During the progress of the Work, the contractor shall keep at the Work Site a copy of current As Built Documents, Documents required to be kept at the Work Site by Applicable Laws, and other documents that the Contract Administrator requests by notice to the Contractor.

11.3 As-Built Documents, warranties for Materials, manuals, Product Data, Shop Drawings, and other Documents produced or obtained by the Contractor, Subcontractors, and Suppliers in connection with the Work that will be needed for use, maintenance, repair, renovation, reconstruction, or completion of the Work will belong to SHMC, and the Contractor shall deliver such Documents to the Contract Administrator upon completion of the Work or upon termination of this Contract.

11.4 The Contractor shall allow SHMC to examine and copy Documents within the possession or control of the Contractor that are pertinent to the Contract while the Work is in progress and within six years after termination of the Contract or completion of the Work. This provision applies to Documents that may be otherwise privileged.

11.5 SHMC will endeavor to honor requests by the Contractor to forgo disclosure of Documents provided by the Contractor which the Contractor believes in good faith to be “trade secrets” or otherwise confidential and designates as such. The County Counsel has exclusive discretion to determine whether a request to keep Documents confidential is consistent with ORS 192.501 to 192.502.
12 CONTRACTOR’S RESPONSIBILITY FOR THE WORK

12.1 By executing this Contract, the Contractor acknowledges that the Contractor:

12.1.1 Has carefully examined the Contract Documents, other pertinent Documents, and all available information concerning physical conditions at the Work Site;
12.1.2 Has determined that labor, construction equipment, and Materials that are needed for the Work are available;
12.1.3 Has notified the Contract Administrator of errors, ambiguities, or inconsistencies in the Contract Documents; and
12.1.4 Is not relying on representations by any officer, employee, or agent of SHMC about the Work that are not included in or made pursuant to the Contract Documents.

12.2 The Contractor is responsible for the entire Work. Unless particular contract Documents specifically require or allow otherwise, the Contractor shall:

12.2.1 Furnish and pay for all Materials and other Goods, tools, construction equipment, labor, utilities, transportation, personal services, fuel, facilities, and documents that are required by the Contract Documents, or that should be inferred from the Contract Documents as necessary to complete the Work, whether Pay Items or Incidental Work;
12.2.2 Perform the Work in accordance with the Contract Documents and generally accepted trade and industry standards;
12.2.3 Diligently prosecute the Work without interruption in accordance with the approved Progress Schedule;
12.2.4 Control the actions of all persons who are engaged in the Work and assure that they comply with the Contract Documents; and
12.2.5 Cooperate with other prime contractors who are working on the Project as stated in the Contract Documents.

12.3 Unless specific provisions of the Contract Documents state otherwise, the Contractor shall pay all costs incurred in performance of the Contractor’s obligations under the Contract Documents.

12.4 The Contractor shall supervise the Work to assure timely, proper execution of the Work. The Contractor shall employ a competent superintendent who is experienced in the type of Work being performed and who is capable of understanding the Plans and Specifications. The superintendent must be available to confer with the Contract Administrator regularly about the progress of the Work and must be at the Work Site when substantial operations of the Contractor or Subcontractors are in progress. If the Contractor’s superintendent does not have authority to execute Change Orders under Subsection 4.9, a person who does have such authority must be readily available to act on behalf of the Contractor.
12.5 The obligations of the Contractor under the Contract Documents regarding performance of the Work will apply to Subcontractors and Suppliers with respect to the Work that they perform and the Materials that they supply, and the contractor will be responsible for such Work and Materials.

13 WORKERS

13.1 The Contractor and Subcontractors shall provide competent, qualified workers. Workers must have any licenses and certificates required by Applicable Laws for performing the Work to which they are assigned.

13.2 The Contractor shall comply with reasonable directions from the Contract Administrator to exclude workers from the Work Site who are careless, incompetent, or disruptive.

14 MATERIALS

14.1 Materials provided by the Contractor must conform to the Specifications; must be of good, merchantable quality; and must be fit for the purpose for which they are used. With respect to Materials, the Contractor is a “merchant” of Goods under ORS Chapter 72.

14.2 Equipment must be new, current models of standard production. Equipment must be cleaned, conditioned, installed, and connected in accordance with instructions of the manufacturer.

14.3 If required by the Specifications, the Contractor, at the Contractor’s expense, shall have Materials tested before they are incorporated in the Work. Upon completion of tests, the Contractor shall provide the test results to the Contract Administrator who will approve or reject Materials by notice to the Contractor. Such notice will state any conditions of approval or reasons for rejection.

15 SUBSTITUTES

15.1 The Contractor may propose supplying a Substitute that is equivalent to a Specified Product. The Contract Administrator may refuse to approve a Substitute that could have resulted in lower bids from all bidders if approval had been requested during the bidding process. The Contractor shall provide a written statement of compelling reasons for the Contractor’s failure to request approval of the Substitute prior to bid submission. The Contractor shall document the following information and any other information requested by the Contract Administrator for evaluation of the proposed Substitute:

15.1.1 Technical characteristics of the Substitute;
15.1.2 Past performance and reliability of the Substitute when used for purposes similar to the intended use for the Specified Product;
15.1.3 Advantages and disadvantages of using the Substitute in comparison with the Specified Product;
15.1.4 Changes in the Work and changes in the Contract Time that will be necessary to use the Substitute;
15.1.5 Costs of providing, using, and maintaining the Substitute; and
15.1.6 Warranties, requirements for maintenance of the Substitute, and availability of maintenance and repair service.

15.2 The Contractor shall certify that all information regarding the Substitute provided by the Contractor is true and complete and that the performance of the Substitute will be equal or superior to the Specified Product when used for the specified purpose or function.

15.3 The Contract Administrator has complete discretion to approve or reject a Substitute. Approval of a Substitute will be documented by a Change Order. The Contract Administrator may revoke approval of Substitute, and require the contractor, at the Contractor’s expense, to replace the Substitute if the Contract Administrator deems the Substitute unsatisfactory after it is incorporated in the Work. If a Substitute is approved, the Contractor will be solely responsible for the resulting Work.

15.4 The Contractor shall pay all costs associated with a request for substitution regardless of whether it is approved, including costs incurred by SHMC in reviewing and acting on the request. If the cost of using the Substitute is less than the cost of using the specified Product, SHMC will be entitled to a commensurate reduction in the Contract Price. Unless the Change Order allowing a Substitute states otherwise, the Contract Price will not be increased for use of the Substitute.

16 CONTRACTOR’S CONSTRUCTION EQUIPMENT AND METHODS

16.1 Construction equipment used by the Contractor to perform the Work must be in good operating condition and must be adequate for efficient performance of the Work.

16.2 Unless the Contract Documents require use of a specific Construction Method, the Contractor will be responsible for determining what Construction Methods are appropriate for performing the Work. If the Contract Documents require a specific Construction Method, the Contractor may request approval to use a different Construction Method in the same manner as a request for approval of a Substitute under Section 15. If the Contractor’s request is approved, the Contractor will be solely responsible for the resulting Work.

17 SUBCONTRACTS

17.1 If the value of the contract is $100,000 or more, within two (2) hours of the date and time of the deadline when the bids were due, a bidder shall submit to SHMC the names, addresses and Construction Contractors Board registration numbers of any first tier subcontractor that will be furnishing labor or will be furnishing labor and materials in connection with the work and whose contract value is equal to or greater than 5% of the total project bid or $15,000, whichever is greater, or $350,000 regardless of the percentage of the project bid.

17.2 Any Work that is performed by a person who is not hired and paid as an employee of the Contractor, including Work performed with construction equipment that is rented with an operator, must be performed under a written Subcontract that is approved pursuant to this section. A
prospective Subcontractor must qualify as an independent contractor under ORS 670.600.

17.3 The Contractor shall not enter into Subcontracts for the Work, allow a Subcontractor to subcontract Work at a lower tier, or allow assignment of a Subcontractor’s interest in a Subcontract without the prior approval of the Contract Administrator. The Contractor shall submit a request to the Contract Administrator with a copy of the proposed Subcontract or assignment. The Contractor shall document the qualifications of a proposed Subcontractor as directed by the Contract Administrator. The Contractor will be notified of the Contract Administrator’s decision regarding a proposed Subcontract within seven (7) days after the Contract Administrator receives all documents required by this section. The Contract Administrator may reject a Subcontractor for any of the reasons stated in ORS 279C.440(2) with respect to disqualification of bidders and shall reject the subcontract if the subcontractor is on the list created by the Construction Contractors Board in accordance with ORS 701.227(4). The Contract Administrator will not approve a Subcontract that merely provides a labor force for the Work.

17.4 Subcontracts must correlate with the Specifications and Plans for the subcontracted Work. Subcontracts must state that the Subcontractor is bound by relevant provisions of the Contract Documents concerning control and execution of the Work and administration of the Contract and other provisions that benefit or protect the interests of SHMC.

17.5 A Subcontract must state that the Subcontractor will defend and indemnify SHMC and its officers, employees, and agents from all Third-Party Claims arising out of the Subcontractor’s negligence, breach of the Subcontract, or other wrongful acts and omissions of the Subcontractor. A Subcontractor must provide the same liability insurance coverage and workers' compensation coverage that is required of the Contractor. Proof of such coverage that conforms to Sections 39 and 40 must be provided to the Contract Administrator before the Subcontractor performs Work at the Work site.

17.6 Pursuant to ORS 279C.580(3), the Contractor shall include the following in every subcontract for property or services entered into by the contractor or a first-tier subcontractor (including material suppliers):

17.6.1 A payment clause which obligates the Contractor to pay the first-tier subcontractor for satisfactory performance of its subcontract within ten (10) days out of such amounts as are paid to the Contractor by SHMC under the contract; and

17.6.2 An interest penalty clause that obligates the Contractor, if payment is not made within thirty (30) days after receipt of payment from SHMC, to pay to the first tier subcontractor an interest penalty on amounts due in the case of each payment not made in accordance with the payment clause included in the subcontract under Section 17.6.1. The interest penalty shall be calculated pursuant to ORS 279C.580(3)(B) and ORS 279C.515(2), on amounts due in the case of each payment not made in accordance with section 17.6.1.

17.6.3 If the only reason that the Contractor or first tier subcontractor did not make the payment when due is that the contractor or first tier
subcontractor did not receive payment from SHMC or the Contractor when payment was due, then the Contractor or first tier subcontractor may not be obligated to pay the interest penalty.

Pursuant to ORS 279C.580(4), the Contractor shall require each Subcontractor to include in each lower tier Subcontract a payment clause and an interest penalty clause conforming to ORS 279C.580(3).

17.7 Each Subcontract shall require the Subcontractor to consent to assignment of the Contractor’s interest in the Subcontract, and the Contractor’s interest in each Subcontract is hereby assigned to SHMC subject to the following conditions:

17.7.1 An assignment will be effective only if SHMC gives the Subcontractor written notice that SHMC is accepting the assignment after termination of this Contract; and

17.7.2 Assignment will be subject to the prior rights of the surety under the performance bond for the Contract.

17.8 Unless assignment of Subcontracts is effected pursuant to Subsection 17.7:

17.8.1 The Contractor shall coordinate the Work of Subcontractors and require Subcontractors to communicate with the Contract Administrator through the Contractor;

17.8.2 Subcontractors shall not make direct Claims against SHMC; and

17.8.3 The Contractor will be responsible for all Work performed by Subcontractors.

17.9 The Contract Administrator’s approval of a Subcontract or assignment or amendment of a Subcontract will not diminish the Contractor’s responsibility for all subcontracted Work or release the Contractor or its surety of their responsibilities under the Contract Documents and bonds.

18 USE OF PREMISES

18.1 SHMC will allow the Contractor to have access to the Work site and use of the Work site as necessary for performance of the Work. The Contractor shall confine the Work to the Work Site and areas that the Contractor is allowed to use for access to the Work Site as described in the Contract Documents.

18.2 The Contractor shall accommodate regular use of the Premises and provide any temporary facilities necessary for safe use of the Premises. The Contractor shall not unreasonably obstruct use of the Premises or allow debris from the Work to accumulate. Upon completion of the Work, the Contractor shall remove from the Premises all debris resulting from the Work and the contractor’s personal property and leave the Premises clean and ready for use by SHMC.
19 SAFETY AND PROTECTION OF PROPERTY

19.1 The Contractor is responsible for safety at the Work Site and shall take reasonable precautions to prevent injury to persons and damage to property that may result from the Work. The Contractor shall provide safety facilities required by Applicable Laws.

19.2 Unless prohibited by Applicable Laws, in emergencies, the Contractor shall take immediate, appropriate actions necessary to prevent or mitigate injury or loss. If an emergency is not caused in whole or in part by acts or omissions for which the Contractor is responsible under the Contract Documents, the Contractor will be compensated for actions taken pursuant to this subsection in the same manner as for Changes in the Work. Otherwise, the Contractor will bear the cost of any precautionary and emergency measures taken under this section.

19.3 If the Contractor determines that Construction Methods required by the Contract Documents are not safe, the Contractor shall give the Contract Administrator notice and may propose safer alternatives in the same manner as Substitutes. If the Contract Administrator does not approve the alternative Construction Method proposed by the Contractor pursuant to this subsection, SHMC will be responsible for any third-party claim or damage to the Work that results solely from the construction Method required by the Contract Documents.

19.4 The Contractor shall take adequate measures to protect the Work and Materials stored at the Work site from fire, weather, vandalism, theft, and other foreseeable loss.

19.5 The Contractor will be responsible for all damage to SHMC’s real and personal property resulting from the Work, and the contractor will compensate SHMC for such damage upon receipt of notice from the Contract Administrator describing the damages suffered by SHMC.

20 COOPERATION WITH UTILITIES

20.1 Utilities that are located at the Work Site will be indicated on the Plans if the location is known to SHMC, and SHMC will provide to the Contractor any information in SHMC’s possession concerning existing utilities, subject to the limitations stated in Section 8. The contractor will be primarily responsible for determining the location of utilities by reviewing information provided by SHMC, contacting utility owners, and uncovering utilities at the Work Site.

20.2 SHMC will exercise any power that SHMC has under Oregon Law to require Utility owners to alter or relocate Utilities to accommodate the Work in a timely manner.

20.3 If Utilities must be altered or moved temporarily or permanently to accommodate the Work, the Contractor shall coordinate the Work with the Utility owners. Unless specific provisions of the Contract Documents state otherwise, or unless the Contractor makes other arrangements with a Utility owner, Utilities will be altered or relocated by the Utility owner. The Contractor may agree with a Utility owner to make changes in a Utility that differs from the Plans subject to the consent of the Contract Administrator, but the Contractor shall bear the cost of such changes.

20.4 If Contractor discovers an unanticipated Utility at the Work Site, the Contractor shall determine the owner of the Utility, and notify the owner
and the Contract Administrator. The Contractor shall not disturb any unanticipated Utility, and shall protect the Utility until the Contract Administrator determines whether a Change in the Work is necessary and directs the Contractor to act accordingly.

21 SUBMITTALS

21.1 Submittals are not Contract Documents. The purpose of Submittals is to demonstrate the way in which the Contractor intends to implement those portions of the Work for which submittals are required under the Contract Documents. Informational Submittals to which the Contract Administrator is not expected to respond will be identified in the Contract Documents.

21.2 The Contractor shall provide Samples, Shop Drawings, Product Data, and other Submittals to the Contract Administrator as required by the Contract Documents. The Contractor shall provide Submittals promptly and in proper sequence to allow for orderly progress of the Work.

21.3 The Contractor shall give special attention to details of Submittals that have been revised at the direction of the Contract Administrator.

21.4 The Contractor shall not perform any Work covered by a Submittal until the Submittal is approved by the Contract Administrator.

21.5 Unless the Contractor gives notice to the contrary at the time that the contractor provides a Submittal, the contractor shall be deemed to certify that:

21.5.1 The Submittal conforms to the Specifications;

21.5.2 Any Sample is representative of the Material that will be used for the Work; and

21.5.3 Information contained in a Submittal, including information on composition, quantities, dimensions, field measurements, performance criteria, fabrication, assembly, and installation requirements, is true and correct.

21.6 The Contract Administrator is entitled to rely on technical and professional certifications contained in Submittals and the Contractor will be responsible for such certifications.

21.7 The Contract Administrator will either approve, reject, or direct the Contractor to revise a Submittal, unless it is merely an informational Submittal that does not necessitate a response.

21.8 The Contract Administrator’s approval of a Submittal will not relieve the Contractor of responsibility for errors or deficiencies in the Submittals or waive requirements of the Contract Documents.

22 INSPECTION OF WORK

22.1 The Contractor shall inspect all Work as it progresses to assure that it conforms to the Contract Documents.

22.2 If Applicable Laws require any Work to be inspected by a Governmental Agency, the Contractor shall arrange for the inspection; notify the Contract Administrator in advance of the inspection; and provide copies of Documents resulting from such inspection to the Contract Administrator. If a
Governmental Agency determines that certain Work does not conform to Applicable Laws, such Work will be considered defective for purposes of this section.

22.3 If certain Work is subject to inspection and approval by SHMC under the Contract Documents, the Contractor shall give Inspectors oral notice with written confirmation at least three (3) Working Days before the Work will be ready for any inspection. The Contractor shall provide safe access to the Work for the Inspector to perform the inspection. Within three (3) Working Days after receiving written notice from the Contractor, the Inspector will inspect the Work; recommend rejection or approval of Work to the Contract Administrator; give oral notice of such recommendation to the Contractor, and confirm such notice in writing. Inspectors cannot alter or waive requirements of the Contract Documents.

22.4 All work will be subject to the approval of the Contract Administrator following inspection pursuant to Subsection 22.3. work will be deemed “defective” if the Contract Administrator determines that it does not conform to the Contract Documents. The Contract Administrator will give the Contractor oral notice, followed by written confirmation, of approval or rejection of Work within three (3) Working Days after the Contract Administrator receives a recommendation on such Work from the Inspector. The Contract Administrator may elect to inspect work to confirm the Inspector’s recommendation.

22.5 Except as provided in Subsection 22.6, SHMC will bear the cost of initial inspection of Work by SHMC, and the Contractor shall pay the cost of all other inspections.

22.6 The Contract Administrator may require the Contractor to uncover completed Work for inspection. SHMC will compensate the Contractor for the expense of uncovering and restoration of the Work in the same manner as for a Change in the Work only if all of the following conditions occur:

22.6.1 The Contractor gives timely notice to the Inspector before covering the Work;
22.6.2 The Inspector fails to inspect within a reasonable time;
22.6.3 The Contractor subsequently covers the Work;
22.6.4 The Contract Administrator directs the Contractor to uncover the Work; and
22.6.5 The uncovered Work is not defective.

22.7 The Contract Administrator may require the Contractor to correct defective Work. The Contractor will bear the cost of correcting defective Work, unless the defect is caused solely by SHMC.

22.8 In lieu of requiring the Contractor to correct defective Work for which the Contractor is responsible, the Contract Administrator may reduce the Contract Price by Work Change Directive in an amount determined adequate by the Contract Administrator to compensate SHMC for the reduction in the value of the completed Work, including diminished utility of the Work and the estimated costs of maintenance, and repair of the Work affected by the defect.
22.9 Notices required by this section will be given to the Inspector or the Contract Administrator or the Contractor's superintendent at the Work Site.

22.10 Approval of Work in Progress is subject to final approval prior to Contract closeout.

22.11 Inspection and approval of the Work by SHMC will not relieve the Contractor of responsibility for the Work.

23 MANUALS AND TRAINING

23.1 Operation and maintenance manuals for use of Equipment must be approved by the Contract Administrator in accordance with the procedures for Submittals, and the Contractor must correct deficiencies in those Documents as directed by the Contract Administrator before training begins.

23.2 Prior to Substantial Completion, the Contractor shall provide training to SHMC's personnel for operation and maintenance of Equipment as required by the Specifications.

24 CHANGES IN THE WORK

24.1 Additions to the Work, elimination of Work, and other Changes in the Work may be necessary for proper completion of the Project. Subject to limitations imposed by the Contract Documents and Applicable Laws, SHMC may, at any time, without notice to sureties, make changes in the Specifications, Plans, the Progress Schedule, and other Contract Documents.

24.2 The Contractor shall comply with all Field Orders, Work Change Directives, and Change Orders. The Contract Administrator may issue a Field Order for a Change in the Work that does not affect the cost of the Work or the time required to perform the Work. The Contract Administrator is authorized by SHMC to issue Work Change Directives and sign Change Orders, so long as any Work change Directive or Change Order does not increase the Contract Price by more than 10% of the Contract Price or $25,000, whichever is less. Any work change Directive or Change Order that will increase the Contract Price by more than the preceding amounts must be signed by SHMC.

24.3 SHMC does not warrant that the actual quantities of Unit Price Work will correspond with the estimated quantities stated in the Contract Price Schedule. The Parties expect variations in the quantities of Unit Price Work, and a variation will be deemed a Change in the Work that justifies a change in the Contract Price or the Contract Time only if the Contract Administrator determines that:

24.3.1 The difference between the estimated quantity and the actual quantity significantly changes the character of Work, the cost per unit, or the time needed to complete the Work; and

24.3.2 Either SHMC or the Contractor will suffer substantial inequity if the Contract Price or the Contract Time is not changed.

24.4 If the Contract Administrator requests a Change in the Work that will affect the cost of the Work or the time required to perform the Work, and the Parties agree on corresponding changes in the Contract Price or the Contract Time or both, the Parties will execute a Change Order. A
Change Order may be executed at any time to supersede a Field Order or a Work Change Directive.

24.5 If SHMC requests a Change in the Work that will affect costs or time, but the Parties do not agree on adjustment of the Contract Price or the Contract Time, SHMC will issue a work change Directive. The Contractor will implement the Work change Directive, keeping accurate, complete records on resulting changes in the cost of the Work and the time required for the Work. The Contractor will provide copies of such records and other information requested by the Contract Administrator to evaluate the effects of a Work Change Directive. Within a reasonable time after receiving such information, SHMC will either affirm the initial Work Change Directive or issue a supplemental work Change Directive increasing or decreasing the Contract Price or the Contract Time or both in accordance with Sections 25 and 26 to compensate the Contractor for the Change in the Work.

24.6 If the Contractor does not agree to a change in the Contract Price or a change in the Contract Time as determined by a Work Change Directive, or if the Contractor contends that a change directed by Field Order affects the cost of the Work or the time required to perform the Work, or if the Contractor contends that the Contractor is otherwise entitled to a change in the Contract Time or the Contract Price, the Contractor may submit a Claim in accordance with the Contract Documents.

25 CONTRACT PRICE

25.1 The Contract Price, as adjusted pursuant to the Contract Documents, constitutes the sole and total compensation payable to the Contractor for the Work and will cover all costs incurred by the Contractor in performance of the Work.

25.2 Unless the character of Work covered by a Pay Item that is designated as Lump Sum is changed substantially, the Contractor will be paid the amount stated in the Contract Price Schedule for that Pay Item. Unless a variation in the quantity of Unit Price Work constitutes a Change in the Work under Subsection 24.3, the amount payable for Unit Price Work will be the Unit Price multiplied by the actual quantity furnished or performed by the Contractor. Unless otherwise provided in the Contract Documents, the Contractor will be paid only for Pay Items and not for Incidental Work.

25.3 The Contractor will be entitled to an increase in the Contract Price for a Change in the Work that increases the cost of the Work. SHMC will be entitled to a decrease in the Contract Price for any Work that is eliminated for any Change in the Work that reduces cost of the Work. Increases and decreases resulting from a single Change in the Work or contemporaneous Changes in the Work will be offset.

25.4 The price of a Pay Item that is eliminated by a Change in the Work will be deducted from the Contract Price, but the Contractor will be reimbursed for actual direct costs incurred by the Contractor, a Subcontractor, or a Supplier for acquisition of special materials, special construction equipment, and other items provided solely for the eliminated Work, to the extent that such costs cannot be mitigated by the Contractor, the Subcontractor, or the Supplier. The price of each Pay Item is presumed to include an appropriate share of the
Contractor’s overhead and profit, so the Contractor will not be entitled to any payment for loss of anticipated profits for eliminated Work.

25.5 If the character of Work covered by a Lump Sum is changed substantially, but the Pay Item is not eliminated, the Lump Sum price will not apply, and payment for that Work will be based on the cost of the Work as determined under Subsections 25.6 through 25.10. If a variation in the quantity of Unit Price Work constitutes a Change in the Work under Subsection 24.3, but the Unit Price Work is not eliminated, the Unit Price will not apply and payment for that Work will be based on the cost of the Work as determined under Subsections 25.6 through 25.10.

25.6 Unless the Parties agree otherwise in writing, the amount of any increase or decrease in the Contract Price for a Change in the Work, other than elimination of a Pay Item, will be based on the direct cost of the changed Work and the mark-up allowed by this section as determined by the Contract Administrator.

25.7 The direct cost of a Change in the Work comprises:

25.7.1 Salaries, wages, social security contributions, payroll taxes, unemployment insurance, workers’ compensation, fringe benefits, and costs for the labor or services of employees engaged in the Work;

25.7.2 The reasonable cost of construction equipment which will be determined by the Contract Administrator in accordance with standards established by the Contract Documents or other reasonable standards selected by the Contract Administrator;

25.7.3 Fuel, oil, and other Goods regularly consumed by operation of construction equipment;

25.7.4 Cost of Materials used for the Work;

25.7.5 Reasonable extra payments by the Contractor to key employees for necessary transportation, travel, and subsistence;

25.7.6 Taxes directly related to the Work;

25.7.7 Extra premiums for increased bond and insurance coverage attributable to the Change in the Work; and

25.7.8 Extraordinary and incidental expenditures directly related to the Change in the Work.

25.8 The direct cost of a change in the Work will not include Overhead and anticipated profit; costs resulting from the negligence, breach of contract, or other wrongful acts or omissions of the Contractor; the cost of correction of defective Work; the cost of small tools that are customarily provided by Workers; or costs for which the Contractor is responsible under other provisions of the Contract Documents.

25.9 For additive Changes in the Work, the following mark-ups will be applied to direct costs of additional Work to cover the Contractor’s Overhead and profit:

Labor performed by the Contractor’s employees...... 17%

Construction equipment and Materials provided by the Contractor......................................................... 12%
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Labor, construction equipment, and materials provided by a Subcontractor an additional…………………………….5%

25.10 For reductive changes, the Contract Price will be reduced by direct costs eliminated by the Change in the Work, and if the reductions in direct costs constitute more than 10% of the Contract Price, the Contract Administrator may elect to further reduce the Contract Price in an amount equal to the reduction in direct cost multiplied by percentages stated in Subsection 25.9.

26 CONTRACT TIME

26.1 The Contract Time may be expressed in the Specifications by a calendar date on which the Work must be completed or as a certain number of calendar days. When the Contract Time is stated as a certain number of calendar days, counting will begin at 12 AM on the fifteenth day after the date of the Award. Saturdays and holidays will be counted as calendar days.

26.2 The Contract Administrator will issue the Notice to Proceed within five (5) days after the preconstruction conference. Upon receiving the Notice to Proceed, the Contractor shall begin the Work and shall diligently prosecute the Work.

26.3 The Progress Schedule submitted by the Contractor at the pre-construction conference must realistically provide for completion of the Work within the Contract Time. Within ten (10) days after receiving the proposed Progress Schedule, the Contract Administrator will either approve it or return it to the Contractor for revisions. Upon making changes in the Progress Schedule, the process for approval will be repeated until the Progress Schedule is approved. The approved Progress Schedule will be part of the Contract Documents. The Contract Administrator’s approval of the Progress Schedule will not constitute approval of the Contractor’s Construction methods or durations. The Progress Schedule will be adjusted as directed by the Contract Administrator to conform to changes in the Contract Time.

26.4 The Contract Administrator will determine and record the passage of the Contract Time and will provide Statements of the Contract Time (hereinafter SCT) to the Contractor which will include any adjustments made pursuant to this section. SCT will be provided at least monthly for projects of more than two (2) months duration and weekly for projects of less than two (2) months’ duration. Change Orders which adjust contract time shall be deemed to be an SCT.

26.5 The Contractor shall notify the Contract Administrator of any delay within five (5) days after the Contractor knows of the delay. Such notice must state the reason for the delay, the estimated duration of the delay, the net delay to completion of the Work, and any adjustment of the Contract Time that the Contractor is requesting. If the Contractor fails to recognize and give notice of a condition or event that will result in a delay within five (5) days after it should be apparent to the Contractor, the Contract Administrator may deny a subsequent Claim for adjustment of the Contract Time because of such event or condition.

26.6 The Contract Time and the Progress Schedule may be adjusted by change Order or Work change Directive consistent with changes in the Work and other events that materially affect the progress of the Work. The Contractor will be entitled to extension of the Contract Time only for:
26.6.1 Unavoidable delays caused by occurrences beyond the Contractor’s control;
26.6.2 Changes in the Work that actually increase the amount of time required to perform the Work; and
26.6.3 Conditions or occurrences for which SHMC is at fault that increase the amount of time required for the Work.

26.7 Actual delays caused by the following conditions or occurrences may be deemed unavoidable and may support an extension of the Contract Time:

26.7.1 Acts of God;
26.7.2 Extremely abnormal adverse weather conditions;
26.7.3 War, riot, and acts of a public enemy;
26.7.4 Freight embargoes and other interruptions of commerce caused by unforeseeable acts of a Governmental Agency;
26.7.5 Suspension of the Work by SHMC because of conditions or events for which the Contractor is not at fault;
26.7.6 Vandalism that could not be prevented by the Contractor;
26.7.7 Fire, explosion, or collapse that is not caused by the negligence or wrongful acts or omissions of the Contractor;
26.7.8 Industry wide strikes or other strikes that are not the result of actions or decisions of the Contractor; and
26.7.9 Extremely unusual physical conditions at the Work Site that could not be foreseen by examination of all available information.

26.8 An extension of the Contract Time will not be allowed for:

26.8.1 Contention by the Contractor that insufficient time was allowed by the original Contract Documents;
26.8.2 Delay which could have been avoided by the Contractor, a Subcontractor, or a Supplier exercising care, foresight, and diligence, including delays caused by shortage of items described in Subsection 12.2.1;
26.8.3 Delay caused by the Contractor’s methods of construction;
26.8.4 An unavoidable delay which affects only part of the Work and does not delay completion of the entire Work within the Contract Time; or
26.8.5 Delay caused by conditions or occurrences for which the Contractor is at fault.

26.9 The Contract Administrator may grant a time extension for avoidable delays if the Contract Administrator determines that it will benefit SHMC.

26.10 If the Contract Administrator determines that the Contractor is not prosecuting the Work in accordance with the Progress Schedule and that the Contractor is not entitled to an extension of the Contract Time, the Contract Administrator may direct the Contractor to revise the Progress Schedule and to accelerate the Work. If the Contractor contends that the Contractor is entitled to an extension of the Contract Time or compensation for the acceleration of the Work, the Contractor may assert a Claim.
27 SALMON HARBOR MANAGEMENT COMMITTEE’S RIGHT TO SUSPEND THE WORK

27.1 The Contract Administrator may suspend all or part of the Work by notice to the Contractor if the Contract Administrator determines that such suspension is necessitated by:

27.1.1 Unsafe conditions at the Work Site;
27.1.2 Defects in the Work;
27.1.3 The Contractor’s breach of contract or violation of Applicable Law;
27.1.4 Directives of any Governmental Agency;
27.1.5 Physical conditions that are unsuitable for performing the Work; or
27.1.6 Other conditions or events that affect substantial interests of SHMC.

27.2 During the suspension, the Contractor will be responsible for protection of the Work, maintenance of access through the Work Site, temporary facilities, and clean-up. Upon receiving notice from the Contract Administrator to resume Work, the Contractor shall restore any Work damaged during the suspension, remove temporary facilities, and proceed with the Work.

27.3 If the Work is suspended because of conditions or events for which the Contractor is at fault, SHMC may recover from the Contractor actual damages suffered by SHMC because of the suspension, including additional administrative expenses and the cost of remedial actions taken by SHMC to correct any problem caused or aggravated by the suspension.

27.4 If the Work is suspended without good cause, or for the convenience of SHMC, or because of conditions or events for which SHMC is at fault, SHMC will compensate the Contractor for any direct costs caused by suspension plus mark-up as provided in Subsection 25.9, and the Contract Time will be extended accordingly.

27.5 If the work is suspended through no fault of the Contractor or SHMC, neither Party shall owe monetary compensation to the other for the suspension, but the Contract Time may be extended.

28 SALMON HARBOR MANAGEMENT COMMITTEE’S RIGHT TO INTERVENE IN THE WORK

28.1 If the Contractor abandons or suspends the Work unilaterally, persistently fails to comply with the Contract Documents, or fails to take actions that are required to prevent or mitigate injury to persons or damage to property or the environment, SHMC may take possession of the Work site, perform the Work with Materials and construction equipment at the Work Site, and take other action that SHMC deems necessary to protect SHMC’s interests, without compensation to the Contractor.

28.2 SHMC may take the actions described in this section before or concurrently with initiation and prosecution of Claims against the Contractor. The Contractor shall reimburse SHMC for the costs incurred by SHMC in taking action pursuant to this section.
29 COMPLIANCE WITH APPLICABLE LAWS

29.1 The Contract Documents will be interpreted and construed in accordance with Oregon law.

29.2 The Parties will comply with all Applicable Laws regardless of whether the laws are cited or stated verbatim in the Contract Documents.

29.3 SHMC will obtain all permits or approvals that are required for the Project by zoning, subdivision, or other land use and development laws. The Contractor shall obtain and pay for all other permits that are required for the Work by Applicable Laws.

29.4 Pursuant to ORS 279A.120(2)(a), the Contractor shall give preference to products that have been manufactured in Oregon, provided that price, fitness, availability, and quality are otherwise equal.

29.5 If the Contractor is not domiciled or registered to do business in the State of Oregon, and the Contract Price exceeds $10,000, the Contractor shall submit reports to the Oregon Department of Revenue as required by ORS 279A.120(3).

29.6 Pursuant to ORS 279C.505, the Contractor shall:

29.6.1 Make payment promptly, as due, to all persons providing to the Contractor labor or Material for the Work.

29.6.2 Pay all contributions or amounts due the Industrial Accident Fund from the Contractor or any Subcontractor incurred in the performance of the Work.

29.6.3 Not permit any lien or claim to be filed or prosecuted against SHMC on account of any labor or Materials furnished.

29.6.4 Pay to the Department of Revenue all sums withheld from employee’s wages pursuant to ORS 316.167.

29.6.5 Demonstrate to SHMC that an employee drug testing program is in place pursuant to ORS 279C.505(2).

29.7 Pursuant to ORS 279C.515, if the Contractor fails, neglects, or refuses to make prompt payment of any Third-Party claim for Work furnished to the Contractor or a Subcontractor by any person in connection with this Contract when due, SHMC may pay such Third-Party Claim to the person furnishing the Work and charge the amount of the payment against funds due or to become due the Contractor by reason of this Contract. SHMC may make payments by check or warrant naming both the Contractor and the person or entity entitled to payment under ORS 279C.515. The payment of a Third-Party Claim in the manner authorized in this subsection will not relieve the Contractor or the Contractor’s surety from the Contractor’s obligations with respect to any unpaid Third-Party Claims.

29.8 Pursuant to ORS 279C.515(2), if the Contractor or a first-tier Subcontractor fails, neglects or refuses to make payment to a person furnishing labor or materials in connection with the work within thirty (30) days after receipt of payment from SHMC for such work, the Contractor or first-tier Subcontractor shall owe the person the amount due plus interest charges commencing at the end of the ten (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 shall be computed pursuant to ORS 279C.515(2).

29.9 If the Contractor or a Subcontractor fails, neglects or refuses to pay a Third-Party Claim for materials or services, the Third Party may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580.

29.10 Pursuant to ORS 279C.530, the Contractor shall promptly, as due, make payment to any person or entity that furnishes medical, surgical or hospital care or other needed care and attention, incident to sickness or injury, to the employees of the Contractor, of all sums which the Contractor agrees to pay for such services and all moneys which the Contractor collected or deducted from the wages of the Contractor’s employees pursuant to any law, contract or agreement for the purpose of providing or paying for such service.

29.11 Pursuant to ORS 279C.520 and ORS 279C.540, unless the Contractor is a party to a valid, existing collective bargaining agreement with a labor organization which provides otherwise, no person shall be employed for the Work for more than 10 hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency, or where the public interest absolutely requires it, and in such cases, except for persons who provide personal services as defined in ORS 279C.100, the employee shall be paid at least time and half pay for:

29.11.1 All overtime in excess of eight hours a day or 40 hours in any one week when the work week is five (5) consecutive days, Monday through Friday;

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

29.11.3 All work performed on Saturday and on any legal holiday specified in ORS 279C.540(1)(B)(b).

29.12 The Contractor and all Subcontractors who perform construction work must be registered with the Construction Contractors Board pursuant to ORS 701.035 to 701.055.

29.13 Any landscape contractor who performs Work described in ORS 671.520 must hold a valid landscape contractor’s license issued under ORS 671.510 to 671.710.

29.14 Any provision of this Contract that reasonably could be deemed to create an obligation that violates the debt limitation of Article XI, Section 10 of the Oregon Constitution will be void.

29.15 The Contractor shall not provide or offer to provide, in connection with this Contract, any appreciable pecuniary or material benefit to any officer or employee of SHMC in violation of ORS Chapter 244 or Douglas County Personnel Rule 20.1.

30 PAYMENT OF PREVAILING WAGE RATES:

30.1 The Contractor and Subcontractors engaged in the Work shall comply with all applicable requirements of ORS 279C.800 to 279C.870. The Contractor and each Subcontractor shall pay to each worker employed by
the Contractor or Subcontractor the prevailing rate of wage established by the Commissioner of the Bureau of Labor and Industries for the worker’s trade or occupation. This invitation to bid and the resulting Contract are subject to the following Bureau of Labor and Industries (BOLI) wage requirements which are incorporated by reference: Prevailing Wage Rates for Public Works Contracts in Oregon, July 1, 2014. These BOLI wage rates are available online at http://egov.oregon.gov/BOLI/WHD/PWR/Jul-2014.

30.2 Each Subcontract shall include the provisions of this section and wage rates applicable to the Work performed under the Subcontract.

31 ENVIRONMENTAL LAWS


31.2 Pursuant to ORS 279C.510, if the Contract contains a demolition component, the Contractor shall salvage or recycle construction and demolition debris if feasible and cost-effective.

31.3 Except as provided in Subsection 14.2 or in the Specifications, the Contractor shall use recycled Materials and provide recycled Goods, to the extent required by ORS 279A.125.

31.4 The Contractor must obtain the Contract Administrator’s consent prior to bringing any Hazardous Substances onto the Premises other than fuel, oil, and lubricants for construction equipment or Hazardous Substances required by the Specifications. The Contractor shall undertake any preventive and remedial actions that are required by Environmental Laws for any Hazardous Substances that are brought upon, used, kept, or stored on the Premises by the Contractor or Subcontractors.

31.5 The Contractor shall implement precautions required for Hazardous Chemicals by ORS 654.750 or OAR Chapter 340 & 437 that may be encountered or used at the Work Site. The Parties will exchange material safety data sheets, label information, and instructions for precautionary measures for any Hazardous Chemicals kept at the Work site by SHMC or used for the Work by the Contractor.

31.6 Both Parties shall comply with the requirements of ORS 279C.525. The Contractor shall immediately notify the Contract Administrator if:

31.6.1 The contractor is delayed or must undertake additional Work because of Environmental Laws of Governmental Agencies that are not named in the Contract Documents or Environmental Laws that are enacted after the Bid is submitted; or

31.6.2 The Contractor encounters a condition that requires compliance with Environmental Laws that is not described in the Specifications, that is not caused by the Contractor, and that was not discoverable by a reasonable visual pre-bid inspection of the Work Site.
31.7 Except for emergencies or as otherwise required by an Environmental Law, the Contractor shall stop Work affected by a condition that is subject to Subsection 31.6.2. Upon receipt of notice from the Contractor under Subsection 31.6, SHMC may take, or the Contract Administrator may direct the Contractor to take, any actions required or allowed by ORS 279C.525 or by other Environmental Laws.

31.8 If a release of a reportable quantity of Hazardous Substances occurs at the Work Site, the Contractor shall immediately notify the Contract Administrator and give any notices to Governmental Agencies that are required by Environmental Laws. The Contractor shall take measures necessary to prevent or mitigate significant harm to human health or the environment, as required or allowed by Environmental Laws. Notice to the Contract Administrator shall describe the nature, time, and location of the release; containment and cleanup procedures that have been implemented; contacts with Governmental Agencies and actions taken by Governmental Agencies; and injuries to persons or damage to property caused by the release.

31.9 Pursuant to ORS 279C.525(1), the following list identifies Governmental Agencies of which SHMC has knowledge that have enacted Environmental Laws which may affect the performance of the Work.

**FEDERAL AGENCIES**

Department of Agriculture  
  Forest Service  
  Soil Conservation Service  
Department of Defense  
  U.S. Army Corps of Engineers  
Department of Interior  
  Bureau of Land Management  
  Heritage, Conservation, and Recreation  
  Service Bureau of Indian Affairs  
  Office of Surface Mining, Reclamation, and Enforcement Geological Survey  
U.S. Fish and Wildlife Service  
Department of Energy  
  Federal Energy Regulatory Commission  
Environmental Protection Agency  
Department of Health and Human Services Department of Housing and Urban Development Solar Energy and Energy Conservation Bank Department of Labor  
  Occupation Safety and Health Administration  
Department of Transportation  
  Federal Highway Administration
STATE AGENCIES

Department of Energy
Department of Agriculture
  Soil and Water Conservation
Division Department of Fish and Wildlife
Department of Forestry Bureau of Labor and Industries
Water Resources Department
Department of Human Resources
Department of Consumer and Business Services
Department of Environmental Quality
State Advisory Committee on Historic Preservation
Land Conservation and Development Commission
Division of State Lands
Department of Geology and Mineral Industries

LOCAL AGENCIES

Board of County Commissioners
City Councils

Historical Preservation Commission
Planning Commissions

Fire Protection Districts
Water Supply Districts

Soil and Water Conservation Districts
Sanitary Districts

Water Authorities

Water Improvement District
Water Control Districts
Drainage Districts

Port Districts

31.10 Pursuant to ORS 279C.525(2), the Specifications and Documents provided by SHMC pursuant to Section 8 identify all known conditions at the Work Site that may require the Contractor to comply with Environmental Laws.

31.11 The Contractor shall bear all expenses for precautionary measures, mitigation, containment, and cleanup required by this section, except as otherwise provided by the Contract Documents or Applicable Laws.

31.12 Upon completion of the Work, the Contractor shall certify to the Contract Administrator that all abatement, clean-up, and disposal of Hazardous
32 **PATENTED OR COPYRIGHTED ITEMS**

32.1 The Contractor warrants that SHMC’s use of any material, system, or other product for the Work will not infringe upon any patent, copyright, or any other proprietary right of any third party.

32.2 The Contractor shall provide to SHMC a nonexclusive, perpetual license to use computer software incorporated in the Work.

32.3 The Contractor shall pay all license fees, royalties, and other costs required by Applicable Laws or otherwise for use of any item that is subject to patent or copyright held by a third party.

33 **WARRANTIES**

33.1 Contractor warrants that the Work conforms to the Specifications.

33.2 All Goods that are provided by the Contractor in connection with the Work will be subject to the warranties provided by ORS 72.3120, 72.3130, 72.3140 and 72.3150.

33.3 Description of Materials and affirmations of qualities contained in documents submitted by the Contractor will constitute express warranties.

33.4 Standard warranties of manufacturers of Materials provided by the Contractor will apply to the extent that they enhance warranty protection for SHMC, but any provisions in manufacturer’s warranties that purport to limit the warranties will not affect the Contractor’s obligations under warranties stated in this section, the Specifications or other provisions of the Contract Documents.

34 **RISK OF LOSS**

34.1 Except as provided in Subsection 34.2, the Contractor will bear the risk of uninsured loss or damage to the Work which occurs prior to substantial completion of the Work.

34.2 **SHMC** will be responsible for a loss which occurs prior to substantial completion of the Work if such loss is caused solely by the acts or omissions of SHMC or its officers, agents, or employees.

34.3 After substantial completion of the Work, risk of uninsured loss or damage will be borne by SHMC, except loss or damage caused by the negligence or other wrongful acts or omissions of the Contractor, defects in the Work, or breach of warranty, which will be borne by the Contractor.

34.4 This subsection does not affect the obligations of the insurer under the policy provided pursuant to Section 40.

35 **NO THIRD-PARTY BENEFICIARIES**

35.1 The principals, employees, and agents of the Contractor and Subcontractors are not third-party beneficiaries of this Contract.

35.2 Notwithstanding Subsection 29.7, and ORS 279C.515, SHMC will not be obligated to pay any Subcontractor, Supplier, Employee of the Contractor, or
any other person or entity who performs Work or provides Materials, unless SHMC elects to accept assignment of a Subcontract under Section 17.

36 LIABILITY OF SHMC’S OFFICERS, EMPLOYEES, AND AGENTS – Officers, employees, and agents of SHMC will not have any personal liability to the Contractor or the successors, principals, Subcontractors, Supplies, insurers, or sureties of the Contractor for actions taken within the scope of their authority under the Contract Documents.

37 NO AGENCY – The Contractor, Subcontractors, Suppliers, and their principals, officers, employees and agents are not agents of SHMC as that term is used in ORS 30.265.

38 INDEMNIFICATION

38.1 Subject to Subsection 38.2, the Contractor shall defend and fully indemnify SHMC, the Port of Umpqua, Douglas County, and their officers, agents, and employees from Third-Party Claims resulting in whole or in part from:

38.1.1 The negligence or other torts of the Contractor or a Subcontractor;
38.1.2 Breach of the Contractor’s obligations under this Contract;
38.1.3 Any breach of any Subcontract or any contract between the Contractor and any third party concerning the Work;
38.1.4 Infringement of any interest described in Section 32 by Contractor or a Subcontractor;
38.1.5 Any violation of Applicable Law, including Environmental Laws, committed by the Contractor, a Subcontractor, or a Supplier;
38.1.6 Any other acts for which the Contractor is at fault.

38.2 Pursuant to ORS 30.140, the Contractor’s obligations and liabilities under Subsection 38.1 for Third-Party Claims arising out of death or bodily injury to persons or damage to property are limited to the extent that the Third-Party Claims arise out of the negligence or other fault of the Contractor, a Subcontractor, a Supplier, or the principals, officers, employees or agents of the Contractor, a Subcontractor, or a Supplier.

39 LIABILITY INSURANCE

39.1 The Contractor shall, at its own expense, at all times during the term of this Contract, maintain in force:

39.1.1 A commercial or comprehensive general liability insurance policy including coverage for completed operations and coverage for the Contractor’s obligations under Section 38 to the extent such obligations are insurable;
39.1.2 A comprehensive automobile liability insurance policy including owned and non-owned automobiles; and
39.1.3 An employer’s liability insurance policy.

39.2 The coverage under each policy must be equal to or greater than the limits for claims made under the Oregon Tort Claims Act (ORS 930.260 to 30.302) with minimum coverage as follows:
39.2.1 Commercial general liability limits of at least $1,000,000 combined single limit per occurrence and $2,000,000 in the aggregate.
39.2.2 Automobile liability limits of at least $1,000,000 combined single limit per accident.
39.2.3 Liability insurance must provide “occurrence” coverage. “Claims made” coverage will not be accepted. SHMC and SHMC’s officers, employees, and agents will be named as additional insureds on each policy.

40 PROPERTY INSURANCE

40.1 The Contractor, at its own expense, shall purchase and maintain builder’s risk property insurance covering the total value for the entire Work on a replacement cost basis without optional deductibles. The policy must insure against all risks of physical loss or damage to the Work from an external cause including, without limitation or duplication of coverage, physical loss or damage caused by fire, lightening, removal, theft, vandalism, malicious mischief, earth movement, collapse, water and windstorm. Coverage must include the interests of SHMC, the Contractor, Subcontractors, and Suppliers in the Work, including Materials stored at the Work Site, off the Work Site, or in transit. Coverage must be maintained until final payment is made or until SHMC has the sole insurable interest in the Work, whichever occurs later.
40.2 The Contractor will be responsible for payment of the amount of any deductible in the event of a paid claim.
40.3 All insured losses will be adjusted by SHMC and insurance proceeds will be paid to SHMC and disbursed by SHMC as fiduciary for the insureds, as their interests may appear.
40.4 If the Contractor maintains property insurance for the Contractor’s personal property, the insurer must execute a written waiver of subrogation against SHMC, which Contractor shall provide to the Contract Administrator.

41 GENERAL REQUIREMENTS FOR INSURANCE PROVIDED BY CONTRACTOR

41.1 Insurance that the Contractor is required to provide under the Contract Documents will be primary insurance for all claims and losses related to the Work.
41.2 Each policy provided by the Contractor must be issued by a responsible insurance company which is licensed to do business in the State of Oregon.
41.3 Prior to starting the Work, the Contractor shall provide certificates of insurance and endorsements for coverage required by this section, which will be subject to review and approval by the County Counsel. Each certificate must obligate the insurer to give written notice to SHMC thirty (30) days prior to termination or restriction of coverage and must name SHMC, the Port of Umpqua, Douglas County, and their officers, employees, and agents as additional insured. SHMC may reject a certificate which states that the insurer will merely “endeavor to mail” written notice.
41.4 In addition to the requirements of Subsection 41.3, above, the Contractor shall provide both verbal and written notice to SHMC immediately of any
change in insurance coverage maintained by the Contractor while the Contractor is performing the Work under this Contract.

42 WORKERS’ COMPENSATION

42.1 The Contractor is a “subject employer” as defined in ORS 656.005 and shall comply with ORS 656.017. All persons performing Work at the Work Site must be covered by workers’ compensation insurance, regardless of whether they are “non-subject workers” described in ORS 656.027.

42.2 Before the pre-construction conference, the Contractor shall provide to the Contract Administrator a certificate of insurance for workers’ compensation coverage in a form acceptable to County Counsel or a certificate of self-insurance issued by ODBCA pursuant to ORS 656.430.

43 BONDS

43.1 Before the pre-construction conference the Contractor shall provide a performance bond and a labor and materials payment bond that conforms to ORS 279C.380, both of which must be issued by a responsible surety company licensed to do business in the State of Oregon. Each bond must be in a form approved by County Counsel and in an amount equal to the Contract Price.

43.2 In lieu of a surety bond, the Contractor may submit a cashier’s check or certified check in the amount equal to 100 percent of the Contract Price. SHMC will negotiate the check and retain the moneys until the time limitation for claims against a bond expires or until all Third Party Claims against the moneys are resolved. SHMC will not pay the Contractor interest on the moneys.

43.3 Pursuant to ORS 279C.836, the Contractor shall, before starting work on the project, provide a public works bond to be filed with the Construction Contractor’s Board, unless exempt under ORS 279C.836(7) or (8).

44 PAYMENT

44.1 SHMC’s obligation to make payments under this Contract is conditioned upon appropriation of funds pursuant to the Oregon Local Budget Law. SHMC has appropriated funds for the Contract for fiscal year that ends on June 30 next following the date the Agreement is signed. If funds are not appropriated for Work performed in subsequent years, SHMC may terminate this Contract by notice to the Contractor.

44.2 The Schedule of Values must be consistent with the Contract Price Schedule and must divide Lump Sum Pay Items into parts that provide a reasonable basis for Progress Payments. An unbalanced Schedule of Values will be rejected. Within ten (10) days after receiving the proposed Schedule of Values, the Contract Administrator will either approve it or return it to the Contractor for revisions. The approved Schedule of Values will be part of the Contract Documents and will be amended to conform to changes in the Contract Price for Lump Sum Pay Items.

44.3 Within ten (10) days after the end of each month, the Contractor shall submit to the Contract Administrator an Application for Payment in a form provided by SHMC together with documentation required by the Contract Documents
or requested by the Contract Administrator. An Application for Payment must be consistent with the Contract Price Schedule and the approved Schedule of Values. If the Contractor is not a resident bidder, the Contractor shall submit proof of compliance ORS 279A.120(3) with the first Application for Payment.

44.4 SHMC will make monthly Progress Payments pursuant to ORS 279C.570 for Work that is completed or is in progress and for Materials that have been installed or are stored at the Work Site. By making a Progress Payments SHMC will not be deemed to accept defective Work or waiver of any breach of contract. The Contract Administrator will determine the amount of each Progress Payment based on:

44.4.1 The Contract Administrator’s estimate of the number of units of acceptable Unit Price Work performed by the Contractor and the Unit Prices stated in the Contract Price Schedule;
44.4.2 The Contract Administrator’s estimate of the percentage of Lump Sum items completed and the Schedule of Values;
44.4.3 Changes in the Contract Documents regarding measurement and payment that are made pursuant to Sections 24 and 25; and
44.4.4 Amounts that are withheld pursuant to this section.

44.5 Notwithstanding ORS 279C.555 or ORS 279C.570(7), SHMC shall retain 25% of any amount earned by Contractor on the public work until Contractor has filed certified statements of compliance with prevailing wage rate statues for the Contractor and all Subcontractors as required by ORS279C.845 or if the Contractor does not provide proof of compliance with ORS 279A.120(3) with the first Application for Payment.

44.6 SHMC may withhold from Progress Payments liquidated damages, the cost of correcting defective Work, and other damages and expenses for which the Contractor is responsible under the Contract Documents, subject to the provisions of the Contract Documents regarding Claims.

44.7 SHMC will withhold retainage equal to 5% of the value of completed Work pursuant to ORS 279C.550 to ORS 279C.570 until completion of all Work.

44.8 Final payment will be withheld until the Contractor submits to the Contract Administrator:

44.8.1 A written release of Claims in a form provided by the Contract Administrator which states that all Claims have been resolved, except for Claims pending under Section 48, Section 49, or Section 50 which are described in the release;
44.8.2 Written certification in a form provided by the Contract Administrator which states that all Subcontractors and Suppliers have been paid in full, that all obligations of the Contractor arising out of the Work have been satisfied, and that there are no liens of any kind outstanding against the Work;
44.8.3 Final As-Built Documents and other Documents required by Subsection 11.3;
44.8.4 Any records requested by the Contract Administrator to determine whether the Contractor’s certifications are accurate; and
44.8.5 Documents transferring title to the Work and any Goods provided by the Contractor to SHMC, free from any liens and encumbrances.
45 LIQUIDATED DAMAGES

45.1 If Substantial Completion is delayed beyond the expiration of the Contract Time, SHMC will suffer inconvenience and monetary damage, but ascertaining the actual loss sustained by SHMC may be difficult. In the absence of liquidated damages, SHMC may not have an adequate remedy if the Contractor delays Substantial Completion.

45.2 Contractor shall pay to SHMC any liquidated damages as stated in the Contract Documents for failure to complete the Work within the Contract Time. Notwithstanding any provision of this Contract that could be construed as conflicting with this Subsection 45.2, by submitting the Bid, the Contractor waives any contention or Claim that the liquidated damages constitute a penalty.

45.3 If liquidated damages are not stated in the Contract Documents, or if SHMC elects to forgo recovery of liquidated damages by written notice to the Contractor, SHMC will be entitled to recover actual damages resulting from delays for which Contractor is responsible.

46 CONTRACT CLOSEOUT

46.1 The Contractor shall notify the Contract Administrator when the Contractor deems the entire Work ready for its intended use. Within five (5) Working Days thereafter, the Contractor and the Contract Administrator shall inspect the Work. If the Contract Administrator does not deem the Work to be substantially complete, the Contract Administrator will notify the Contractor of Work that must be executed to reach Substantial Completion. If the Contract Administrator deems the Work substantially complete, the Contract Administrator will notify the Contractor of the date of Substantial Completion and provide a Punch List of items to be completed or corrected before final payment.

46.2 When the Work specified in the Punch List is complete and all defects are corrected, the Contractor shall notify the Contract Administrator. Within five (5) Working Days after receiving such notice, the Contract Administrator will inspect the Work and take one or more of the following actions:

46.2.1 Recommend that SHMC accept the completed Work;
46.2.2 Direct the Contractor to complete Work; or
46.2.3 Take any action allowed by Section 22 for defective Work.

46.3 Upon completion of the Work, or sooner if requested by the Contract Administrator, the Contractor shall return all keys, parking passes, identification badges, and other personal property provided by SHMC to facilitate the Work and deliver all Documents described in Subsection 11.3 to the Contract Administrator.

46.4 Upon final completion of all Work and performance of all of the Contractor’s obligations under the Contract Documents, SHMC will enter a written order accepting the Work.
47 LIMITATIONS ON CLAIMS

47.1 The Contractor cannot assert a Claim for damages or an increase in the Contract Price based on physical conditions at the Work Site or any form of “differing site conditions” unless:

47.1.1 The Claim is allowed by ORS 279C.525 or other Applicable Laws; or

47.1.2 The Claim is based on the negligence or other wrongful acts or omissions of SHMC, including material deficiency or inaccuracy of Documents provided by SHMC that could have been detected by SHMC with reasonable effort.

47.2 The Contractor may assert a Claim to obtain damages for a delay only if such damages are caused by an unreasonable delay that results directly and solely from the wrongful acts or omissions of SHMC. If SHMC must make a decision regarding the Work or the Contract Documents, any delay resulting from lack of a quorum or the requirements of the Oregon Public Meetings Law will be deemed reasonable, so long as SHMC endeavors in good faith to meet as soon as practicable.

47.3 The Contractor cannot assert a Claim based on breach of implied warranties of the Plans and Specifications unless the Contractor gives SHMC notice pursuant to Subsection 3.4.

47.4 The limitations in this section are in addition to other requirements for Claims under the Contract Documents.

48 PRELIMINARY CLAIMS RESOLUTION PROCESS

48.1 The Contractor must comply with this section if the Contractor contends that the Contractor is entitled to a change in the Contract Price, a change in the Contract Time, damages, or other relief under the Contract Documents because of any decision, act, or omission of SHMC or any officer, employee, or agent of SHMC. Notwithstanding Subsection 3.4, if the Contractor fails to comply with this section, the Claim will be deemed waived.

48.2 The Contractor must give notice of a Claim no later than ten (10) days after the occurrence on which the Claim is based and within thirty (30) days thereafter the Contractor shall submit a detailed statement of the Claim to the Contract Administrator which includes all facts on which the Claim is based, references to provision of the Contract Documents that are pertinent to the Claim, and the Contractor's rationale for the Claim. If the Claim involves Work performed by Subcontractors, the Contractor's shall provide the Contractor’s analysis and evaluation of the Subcontractor’s Claim.

48.3 Within thirty (30) days after the Contractor submits proper notice and a statement of a Claim, the Contract Administrator will review all information concerning the Claim and take one or more of the following actions:

48.3.1 Request additional information from the Contractor and suspend review of the Claim until such information is received;

48.3.2 Disallow the Claim by written notice to the Contractor; or
48.3.3 Prepare and execute a Change Order or issue a Work Change Directive changing the Contract Time or Contract Price or both.

48.4 If the Contract Administrator determines that SHMC is entitled to a change in the Contract Price or the Contract Time, damages, or any other relief under the Contract Documents, the Contract Administrator may submit written notice of a Claim to the Contractor within a reasonable time after the occurrence on which the Claim is based or within a reasonable time after the Contract Administrator discovers such occurrence. Within thirty (30) days after the Contractor receives notice of SHMC’s Claim, the Contractor shall submit a written reply providing any information requested by the Contract Administrator. Within thirty (30) days of receipt of the Contractor’s reply, the Contract Administrator will take appropriate action under Subsection 48.3 and give the Contractor notice of such action. This subsection does not limit SHMC’s right and powers to take unilateral action under other provisions of the Contract Documents.

48.5 Pending final resolution of a Claim, unless the Work is suspended under Section 27 the Contractor shall continue diligent prosecution of the Work.

49 MEDIATION

49.1 A decision of the Contract Administrator under Section 48 will be final and binding on the Contractor, unless the Contractor submits a request for mediation within ten (10) days after the Contract Administrator issues a written decision to the Contractor. SHMC may request mediation on any Claim of SHMC that is not resolved under Section 48.

49.2 A request for mediation shall be submitted in the same manner as notices under Section 6. Both Parties are obligated to participate in mediation before proceeding with litigation. Within ten (10) days after a timely request for mediation is made, representatives of the Parties will meet to select a mediator, and if they are unable to agree on a mediator within ten (10) days thereafter, either Party may petition the Circuit Court for Douglas County to appoint a mediator.

49.3 Procedures for mediation will be determined by the mediator. Each Party will pay its own costs for mediation, including attorney’s fees. The cost of the mediator’s services will be shared equally by the Parties. Both Parties shall endeavor in good faith to resolve all Claims in mediation.

50 LITIGATION

50.1 If a breach of contract occurs, and the resulting Claim is not resolved through mediation within thirty (30) days after the mediation process begins under Section 49, or if either Party refuses to participate in mediation, the Party injured by the breach may pursue any equitable or legal remedies available under Oregon Law. The enforcement of one remedy by a Party will not impair any other right or remedy.

50.2 Litigation arising out of this Contract will be conducted in Circuit Court of the State of Oregon for Douglas County.

51 TERMINATION FOR CONVENIENCE – In addition to SHMC’s right to terminate under Subsection 44.1 or Section 50 or under Applicable Laws, SHMC may
terminate the Contract in whole or in part if SHMC determines that termination of the Contract is in the best interest of the public. SHMC will endeavor to give the Contractor written notice thirty (30) days prior to the date of termination under this section, but failure to give such notice will not invalidate SHMC’s action.

52 ACTION UPON TERMINATION

52.1 Unless the Contract Administrator directs otherwise, upon receiving notice of termination, the Contractor shall stop the Work, terminate Subcontracts, stop orders for Materials, and surrender the Work Site to SHMC. The Contractor shall deliver to the Contract Administrator all Documents concerning the Work and property that the Contractor would be required to furnish upon Contract closeout. The Contract Administrator may direct the Contractor to take actions to preserve and protect completed Work and to leave Materials at the Work Site.

52.2 If SHMC terminates under Subsection 44.1 or Section 51 and the Contractor is not in default, SHMC will pay the Contractor for Work that is completed prior to termination, Work directed pursuant to Subsection 52.1, Materials that the Contractor is directed to leave at the Work Site, and reasonable expenses directly resulting from termination. If mobilization is not a Pay Item, the Contractor may request payment for actual mobilization costs that were allocated to terminated Work. The Contractor will not be entitled to payment for lost profits for any Work that is not performed prior to termination.

END OF SECTION
SECTION 00-5300

CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing the following Contract modifications:
   1. Salmon Harbor Management Committee’s Supplemental Instructions, (ASI).

B. Related Documents and Sections:
   1. General Conditions.
   2. Section 01-3000: Product Substitution Procedures, for administrative procedures for handling request for substitutions made after Contract award.
   3. Section 01-7000: Closeout Procedures, for requirements for inclusion of contract modifications in record documents.

1.02 RESPONSIBLE PARTIES

A. Immediately following Contract execution, Salmon Harbor Management Committee and Contractor to identify each person who is responsible for executing Change Orders and other modifications to the Contract.

1.03 DEFINITIONS

A. Request for Information (RFI):
   1. Written request submitted by Contractor to Salmon Harbor Management Committee on standard form requesting interpretation of Contract documents.
   2. An RFI shall only be used as a vehicle for confirming or verifying an issue through an interpretation of the Contract Documents; responses that result in change to Contract Documents and adjustment to Contract Sum and/or Contract Time must be documented in a Change Order.

B. Owner’s Supplemental Instructions/Architects Supplemental Instructions (ASI):
   1. SHMC’s written order of instruction to Contractor, signed by SHMC, that authorizes minor changes in Work that do not change Contract Sum or Contract Time.

C. Proposal Request (PR):
   1. Initiated by SHMC/Architect: Written request by SHMC to Contractor to quote change to Contract Sum and/or Contract Time for proposed change to Contract Documents.
   2. Initiated by Contractor: Written request by Contractor to SHMC proposing change to Contract Documents accompanied with quotation for change to Contract Sum and/or Contract Time.

D. Change Order (CO):
   1. Prepared by SHMC/Architect, signed by Contractor, Architect and SHMC stating their agreement to a change to the Contract Documents and adjustment to Contract Sum and/or Contract Time.

1.04 REQUEST FOR INFORMATION (RFI):

A. Submit RFIs numbered in sequential order, reviewed by Contractor with respect to construction documents, with the following information:
   1. Project name and address.
   2. Contractors name.
   3. Date of RFI.
   5. Signature of Contractor’s reviewer.
   6. Indicate “URGENT” on RFIs that may cause impact to the project schedule.
B. SHMC will receive RFIs only from the Contractor; SHMC will not accept RFIs directly from subcontractors, suppliers, or other entities.

C. SHMC will receive only legible, properly prepared RFIs.
   1. Unreadable facsimile machine RFIs, illegibly written RFIs, or RFIs with incomplete information, will be returned promptly without action.
   2. RFIs may be transmitted to SHMC by facsimile machine OR Email using PDF.
      a. SHMC will return response by same method received from Contractor.
      b. SHMC will review RFIs with respect to Contract Documents and return response within 7 calendar days.
         1) RFIs marked “URGENT” will take precedence, in order received, over outstanding RFIs and be answered by SHMC as soon as possible.

D. Contractor, in being fully familiar with Construction Documents, shall not be relieved of responsibility to coordinate the Work to prevent adverse impact to Project schedule when submitting RFIs to SHMC for interpretation of Contract Documents.

1.05 OWNER’S (ARCHITECT) SUPPLEMENTAL INSTRUCTIONS (ASI)

A. Supplemental Instructions may include supplementary or revised Drawings and/or Specifications to describe minor changes to Contract Documents.

B. Supplemental Instructions will be executed on a Form provided by SHMC and as attached to these specifications.

1.06 PROPOSAL REQUEST (PR)

A. Proposal Request Initiated by Salmon Harbor Management Committee/Architect:
   1. Proposal Request is a request for information only, and is not an instruction or authorization to execute the change, or an order to stop Work in progress.
   2. Proposal Request may include supplementary or revised Drawings and/or Specifications to describe a proposed change to Contract Documents.
   3. Contractor shall submit cost and/or time quotations to SHMC within 10 working days following receipt of Proposal Request.

B. Proposal Request Initiated by Contractor (Contractor Change Request):
   1. Proposal Request is for a change in the Work accompanied by a detailed quotation of impact on Contract Sum and/or Contract Time.
   2. Proposal Request may include revised Drawings and/or Specifications to describe a proposed change to Contract Documents.
   3. Proposal Request is a request for information only, and does not authorize the Contractor to execute the change or stop work in progress without SHMC’s authorization.
   4. Contractor initiated Proposal Requests may take the form of a “Claim” where Contractor finds it necessary for proper execution of the Work, to propose a change in the Work that is not shown or indicated in Contract Documents, and may affect Contract Sum and/or Contract Time, for which no Proposal Request or Construction Change Authorization has been issued by SHMC.
      a. Contractor’s determination that SHMC’s response to an RFI which affects Contract Sum and/or Contract Time may be addressed in a Proposal Request.
   5. SHMC shall respond to Contractor initiated proposals within 10 working days following receipt of Proposal Request.

1.07 CHANGE ORDERS

A. SHMC/Architect will prepare each Change Order utilizing a suitable form.

B. Changes to Project Contract Sum and/or Contract Time listed or indicated in Change Orders shall include or be determined by methods described in the General Conditions, and as follows:
   1. Proposal Requests approved for change to Contract Documents by SHMC that have not been converted to a Construction Change Directive.
   2. Construction Change Directives where SHMC and Contractor have agreed to change in Project Contract Sum and/or Contract Time.
3. Changes to Project Contract Sum and/or Contract Time that have not been documented by Proposal Request or Construction Change Directive, but have been agreed upon by SHMC and Contractor.

1.08 DOCUMENTATION FOR CONTRACT MODIFICATIONS

A. Cost and Time Quotations: Support quotation for changes in the Work with sufficient substantiating data to allow SHMC to evaluate quotation, to include the following:
   1. Labor expended in hours and unit cost.
   2. Equipment cost.
   3. Products, with quantities used and unit cost, including purchase source.
   4. Taxes, Insurance, and Bonds.
   5. Credit for deleted work where applicable with same documentation as required for cost increases for additional work.
   6. Overhead and profit, determined after credits have been deducted from additions.

B. For claims for Work not authorized through Proposal Requests or Construction Change Directives, provide supporting documentation for each claim for additional cost as indicated above for cost and time quotations with the following additional information:
   1. Name of SHMC’s authorized agent who ordered work, and date of Order.
   2. Dates and hours work performed, and by whom.
   3. Timecard records, including summary of hours worked, and hourly rates paid.
   4. Receipts and invoices for products used including quantities and unit costs.
   5. Receipts and invoices for equipment utilized, including dates and time of use.
   6. Provide the same documentation indicated above for subcontracts same as required for Contractor’s own forces.

C. Document requests for Product substitutions according to requirements of Section 01630.

1.09 CORRELATING CHANGE ORDERS WITH OTHER REQUIREMENTS

A. Revise Schedule of Values and Applications for Payment to record each Change Order as separate item of work with adjustment to Contract Sum and Contract Time as described in Section 44 of the General Conditions for Construction Contracts: Payment.

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 modifications to Contract Documents.

D. Record modifications in Record Documents.

PART 2 PRODUCTS

2.01 FORMS - ATTACHED FOLLOWING THIS SECTION:

A. Change Order
B. Architects Supplemental Instructions
C. Proposal Request

PART 3 EXECUTION - NOT USED

END OF SECTION
CHANGE ORDER

CHANGE ORDER NUMBER: One (1)

DATE: 

PROJECT NO.: 

CONTRACT DATE: 

You are directed to make the following changes in this Contract:

Not valid until signed by the Owner, Architect, and Contractor.

The original Contract Sum was
Net Change by previously authorized Change Orders $ -
The Contract Sum prior to this Change Order was $ -
The Contract Sum will be changed by this Change Order in the amount of $ -
The new Contract Sum including this Change Order will be $ -
The Contract Time will be 
The Date of Completion as of the date of this Change Order therefore is 

Architect: HGE INC., Architects, Engineers & Planners
333 South 4th Street, Coos Bay, Oregon 97420

Contractor: 

Owner: Salmon Harbor Management Committee
P.O. Box 1007 / 100 Ork Road
Winchester Bay, Oregon 97467

By: __________________________ By: __________________________ By: __________________________
**ARCHITECT’S PROPOSAL REQUEST #1**

**PROPOSAL REQUEST NO.:** ONE (1)  
**DATE OF ISSUANCE:**  
**PROJECT NO.:**  
**CONTRACT DATED:** 15.68

**TO:**  
**PROJECT:** Salmon Harbor Marina RV  
Restroom/Laundry/Shower Building  
**CONTRACT FOR:** Salmon Harbor Marina RV Expansion

**ARCHITECT:**  
HGE INC.  
333 South 4th Street  
Coos Bay, Oregon 97420

**OWNER:**  
Salmon Harbor Management Committee  
PO Box 1007 / 100 Ork Rock Road,  
Winchester Bay, Oregon 97467

---

*Please submit an itemized quotation for changes in the contract sum and/or time incidental to proposed modifications to the Contract Documents described herein.*

**THIS IS NOT A CHANGE ORDER NOR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED HEREIN.**

---

**DESCRIPTION:**

1.

**ATTACHMENTS:**

Add: $ ________________  
Signed: ________________  
Date: ________________

---

**REQUESTED BY:** Joe Slack, Architect, AIA  
HGE Inc., Architects, Engineers & Planners  
333 S. 4th Street, Coos Bay, Oregon  97420

**DISTRIBUTION:**  
(VIA EMAIL)
ARCHITECT’S
SUPPLEMENTAL INSTRUCTION #1

PROJECT: Salmon Harbor Marina RV Expansion – Restroom/Laundry/Shower Building
OWNER: Salmon Harbor Management Committee
PO Box 1007 / 100 Ork Rock Road
Winchester Bay, Oregon 97467

PROJECT NO.: 15.68
DATE OF ISSUANCE:
CONTRACT DATE:

TO
CONTRACTOR: To Be Determined

The work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.

DESCRIPTION:

1.

ATTACHMENTS:

ISSUED BY: Joe Slack, Architect, AIA
HGE Inc., Architects, Engineers & Planners
333 S. 4th Street, Coos Bay, Oregon 97420

DISTRIBUTION: (via email)
GEOTECHNICAL STUDY AND REPORT

SALMON HARBOR MARINA
R.V. EXPANSION
WINCHESTER BAY, OREGON

Pinnacle Engineering, Inc.

Matt Keller, PE, CSI
Project Engineer
President

Project #30068.03
20 August 2018

Expires: 06/30/2019
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GEOTECHNICAL STUDY AND REPORT  
SALMON HARBOR MARINA, RV EXPANSION  
WINCHESTER BAY, OREGON

A. EXECUTIVE SUMMARY

It is our opinion, supported by field investigations, laboratory tests and geotechnical analysis, that the existing and proposed site work, soils and geological conditions at the project site are suitable for the proposed building, provided the recommendations of our report are incorporated during design and construction.

Special attention will be required during site preparation, construction of the building foundations and drainage features and other associated improvements. Subsequent sections of this report provide geotechnical recommendations for design and construction of the planned project.

- Local deposits of unsuitable soils may be encountered and would require excavation and disposal.
- Construction Materials Engineering and Testing (CoMET) services of site cuts and fills, compaction testing and observation of construction of slopes and drainage features is recommended.
- CoMET of structural fill and MSE or other retaining walls is required.
- Review of site and foundation design by the geotechnical engineer is recommended prior to beginning construction.

The following sections of this report provide geotechnical recommendations for design and construction of the planned project.

B. INTRODUCTION

B.1. Purpose and Scope

The Salmon Harbor Marina, seeking to expand upon its successful RV Park located on the west spit, has decided to construct an additional 40 recreational vehicle camp sites, associated parking and recreational facilities, pave additional access roads, a laundry/restroom facility and a number of small, ancillary sign and kiosk structures. This report presents the results of field exploration, laboratory tests and geotechnical recommendations for foundation design.

Field investigations consisted of three drill advanced borings, two backhoe test pits, and a geotechnical reconnaissance of the site. Soil samples were retrieved from the borings for laboratory testing and further studies necessary to formulate recommendations for design of the components of the proposed facility, to evaluate potential complications that may occur during construction and to assess long term performance of foundation(s) and paved areas.

B.2. Site and Project Description

The Marina RV Resort site is located in the, Township 22S, Range 13W, W.M., on the west spit. It is bounded on the west and north side by the main channel of the Umpqua
River, on the south side by Salmon Harbor Drive, and on the east side by the harbor facility.

The location investigated is approximately 600 feet by 600 feet in plan and slopes generally south away from the main channel. A vicinity map depicting the site and general surrounding area is presented as Figure 1. Preliminary layout of the improvements is shown on Figure 2, as are test boring and test pit locations.

For the purposes of this analysis, maximum foundation loads were assumed to be from bearing walls, and to be less than 1 kip/lf in magnitude. Structure type was assumed to be light frame, with masonry bearing walls a possible alternate.

Pertinent geotechnical factors that may influence design and construction include;

- An irregular shaped deposit of highly organic dredge spoils undefined in plan and of varying depth throughout the study area and
- Stability of excavations during construction of all utility trenches and/or deep foundations.

If excavation deeper than about eight feet is required, subsurface water will likely be of concern. In order to construct excavations near the free water elevation, dewatering will be necessary. If dewatering is required, well points are recommended as the most suitable process, however other dewatering methods may also prove satisfactory.

Stability of excavations will be of normal concern during construction, as the overburden soils are predominantly granular and nearly cohesionless. Shoring or benching will be required for all excavations deeper than four feet. Excavation into or through the organic component of dredge spoils, more fully discussed below, will likely require shoring nearer the surface, as the material exhibits little shear strength and can flow plastically under normal conditions and without load.

Site soils are non expansive.

C. TOPOGRAPHIC MAPPING

Topographic surveys were not conducted for this effort.

D. GEOLOGIC SITE CHARACTERIZATION

Geologic and geotechnical terms used in this report are defined in Figure 3. Surface geologic mapping of the site is presented as Figure 4.

D.1 Regional Geology

The project site is located approximately 50 miles east of the Cascadia Subduction Zone. The Cascadia Subduction Zone reflects subduction of the Juan de Fuca plate beneath the western edge of the North American continental shelf. ¹

D.2 Project Area Geology

The site soils consist of a man made layer of dredge spoils placed in geologic recent time over existing Quaternary Alluvium, in turn underlain by the Tyee-Elkton formation.

**Quaternary Alluvium (Qal)** – Alluvial deposits cover the valley floors of parts of many of the major streams in the Coast Range Province. Major deposits of Quaternary alluvium include those along the Umpqua, North Umpqua and South Umpqua Rivers in the Roseburg and Elkton areas. The flat bottom lands represent local flood plain deposits which were formed as the stream established a series of local base levels while cutting through barriers in the more resistant parts of the Coast Range to the west. The alluvium is composed of silts and pebbly sands with lenses of gravel in places. At present, most of the streams are dissecting the alluvial fill. Locally, terraces are preserved along the sides of the valleys as at Reedsport. The flat land is valuable and in places may contain economic deposits of sand and gravel.

**Tyee-Elkton Formation (Tet)** - The Tyee Formation was described and defined by Diller (1898) in the Roseburg Quadrangle. Baldwin (1961) assigned the finer-grained siltstones which comprise the upper parts of the section to the Elkton siltstone member (Tee) of the Tyee Formation. Subsequently Thoms (1965) and Bird (1967) proposed elevating the unit to formational status in their respective theses. Lovell (1969) treats the unit as a formation. To date, however, no formal definition of the Elkton siltstone as a formation has been forthcoming.

**D.3. Seismicity and Seismotectonic Considerations**

Local faults generally trend from north to south, and include both normal and thrust type events. Inactive fault locations relative to the project site are depicted on Figure 4.

**D.3.a. Area and Site Seismicity**

Extensive seismotectonic studies have concluded that western Oregon is subject to a much greater likelihood of both random and plate-subduction seismic events of far greater magnitude and far more frequently than was formerly believed. The area west of the Coast Range falls within Seismic Zone 4 for Uniform Building Code purposes, requiring a Seismic Zone Factor of 0.4 for design.

The site is located within 100 miles of an accretionary wedge associate with subduction of the Juan de Fuca plate and is between five and thirty miles of the Heceta South Fault and the Coos Basin Fault. Maximum credible magnitude distributions for the faults are estimated to be in the range of 6.5 to 7.

The design spectral response acceleration expected in the project area is as follows;

\[
S_S = 1.333 \text{ g} \quad S_{MS} = 1.333 \text{ g} \quad S_{DS} = 0.889 \text{ g} \\
S_1 = 0.694 \text{ g} \quad S_{M1} = 1.042 \text{ g} \quad S_{D1} = 0.694 \text{ g}
\]
D.3.b. Site Stability

The test borings indicate that, beneath a very thin vegetative mantle, the area is underlain by very loose to loose sands. Although a seismic refraction survey was not within the scope of services, experience indicates that the sand can be expected to transmit lateral accelerations representative of a velocity range of less than 600 feet per second.

The soils underlying the project site are likely to be very stable during seismic events having a reasonable probability of occurrence. There is no likelihood of damaging liquefaction under the loads proposed.

D.3.c. Site Classification

Beneath the area is generally underlain by a surface layer of SAND over a layer of sandy CLAY. Soils underlying the site are consistent with Site Class D, as defined by current Oregon Structural Specialty Code (OSSC).

D.3.d. Seismic Refraction Survey

A seismic refraction survey was neither requested by our client nor conducted for this investigation. Qualitatively;

- The near surface soils are underlain at shallow depth by low plasticity sandy SILT, which can be expected to transmit lateral accelerations typical of a lower velocity range of 400 to 600 ft/sec.
- Underlying the high plasticity clayey SILT material, the SAND material can be expected to transmit lateral accelerations typical of a lower velocity range of 400 to 600 ft/sec.
- Underlying the SAND material, the low plasticity sandy CLAY material can be expected to transmit lateral accelerations typical of a lower velocity range of 400 to 600 ft/sec.

E. FIELD STUDIES

E.1. Surface Reconnaissance

In conjunction with the geologic and geotechnical site characterization, a surface reconnaissance was conducted at and adjacent to the project site. The surface reconnaissance concluded that there were no observable site defects that would compromise viability of the site for its intended purpose.

The reconnaissance determined that the site, although prone to both flooding and impact in the event of tsunami, is stable.

E.2. Surface Hydrology

The shallow natural CLAY and SILT layers are relatively impermeable and, therefore, retard percolation of surface water. Although retarded, the surface water typically penetrates through fractures in the rock, which results in retention of much of the
seepage close to the surface. The underlying CLAY and SILT interface appears to transmit a small to moderate amount of water year round, increasing during wet months.

Post development, the surface water runoff will be conveyed via gutters, ditches and storm drains then, ultimately, the Umpqua River.

E.3.  Field Observations

Field observations included soil description, classification, qualitative density measurement, thickness measurement of the various soil horizons and depth to or presence of groundwater.

E.4.  Site Exploration and Field Testing

Three borings, designated TB1 through TB3, were drilled at the locations shown on Figure 2. All borings were drilled by Western Testing, LLC (WTL) using a truck-mounted Back Country Badger drill rig which advanced 6" diameter continuous flight hollow stem auger to a depth of approximately twelve feet. The drilling and sampling operations were performed and the drill holes logged by a Certified Soils Technician, under the supervision of a registered Professional Engineer.

Soils retrieved from auger cuttings were continuously classified during drilling by our Technician.

Samples were taken in each boring, at approximate 4 foot intervals and at soil horizon changes apparent from drill cuttings. Most of the samples were obtained using a split spoon advanced by the Standard Penetration Test Method, which also provides an accurate measure of soil density. The Standard Penetration Test measures the resistance to penetration of a 2" diameter sampler driven by a 30" drop of a 140 pound hammer and provides a disturbed, but representative sample suitable for classification and other testing.

Undisturbed samples of cohesive materials were taken by advancing thin wall tubes at the locations and depths noted on the drill logs. Samples were recovered from the thin wall tubes and tested to determine plasticity index, natural moisture/density relationship and other benchmark tests. Finally, bulk samples were taken at the depths and locations indicated on the drill logs for other laboratory tests.

The drill holes were filled with cuttings immediately upon completion of drilling. Bentonite seals were not required.

The summary logs of test borings are contained in Appendix A. Please note that soil descriptions and horizons shown in field logs are distinctive. Actual changes in soil horizons are gradual. Water levels are for the dates of observation and are likely to vary seasonally.

Field testing included the Standard Penetration Tests described above. Additional representative soil samples were obtained for laboratory analysis to determine classification, natural moisture and density, plasticity index, coarse particle specific gravity, coarse particle distribution, consolidation characteristics of the fine grained portions and moisture density relationship.
Two test pits, TP1 and TP2 were advanced to twelve feet using a CAT 420D Back Hoe with a 20” bucket. Test pit locations were selected by the geotechnical engineer and are depicted on Figure 2. The excavations were observed, logged and samples retrieved by a certified technician. The summary logs of test pits are contained in Appendix A.

Samples were retrieved in each test pit at visible soil horizon changes. Most of the samples were obtained using a Modified California Barrel advanced by hand driving, which provides a measure of soil density while recovering moderately disturbed samples for strength and performance testing. Bulk samples were retrieved at the depths and locations indicated on the test pit logs.

In addition to basic field soil classification tests, in situ field density tests were conducted on natural site soils.

The test pits were left unfilled for a brief time to allow groundwater levels to stabilize if present. Groundwater was not encountered at any of the test pit locations.

Please note that shear strengths and estimated bearing capacities noted on the field logs are field estimates of ultimate values, recorded for correlation of laboratory results and are only provided for comparative purposes. They should not be used for design. We should be contacted before utilization of values other than those recommended in Section G to confirm applicability and that the designer’s interpretation is consistent with our understanding of design properties.

E.5. Geotechnical Characterization

The site soils average more than 14 feet in depth at the site, and are likely to be consistent within the influence area and depth of each foundation. Shallow soils are generally very loose to loose sands with a silt component. The shallow soils are compactible, after removal of the vegetative component, and may be used as site fills. The vegetative component is suitable for use as landscaping material.

E.6. Groundwater

Groundwater (the phreatic surface) was observed in test borings 1 and 2 at depths of 12 feet and 8 feet respectively. Groundwater was not clearly identified during exploration due to caving of the drill holes, however is likely to closely reflect water surface elevations of the harbor. We project that the average high groundwater elevation will be approximately 10 feet below the finished surface.

E.7. Subsurface Soil Conditions

The surface layer along the north margin of the site consists of a thin layer of sandy SILT approximately five feet thick. Underlying the sandy SILT is a layer of SAND approximately four feet thick which transitions to a layer of sandy CLAY at a depth of approximately eight feet.

The surface layer along the south margin of the site consists of a layer of sand that transitions to a layer of sandy CLAY at an approximate depth of eight feet.
E.8. **Soil Permeability**

Permeability tests were not performed for this study. Qualitatively, flow velocities within the proposed structural fill soil can be expected to range between $10^{-4}$ and $10^{-5}$ cm/sec and as high as $10^{-2}$ cm/sec at the bedrock interface where fine grained soils transition to weathered formation material. Where sandy layers exist, their permeability will be on the order of $10^{-3}$ cm/sec.

**F. LABORATORY TESTING**

All of the samples recovered during the site exploration were visually reexamined at our Roseburg laboratory to verify the field descriptions. To assist in soil classification and assessing long term stability of the site soils, physical characteristics, including bearing capacity, consolidation, unconfined compressive strength, natural moisture/density relationship, plasticity indices and sieve analyses were determined for the fine grained portion of all samples. Samples were then classified in conformance with the Unified Soil Classification System (USCS) per ASTM D-2487.

**F.1. Soil Classification**

The USCS identifies soil type by single letter prefix and subgroup by single letter suffix as follows:

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Prefix</th>
<th>Subgroup</th>
<th>Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel</td>
<td>G</td>
<td>Well Graded</td>
<td>W</td>
</tr>
<tr>
<td>Sand</td>
<td>S</td>
<td>Poorly Graded</td>
<td>P</td>
</tr>
<tr>
<td>Silt</td>
<td>M</td>
<td>Silty</td>
<td>M</td>
</tr>
<tr>
<td>Clay</td>
<td>C</td>
<td>Clayey</td>
<td>C</td>
</tr>
<tr>
<td>Organic</td>
<td>O</td>
<td>$w_L &lt; 50$ per cent</td>
<td>L</td>
</tr>
<tr>
<td>Peat</td>
<td>Pt</td>
<td>$w_H &gt; 50$ per cent</td>
<td>H</td>
</tr>
</tbody>
</table>

**F.2. Electro-Chemical Parameters**

Tests to determine electro-chemical characteristics were beyond the scope of this effort. In the event that chemically sensitive construction materials are proposed, we should be contacted and additional testing performed.

Considering the geologic parent material of Quaternary Alluvium, we recommend use of Type II cement (sulfate resistant) for concrete mix to be used in construction.

**F.3. Strength Parameters**

Strength parameters of cohesionless material were determined by the Standard Penetration Test, which are recorded on each Summary Log of Borings. The granular soils exhibit ultimate strengths ranging from 1,500 to 3,500 psf.
F.4. Performance Parameters

In addition to the strength parameters described above, consolidation characteristics of the soil were carefully considered, both in terms of primary and secondary (long term) settlement.

The granular materials are loose to very loose and will deform (consolidate) upon application of induced loads. The primary consolidation will be nearly immediate. Secondary consolidation will have occurred prior to completion of construction. Accordingly, there is little risk of long term settlement.

The organic component is present at a depth of 8'-0" below ground surface. This material has been pre-consolidated under the fill above. There is low risk of settlement of this material.

Recommended bearing pressures are presented in Section G of this report.

G. ENGINEERING STUDIES AND RECOMMENDATIONS

G.1. General

The engineering studies and recommendations summarized in this section provide design parameters for foundations for the proposed structure and for associated construction.

For the purposes of this analysis, column loads were assumed to be on the order of 40 kips. Wall loads were assumed to be on the order of 1 kip/lf. The dead load component was estimated to be 50% of total load.

All density criteria presented herein refer to ASTM D 1557 (Modified Proctor) at optimum to 2% above optimum moisture, unless specifically noted otherwise.

Pertinent geotechnical factors that may influence design and construction include;

- Control of both ground and surface water will be required during construction to facilitate constructability and during the life of the project to assure satisfactory long term performance.
- Stability of excavations during construction of all structures and trenches will require careful monitoring by the contractor.

G.2. Site Preparation and Grading

G.2.a. Clearing, Grubbing and Stripping

Because of the site topography, cuts and, to a lesser extent, fills will be required to accomplish overlot grading for the RV facility. Dredge spoils may be discovered during excavation at the site. If encountered, they will require removal and disposal. Prior to placement of fill, all existing top growth, sod and other deleterious material should be stripped from the site and disposed.
Excavated material can be expected to gain volume (fluff) between 5% and 10%, depending upon moisture content and method of excavation. Site materials used for fills can be expected to lose approximately 10% volume due to drying and consolidation.

PEI should be contacted to verify suitable subgrade.

G.2.b Removal of Unsuitable Soil

Where areas of unsuitable soil, wood waste, building debris or other deleterious materials are encountered during excavation, they should be removed and replaced with compacted structural fill with the over-excavation lined with Type 2 drainage geotextile as recommended or specified by Engineer.

G.2.c. Density Testing and Subgrade Re-compaction

After stripping, the exposed subgrade should be tested per Oregon Department of Transportation Test Method 158 (ODOT TM 158) and observed by the geotechnical engineer's representative. Such testing should not be attempted in wet weather and should be discontinued if the subgrade pumps, deflects under load or otherwise deforms.

Where soils are disturbed or if they pump when tested, they should be excavated, moisture conditioned and re-compacted or be replaced with imported structural fill. Effective re-compaction of the fine grained soil will require moisture conditioning. Moisture conditioning and re-compaction beneath pavement or slabs should extend to a depth of between 10 and 12 inches. The re-compaction should achieve 90% of maximum density, as determined by ASTM D-1557.

In locations where the subgrade consists of soils that are firm and generally unyielding, moisture conditioning and re-compaction is not required. We should be contacted to perform in situ strength tests of subgrade soils and to advise regarding moisture conditioning and compaction.

G.3. Structural Fill Placement and Compaction

Structural fill is defined as any fill placed and compacted to specified densities and located under roadways, structures, driveways, sidewalks and other load-bearing areas, and specifically includes all site fills more than 4 feet thick.

G.3.a. Structural Fill Materials

Structural fill should consist of a free-draining granular material with a maximum particle size of 8 inches or 2/3 of the un-compacted lift thickness, whichever is lesser. The material should be well graded with less than 5 percent non-plastic fines. During dry weather, any organic-free, non-expansive, compactable granular material meeting the maximum size criteria is typically acceptable for this use. Locally available crushed rock and jaw run crushed shale have performed adequately for most applications of structural fill.
G.3.b. Structural Fill Placement

Structural fill should be placed in horizontal lifts not exceeding 8 inches loose thickness, or thinner if necessary to obtain specified density. Each lift should be compacted to 90% of the maximum density. The lift thickness may be increased if specified density is consistently being exceeded and approved by the Engineer.

In order to accomplish effective compaction for the full fill footprint, we recommend that fills be over built by five feet, then the face cut back to achieve the design fill face.

Structural fill placed beneath footings or other structural elements should be centered on the footing. Thickness of the structural fill will vary depending on the depth of suitable bearing conditions. The width of structural fill should be equal to the width of footing plus twice the depth of the structural fill beneath the footing.

G.3.c. Compaction

To facilitate the earthwork and compaction process, the earthwork contractor should place and compact fill materials at 1% to 2% above their optimum moisture content. If fill source soils are too wet to compact, they may be dried by continuous windrowing and aeration to achieve optimum moisture. If soils become dry, moisture should be added to maintain the moisture content at or near optimum during compaction operations.

If soil having swell potential is used for fills beneath structures, it should be moisture conditioned to 2% to 4% over optimum and compacted to 88% of maximum density. Swell properties should be determined by laboratory testing prior to use as structural fill.

G.3.c.1. Fill Observation and Testing Methods - Field density testing by nuclear methods is appropriate for compaction of 2½ - inch to ¾ - inch minus crushed base rock, fine grained soils, decomposed granite and other materials 2½ inches or smaller in size. Due to the effect of particle size on test methods, other methods of compaction testing may be favored. Testing of only the upper lifts is not adequate to verify compaction.

G.3.d. Non-Structural Fill

Stripped material should not be used as fill beneath permanent structures, roadway embankments, or as retaining wall backfill. If used as landscape fill, it should be placed and compacted to 88% density at 2% above optimum moisture and thoroughly processed to create a homogeneous fill. It should be limited to non-structural berms less than ten feet in height and having slopes no steeper than 3 ½ H to1 V. Surface shrinkage cracks and long-term creep of even relatively flat slopes is probable on the surface of these silty SAND fills.

G.4. Slopes

Temporary cut and low, permanent fill slopes will be required for construction of the site fill and structure pad.
G.4.a. Cut Slopes

Permanent cut slopes will result from site excavation, overlot grading and placement of fills. Temporary cut slopes will be required for construction of retaining structures and other portions of the project. For brief periods, these may be excavated at steeper angles than listed above. The SILT soil may stand vertical to a depth of 4 feet for brief periods, except where saturated. In deeper trenches, side walls are likely to slough. We recommend cut slope angles no steeper than;

<table>
<thead>
<tr>
<th>Soil Classification</th>
<th>Type of Cut</th>
<th>Inclination</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAND</td>
<td>Temporary Cuts</td>
<td>1 H to 1V</td>
</tr>
<tr>
<td>SAND</td>
<td>Permanent Cuts</td>
<td>1¾ H to 1V</td>
</tr>
<tr>
<td>silty SAND</td>
<td>Temporary Cuts</td>
<td>1¼ H to 1V</td>
</tr>
<tr>
<td>silty SAND</td>
<td>Permanent Cuts</td>
<td>2 H to 1V</td>
</tr>
</tbody>
</table>

G.4.b. Fill Slopes

Permanent fill will be required to achieve a level pad. Fills may be constructed of imported rock, SHALE, SANDSTONE or compacted, blended, clean natural soil. All materials should be considered and constructed as Structural Fill, compacted as described above.

We recommend the following steepest fill slope inclinations.

<table>
<thead>
<tr>
<th>Soil Classification</th>
<th>Type of Fill</th>
<th>Inclination</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAND/silty SAND</td>
<td>All</td>
<td>1¾ H to 1V</td>
</tr>
<tr>
<td>Clean, crushed sedimentary rock</td>
<td>All</td>
<td>1¾ H to 1V</td>
</tr>
<tr>
<td>Compacted, crushed base course</td>
<td>All</td>
<td>1½ H to 1V</td>
</tr>
</tbody>
</table>

G.5. Paved Areas and Non-Structural Slabs on Grade

G.5.a. Density Testing and Subgrade Re-compaction

After stripping, the subgrade should be moisture conditioned and compacted to 90% of maximum dry density as determined by the Modified Proctor Compaction Test (ASTM D-1557) or 70% relative density. The compacted subgrade should then be proof rolled with a loaded dump truck or similar heavy vehicle to detect any unusually soft areas or organic deposits which would require removal and re-compaction.

G.5.b. Structural Fill Materials

Except for organic components, material excavated from the site may be used as fill.

G.5.c. Structural Fill Placement and Compaction

Beneath permanent structures or roadways, fill should be placed in lifts not exceeding 9 inches thick, measured loose, compacted to 90% of the maximum
dry density determined by ASTM D-1557, at plus or minus 2% of optimum moisture or at 70% relative density. Fills not beneath structures or paving may be compacted to 88% dry density per ASTM D-1557.

**G.5.d. Removal of Unsuitable Soil**

Soft areas discovered during proof rolling should be over excavated and filled with compactible material compacted as described above.

**G.6. Site Drainage and Erosion Control**

**G.6.a. Buildings**

Final grading should accomplish rapid positive drainage away from the structure for a horizontal distance of at least 10 feet at a minimum grade of 10%. This water should be channeled to surface drains or swales for proper disposal. The landscaping around the structure should be graded such that drainage discharges clear of the foundation influence area. Downspouts should be connected to a sealed system which discharges to a location clear of the foundation influence area.

**G.6.b. Surface Areas**

Surface and subsurface water flows should be intercepted by swales and/or catch basins and conveyed through tight lines to acceptable discharge locations. We recommend that hard surfaces be provided, sloped and shaped to channel water away from the structure.

**G.6.c. Erosion Control**

Site soils are moderately susceptible to erosion if unprotected. The site grades are such that erosion and sediment transport during construction are not expected to be significant. The site cuts and fills, building pad, etc. should be graded such that surface water is collected and disposed without causing erosion or siltation. Sediment laden water should not be allowed to flow directly into streams or off-site drainage systems.

Typical project landscaping should be adequate for long-term erosion control.

**G.7. Building Foundations**

**G.7.a. General**

A combination of spread and continuous footings is recommended for the structure. To compensate for swell pressures, footings should bear on non-swelling imported structural fill.

**G.7.b. Imported Fill**

**G.7.b.1. Subgrade Preparation** - After excavation, the subgrade should be moisture conditioned and compacted to 88% of maximum dry density at 2% above optimum moisture.
G.7.b.2. Structural Fill – Structural fill shall be placed and compacted to 90% of the modified proctor density per ASTM D1557.

G.7.b.3. Fill Placement - Fill should be placed in lifts not exceeding 10 inches thick, measured loose, and compacted to 90% of maximum dry density. Fills not beneath structures or paving may be compacted to 88% density.

G.7.b.4. Unsuitable Soil – Additional areas of unsuitable soil discovered during density testing should be over excavated and filled with structural fill material compacted as described above. If these occur locally beneath significant fills, they should be removed, if feasible, or stabilized by drainage if removal is not feasible. Please contact us for additional recommendations, if this condition is encountered.

G.7.b.5. Footing Embedment - Spread footings should be embedded a minimum of 18 inches below natural or finish grade to provide lateral support and frost protection. Footing excavations should be backfilled with structural fill.

G.7.b.6. Allowable Bearing Pressure – Building footings placed as recommended above may be designed for the following bearing pressures;

<table>
<thead>
<tr>
<th>Classification</th>
<th>Allowable Bearing Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properly prepared natural site soils</td>
<td>1,500 #/ft²</td>
</tr>
<tr>
<td>Compacted structural fill</td>
<td>2,500 #/ft²</td>
</tr>
</tbody>
</table>

G.7.b.6a. Increases - Allowable bearing pressures may be increased as follows;

<table>
<thead>
<tr>
<th>Condition</th>
<th>Basis</th>
<th>Load Factor Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square spread footings</td>
<td>Shape</td>
<td>20%</td>
</tr>
<tr>
<td>Live loads</td>
<td>Load Duration Factor</td>
<td>15%</td>
</tr>
<tr>
<td>Short term loads</td>
<td>Load Duration Factor</td>
<td>33%</td>
</tr>
</tbody>
</table>

G.7.b.7. Minimum Width - The minimum recommended width for continuous footings is 1'- 4" and the minimum recommended dimension for spread footings is 2'-0", except as required to accommodate swell pressure.
G.7.c. Footing Drains

We recommend that exterior footing drains be provided for below grade components, located at an elevation low enough to intercept groundwater and limit it from rising above the surface of crawlspace and the bearing area of interior slabs on grade. Footing drains should discharge clear of the foundation influence area. See Section G.7.f.

G.7.d. Settlement

Building settlement will vary with thickness and swell/consolidation potential of fill, type and thickness of underlying soils and methodology of foundation construction. In addition to settlement, vertical movement due to swelling of the foundation soil is possible for lightly or differentially loaded structural components placed on over-compacted non-natural imported soil having swell potential.

Relying on the loads estimated herein and assuming that the dead load portion will be approximately 1/2 of the total, we project total vertical movement to be less than 1/2 inch. Differential movement between structural and non-structural components could be as much as ½ inch.

G.7.e. Interior Floor Slabs

Interior floor slabs should not be rigidly connected to the perimeter footing, i.e., should float within the structure. The following recommendations are provided for slabs constructed on structural fill over properly prepared subgrade soils;

G.7.e.1. Aggregate Base Course (ABC) - A 6 inch thick layer of clean (less than 2% passing the No. 200 sieve) ¾” minus crushed rock should be placed over the structural fill to provide a positive capillary moisture break and uniform slab support. The capillary break is essential in areas to receive tile and linoleum and other areas with relatively impermeable floor finishes. To decrease drying stress, a ¼ inch thickness of clean sand should be placed on top of the ABC.

G.7.e.2. Underslab Membrane - A moisture retarder or barrier should be used to decrease seepage or upward migration of moisture through the concrete, but is likely to increase soil moisture and exacerbate expansion if soils having expansion potential are imported. To protect the membrane, a ¼ inch thickness of clean sand should be placed on top of the membrane.

G.7.e.3. Minimum Slab Thickness - Minimum recommended slab thickness is 5 inches to allow sufficient cover over the reinforcing steel. **Note that all slabs should be designed for the actual use and equipment anticipated.**

G.7.e.4. Isolation - Floor slabs and walls, both bearing and non-bearing, resting on floor slabs should be isolated from other structural components. We would be pleased to provide typical isolation details or to review structural plans prepared by others.

G.7.e.5. Reinforcement - The slabs should be reinforced with deformed reinforcing steel instead of welded wire fabric.
G.7.e.6. Reinforcement Location - Locate reinforcing a dimension of 1/3 slab thickness below the surface. Use “dobies” or bolsters to establish accurate position of reinforcement.

G.7.e.7. Fiber - Polypropylene fiber may be added to the concrete mix to help decrease plastic shrinkage cracking; however it is not a replacement for structural reinforcing.

G.7.e.8. Joints - Contraction and control joints conforming to ACI recommendations should be incorporated in the construction. Saw cut joints or wet scored joints should be accomplished within 12 hours after concrete placement. Construction joints and joints across dissimilar pours should be joined by square dowels to decrease the potential for differential vertical movement or curling.

G.7.f. Footing and Floor Drains

G.7.f.1. Footing Drains - Drains should consist of a rigid, smooth interior perforated drain pipe placed adjacent to the base of the footing. The perforated pipe should be encapsulated in a minimum of 8 inches of clean drain rock or pea gravel wrapped in ODOT drainage geotextile Type 1.

G.7.f.2. Wall Drains - Drains are recommended for below grade walls. These walls should be provided a minimum 12-inch wide zone of drain rock isolated with non-woven drainage geotextile, continuous from the top of footing to one foot below the surface. A preformed, fabric-wrapped, polymer sheet drain, such as Linq Drain, Enkamat, or Amerdrain may be used instead of the vertical drainage zone, provided the excavation is backfilled with clean, free-draining material. Design of such walls should disregard friction between the wall and fill for stability computations, however. Walls demising habitable areas should be provided durable wall sealant coating or other water proofing membrane before installing the sheet drain.

G.7.f.3. Floor Subdrains - Where the drain rock layer below slabs will be lower than the adjacent exterior grades, water will tend to accumulate. In these locations, positive drainage of the under slab layer should be provided.

G.7.f.4. Discharge - Foundation drains and subdrains should be routed to discharge clear of the foundation influence area or slopes. Interconnection of roof downspouts or surface area drains with foundation, wall, or floor subdrain systems is not allowed.

G.8. Lateral Earth Pressures and Drainage

G.8.a. Lateral Load Resistance

Lateral loads exerted upon these structures can be resisted by passive pressure acting on buried portions of the foundation and other buried structures and by friction between the bottom of concrete elements of the foundations and slabs and the underlying soil.
Lateral load resistance should be calculated using the values presented in Section F.3 for the recommended depth of embedment as;

\[ P_a \text{ or } P_p = \frac{1}{2} k(a \text{ or } p) \gamma H^2 \]

where:
- \( P_a \) is active earth pressure
- \( P_p \) is passive earth pressure
- \( k_a = \tan^2 \left( 45° - \frac{\varphi}{2} \right) \)
- \( k_p = \frac{1}{k_a} \)
- \( \gamma = \) soil unit weight

The first one foot below the ground surface should be ignored when computing passive resistance.

- A coefficient of friction of 0.45 is recommended for elements poured neat against structural rock fill or bedrock.
- A coefficient of friction of 0.30 is recommended for elements poured against natural soils.
- The above values should be reduced to 0.2 for areas where bearing is over a non-soil vapor barrier or low permeability membrane.

G.8.b. Lateral Earth Pressures

It is possible that both unrestrained and restrained retaining walls may be constructed for the project. Lateral earth pressures will be imposed on below-ground and backfilled structures or walls, including daylight basements and foundations which do not have uniform heights of fill on both sides. The following recommendations are provided for design and construction of retaining walls:

- Walls which are free to rotate at the top when backfilled should be designed for an equivalent fluid pressure of 45 \$/ft^3. This value should be increased to 52 \$/ft^3 for a 2 H to 1 V back slope.
- Walls that are fixed at the top should be designed for an equivalent fluid pressure of 60 \$/ft^3. This should be increased to 67 \$/ft^3 for a 2 H to 1 V back slope.
- A wet soil unit weight of 135 \$/ft^3 should be used for design.
- Backfill should consist of non-expansive, free draining, soil material. The backfill should be placed in lifts at near the optimum moisture content and compacted to between 88 and 90 % of the maximum density. Care should be employed to avoid over compacting the backfill. Loosely placed backfill and over-compacted backfill will exert greater pressures on the wall than the pressures considered above.
- To prevent damage, backfill and compaction against walls or embedded structures should be accomplished with hand-operated equipment within a lateral distance of 1/2 to 1/3 the unsupported height of wall. Beyond this zone, normal compaction equipment may be used.
While proper compaction of wall backfill is critical to long-term performance, care should be taken to avoid over compaction of the backfill materials, which can result in lateral loads greater than the design pressures recommended above.

For design of retaining walls supporting or bracing structures, a peak horizontal acceleration coefficient of 0.1g is recommended for seismic loads.

To prevent development of hydrostatic pressures exceeding the lateral earth pressures, a perimeter drainage system is recommended for underground structures, including basements.

Hydrostatic pressures behind retaining walls should be relieved by installation of free draining backfill behind the walls, with weep holes spaced as necessary (typically 10 feet on center) to achieve effective drainage. The free draining backfill should be protected from plugging by encapsulating with drainage geotextile as recommended above.

Allowable bearing capacities should be as recommended for Building Structures.

G.9. Trenching and Piping

Additional underground piping will be constructed. Excavation can be accomplished by normal means. Depending on when construction occurs, dewatering of the trench may be necessary to facilitate construction.

- Pipe should be cradled in coarse aggregate compacted to 90% density, having a minimum thickness equal to 1/4 pipe diameter below bottom of pipe and extending upward to the pipe spring line.
- The trench backfill should consist of clean excavated material, compacted to 90% density.
- Beneath paved areas, full depth granular backfill is recommended as a minimum, and use of lean cement slurry should be considered.
- The top 12” of trench backfill should be compacted to a density of 92%. Loads on pipe will vary with depth and width of trench.
- For pipe design, an effective pressure of 130 #/ft³ per foot of depth is recommended.

Underground pipes located beneath paved areas and having shallow cover should be designed to withstand vehicular loads.

H. ADDITIONAL SERVICES AND LIMITATIONS OF REPORT

H.1. Additional Services

Additional services by the geotechnical engineer are recommended to help insure that design recommendations are correctly interpreted during final project design and to help verify compliance with project specifications during construction. Additional services could include, but not be limited to:
- Review of final construction plans and specifications for compliance with geotechnical recommendations.
- Attend project team meetings to clarify issues raised during the construction process.
- Review and/or design of swale, fill and basement subdrain systems.
- Review of proposed cuts and fills, fills on slopes, surface and subdrains, swale drains, foundation support, and basement or rock fill subdrains.
- Site observation and/or CoMET services, i.e., observation of over excavated areas below keys, benches and footings and slabs, subgrade proof rolling, placement and compaction testing of structural fill, fill subdrains, swale subdrains, foundation drains, wall drains, subgrade proof rolling, pavement subgrade and aggregate base placement, site grading, surface drainage, etc.
- Special Inspection as defined by the OSSC may be required for certain of the components.
- Periodic construction field reports, as requested by the client and required by the building department

H.2. Limitations

Where used herein, the terms “Special Inspector, Inspector and Special Inspection” are understood to be for services contemplated, prescribed and as defined by the International Building Code and the Oregon Structural Specialty Code.

The analyses, conclusions and recommendations contained in this report are based on site conditions and development plans as they existed at the time of the study, and assume that soils and groundwater conditions encountered, observed or inferred during our exploration are representative of soils and groundwater conditions throughout the site. If, during construction, subsurface conditions are found to be different or design parameters change, we should be advised at once so that we can review this report and reconsider our recommendations, as appropriate. If there is a significant lapse of time between submission of this report and the start of work at the site, if the project is changed, or if site conditions have changed, we recommend that this report be reviewed to verify continued applicability.

This report was prepared for the use of the owner and design team for the subject project. It is only for this site and construction project. No third party beneficiaries are intended. Potential users of the report should be so notified.

It should be made available to other contractors for information and factual data only, such as test boring or test pit logs, measured water levels, samples, sample classifications and laboratory test results. The report is interpretive in nature and shall not be used for contractual purposes, such as warranting that subsurface conditions will be consistent with, or as indicated by the formal boring or test pit logs and subsurface profiles contained or inferred herein and/or discussions of subsurface conditions. It is not to be used for extensions of this project or for other projects without our express written consent. We should be contacted to review both plans and specifications for compatibility with this report before finalization. CoMET services, compaction testing and periodic observation during construction are recommended.
We have performed these services in conformance with generally accepted engineering and geotechnical engineering practices in southern Oregon at the time the study was accomplished. No other warranty is either expressed or implied.

Since test pits and borings represent only the conditions at those discrete locations, unanticipated soil conditions may be and, in fact, are commonly encountered on projects of similar size. Unanticipated conditions cannot be precluded by practical field studies. Since such unexpected conditions frequently result in budget increases to attain a properly constructed project, we recommend that a reasonable contingency account be established sufficient to fund possible extra costs.
SOIL TYPES (Ref. 1)

Boulders: Particles of rock that will not pass a 12 inch screen.
Cobbles: Particles of rock that will pass a 12 inch screen, but not a 3 inch sieve.
Gravel: Particles of rock that will pass a 3 inch sieve, but a #4 sieve.
Sand: Particles of rock that will pass a #4 sieve, but not a #200 sieve.
Silt: Soil that will pass a #200 sieve, that is non-plastic or very slightly plastic, and exhibits little or no strength when dry.
Clay: Soil that will pass a #200 sieve, that can be made to exhibit plasticity within a range of water contents, and that exhibits considerable strength when dry.

MOISTURE AND DENSITY

Moisture condition: An observational term; moist, wet.
Moisture content: The weight of water in a sample divided by the weight of dry soil in the sample, expressed as a percentage.
Dry Density: The pounds of dry soil in a cubic foot of soil

DESCRIPTORS OF CONSISTENCY (Ref. 3)

Liquid Limit: The water content at which a - #200 soil is on the boundary between exhibiting liquid and plastic characteristics. The consistency feels like soft butter.
Plastic Limits: The water content at which a - #200 soil is on the boundary between exhibiting plastic and semi-solid characteristics. The consistency feels like stiff putty.
Plasticity Index: The difference between the liquid limit and the plastic limit, i.e. the range in water contents over which the soil is in a plastic state.

MEASURES OF CONSISTENCY OF COHESIVE SOILS (CLAYS) (Ref's 2&3)

Very soft N=0-1* C=0-250 psf Squeezes between fingers
Soft N=2-4 C=250-500 psf Easily molded by finger pressure
Medium stiff N=5-8 C=500-1000 psf Molded by strong finger pressure
Stiff N=9-15 C=1000-2000 psf Dented by strong finger pressure
Very stiff N=16-30 C=2000-4000 psf Dented slightly by finger pressure
Hard N>30 C=4000 psf Dented slightly by pencil point

*N= Blows per foot in the Standard Penetration Test. In cohesive soils, with the 3 inch diameter sampler. 140-pound weight, divide the blow count by 1.2 to get N (Ref. 4).

MEASURES OF RELATIVE DENSITY OF GRANULAR SOILS (GRAVELS, SANDS, SILTS) (Ref's 2 & 3)

Very Loose N=0-4** RD=0-30 Easily push a ½ inch reinforcing rod by hand
Loose N=5-10 RD=30-50 Push a ½ inch reinforcing rod by hand
Medium Dense N=11-30 RD=50-70 Easily drive a ½ inch reinforcing rod
Dense N=31-50 RD=70-90 Drive a ½ inch reinforcing rod 1 foot
Very Dense N>50 RD=90-100 Drive a ½ inch reinforcing rod a few inches

**N= Blows per foot in the Standard Penetration Test. In granular soils, with the 3 inch diameter sampler, 140 pound weight, divide the blow count by 2 to get N (Ref 4). RD = Relative Density.

Ref. 1: ASTM Designation: D 2487-93, Standard Classification of Soils for Engineering Purposes(Unified Soil Classification system).
02320.00 Scope - This section includes the requirements for geosynthetics used in various applications.

02320.01 Definitions - Geosynthetic terms are defined in 00350.01

02320.10 Acceptance:
(a) General Requirements - Furnish all geosynthetics meeting the following requirements:
   · Free of defects, cuts or tears.
   · Resistant to ambient temperatures, acid and alkaline conditions, micro-organisms and insects.
   · For the intended purpose and have dimensional stability.
(1) Geotextiles - Furnish woven or nonwoven geotextiles meeting the following requirements:
   · Be composed of long chain, synthetic polymeric filaments or yarns formed into a stable network that retains its relative structure during handling, placement and design service life. At least 95%, by weight, of the long chain polymers shall be on polyolefin or polyester.
   · Meet or exceed the properties specified in 02320.20, Table 02320-1.
   · Be free of any chemical treatment or coating which might significantly reduce permeability.
   · Have the selvage finished to the outer fibers are prevented from pulling away from the fabric.
(2) Geogrids - Furnish geogrids meeting the following requirements:
   · A regular network of integrally connected, polymer, tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil or rock.
   · Dimensionally stable and able to retain their geometry under manufacture, transport and installation.
(b) Acceptance Requirements - The actual minimum average roll values furnished by the manufacturer shall be based on representative test results from the manufacturing plant which produced the geosynthetic, and shall meet or exceed each of the specified minimum values. All geosynthetics shall be clearly labeled as being part of the same production run certified as meeting all applicable requirements.
(c) Manufacturer’s Documentation - Furnish a Level A or Level B certification, for the applicable geosynthetics.
   (1) Level A - Manufacturer’s Test Result Certificate - Furnish a test result certificate from the geosynthetic manufacturer. The certificate shall:
      · Include the minimum average roll values for each of the specified properties from the same production run as the delivered material.
      · Include test results for factory seams.
      · Include production run number, production plant name and location.
If the geosynthetic material is modified, remanufactured, relabeled or sewn, furnish an additional certificate from the supplier making the changes that explain the altered properties, seam strength or relabeling.
(2) Level B - Manufacturer’s Quality Compliance Certificate - As a basis of acceptance, furnish either a manufacturer’s brochure or a quality compliance certificate with geosynthetic properties shown.
   If the brochure or certificate lists typical or average roll values instead of minimum average roll values, then increase by 25% the specified minimum values in Table 02320-1 for grab tensile strength, burst strength and puncture strength to determine compliance.
(d) Manufacturer’s Sampling/Testing - The manufacturer’s reported property values shall be based on the following sampling and testing requirements:
   (1) Sampling - Sample all geosynthetics according the ASTM D 4354. The production unit used for sampling shall be a roll or sheet.
   (2) Testing - Perform the specified tests to determine geotextile properties for the intended application(s). The tensile strength requirements shall be tested in both machine and cross-machine directions.
02320.11 Seam Testing and Acceptance:
(a) Factory Seams - Where factory seams are made, the sheets of geotextile shall:
   · Be sewn together using a lock type stitch Type 301 or 401 as shown.
   · Be sewn with polymeric thread that is at least 95%, by weight, polyolefin or polyester, and as resistant to deterioration as the geotextile being sewn.
   · Have test results showing that the seams meet or exceed 90% of the specified tensile strength minimum values for intended application.
   · Nylon thread will not be allowed.
(b) Field Seams - Where field sewn seams will be used, furnish:
   · The manufacturer’s test result certificate, that includes wide strip, tensile strength test results and verifies that seams tensile strength and seam grab tensile strength meet or exceed 50% of the minimum specified tensile strength values for the geotextile.
   · A field-stitched seam test sample.
### Table 02320: Geotextile Property Values (Oregon Standard Specifications for Construction 2015)

<table>
<thead>
<tr>
<th>GEOTEXTILE PROPERTY</th>
<th>TEST METHOD</th>
<th>UNITS</th>
<th>DRAINAGE (1) WOVEN</th>
<th>NON-WOVEN</th>
<th>RIP RAP WOVEN</th>
<th>NON-WOVEN</th>
<th>SEDIMENT FENCE GEOTEXTILE SUPPORTED</th>
<th>UNEQUALIZED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grab Tensile Strength (minimum) Machine Direction Cross Machine Direction</td>
<td>ASTM D 4632</td>
<td>lb</td>
<td>180</td>
<td>115</td>
<td>250</td>
<td>160</td>
<td>90</td>
<td>120</td>
</tr>
<tr>
<td>Grab Tensile Strength (minimum) Machine Direction Cross Machine Direction</td>
<td>ASTM D 4632</td>
<td>%</td>
<td>&lt;50</td>
<td>250</td>
<td>&lt;50</td>
<td>250</td>
<td>90</td>
<td>120</td>
</tr>
<tr>
<td>Tear Strength (min)</td>
<td>ASTM D 4533</td>
<td>lb</td>
<td>67</td>
<td>40</td>
<td>90</td>
<td>56</td>
<td>110</td>
<td>80</td>
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<tr>
<td>Puncture Strength (minimum)</td>
<td>ASTM D 6241</td>
<td>lb</td>
<td>370</td>
<td>220</td>
<td>495</td>
<td>310</td>
<td>620</td>
<td>430</td>
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<tr>
<td>Apparent Opening Size (ADS) (maximum) U.S. Standard Sieve</td>
<td>ASTM D 4751 (CV-02215 Corps of Engineers)</td>
<td>in</td>
<td>NO. 40</td>
<td>NO. 40</td>
<td>NO. 40</td>
<td>NO. 40</td>
<td>NO. 40</td>
<td>NO. 40</td>
</tr>
<tr>
<td>Permittivity (minimum)</td>
<td>ASTM D 4491</td>
<td>s⁻¹</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.05</td>
</tr>
<tr>
<td>Ultraviolet Stability (Retained Strength) (minimum)</td>
<td>ASTM D 4355 @ 500 hours</td>
<td>%</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Asphalt Retention (minimum)</td>
<td>ODOT TM 817</td>
<td>oz/ft²</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Melting Point (minimum)</td>
<td>ASTM D 276</td>
<td>°F</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
</tbody>
</table>

(1) Silt film or silt tape fabrics are not acceptable.
(2) As measured according to ASTM 4632.

---

**NOTE:** CONTRACTOR SHALL SUBMIT TO ENGINEER MATERIAL VENDOR DOCUMENTATION OF COMPLIANCE WITH GEOTEXTILE SPECIFICATIONS.
APPENDIX A
TEST PIT AND TEST BORING
LOGS AND TESTS
## TEST LOG

**TP1**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Description</th>
<th>Recov (%</th>
<th>Driven (in)</th>
<th>PID ppm</th>
<th>Sample#</th>
<th>Soil Type</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>SW-SAND, light to medium brown, moist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>CL- sandy CLAY, dark brown</td>
<td>34670</td>
<td>34669</td>
<td>BKT</td>
<td>CAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>END TEST PIT AT 10 FEET.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PROJECT:** SALMON HARBOR GEO EX  
**CLIENT:** PINNACLE ENGINEERING, INC.  
**LOCATION:** 43°40'51.25"N, 124°11'6.5"W  
**DRILLER:** DOUGLAS COUNTY PUBLIC WORKS  
**DRILLING METHOD:** CAT 420D BACK HOE-20" BUCKET  
**DEPTH TO WATER:** Initial:  

**AFTER DRILLING:**  

**ELEVATION:** 18  
**LOGGED BY:** TWS  

**TEST RESULTS**

<table>
<thead>
<tr>
<th>Plastic Limit</th>
<th>Liquid Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Content</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>
### Natural Moisture Density Report

**Project:** Salmon Harbor RV Park  
**Contractor:** NA  
**Subject:** Gecotech - Natural Moisture  
**Tested By:** TJB  
**Testing Date:** 8/9/18  
**Date:** 8/9/18

#### Bore Hole Summary

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>T82 @ 12&quot;</th>
<th>T82 @ 4'</th>
<th>T81 @ 12&quot;</th>
<th>T81 @ 7'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>34876</td>
<td>34876</td>
<td>34875</td>
<td>34873</td>
</tr>
<tr>
<td>Length 1 (in.)</td>
<td>3.65</td>
<td>4</td>
<td>3.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Length 2 (in.)</td>
<td>3.7</td>
<td>3.7</td>
<td>3.7</td>
<td>4</td>
</tr>
<tr>
<td>Length 3 (in.)</td>
<td>3.75</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Avg Length (in.)</td>
<td>3.67</td>
<td>4.00</td>
<td>3.77</td>
<td>3.87</td>
</tr>
<tr>
<td>Diameter 1 (in.)</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Diameter 2 (in.)</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Avg Diameter (in.)</td>
<td>1.90</td>
<td>1.90</td>
<td>1.90</td>
<td>1.90</td>
</tr>
<tr>
<td>Volume (ft³)</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Tare (gram)</td>
<td>32.7</td>
<td>33.6</td>
<td>49.4</td>
<td>33.5</td>
</tr>
<tr>
<td>Wet + Tare (gram)</td>
<td>317.1</td>
<td>326.2</td>
<td>416</td>
<td>336.7</td>
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<tr>
<td>Dry + Tare (gram)</td>
<td>302.9</td>
<td>315.2</td>
<td>349.4</td>
<td>324.8</td>
</tr>
<tr>
<td>Water (gram)</td>
<td>14.2</td>
<td>11</td>
<td>66.6</td>
<td>11.9</td>
</tr>
<tr>
<td>% Moisture</td>
<td>5.3%</td>
<td>3.9%</td>
<td>22.2%</td>
<td>4.1%</td>
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</tbody>
</table>

#### Density (PCF)

<table>
<thead>
<tr>
<th>Bore Hole</th>
<th>99.3</th>
<th>94.9</th>
<th>107.3</th>
<th>99.0</th>
</tr>
</thead>
</table>

#### Remarks:

[Blank space for remarks]

Reviewed By: ___________________________  
Date: ___________________________

*Special Inspection*, "Inspection" and "Inspector" are terms as defined by the International Building Code
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Description</th>
<th>Recover (in)</th>
<th>Dried (in)</th>
<th>PID ppm</th>
<th>Sample#</th>
<th>Soil Type</th>
<th>Sampler</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ML-sandy SILT w/ crushed egg (pit run) and silty sand, light brown, medium dense</td>
<td>34871</td>
<td>34872</td>
<td>CAL</td>
<td>BAG</td>
<td></td>
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</tr>
<tr>
<td>2</td>
<td>SM-SAND, light brown, moist</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CL-sandy CLAY, dark brown, moist</td>
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<td>END TEST PIT AT 12 FEET</td>
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<tr>
<td>Depth (ft)</td>
<td>Description</td>
<td>Recovery (%)</td>
<td>Drills (ft)</td>
<td>PID (ppm)</td>
<td>Sample #</td>
<td>Soil Type</td>
<td>Sampler</td>
<td>Symbol</td>
</tr>
<tr>
<td>-----------</td>
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<td>--------</td>
</tr>
<tr>
<td>0</td>
<td>SW-SAND, light brown</td>
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<td>12</td>
<td>18</td>
<td>34873</td>
<td>SPT</td>
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<td>3-0-0 (N=0)</td>
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<td>18</td>
<td>34875</td>
<td>SPT</td>
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<td>3-7-17 (N=24)</td>
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</tr>
<tr>
<td>Depth (feet)</td>
<td>Description</td>
<td>Recovery (in)</td>
<td>Driven (in)</td>
<td>PID ppm</td>
<td>Sample#</td>
<td>Soil Type</td>
<td>Sampler</td>
<td>Symbol</td>
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<tr>
<td>-------------</td>
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</tr>
<tr>
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<td>SW-SAND, light brown, moist</td>
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<td>34876</td>
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<td>SPT</td>
<td>4-5-4 (N=9)</td>
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<td>7-14-16 (N=30)</td>
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**TEST RESULTS**

<table>
<thead>
<tr>
<th>Plastic Limit</th>
<th>Liquid Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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*This information pertains only to this boring and should not be interpreted as being indicative of the site.*
<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Description</th>
<th>Recovery (in.)</th>
<th>Driven (in.)</th>
<th>PID ppm</th>
<th>Sample#</th>
<th>Soil Type</th>
<th>Sampler</th>
<th>Symbol</th>
<th>Plastic Limit</th>
<th>Liquid Limit</th>
<th>Water Content</th>
<th>Seepage</th>
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END TEST BORE AT 10 FEET.
PRACTICAL REFUSAL
SECTION 01-1000
SUMMARY

PART 1 GENERAL

1.01 PROJECT
A. Project Name: Salmon Harbor Marina - RV Expansion - Restroom/Shower/Laundry Building.
B. Owner's Name: Salmon Harbor Management Committee.
C. Architect's Name: HGE Inc., Architects, Engineers, & Planners.
D. Work on this Contract consists of an approximately 22 foot by 50 foot, 1172 square foot single story wood framed building, with sloped roof and asphalt shingles. Building includes laundry room, men’s and women’s restroom and shower space, and mechanical/electrical room. This building structure project is part of a 40 space, full hook-up, RV expansion project for Salmon Harbor Marina project. Contractor is required to coordinate and cooperate with the site contractor constructing the RV site improvements as the work will occur concurrently. All site work around building will be by site contractor.

1.02 EXPLANATION OF CONTRACT DOCUMENTS:
A. The Conditions of the Contract and the General Requirements (Division 1) of these Specifications apply to the Work described under each Section hereof. The Contractor shall instruct each subcontractor, if used, to become fully familiar with them.

1.03 DIVISION AND PARAGRAPH NUMBERING:
A. Numbering and lettering of Divisions and Paragraphs in these Specifications are merely for identification and may not be consecutive.

1.04 SUB-CONTRACTS:
A. Divisions of Specifications into trade Sections conforms roughly to customary practice. They are used for convenience only. Salmon Harbor Management Committee is not bound to define limits of any subcontract and will not enter into disputes between the Contractor and his employees, including subcontractors.

1.05 RELATED REQUIREMENTS SPECIFIED ELSEWHERE
A. Where references are made to other Sections regarding Related Requirements Specified Elsewhere, it is for the convenience of the Contractor only and shall not limit the Contractor's responsibility under other Sections not so referenced. As previously noted, each Section of the Specifications is bound by all applicable requirements of all Sections in Division 1.

1.06 WORDING OF SPECIFICATIONS:
A. These are abbreviated or "streamline" type specifications and frequently include incomplete sentences. The omission of words or phrases such as "The Contractor shall", "according to the drawings", "in conformity with", "shall", "shall be", "as noted", "a", "an", "and", are all intentional. Omitted words or phrases shall be supplied by inference, in the same manner as they are in the notes on the Drawings. Titles and headings are frequently a part of the Specifications, and the same as the text of the article or paragraph. Where question arises as to wording in the Drawings and Specifications, consult SHMC.

1.07 WORK COVERED BY CONTRACT DOCUMENTS:
A. 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, permits, fees, transportation, incidentals, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

1.08 ADDITIONAL DEFINITIONS:
A. The term "approved" means "approved by Salmon Harbor Management Committee".
B. The term "for approval" means "for Salmon Harbor Management Committee's approval".
C. The term "as directed" means "as directed by Salmon Harbor Management Committee".
D. The term "product" includes materials, systems, and equipment.
E. The term "provide" means "furnish and install, complete, in place and ready for operation and use".
F. The term "selected" means "selected by Salmon Harbor Management Committee".
G. The term “Substantial Completion” or “Substantially Complete” means ready for occupancy and use by Salmon Harbor Management Committee.
H. Items “furnished by SHMC” shall be installed by the contractor unless noted otherwise.
I. Where the words "or approved" are used, SHMC is the sole judge of quality and suitability of proposed substitution.

1.09 WORK BY OTHERS:
A. Items specifically noted in the Contract Documents as:
B. "By Others"
C. "N.I.C." (Not in Contract)
D. "By Salmon Harbor Management Committee"
E. Site Work:
   1. All adjacent site work, including paving, concrete paving/walks, utility connections beyond 5 feet from building, final grading around building.

1.10 SALMON HARBOR MANAGEMENT COMMITTEE FURNISHED ITEMS:
A. Items specifically noted: "Furnished by SHMC" or FBSHMC.
   1. SHMC furnished items shall be installed by the Contractor unless noted otherwise.

1.11 UNACCEPTABLE EXISTING CONDITIONS:
A. Exposed to view, or noted in the Contract Documents, or otherwise accessible to verify prior to bid opening date:
   1. Repair or replace as part of this Work.
      a. No additional payments by SHMC will be made.
   2. Concealed, and not accessible to verify prior to bidding:
      a. Repair or replace where necessary;

1.12 CONTRACTOR USE OF PREMISES:
A. 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 with any materials or equipment.
   1. Confine operations to Project Areas directed by SHMC.
   2. Obtain SHMC’s permission for use of any existing facilities, utilities, areas, materials, etc., not specifically provided for the Contractor's use in the Contract Documents.
B. This work is will occur concurrently with the 40 space RV expansion site work and Contractor required to coordinate his/her efforts with the efforts of the site contractor. The site contractor will be performing earthwork, clearing grubbing, fill, baserock, paving, utilities, drainage, electrical, etc.

1.13 CONTRACT DESCRIPTION
A. Contract Type: One single prime contract based on a Stipulated Price.

1.14 WORK SEQUENCE
A. Contractor to coordinate site deliveries with site contractor. Site contractor is required to accommodate building contractor within reason to provide access to building site. It is understood
that site contractor will build access road for building contractors use to building site and provide reasonable staging area for building contractor.

PART 2  PRODUCTS - NOT USED
PART 3  EXECUTION - NOT USED

END OF SECTION
SECTION 01-2300
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Description of alternates.

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

1.03 SCHEDULE OF ALTERNATES
A. Alternate No. 1 - Infrared Heaters:
   1. Base Bid Item: Radiant slab floor heat (hydronic).

PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01-3000
ADMINISTRATIVE REQUIREMENTS

PART 1  GENERAL
1.01  SECTION INCLUDES
   A. Preconstruction meeting.
   B. Progress meetings.
   C. Construction progress schedule.
   D. Submittals for review, information, and project closeout.
   E. Number of copies of submittals.
   F. Submittal procedures.

1.02  RELATED REQUIREMENTS
   A. Section 01-7000 - Execution and Closeout Requirements: Additional coordination requirements.

1.03  PROJECT COORDINATION
   A. Project Coordinator: Construction Manager. Contractor is responsible for Project Coordination.
   B. Cooperation between the various crafts of other contracts and subcontractors shall be required for proper execution of the Work.
   C. Prior to the installation of materials or equipment with the Work of other Sections, by SHMC, or by other contracts, verify the requirements of the other crafts or other contract materials or equipment.
   D. Bring deviations to the attention of SHMC immediately.
   E. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
   F. During construction, coordinate use of site and facilities through the Project Coordinator.
   G. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
   H. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
   I. Coordinate field engineering and layout work under instructions of the Project Coordinator.
   J. Make the following types of submittals to Architect through the Project Coordinator:
      1. Requests for interpretation.
      2. Requests for substitution.
      3. Shop drawings, product data, and samples.
      4. Design data.
      5. Manufacturer's instructions and field reports.
      6. Applications for payment and change order requests.
      7. Progress schedules.
      8. Coordination drawings.

1.04  SUBMITTALS:
   A. Submittals are defined as documents required by the Contract to be submitted to SHMC for review, and may include shop drawings, product data, samples, or a schedule of construction events.
   B. Shop drawings, Product Data, Samples and other Submittals are not part of the Contract. Their purpose is to demonstrate, for those portions of the Work for which Submittals are required, the
way the Contractor proposes to conform to the requirements of the Contract and the design concept expressed in the Contract.

C. The Contractor shall review, approve and submit to SHMC all Shop Drawings, Product Data, Samples and other Submittals required by the Contract regardless of whether the document originated with the Contractor or with some other subcontractor or supplier. They shall be submitted at the time required by the Contract, or, if no time is specified, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of SHMC or of separate contractors. Submittals made by the Contractor that are not required by the Contract may be returned without action or may not be returned at all.

D. Informational Submittals upon which SHMC is not expected to take responsive action may be so identified in the Contract.

E. SHMC’s review of any Submittal does not relieve the Contractor from its responsibility to follow the requirements of the Contract. SHMC is not responsible for ensuring that Submittals are correct. Failure of SHMC to discover that a submittal varies from the requirements of the Contract Documents shall not relieve the Contractor of its responsibilities to conform to the Contract nor provide a basis for a change order. Nevertheless, SHMC shall review any Submittals provided in order to make a general determination about whether they appear to meet Contract requirements or the intended design of the project. The Contractor remains responsible for following the contract, including, but not limited to:

1. Confirming and correlating all dimensions;
2. Fabricating and construction techniques;
3. Coordinating the work with that of all other trades and subcontractors;
4. Satisfactorily performing the Work in strict accordance with the contract documents;
5. The means and methods of construction;
6. Conforming to all the requirements of the Contract.

F. Submittals Shall Include:
1. Date and revision dates.
2. Project title and number.
3. Name of Contractor, Supplier and Manufacturer.
4. Identification of product material.
5. Relation to adjacent structure or material; field dimensions, clearly identified as such; other dimensions critical to product installation, or relevant to installation of other adjacent products.
6. Specification Section number.
7. Applicable standards such as ASTM, Federal Specification, etc.
9. Contractor's note or stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.
10. Transmittal letter with all submittals containing: the number of drawings, data or samples submitted; notification of deviation from the Contract Documents; other pertinent data.

1.05

PART 2 PRODUCTS

2.01 SHOP DRAWINGS:
A. Defined as: Original drawings prepared by the Contractor, Subcontractor, Supplier or Distributor which illustrate some portion of the Work; showing fabrication, layout, setting or erection details.

B. Identify details by reference to contract sheet and detail number.

C. Minimum size sheet 8"x11", maximum 24"x36".

2.02 PRODUCT DATA:
A. Manufacturer's standard schematic drawings;
   1. Modify to delete extraneous information.
2. Supplement standard information as applicable to project

B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data;
   1. Clearly mark each copy to identify pertinent materials, products or models.
   2. Show dimensions, weights, and clearances required.
   3. Show performance data.

2.03 SAMPLES:
   A. Defined as: Physical examples to illustrate materials, colors, equipment or workmanship, and to establish standards by which completed work is judged.
   B. Office Samples: Sufficient size and quantity to illustrate:
      1. Functional characteristics of product or material, with integrally related parts and attachment devices.
      2. Full range of color samples.
   C. Field samples and mock-ups:
      1. Erect at Project site in location acceptable to SHMC.
      2. Include work of all trades required in finished work.
      3. After review, approved field samples may be used in construction of Project.

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING
   A. Architect will schedule a meeting after Notice of Award.
   B. Attendance Required:
      1. Owner.
      3. General Contractor, contractor's superintendent(s) and major subcontractors.
   C. Agenda:
      1. Distribution of Contract Documents.
      2. Designation of personnel representing the parties to Contract, Owner and Architect.
      3. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
      4. Scheduling.
   D. Record minutes and distribute copies within three days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS
   A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.
   B. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
   C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.
   D. Agenda:
      1. Review minutes of previous meetings.
      2. Review of Work progress.
      3. Field observations, problems, and decisions.
      4. Identification of problems that impede, or will impede, planned progress.
      5. Review of submittals schedule and status of submittals.
      6. Maintenance of progress schedule.
      7. Corrective measures to regain projected schedules.
      8. Planned progress during succeeding work period.
10. Effect of proposed changes on progress schedule and coordination.
11. Other business relating to Work.

E. Record minutes and distribute copies within three days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE

A. Contractor's Construction Schedule:
1. Prior to proceeding with the Work, Contractor shall meet with Salmon Harbor Management Committee to develop a proposed progress schedule. The progress schedule shall include dates of submission and dates reviewed submittals will be required for each product, as well as the dates for starting and completion of the various stages of the project.
2. Include critical dates for procurement of products.
3. If in SHMC's opinion, Work progress falls behind approved Schedule, Contractor shall take necessary action to regain lost time. Contractor shall increase Work amount, or number of shifts, or establish overtime operations, or all of them, and submit for review Schedule revisions in which progress rate will be regained, all without additional cost to SHMC.
4. Contractor's failure to comply with any of these requirements shall be grounds for determination that the Contractor is not prosecuting the Work with such diligence as will insure Project completion within specified time. Upon such determination, SHMC may terminate Contractor's right to proceed with the Work, or any separable part thereof, in accordance with Contract Conditions.
5. Testing Schedule
   a. None required.

3.04 SUPERINTENDENT

A. General Contractor's Superintendent (as defined in the General Conditions) shall remain at project site during all times during which Work under this contract is being carried out, regardless of the type of trades involved or apparent significance of work being performed.
B. Superintendent shall not be changed or replaced prior to Final Completion of the project without SHMC's written consent.

3.05 COORDINATION:

A. Do all necessary work to receive or join work of all trades.
B. Coordinate the Work to provide adequate clearances for proper installation and maintenance of materials and equipment.
C. Work closely with Salmon Harbor Management Committee and be prepared to proceed with work when called upon to insure work of other contracts is not delayed or work of this contract does not delay progression of overall project.

3.06 SUBMITTALS:

A. CONTRACTOR'S RESPONSIBILITY:
1. Review submittals prior to submission to SHMC. When tendering a Submittal for review, the Contractor represents that it has determined and verified materials, field measurements and field construction criteria related thereto, or shall do so, and has checked and coordinated the information contained with such Submittals with the requirements of the Work and of the Contract. The Contractor shall expressly note where any submittal differs from or varies from the requirements of the Contract, notwithstanding any belief on the part of the Contractor that the variance is obvious.
2. Verify: field measurements, field construction criteria, catalog numbers and similar data.
4. Contractor's responsibility for errors and omissions in submittals is not relieved by SHMC's review of submittals.
5. Contractor's responsibility for deviations from the Contract Documents is not relieved by review of submittals unless SHMC gives written acceptance of specific revisions.
6. Begin no work which requires submittals until return of submittals with appropriate stamp and initials or signature indicating approval.

B. SUBMISSION REQUIREMENTS:
   1. Submit at least 10 days before the date each reviewed submittal is needed.
   2. Submit number of copies of shop drawings and product data which the Contractor requires for distribution plus 2 copies which SHMC will retain.
   3. Submit at least 3 each of required office samples unless otherwise specified in the applicable Specification Sections.

C. RESUBMISSION REQUIREMENTS:
   1. Revise initial drawings as required and resubmit as specified for initial submittal.
   2. Indicate changes which have been made other than those requested by SHMC

3.07 CONTINUED USE OF FACILITIES BY SALMON HARBOR MANAGEMENT COMMITTEE:
   A. Coordinate with SHMC for continued use of other facilities during construction. Obtain schedule of events for SHMC and work with SHMC Staff to allow activities identified in schedule to occur with minimal disruption by work of this contract.

END OF SECTION
SECTION 01-4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Testing and inspection agencies and services.
B. Control of installation.
C. Manufacturers' field services.
D. Defect Assessment.

1.02 RELATED REQUIREMENTS
A. Section 01-3000 - Administrative Requirements: Submittal procedures.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
B. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
C. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
   1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.05 REFERENCES AND STANDARDS
A. For products and workmanship specified by reference to a document or documents not included in the Contract Documents, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
C. Obtain copies of standards where required by product specification sections.
D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 TESTING AND INSPECTION AGENCIES AND SERVICES
A. Owner will employ and pay for services of an independent testing agency to perform specified testing.
B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TESTING AND INSPECTION

A. Testing Agency Duties:
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Architect.
   6. Submit reports of all tests/inspections specified.

B. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

C. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.03 MANUFACTURERS’ FIELD SERVICES

A. 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, as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers’ written instructions.

3.04 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

END OF SECTION
SECTION 01-5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Temporary utilities.
B. Temporary Controls: Barriers, enclosures, and fencing.
C. Security requirements.
D. Vehicular access and parking.
E. Waste removal facilities and services.

1.02 REQUIREMENTS OF REGULATORY AGENCIES
A. Comply with all applicable codes, ordinances and laws. Pay all permits and fees required for temporary facilities and controls.

1.03 TEMPORARY UTILITIES
A. Temporary Heat:
   1. Furnish as required to protect the work, and to provide proper conditions for installation and curing of work of the respective trades.
   2. The Contractor shall provide all fuel for temporary heat generated by independent heating devices and shall be responsible for all damage to the building, its contents and persons.
   3. Fuel for operation of the permanent heating equipment until the date of Substantial Completion shall be paid for by the Contractor.

B. Temporary Lights and Power:
   1. Furnish adequate lights and power for safe working conditions, as required by O.S.H.A. or other applicable regulatory agencies.
   2. Temporary power shall be supplied by the Contractor. All appurtenances required by work of this contract to be provided by Contractor.
   3. Each Contractor shall provide extension cords and lamps as necessary for the work under his contract, and shall provide his own connections to and extensions from the power source.

C. Telephone:
   1. Maintain non coin box telephone with FAX capability. (Cell phone is acceptable.) Coordinate with SHMC office for Fax service.
   2. Notify SHMC of number.
   3. Install when work is started; maintain on job site until completion.

D. Temporary Toilets:
   1. Contractor responsible to meet all State and Local requirements for sanitary facilities.
   2. SHMC to provide Sanican for Contractor use.

E. Water:
   1. Drinking Water: Provide from a proven safe drinking source for all those connected with the work; serve in single service containers, or other approved source.
   2. Construction Water: Water is available at the site.
   3. All water used until substantial completion paid for by SHMC.

F. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

G. Existing facilities may not be used, unless approved by the Owner.

H. Use trigger-operated nozzles for water hoses, to avoid waste of water.
1.04 CONSTRUCTION AIDS
   A. Provide all necessary construction aids, including, but not limited to ladders, ramps, hoists, runways, etc.
   B. Contractor shall be responsible for all such apparatus, equipment and construction meeting the requirements of labor and State and local laws.

1.05 BARRIERS
   A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from construction operations.
   B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
   C. Project Limits Barricade: At Contractor’s option.

1.06 VEHICULAR ACCESS AND PARKING
   A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
   B. Coordinate access and haul routes with governing authorities and Owner.
   C. Provide and maintain access to fire hydrants, free of obstructions.
   D. Provide means of removing mud from vehicle wheels before entering streets.
   E. Designated existing on-site roads may be used for construction traffic.
   F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.07 SPECIAL CONTROLS
   A. Noise Control: The Contractor shall prevent all unnecessary noise from his operations and those from his employees and subcontractors.
   B. Dust Control: During the entire period of construction, the Contractor shall exercise all reasonable and necessary means to abate dust. Necessary sprinkling and wetting shall be performed so that the site will not become excessively dusty at any time and the amount of dust carried in the air will be kept to a minimum.
   C. Water Control: Perform pumping, trenching, damming, and under draining necessary to keep site free from water during construction. Dispose of water in a manner acceptable to local regulation, taking care that no existing water disposal facilities are impeded, clogged, damaged, or interfered with in any way.
   D. Rubbish and Debris: Allow no excess accumulation of non-reusable material at the job site. Dispose of accumulations of rubbish and debris in a satisfactory manner, in accordance with the rules and regulations of the pollution control agencies having jurisdiction.
   E. Protection of Existing Improvements:
      1. The Contractor is hereby cautioned and notified that he is responsible for the protection of existing improvements which are to remain in place, throughout the execution of this contract. Temporary enclosures, walls, covers, or other protection shall be provided and maintained.
      2. The Contractor shall be solely and directly responsible for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damages which result from carrying out the work to be done under the contract.

1.08 RESTORATION OF EXISTING IMPROVEMENTS:
   A. Restoration of Damage: Except as shown on the plans or as provided elsewhere in these specifications, the Contractor shall at his expense repair or replace curbs, sidewalks, driveways, utilities, street surfaces, plant materials, and any and all structures and substructures damaged
by his operations. These repairs and replacements shall be similar and equal in every respect to those now in place, and acceptable to SHMC.

B. Restoration of Services: In the event of interruption to any utility services as a result of the Contractor's operations, the Contractor shall promptly notify the proper authority. He shall cooperate with said authority in restoration of service as promptly as possible, and shall bear all costs of repair. In no case shall interruption of any utility service be allowed to exist outside working hours unless prior approval is received.

1.09 FIELD OFFICES

A. Office: Weathertight, with lighting, electrical outlets, heating, equipment, and equipped with sturdy furniture, drawing rack and drawing display table.

B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.10 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS - NOT USED
PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01-5500
VEHICULAR ACCESS AND PARKING

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Parking.
   B. Existing pavements and parking areas.
   C. Construction parking controls.
   D. Haul routes.
   E. Maintenance.
   F. Removal, repair.
   G. Mud from site vehicles.

PART 2 PRODUCTS

PART 3 EXECUTION
3.01 PREPARATION
   A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.

3.02 PARKING
   A. Do not allow heavy vehicles or construction equipment in parking areas.
   B. Arrange for temporary parking areas to accommodate use of construction personnel.

3.03 CONSTRUCTION PARKING CONTROL
   A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Owner's operations.
   B. Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.
   C. Prevent parking on or adjacent to access roads or in non-designated areas.

3.04 HAUL ROUTES
   A. Confine construction traffic to designated haul routes.
   B. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

3.05 MAINTENANCE
   A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, Products, mud, snow, and ice.
   B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

3.06 REMOVAL, REPAIR
   A. Repair existing facilities damaged by use, to original condition.
   B. Repair damage caused by installation.

3.07 MUD FROM SITE VEHICLES
   A. Provide means of removing mud from vehicle wheels before entering streets.

END OF SECTION
SECTION 01-6000
PRODUCT REQUIREMENTS

PART 1  GENERAL

1.01  SECTION INCLUDES
A. General product requirements.
B. Transportation, handling, storage and protection.
C. Delivery and Inspection
D. Product option requirements.
E. Substitution limitations and procedures.
F. Storage
G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02  RELATED REQUIREMENTS
A. Document 00-2113 - Instructions to Bidders: Product options and substitution procedures prior to bid date.
B. Section 01-1000 - Summary: Lists of products to be removed from existing building.
C. Section 01-3000 - Administrative Requirements.
D. Section 01-4113 - Codes and Standards.
E. Section 01-4500 - Quality Control.
F. Section 01-6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
G. Section 01-7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting packaging and substitutions.

1.03  SUBMITTALS
A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2  PRODUCTS

2.01  NUMBER OF ITEMS SPECIFIED:
A. Wherever in these specifications an article, device, or equipment is referred to in the singular number, such reference shall apply to as many such articles as are shown on the Drawings or are required to complete the installations.

2.02  CONFORMANCE WITH SPECIFIED PRODUCT DESCRIPTIONS
A. Conform to applicable Specifications and Reference Standards.
B. Furnish all materials of a kind by one manufacturer, except component parts of an assembly need not be the product of a single manufacturer unless otherwise indicated.
C. Furnish all items new and free from defects, of size, type, and quality specified.
D. Refer to Section 01640 for requirements concerning proprietary specifications and product options.
E. Items shown on the drawings, but not otherwise described or noted, shall be provided in conformance with applicable code requirements.

2.03 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. Where all other criteria are met, Contractor shall give preference to products that:
   1. If used on interior, have lower emissions, as defined in Section 01-6116.
   2. If wet-applied, have lower VOC content, as defined in Section 01-6116.
   3. Have a published GreenScreen Chemical Hazard Analysis.

2.04 PRODUCT OPTIONS

A. Definition of Descriptive Specification: For the purposes of this Contract, Descriptive Specification shall mean one or more listed requirements describing a Product, or reference to Standard Specifications or Standards issued by a named Agency, Manufacturer or similar Organization.

B. For Products specified only by Descriptive Specifications, select any product meeting specified requirements.

C. For Products specified by listing proprietary names of Products:
   1. If no Descriptive Specification is included, select any named Product.
   2. If descriptive specification is included it shall take precedence. Contractor shall verify with supplier that the named Product may be provided to meet the requirements of the descriptive specification including requirements in addition to named manufacturers regular standards. If Product cannot be provided to meet the specifications, notify Salmon Harbor Management Committee at least (5) five days prior to Bid Opening, or prior to execution of the Agreement if the Project is negotiated. Failure to deliver such notice within the specified time limit shall for the purposes of this Contract establish that the Contractor has made the required verifications, and he shall be responsible either to provide the Product as specified, or to provide an approved substitute Product at no additional cost to Salmon Harbor Management Committee.
   3. Materials or Products specified by name of manufacturer shall establish a standard of quality and shall not be construed as limiting competition. The Contractor may use other materials or products only as approved in writing by Salmon Harbor Management Committee.

D. Items shown on the drawings, but not otherwise described or noted, shall be provided in conformance with applicable code requirements.

2.05 SUBSTITUTIONS

A. Submit requests for substitution approvals in triplicate and include complete data substantiating compliance of proposed substitution with Contract Documents as follows:
   1. Identity of product for which substitution is requested, including specification page and paragraph.
   2. Identity of proposed substitution, including 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 maintenance service.

B. In making request for substitution, Manufacturer/Contractor represents:
   1. He has personally investigated proposed Product, and determined that it is equal to or superior in all respects to that specified.
   2. He will provide the same guarantee for substitutions as for product specified.
3. He will coordinate installation of proposed substitution into Work, making such changes as may be required for the Work to be complete in all respects.
4. He waives all claims for additional costs related to substitution which consequently become apparent.
5. Data submitted with substitution request is complete and accurate.

C. Substitutions will not be considered if:
   1. They are indicated or implied on shop drawings or project data submittals without formal request for substitution as described herein above.
   2. Acceptance will require substantial revision of the Contract Documents.
   3. Salmon Harbor Management Committee does not agree that the proposed substitution is in their best interest.

D. 2.06 MAINTENANCE MATERIALS
   A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
   B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES
   A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
   B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
   C. A request for substitution constitutes a representation that the submitter:
      1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
      2. Will provide the same warranty for the substitution as for the specified product.
      3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
      4. Waives claims for additional costs or time extension that may subsequently become apparent.
   D. Substitution Submittal Procedure:
      1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
      2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
      3. The Architect will notify Contractor in writing of decision to accept or reject request.

3.02 TRANSPORTATION AND HANDLING
   A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
   B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
   C. Timing: Arrange Product deliveries in accord with Construction Progress; coordinate with SHMC to avoid conflict with Work and site conditions.
   D. Transport and handle products in accordance with manufacturer’s instructions.
   E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
   F. Delivery and inspection: Deliver Products undamaged, in Manufacturer’s original containers or packaging, and with legible identifying labels intact. Immediately upon delivery, inspect shipments to assure that Products are properly protected and undamaged.
G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

L. Protection after Installation: Provide substantial coverings as necessary to protect installed Products against damage. Remove covering when no longer needed.

3.04 INAPPROPRIATE PRODUCTS AND METHODS:

A. Should any materials be found to be contrary to the Contract, the material no matter in what stage of completion, may be rejected by SHMC and if rejected shall be removed from the site at once.

B. If the Contractor believes that any specified product, method, or system is inappropriate for use, or any specified result cannot be achieved, he shall so notify SHMC at least (7) seven days prior to Bid opening, or prior to execution of the Agreement if the project is not bid. Failure to deliver such notice of objection within the specified time limit, shall for the purposes of this Contract, establish that the Contractor agrees that the specified products, methods, or systems are appropriate, and achievable, and the Contractor's responsibility to provide and warrant such product, method, or system shall not later be voided or reduced. If after the agreement is signed, the Contractor notifies SHMC that a specified result, product, or system cannot be provided, then it shall be the Contractor's responsibility to provide a substitute which is acceptable to SHMC.

3.05 PREPARATION AND INSPECTION

A. No Product shall be applied or installed until conditions and surfaces are acceptable to Applicator or Installer.

B. Notify SHMC of unacceptable condition or surfaces.

C. Failure to notify SHMC of unsatisfactory condition or subsurface before Work is started shall place full responsibility for final results upon the installer or applicator.

D. Prior to covering, concealing or otherwise affecting the Work of other trades, verify with SHMC that the Work of the other trade is complete and may be so concealed, covered, or affected.
Failure to make such verification shall cause Contractor to assume complete responsibility for any necessary corrective measures.

3.06 MANUFACTURER’S INSTRUCTIONS:

A. Perform Work in accordance with manufacturer’s instructions. Do not omit preparatory or installation procedures required by Manufacturer, unless specifically modified or exempted by Contract Documents. When Contract Documents require Work to comply with Manufacturer’s instructions, obtain and distribute such instructions to parties performing Work, and if requested, include copy to SHMC. Maintain one copy of Manufacturer’s instructions at job site during installation and until acceptance. Handle, install, connect, clean, condition, and adjust Products in strict accordance with Manufacturer’s instructions and in conformance with specified requirements. Should job conditions or specified requirements conflict with Manufacturer’s instructions, consult SHMC for further instructions. Do not proceed with Work without clear instructions.

END OF SECTION
SECTION 01-6116
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Requirements for Indoor-Emissions-Restricted products.

1.02 RELATED REQUIREMENTS
A. Section 01-3000 - Administrative Requirements: Submittal procedures.
B. Section 01-6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

1.03 DEFINITIONS
A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings applied on site.
   2. Interior adhesives and sealants applied on site, including flooring adhesives.
   3. Flooring.
   4. Products making up wall and ceiling assemblies.
   5. Thermal and acoustical insulation.
B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings applied on site.
   2. Interior adhesives and sealants applied on site, including flooring adhesives.
C. Interior of Building: Anywhere inside the exterior weather barrier.
D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
   1. Concrete.
   2. Clay brick.
   3. Metals that are plated, anodized, or powder-coated.
   4. Glass.
   5. Ceramics.
   6. Solid wood flooring that is unfinished and untreated.

1.04 REFERENCE STANDARDS
C. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.
D. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; current edition.
E. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

1.05 SUBMITTALS
A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.
1.06 QUALITY ASSURANCE

A. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.

B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.01 MATERIALS

A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
   3. Paints and Coatings: Each color; most stringent of the following:
      a. 40 CFR 59, Subpart D.
      b. SCAQMD 1113 Rule.
      c. CARB (SCM).

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. All additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION
SECTION 01-7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Examination, preparation, and general installation procedures.
B. Pre-installation meetings.
C. Cleaning and protection.
D. Starting of systems and equipment.
E. Demonstration and instruction of Owner personnel.
F. Closeout procedures, except payment procedures.

1.02  RELATED REQUIREMENTS
A. Section 01-1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
B. Section 01-3000 - Administrative Requirements: Submittals procedures.
C. Section 01-7419 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.
D. Section 01-7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.
E. Section 07-8400 - Firestopping.

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

1.04  QUALIFICATIONS
A. For survey work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

1.05  PROJECT CONDITIONS
A. Use of explosives is not permitted.
B. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.06  COORDINATION
A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.
B. Notify affected utility companies and comply with their requirements.
C. Coordinate completion and clean-up of work of separate sections.

PART 2  PRODUCTS

2.01  PATCHING MATERIALS
A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01-6000.

PART 3 EXECUTION

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

3.02 PREPARATION
A. Clean substrate surfaces prior to applying next material or substance.
B. Seal cracks or openings of substrate prior to applying next material or substance.
C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS
A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
B. Require attendance of parties directly affecting, or affected by, work of the specific section.
C. Notify Architect four days in advance of meeting date.
D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.
E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

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

K. Periodically verify layouts by same means.

L. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS
A. Install products as specified in individual sections, in accordance with manufacturer’s instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 CUTTING AND PATCHING
A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-conforming work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing.

D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.

I. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
3.07 PROGRESS CLEANING
   A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
   B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
   C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
   D. Collect and remove waste materials, debris, and trash/rubbish from site weekly and dispose off-site; do not burn or bury.

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

3.09 SYSTEM STARTUP
   A. Coordinate schedule for start-up of various equipment and systems.
   B. Notify Architect and owner seven days prior to start-up of each item.
   C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
   D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
   E. Verify that wiring and support components for equipment are complete and tested.
   F. Execute start-up under supervision of applicable Contractor personnel and manufacturer’s representative in accordance with manufacturers’ instructions.
   G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
   H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

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

3.12 INSTRUCTION OF SALMON HARBOR MANAGEMENT COMMITTEE’S PERSONNEL
A. Prior to final acceptance, instruction SHMC's Personnel in necessary operation, adjustment, and maintenance of Products, Equipment, and Systems.
B. Operating and Maintenance Manual shall constitute basis of instruction.
C. Review manual with SHMC's personnel in detail to explain all aspects of operations and maintenance.

3.13 FINAL CLEANING
A. Use cleaning materials that are nonhazardous.
   1. Use only those recommended by Manufacturer or surface to be cleaned.
   2. Use only on surfaces recommended by cleaning material manufacturer.
   3. Follow cleaning Material and Manufacturer's instructions.
B. Clean exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces,
C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
E. Clean filters of operating equipment.
F. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
G. Clean site; sweep paved areas, rake clean landscaped surfaces.
H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
I. Perform final cleaning prior to Occupancy or Final Completion, whichever of the two is earlier.
J. Employ skilled workmen for final cleaning.
K. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign matter from all exposed interior and exterior surfaces.
L. Clean and polish glass, mirrors, fixtures, hardware, resilient floor covering and other glossy surfaces.
M. Hose clean exterior paved surfaces; rake clean other surfaces of grounds, after removal of temporary facilities.
N. Ventilating System: Clean ducts, fans and heaters if units were operated during construction.
O. Remove rubbish dirt and extraneous materials from the interiors of conduits, catch basins, manholes, and other construction work.

3.14 CLOSEOUT PROCEDURES
A. Make submittals that are required by governing or other authorities.
B. SUBSTANTIAL COMPLETION
   1. When Contractor considers Work Substantially Complete, he shall submit to Architect/SHMC:
      a. Written notice that Work is Substantially Complete.
      b. List of items to be completed or corrected.
   2. Architect/SHMC will, as soon as possible after receipt of notice, inspect to verify completion status.
   3. Should Architect/SHMC consider that Work is not Substantially Complete:
      a. Architect/SHMC will notify Contractor in writing, giving reasons therefore.
EXECUTION AND CLOSEOUT REQUIREMENTS
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b. Contractor shall remedy Work deficiencies, and send second notice of Substantial Completion to Architect/SHMC.
c. Architect/SHMC will re-inspect Work.

4. When Architect concurs that Work is Substantially Complete, he will:
a. Prepare Certificate of Substantial Completion accompanied with Contractor's list of items to be completed or corrected, as verified by Architect/SHMC.
b. Submit Certificate to SHMC and Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

C. FINAL COMPLETION
1. When Contractor considers Work complete, he shall submit written certification that:
a. Contract Documents have been reviewed.
b. Contractor has inspected Work for compliance with Contract Documents.
c. Work has been completed in accordance with the Contract Documents.
d. Equipment and Systems have been tested in presence of SHMC's Representative and are operational.
e. Work is complete and ready for final inspection

2. Architect/SHMC will, as soon as possible after receipt of Contractor's Certification, inspect to verify completion status.

3. Should Architect/SHMC consider Work incomplete or defective:
a. Architect/SHMC will notify Contractor in writing, listing incomplete or defective Work.
b. Contractor shall immediately remedy deficiencies, and send second written certification to Architect/SHMC that Work is complete.
c. Architect/SHMC will re-inspect Work.

4. When Architect/SHMC finds Work acceptable under Contract Documents, he shall request final closeout submittals.

D. Notify Architect and SHMC when work is considered ready for Substantial Completion.

E. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's and SHMC's review.

F. Owner will occupy all of the building as specified in Section 01-1000.

G. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

H. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

I. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

J. Architect and SHMC will, as soon as possible after receipt of notice, inspect to verify completion status.

K. Substantial Completion:

L. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

M. Should Architect/SHMC consider Work incomplete or defective:
1. Architect/SHMC will notify Contractor in writing, listing incomplete or defective Work.
2. Contractor shall immediately remedy deficiencies, and send second written certification to Architect/SHMC that Work is complete.
3. Architect/SHMC will re-inspect Work.
4. When Architect/SHMC finds Work acceptable under Contract Documents, he shall request final closeout submittals.

N. REINSPECTION FEES
1. Should Architect/SHMC be required to make more than two final inspections due to Contractor's failure to correct specified deficiencies, Architect/SHMC will deduct a compensation amount from Contractor's final payment as follows:

2. SHMC time at $80.00 per hour.
3. Others at 1.20 times the direct cost incurred.
4. Charges will be made for necessary travel time, auto expense computed at 56 cents per mile, and all other expenses incurred in making inspections.

3.15 FINAL ADJUSTMENTS AND FINAL PAYMENT

A. Architect/SHMC will prepare and issue final Change Order, reflecting approved adjustments to Contract Sum not previously made by Change Orders.

B. Contractor shall follow procedures specified in Contract Conditions in making final application for payment.

END OF SECTION
SECTION 01-7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.
B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
   1. Aluminum and plastic beverage containers.
   2. Corrugated cardboard.
   3. Wood pallets.
   4. Clean dimensional wood: May be used as blocking or furring.
   5. Land clearing debris, including brush, branches, logs, and stumps; see Section 31-1000 - Site Clearing for use options.
   6. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
   7. Paint.
E. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.
   5. Incineration, either on- or off-site.
F. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

A. Section 01-5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
B. Section 01-6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
C. Section 01-7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

A. See Section 01-6000 for waste prevention requirements related to delivery, storage, and handling.

B. See Section 01-7000 for trash/waste prevention procedures related to cutting and patching, installation, protection, and cleaning.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Meetings: Discuss trash/waste management goals and issues at project meetings, particularly at:
   1. Pre-construction meeting.
   2. Regular job-site meetings.

B. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. As a minimum, provide:
      a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
      b. Separate dumpsters for each category of recyclable.
      c. Recycling bins at worker lunch area.
   2. Provide containers as required.
   3. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   4. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

C. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

D. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified
materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

E. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

F. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION
SECTION 01-7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Project Record Documents.
   B. Operation and Maintenance Data.
   C. Warranties and bonds.
   D. Evidence of Payments and Release of Liens.

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

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION
3.01 PROJECT RECORD DOCUMENTS
   A. Maintain on site one set of the following record documents; record actual revisions to the Work:
      1. Drawings.
      3. Addenda.
      4. Field Orders.
      5. Change Orders and other modifications to the Contract.
      6. Reviewed shop drawings, product data, and samples.
      7. Field Test Reports.
      8. Manufacturer's instruction for assembly, installation, and adjusting.
      9. Other written instructions.
   B. Ensure entries are complete and accurate, enabling future reference by Owner.
   C. Store record documents separate from documents used for construction, and maintain in clean, dry, legible condition; available at all times for inspection by SHMC.
   D. Record information concurrent with construction progress; do not Conceal any Work until required information has been recorded. Lack of current Record Documents shall be grounds for withholding progress payments.
   E. Specifications and Addenda: Legibly mark and record at each product section description of actual products installed, including the following:
      1. Manufacturer, trade name, catalog number / product model and number, and Supplier for each Product actually installed.
      2. Product substitutions or alternates utilized.
   F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
      1. Measured depths of foundations in relation to finish floor elevation datum.
      2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
      3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract drawings.
6. Contractor to submit clean set of Drawings, transferring all changes that occurred during construction from the working job set of Drawings to a clean set of Drawings. Submit to Architect for review and approval.

3.02 RECORDING
A. Documents shall be maintained by a competent draftsman. If SHMC considers submitted drafting to be unacceptable, redraw until acceptable at no additional cost to SHMC.
B. Label each Document "PROJECT RECORD" in 1" high printed letters.
C. Required Drawings:
   2. Prior to submittal, transfer recorded information to one additional blue-line print. Contractor may retain "work set" for his records.

3.03 SUBMITTALS
A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment, accompanied by transmittal letter, containing:
   1. Project Title.
   2. Date.
   3. Contractor's name and address.
   4. Title and number of each Record Document.
   5. Signature of Contractor, or his authorized representative.
B. Operation and Maintenance Data:
   1. Data preparation shall be done by personnel:
      a. Completely familiar with the requirements of Operation and Maintenance Data.
      b. Trained and experienced in maintenance and operation of described products.
   2. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   3. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   4. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   5. Submit two sets of revised final documents in final form within 10 days after final inspection.
C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
D. All closeout submittals shall be made at one time to SHMC, except that extra materials shall be delivered at one time to the Project site, with letter of transmittal listing items to SHMC with verifying signature of receipt of SHMC's representative.

3.04 OPERATION AND MAINTENANCE DATA
A. Compile full details for care and maintenance of materials, equipment, and systems, where specified herein or in other Specification Sections.
1. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors or installers and suppliers, including local source of supplies, paint, and replacement parts, and recommended Maintenance Contractor, if needed.

2. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

3. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

4. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

B. Instruct SHMC's personnel in maintenance or Products and in operation of equipment and systems.

3.05 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.


D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.06 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

D. Include color coded wiring diagrams as installed.

E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

G. Provide servicing and lubrication schedule, and list of lubricants required.

H. Include manufacturer's printed operation and maintenance instructions.

I. Include sequence of operation by controls manufacturer.

J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

K. Additional Requirements: As specified in individual product specification sections.
3.07 ADDITIONAL DATA
   A. Prepare and include additional data:
      1. When need becomes apparent during instruction of SHMC’s personnel.
      2. As specified in other Sections of the Specifications.

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

3.09 WARRANTIES, BONDS, AND MAINTENANCE CONTRACTS
   A. Obtain warranties, bonds, and maintenance contracts, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
   1. The Contractor shall and hereby does warrant against ordinary wear and usage the following Work as noted, and for the following periods of time after the start of the Warranty Period as defined below (3.09.4):
      a. Warranties for Work and for periods of service as called for in the respective Sections of the Specifications, regardless of limitations or conditions written into any certificates of warranty or guarantee which might be submitted.
      1) 10 years: Weather tightness of Sealants, Roofing, Moisture barrier, Damp proofing, Flashing, Roof Accessories, and other Work which is a component part of Roofing or other weather protective or moisture protective elements of the Work and a specific warranty is not stated in the respective Division 7 section.
      2) 3 years: Applied finishes against delaminating from surface to which applied.
      3) 2 years: Effectiveness of soil sterilizers; Plumbing, HVAC, and electrical work and equipment specified in Divisions 22, 23, and 26, respectively.
b. The above warranties are an extension to run concurrently with the one-year statutory warranty, and are in addition to any Guarantee, Bond or warranties called for elsewhere in the Contract Documents.

2. General Warranties:
   a. Provide one-year warranty as described in the General Conditions, Article 3.5. Warranty period shall commence on the date of the fully executed Certificate of Substantial Completion.
   b. Weather-tight warranty: The Contractor shall, and hereby does, warranty flashings, roofing, and all other work which is a component part of the roofing to be weather-tight under ordinary wear and usage for a period of two years from and after Substantial Completion of the building. This is an extension of the general one year warranty described above. Further, the Contractor shall warranty that it will make good without delay all defects of labor and materials without additional cost to the Owner.

3. Product Warranties:
   a. Warrant that the Product will be replaced or properly repaired, without delay and without cost to SHMC, should the Product fail to properly function or provide service within the specified warranty period.

4. Additional Warranties: See individual technical specification sections for written warranties for specific projects of work.

5. Warranty Period: shall begin upon Substantial Completion, or if a Certificate of Substantial completion is not issued, or if Work which is to be covered by warranty is not then complete, Warranty period shall begin upon the date of Final Acceptance or on the date appearing on the final Certificate for Payment to the Contractor, whichever is earlier. SHMC's occupancy or use of the Project will not alter the Warranty Period herein defined.

6. Include instances which might affect validity of warranties, bonds, or contracts.

B. Verify that documents are in proper form, contain full information, and are notarized; duly signed by the installing Subcontractor, or representative of the Product Manufacturer.

C. Co-execute submittals when required.

D. Include proper procedures in event of failure.

E. Retain warranties, bonds, and maintenance contracts until time specified for submittal.

F. Warranty Submittals shall include:
   1. Project name and address
   2. Description of Product, and reference to Specification Section
   3. Length of Warranty as specified.
   4. Date of beginning for Warranty Period.
   5. Conditions of warranty as specified above.
   6. Additional conditions of warranty as required for Product by Specifications.
   7. Statement that the signatory agrees to provide said warranty.
   8. Typed Name of individual signing warranty, signature, and date.

G. Where extended Warranties or specific conditions of Warranty are called for in the respective Sections of the Specifications, but where no Certificate of Warranty is required to be submitted, the Contractor may, at his option, and to protect his own interests, require the respective Subcontractors or Suppliers to provide him with Certificates of Warranty covering his Warranty obligations to SHMC.


I. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

J. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
K. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

3.10 WARRANTY CONDITIONS

A. Should any Work covered by Warranty fail to properly function or to provide proper service within the Warranty period, the Contractor shall correct the defect immediately, at no cost to SHMC, following receipt of written notice from SHMC. Should any other damage be incurred, either as a direct result of the subject defect, or as a result of the Contractor's failure to promptly correct the defect, then the Contractor shall also correct the resulting damage to SHMC's satisfaction, at no additional cost, whether or not said damage is to Work provided under this contract. If delay in correction of a defect covered by warranty can reasonably be expected to create a risk of significant future damage, contingent expenses, or danger to persons or property, and if the Contractor does not act with promptness commensurate to such risk, or if SHMC cannot contact the Contractor after making a reasonable effort, then SHMC may at his option, have the defect corrected and the Contractor shall pay all related costs billed to SHMC.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

C. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty except that the remaining warranty period shall be a minimum of one year following acceptance of the subject correction Work.

3.11 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

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

B. Duly sign and execute all submittals before delivery to SHMC.

END OF SECTION
SECTION 03-2000
CONCRETE REINFORCING

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Reinforcing steel for cast-in-place concrete.
B. Supports and accessories for steel reinforcement.

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

1.03 REFERENCE STANDARDS
A. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
F. CRSI (DA4) - Manual of Standard Practice; 2009.

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

1.05 QUALITY ASSURANCE
A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS
2.01 REINFORCEMENT
A. Reinforcing Steel: ASTM A615/A615M Grade 60 - 60,000 psi.
   1. Deformed billet-steel bars.
   2. Unfinished.
B. Reinforcement Accessories:
   1. Tie Wire: Comply with CRSI specifications.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

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

PART 3 EXECUTION
3.01 PLACEMENT
A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
B. Do not displace or damage vapor barrier.
C. Accommodate placement of formed openings.

D. Maintain concrete cover around reinforcing as follows:
   1. Supported Slabs and Joists: 3/4 inch, not exposed to ground or weather.
   2. Walls (exposed to weather or backfill): 2 inch.
   3. Footings and Concrete Formed Against Earth: 3 inch.
   4. Slabs on Fill: 3 inch.

E. Conform to applicable code for concrete cover over reinforcement.

END OF SECTION
SECTION 03-3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Concrete formwork.
B. Concrete footings, foundation walls and slab.
C. Miscellaneous concrete elements, including equipment pads, light pole bases, thrust blocks, and manholes.

1.02 RELATED REQUIREMENTS
A. Section 014000 - Quality Requirements.
B. Section 32-1313 - Concrete Paving: Sidewalks, curbs and gutters.
C. Section 03-2000 - Concrete Reinforcing.
D. Section 03-3523 - Exposed Aggregate Concrete Finishing.

1.03 REFERENCE STANDARDS
C. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).
F. ACI 306R - Cold Weather Concreting; 2010.
G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
H. ACI 347R - Guide to Formwork for Concrete; 2014.
Q. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.

1.04 SUBMITTALS
A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
C. Test Reports: Submit report for each test or series of tests specified.

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

PART 2 PRODUCTS

2.01 FORMWORK
A. Formwork Design and Construction: Comply with guidelines of ACI 347 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.
   1. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface. Fill all voids after cones have been removed.

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

2.03 CONCRETE MATERIALS
A. Cement: ASTM C150, Type II - Moderate Portland type.
   1. Acquire all cement for entire project from same source.
   1. Acquire all aggregates for entire project from same source.
C. Fly Ash: ASTM C618, Class C or F.
D. Calcined Pozzolan: ASTM C618, Class N.
E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
F. Water: Clean and not detrimental to concrete.

2.04 ADMIXTURES
A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
B. Air Entrainment Admixture: ASTM C260/C260M.

2.05 ACCESSORY MATERIALS
A. Underslab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with ASTM E1745, Class A; 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. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor retarder.
   2. Products:
B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. ASTM C1107/C1107M; Grade A, B, or C.
C. Epoxy Adhesive: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator.
   1. Products:
      a. Hilti RE-500 SD.
      b. Simpson SET-XP or 3.
c. Or equivalent.

2.06 CONCRETE MIX DESIGN
A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
   1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.
B. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
C. Normal Weight Concrete:
   1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 4,000 psi, unless drawings indicate otherwise. Concrete should be a minimum of a 6-sack mix.
   2. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.
   3. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.

2.07 MIXING
A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION
A. 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.

3.03 REBAR DOWELING WITH EPOXY ADHESIVE
A. Install in accordance with manufacturers evaluation report.
   1. Coordinate inspection.
   2. Clean hole.
   3. Insure adequate mixing.
   4. Allow cure time.

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

3.05 SLAB JOINTING
A. Locate joints as indicated on drawings.
B. Anchor joint fillers and devices to prevent movement during concrete placement.
C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES
A. Maximum Variation of Surface Flatness:
   1. Exposed Concrete Floors: 1/4 inch in 10 ft.
B. Correct the slab surface if tolerances are less than specified.
C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.07 CONCRETE FINISHING
A. Repair surface defects, including tie holes, immediately after removing formwork.
B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/8 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and terrazzo with full bed setting system.
   2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, thin set quarry tile, and thin set ceramic tile.
   3. Other Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.08 CURING AND PROTECTION
A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
D. Surfaces Not in Contact with Forms:
   1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
   2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   3. Final Curing: Begin after initial curing but before surface is dry.

3.09 FIELD QUALITY CONTROL
A. An independent testing agency will perform field quality control tests, as specified in Section 01-4000.
B. Provide free access to concrete operations at project site and cooperate with appointed firm.
C. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

3.10 DEFECTIVE CONCRETE
A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
B. Defective Concrete: Concrete not 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.

3.11 SCHEDULE - CONCRETE TYPES AND FINISHES
A. Concrete Slabs: 4,000 psi 28 day concrete, trowel finish.

END OF SECTION
SECTION 03-3523
EXPOSED AGGREGATE CONCRETE FINISHING

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Exposed aggregate concrete finish on cast-in-place concrete work specified in Section 03-3000.

1.02  RELATED REQUIREMENTS
A. Section 03-1000 - Concrete Forming and Accessories.
B. Section 03-3000 - Cast-in-Place Concrete.

1.03  REFERENCE STANDARDS
A. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
C. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).

1.04  ADMINISTRATIVE REQUIREMENTS
A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05  SUBMITTALS
A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
B. Samples: Submit two, 2 pound plastic bags of each aggregate specified, illustrating size, color and the extremes of color range.

1.06  QUALITY ASSURANCE
A. Perform Work in accordance with ACI 301 and ACI 303R.
   1. Maintain one copy of each document on project site.

1.07  MOCK-UP
A. Construct mock-up comprised of one horizontal field sample panel, 2 feet long by 2 feet wide, with full aggregate color range represented.
B. Locate where directed.
C. Mock-up may not remain as part of the Work.

1.08  DELIVERY, STORAGE, AND HANDLING
A. Provide pigment, surface retarder, and acid etch solution in manufacturer's original packaging, including use instructions.

PART 2  PRODUCTS

2.01  APPLICATIONS
A. Vestibule 01 and Lobby/Laundry 02: Light brown aggregate, 1/4 inch minimum and 3/8 inch maximum size. Hand Seeded. Evenly distributed. 99% coverage.

2.02  CONCRETE MATERIALS
A. Cement, Water, Admixtures: Specified in Section 03-3000.
B. Cement: ASTM C150/C150M, Type I - Normal portland type; white color.
C. Admixture: Air entrainment as specified in Section 03-3000.
D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.
E. Aggregate Supplier:
   1. Contractor's choice.
F. Aggregate: Natural quartz; smooth; 1/4 inch minimum size to 3/8 inch maximum size; clean washed type.
   1. No iron bearing aggregate permitted.
   2. Color: Buff color from single source throughout.

2.03 ACCESSORY MATERIALS
   A. High Gloss Clear Sealer: Non-yellowing, transparent combination curing compound and sealer complying with ASTM C1315 Type I Class A.
      3. Manufacturers:
         b. Substitutions: See Section 01-6000 - Product Requirements.

2.04 CONCRETE MIX
   A. Concrete mix design is specified in Section 03-3000.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify that items to be cast into concrete are placed securely and will not impede placing concrete.
   B. Notify Architect minimum 24 hours prior to commencement of concreting operations.

3.02 PREPARATION
   A. Clean formwork surfaces.
   B. Apply surface retarder to formwork in accordance with manufacturer's instructions.
   C. Clean previously placed concrete with steel brush and apply bonding agent in accordance with manufacturer's instructions.

3.03 PLACING CONCRETE
   A. Place concrete in accordance with Section 03-3000 and comply with ACI 301.
   B. Place concrete continuously between predetermined construction and contraction joints. Do not interrupt successive placement such that cold joints occur.

3.04 AGGREGATE EXPOSURE
   A. After removal of formwork, wet concrete surfaces with water and scrub with acid etch solution, exposing aggregate to match accepted sample panel.

3.05 CURING
   A. Cure concrete floor surfaces as specified in 03-3000.

3.06 CLEANING
   A. When desired finish is achieved, wash and rinse exposed aggregate surfaces.

3.07 DEFECTIVE CONCRETE
   A. Patch, cure, and finish imperfections to match adjacent areas.

3.08 PROTECTION
   A. Protect concrete from premature drying or staining, excessively hot or cold temperatures, or mechanical injury.

3.09 SCHEDULES
   A. See Finish Schedule

END OF SECTION
SECTION 06-1000
ROUGH CARPENTRY

PART 1  GENERAL

1.01  SECTION INCLUDES
A.  Structural dimension lumber framing.
B.  Non-structural dimension lumber framing.
C.  Rough opening framing for doors, windows, and roof openings.
D.  Sheathing.
E.  Preservative treated wood materials.
F.  Miscellaneous framing and sheathing.
G.  Communications and electrical room mounting boards.
H.  Concealed wood blocking, nailers, and supports.
I.  Miscellaneous wood nailers, furring, and grounds.
J.  Water-resistive barrier over wall sheathing.

1.02  RELATED REQUIREMENTS
A.  Section 06-1753 - Shop-Fabricated Wood Trusses.
B.  Section 07-2500 - Weather Barriers: Water-resistive barrier over sheathing.
C.  Section 07-6200 - Sheet Metal Flashing and Trim: Sill flashings.

1.03  REFERENCE STANDARDS
C.  WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17; 2015.

PART 2  PRODUCTS

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

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

2.03 EXPOSED DIMENSION LUMBER
   A. Sizes: Nominal sizes as indicated on drawings.
   B. Surfacing: S4S.
   C. Sizes: Nominal sizes as indicated on drawings, Rough (unsurfaced).
   D. Moisture Content: S-dry or MC19.
   E. Rafter, Small Beam, and Purlin Framing (2 by 6 through 4 by 16):
      1. Species: Western Cedar.
      2. Grade: Select.

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

2.05 CONSTRUCTION PANELS
   A. Roof Sheathing: APA PRP-108/APA PRPR-108, Form B455, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
      2. Thickness: 5/8 inch, nominal.
      3. Edges: square.
   B. Wall Sheathing, plywood: APA PRP-108/APA PRP-108, Form B455 Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
      2. Thickness: 5/8 inch, nominal.

2.06 FACTORY WOOD TREATMENT
   A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
      1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
   B. Preservative Treatment:
      1. Manufacturers:
         d. Substitutions: See Section 01-6000 - Product Requirements.
      2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.40 lb/cu ft retention.
         a. Treat lumber exposed to weather.
         b. Treat lumber in contact with roofing, flashing, or waterproofing.
         c. Treat lumber in contact with masonry or concrete.

PART 3 EXECUTION

3.01 PREPARATION
   A. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.
   B. Coordinate installation of rough carpentry members specified in other sections.
3.02 INSTALLATION - GENERAL
   A. Select material sizes to minimize waste.
   B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory
      components, including: shims, bracing, and blocking.
   C. Where treated wood is used on interior, provide temporary ventilation during and immediately
      after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION
   A. Set structural members level, plumb, and true to line. Discard pieces with defects that would
      lower required strength or result in unacceptable appearance of exposed members.
   B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to
      maintain structure in true alignment and safe condition until completion of erection and
      installation of permanent bracing.
   C. Install structural members full length without splices unless otherwise specifically detailed.
   D. Comply with member sizes, spacing, and configurations indicated, and fastener size and
      spacing indicated, but not less than required by applicable codes and AFPA Wood Frame
      Construction Manual.
   E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that
      are parallel to floor joists; use metal joist hangers unless otherwise detailed.
   F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

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

3.05 INSTALLATION OF CONSTRUCTION PANELS
   A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with
      ends staggered and over firm bearing.
      1. At long edges provide solid edge blocking where joints occur between roof framing
         members, as indicated on Roof Framing Plan
      2. Nail panels to framing; staples are not permitted.
   B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm
      bearing and staggered, using nails, screws, or staples.

3.06 SITE APPLIED WOOD TREATMENT
   A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts,
      complying with manufacturer's instructions.
   B. Allow preservative to dry prior to erecting members.
3.07 TOLERANCES
   A. Framing Members: 1/4 inch from true position, maximum.
   B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.08 CLEANING
   A. Waste Disposal: Comply with the requirements of Section 01-7419.
      1. Comply with applicable regulations.
      2. Do not burn scrap on project site.
      3. Do not burn scraps that have been pressure treated.

END OF SECTION
SECTION 06-1733
WOOD I-JOISTS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Wood I-joists for roof framing.
B. Bridging, bracing, and anchorage.
C. Framing for openings.

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

1.03 DESIGN REQUIREMENTS
A. Refer to structural notes/criteria in drawings.

1.04 SUBMITTALS
A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's literature describing materials, dimensions, allowable spans and spacings, bearing and anchor details, bridging and bracing requirements, and installation instructions; identify independent inspection agency.
C. Shop Drawings: Indicate sizes and spacing of joists, bracing and bridging, bearing stiffeners, holes to be cut (if any), and framed openings between joists.
D. Certificate: Certification by joist manufacturer that products delivered are of the same design and construction as those evaluated by the independent inspection agency.

1.05 DELIVERY, STORAGE, AND HANDLING
A. Deliver products to site in manufacturer's original packaging with manufacturer's name and product identification intact and legible.
B. Protect products from damage due to weather and breakage.
C. Protect joists from warping or other distortion by stacking in upright position, braced to resist movement, with air circulation under coverings and around stacks.
D. Handle individual joists in the upright position.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Wood I-Joists:
   4. Substitutions: See Section 01-6000 - Product Requirements.

2.02 MATERIALS
A. Wood I-Joists: Solid lumber top and bottom flanges and oriented strand board (OSB) webs bonded together with structural adhesive, with published span rating to meet project requirements.
   1. Oriented Strand Board: Comply with PS 2.
   2. Adhesive: Tested for wet/external service in accordance with ASTM D2559.
   3. Depth: As indicated on drawings.
B. Wood Blocking, Plates, and Miscellaneous Framing: As specified in Section 06-1000.
C. Fasteners: Electrogalvanized steel, type to suit application.
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that supports and openings are ready to receive joists.

3.02 PREPARATION
   A. Coordinate placement of bearing items.

3.03 ERECTION
   A. Install joists in accordance with manufacturer's instructions.
   B. Set structural members level and plumb, in correct position.
   C. Make provisions for erection loads and for sufficient temporary bracing to maintain structure plumb and in true alignment until completion of erection and installation of permanent bracing.
   D. Install permanent bridging and bracing.
   E. Install headers and supports to frame openings required.
   F. Frame openings between joists with lumber in accordance with Section 06-1000.
   G. Coordinate installation of sheathing/decking with work of this section.

3.04 TOLERANCES
   A. Framing Members: 1/2 inch maximum, from true position.

END OF SECTION
SECTION 06-1753
SHOP-FABRICATED WOOD TRUSSES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Shop fabricated wood trusses for roof framing.
B. Bridging, bracing, and anchorage.

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

1.03 REFERENCE STANDARDS
A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
F. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17; 2015.

1.04 QUALITY ASSURANCE
A. Designer Qualifications: Perform design by or under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

PART 2 PRODUCTS

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

2.02 MATERIALS
A. Lumber:
   1. Grade: WCLB (GR), Douglas Fir-Larch No. 2 or better.
B. Steel Connectors: Hot-dipped galvanized steel sheet, ASTM A653/A653M Structural Steel (SS) Grade 33/230, with G90/Z275 coating; die stamped with integral teeth; thickness as indicated.
C. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

2.03 ACCESSORIES
A. Wood Blocking, Bridging, Plates, and Miscellaneous Framing: Softwood lumber, any species, construction grade, 19 percent maximum and 7 percent minimum moisture content.

2.04 FABRICATION
A. Fabricate trusses to achieve structural requirements specified.
   1. Design Loads (Truss engineer to include weights necessary for chord and web members):
      a. Live Load Top Chord: 24 lbs./sq. ft.
      b. Dead Load Top Chord: 8 lbs./sq. ft.
      c. Live Load Bottom Chord: 2 lbs./sq.ft.
d. Dead Load Bottom Chord: 5 lbs./sq. ft.
B. Brace wood trusses in accordance with TPI DSB-89 and BCSI 1.

PART 3 EXECUTION

3.01 ERECTION
A. Install trusses in accordance with manufacturer's instructions and TPI DSB-89 and TPI BCSI 1; maintain a copy of each TPI document on site until installation is complete.
B. Set members level and plumb, in correct position.
C. Install permanent bridging and bracing.

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

END OF SECTION
SECTION 06-2000
FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Finish carpentry items.
B. Wood door frames, glazed frames.
C. Wood casings and moldings.
D. Interior standing and running trim.
E. Exterior standing and running trim.

1.02 RELATED REQUIREMENTS
A. Section 01-6116 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 06-1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
C. Section 06-4100 - Architectural Wood Casework: Shop fabricated custom cabinet work.
D. Section 07466 - Fiber Cement Siding.
E. Section 09-9000 - Painting and Coating: Painting and finishing of finish carpentry items.

1.03 REFERENCE STANDARDS
A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
C. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
D. PS 1 - Structural Plywood; 2009.

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

1.05 QUALITY ASSURANCE
A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
B. Factory-mark each piece of lumber with type, grade, mill, and grading agency identification. Omit marking from surfaces to receive transparent finish.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Protect work from moisture damage.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS
A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI (AWS) for Premium Grade.
B. Unless otherwise indicated provide products of quality specified by AWI Architectural Woodwork Quality Standards Illustrated for Premium grade.
C. Unless otherwise indicated provide products of quality specified by Woodwork Institute Manual of Millwork for Premium grade.

2.02 WOOD-BASED COMPONENTS
A. Wood fabricated from old growth timber is not permitted.
2.03 LUMBER MATERIALS
   A. Softwood Lumber: Doug-Fir / Hem fir, KD S4S, Grade C and better, WCLIB #16 Paragraph 101C, sizes shown on drawings. species, maximum moisture content of 6 percent; with vertical grain.
      1. Location: Interior.
   B. Softwood Lumber: Resawn texture Cedar, K.D., grade C and better species, maximum moisture content of 6 percent; primed, fingerjointed, 20' lengths.
      1. Location: Exterior, scheduled for paint finish.

2.04 SHEET MATERIALS
   A. Softwood Plywood Exposed to View: Face species as indicated, rough sawn texture, veneer core; PS 1 Grade A-B; no plugs, glue type as recommended for application.

2.05 PLASTIC LAMINATE MATERIALS
   A. Plastic Laminate: NEMA LD 3, HGS; color as selected; textured, low gloss finish.

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

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

2.08 FABRICATION
   A. Shop assemble work for delivery to site, permitting passage through building openings.
   B. Cap exposed plastic laminate finish edges with aluminum trim.
   C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
   D. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

PART 3 EXECUTION
3.01 INSTALLATION OF INTERIOR AND EXTERIOR TRIM
   A. Discard units of materials which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements, or which are of defective manufacture with respect to surfaces, sizes, and patterns.
   B. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
   C. Set and secure materials and components in place, plumb and level, tru and straight, with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8-0" for plum and level and with 1/32" maximum offset in flush adjoining surfaces, 1/8" minimum offsets in revealed adjoining surfaces.
   D. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps. Refinish cut surfaces or repair damaged finish at cuts.
   E. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners to produce tight fitting joints with full surface contact throughout length of joint. Use scarf (miter) joints for end-to-end joints. At exterior scarf joints, slope away from winter wind direction and water run off. Set nails and putty prior to finishing. Miter all joints.
F. Anchor finish carpentry work to anchorage devices or blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Use fine finishing nails for exposed nailing, countersunk and filled flush with finished surface and matching final finish where transparent finish is indicated.

3.02 PREPARATION FOR SITE FINISHING
A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
B. Site Finishing: See Section 09-9000.

3.03 TOLERANCES
A. Maximum Variation from True Position: 1/16 inch.
B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION
SECTION 06-4100
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Specially fabricated cabinet units.
B. Countertops.
C. Cabinet hardware.
D. Factory finishing.

1.02 RELATED REQUIREMENTS
A. Section 06-1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
B. Section 09-9000 - Painting and Coating: Site finishing of cabinet exterior.

1.03 REFERENCE STANDARDS
A. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.
C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2009.
F. PS 1 - Structural Plywood; 2009.
G. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2010.

1.04 SUBMITTALS
A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
C. Product Data: Provide data for hardware accessories.

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

PART 2 PRODUCTS

2.01 CABINETS
A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI Architectural Woodwork Standards (AWS) for Premium Grade.

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

A. Particleboard: ANSI A208.1; medium density industrial type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips bonded with interior grade adhesive under heat and pressure; sanded faces; thickness as required; use for components indicated on drawings.

B. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as required.

C. Plywood for Non-Decorative Purposes: NIST PS 1, Interior rated adhesives, core of seven (7) wood plies from listed species unless otherwise indicated, thickness as indicated or as required by application.
   2. Concealed Surfaces: PS 1; APA B-B Grade, rotary cut Douglas fir face veneer.
   3. Location: At countertops and base cabinets in all sink and lavatory locations.

D. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth two sides (S2S); use for drawer bottoms, dust panels, and other components indicated on drawings.

E. Pre-Finished High Density Particle Board (PFHDPB)

2.04 LAMINATE MATERIALS

A. Provide specific types as follows:
   1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, colors and finish as selected by Architect.
   2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, colors and finish as selected by Architect.
   3. Semi-Exposed Materials: High pressure laminate, 0.020" thick, cabinet liner. (CL.20) in color and finish selected by Architect.

2.05 COUNTERTOPS

A. Plastic Laminate Countertops: Medium density fiberboard substrate covered with HPDL, conventionally fabricated, with edge as noted in drawings.

2.06 SITE FINISHING MATERIALS

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

2.07 FABRICATION

A. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum 2 feet from sink cut-outs.
   1. Cap exposed plastic laminate finish edges with material of same finish and pattern.

B. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

2.08 FACTORY FINISHING

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

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 INSTALLATION

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

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

3.04 CLEANING
   A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION
SECTION 07-2100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.
B. Sound Batt Insulation in Sound Walls.
C. Rigid Cellular Polystyrene Thermal Insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.
D. Rigid Cellular Polystyrene Thermal Insulation at all exterior wall headers.
E. Extruded Polystyrene XPS Rigid Foam Insulation at underslab radiant heat.

1.02 RELATED REQUIREMENTS

A. Section 06-1000 - Rough Carpentry: Supporting construction for batt insulation.

1.03 REFERENCE STANDARDS


1.04 SUBMITTALS

A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.05 FIELD CONDITIONS

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

1.06 LABELING REQUIREMENTS

A. Building Thermal Envelope Insulation:
   1. An R-value identification mark is applied (by manufacturer) to each piece of insulation 12 inches or greater in width.
   2. Alternately, the insulation installers have provided a signed, dated and posted certification listing the type, manufacturer and R-value of installation installed.
B. Insulation Mark Installation:
   1. Insulation materials are installed such that the manufacturer's R-value is readily observable upon inspection.
C. Insulation Product Rating:
   1. The thermal resistance (R-value) of insulation has been determined in accordance with the US FTC R-value rule.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Insulation:
5. Or approved.

B. Substitutions: See Section 016000 - Product Requirements.

2.02 APPLICATIONS

A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board.
B. Insulation in Wood Framed Walls: Batt insulation with separate vapor retarder.
C. Insulation in Wood Framed Ceiling Structure: Batt insulation with integral vapor retarder.
D. Insulation behind window and door headers (interior side): Rigid, Cellular Polystyrene Thermal Insulation.

2.03 FOAM BOARD INSULATION MATERIALS

A. Expanded Polystyrene (EPS) Board Insulation: ASTM C578, Type XI; with the following characteristics:

1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
2. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
3. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
5. Board Density: 0.7 lb/cu ft.
7. Location: At headers only.

B. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.

1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
5. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
6. Manufacturers:
7. Substitutions: See Section 01-6000 - Product Requirements.

2.04 BATT INSULATION MATERIALS

A. Where batt insulation is indicated, use glass fiber batt insulation.
B. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
C. Batt Insulation: ASTM C 665; preformed batt; friction fit, conforming to the following:

1. Material: Glass fiber.
2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
5. Thermal Resistance: R of [19, 30 and 38].
6. Thickness: 5-1/2", 9-1/2" and 12" inch, refer to Drawings for R-values locations.
7. Vapor Barrier Facing: Aluminum foil, flame spread 25 rated; one side (or equivalent), when not in direct contact with finish material, paper face elsewhere.
D. Glass Fiber Sound Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C 665; friction fit.
   1. Density: 0.8 pcf.
   2. Thickness: 3 inch.
   3. Manufacturers:
      a. Same as above.
      b. Substitutions: See Section 01-6000 - Product Requirements.
   4. Locations: Restroom walls.

2.05 ACCESSORIES
A. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide, at foil face vapor barrier areas, polyester elsewhere.
B. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.
C. Wire: Galvanized steel.
D. Support tape: Nylon reinforced or as approved by manufacture.
E. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.
B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT EXTERIOR WALLS
A. Install boards horizontally on walls (at headers).
   1. Install in running bond pattern.
   2. Butt edges and ends tightly to adjacent boards and to protrusions.
B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane and in gaps / shimmed spaces.

3.03 BOARD INSTALLATION UNDER CONCRETE SLABS
A. Place insulation under slabs on grade after base for slab has been compacted.
B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.04 BATT INSTALLATION
A. Install insulation and vapor retarder in accordance with manufacturer’s instructions.
B. Insulation at roof spaces: Refer to detail section Drawings. Secure with wire to support between trusses as needed, tape joints of foil faced vapor barrier, or install separate vapor barrier with taped seams. Insulation must be adequately supported for uniform placement. Add additional support as needed.
C. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
E. Fit insulation tightly to exterior side of mechanical and electrical services within the plane of the insulation.
F. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over member face.
G. Tape seal tears or cuts in vapor retarder.
H. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

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

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Water-Resistive Barrier: Under exterior wall cladding, over sheathing or other substrate; not air tight or vapor retardant.
B. Vapor Retarders: Materials to make joints around frames of openings in exterior walls water vapor-resistant and air tight.

1.02 RELATED REQUIREMENTS
A. Section 03-3000 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.
B. Section 06-1000 - Rough Carpentry: Water-resistive barrier under exterior cladding.
C. Section 07-2100 - Thermal Insulation: Vapor retarder installed in conjunction with batt insulation.
D. Section 07-9005 - Joint Sealers: Sealant materials and installation techniques.

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

1.04 REFERENCE STANDARDS

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

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

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES
A. Water-Resistive Barrier: Provide on exterior walls under exterior cladding.

2.02 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)
A. Self-Adhered Water Resistant Air Barrier Membrane:
1. Air Permeance: 0.004 cubic feet per square foot, maximum, when tested in accordance with ASTM E2178.
2. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
3. Water Vapor Permeance: 29 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
4. Dry Film Thickness: 28 mils (0.028 inch), minimum.
7. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 50 or less, when tested in accordance with ASTM E84.
8. Products:
   b. Substitutions: See Section 01-6000 - Product Requirements.
9. Location: Entire exterior wall, from foundation to eaves, typical.

2.03 ADHESIVES
   A. Approved adhesive-primer: Blueskin Adhesive, roller applied, per manufacturer recommendations. Provide at all areas to receive weather barrier - entire exterior wall area.

2.04 ACCESSORIES
2.05 SELF-ADHERING FLASHING
   A. Manufacturer and Product:
      2. Henry Company, Blueskin SA.
      3. Substitutions: See Section 01-6000 - Product Requirements.
   B. Materials: Rubberized asphalt and polyethylene. 40 mils thickness.
   C. Location: Around all wall openings and where noted on drawings.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION
   A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
   B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer’s instructions.

3.03 INSTALLATION
   A. Install materials in accordance with manufacturer’s instructions.
   B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
   C. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.
   D. Self-Adhesive Sheets:
      1. All surfaces to receive membrane must be dry and clean of oil, dust, fronts, bulk water and other contaminants that would be detrimental to adhesion of membrane. Approved adhesive - primer to be applied as recommended by Membrane manufacturer.
      2. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
      3. Lap sheets shingle-fashion to shed water and seal laps air tight.
4. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that all laps are firmly adhered with no gaps or fishmouths.
5. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
6. At wide joints, provide extra flexible membrane allowing joint movement.

E. Openings and Penetrations in Exterior Weather Barriers:
   1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
   2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with at least 4 inches wide; do not seal sill flange.
   3. At openings to be filled with non-flanged frames, seal weather barrier to all sides of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
   4. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
   5. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.
   6. Refer to Drawings for additional placement requirements, and coordination placement with metal flashings.

3.04 FIELD QUALITY CONTROL
   A. Do not cover installed weather barriers or vapor retarders until inspections have been completed.

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

END OF SECTION
SECTION 07-3113
ASPHALT SHINGLES

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Asphalt shingle roofing.
B. Flexible sheet membranes for eave protection, underlayment, and valley protection.

1.02  RELATED REQUIREMENTS
A. Section 06-1000 - Rough Carpentry: Roof sheathing.
B. Section 07-6200 - Sheet Metal Flashing and Trim: Edge and cap flashings.

1.03  REFERENCE STANDARDS

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

PART 2  PRODUCTS

2.01  SHINGLES
A. Manufacturers:
   1. GenStar Roofing; Product High Sierra, match existing color of Marine Activity Center asphalt shingles.
   2. Substitutions: See Section 01-6000 - Product Requirements.
B. Asphalt Shingles: Asphalt-coated glass felt, mineral granule surfaced, complying with ASTM D3462; Class A fire resistance.
   1. Self-sealing type.
   2. Style: Laminated overlay.
C. Ridge Shingles: Manufacturer's standard factory pre-cut units to match shingles.

2.02  SHEET MATERIALS
A. Underlayment: Synthetic non-asphaltic sheet, intended by manufacturer for mechanically fastened roofing underlayment without sealed seams.
   1. Type: Woven polypropylene with anti-slip polyolefin coating on both sides.
   3. Performance: Meet or exceed requirements for ASTM D226/D226M, Type II asphalt-saturated organic felt.
   4. Fasteners: As recommended by manufacturer or building code qualification report or approval.
   5. Manufacturers:
      a. GAF "Deck-Armor" or equivalent to shingle manufacturer_______
      b. Substitutions: See Section 01-6000 - Product Requirements.
   6. Location: Typical under shingles, as roof deck protection. See below for eaves, valleys, wall junctures, etc.
   2. Manufacturers: 
      a. GAF "Weatherwatch" meneral surfaced leak barrier", or equivalent to shingle manufacturer
      b. Substitutions: See Section 01-6000 - Product Requirements
   3. Location: Typical at eaves, valleys, wall junctures, etc., and other locations as noted in drawings.

2.03 ACCESSORIES
   A. Nails: Standard round wire shingle type, of hot-dipped zinc coated steel, 10 wire gage, 0.1019 inch shank diameter, 3/8 inch head diameter, of sufficient length to penetrate through roof sheathing or 3/4 inch into roof sheathing or decking, except at overhangs. Do not penetrate through 5/8" thick plywood soffits.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify existing conditions prior to beginning work.
   B. Verify deck surfaces are dry, free of ridges, warps, or voids.

3.02 PREPARATION
   A. Broom clean deck surfaces before installing underlayment or eave protection.
   B. Install eave edge flashings tight with fascia boards. Weather lap joints 2 inches and seal with plastic cement. Secure flange with nails spaced 6 inches on center.

3.03 INSTALLATION - UNDERLAYMENT
   A. At Roof Slopes Less Than 4:12: Install two layers of underlayment over entire roof area, with ends and edges weather lapped minimum 4 inches. Stagger end laps of each consecutive layer. Nail in place. Location: 3:12 slope at recessed roof section for PV Panels, Alternate Bid, refer to Building Section Drawings.
   B. At Roof Slopes Greater Than 4:12: Install underlayment perpendicular to slope of roof, with ends and edges weather lapped minimum 4 inches. Stagger end laps of each consecutive layer. Nail in place. Weather lap minimum 4 inches over eave protection.
   C. Items projecting through or mounted on roof: Weather lap and seal watertight with plastic cement.

3.04 INSTALLATION - VALLEY PROTECTION
   A. Install one ply of flexible flashing, minimum 18 inches wide, centered over valleys.
   B. Install flexible flashing in accordance with manufacturer's instructions.
   C. Weather lap joints minimum 2 inches.
   D. Nail in place minimum 18 inches on center, 1 inch from edges.
   E. At Exposed Valleys: Install minimum 36 inches wide roll roofing with mineral surface side up over first layer of protection, centered. Apply a 4 inch wide band of lap cement along each edge of first, press roll roofing into cement, and nail in place minimum 18 inches on center, 1 inch from edges.

3.05 INSTALLATION - METAL FLASHING AND ACCESSORIES
   A. Weather lap joints minimum 2 inches and seal weather tight with plastic cement.
   B. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight with plastic cement.
3.06 INSTALLATION - SHINGLES

A. Install shingles in accordance with manufacturer's instructions.
   1. Fasten individual shingles using 2 nails per shingle, or as required by code, whichever is greater.
   2. Fasten strip shingles using 4 nails per strip, or as required by code, whichever is greater.

B. Place shingles in straight coursing pattern with 5 inch weather exposure to produce double thickness over full roof area. Provide double course of shingles at eaves.

C. Project first course of shingles 3/4 inch beyond fascia boards.

D. Extend shingles 1/2 inch beyond face of gable edge fascia boards.

E. After installation, place one daub of plastic cement, one inch diameter under each individual shingle tab exposed to weather, to prevent lifting.

F. Complete installation to provide weather tight service.

3.07 PROTECTION

A. Do not permit traffic over finished roof surface.

END OF SECTION
SECTION 07-4646
FIBER CEMENT SIDING

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Wood-fiber cement siding.

1.02 RELATED REQUIREMENTS
A. Section 06-1000 - Rough Carpentry:
B. Section 07-2500 - Weather Barriers: Weather barrier under siding.
C. Section 07620 - Sheet Metal Flashing and Trim
D. Section 07-9005 - Joint Sealers.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Manufacturer's requirements for related materials to be installed by others.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods, including nail patterns.
C. Test Report: Applicable model code authority evaluation report (e.g. ICC-ES).
D. Maintenance Instructions: Periodic inspection recommendations and maintenance procedures.
E. Warranty: Submit copy of manufacturer’s warranty, made out in Owner’s name, showing that it has been registered with manufacturer.
F. Samples: Submit in pattern specified:
   1. Two (2) pieces each of lap siding, 8.25" x 12", Cedarmill texture.
   2. One (1) 2' x 2' section of panel siding, Cedarmill texture.
   3. Two (2) x-1/2" wide batten boards, Cedarmill texture.

1.05 QUALITY ASSURANCE
A. Installer Qualifications: Company specializing in performing work of the type specified in this section with minimum 3 years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Store products under waterproof cover and elevated above grade, on a flat surface.

PART 2 PRODUCTS
2.01 SIDING
A. Lap Siding: Individual horizontal boards made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186 Type A Grade II; with machined edges, for nail attachment.
   1. Style: Hardiplank lap siding.
   2. Texture: Select Cedarmill.
   3. Length: 12 ft, nominal.
   5. Thickness: 5/16 inch, nominal.
   7. Lap Siding Manufacturers:
         1) HZ10 system required for this region.
b. Substitutions: See Section 01-6000 - Product Requirements.

B. Panels: Hardipanel vertical siding. Sierra 8, 4’ x 8’; 4’ x 9’, and 4’ x 10’ panels. Lengths are required to minimize waste and joints. Select Cedarmill formed under high pressure with integral surface texture, complying with ASTM C1186 Type A Grade II; with machined edges, for nail attachment.

C. Battens: Hardie. Trim battens, 3/4” x 2-1/2” x 12’ long, Rustic texture.

2.02 ACCESSORIES
A. Fasteners: Galvanized or corrosion resistant; length as required to penetrate sheathing and stud a minimum of 1-1/4 inch.

B. Sheet Metal Flashing: 8 inch wide metal flashing under butt joints of siding, per manufacturers recommendations.

C. Joint Sealer: As specified in Section 07-9005.

PART 3 EXECUTION
3.01 PREPARATION
A. Examine substrate and clean and repair as required to eliminate conditions that would be detrimental to proper installation.

B. Verify that weather barrier has been installed over substrate completely and correctly.

C. Do not begin until unacceptable conditions have been corrected.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION
A. Install sheet metal flashing:
   1. Above door and window trim and casings.
   2. Above horizontal trim in field of siding.

3.03 INSTALLATION
A. Install in accordance with manufacturer's instructions and recommendations.
   1. Read warranty and comply with all terms necessary to maintain warranty coverage.
   2. Use trim details indicated on drawings.
   3. Touch up all field cut edges before installing.
   4. Pre-drill nail holes to prevent breakage.

B. Over Wood and Wood-Composite Sheathing: Fasten siding through sheathing into studs.

C. Over Steel Studs: Use hot-dipped galvanized self-tapping screws, with the points of at least 3 screws penetrating each stud the panel crosses and at panel ends.

D. Allow space between both ends of siding panels that butt against trim for thermal movement; seal joint between panel and trim with exterior grade sealant.

E. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses. Install 8 inch wide X 8 inch high flashing behind butt joints in the field (not required at corners). Lap flashing over the previous course of siding.

F. Do not install siding less than 6 inches from surface of ground nor closer than 1 inch to roofs, patios, porches, and other surfaces where water may collect.

G. After installation, seal all joints except lap joints of lap siding. Seal around all penetrations. Paint all exposed cut edges.

H. Finish Painting: Specified in Section 09-9000.

3.04 PROTECTION
A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION
SECTION 07-6200
SHEET METAL FLASHING AND TRIM

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, sheet metal roofing, and other items indicated in Schedule.

1.02  RELATED REQUIREMENTS
A. Section 06-1000 - Rough Carpentry: Wood nailers.
B. Section 07-9005 - Joint Sealers.

1.03  REFERENCE STANDARDS
A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

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

1.05  QUALITY ASSURANCE
A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual and CDA Copper in Architecture Handbook requirements and standard details, except as otherwise indicated.
B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

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

PART 2  PRODUCTS

2.01  SHEET METAL FLASHING AND TRIM MATERIALS
A. Stainless Steel Flashing: Duraflash, 26 ga. ASTM A666 Type 304, soft temper, 0.018 inch thick; smooth No. 4 finish.
C. Metal Drip Edges: Extruded aluminum with bonderized finish or Duraflash.

2.02  ACCESSORIES
A. Fasteners: Stainless steel, with soft neoprene washers.
B. Primer: Zinc chromate type.
C. Protective Backing Paint: Zinc molybdate alkyd.
D. Sealant: Type 1 specified in Section 07-9005.
E. Plastic Cement: ASTM D4586, Type I.

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

2.04 GUTTER AND DOWNSPOUT FABRICATION
A. Gutters: Profile as indicated.
B. Downspouts: Rectangular profile.
C. Gutters and Downspouts: Size indicated.
D. Accessories: Profiled to suit gutters and downspouts.
   1. Anchorage Devices: In accordance with SMACNA requirements.
   2. Gutter Supports: Brackets.
   3. Downspout Supports: Brackets.
E. Downspout Boots: Plastic.
F. Seal metal joints.

PART 3 EXECUTION
3.01 PREPARATION
A. Install starter and edge strips, and cleats before starting installation.
B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.02 INSTALLATION
A. Conform to drawing details.
B. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
C. Apply plastic cement compound between metal flashings and felt flashings.
D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
E. Seal metal joints watertight.
F. Secure gutters and downspouts in place using concealed fasteners.
G. Slope gutters 1/8 inch per foot minimum.
H. Connect downspouts to downspout boots. Grout connection watertight.

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

END OF SECTION
SECTION 07-9005
JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Sealants and joint backing.

1.02 RELATED REQUIREMENTS
A. Section 01-6116 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 07-2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders:
C. Section 09-2116 - Gypsum Board Assemblies: Acoustic sealant.

1.03 REFERENCE STANDARDS
D. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordinate the work with other sections referencing this section.

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

1.06 FIELD CONDITIONS
A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

PART 2 PRODUCTS

2.01 SEALANTS
A. Sealants and Primers - General: Provide products having volatile organic compound (VOC) content as specified in Section 01-6116.

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

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

2.02 ACCESSORIES
   A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
   B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
   C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
   D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

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

3.02 PREPARATION
   A. Remove loose materials and foreign matter that could impair adhesion of sealant.
   B. Clean and prime joints in accordance with manufacturer's instructions.
   C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
   D. Protect elements surrounding the work of this section from damage or disfigurement.

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

3.04 CLEANING
   A. Clean adjacent soiled surfaces.

3.05 PROTECTION
   A. Protect sealants until cured.

3.06 SCHEDULE
   A. Exterior Joints for Which No Other Sealant Type is Indicated: Type 1.
   B. Interior Joints for Which No Other Sealant is Indicated: Type 2.

END OF SECTION
PART 1  GENERAL

1.01  RELATED REQUIREMENTS
A. Section 09-9123 - Interior Painting: Field finishing of doors.

1.02  REFERENCE STANDARDS
A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

1.03  SUBMITTALS
A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
C. Specimen warranty.
D. Samples: Submit two samples of door veneer, 12 by 12 inch in size illustrating wood grain, stain color, and sheen.
E. Manufacturer's Installation Instructions: Indicate special installation instructions.
F. Warranty, executed in Owner's name.

1.04  QUALITY ASSURANCE
A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

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

1.06  WARRANTY
A. See Section 01-7800 - Closeout Submittals, for additional warranty requirements.
B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2  PRODUCTS

2.01  DOORS
A. All Doors: See drawings for locations and additional requirements.
   1. Quality Level: Custom Grade, Standard Duty performance, in accordance with AWI/AWMAC/WI (AWS).
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
   3. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
      a. Masonite - Aspiro Series, Marshfield - Algoma.
      b. Oregon Door.
      c. VT Industries.
      d. Or approved equal.
B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at all locations.
2. Wood veneer facing for field transparent finish where indicated on drawings.

2.02 DOOR AND PANEL CORES
   A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

2.03 DOOR FACINGS
   A. Veneer Facing for Transparent Finish: Birch, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
   B. Door Frames: Custom grade Fir, vertical grain, complying with AWI Section 900.

2.04 DOOR CONSTRUCTION
   A. Fabricate doors in accordance with door quality standard specified.
   B. Cores Constructed with stiles and rails:
      1. Provide solid blocks at lock edge for hardware reinforcement.
      2. Provide solid blocking for other throughbolted hardware.
   C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.
   D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
   E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
      1. Exception: Doors to be field finished.
   F. Provide edge clearances in accordance with the quality standard specified.

2.05 FACTORY FINISHING - WOOD VENEER DOORS
   A. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for Grade specified and as follows:
      1. Transparent:
         b. Stain: As selected by Architect from manufacturer's standard palette of stained veneer samples.
         c. Sheen: Satin.

PART 3 EXECUTION

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

END OF SECTION
SECTION 08-1613
FIBERGLASS DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Fiberglass reinforced plastic (FRP) doors.
B. Frames for fiberglass reinforced plastic doors.
C. Hinges and other door hardware.
D. Glazing.
E. Accessories.

1.02 RELATED REQUIREMENTS
A. Section 08-7100 - Door Hardware: Door hardware.
B. Section 08-8000 - Glazing.
C. Section 09-9000 - Painting and Coating.

1.03 REFERENCE STANDARDS

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination: Obtain hardware templates from hardware manufacturer prior to starting fabrication.

1.05 SUBMITTALS
A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's standard details, installation instructions, and hardware and anchor recommendations.
C. Test Reports: Show compliance with specified criteria.
D. Shop Drawings: Show layout and profiles; include assembly methods.
   1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.
   2. Indicate wall conditions, door and frame elevations, sections, materials, gages, finishes, location of door hardware by dimension, and details of openings; use same reference numbers indicated on Drawings to identify details and openings.
E. Selection Samples: Submit two complete sets of color chips, illustrating manufacturer's available finishes, colors, and textures.
F. Verification Samples: Submit door surface samples for each finish specified, illustrating finishes, colors, and textures.
G. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.
H. Maintenance Data: Include instructions for repair of minor scratches and damage.
I. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer; include detailed terms of warranty.
J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01-6000 - Product Requirements, for additional provisions.
   2. Package products with protective covering and identify with descriptive labels.

1.06 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing products of the type
      specified in this section, with not less than three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING
   A. Mark doors with door opening mark number, door type, color, and weight.
   B. Deliver materials in manufacturer's original, unopened, undamaged containers with
      identification labels intact.
   C. Deliver pre-assembled doors and frames with braces, spreaders, and packaging as required to
      prevent damage.
   D. Store materials in original packaging, under cover, protected from exposure to harmful weather
      conditions and from direct contact with water.
      1. Store at temperature and humidity conditions recommended by manufacturer.
      2. Do not use non-vented plastic or canvas shelters.
      3. Immediately remove wet wrappers.
   E. Store in position recommended by manufacturer, elevated minimum 4 inches above grade, with
      minimum 1/4 inches space between doors.

1.08 FIELD CONDITIONS
   A. Do not install doors until structure is enclosed.
   B. Maintain temperature and humidity at manufacturer's recommended levels during and after
      installation of doors.

1.09 WARRANTY
   A. See Section 01-7800 - Closeout Submittals, for additional warranty requirements.
   B. Provide manufacturer's standard warranty covering materials and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Molded Fiberglass Doors:
      1. Masonite - Vista Grande Flushed Glazed (masonite.com)
      2. Caldwell's Doors (caldwells.com)
      3. Or Approved

2.02 DOOR AND FRAME ASSEMBLIES
   A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.
      1. Door and frame shipped with braces, spreaders, and packaging as required to prevent
         damage.
      2. Mechanical Durability: Tested to ANSI A250.4 Level A (1,000,000 cycles), minimum;
         tested with hardware and fasteners intended for use on project.
      3. Screw-Holding Capacity: Tested to 900 psi, minimum.
      4. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed
         index of 450 or less, Class A; when tested in accordance with ASTM E84.
      5. Flammability: Self-extinguishing when tested in accordance with ASTM D635.
      6. Chemical Resistance: Resist degradation due to exposure to tap water, distilled water, and:
         a. Ocean salt spray.
      7. Sizes: As indicated on drawings.
9. Clearance Between Bottom of Door and Finished Floor: 3/4 inch, maximum; not less than 1/4 inch clearance to threshold.
10. Provide frame anchors that allow for variation in rough opening size; do not field cut doors or frames to fit.
11. Provide rot resistant material at bottom 4" minimum of exterior door jambs.

2.03 COMPONENTS
A. Doors: Through-color gel coating on fiberglass reinforced polyester resin construction with reinforced core.
   2. Core Material: Manufacturer's standard core material for application indicated.
   3. Construction:
      a. Molded in one piece including through color gel coating on each side; manufacturer's standard subframe, core and faces fused during curing; hardware reinforcements.
   4. Face Sheet Texture: Smooth.
   5. Door Construction: Molded in one piece; manufacturer's standard subframe, core and faces fused during cure in mold; hardware reinforcements.
   7. Waterproof Integrity: All edges, cut-outs, and hardware preparations factory fabricated of fiberglass reinforced plastic; provide cut-outs with joints sealed independently of glazing or louver inserts or trim.
   8. Hardware Preparations: Factory reinforce, machine, and prepare for all hardware including field installed items; provide solid blocking for each hardware item; make field cutting, drilling or tapping unnecessary; obtain manufacturer's templates for hardware preparations.
B. Frames: Profiles and dimensions as indicated on drawings; same type and construction used in mechanical durability test for doors.
   1. Construction: Use one of the following:
      a. Composite frame.
   2. At hardware cut-outs provide continuous backing or mortar guards of same material as frame, sealed watertight.
   3. Reinforcing: Provide manufacturer's standard reinforcing at hinge, strike, and closer locations.
C. Hinge and Hardware Fasteners: Stainless steel, Type 304; wood screws.

2.04 PERFORMANCE REQUIREMENTS
A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.
B. Structural Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.

2.05 FINISHES
A. Primer: Aliphatic urethane for field finishing.

2.06 ACCESSORIES
A. Glazing Stops: Pultruded fiberglass unless otherwise indicated or required by fire rating; provided by door manufacturer to fit factory made openings, color and texture to match door; fasteners not penetrating waterproof integrity.
   1. Exterior Doors: Provide non-removable stops on outside and continuous compression gasket weatherseal.
   2. Opening Sizes: As indicated on drawings.
B. Glazing: As specified in Section 08-8000.
C. Glazing:
   1. Fully tempered float glass, 1/4 inch thick, clear.
D. Door Hardware: As specified in Section 08-7100.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify actual dimensions of openings by field measurements before door fabrication; show recorded measurements on shop drawings.
B. Do not begin installation until substrates have been properly prepared.

3.02 PREPARATION
A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
B. Clean and prepare substrate in accordance with manufacturer's directions.
C. Protect adjacent work and finish surfaces from damage during installation.

3.03 INSTALLATION
A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors.
B. Install exterior doors in accordance with ASTM E2112.
C. Install door hardware as specified in Section 08-7100.
D. Set units plumb, level, and true-to-line, without warping or racking doors, and with specified clearances; anchor in place.
E. Set thresholds in continuous bed of sealant.
F. Repair or replace damaged installed products.

3.04 ADJUSTING
A. Lubricate, test, and adjust doors to operate easily, free from warp, twist or distortion, and to fit watertight for entire perimeter.
B. Adjust hardware for smooth and quiet operation.
C. Adjust doors to fit snugly and close without sticking or binding.

3.05 CLEANING
A. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.

3.06 PROTECTION
A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION
SECTION 08-5313
VINYL WINDOWS

PART 1 GENERAL

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

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

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
   A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide component dimensions, anchorage and fasteners, glass, internal drainage details.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Vinyl Windows:
      2. Substitutions: See Section 01-6000 - Product Requirements.

2.02 VINYL WINDOWS
   A. Vinyl Windows: Factory fabricated frame and sash members of extruded, hollow, ultra-violet-resistant, polyvinyl chloride (PVC) with integral color; with factory-installed glazing, hardware, related flashings, anchorage and attachment devices.
      1. Configuration: As indicated on drawings.
         a. Product Type: FW - Fixed window and awning window with removable crank handle.
      3. Size to fit openings with minimum clearance around perimeter of assembly providing necessary space for perimeter seals.
      4. Framing Members: Fusion welded corners and joints, with internal reinforcement where required for structural rigidity; concealed fasteners.
      5. System Internal Drainage: Drain to exterior side by means of weep drainage network any water entering joints, condensation within glazing channel, or other migrating moisture within system.
   B. Performance Requirements: Provide products that comply with the following:
      1. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 requirements in accordance with the following:
      2. Performance Validation: Windows shall comply with AAMA/WDMA/CSA 101/I.S.2/A440 performance requirements as indicated by having AAMA, WDMA, or CSA certified label, or
an independent test report for indicated products itemizing compliance and acceptable by authorities having jurisdiction.

### 2.03 COMPONENTS

A. **Glazing:** Insulated double pane, annealed glass, clear, low-E coated, argon filled, with glass thicknesses as recommended by manufacturer for specified wind conditions and acoustic rating indicated.

B. **Windows:** Extruded, hollow, tubular, ultra-violet resistant polyvinyl chloride (PVC) with integral color; factory fabricated; with vision glass, related flashings, anchorage and attachment devices.
   2. Configuration: Fixed, non-operable, outward opening, top hinged, horizontal sliding, and double hung sash.

C. **Frames:** Standard profile; flush glass stops of screw fastened type.

### 2.04 HARDWARE

A. **Horizontal Sliding Sash:** Rigid PVC interfacing tracks with dual brass wheel and stainless steel axle assembly housing, provide two sets for each operating sash and opening stops in head and sill track as required.

B. **Sash lock:** Lever handle and keeper with cam lock, provide at least one for each operating sash.

C. **Finish For Exposed Hardware:** Manufacturer's standard.

### 2.05 FABRICATION

A. Fabricate framing, mullions and sash members with fusion welded corners and joints, in a rigid jig. Supplement frame sections with internal reinforcement where required for structural rigidity.

B. Form snap-in glass stops, closure molds, weather stops, and flashings of extruded PVC for tight fit into window frame section.

C. Arrange fasteners to be concealed from view.

D. Permit internal drainage weep holes and channels to migrate moisture to exterior. Provide internal drainage of glazing spaces to exterior through weep holes.

E. Factory glaze window units.

### PART 3 EXECUTION

#### 3.01 INSTALLATION

A. Install window unit assemblies in accordance with manufacturers instructions and applicable building codes.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities as necessary.

C. Align window plumb and level, free of warp or twist, and maintain dimensional tolerances and alignment with adjacent work.

#### 3.02 ADJUSTING

A. Adjust hardware for smooth operation and secure weathertight closure.

#### 3.03 CLEANING

A. Remove protective material from pre-finished surfaces.

B. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.

C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer and appropriate for application indicated.

**END OF SECTION**
## DOOR SCHEDULE

<table>
<thead>
<tr>
<th>Room Name</th>
<th>Door No.</th>
<th>Size (WxH)</th>
<th>Type</th>
<th>Material</th>
<th>Frame</th>
<th>Hardware Group</th>
<th>Rating</th>
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<td>30 - 70</td>
<td>D*</td>
<td>Glass/FG</td>
<td>Comp</td>
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<td>3 / A5.1</td>
<td>3 / A5.1</td>
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<td>30 - 70</td>
<td>A</td>
<td>WD</td>
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</table>

**Legend**

- AL - Aluminum Storefront System
- FG - Fiberglass
- HM - Hollow Metal
- KD - Knock Down Steel Frame (Timely)
- SS - Stainless Steel
- WD - Wood
- (E) - Existing

**Door Types**

- A
- B
- C
- D
- E

Louvered 18" x 18" vent
SECTION 08-7100  
DOOR HARDWARE  

PART 1 GENERAL  

1.01 SECTION INCLUDES  
A. Hardware for wood and fiberglass doors.  
B. Lock cylinders for doors for which hardware is specified in other sections.  
C. Thresholds.  
D. Weatherstripping, seals and door gaskets.  

1.02 RELATED REQUIREMENTS  
A. Section 08-1416 - Flush Wood Doors.  
B. Section 08-1613 - Fiberglass Doors.  

1.03 REFERENCE STANDARDS  
B. BHMA A156.1 - American National Standard for Butts and Hinges; 2013.  
C. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; 2011.  
D. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.  
E. BHMA A156.6 - American National Standard for Architectural Door Trim; 2010.  
G. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; 2010.  
I. BHMA A156.18 - American National Standard for Materials and Finishes; 2012.  
L. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.  
M. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.  
O. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; 1993; also in WDHS-1/WDHS-5 Series, 1996.  

1.04 ADMINISTRATIVE REQUIREMENTS  
A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.  

1.05 SUBMITTALS  
A. See Section 01-3000 - Administrative Requirements, for submittal procedures.  
B. Shop Drawings:  
   1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, electrical characteristics and connection requirements.
2. Submit manufacturer’s parts lists and templates.

1.06 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING
   A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

PART 2 PRODUCTS

2.01 MANUFACTURERS - BASIS OF DESIGN
   A. Substitutions: See Section 01-6000 - Product Requirements.

2.02 DOOR HARDWARE - GENERAL
   A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
   B. Provide all items of a single type of the same model by the same manufacturer.
   C. Provide products that comply with the following:
      1. Applicable provisions of federal, state, and local codes.
   D. Finishes: All door hardware the same finish unless otherwise indicated.
      1. Primary Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).
      a. Location: All exterior doors.
      3. Finish Definitions: BHMA A156.18.
   E. Fasteners:
      1. Concrete and Masonry Substrates: Stainless steel machine screws and lead expansion shields.

2.03 Hinges
   A. Hinges: Provide hinges on every swinging door.
      1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
      2. Provide ball-bearing hinges at all doors.
      3. Provide hinges in the quantities indicated.
      4. Provide non-removable pins on exterior outswinging doors.
   B. Manufacturers - Hinges:
      5. Substitutions: See Section 01-6000 - Product Requirements.

2.04 PUSH/PULLS
   A. Manufacturers - Push/Pulls:
      1. Assa Abloy McKinney or Ives.
      3. Substitutions: See Section 01-6000 - Product Requirements.

2.05 LOCKS AND LATCHES
   A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
      1. Hardware Sets indicate locking functions required for each door.
      2. If no hardware set is indicated for a swinging door provide an office lockset.
      3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
4. **Lock Cylinders:** Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.

B. **Lock Cylinders:** Manufacturer’s standard tumbler type, six-pin standard core.
   1. Provide cams and/or tailpieces as required for locking devices required.

C. **Keying:** Grand master keyed.

D. **Latches:** Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

### 2.06 CYLINDRICAL LOCKSETS

A. **Cylindrical Locksets:**

B. **Locking Functions:** As defined in BHMA A156.2, and as follows:
   1. Passage: No locking, always free entry and exit.
   2. Office: F81, key not required to lock, remains locked upon exit.
   3. Classroom: F84, key required to lock.
   4. Always-Locked - Soreroom: F86, key required to lock, may not be left unlocked.

C. **Manufacturers - Cylindrical Locksets:**

D. **Lever - L style, lever with return.**

### 2.07 CLOSERS

A. **Closers:**

B. **Closers:** Complying with BHMA A156.4.
   1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
   2. Provide a door closer on every exterior door.

C. **Manufacturers - Closers:**
   2. LCN, an Allegion brand: www.allegion.com/us.
   3. Substitutions: See Section 01-6000 - Product Requirements.

### 2.08 STOPS AND HOLDERS

A. **Stops:** Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
   1. Provide wall stops, unless otherwise indicated.
   2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
   3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.

B. **Manufacturers - Wall and Floor Stops/holders:**
   2. Ives.

### 2.09 GASKETING AND THRESHOLDS

A. **Gasketing and Thresholds:**

B. **Gaskets:** Complying with BHMA A156.22.
   1. On each door in smoke partition, provide smoke gaskets; top, sides, and meeting stile of pairs. If fire/smoke partitions are not indicated on drawings, provide smoke gaskets on each door identified as a "smoke door" and 20-minute rated fire doors.
   2. On each exterior door, provide weatherstripping gaskets, unless otherwise indicated; top, sides, and meeting stiles of pairs.
      a. Where exterior door is also required to have fire or smoke rating, provide gaskets functioning as both smoke and weather seals.
   3. On each exterior door, provide door bottom sweep, unless otherwise indicated.
C. Thresholds:
   1. At each exterior door, provide a threshold unless otherwise indicated.

D. Manufacturers - Gasketing and Thresholds:

2.10 PROTECTION PLATES AND ARCHITECTURAL TRIM

A. Protection Plates:

B. Protection Plates:
   1. Kickplate: Provide on both sides of every door with closer, except exterior doors. Provide
      on interior side of exterior doors.

C. Manufacturers - Protection Plates and Architectural Trim:
   1. Trimco: www.trimcobbw.com
   2. Ives:  www.iveshinges.com

2.11 FINISHES

A. Interior doors - #626 Satin Chrome Plated.

B. All Exterior doors - #630 - Satin Stainless Steel.

2.12 KEYING

A. Door Locks: Grand master keyed.

B. Supply keys in the following quantities:
   1. 2 master keys.
   2. 5 grand master keys.
   3. 3 change keys for each lock.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are
   present and properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Mounting heights for hardware from finished floor to center line of hardware item: As listed in
   Schedule, unless otherwise noted:
   1. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware
      for Wood Flush Doors."
   2. Locksets: 38 inch.
   3. Push/Pulls: 42 inch.
   4. Dead Locks: 42 inch.

3.03 ADJUSTING

A. Adjust work under provisions of Section 01-7000.

3.04 HARDWARE SCHEDULE - ATTACHED AT END OF THIS SECTION.

END OF SECTION
## HARDWARE SCHEDULE

### GROUP 1 - Door 01

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Model/Part Number</th>
<th>Quantity</th>
<th>Material/Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each Hinges</td>
<td>FBB191 4½&quot;x4½&quot;</td>
<td>3</td>
<td>Stanley</td>
</tr>
<tr>
<td>Each Keypad Lock</td>
<td>DL2700WP</td>
<td>1</td>
<td>Alarm Lock</td>
</tr>
<tr>
<td>Each Closer</td>
<td>3501</td>
<td>1</td>
<td>Yale</td>
</tr>
<tr>
<td>Each Floor Stop</td>
<td>1211</td>
<td>1</td>
<td>Trimco</td>
</tr>
<tr>
<td>Each Kick Plate</td>
<td>K6000 8x2LDW Clear</td>
<td>1</td>
<td>Trimco</td>
</tr>
<tr>
<td>Each Threshold</td>
<td>274+195 (Welded)</td>
<td>1</td>
<td>Pemko</td>
</tr>
<tr>
<td>Each Threshold Stop Strip</td>
<td>1842AS</td>
<td>1</td>
<td>Pemko</td>
</tr>
<tr>
<td>Each Door Sweep/Drip Edge</td>
<td>216AV</td>
<td>1</td>
<td>DUR</td>
</tr>
<tr>
<td>Each Kerf-In Weatherstrip</td>
<td>Q108</td>
<td>1</td>
<td>Black, Pemko</td>
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### GROUP 2 – Door 02

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<th>Model/Part Number</th>
<th>Quantity</th>
<th>Material/Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each Hinges</td>
<td>FBB179 4½&quot;x4½&quot;</td>
<td>3</td>
<td>Stanley</td>
</tr>
<tr>
<td>Each Closer</td>
<td>3501</td>
<td>1</td>
<td>Yale</td>
</tr>
<tr>
<td>Each Push Plate</td>
<td>HAG-30S-3½&quot;x15&quot;</td>
<td>1</td>
<td>Hager</td>
</tr>
<tr>
<td>Each Pull Plate</td>
<td>HAG-33E-3½&quot;x15&quot;</td>
<td>1</td>
<td>Hager</td>
</tr>
<tr>
<td>Each Floor Stop</td>
<td>1211</td>
<td>1</td>
<td>Trimco</td>
</tr>
<tr>
<td>Each Kick Plate</td>
<td>K6000 8x2LDW Clear</td>
<td>2</td>
<td>Trimco</td>
</tr>
<tr>
<td>Each Kick Plate</td>
<td>K6000 8x1LDW Clear</td>
<td>2</td>
<td>Trimco</td>
</tr>
<tr>
<td>Set Kerf-In Weatherstrip</td>
<td>Q108</td>
<td>1</td>
<td>Black, Pemko</td>
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### GROUP 3 – Doors 03, 04

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<th>Model/Part Number</th>
<th>Quantity</th>
<th>Material/Manufacturer</th>
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</thead>
<tbody>
<tr>
<td>Each Hinges</td>
<td>FBB179 4½&quot;x4½&quot;</td>
<td>3</td>
<td>Stanley</td>
</tr>
<tr>
<td>Each Closer</td>
<td>3501</td>
<td>1</td>
<td>Yale</td>
</tr>
<tr>
<td>Each Push Plate</td>
<td>HAG-30S-3½&quot;x15&quot;</td>
<td>1</td>
<td>Hager</td>
</tr>
<tr>
<td>Each Pull Plate</td>
<td>HAG-33E-3½&quot;x15&quot;</td>
<td>1</td>
<td>Hager</td>
</tr>
<tr>
<td>Each Wall Stop</td>
<td>WS406/407CVX</td>
<td>1</td>
<td>Ives</td>
</tr>
<tr>
<td>Each Kick Plate</td>
<td>K6000 8x2LDW Clear</td>
<td>2</td>
<td>Trimco</td>
</tr>
<tr>
<td>Each Kick Plate</td>
<td>K6000 8x1LDW Clear</td>
<td>2</td>
<td>Trimco</td>
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<tr>
<td>Each Silencer</td>
<td>SR65</td>
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### GROUP 4 – Door 05A

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<tbody>
<tr>
<td>Each Hinges</td>
<td>FBB179 4½&quot;x4½&quot;</td>
<td>3</td>
<td>Stanley</td>
</tr>
<tr>
<td>Each Lockset</td>
<td>65G04 LL</td>
<td>1</td>
<td>Sargent</td>
</tr>
<tr>
<td>Each Closer</td>
<td>3501</td>
<td>1</td>
<td>Yale</td>
</tr>
<tr>
<td>Each Wall Stop</td>
<td>WS406/407CCV</td>
<td>1</td>
<td>Ives</td>
</tr>
<tr>
<td>Each Kick Plate</td>
<td>K6000 8x2LDW Clear</td>
<td>2</td>
<td>Trimco</td>
</tr>
<tr>
<td>Each Kick Plate</td>
<td>K6000 8x1LDW Clear</td>
<td>2</td>
<td>Trimco</td>
</tr>
<tr>
<td>Set Kerf-In Weatherstrip</td>
<td>Q108</td>
<td>1</td>
<td>Black, Pemko</td>
</tr>
<tr>
<td>Item</td>
<td>Model</td>
<td>Quantity</td>
<td>Material</td>
</tr>
<tr>
<td>--------------</td>
<td>---------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>3 Each Hinges</td>
<td>FBB191</td>
<td>4½&quot;x4½&quot;</td>
<td>630</td>
</tr>
<tr>
<td>1 Each Panic</td>
<td>8804 PSB</td>
<td></td>
<td>630</td>
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<tr>
<td>1 Each Closer</td>
<td>4111 SP CUSH</td>
<td>Alum</td>
<td>LCN</td>
</tr>
<tr>
<td>1 Each Threshold</td>
<td>2005A</td>
<td>Alum</td>
<td>Pemko</td>
</tr>
<tr>
<td>1 Each Door Sweep</td>
<td>315CN</td>
<td>Alum</td>
<td>Pemko</td>
</tr>
<tr>
<td>1 Set Kerf-In Weatherstrip</td>
<td>Q108</td>
<td>Black</td>
<td>Pemko</td>
</tr>
</tbody>
</table>

L – Lever Style

END OF SECTION
SECTION 08-8000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Glass.

1.02 REFERENCE STANDARDS
E. GANA (GM) - GANA Glazing Manual; 2009.

1.03 SUBMITTALS
A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

1.04 QUALITY ASSURANCE
B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.05 FIELD CONDITIONS
A. Do not install glazing when ambient temperature is less than 50 degrees F.
B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.06 WARRANTY
A. See Section 01-7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 GLAZING TYPES
A. Type IG-1 - Sealed Insulating Glass Units: Vision glazing, low-E.
   1. Application(s): All windows and doors.
   2. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: Clear.
      b. Coating: Low-E type, on #2 surface.
   3. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: Clear.
   4. Total Thickness: 1 inch, 5/8" at doors.
   5. Total Solar Heat Gain Coefficient: 40 percent, nominal.

2.02 EXTERIOR GLAZING ASSEMBLIES
A. Structural Design Criteria: Select type and thickness of glass to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass, 50 lbs. per square foot.
   1. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
3. Glass thicknesses listed are minimum.

2.03 GLASS MATERIALS
A. Float Glass Manufacturers: subject to compliance with requirements, provide products of one of the following:
   1. AGC Glass Company North America, Inc: www.us.agc.com/
   2. Guardian Industries Corp: www.sunguardglass.com/
   4. PPG Industries, Inc: www.ppgideascapes.com/
   5. Substitutions: Refer to Section 01-6000 - Product Requirements.
B. Float Glass: All glazing is to be float glass unless otherwise indicated.
   1. Annealed Type: ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
   3. Tinted Types: Color and performance characteristics as indicated.
   4. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

2.04 SEALED INSULATING GLASS UNITS
A. Sealed Insulating Glass Units: Types as indicated.
   1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
   2. Edge Spacers: Aluminum, bent and soldered corners.
   3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
   4. Purge interpane space with dry hermetic air.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that openings for glazing are correctly sized and within tolerance.
B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION
3.03 MANUFACTURER'S FIELD SERVICES
A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
B. Monitor and report installation procedures and unacceptable conditions.

3.04 CLEANING
A. Remove glazing materials from finish surfaces.
B. Remove labels after Work is complete.
C. Clean glass and adjacent surfaces.

3.05 PROTECTION
A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

END OF SECTION
<table>
<thead>
<tr>
<th>Location</th>
<th>No.</th>
<th>Floor Mat.</th>
<th>Base</th>
<th>North</th>
<th>South</th>
<th>East</th>
<th>West</th>
<th>Mat.</th>
<th>Hgt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VESTIBULE</td>
<td>01</td>
<td>EXP. AGG.</td>
<td>RBR</td>
<td>LEP</td>
<td>LEP</td>
<td>LEP</td>
<td>LEP</td>
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</tr>
<tr>
<td>LOBBY/ LAUNDRY</td>
<td>02</td>
<td>EXP. AGG.</td>
<td>RBR</td>
<td>LEP</td>
<td>LEP</td>
<td>LEP</td>
<td>LEP</td>
<td>LEP</td>
<td>VARIES Vaulted ceiling</td>
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<tr>
<td>WOMEN</td>
<td>03</td>
<td>TILE</td>
<td>LEP/ TILE</td>
<td>LEP/ TILE</td>
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<td>04</td>
<td>TILE</td>
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<td>05</td>
<td>CONC.</td>
<td>RBR</td>
<td>LEP</td>
<td>LEP</td>
<td>LEP</td>
<td>LEP</td>
<td>LEP</td>
<td>10'-0&quot;</td>
</tr>
</tbody>
</table>

Legend: Refer to Color Schedule for selected Brand/Colors

- AC: Adhesive Applied Acoustical Ceiling
- Tile
- CPT: Carpet
- (E): Existing
- EXP AGG CONC: Exposed Aggregate Concrete
- FRP: Fiberglass Reinforced Plastic Panels
- LEP: Latex Enamel Paint
- LEP/P. LAM: Latex Enamel Paint above Plastic Laminate Wainscot
- LN: Linoleum
- LVT: Luxury Vinyl Tile
- P. LAM: Plastic Laminate
- RBR: Rubber base
- RF: Resilient Flooring
- SS: Solid Surface Countertop
- SAT: Suspended Acoustical Tile
- SGB: Suspended Gyp Bd.
- WD: Wood
- WDPL: Wood Paneling over gypsum board
- WD / RBR: Wood and 2 inch rubber base - see detail

Salmon Harbor Marina - RV Expansion, Project # 15.68
May 2019
SECTION 09-2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Gypsum wallboard.
B. Joint treatment and accessories.
C. Prime paint on walls and ceilings to receive textured finish.
D. Textured finish system.

1.02 RELATED REQUIREMENTS
A. Section 06-1000 - Rough Carpentry: Building framing and sheathing.
B. Section 06-1000 - Rough Carpentry: Wood blocking product and execution requirements.
C. Section 07-2100 - Thermal Insulation: Acoustic insulation.
D. Section 07-9005 - Joint Sealers: Acoustic sealant.

1.03 REFERENCE STANDARDS
D. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.

1.04 SUBMITTALS
A. Samples: Submit one sample each of gypsum board finished with proposed texture application, 24 inches square in size, illustrating finish color and texture.

PART 2 PRODUCTS
2.01 GYPSUM BOARD ASSEMBLIES
A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.02 BOARD MATERIALS
A. Manufacturers - Gypsum-Based Board:
   4. Or approved.
B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Thickness:
C. Mold-Resistant Paper-Faced Products:
   a. CertainTeed Corporation; ProRoc Brand Moisture & Mold Resistant Gypsum Board.
D. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
2. Type: Regular and Type X, in locations indicated.
3. Type X Thickness: 5/8 inch.
5. Edges: Tapered.

D. Ceiling Board: Special sag-resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Ceilings, unless otherwise indicated.
   2. Thickness: 5/8 inch.

2.03 ACCESSORIES
A. Acoustic Insulation: As specified in Section 07-2100.
B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
C. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
E. Screws for Attachment to Steel Members Less Than 0.03 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.
F. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.
G. Adhesive for Attachment to Wood: ASTM C557.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION
A. Studs: Space studs as indicated.
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer’s instructions.
B. Blocking: Install wood blocking for support of:
   1. Framed openings.
   2. Wall mounted cabinets.
   3. Plumbing fixtures.
   4. Toilet accessories.
   5. Wall mounted door hardware.

3.03 ACOUSTIC ACCESSORIES INSTALLATION
A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
   1. Place one bead continuously on substrate before installation of perimeter framing members.
   2. Place continuous bead at perimeter of each layer of gypsum board.
   3. In non-fire-rated construction, seal around all penetrations by conduit, pipe, ducts, and rough-in boxes.

3.04 BOARD INSTALLATION
A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

D. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For non-rated assemblies, install as follows:

3.05 INSTALLATION OF TRIM AND ACCESSORIES
A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.06 JOINT TREATMENT
A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive wall coverings, unless otherwise indicated.
   2. Level 3: Walls and ceilings to receive textured finish.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.
   2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.

3.07 TEXTURE FINISH
A. Prime paint prior on all walls and ceilings designated to receive spray textured finish.

B. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.

C. Texture Required: Light orange peel texture.

3.08 TOLERANCES
A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION
SECTION 09-3000
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Tile for floor applications.
B. Tile for wall applications.
C. Tile for shower receptors.
D. Cementitious backer board as tile substrate.
E. Coated glass mat backer board as tile substrate.
F. Ceramic accessories.

1.02 RELATED REQUIREMENTS
A. Section 07-1400 - Fluid-Applied Waterproofing.
B. Section 07-9200 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.
C. Section 09-2116 - Gypsum Board Assemblies: Tile backer board.

1.03 REFERENCE STANDARDS
1.04 ADMINISTRATIVE REQUIREMENTS
   A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS
   A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide manufacturers’ data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
   C. Shop Drawings: Indicate tile layout, perimeter conditions, control and expansion joints, thresholds, ceramic accessories, and setting details.
   D. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
   E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
      1. See Section 01-6000 - Product Requirements, for additional provisions.
      2. Extra Tile: 5 percent of each size, color, and surface finish combination, but not less than 10 of each type.

1.06 QUALITY ASSURANCE
   A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.
   B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
   C. Installer Qualifications:
      1. Company specializing in performing tile installation, with minimum of five years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING
   A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.08 FIELD CONDITIONS
   A. Do not install solvent-based products in an unventilated environment.
   B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS
2.01 TILE
   A. Manufacturers: All products by the same manufacturer.
      2. Substitutions: Not permitted.
   B. Porcelain Tile: ANSI A137.1, standard grade.
      1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
      2. Size: 12 by 12 inch, nominal, 6 by 6 inch, nominal, 4 by 12 inch nominal, decorative border.
      3. Thickness: 5/16 inch.
      4. Edges: Square.
      5. Surface Finish: Matte glazed.
      6. Color(s): To be selected by Architect from manufacturer's standard range.
      7. Products:
         a. DalTile - Continental Slate.
         b. Substitutions: Not permitted.

2.02 TRIM AND ACCESSORIES
   A. Porcelain Tile Accessories: Glazed finish, same color and finish as adjacent field tile; same manufacturer as tile.
B. Pre-Formed Accessories To Be Covered with Tile: High density expanded polystyrene with ANSI A118.10 waterproofing finish or membrane.
   1. Products:
      a. 12" x 12" niche. Locate as shown on interior elevations.
      b. Manufacturer: Contractor’s Choice.

2.03 SETTING MATERIALS

A. Manufacturers:
   1. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
   7. Substitutions: See Section 01-6000 - Product Requirements.

   1. Applications: Use this type of bond coat where indicated and where no other type of bond coat is indicated.
   2. Products:
      a. ARDEX Engineered Cements; S 28: www.ardexamericas.com/#sle.
      b. Custom Building Products; Complete Contact-LFT Premium Rapid Setting Large Format Tile Mortar, with Multi-Surface Bonding Primer: www.custombuildingproducts.com/#sle.
      d. TEC, an H.B. Fuller Construction Products Brand; TEC 3N1 Performance Mortar: www.tecspecialty.com/#sle.
      e. Substitutions: See Section 01-6000 - Product Requirements.

C. Provide setting materials made by the same manufacturer as grout.

D. Mortar Bed Materials: Pre-packaged mix of Portland cement, sand, latex additive, and water.
   1. Products:
      a. ARDEX Engineered Cements; A 38: www.ardexamericas.com/#sle.
      d. Merkrete, by Parex USA, Inc; Merkrete Underlay C: www.merkrete.com/#sle.
      e. Proflex Products, Inc; MSI - Mud Set Installation: www.proflex.us/#sle.
      f. Substitutions: See Section 01-6000 - Product Requirements.

2.04 GROUTS

A. Manufacturers:
   1. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
   8. Substitutions: See Section 01-6000 - Product Requirements.

B. Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
   1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
3. Color(s): As selected by Architect from manufacturer's full line.

C. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
1. Applications: Between tile and plumbing fixtures.
2. Color(s): As selected by Architect from manufacturer's full line.
3. Products:
   e. Substitutions: See Section 01-6000 - Product Requirements.

D. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
1. Composition: Water-based colorless silicone.
2. Products:
   b. Substitutions: See Section 01-6000 - Product Requirements.

2.05 MAINTENANCE MATERIALS
A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
1. Applications: Between tile and plumbing fixtures.
2. Color(s): As selected by Architect from manufacturer's full line.
3. Products:
   a. ARDEX Engineered Cements; ARDEX SX: www.ardexamericas.com/#sle.
   b. Custom Building Products; Commercial 100% Silicone Caulk: www.custombuildingproducts.com/#sle.
   d. Merkrete, by Parex USA, Inc; Merkrete Colored Caulking: www.merkrete.com/#sle.
   e. Substitutions: See Section 01-6000 - Product Requirements.

B. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
1. Composition: Water-based colorless silicone.
2. Products:
   a. Contractor's Choice.

C. Grout Release: Temporary, water-soluble pre-grout coating.

2.06 ACCESSORY MATERIALS
A. Waterproofing Membrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
1. Crack Resistance: No failure at 1/16 inch gap, minimum; comply with ANSI A118.12.
2. Fluid or Trowel Applied Type:
   a. Material: Synthetic rubber or Acrylic.
   b. Thickness: 25 mils, minimum, dry film thickness.
   c. Products:
      1) ARDEX Engineered Cements; ARDEX 8+9: www.ardexamericas.com/#sle.
      3) TEC, an H.B. Fuller Construction Products Brand; TEC HydraFlex Waterproofing Crack Isolation Membrane: www.tecspecialty.com/#sle.
      4) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com/#sle.
5) Merkrete, by Parex USA, Inc; Merkrete Hydro Guard 1: www.merkrete.com/#sle.

B. Waterproofing Membrane at Showers: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
   1. Fluid or Trowel Applied Type:
      c. Thickness: 25 mils, minimum, dry film thickness.
      d. Products:
         1) Substitutions: See Section 01-6000 - Product Requirements.

C. Backer Board: Coated glass mat type complying with ASTM C1178/C1178M; inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.
   2. Products:
      a. USG Durock
      b. Locations: At back and side walls of showers.
      c. Substitutions: See Section 01-6000 - Product Requirements.

D. Backer Board: High density polystyrene with reinforced cementitious coating on both sides; with compatible alkaline resistant joint tape; to be covered with waterproofing prior to installation of tile.
   1. Thickness: 5/8 inches.
   2. Products:
      b. Locations: At back and side walls of showers.
      c. Substitutions: See Section 01-6000 - Product Requirements.

E. Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
   B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
   C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.
   D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.
   E. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
      1. Moisture Emission Rate: Not greater than 3 lb per 1000 sq ft per 24 hours, test in accordance with ASTM F1869.
      2. Alkalinity (pH): Verify pH range of 5 to 9, test in accordance with ASTM F710.
   F. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION
   A. Protect surrounding work from damage.
   B. Vacuum clean surfaces and damp clean.
   C. Seal substrate surface cracks with filler.
   D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.
E. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL
A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.13, manufacturer's instructions, and TCNA (HB) recommendations.
B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
E. Form internal angles square and external angles bullnosed.
F. Install ceramic accessories rigidly in prepared openings.
G. Install non-ceramic trim in accordance with manufacturer's instructions.
H. Install thresholds where indicated.
I. Sound tile after setting. Replace hollow sounding units.
J. Keep control and expansion joints free of mortar, grout, and adhesive.
K. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
L. Grout tile joints unless otherwise indicated.
M. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - FLOORS ENCAPSULATED WITH HYDRONIC TUBING - THIN-SET METHODS
A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.
1. Use uncoupling membrane under all tile unless other underlayment is indicated.
2. Where waterproofing membrane is indicated, install in accordance with TCNA (HB) Method F122, with latex-Portland cement grout.
B. Install tile-to-tile floor movement joints in accordance with TCNA (HB) Method EJ171F.

3.05 INSTALLATION - SHOWER WALLS
A. At tiled shower receptors install in accordance with TCNA (HB) Method B420, mortar bed floor, and W245, thin-set over coated glass mat backer board walls.
B. Grout with polymer modified grout.

3.06 INSTALLATION - WALL TILE
A. Over coated glass mat backer board on studs, install in accordance with TCNA (HB) Method W245.
B. Over gypsum wallboard on wood or metal studs install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.

3.07 CLEANING
A. Clean tile and grout surfaces.

3.08 PROTECTION
A. Do not permit traffic over finished floor surface for 4 days after installation.

3.09 SCHEDULE
A. A. See interior elevations and Finish Schedule

END OF SECTION
SECTION 09-9000
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, varnishes, and other coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Mechanical and Electrical:
      a. In finished areas, paint all conduit, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.
      c. On the roof and outdoors, paint all equipment that is exposed to weather or to view, including that which is factory-finished.

D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Floors, unless specifically so indicated.
   7. Acoustical materials, unless specifically so indicated.
   8. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

1.03 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS


1.05 SUBMITTALS

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

B. Product Data: Provide data on all finishing products, including VOC content.

C. Samples for Verification Purposes: Provide samples of each color and material to be applied, with texture to simulate actual conditions. Use selected colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.
   1. Provide a list of material and application for each coat of each sample.
   2. Submit samples on the following substrates for the Architect's review of color and texture only:
      a. Drywall: 4" x 8" draw down.
      b. Stained or Natural Wood: Provide two 4" x 8" samples of each natural and stained wood finish.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS
A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   3. Rodda Paint: www.roddapaint.com
   4. Dutch Boy Paint: www.dutchboy.com
   5. Glidden Paint: www.glidden.com
   7. Or approved equal.

C. Transparent Finishes:
   1. Same as above.

D. Stains:
   1. Same as above.

E. Primer Sealers: Same manufacturer as top coats.
   1. Same as above.

F. Substitutions: See Section 01-6000 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL
A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each coating material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:
   1. Provide coatings that comply with the most stringent requirements specified in the following:
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
D. Colors: As indicated on drawings.
   1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint WE-OP-3L - Wood, Opaque, Latex, 3 Coat - unfinished wood trim, soffits:
   1. One coat of latex primer sealer.
   2. Semi-gloss: Two coats of latex enamel; Moorcraft Super Spec Latex House & Trim No. 170, applied at dry film thickness of not less than 1.1 mils per coat.

B. Paint WE-OP-2L - Wood, Opaque, Latex, 2 Coat - Preprimed Siding & Trim, Doors & Door Frames:
   1. One coat of latex primer sealer - touch up as needed on bare surfaces, end cuts, etc.
   2. Semi-gloss: Two coats of latex enamel; Moorcraft Super Spec Latex House & Trim No. 170, applied at dry film thickness of not less than 1.1 mils per coat.

C. Paint ME-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
   1. One coat of alkyd primer.
   2. Semi-gloss: Two coats of alkyd enamel; Benjamin Moore Paints: IMC DTM Acrylic Semi-Gloss (M29). Applied at a dry film thickness of not less than 2.0 mils per coat.

D. Paint ME-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
   1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
   2. Semi-gloss: Two coats of alkyd enamel; Benjamin Moore Paints: IMC DTM Acrylic Semi-Gloss (M29). Applied at a dry film thickness of not less than 2.0 mils per coat.

2.04 PAINT SYSTEMS - INTERIOR

A. Paint WI-TR-VS - Wood, Transparent, Varnish, Stain:
   1. One coat of stain; Benjamin Moore Paints; Benwood Wood Finishes Penetrating Stain (234).
   2. One coat sealer.
   3. Gloss: Two coats of varnish; Benjamin Moore; Stays Clear Acrylic Polyurethane No. 423, Satin.

B. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
   1. One coat of latex primer.
   2. Semi-gloss: Two coats of latex enamel; Benjamin Moore Paints: IMC DTM Acrylic Semi-Gloss (M29). Applied at a dry film thickness of not less than 2.0 mils per coat.

C. Paint MI-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:
   1. Touch-up with latex primer.
   2. Gloss: Two coats of latex enamel; Benjamin Moore Paints: IMC DTM Acrylic Semi-Gloss (M29). Applied at a dry film thickness of not less than 2.0 mils per coat.

D. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
   1. One coat of Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer No. 253: Applied at a dry film thickness of not less than 1.2 mils, primer sealer.
   2. Eggshell: Two coats of latex enamel; Moorcraft Super Spec Latex Eggshell Enamel No. 274: Applied at a dry film thickness of not less than 1.3 mils per coat.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.
PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
C. Test shop-applied primer for compatibility with subsequent cover materials.
D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
   3. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
C. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
D. Seal surfaces that might cause bleed through or staining of topcoat.
E. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
F. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-SP 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).
G. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
H. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
I. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
J. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
K. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.
L. Exterior Wood to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied. Prime concealed surfaces.
M. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.
N. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.
3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

C. Apply products in accordance with manufacturer's instructions.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance.

F. Sand wood and metal surfaces lightly between coats to achieve required finish.

G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

H. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

END OF SECTION
SECTION 10-2800
TOILET, SHOWER, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Accessories for toilet rooms, utility rooms, and shower rooms.
   B. Utility room accessories.
   C. Grab bars.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Toilet Accessories:
      5. Bobrick
      6. Substitutions: Section 01-6000 - Product Requirements.

2.02 FINISHES
   A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

2.03 TOILET ROOM ACCESSORIES
   A. Toilet Paper Dispenser: (O.F.C.I.) 9" single roll. Provide blocking at location indicated on interior elevation.
      1. Paper Discharge: Touchless automatic.
      2. Manufacturers:
      3. Substitutions: Section 01-6000 - Product Requirements.
   C. Waste Receptacle: Surface mounted, B-279 Stainless Steel, satin finish.
   D. Soap Dispenser: (O.F.C.I.) Provide blocking at location indicated on interior elevation. DEB Proline1.
      1. Minimum capacity: 250 seat covers, each side.
   F. Sanitary Napkin Disposal Bag Dispenser: (O.F.C.I.)
   G. Coat Hook with bumper: Bobrick B-212.
   H. Grab Bars: Bobrick B-6806 series Stainless steel, 1-1/2 inches outside diameter, minimum 0.05 inch wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
      1. Length: 42, 36, and 18 inches.
   I. Mirrors: Stainless steel framed, 6mm thick float glass mirror.
      1. Size: See elevations for location and size.

2.04 SHOWER STALL ACCESSORIES
   A. Folding Shower Seat: Wall-mounted surface; welded tubular seat frame, structural support members, swing-down legs, provide blocking as required.
      1. Seat: 32"x22 1/2", Teakwood slats secured to supporting frame members with stainless steel screws. Ease edges of each slat.
      2. Size: ADA Standards compliant.
3. Products:
   a. Freedom Showers APFSSL2-32 335PT.
   B. Two-Wall Grab Bar: 1 1/2 inch round outside diameter, minimum 0.05 inch wall thickness non-slip grasping surface, concealed flange mounting, 1 1/2 " clearance between wall and inside of grab bar. (@ ADA shower).
   C. Folding Bench with Legs (@each shower) 18'x15', Phenolic Slatted teak wall-mounted.

2.05 LAUNDRY ROOM ACCESSORIES
   A. Rearload Change Dispenser: Hamilton ER60 with Hamilton Mars Validator (O.F.C.I.). Provide blocking as required.
   B. Laundry Soap Dispenser: Vend-Rite 894, 8 column vendor with coin slides. (O.F.C.I.). Provide blocking as required.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify existing conditions before starting work.
   B. Verify exact location of accessories for installation.
   C. Verify that field measurements are as indicated on drawings.
   D. See Section 06-1000 for installation of blocking in walls.

3.02 PREPARATION
   A. Deliver inserts and rough-in frames to site for timely installation.
   B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION
   A. Install accessories in accordance with manufacturers’ instructions in locations indicated on drawings.
   B. Install plumb and level, securely and rigidly anchored to substrate.
   C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
   D. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

3.04 SCHEDULE
   A. ADA TOILET STALLS to have:
      1. (1) 42 inch grab bar
      2. (1) 36 inch grab bar
      3. (1) 18 inch grab bar
   B. ADA & STANDARD TOILET STALLS to have:
      1. (1) Toilet Tissue Dispenser (O.F.C.I.)
      2. (1) Toilet Seat Cover Dispenser (O.F.C.I.)
      3. (1) Coat Hook with bumper.
   C. WOMEN'S TOILET STALLS to have:
      1. (1) Women's Disposal Dispenser (O.F.C.I.)
   D. MEN'S & WOMEN'S RESTROOMS to have:
      1. (1) Mirror
      2. (2) Soap Dispensers, wall mounted (O.F.C.I.)
      3. (1) Paper Towel Dispenser (O.F.C.I.)
      4. (1) Trash Receptacle

END OF SECTION
SECTION 10-4400
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Fire extinguishers.
B. Fire extinguisher cabinets.
C. Accessories.

1.02 RELATED REQUIREMENTS
A. Section 06-1000 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS
B. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS
A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate cabinet physical dimensions.
C. Product Data: Provide extinguisher operational features.

1.05 FIELD CONDITIONS
A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Fire Extinguishers:
   1. Ansul, Inc: www.ansul.com or equivalent.
   2. Substitutions: See Section 01-6000 - Product Requirements.
B. Fire Extinguisher Cabinets and Accessories:
      a. For cabinet, Cameo Series, C 2409-5R specified.
   4. Substitutions: See Section 01-6000 - Product Requirements.

2.02 FIRE EXTINGUISHERS
A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
B. Foam Type Fire Extinguishers: Stainless steel tank, with pressure gage.
   1. Class: A:B
   2. Finish: Baked enamel, red color.
   3. Temperature range: 40 degrees F to 120 degrees F.

2.03 FIRE EXTINGUISHER CABINETS
A. Metal: Formed primed steel sheet; 0.036 inch thick base metal.
B. Cabinet Configuration: Semi-recessed type.
   1. Sized to accommodate accessories and extinguisher.
   2. Trim: Returned to wall surface, with 1 inch projection, rolled edge.
C. Door: 0.036 inch thick, reinforced for flatness and rigidity; latch. Hinge doors for 180 degree opening with continuous piano hinge. Provide roller type catch.
D. Door Glazing: Transparent acrylic bubble. Set in resilient channel gasket glazing.
E. Weld, fill, and grind components smooth.
F. Finish of Cabinet Exterior Trim and Door: Brushed aluminum finish with clear transparent acrylic bubble type glazing.
G. Finish of Cabinet Interior: White enamel.

2.04 ACCESSORIES
   A. Extinguisher Brackets: Formed steel, chrome-plated.
   B. Graphic Identification: Fire Extinguisher.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify existing conditions before starting work.
   B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION
   A. Install in accordance with manufacturer's instructions.
   B. Install cabinets plumb and level in wall openings, 48 inches from finished floor to top of cabinet.
   C. Place extinguishers and accessories in cabinets.
   D. Position cabinet signage at 8 feet above finished floor.

3.03 LOCATIONS
   A. See Drawings for locations and total number required.

END OF SECTION
SECTION 11-8510
RETRACTABLE STAIRS

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Manual disappearing stairs and ladders.

1.02 REFERENCES
A. ANSI A14.9: Safety Requirements for Ceiling Mounted Disappearing Climbing Systems.

1.03 SUBMITTALS
A. Submit under provisions of Section 01 3000.
B. 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.
C. Shop Drawings for Stairs:
   1. Plan and section of stair installation.
   2. Indicate rough opening dimensions for ceiling and/or roof openings.

1.04 DELIVERY, STORAGE, AND HANDLING
A. Store stairway until installation inside under cover in manufacturer's unopened packaging. If stored outside, under a tarp or suitable cover.

1.05 WARRANTY
A. Limited Warranty: One year against defective material and workmanship, covering parts only. Defective parts, as deemed by the manufacturer, will be replaced at no charge, freight excluded, upon inspection at manufacturer's plant.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Werner Co. Corporate Headquarters, 93 Werner Road, Greenville, PA 16125; Tel: 888-523-3371; Fax: 888-456-8459; www.wernerco.com
B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.02 MANUAL DISAPPEARING STAIRWAY.
A. Manual Disappearing Stairway.
B. Performance Standard: Unit shall comply with ANSI A14.9, Commercial Type, for rough openings between 22 1/2 inches to 25 inches. Stairway capacity shall be rated at 375 lbs.
C. Components:
   1. Ceiling Opening
      a. Ceiling heights from 7’ 8” - 10’ 3” require opening of 22½” x 54”
   2. Stairway Stringer: 6005-T5 Extruded aluminum channel; tri-fold design; steel blade type hinges; adjustable feet with plastic Mar-guard.
   4. Railing: Aluminum bar handrail riveted to stringers, upper section only.
   5. Frame:
      a. Pine
   6. Door Panel
      a. Plywood.
   7. Hardware:
a. Steel blade type hinge connecting stringer sections. Zinc plated and chromate sealed.
b. Double acting steel springs, both sides.
c. Rivets rated at 1100 lb (499 kg) shear strength each.

2.03 FABRICATION
A. Completely fabricate ladder ready for installation before shipment to the site.

PART 3 EXECUTION
3.01 EXAMINATION
A. Do not begin installation until rough opening and structural support have been properly prepared.
B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
C. Examine materials upon arrival at site. Notify the carrier and manufacturer of any damage.

3.02 INSTALLATION
A. Install in accordance with manufacturer's instructions.

3.03 PROTECTION
A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION
SECTION 22-0500
COMMON PLUMBING MATERIALS AND METHODS

PART 1 GENERAL

1.01 DESCRIPTION

A. The provisions of the General Requirements, Supplementary Requirements, and Division 1 apply to the plumbing work specified in this Division.

B. The requirements of this Section apply to the plumbing systems specified in these Specifications and in other Division 22 sections.

C. Provide all items, articles, materials, equipment, operations and/or methods listed, mentioned, shown and/or scheduled on the Drawings and/or in these Specifications, including all labor, supervision, services, permits, fees, and incidentals necessary and required to provide a complete and operable facility with complete systems as shown, specified, and required by applicable codes.

D. The work shall include, but not be limited to, the following systems:
   1. Water, sanitary sewer, and storm sewer service complete per serving utility company requirements.
   2. Service and distribution piping including valves, supports, insulation, etc.
   3. Complete plumbing systems, including fixtures, trim, equipment, etc.
   4. Rough-in and final connection of plumbing equipment and fixtures furnished under other Divisions of this Specification.
   5. Piping to and connection of equipment or fixtures furnished outside of these Specifications and Contract but described on the Drawings.
   6. Special systems as specified herein.

E. Advise subcontractor, suppliers, and vendors involved in the work specified in this Section of the applicable requirements.

1.02 QUALITY ASSURANCE

A. All work and materials shall conform to all applicable local and state codes and all federal, state and other applicable laws and regulations. All clarifications and modifications which have been cleared with appropriate authorities are listed under the applicable sections. All electrical products shall bear the label of a recognized testing laboratory such as UL or CSA.

B. Whenever the requirements of the Specifications or Drawings exceed those of the applicable code or standard, the requirements of the Specifications and Drawings shall govern.

C. Codes and Standards: Comply with the provisions of the following referenced codes, standards and specifications:
   1. Federal Specifications (FS)
   2. American National Standards Institute (ANSI)
   3. National Electrical Manufacturer's Association (NEMA)
   4. National Fire Protection Association (NFPA)
   5. Underwriters Laboratories, Inc. (UL)
   6. Factory Mutual (FM)
   7. International Building Code (IBC) with State and Local Amendments
   8. International Mechanical Code (IMC) with State and Local Amendments
   9. Uniform Plumbing Code (UPC) with State and Local Amendments
   10. American Society for Testing and Materials (ASTM)
   11. Americans with Disabilities Act (ADA)
   12. International Fire Code (IFC) with State and Local Amendments
   14. Manufacturers Standardization Society (MSS)
   15. National Sanitation Foundation (NSF)
   16. American Gas Association (AGA)
D. Each piece of equipment furnished shall meet all detailed requirements of the Drawings and Specifications and shall be suitable for the installation shown. Equipment not meeting all requirements will not be acceptable, even though specified by name. Where two or more units of the same class of equipment are furnished, use product of the same manufacturer; component parts of the entire system need not be products of same manufacturer. Furnish all materials and equipment, new and free from defect and of size, make, type and quality herein specified or approved by the Architect. All materials shall be installed in a neat and professional manner.

E. All apparatus shall be built and installed to deliver its full rated capacity at the efficiency for which it was designed.

F. The Drawings and Specifications are complementary. What is called for by one shall be as though called for by both.

G. Drawings: Do not scale drawings for roughing-in measurements, nor use as shop drawings. Make field measurements and prepare shop drawings as required. Coordinate work with shop drawings of other specification divisions.

H. Field Wiring: It is the intent of these specifications that all systems shall be completed and operable. Refer to all drawings and specifications, especially the electrical drawings, to determine voltage, phase, circuit ampacity and number of connections provided. Provide all necessary field wiring and devices from the point of connection indicated on the electrical drawings. All equipment shall be installed in compliance with the Electrical Code and the equipment’s UL listing. Bring to the attention of the Architect in writing, all conflicts, incompatibilities, and/or discrepancies prior to bid or as soon as discovered.

1.03 WORK OF OTHER CONTRACTS

A. Work under this contract shall be conducted in a manner to allow for the future installations of such equipment or items listed in other sections of this Specification.

1.04 WORK OF OTHER DIVISIONS

A. Work under this Division shall be conducted in a manner to cooperate with the installation of such equipment or items as specified in other Divisions.

B. HVAC piping systems, fuel piping systems, fire suppression piping systems, and control devices and control wiring relating to the heating and air conditioning systems are specified under other Divisions of these Specifications except for provisions or items specifically noted on the Drawings or specified herein.

C. Consult all Drawings and Specifications in this project and become familiar with all equipment to be installed. Coordinate all aspects of the construction with the other trades on the job to ensure that all work and materials required to provide a complete and operational facility are included in the bid.

D. All sections of Division 22 are interrelated and shall be considered in their entirety when interpreting any material, method, or direction listed in any section of Division 22. Individual sections are not written for specific subcontractors or suppliers but for the general contractor.

1.05 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES (SUBMITTALS)

A. Submit in accordance with Division 1 full technical and descriptive shop drawing data on proposed materials and equipment as detailed in each section.

B. The Contractor shall verify that all equipment submitted can be delivered and installed within the time constraints of the construction period.

C. Include the manufacturer, type, style, catalog number, complete specification, certified dimensions, provided options or accessories, and description of physical appearance for each item and option submitted. Reproduction of catalog data sheets shall be clean and legible to show all details, including gauge of metal used.
D. Include only information on exact equipment to be installed, not general catalogs of the manufacturer. Where sheets show proposed equipment as well as other equipment, identify proposed equipment with arrow or similar concise method.

E. Submit with each copy a transmittal letter verifying that all included equipment submittals have been carefully considered for quality, dimensions, function, and have been coordinated with the Drawings and Specifications. Guarantee that proposed materials will meet or exceed the quality and function of those specified.

F. Include field wiring diagrams and connection diagrams for all control and/or low voltage systems, including floor plans.

G. Submittal Review: The submittal review process is a means to provide quality control. The action noted to be taken (or where conflicts with the contract documents are not noted) shall not be interpreted by the Contractor as automatic "change orders." Approval of the data for substitution and shop drawings shall not eliminate the contractor's responsibility for compliance with Drawings or Specifications, nor shall it eliminate the responsibility for freedom from errors of any sort in the data discovered prior to or after the review process. Deviations, discrepancies, and conflicts between the submittals and the Contract Documents shall be called to the Architect's attention in writing at the time of transmittal of the data.

H. Unless otherwise directed by Division 1, submittal data shall be in a 3-ring plastic binder with a clear plastic sleeve and a project identification sheet inserted. Arrange submittals numerically with specification sections identified on divider tabs. All required division 22 sections shall be submitted at one time.

1.06 PRODUCT SUBSTITUTION

A. Materials other than those specified may be approved for this project providing a written request is submitted to the Architect prior to bid in accordance with Instructions to Bidders. Requests shall include complete specifications, dimensions, manufacturer and catalog number for each item for which approval is desired. If, in the opinion of the Architect, the material is not complete or if it is not an acceptable substitute, he may reject it. The Architect's evaluation will be based solely on the material submitted.

1.07 CHANGE ORDERS

A. All supplemental cost proposals by the Contractor shall be accompanied by a complete itemized breakdown of labor and materials without exception. At the Architect's request, the contractor's estimating sheets for the supplemental cost proposals shall be made available to the Architect. Labor must be separated and allocated for each item of work.

1.08 RECORD DOCUMENTS

A. Project Record (As-Installed) Drawings:
   1. Maintain a set of record drawings on the job site as directed in Division 1.
   2. Keep Drawings clean, undamaged, and up to date.
   3. Record and accurately indicate the following:
      a. Depths, sizes, and locations of all buried and concealed piping and all cleanouts, whether concealed or exposed, dimensioned from permanent building features.
      b. Locations of all valves with assigned tag numbers.
      c. Changes, additions, and revisions due to change orders, obstructions, etc.
      d. Eradicate extraneous information.
      e. Locations of tracer wire terminal points.
      f. Model numbers of installed equipment.
   4. Make Drawings available when requested by Architect for review.
   5. Submit as part of the required Project Closeout documents. Final submittal will be in the form of reproducible drawings.
6. Quality of entire set of project record drawings to match the quality of the contract documents; quality to be judged by Architect. Computer-aided design drafting (CADD) shall be used to complete project record drawings. Use standards set in contract documents. Note field modifications, all addenda and change order items on project record drawings. If deficiencies are found in either the quality or the accuracy of the drawings, they will be returned unapproved. Additional review of subsequent submissions shall be at the contractor’s expense.

B. Operating and Maintenance Manuals: Submit five (5) sets of Operating and Maintenance Instructions, including manufacturer’s service data, wiring diagrams, and parts lists and vendors for all serviceable items of equipment, valve charts, balancing data, final control diagrams showing final set points, and any additional equipment added by change order, bound in three-ring, vinyl or canvas covered, loose-leaf binders organized with index and thumb-tab markers for each classification of equipment or data. Comply with provisions of Section 01700 where applicable to the mechanical work.

C. Instruction Manual: Submit separate Instruction Manual [30] days prior to scheduling the required Instruction Period. Include the following:
1. Description of each system and operational sequences.
2. Seasonal system adjustments.
3. Description and normal settings for time clocks, thermostats, fan and other motor switches, etc.
5. Emergency measures upon system failure.

1.09 WARRANTY

A. Furnish, prior to application for final payment, three copies of written and signed guarantee effective a period of one year from date of completion and acceptance of entire project; agree to correct, repair and/or replace defective materials and/or equipment or the results of defective workmanship without additional expense to the Owner. Where no response satisfactory to the Owner has occurred within three working days from the written report of a warranty covered defect, the contractor shall agree to pay for the cost of repair of the reported defect by a contractor of the Owner’s choice.

B. Where the manufacturer’s guarantee exceeds one year, the longer guarantee shall govern and include the Contractor’s labor.

PART 2 PRODUCTS

2.01 GENERAL

A. General: Provide all new materials and equipment, identical to apparatus or equipment in successful operation for a minimum of two years. Provide materials of comparable quality omitted here but necessary to complete the work. Maximum allowable variation from stated capacities, minus 5% to plus 10% as approved in each case.

B. Compatibility: Provide products which are compatible with other portions of the work and provide products with the proper or correct power and fuel-burning characteristics, and similar adaptations for the project.

C. Efficiency: Service (Domestic) Water Heating Equipment shall comply with ASHRAE Standard 90.1-2001 and the State Energy code. Where equipment efficiencies are indicated, the use of alternate or substitute manufacturer’s equipment with lower efficiencies is not permitted.

D. Lead Content: Potable water piping, fittings, and valves not limited to faucets, mixing valves, or pressure reducing valves shall not exceed federal standards for lead content.

E. Storage and Handling:
1. Delivery: Deliver to project site with manufacturer’s labels intact and legible.
2. Handling: Avoid damage.
3. Storage: Inside protected from weather, dirt and construction dust. Where necessary to store outside, elevate well above grade and enclose with durable, waterproof wrapping.

2.02 MOTORS

A. General: Motors shall conform to UL, CSA, and NEMA MG-1 and bear a permanently attached nameplate indicating compliance and motor characteristics. Provide motors meeting UL 507 standard where applicable.

B. Manufacturers: General Electric, Lincoln, Baldor, Wagner, Westinghouse or accepted substitute. Where selection of motor manufacturer is within Contractor's control (independent of equipment selection), provide motors produced by a single manufacturer to the greatest extent possible.

C. Temperature Rating: Class B insulation, except where otherwise indicated or required for service indicated.

D. Starting Capability: As required for service indicated, but not less than 5 starts per hour.

E. Phases and Current: 1/3 horsepower and smaller capacitor-start, capacitor-run single-phase; 1/2 horsepower and larger, squirrel-cage induction polyphase. Coordinate with actual current characteristics; specified in Division 16 and use no 230/460 voltage motors on 208 voltage power or vice versa.

F. Service Factor: 1.15 for polyphase; 1.25 for single-phase.

G. Construction: General purpose, continuous duty; NEMA design "B", except "C" for high starting torque applications.

H. Frames: For single phase motor sizes NEMA No. 48, except 56 for heavy-duty applications. NEMA "T" frames for 1 horsepower and larger polyphase motors. Special frame types as required for close coupled pumps and similar applications.

I. Bearings: Ball or roller, and design for thrust where applicable; double shielded and regreasable, except provide permanently sealed where not accessible for greasing. Sleeve-type bearings permitted only where indicated for fractional (1/6 hp or less) horsepower motors with direct drive loads. Minimum L-10 bearing life of 40,000 hours when used with minimum pitch sheaves per NEMA Table 14-1.

J. Enclosure Type: Unless otherwise indicated, open drip-proof for normal concealed indoor use, guarded where exposed to employees or occupants. Type II for outdoor use, except weather-protected Type I where adequately housed. Totally enclosed where explosion-proof motors are required.

K. Overload Protection: Built-in thermal with internal sensing device for stopping motor, and for signaling where indicated on single phase motors.

L. Speed: Not faster than synchronous speeds of 1800 RPM except on some pumps as approved in each case.

M. Efficiency: The manufacturer's highest (NEMA premium) efficiency motors tested under procedures recommended by NEMA MG-1 (IEEE Standard 112, Test Method B). Intermittent duty motors, operating less than 6 hours per day, shall comply with EPAct/EISA standards. Submit manufacturer's data if motor nameplate does not indicate minimum efficiency. Nominal full load efficiencies for 460 volt, 1800 rpm motors:

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<tr>
<th>HP</th>
<th>Efficiency %</th>
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<td>1-1/2</td>
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N. Inverter Duty Motors: Where motors are controlled by an adjustable frequency drive, provide motors labeled “Inverter Duty,” complying with NEMA MG1-31, and meeting the requirements of the adjustable frequency drive manufacturer.

2.03 STARTERS AND SWITCHES

A. Manufacturers: General Electric, ITE, Allen Bradley, Square D, Cutler-Hammer, Cerus Industrial or accepted substitute. Provide starters by same manufacturer throughout project.

B. General: Provide each motor with starter or switch as approved and recommended by manufacturer of motor or equipment of which motor is a part.

C. Starter Characteristics: Type I general purpose enclosure with padlock ears and supports for mounting as indicated. Starter type and size as recommended by motor manufacturer. Use no starter smaller than NEMA Size 1.

D. Manual Switches: Provide on motors 1/3 horsepower and smaller except where automatic control or interlock is indicated. Include pilot light. Provide overload protection where not protected by internal motor overload protection.

E. Magnetic Starters: Provide for 1/2 horsepower and larger motors, and for smaller motors on automatic control or with interlock switch. Full voltage, across the line, single speed, non-reversing except where otherwise required. Include power on and running pilot lights, on-off-auto selector switch, external reset button, overload relay on each phase, and devices for coordination with control system (including fused transformer for control circuit). Provide automatic ambient temperature compensation for starter heaters.

2.04 GUARDS

A. Provide guards in accordance with State Safety Code and OSHA requirements over all rotating equipment including belts, shafts and couplings. Drive guards over belts and sheaves shall include 2-1/2” diameter access opening at shaft ends for speed counter.

2.05 ACCESS PANELS

A. Manufacturers: Inryco/Milcor, Bilco, Elmdor, Karp, Potter-Roemer or accepted substitute. Inryco/Milcor Style DW, K, or M panels as required by construction.

B. Construction: Flush style, fire rated in fire rated partitions and ceilings. Screwdriver latches on all access panels.

2.06 EXPANSION JOINTS AND LOOPS

A. Flexible Expansion/Seismic Loop: Factory fabricated assembly consisting of two 90 degree elbows, two lengths of flexible hose, and a 180 degree return bend to allow free movement in 3 axis. Return bend shall include attachment point for support and a drain/vent fitting. Hose shall be corrugated metal style with metal overbraid. Connections to match piping system except connection 2" and larger shall be flanged style. Copper or bronze construction for potable water systems. Metraflex “Metraloop.”

2.07 METERS AND GAUGES

A. General: Install meters and gauges where shown on the plans or specified elsewhere in these specifications.

B. Pressure-Temperature Test Plugs:
1. ¼” or ½” NPT fitting of solid brass capable of receiving either an 1/8” OD pressure or temperature probe and rated for zero leakage from vacuum to 1000 psig. Neoprene valve core for temperatures to 200 deg. F., Nordel to 350 deg. F.
2. Provide for each test plug a pressure gauge adapter with 1/16” or 1/8” OD pressure probe.
3. Furnish a test kit containing one 2-1/2" dial pressure test gauge of suitable range, one gauge adapter with 1/16" or 1/8" OD probe and two 5" stem pocket test thermometers – one 0 to 220 degrees F and one 50 to 550 degrees F. Turn the kit over to the Architect.


C. Thermometers: Liquid-in-glass, adjustable stem, separable sockets, plus 40 to 240 degrees F range (unless indicated otherwise). Weiss numbers are listed. Equivalent Taylor, Trenice, Weksler or approved substitute.
   1. Wide case (9") in equipment rooms and all major equipment items. Weiss “9VS” series.
   2. Narrow case (7") in all other locations. Weiss “7VS” series.

D. Pressure Gauges: Install on discharge of all pumps and where shown on Drawings 4-1/2" dial, 0-100 psig graduation pressure gauges with Ashcroft No. 1106 pulsation dampers and stop cocks. Weiss UGE-1 or equivalent Ashcroft, Marsh, Trenice, Weksler.

2.08 VALVES

A. General: Provide factory fabricated valves of the type, body material, temperature and pressure class, and service indicated. Bronze gate, globe and check valves shall comply with MSS-SP-80. Ball valves shall comply with MSS-SP-110. Iron gate and globe valves shall comply with MSS-SP-70. Iron check valves shall comply with MSS-SP-71. Butterfly valves shall comply with MSS-SP-67. Valve size same as connecting pipe size.

B. Acceptable Manufacturers: Milwaukee, Crane, Grinnell, Nibco, Hammond, Stockham, Legend, Watts, Apollo, Webstone, and Walworth. Grooved end valves Victaulic, Tyco-Grinnell, Gruvlock, or accepted substitute. NIBCO numbers are given except as noted. Where possible, provide valves from a single manufacturer.

C. Valve styles: Domestic hot and cold water.
   1. Valves 2” and Smaller:
      a. Ball: Two-piece, bronze body, full port, 600 psi WOG, Fig. T/S-585-70.
      b. Check: Bronze body, swing check, 200 psi WOG, T/S-413B (bronze disc) or T/S-413Y (Teflon disc).
      c. Globe (shutoff): Bronze body, Teflon disc, 200 psi WOG, T/S-211Y.
      d. Globe (throttling): Bronze body, full stainless steel plug disc, 600 psi WOG, T-276AP.
   2. Valves 2” through 12”:
      a. Ball: Three-piece, bronze body, full port, 600 psi WOG, T/S-595Y.
      c. Gate (to 3”): Bronze body, non-rising stem, 200 psi WOG, T/S-133.
      d. Gate (4” to 12”): Iron body, bronze trim, non-rising stem, solid wedge, bolted bonnet, 200 psi WOG, F-619.
      e. Check (2 1/2” and larger): Iron body, bronze trim, Class 125, F-918-B (swing type).

D. Butterfly Valve Operators: Locking lever for shut-off service; “Memory Stop” for lever handle with 10 position throttling plate for throttling service; gear operator with babbitt sprocket rim for chain-operated valves and gear operators on all 8” or larger valves.

E. Butterfly Valve Style: Lug-type with cap screws for all valves utilized for equipment isolation for servicing. Lug and grooved style valves shall be capable for use as isolation valves and recommended by manufacturer for dead-end service at full system pressure.

F. Insulated Valves: Install extended-stem valves in all piping specified as insulated, and arrange in the proper manner to receive insulation.

G. Multifunction Valves: Valves incorporating multiple functions including strainers, drain valves with retained caps, air vent valves, P/T ports, unions, pump flanges, check valves, and balancing valves are acceptable. Webstone.

H. Mechanical Actuators: Provide mechanical actuators with chain operators where indicated, where valves 4” and larger are mounted more than 7’ above the floor, and where manual operation is difficult because of valve size, pressure differential or other operating conditions. Drop chains to 6’-6” above the floor.
I. Selection of Valve Ends (Pipe Connections): Select and install valves with ends matching the types of pipe/tube connections.

2.09 HANGERS AND SUPPORTS

A. General: Provide factory-fabricated horizontal piping hangers, clamps, hanger rod, inserts, supports, etc., of the indicated MSS type and size. The Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry Practice SP-58 and SP-69 are referenced in this section.

B. Manufacturers: B-Line, Grinnell, Anvil, Superstrut, Tolco, Erico, or accepted substitute. Grinnell figure numbers in parentheses where applicable (or other manufacturers as noted).

C. Corrosion Protection: Provide materials which are zinc plated or factory painted to prevent corrosion. Prevent electrolysis in the support of copper tubing by the use of hangers and supports which are copper plated, plastic coated, or by other recognized industry methods.


E. Horizontal Piping Hangers and Supports:
   1. Adjustable Clevis Hanger: MSS Type 1 (Fig. 260).
   2. Adjustable Band Hanger: MSS Type 7 (Fig. 97), fabricated from steel.
   3. Adjustable Swivel-Band Hanger: MSS Type 10 (Fig. 70).
   4. Clamp: MSS Type 4 (Fig. 212, 216).
   5. Double-Bolt Clamp: MSS Type 3 (Fig. 295A, 295H), including pipe spacers.
   6. Adjustable Saddle-Support: MSS Type 36 (Fig. 258) and MSS Type 37 (Fig. 259), including saddle, pipe and reducer. Fabricate base-support from steel pipe and include cast-iron flange or welded-steel plate.
   7. Channel Support System: Galvanized, 12 gauge channel and bracket support systems, single or double channel as indicated on the Drawings or as required by piping and equipment weights. Grinnell "Power Strut" channel. Acceptable Manufacturers: Super Strut, Globestrut, Bee, Kindorf or Unistrut.

F. Vertical Pipe Clamps:
   1. Two-Bolt Riser Clamp: MSS Type 8 (Fig. 261).
   2. Four-Bolt Riser Clamp: MSS Type 42 include pipe spacers at inner bolt-holes.

G. Hanger Attachment:
   2. Turnbuckles: MSS Type 13 (Fig. 230).
   3. Weldless Eye-Nut: MSS Type 17 (Fig. 290).
   4. Malleable Eye-Socket: MSS Type 16 (Fig. 110R).
   5. Clevises: MSS Type 14 (Fig. 299).

H. Building Attachments:
   1. Concrete Inserts: MSS Type 18 (Fig. 282), steel or Grinnell Power-Strut PS349 continuous channel. Acceptable Manufacturers: Michigan Hanger, Globestrut, Unistrut, Super Strut.
   2. Clamps: MSS Type 19 (Fig. 285, 281), Type 20, 21 (Fig. 225, 226, 131), Type 23 (Fig. 86, 87, 88), Type 25 (Fig. 227), Type 27 through 30 where applicable.

2.10 IDENTIFICATION MARKERS

A. Pipe Markers:
   2. Acceptable Manufacturers: Brady B946 with arrow banding tape or similar Seaton, Zeston, MSI.

B. Nameplates:
1. Engraved nameplates, 1/16” thick, laminated 2-ply plastic, bottom ply white, outer ply black, letters formed by exposing bottom ply.

2. Size: 2” by 4” nameplates with 1/4” high letters.

C. Valve Tags:
1. 2” diameter, 18-gauge polished brass tags with 3/16” chain hole and 1/4” high stamped, black-filled service designation.
2. Acceptable Manufacturers: Seaton, Brady, MSI.

2.11 CONCRETE FOR MECHANICAL WORK

A. Classes and Applications: Provide strength classes with the following cement content and water/cement ratios for the indicated applications and similar required applications:
1. 4000 psi Class: 565 pounds cement/yard (6.0 sacks); 0.57 water/cement ratio. Provide 4000 Class for tanks, vaults, beam-type foundations and similar structures.
2. 3000 psi Class: 500 pounds cement/yard (5.25 sacks); 0.68 water/cement ratio. Provide 3000 Class for miscellaneous underground structural concrete, reinforced encasement, block type foundations (with smallest dimension at least 0.2 times largest dimension), curbs, pads, inertia blocks (unframed type), and similar structural support work.
3. 2500 psi Class: 450 pounds cement/yard (4.75 sacks); 0.75 water/cement ratio. Provide 2500 Class for plain encasement, thrust blocks, filling steel-framed units, and similar work.
4. Rough Grouting Class: 565 pounds cement/yard (6.0 sacks): 0.75 water-cement ratio; adjust aggregate sizes to facilitate placement. Use for rough grouting, not for setting equipment bases.
5. Backfill Class (Lean Concrete): 375 pounds cement/yard (4.0 sacks); 0.87 water/cement ratio. Use for backfiring where excavations are extended below point of support for mechanical work.

2.12 PENETRATION FIRE STOPPING

A. Through-penetration fire stopping system tested and listed by Underwriters Laboratories. 3M, Metacaulk, SpecSeal, or approved.

B. Select system for proper application based on wall construction, type of penetrating item, wall rating, etc.

PART 3 EXECUTION

3.01 LAYOUT AND COORDINATION

A. Site Examination: Before starting work, carefully examine site and all contract Drawings. Become thoroughly familiar with conditions governing work on this project. Verify all indicated elevations, building measurements, roughing-in dimensions and equipment locations before proceeding with any of the work.

B. Utility Locations: The location of existing utilities, wires, conduits, pipes, ducts, or other service facilities are shown in a general way only on the Drawings and are taken from existing records. Ascertain whether any additional facilities other than those shown on the plans may be present and determine the exact location and elevations of all utilities prior to commencing installation.

C. Sleeves, Inserts, Cast-in-Place Work: Provide sleeves, inserts, anchoring devices, cast-in-place work, etc. which must be set in concrete sequenced at the proper time for the project schedule.

D. Coordination:
1. The drawings are based on equipment of a certain manufacturer and may be identified as such. Where alternate manufacturers or approved substitutes are incorporated into the work, any required design changes are the responsibility of the contractor. Such changes may include changes in utility or system connection sizes, location, or orientation, service clearances, structural support or acoustic considerations.
2. Where the work must be sequenced and positioned with precision in order to fit into the available space, prepare accurate scale shop drawings showing the actual physical dimensions required for the installation and submit prior to purchase/fabrication/installation of any of the elements involved in the coordination.
3. Cooperate with other trades in furnishing material and information for sleeves, bucks, chases, mountings, backing, foundations and wiring required for installation of mechanical items.

4. Coordinate all work with other trades and determine in advance where interfacing of the mechanical work and other work are required to be connected together. Provide all materials and equipment to make those connections. Submit shop drawings showing required connections where special conditions exist.

E. Discrepancies: Report immediately any error, conflict or discrepancy in Plans, Specifications and/or existing conditions. Do not proceed with any questionable items of work until clarification of same has been made. Should rearrangement or re-routing of piping be necessary, provide for approval the simplest layout possible for that particular portion of the work.

3.02 UTILITY COORDINATION

A. Utility Coordination: Coordinate all aspects of the incoming plumbing utility services indicated with the city engineer, serving utility, and the off-street improvements contractor. Requirements of the utility company which exceed the provisions made on the Drawings or covered by these Specifications shall take precedence. Provisions made on the Drawings or Specifications in excess of the utility company's requirements shall take precedence. No additional compensation will be allowed the contractor for connection fees or additional work or equipment not covered in the Drawings or Specifications which are a result of policies of the serving utilities.

3.03 CONTINUITY OF EXISTING SERVICES

A. Existing water, power, heat, ventilation, air conditioning and other services shall remain in service during new construction work. Coordinate any interruption of these services with the Owner's representative a minimum of twenty-four (24) hours in advance. Arrange work to minimize number and extent of all interruptions.

B. Protect from damage active utilities existing and evident by reasonable inspection of the site whether shown or not on the Drawings. Protect, relocate or abandon utilities encountered in the work which are not shown on the Drawings or evident by inspection of the work as directed by the Architect. Maintain continuity of all utility services to existing buildings.

C. All necessary service interruptions of utilities shall be scheduled with the Director of Physical Plant. Minor interruptions will require a minimum of forty-eight (48) hours prior notification. Major shut down of any utility is to be scheduled between the hours of 5:30 p.m. and 6:00 a.m. and will require a minimum of seven (7) days prior notice.

3.04 MECHANICAL EQUIPMENT WIRING

A. Provide all mechanical equipment motors, automatic temperature, limit, float and similar control devices required, with wiring complete from power source indicated on Electrical Drawings.

B. Provide properly rated motor overload and undervoltage protection and all manual or automatic motor operating devices for all mechanical equipment.

C. Equipment and systems shown on the Drawings and/or specified, are based upon requirements of specific manufacturers which are intended as somewhat typical of several makes which may be approved. Provide all field wiring and/or devices necessary for a complete and operable system including controls for the actual selected equipment/system.

D. Provide all starters for mechanical motors. Review Electrical Specifications and Drawings to determine which mechanical motor starters will be provided under the Electrical Specification Sections and provide all others.

3.05 GENERAL INSTALLATION

A. Locating and Positioning Equipment: Observe all Codes, Regulations and good common practice in locating and installing mechanical equipment and material so that completed installation presents the least possible hazard. Maintain adequate clearances for repair and service to all equipment and comply with Code requirements.
B. Arrangement: Arrange piping parallel with primary lines of the building construction, and with a minimum of 7’ overhead clearance in all areas where possible. Unless indicated otherwise, conceal all piping. Locate operating and control equipment properly to provide easy access, and arrange entire mechanical work with adequate access for operation and maintenance. Give right-of-way to piping which must slope for drainage. Set all equipment level or as recommended by manufacturer. Under no conditions shall beams, girders, footings or columns be cut for mechanical items. Casting of pipes into concrete is prohibited unless so shown on Drawings.

C. Drip Pans: Provide drip pans under all domestic hot water heaters and all above ceiling in-line pumps and cooling coils. Locate pan immediately below piping and equipment, and extend a minimum of 6” on each side and lengthwise 18” beyond equipment being protected. Fabricate pans 2” deep, of reinforced 20 gauge galvanized sheet metal with watertight seams and rolled or hemmed edges. Provide 3/4” drainage piping, properly discharged to over floor drain or as shown on the Drawings. Comply with Mechanical Code for overflow protection and pipe sizing.

D. Access Panels: Provide access panels with proper backing reinforcement for all equipment, dielectric unions, valves and items requiring service and installed above ceilings, behind walls, or in furring, complete with correct frame for type of building construction involved. Exact size, number and location of access panels are not necessarily shown on Drawings. Use no panel smaller than 12” by 12” for simple manual access or smaller than 16” x 20” where personnel must pass through.

E. Adjusting: Adjust and calibrate all automatic mechanical equipment, mixing valves, flush valves, float devices, etc. Adjust flow rates at each piece of equipment or fixture.

F. Building Vapor Barrier: Wherever the building insulation vapor barrier is penetrated by piping, hangers, conduits, etc., provide clear self-adhesive tape recommended by the insulation manufacturer around the penetrations.

G. Concrete Work: Coordinate with other work, particularly other concrete work and accessories. Comply with applicable provisions of Section 03310 for mechanical work concrete, including formwork, reinforcement, mix design, materials (use mix designs and materials accepted for Division 3 work where possible), admixtures, accessories, (including waterstops), placing of wet concrete, finishing, curing, protecting, testing, submittals and other requirements of the concrete work.

H. Housekeeping Pads: Construct minimum 3” thick with chamfered edges using 3000 psi concrete. Provide #4 reinforcing bars 8” on center in each direction and within 4” of each edge, centered in pad thickness. Provide ½” dowel with 3” embedment into floor slab for each 2 square feet of pad area. Dowels and equipment anchor bolts shall be spaced a minimum of 6” from pad edges.

3.06 VALVE INSTALLATION

A. General: Comply with the following requirements:
   1. Install valves where required for proper operation of piping and isolation of equipment, including valves in branch lines where necessary to isolate sections of piping, and where shown on the drawings. Install valves at low points in piping systems that must be drained for service or freeze protection.
   2. Locate valves in accessible spaces (or behind access panels) and so that separate support can be provided when necessary.
   3. Install valves with stems pointed up, in the vertical position where possible, but in no case with stems pointed downward from a horizontal plane.

B. Insulated Valves: Install extended-stem valves in all piping specified as insulated, and arrange in the proper manner to receive insulation.

C. Valve Access: Provide access panels to all valves installed behind walls, in furring or otherwise inaccessible.

D. Lubricant-Seal: Select and install plug valves with lubricant-seal except where frequent usage is indicated or can be reasonably expected to occur.
3.07 INSTALLATION OF HANGERS AND SUPPORTS

A. General: Proceed with the installation of hangers, supports and anchors only after the required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) the proper placement of inserts, anchors and other building structural attachments.

1. Install hangers, supports, clamps, and attachments to support piping and equipment properly from the building structure. Use no wire or perforated metal to support piping, and no supports from other piping or equipment. For exposed continuous pipe runs, install hangers and supports of the same type and style as installed for adjacent similar piping.

2. Prevent electrolysis in the support of copper tubing by the use of hangers and supports which are copper plated or by other recognized industry methods.


4. Arrange supports to prevent eccentric loading of joists and joist girders. Locate supports at panel points only. Do not drill beam or joist flanges for hanger attachment.

B. Provisions for Movement:

1. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends and similar units. Install specified seismic restraints to restrict excessive movement.

2. Install hangers and supports so that equipment and piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

3. Install hangers and supports to provide the indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded. Comply with the following installation requirements:
   a. Clamps: Attach clamps, including spacers (if any), to piping outside the insulated piping support. Do not exceed pipe stresses allowed by ANSI B31.
   b. Insulated Pipe Supports: Insulated pipe supports shall be supplied and installed on all insulated pipe and tubing.
   c. Load Rating: All insulated pipe supports shall be load rated by the manufacturer based upon testing and analysis in conformance with ASME B31.1, MSS SP-58, MSS SP-69 and MSS SP-89.
   d. Support Type: Manufacturer’s recommendations, hanger style and load shall determine support type.
   e. Insulated Piping Supports: Where insulated piping with continuous vapor barrier or where exposed to view in finished areas is specified, install hard maple wood insulation shields (Elcen Fig. 216) or steel pipe covering protection shields (MSS type 39) at each hanger.

C. Pipe Support:

1. Vertical Spacing: Support at base, at equivalent of every floor height (maximum 10’ as required by Code) and just below roof line.

2. Screwed or Welded Steel or Copper Piping: Maximum hanger spacing shall be as follows:

<table>
<thead>
<tr>
<th>Size</th>
<th>Steel Span</th>
<th>Copper Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/4&quot; and smaller</td>
<td>7’ span</td>
<td>6’ span</td>
</tr>
<tr>
<td>1-1/2&quot; pipe</td>
<td>9’ span</td>
<td>6’ span</td>
</tr>
<tr>
<td>2” pipe</td>
<td>10’ span</td>
<td>10’ span</td>
</tr>
<tr>
<td>2-1/2&quot; &amp; larger</td>
<td>12’ span</td>
<td>10’ span</td>
</tr>
</tbody>
</table>

3. Cast Iron Soil Pipe:
   a. Hubless and Compression Joint: At every other joint except when developed length exceeds 4’, then at each joint.
   b. Additional Support: Provide at each horizontal branch and/or at concentrated loads to maintain alignment and prevent sagging.

4. Glass Pipe: Maximum 3’ hanger spacing or as recommended by manufacturer.

5. Polyvinyl Chloride, Polypropylene and Other Plastic Pipe: Maximum hanger spacing and minimum rod diameters as follows:
a. Continuous support 1/2" to 4" pipe size Fee & Mason No. 109 channels with Fee & Mason No. 108 hanger. Lay pipe directly into the channel with fittings or couplings placed in spaces between channel sections. Secure piping to the channel at intervals between hangers with a few turns of vinyl electrical tape.
b. Non-Continuous Support: Maximum 4' spans or shorter if required by manufacturer for temperatures and pipe schedule.
c. Arrange supports to allow free movement, but restrict upward movement of lateral runs so as not to create reverse grade on drainage pipe. Use double bolt clamp or band hanger with restraint (Tolco fig. 25).

6. Install additional hangers or supports at concentrated loads such as pumps, valves, etc. to maintain alignment and prevent sagging.

7. Support Rod: Hanger support rods sized as follows:

<table>
<thead>
<tr>
<th>Pipe and Tube Size</th>
<th>Rod Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches mm</td>
<td>Inches mm</td>
</tr>
<tr>
<td>1/2&quot; to 4&quot; 12.7 to 101.6</td>
<td>3/8&quot; 9.5</td>
</tr>
<tr>
<td>5&quot; to 8&quot; 127.0 to 203.2</td>
<td>1/2&quot; 12.7</td>
</tr>
<tr>
<td>10&quot; to 12&quot; 254.0 to 304.8</td>
<td>5/8&quot; 15.9</td>
</tr>
</tbody>
</table>

D. Adjust hangers and supports to bring piping to proper levels and elevations.

E. Provide all necessary structural attachments such as anchors, beam clamps, hanger flanges and brackets in accordance with MSS SP-69. Attachments to beams wherever possible. Supports suspended from other piping, equipment, metal decking, etc., are not acceptable.

F. Horizontal banks of piping may be supported on common steel channel member spaced not more than the shortest allowable span required on the individual pipe. Maintain piping at its relative lateral position using clamps or clips. Allow lines subject to thermal expansion to roll axially or slide. Size channel struts for piping weights.

G. Installation of drilled-in concrete anchors shall comply with the manufacturer's instructions for working load, depth of embedment, and spacing between anchors and from the edge of the slab. Use only wedge style anchors.


3.10 PLUMBING SYSTEM IDENTIFICATION

A. Piping System: Indicate each pipe system by its generic name (abbreviated) as shown/scheduled/specified; except vent and drainage piping. Comply with ANSI A13.1 for marker locations, letter sizes, and colors. Include arrows to show direction of flow and "Electric Traced" signs to identify heat cable wrapped piping. Locate pipe labels in accessible areas as follows:
   1. Near each valve, meter, gauge, or control device.
   2. Near equipment such as pumps, heat exchangers, water heaters, etc.
   3. At piping branch connections.
   4. At penetrations (each side) of walls, ceilings, and floors.
   5. At access panels and doors.
   6. At 25 foot maximum intervals. Provide a minimum of 1 label above each room where lift out ceiling is installed. Reduce intervals in congested areas such as mechanical rooms.

B. Valve Identification: Tag all valves with brass disc and chain. Prepare valve charts indicating valve number, size, location, function and normal position. Use no duplicate numbers in Plumbing and Heating systems. Mount glazed frames containing one set of valve charts in the building mechanical room.

C. Equipment: Provide engraved plastic-laminate signs at locations of major equipment such as heat exchangers, pumps, etc. Identify equipment in field same as on drawings. Permanently mount in an appropriate and effective location.
D. Operation Tags: Where needed for proper and adequate information on operation and maintenance of mechanical systems, provide tags of plasticized card stock, either pre-printed or hand printed to convey the message; example: "DO NOT CLOSE THIS VALVE EXCEPT WHEN THE PUMP IS OFF."

3.11 EQUIPMENT CONNECTIONS

A. Provide complete plumbing connections for all items of equipment requiring such connections, including incidental piping, fittings, trim and labor necessary for a finished working installation.

B. Verify the rough-in and finish requirements for all equipment provided under other Divisions of the work and requiring plumbing connections with equipment supplier and installer prior to rough-in. Minimum branch pipe size for fixtures shall be 1/2".

3.12 PROTECTION

A. Protect all work and materials against loss or damage. Close all pipe openings with caps or plugs. At final completion, thoroughly clean and deliver all work and equipment in an unblemished new condition. Keep all motors and bearings in watertight and dustproof covers during entire course of installation.

B. Protect floors, walls, framing and sheathing where pipe cutting and threading operations are conducted with plastic sheeting under plywood sheets. Extend plastic sheeting beyond the plywood. Clean-up metal cuttings, oil, etc., daily or as necessary to prevent debris from being tracked beyond the protected area. Damages, as determined by the Architect, due to the pipe cutting/threading operation shall be repaired by the responsible trade.

3.13 CUTTING AND PATCHING

A. General: Comply with the requirements of Division 1 for the cutting and patching of other work to accommodate the installation of mechanical work. Do all necessary cutting and patching of existing building and yard surfaces required for completion of the mechanical work. Patch to match finish and color of adjacent surfaces.

B. Precautions:
   1. In the event insulated piping or equipment and/or sprayed or trowelled-on fireproofing, sprayed acoustical material, and similar materials are uncovered during the cutting, patching or demolition operation, notify the Architect immediately to investigate the possibility that it is asbestos-laden material. Do not damage or attempt to remove any material suspected of containing asbestos.
   2. Do not proceed with the Work in such areas until so instructed by the Architect.

3.14 PIPE PENETRATION FIRE STOPPING

A. Install as recommended by manufacturer and in accordance with the product’s UL listing. Below are the minimum installation requirements.
   1. Install specified penetrating item(s) with required annular spacing in proper size wall or floor opening. Support penetrating item(s) adequately on both sides of construction.
   2. Clean all opening and penetrating item surfaces in penetration area to remove loose debris, dirt, oil, wax, grease, old caulking, etc.
   3. If needed or required for gypsum or concrete block walls, install specified galvanized steel wire mesh or sleeve recessed and centered inside wall around penetrating item(s) so that it is snug against perimeter of opening.
   4. When required, install specified type and depth of backing material in annular space, recessed to required fill depth of fire stopping caulking.
   5. Gun, trowel, and/or pump fire stopping sealant to specified depth in annular space around penetrating item(s). Trowel sealant surfaces flush with wall or floor surfaces to a smooth, defect-free finish. Where required, apply specified size caulking bead around penetrating item(s) at zero annular contact areas and tool smooth.
3.15 MATERIALS AND EQUIPMENT FURNISHED BY THE OWNER FOR INSTALLATION BY THE CONTRACTOR

A. Description: Refer to the Drawings for list of fixtures and equipment furnished by the Owner to be installed by the Contractor.

B. Schedule: Inform the Owner in writing a minimum of 48 hours in advance of when fixtures, trim and/or equipment are needed for installation.

C. Receiving: Inspect all received material and verify the condition and suitability of it for this project. Report any defects or discrepancies immediately to the Owner for resolution.

3.16 MECHANICAL PAINTING

A. Minimum Requirements: Comply with minimum requirements of Division 9, Painting. All mechanical equipment, piping, insulation, etc., exposed in finished areas, storage rooms and other locations except mechanical equipment rooms will be painted under Section 09900.

B. Painting Materials: Materials shall comply with Section 099000, Painting and shall be compatible with the material to be painted.

C. Uninsulated Piping: Paint black or galvanized uninsulated piping located buried in ground, in concrete or masonry one (1) coat acid-resisting black paint. Paint black or galvanized uninsulated piping in moist equipment rooms, crawl spaces without vapor barriers, or exposed to weather one (1) coat black asphaltum varnish.

D. Iron Work: Paint hangers, rods, anchors, guides, threads of galvanized pipe, bases, supports, uncoated sheet metal and other iron work without factory finish, exposed to weather, located in moist concealed spaces and moist equipment rooms, one coat acid-resisting black paint. Apply one (1) coat Dixon's Aluminum Graphite No. 209 paint over the (1) coat primer as recommended by paint manufacturer to all hot metal surfaces.

E. Piping in Mechanical Room: All insulated and uninsulated piping exposed in mechanical equipment rooms shall be painted. Painting is not required for cast iron, plastic, or glass waste piping, or for stainless steel piping, PEX tubing and soft copper tubing. Contractor shall submit proposed colors for approval. In lieu of painting, insulated piping may be covered with colored PVC insulation jacketing as specified in Section 22 0700, Plumbing Insulation.

F. Insulated Piping and Other Insulated Surfaces: Paint insulated piping in half-round, split tile, or other inaccessible locations, one (1) coat asphalt emulsion.

3.17 PLUMBING WORK CLOSEOUT

A. General: Refer to the Division 1 sections for general closeout requirements. Calibrate all equipment requiring same. Complete each system as shown or specified herein and place in operation except where only roughing-in or partial systems are called for. Each system shall be tested and left in proper operation free of leaks, obstructions, or contamination.

B. Record Drawings: Submit record set of drawings required in Section 01300, Submittals, or as previously specified in this Section.

C. Closeout Equipment/Systems Operations: Sequence operations properly so that work of project will not be damaged or endangered. Coordinate with seasonal requirements. Operate each item of equipment and each system in a test run of appropriate duration with the Architect present and with the Owner's operating personnel present, to demonstrate sustained, satisfactory performance. Adjust and correct operations as required for proper performance. Clean and lubricate each system, and replace dirty filters, excessively worn parts and similar expendable items of the work.
D. Operating Instructions: Conduct a walk-through instruction seminar for the Owner's personnel who are to be involved in the continued operation and maintenance of plumbing equipment and systems. Provide written instructions outlining and explaining the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar features of the systems.

END OF SECTION
SECTION 22-0700
PLUMBING INSULATION

PART 1 GENERAL

1.01 DESCRIPTION
   A. The requirements of this section apply to the insulation of plumbing systems specified elsewhere in these specifications.
   B. The requirements of Section 22 0500, Common Plumbing Materials and Methods, also apply to this section.

1.02 QUALITY ASSURANCE
   A. Minimum Insulation Thickness and Thermal Performance: Comply with the State of Oregon Energy Efficiency Code except where more stringent requirements.
   B. Composite (Insulation, Jacket or Facing and Adhesives) Fire and Smoke Hazard Ratings: Not to exceed a flame spread of 25 or smoke development of 50 and containing less than 0.1% by weight deca-PDE fire retardant.
   C. Component Ratings of Accessories (Adhesives, Mastics, Cements, Tapes, Finishing Cloth for Fittings): Same as "B" requirements above and permanently treated. No water soluble treatments.

1.03 SUBMITTALS
   A. Submit catalog data and performance characteristics for each product specified.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING
   A. General: In addition to the requirements specified in Section 22 0500, the following apply:
      1. Deliver insulation, coverings, cements, adhesives and coatings to the site in factory-fabricated containers with the manufacturer's stamp or label affixed showing fire hazard ratings of the products. Store insulation in original wrappings and protect from weather and construction traffic.
      2. Protect insulation against dirt, water, chemical and mechanical damage. Do not install damaged insulation. Remove such insulation from project site.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
   A. Insulation Manufacturers: Johns Manville, Owens-Corning, Knauf, Certain Teed, Armstrong, Pabco, Imcoa or Nomaco. Johns Manville products are listed unless indicated otherwise.
   B. Adhesive Manufacturers: Foster, 3M, Insul-Coustic, Borden, Kingco or Armstrong.

2.02 PIPING INSULATION
   A. Interior and Exterior Piping Systems 32 to 180 Deg. F: Glass fiber preformed pipe insulation with a minimum K-value of 0.23 at 75 deg. F, a minimum density of 3.5 pounds per cubic foot within all-service vapor barrier jacket, vinyl or pre-sized finish and pressure sensitive seal containing less than 0.1% by weight deca-PDE fire retardant.
   B. Exterior Installations: Same as for interior installations except 0.016" aluminum finish jacket or, in coastal environments, 0.016" stainless steel.
C. Pipe Temperatures Minus 30 to 180 Deg. F: Flexible, preformed, pre-slit, self-sealing elastomeric pipe insulation up to 2-1/8" ID, thermal conductivity of 0.27 BTU/hr. sq. ft./in. at 75 deg. F and vapor transmission rating of 0.2 perms/inch. On cold surfaces, apply in thickness necessary to prevent condensation on the surface at 85 deg. F and 70% RH. Armstrong "Armaflex 2000" or, in concealed locations, Imcoa or Nomaco also approved.

2.03 EQUIPMENT INSULATION

A. Equipment Temperatures Below 70 Deg. F: Flexible, closed cell, elastomeric sheet insulation of 5.5#/cubic feet density and 0.27 thermal conductivity at 75 deg. F. Armstrong "Armaflex."

B. Equipment Temperatures From 70 to 450 Deg. F: Glass fiber 3 pound density insulation with a 0.23 thermal conductivity at 75 deg. F. Johns Manville "814 Spin-Glas" with "FSK" jacket containing less than 0.1% by weight deca-PDE fire retardant or finished as recommended by manufacturer.

C. Equipment Temperatures From 350 to 1200 Deg. F: Molded high temperature calcium silicate minimum 12.5 pound density and 0.4 thermal conductivity at 200 deg. F mean temperature. Glass cloth finish, Claremont Diplag or finished as recommended by insulation manufacturer.

D. Exterior Tanks and Equipment Insulation Covering: Same as interior insulation with weatherproof metal or finished as recommended by insulation manufacturer.

2.04 INSULATION ACCESSORIES

A. Insulation Compounds and Materials: Provide rivets, staples, bands, tapes, adhesives, cements, coatings, sealers, welded studs, etc., as recommended by the manufacturer for the insulation and conditions specified. No staples allowed on cold water piping systems.

B. Interior Tanks and Equipment Insulation Covering: Finished metal jacket or as recommended by the manufacturer for insulation material specified.

C. PVC Protective Jacketing and Valve and Pipe Fitting Covers: Johns Manville Zeston 2000, Proto LoSmoke, or Ceel-Co Ceel-Tite 100 Series with precut fitting fiberglass insulation or approved.

D. Jacket Lap Sealing Adhesives: Foster Drion 85-75 contact cement or approved substitute.

E. Saddles and Shields: Install to prevent crushing of insulation at support points.
   1. Protection Saddles: MSS Type 39.
   2. Protection Shields: MSS Type 40.
   3. Preinsulated Pipe Supports: Calcium silicate load bearing metal jacketed inserts. Pipe Shields Inc. or accepted substitute.
      c. Pipe supported on pipe rolls - Models A3000, A4000, A5000.
      d. Vertical riser clamp – Models E1000, E1100, E1200.

F. Removable/Reusable Insulation Covers:
   1. Insulation Filler: Install 2-1/4# - 4#/cu. ft. glass fiber, 6# - 8#/ cu. ft. mineral wool or glass fiber/type E felted (9#/cu. ft.) flexible blankets and pads for large, irregular shaped equipment such as pump casings, bolting flanges, etc. For small common shapes such as valves, elbows, flanges, etc., install preformed flexible glass fiber pipe wrap, preformed glass fiber pipe covering or glass fiber/type E felted (9#/cu. ft.) insulation.
   2. Hot Encasement: Glass fiber cloth plain or silicon coated on both sides, knitted stainless steel mesh, glass fiber cloth laminate with aluminum, or stainless steel foil or hex wire mesh.
   3. Cold Encasement: Glass fiber cloth silicon coated both sides, knitted stainless steel mesh, glass fiber cloth laminate with aluminum or stainless steel foil or glass fiber cloth with nickel wire insertion, silicon coated both sides.
   4. Stitching: Glass fiber thread/PVC coated, staples - galvanized or stainless steel, galvanized or stainless steel hog rings, 0.010" - 0.15" dia/dead soft stainless steel wire.
5. Attachments and Securements:
   a. Quilting: Stainless 2-hole washers, both sides with twisted 0.035" - 0.051" wire loops, 12 ga. stainless spindle/washer/ speed clip assembly or stainless 0.035" - 0.051" wire loops.
   b. Lacing and Hooks: Stainless 2-hole 12 gage bent wire lacing hooks, stainless 2-hole dished washer assembly with twisted 0.035" - 0.051" wire loops, 12 gage stainless spindle washer with built-in hook and speed clip or stainless 1-hole dished and flat washer riveted through the cloth.

PART 3 EXECUTION

3.01 PIPING INSULATION

A. General: Do not insulate underground piping except at joints and fittings on preinsulated piping unless indicated otherwise.

B. At the contractor’s option and in accordance with Part 2 of this section, elastomeric insulation may be installed on domestic water piping in thicknesses providing overall thermal resistance equivalent to the glass fiber insulation. Increased thickness is typically required. Installation shall comply with the manufacturer’s recommendation with joints and seams completely sealed.

C. Domestic Water Piping:
   1. Insulate with glass fiber pipe covering, 1” thick for cold water piping and for 1” and smaller hot water piping; 1-1/2” for 1-1/4” and larger hot water piping.
   2. Insulate hot water return piping same as cold water piping.
   3. Insulate all water piping exposed to outside weather and freezing temperatures with 1” thickness of glass fiber pipe covering with weather-proof metal jacket. Apply insulation after heat cable is installed.

D. Interior Rain Drains:
   1. Concealed: Insulate with 1” thick one pound density glass fiber blanket and continuous vapor barrier jacket.
   2. Exposed: Insulate with 3.5 pound density glass fiber insulation with continuous vapor barrier jacket.
   3. Cold climates: Insulate over heat tape where indicated.

E. Waste Lines: Insulate all pipe exposed to outside temperatures with 3/4” thick glass fiber pipe insulation with a vapor barrier jacket.

F. Pipe Fittings:
   1. Insulate and finish all fittings including valve bodies, bonnets, unions, flanges and expansion joints with precut fiberglass insulation and preformed PVC covers sealed to adjacent insulation jacket for continuous vapor barrier covering over all fittings.
   2. Provide removable/reusable insulation covers on 4” and larger valves, unions, flanges, pump casings, strainers and similar fittings or equipment requiring periodic service.

G. Protective Covering: Install continuous protective PVC or metal covering on all piping and fittings in mechanical rooms, accessible tunnels, attic spaces, accessible ceilings, etc., where insulation may be subject to damage. Install with rivets or cement seams and joints.

H. Piping Insulation Lap Seams and Butt Joints: Install insulation jacket in accordance with manufacturer's recommendation and without staples on cold water lines. Where jacket joint and lap seams have not adhered, remove affected section of insulation and reinstall or apply lap sealing adhesive in accordance with manufacturer's instructions.

3.02 NON-JACKETED HOT WATER TANKS

A. Materials: Insulation blanket and metal jacket as specified above.
B. Manholes, Nameplates, Handholes, Cleanouts, Etc.: Do not insulate over manholes, ASME Code stamps, manufacturer's nameplates, handholes, cleanouts, etc. Provide neatly beveled edges at interruptions of the insulation. When surfaces are to operate below ambient saturation temperatures, provide removable sections of insulation to cover the above with vapor sealed edges. Provide appropriate tagging.

END OF SECTION
section 22-1000

PLUMBING PIPING AND PUMPS

PART 1 GENERAL

1.01 DESCRIPTION

A. Provide pipe, pipe fittings, piping specialties, pumps and related items required for complete piping system.

B. Related Work: The requirements of Section 22 0500, Common Plumbing Materials and Methods, also apply to this section.

1.02 QUALITY ASSURANCE

A. General: ASTM, and ANSI Standards are indicated. In addition, special standards are referenced where neither ASTM nor ANSI Standards are applicable.

B. Labeling: All piping shall be continuously and legibly labeled on each length as required by codes and standards and including as a minimum, country of origin, manufacturer’s identification marking, wall thickness designation, and applicable standards and approvals. Fittings shall be labeled as required by the referenced standard. Tubular fixture traps shall be stamped with manufacturer’s mark and material thickness.

C. Potable Water Valves: Potable water piping materials not limited to faucets, mixing valves, or pressure reducing valves. Valves shall meet NSF Standard 61, Section 9, for drinking water faucets and shall be brass construction. Brass components which contact water within the faucet shall be from brass which contains no more than 3 percent lead by dry weight.

D. Concealed Plastic Piping: No concealed plastic piping inside the building unless approved by Code or Governing Authorities.

E. Definitions: Where piping fluid is not indicated in the following paragraphs, provide similar piping materials for similar fluids (i.e., “make-up water” = “domestic water”; “wet stand pipe” = “fire sprinkler pipe”; “drainage piping” = “sanitary/storm sewer piping”).

F. Plumbing System Disinfection shall be performed by an experienced, qualified, chemical treatment agency. Mt. Hood Chemical, Chemcoa, or approved alternate.

1.03 STORAGE AND HANDLING

A. Provide factory-applied end caps on each length of pipe and tube. Maintain end caps through shipping, storage and handling as required to prevent pipe-end damage and eliminate dirt and moisture from inside of pipe and tube. Protect flanges and fittings from moisture and dirt by inside storage and enclosure, or by packaging with durable, waterproof wrapping.

1.04 SUBMITTALS

A. Submit catalog data for each product specified.

PART 2 PRODUCTS

2.01 PIPING MATERIALS

A. Copper Pipe and Tube:
   1. Application:
      a. Domestic water
      b. Priming lines
      c. Radiant Heat system above grade.
      a. Above Ground Domestic Water: Type L hard temper copper with soldered joints.
b. Underground Domestic Water and Priming Lines: Type L soft annealed with no joints or type K hard tempered copper with silver soldered joints.


4. Preinsulated Piping: Type K solder joint copper piping with 1" thick urethane insulation protected by 20 gauge PVC outer jacket. Rovanco "Insul/80," equivalent Rikwil or approved substitute.

1. Application: Three-story or less structures and where allowed by Code only.
   a. Sanitary waste
   b. Plumbing vent
   c. Rain drain

2. Pipe: All pipe to be solid core - No foam core.
   a. Acrylonitrile-butadiene-styrene (ABS) (ASTM D3965) plastic drain, waste and vent piping (ASTM F628) and fittings (ASTM D2661) (DWV).
   b. Poly(vinyl chloride) (ASTM D1784) (PVC) plastic drain, waste and vent pipe (ASTM D2665 and D1785) and fittings (ASTM D2665) (DWV).

3. Fittings: Provide fittings of the type indicated, matching piping manufacturer. Where not otherwise indicated, provide socket style, solvent weld fittings produced and recommended for the service indicated by the piping manufacturer.

D. Plastic Pipe:
   a. Domestic water

2. Pipe:

3. Fittings: Provide fittings of the type indicated, matching piping manufacturer. Where not otherwise indicated, provide fittings produced and recommended by the piping manufacturer for the service indicated.

E. Plastic Pipe:
1. Application:
   a. Below grade only radiant heating water.

2. Pipe:
   a. Cross-linked polyethylene (PEX) tubing manufactured by PEX-a or Engel Method for closed loop heating service (with oxygen barrier): Tested/listed to ASTM E84, ASTM F876 and F877, and CSA B137.5 listed certified to NSF standards 14 and 61. Rated for 100 PSI at 180º F. Wirsbo AQUAPEX or approved.

3. Fittings: ASTM F1960 cold expansion fittings. Provide fittings of the type matching piping manufacture and recommended by the piping manufacturer for the service indicated.

2.02 MISCELLANEOUS PIPING MATERIALS

A. Insulating (Dielectric) Fittings: Provide standard products recommended by the manufacturer for use in the service indicated, and which effectively isolate ferrous from non-ferrous piping (electrical conductance), prevent galvanic action, and reduce corrosion. Victaulic "Clear Flow."

B. Soldering and Brazing Materials: Provide soldering materials as determined by the installer to comply with installation requirements.
1. Tin-Antimony Solder: ASTM B32, Grade 95TA.
2. Lead-Free Solder: ASTM B32, Grade HB. Harris "Bridgit" approved.
3. Silver Solder: ASTM B32, Grade 96.5TS.
5. Brazing filler rod: BCuP rod to suit conditions.

C. Gaskets for Flanged Joints: ANSI B16.21; full-faced for cast-iron flanges; raised-face for steel flanges. Pressure and temperature rating required for the service indicated.
D. **Pipe Sleeves:** For installation in cast in place concrete floor systems. UL 1479 listed with ratings for fire, smoke, and water intrusion. Cast in place pipe sleeve with external waterstop collar and interior pipe seal and intumescent collar. Holdrite “Hydroflame”.

E. **Sleeve Seal:** Rubber-link pipe wall and casing closure. Thunderline Link-Seal. For fire rated wall, floor or ceiling penetrations, 3-M “CP-25” caulk, “No. 303” putty and/or “PSS 7904” sealing system.

F. **Strainers:** "Y-pattern," Class 125 [epoxy coated iron body] [bronze body] with tapped blow-off connection and removable 20 mesh stainless steel screen. NIBCO or equal.

G. **Tracer Wire:** 14 gauge, single strand, copper wire with blue insulation for water, green for sanitary and storm sewers, and yellow for gas. 3M “DBY” direct bury splice kit required at all splices.

### 2.03 PIPING SPECIALTIES

A. **Cleanouts:**

1. **Manufacturer:** J.R. Smith, Zurn, Wade, Watts, Josam, Mifab, Sioux Chief, or approved substitute.

2. **Types:**
   a. **Tile Floor Cleanouts:** Smith 4053-U with square heavy-duty nickel bronze top, bronze plug, and vandalproof screws. Adjustable top where cast into floor slab.
   b. **Carpeted Floor Cleanout:** Smith 4023-U-X with round heavy-duty nickel bronze top, bronze plug, carpet clamping device, and vandalproof screws. Adjustable top where cast into floor slab.
   c. **Concrete Floor Cleanout:** Smith 4023 with round heavy-duty nickel bronze top. Adjustable top where cast into floor slab.
   d. **Wall Cleanouts:** Smith 4472-U, bronze ferrule with raised head bronze plug, stainless steel shallow cover and vandalproof screws.
   e. **Outside Area Walks and Drives:** Smith 4253-U-G with galvanized cast iron body, top secured with vandalproof screws, and bronze plug. Install in 18” x 18” x 6” deep concrete pad flush with grade.
   f. **Plastic Body Cleanouts:** At contractor’s option, where ABS-DWV or PVC-DWV piping is approved, compatible plastic body cleanouts may be substituted. Cleanouts shall have finished tops of style and material as specified above.

B. **Drains:**

1. **Manufacturers:** Zurn, Jay R. Smith, Josam, Watts, Wade, Froet Industries, Mifab, Sioux Chief, or approved substitute. Where numbers are scheduled on the drawings they represent minimum the acceptable standard for locations involved.

2. **Cast iron construction with acid resistant coating, anchor flange, and other options as indicated by model number. PVC drains where specifically noted. Cast iron dome strainers on roof drains.**

3. **Install 4 pound sheet lead flashing, extending not less than 10” from and clamped to all drains not completely cast-in-place in a homogeneous material.**

C. **Flashing:** Minimum 4# sheet lead; to extend horizontally 10” from edge of vent penetrations or rain drain body and vertically 12” minimum up from roof turned over and down into hub of vent or finished with bronze cap providing counterflashing for screwed pipe.

D. **Downspout Boot:** Smith No. 1787-12, 4” diameter by 18”, offset type. Smith No. 1785 or 1786 for rectangular downsputs.

E. **Traps:** Except chrome plated fixture traps. Recessed drainage pattern for threaded pipe and same grade as pipe for cast iron and plastic pipe; with cleanout plugs in trap body in all above grade locations.

F. **Pressure Reducing Valve:** Single seat type with renewable stainless steel seat and valve. Size and capacity as shown on Drawings. Bronze bodies with screwed connections on valves 2-1/2” and smaller and flanged steel bodies on valves 3” and larger. Install each PRV with strainer on inlet or internal strainer. Leslie, Watts, Apollo, Cash-Acme, Zurn-Wilkins, or approved substitute.
G. Backflow Preventer: Where indicated on the Drawings, install a double check backflow preventer complete with strainer on inlet, shutoff valves, two separate check valves, and test cocks. USC Foundation for Cross Connection Control, State Health Officials, and serving utility approved. Bronze bodies on units 2” and smaller, and cast iron bodies with bronze trim on units 2-1/2” and larger.

H. Building Shut Off Valve Box: 10” round concrete enclosure with cast iron traffic weight cover. Brooks 3RT or approved substitute.

2.04 BACKFILL MATERIALS

A. Subbase Materials: A graded mixture of gravel, sand, crushed stone or crushed slag.

B. Finely-Graded Subbase Material: Well graded sand, gravel, crushed stone or crushed slag, with 100% passing a 3/8" sieve.

C. Backfill Material: Soil material suitable for compacting to the required densities, and complying with AASHTO designation M145, Group A-1, A-2-4, A-2-5, or A-3.

D. Drain Field Fill Material: Washed and uniformly graded gravel crushed stone or crushed slag, with 100% passing a 1-1/2" sieve and not more than 5% passing a No. 4 sieve.

E. Stabilization Fabric: Nonwoven stabilization and drainage fabric. Mirafi 140S or 140M.

PART 3 EXECUTION

3.01 UTILITY SERVICE

A. Plumbing Utility Connections: Complete installation. Contact local serving utilities to determine conditions involved and make or arrange to have connection made at proper time and pay all costs involved.

B. Sanitary and Storm Sewers: Connect to or arrange for connection to existing/public sanitary and storm sewers as shown on the Drawings and as required by the serving utility. Verify depth, size and location prior to installation of the new sewer systems.

C. Water Service: Connect to or arrange for connection to existing/public water service. Verify serving utility requirements prior to beginning any installation. Verify water main size, depth, pressure and location prior to starting work.

D. Fire Service: Connect to or arrange for connection to existing public water main. Contact local serving utilities to determine conditions involved and make or arrange to have connection made at proper time and pay all costs involved. Provide vault and install backflow preventer provided under the fire sprinkler work specified in Section 21 1300. Coordinate vault size and piping arrangement. Installation of meters and vault by the serving utility.

3.02 PIPE INSTALLATION

A. General: Install pipe, tube and fittings in accordance with recognized industry practices, manufacturer’s instructions, and plumbing code standards. Install each run accurately aligned with a minimum of joints and couplings, but with adequate and accessible unions and flanges for disassembly, maintenance and/or replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Comply with ANSI B31 Code for Pressure Piping.

B. Piping Runs: Route piping close to and parallel with walls, overhead construction, columns and other structural and permanent-enclosure elements of the building. Install piping plumb and level except where pitched for drainage. If not otherwise indicated, run piping in the shortest route which does not obstruct usable space or block access for servicing the building or equipment and avoid diagonal runs. Wherever possible in finished and occupied spaces, conceal piping from view. Do not encase horizontal runs in solid (concrete or CMU) partitions.

C. Piping: Install for services as specified in Part 2. The following are special requirements:
1. Underground Drainage Pipe: Install cast iron soil pipe for the following conditions. When specified in Part 2 of this Section and where allowed by Code, plastic piping may be installed in lieu of cast iron piping.
   a. Under the building to 5’ outside the building structure.
   b. 5’ each way from a potable water line crossing.
   c. First section (minimum 5’) from any connection to underground structures such as catch basins, manholes, disposal well or tank, etc.
   d. Through all fill areas where pipe cannot be rested on undisturbed earth.
   e. Where the top of the pipe is less than 12 inches below finish grade.
   f. At contractor's option in lieu of concrete or clay sewer pipe.

2. Existing Domestic Water Piping: Piping materials as specified in Part 2 except where existing domestic water piping to be connected to is galvanized steel, new galvanized steel piping for short branches and rough-ins may be installed.

3.03 PIPING JOINTS

A. General: Provide joints of the type indicated in each piping system, and where piping and joint as manufactured form a system, utilize only that manufacturer's material.

B. Ferrous Threaded Piping: Thread pipe in accordance with ASME B1.20.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave no more than three threads exposed.

C. Solder Copper Tube and Fitting Joints: In accordance ANSI B 828 with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in a manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens. "T-Drill" field formed tees may be utilized where the main is at least two pipe sizes larger than the branch.

D. Braze Copper Tube and Fitting Joints: Where indicated. Pass a slow stream of dry nitrogen gas through the tubing at all times while brazing to eliminate formation of copper oxide.

E. Flanged Joints: Match flanges within piping system, and at connections with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gasket.

F. Concrete Sewer Pipe Joints: Comply with applicable provisions of "Concrete Pipe Field Manual" by the American Concrete Pipe Assoc.

G. Plastic Pipe/Tube Joints: Comply with manufacturer's instructions and recommendations, and with applicable industry standards:

H. Grooved Pipe Joints: Comply with fitting manufacturer's instructions for making grooves in pipe ends. Remove burrs and ream pipe ends. Assemble joints in accordance with manufacturer's instructions. Visually inspect the assembled joint to ensure proper gasket seating.

I. Insulating (Dielectric) Fittings: Comply with manufacturer's instructions for installing unions or fittings. Install in a manner which will prevent galvanic action and stop corrosion where the "joining of ferrous and non-ferrous piping" is indicated.

J. Changes in Direction: Use fittings for all changes in direction. Run lines parallel with building surfaces.

K. Line Grades:
   1. Drainage Lines: Run at maximum possible grade and in no case less than 1/4" per foot within building.
   2. Vents: Pitch for drainage 1/4" per 10'.
3. Water: Pitch to low points and install hose bib drains. 3’ minimum depth of ground cover for all lines outside building unless otherwise noted.

L. Unions and Flanges: At all equipment to permit dismantling and elsewhere as consistent with good installation practice.

M. Expansion: Provide loops, swing joints, anchors, runouts and spring pieces to prevent damage to piping or equipment.

### 3.04 CLEANOUTS

A. Where required by code, at each change of sewer direction 45 degrees or greater and more than 10’ long, at end of each branch or main and spaced not greater than 100’ apart, as required by code and/or as shown on Drawings.

### 3.05 MISCELLANEOUS PIPING EQUIPMENT

A. Floor, Wall and Ceiling Plates: Chrome plated pressed steel or brass screw locked split plates on all pipe penetrations in finished spaces.

B. Strainers: Install in a manner to permit access for cleaning and screen removal and with blow-off valve.

C. Sleeves: At all penetrations of masonry or cast in place concrete construction. PVC, 24 gauge galvanized steel tube or Schedule 40 galvanized steel pipe. Use steel pipe sleeves through beams, footings, girders or columns and for all penetrations of walls or floors below grade. Where floor finish is ceramic tile, terrazzo, or similar material extend standard steel pipe sleeves 1-1/2” above finished floor. Fabricate sleeves 1” diameter larger than pipe or insulation. PVC and sheet metal sleeves at non-structural penetrations only. Use specified sleeve system for all above grade concrete floor applications.

D. Sleeve Caulking: Caulk below grade pipe with rubber link seal. Grout above grade pipe with cement mortar or approved waterproof mastic. All caulking or grouting shall extend full depth of sleeve. Utilize rubber sealing links in lieu of caulking. Install UL sealing caulk, putty and/or system at all penetrations of fire rated walls, floors and ceiling.

E. Shock Arrestors: Install at end of mains, in a battery of three or more flush valve-operated fixtures water header, ahead of quick closing and solenoid operated valves. Size per PDI recommendations where size is not indicated. Provide access panels.

F. Trap Priming: Traps serving floor drains, floor sinks, catch basins, and similar fixtures shall be primed in accordance with Code requirements.

G. Domestic Hot Water Mixing Valves: Install in accordance with manufacturers installation instructions and piping diagrams.

### 3.06 EXCAVATING

A. General: Do not excavate for mechanical work until the work is ready to proceed without delay, to minimize the total time lapse from excavation to completion of backfilling. Comply with all applicable Federal and state safety regulations and local erosion control requirements.

B. Width: Excavate for piping with 6" to 9" clearance on both sides of pipe, except where otherwise shown or required for proper installation of pipe joints, fittings, valves and other work. Excavate for other work to provide minimum practical but adequate working clearances.

C. Depth for Direct Support: For work to be supported directly on undisturbed soil, do not excavate beyond indicated depths, and hand-excavate the bottom cut to accurate elevations. Support the following work on undisturbed soil at the bottom of the excavations:
   1. Piping of 5” and less pipe/tube size.
D. Depth for Subbase Support: For large piping (6" pipe size and larger), tanks and where indicated for other mechanical work, excavate for installation of subbase material in the depth indicated, or, if not otherwise indicated, 6" below bottom of work to be supported.

E. Depth for Exterior Piping: Excavate for exterior water-bearing piping (water and drainage) so that the top of piping will not be less than 3' vertical distance below finished grade.

F. Depth for Unsatisfactory Soil Conditions: Where unsatisfactory soil condition at the bottom of excavation exists, excavate additional depth as directed to reach satisfactory soil-bearing condition. Backfill with subbase material, compacted as directed, to indicated excavation depth.

G. Rock and Boulder Removal: Refer to Division 1 for procedure on additional work, including additional excavating and backfilling, rock removal, etc.

H. Protection of Trees: Excavate near large trees (within the drip line) by hand, and protect the root system from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with burlap. Paint root cuts of 1" diameter and larger with asphaltic tree paint.

I. Excavated Materials: Store excavated material (temporarily) near the excavation, in a manner which will not interfere with or damage the excavation or other work. Do not store under trees (within the drip line). Retain excavated material which complies with the requirements for backfill material. Dispose of excavated material which is either in excess of quantity needed for backfilling or does not comply with requirements for backfill material.

J. Move unused material to another location on Owner's property, or adjacent to the project site, and dispose of as directed by the Architect. Remove unused material from project site, and dispose of in a lawful manner.

3.07 DEWATERING

A. Maintain dry excavation for mechanical work by removing water. Protect excavations from inflow of surface water. Pump minor inflow of ground water from excavations; protect excavations from major inflow of ground water by installing temporary sheeting and waterproofing. Provide adequate barriers which will protect other excavations and below-grade property from being damaged by water, sediment or erosion from or through mechanical work excavations. Comply with local erosion control regulations where applicable.

3.08 BASE PREPARATION

A. Subbase Installation: Where indicated, install subbase material to receive mechanical work, and compact by tamping to form a firm base for the work. For 4" and larger piping, horizontal cylindrical tanks and similar work, shape the subbase to fit the bottom 90 degrees of the cylinder, for uniform continuous support. Provide finely-graded subbase material for wrapped, coated and plastic pipe and tank. Shape subbases and bottoms of excavation with recesses to receive pipe bells, flanged connections, valves and similar enlargements in the piping systems and set bottom of trench at proper pitch and correct elevations with subbase material.

B. Concrete Encasement: Where piping under roadways is less than 2'-6" below surface of roadway, provide 4" base slab of concrete to support piping. After piping is installed and tested, provide 4" thick encasement (sides and top) of concrete before backfilling. Provide Class 2500 concrete for encasement and slab.

C. Previous Excavations: Where piping crosses over an area more than 5' wide which has been previously excavated to a greater depth than required for the piping installation, provide suitable subsidence-proof support for the piping. Comply with the details shown, or where not otherwise shown, provide the following support system:
   1. Excavate to undisturbed soil, in a width equal to the pipe diameter plus 2'. Install 8" courses of subbase material, each compacted to 95% of maximum density, as required to fill excavation and support piping.
3.09 BACKFILLING

A. Do not backfill until installed mechanical work has been tested and accepted wherever testing is indicated. Install drainage fill where indicated, and tamp to a uniform firm density. Backfill with finely-graded subbase material to 6” above wrapped, coated and plastic piping and tanks, and to center line of other tanks (where recommended by tank manufacturer, use “pea gravel” backfill). Condition backfill material by either drying or adding water uniformly, to whatever extent may be necessary to facilitate compaction to the required densities. Do not backfill with frozen materials.

3.10 CLEANING

A. General: Clean all dirt and construction dust and debris from all mechanical piping systems and leave in a new condition. Touch up paint where necessary.

B. Disinfection of Domestic Water Piping System:
1. Prior to starting work, verify system is complete and clean.
2. Open all drains and fixtures valves in the building starting with the valve nearest the water service line and permit the water to run clear for 10 minutes to eliminate grease, cuttings, flux, and foreign matter.
3. Disinfect piping system in accordance with ANSI/AWWA C651-92 standard.
4. Take samples from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C601. If any sample fails the analysis, repeat the procedure.
5. Include a copy of the bacteriological analysis in the Operating and Maintenance manuals.

C. Sanitary and Storm Drainage System:
1. Remove construction debris from cleanouts, drains, strainers, baskets, traps, etc., and leave same accessible and operable. Place plugs in the end of uncompleted piping at the end of the day or whenever work stops.
2. Clear the interior of sewer piping of dirt and other superfluous material as the work progresses. Maintain a swab or drag in the line and pull past each mortared joint as it is completed. In large, accessible conduit, brushes and brooms may be used for cleaning. Flush lines between manholes to remove collected debris.
3. Before final acceptance of completed sewer system, flush and clean the entire system with water. Trap and remove solid material obtained from flushing and cleaning from the new system. Do not allow debris to enter the existing sewer system.

D. Refrigeration System Piping: If, for any reason, sanitized and sealed-at-the-mill tubing is not used, clean the tubing as follows:
1. Wipe each tube internally with a dry, lintless cloth followed with a clean lintless cloth saturated with recommended refrigerant.
2. Repeat until the saturated cloth is not discolored by dirt.
3. Wipe with a clean cloth saturated with compressor oil and squeezed dry.
4. Wipe with a dry, lintless cloth.

3.11 TEST

A. General:
1. Minimum duration of two hours or longer, as directed for all tests. Furnish report of test observation signed by qualified inspector. Make all tests before applying insulation, backfilling, or otherwise concealing piping or connecting fixtures or equipment. Where part of the system must be tested to avoid concealment before the entire system is complete, test that portion separately, same as for entire system.
2. Provide all necessary temporary equipment for testing, including pump and gauges. Remove control devices before testing and do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with water and pressurize for the indicated pressure and time.
3. Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 5% of test pressure.

B. Repair:
1. Repair piping system sections which fail the required piping test by disassembly and re-installation, using new materials to the extent required to overcome leakage. Do not use chemical stop-leak compounds, solder, mastics, or other temporary repair methods.

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2. Drain test water from piping systems after testing and repair work has been completed.

C. Sewer: Furnish all facilities and personnel for conducting the test. Test in accordance with the requirements of the State Plumbing Inspector and local authorities.

D. Plumbing Waste and Vent Piping: Hydrostatic test by filling to highest point, but not less than 10' water column on major horizontal portion.

E. Water Piping: Hydrostatic pressure of 100 psig without loss for four hours.

F. Tanks and Equipment: Hydrostatic pressure to 1.5 times operating pressure but do not exceed maximum rated pressure.

G. Refrigerant System:
   1. When the refrigerant connections have been completed, close the compressor suction and discharge valves (or receiver outlet valve in the case of condensing unit) and test the balance of the system to near operating pressure with a dry nitrogen.
   2. Carefully test all joints, using soap and water or other sudsing solution. After all joints are tested, discharge the gas and repair all leaks, then repeat the test with a mixture of nitrogen and HCFC-22 and a halide torch or an electronic leak detector.
   3. Evacuate the system to remove moisture and non-condensables. Lower the absolute pressure with a vacuum pump to 1000 microns of mercury. Apply external heat as required to vaporize moisture.
   4. Dehydrate each refrigerant circuit by satisfactory use of a vacuum pump before charging with refrigerant. Furnish all necessary refrigerant and oil for complete operating charge of the system. Upon completion of the work of construction, test all refrigeration equipment under normal operating conditions and leave in operating order. Adjust automatic temperature controls.
   5. After the first 24 hours of operation, measure the pressure drop across the suction filter. If the pressure drop exceeds 5 pounds per square inch, replace the cartridge with a new one, retesting and replacing the cartridge and/or adjusting the system as necessary to achieve a pressure drop of less than 5 pounds per square inch in 24 hours.

3.12 SUPERVISION AND START-UP

A. Adjust flush valves, pressure reducing valves, mixing valves, water heater thermostats, domestic hot water circulating system balancing valves, and similar equipment.

B. The installation, start-up, and adjustment of the Thermostatic mixing valve shall be supervised by an authorized agent of the manufacturer. The manufacturer’s agent shall check out and approve the installation and shall also approve and be responsible for adjusting the operating and control system and instructing the Owner’s representatives on the system operation.

END OF SECTION
SECTION 22-1200
FACILITY FUEL SYSTEMS

PART 1 GENERAL

1.01 DESCRIPTION
A. The requirements of this section apply to the fuel storage, handling, and distribution systems for the facility.
B. Related Work: The requirements of Section 22 0500, Common HVAC Materials and Methods, also apply to this section.

1.02 CODES AND STANDARDS
A. General
B. NFPA 30, 31
C. UL-142

1.03 SUBMITTALS
A. Required for all items.

PART 2 PRODUCTS

2.01 PIPING MATERIALS
A. Black Steel Pipe:
   1. Applications: Above ground only.
      a. LP Gas, indoors.
   3. Threaded Fittings: For above ground installations only. Banded class 150 malleable iron fittings, ANSI B16.3 to 150 psi.
   5. MegaPress Fittings: \( \frac{1}{2} \)-inch through 2-inch shall conform to ASME B31.1, ASME B31.3, or ASME B31.9. Fittings shall have zinc and nickel coating, an HNBR sealing element, 420 stainless steel grip ring, separator ring, and an un-pressed fitting leak identification feature. Sealing elements shall be verified for the intended use. Viega MegaPress or Engineer approved equal.

B. Galvanized Steel Pipe:
   1. Applications: Above ground only.
      a. LP Gas, outdoors.
   3. Fittings: Banded class 150 galvanized malleable iron threaded fittings, ANSI B16.3.

C. Flexible Fuel Gas Piping (CSST):
   1. Application: 2 psi or less for final connection of equipment.
      a. LP Gas.
   2. Pipe: Corrugated 300 series stainless steel tubing with yellow polyethylene jacketing.
   3. Fittings: Fittings shall be yellow brass and provide a self-flaring connection to the tubing. Systems incorporating gaskets or o-rings are not acceptable.
   4. Underground Installations: CSST pre-sleeved with heavy wall internally ribbed polyethylene secondary venting conduit with end seals and vent connection fittings.
   5. Approvals: System shall be listed by an approved independent laboratory and approved for use by the local code officials. TracPipe, Gastite, or approved.

2.02 PIPING ACCESSORIES
A. Fuel Gas Valves: UL listed or AGA approved valves.
   1. 10 psig or Less:
      a. Ball: NIBCO bronze body T/S 585-70-UL, brass body FP-600.
B. Strainers: Threaded bronze or iron body for 175 working pressure, Y pattern with 1/32" stainless steel perforated screen.

C. Gas Pressure Regulators: Size based on pressures indicated on the drawings and for 1.5 times connected load. Style and model as approved by Serving Gas Company. Regulators for systems operating above 2 PSI shall be rated for 60 PSI minimum. The size of the orifice shall be clearly marked on the valve. Maxitrol, Rockwell, Fisher, Reliance, or approve substitute.

D. Gas Appliance Connectors: For low pressure gas connection to indoor or outdoor stationary appliances, AGA approved corrugated stainless steel tubing with zinc plated steel end fittings. Brasscraft or approved substitute.

E. Gas Connection Hose: For low pressure gas connection to moveable appliances including cooking equipment, flexible hose consisting of inner tube, stainless steel braid, and outer protective jacket with swivel steel threaded end fittings. T & S Brass HG series, or approved substitute.

PART 3 EXECUTION

3.01 EQUIPMENT INSTALLATION

A. Locating and Positioning Equipment: Observe all Codes and Regulations and good common practice in locating and installing mechanical equipment and material so that complete installation presents the least possible hazard. Maintain adequate clearances for repair and service to all equipment. Installation of any equipment with less than minimum clearances shall not be accepted.

B. Anchorage: Anchor and/or brace mechanical equipment, piping and ductwork to resist displacement due to seismic action; include snubbers on equipment mounted on spring isolators.

3.02 PIPE INSTALLATION

A. General: Install pipe, tube and fittings in accordance with recognized industry practices for each indicated service without piping failure. Install each run with a minimum of joints and couplings, but with adequate and accessible unions and flanges for disassembly, maintenance and/or replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Align piping accurately at connections.

B. Ferrous Threaded Piping: Thread pipe in accordance with ANSI 82.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave no more than 3 threads exposed.

C. Flexible Gas Piping (CSST): Comply with manufacturer’s recommendations for system installation. Provide striker plates and supports as required. All penetrations of finished walls, including mechanical room walls, shall be accomplished using surface or recessed termination fittings. Where installed underground below a building, vent the conduit to outdoors per Code.

D. Changes in Direction: Use fittings for all changes in direction. Run lines parallel with building surfaces.

E. Unions and Flanges: At all equipment to permit dismantling and elsewhere as consistent with good installation practice.

F. Expansion: Provide loops, swing joints, anchors, runouts and spring pieces to prevent damage to piping or equipment.

G. Compression Fittings:
3.03 LP TANK
A. LP Tank is provided by owner. Owner to contact their Propane gas service company as required and pay all costs involved. Install regulator at the entrance to the building to deliver proper inlet pressures and vent regulators to outside where required.

3.04 CLEANING
A. General: Clean all dirt and construction dust and debris from all mechanical piping systems and leave in a new condition. Touch up paint where necessary.
B. Fuel Piping: Blow clear of debris with nitrogen or oil free air.

3.05 TEST
A. General: Minimum duration of two hours or longer, as directed for all tests. Furnish report of test observation signed by qualified inspector. Make all tests before applying insulation, backfilling, or otherwise concealing piping or connecting fixtures or equipment. Where part of the system must be tested to avoid concealment before the entire system is complete, test that portion separately, same as for entire system.
B. Compression Fittings.
C. Gas Piping: One half hour minimum air at 60 psig for 2 psig gas, and 15 minutes at 10 psig for 7” water gauge natural gas or as approved and certified by serving utility. Allow district personnel to witness test.

3.06 MECHANICAL PAINTING
A. Uninsulated Piping: Paint black steel piping in moist equipment rooms, crawl spaces, inside of secondary containment piping, or exposed to weather two (2) coats black rust-inhibiting paint.

END OF SECTION
SECTION 22-3000
PLUMBING EQUIPMENT

PART 1 GENERAL

1.01 DESCRIPTION
A. The requirements of this section apply to the plumbing equipment.
B. Provide plumbing equipment specified and shown on the Drawings.
C. Related Work: The requirements of Section 22 0500, Common Plumbing Materials and Methods, also apply to this section.

1.02 QUALITY ASSURANCE
A. Code: Comply with requirements of the Oregon State Plumbing Specialty Code.
B. All equipment and component parts shall conform to governing codes. Gas-fired equipment shall be design certified by AGA.
C. Labeling: All equipment shall have permanent labels affixed by the manufacturer listing model number, capacity, efficiency, approvals, and similar characteristics of the product.

PART 2 PRODUCTS

2.01 PIPING
A. Piping, fittings, pumps, and related items are specified in Section 22 1000.

2.02 LP GAS STORAGE WATER HEATERS
A. Light Commercial Gas-fired Storage Water Heater:
   1. AGA and serving utility approved commercial gas-fired heater complying with the state energy code and ASHRAE 90.1-2010 requirements and of size and capacity shown on Drawings. Glass-lined steel tank equipped with sacrificial anode. 1-1/2” minimum of non-organic insulation, or equal non-CFC foam. Cold rolled enameled steel jacket to encase sides, top, and combustion chamber. Adjustable automatic thermostat, safety pilot, gas cocks, automatic gas pressure regulator, all brass hose bib drain. Provide with ASME code pressure-temperature relief valve. Heater shall be constructed to operate in condensing range with PVC vent and ducted combustion air. Efficiency shall be at least 90%.
   2. Rheem, Ruud, A.O. Smith, Bradford White, State, American, or approved substitute.

2.03 WATER HEATER ACCESSORIES
A. Water Heater and Tank Seismic Restraints: For water heaters and tanks, Watts “Spacemaker”, Holdrite “Quickstrap,” or approved.
B. Water Heater Stands: Galvanized steel stands with anchoring clips for attachment to wall or floor. Watts “Spacemaker”, Holdrite, or approved.
C. Water Heater mounting bracket: Wall or ceiling mounted water heater support assembly with seismic restraints. Watts “Spacemaker, Holdrite, or approved.
D. Domestic Hot Water Expansion Tank: Plastic lined drawn steel tank for potable water with epoxy exterior finish, air charging valve and system piping connection. Butyl rubber diaphragm with steel retaining ring. Base mounting ring on sizes over 5 gallons. ASME construction on sizes over 10 gallons. Provide with relief valve where working pressure rating is less than 150 psi.
2.04 WATER TO WATER HEAT EXCHANGER

A. Brazed plate style heat exchanger. Single plate type plate material to be 316L stainless steel with 99.9% copper braze alloy & 304 stainless steel connection rated for at least 150 psi and 250º F. See drawings for capacity. Bell & Gossett, Xylem, Kelvion or approved. Provide with 20-40 mesh water strainer on both inlet lines.

2.03 RADIANT HEATING WATER SPECIALTIES

A. Air Vents: Install at all system high points whether shown or not; fabricate of 2" diameter or larger pipe at least 12" long. At the high point of each main install an Armstrong No. 1AV autovent, or equivalent Taco, Bell & Gossett, Armstrong, Dunham-Bush approved substitute.

B. Pumps Smaller Than 350 GPM: Pipe mounted, in-line arrangement with mechanical seals with ceramic seal seats, suitable for continuous operation at 225 deg. F at head and capacity stated on Drawings. Cast iron impeller casing, oil lubricated bronze journal and thrust bearings or regreasable ball bearings (manufacturer's standard), 1750 rpm standard frame motor. Provide pressure gauge tappings on suction and discharge flanges. Impeller size not to exceed 90% of largest diameter impeller which will fit pump casing. Minimum horsepower and efficiency as indicated on Drawings and not less than will be required at any point of the impeller curve. For pumps larger than 1.0 HP motor, provide split coupled design. Close coupled allowed for pumps 1.0 HP or under. Bell & Gossett, Paco, Taco, Armstrong, Patterson, Aurora, Grundfos, or approved substitute.

C. Circuit Setter and Balancing Valves: Calibrated ball valve style balancing fitting with differential pressure taps, brass or bronze body and trim. Bell & Gossett, Taco, Wheatley, Pro Hydronics, Nutech, Griswold or approved substitute.

PART 3 EXECUTION

3.01 UTILITY SERVICE

A. Plumbing Utility Connections: Complete installation. Verify rough in dimensions of equipment prior to installing piping.

3.02 EQUIPMENT INSTALLATION AND CONNECTION

A. All equipment shall be installed plumb and level unless otherwise recommended by the manufacturer.

B. Arrange piping connections to equipment to allow removal and replacement of the equipment without disassembly of connecting piping. Provide valves, unions, flanges, etc. at connection points.

C. Arrange equipment for adequate service access as recommended by the manufacturer and as required by code.

D. Anchor equipment to resist displacement due to seismic events as detailed on the drawings, recommended by the manufacturer, and as required by code and as specified in other sections of these specifications. Provide seismic straps as specified above for tank type water heaters.

E. Install drain pans under all water heaters as specified in Section 22 0500.

3.03 EQUIPMENT CLEANING

A. Remove construction and shipping protection and thoroughly clean all plumbing equipment just prior to building acceptance.
3.04 SUPERVISION AND START-UP

A. Do not place equipment onto operation until required work of other trades is complete, e.g. venting systems, combustion air ducts, etc.

B. Follow manufacturer’s instructions for start-up and adjustment of equipment.

C. The installation, start-up, and adjustment of the power water heater shall be performed by an authorized agent of the manufacturer. The manufacturer’s agent shall check out and approve the installation and shall also approve and be responsible for adjusting the operating and control system and instructing the Owner’s representatives on the system operation.

END OF SECTION
SECTION 22 4000
PLUMBING FIXTURES

PART 1 GENERAL

1.01 DESCRIPTION
   A. The requirements of this section apply to the plumbing fixtures and trim.
   B. Provide fixtures as shown on the Drawings and specified herein. Provide all required fixture trim and accessories for a complete, finished installation.
   C. Related Work: The requirements of Section 22 0500, Common Plumbing Materials and Methods, also apply to this section.

1.02 QUALITY ASSURANCE
   A. Code: Comply with requirements of the Oregon State Plumbing Specialty Code.
   B. Fixture color: White unless indicated otherwise.
   C. Potable Water Valves: Potable water valves not limited to faucets, mixing valves, or pressure reducing valves. Valves shall meet NSF Standard 61, Section 9, for drinking water faucets and shall be brass construction. Brass components which contact water within the faucet shall be from brass which contains no more than 3 percent lead by dry weight.

PART 2 PRODUCTS

2.01 PIPING
   A. Piping, fittings, and related items as specified in related Sections 22 1000.

2.02 INTERIOR PLUMBING MATERIALS
   A. Shock Arrester: Precharged bellows or sealed piston type manufactured to meet PDI WH-201 and ASSE 1010 Standards. Size in accordance with PDI procedures. J. R. Smith, PPP, Sioux Chief, Wade, Zurn, Watts, Josam, or approved substitute.
   B. Traps: Except chrome plated fixture traps. Recessed drainage pattern for threaded pipe and same grade as pipe for cast iron pipe; with cleanout plugs in trap body in all above grade locations.
   A. Single Fixture Tempering Valve: Lead free construction thermostatic mixing valve with ASSE1070 certification Watts LFMMV series or equal. Bronze/brass construction with stainless steel disc and springs, copper thermostat.
   D. Secondary piping supports: Install manufactured secondary piping supports for support and positioning of fixture rough-in piping from framing members. Hubbard, Sioux-Chief, or approved substitute.

2.03 PLUMBING FIXTURES
   A. Stops: Furnish stop valves for all fixtures. [Screwdriver / Loose key / Wheel handle] style, in wall, angle or straight through pattern to fit installation. Stops to be all brass with full turn brass stem and replaceable washer, no plastic. Compression nuts to be high copper content brass. Finish to be copper nickel chrome plate. Product to carry manufacturer’s name. Risers to be chrome plated copper. McGuire, Chicago, Brasskraft, Keeney, Zurn, or approved substitute.
   B. Fixture traps: Exposed fixture tailpieces, traps, and wastes shall be chrome plated 17 gauge seamless brass tube with cast brass nuts and deep or box style escutcheons as required to conceal rough piping. Products to be stamped with manufacturers name and material gauge. McGuire, Keeney, Zurn, or approved.
C. Provide handicap piping protector kit on all exposed accessible fixture traps and supplies (I&S Insulation Co. Inc., Brocar Products Inc. kit 500R, McGuire “Prowrap”, Plumberex “Pro-2000” or approved substitute.

D. 1.6 Gallon Flush Water Closet, Flush Valve, Vitreous China: Elongated water closet bowl shall be designed for 1.6 gallon siphon jet flushing action.

   1. Install each listed water closet with the following:
      a. Flush Valve: Quiet acting, exposed chrome plated brass with ADA metal oscillating non-hold-open handle screwdriver check/control stop with vandal resistant cap, cast wall flange, synthetic rubber diaphragm, and vacuum breaker, as recommended by fixture manufacturer. Sloan, Zurn.
      b. Seat: Solid white heavy weight molded plastic seat, with molded in bumpers; open front less cover for elongated bowl with check and self-sustaining hinge. Hinge and hardware to be 300 series stainless steel. Church 295-SSC, Beneke 523-SS/CH-B, or Bemis 1955 SS/C, Zurn Z5956SS-EL-STS.


E. Urinal, Flush Valve, Vitreous China, "UR-1":

   1. Install each listed urinal with the following: Quiet acting, exposed chrome plated brass flush valve with ADA metal oscillating non-hold-open handle screwdriver check/control stop with vandal resistant cap, cast wall flange, synthetic rubber diaphragm, and vacuum breaker, as recommended by fixture manufacturer. Sloan, Zurn.


F. Lavatory, Vitreous China:

   1. Faucet: Chrome plated brass body, deck mounted with handle for the handicapped, vandal resistant 0.5 gpm aerator with grid strainer waste. Delta 516-HDF-DST, or equal Moen, Chicago, or Symmons.


H. Drains:

   1. Zurn, Jay R. Smith, Josam, Wade and Mifab. Numbers scheduled on drawings represent minimum acceptable standard for locations involved.

   2. Install 4 pound sheet lead flashing, extending not less than 10" from and clamped to all drains not completely cast-in-place in a homogeneous material.

I. Fixtures Furnished by Owner (and/or under another Section): Some fixtures will be furnished by the Owner (and/or under another specification section). Include under this section the required rough-ins, 3/8" chrome plated supplies with screwdriver stops, 1-1/2" chrome plated cast brass "P" trap (or, on kitchen sinks, 2" cast iron "P" traps) for each sink compartment, and make final connection. Verify all rough-ins and connection requirements before commencing work.

J. Hose Bibs:

   1. Outside "HB-1": For Moderate Climate with vacuum breaker, bronze wall casing and wall clamp. Zurn Z-1333C, equal Wade, Woodford, Smith, or Watts.

   2. Inside "HB-2": Polished chrome plate, ¾" lock shield, loose key, Chicago 952.

K. Service Sump (Mop Basin)" SS-1":

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1. Faucet exposed, brass body, rough plated, long spout, top brace, hose end spout with bucket hook, vacuum breaker and integral stops in shanks. Chicago 897-RCF, T & S B-0665-BSTP, or equal Zurn, Delta Commercial, mounted 24" above rim. Install with 18 gauge type 302, No. 4 finish stainless steel splash on the two walls.

2. 28x28x13" Corner Mop Sink, Enameled Cast Iron with vinyl bumper guard and 3" brass body strainer outlet. American Standard 7745.811

T. Single Stall Shower, "SH-1": Install with concealed piping and 2.5 gpm head. Pressure equalizing mixing valve with combination strainer/check stops and temperature limit stop. Chicago SH-PB1-02-000, or equal Delta, Moen, Symmons.

T. Single Stall Shower, ADA, "SH-2": Install with concealed piping and 2.5 gpm head, handheld shower head with flex hose, vacuum breaker, and wall slide bar for ADA. Pressure equalizing mixing valve with combination strainer/check stops and temperature limit stop. Chicago SH-PB1-11-044, or equal Delta, Moen, Symmons.

PART 3 EXECUTION

3.01 PIPING

A. Install in accordance with Section 22 1000.

3.02 FIXTURE INSTALLATION AND CONNECTION

A. All exposed fixture hardware and piping shall be plated with polished chrome unless otherwise directed in these specifications. Where chair carriers or special carrier design are not indicated, provide 3/16” thick by 6" wide steel to waste or vent piping and to available building construction.

B. All fixtures in contact with finished walls and floors shall be caulked with waterproof, white, non-hardening sealant which will not crack, shrink or change color with age.

C. All fixtures and component parts shall conform to governing codes.

D. All fixtures shall be securely mounted level and plumb or as recommended by the manufacturer. Mount fixtures intended to be accessible to the handicapped at the dimensions required by code.

3.03 STARTUP

A. Adjust flush valves, pressure reducing valves, mixing valves, water heater thermostats, hot water circulating system balancing valves, and similar equipment.

B. Remove construction protection, tags and labels and thoroughly clean all plumbing equipment and trim. Scour all fixtures just prior to building acceptance.

3.04 GAS SERVICE

A. Contact propane gas company service as required and pay all costs involved. Run all gas distribution piping and make final connections to all gas using equipment. Install regulators to deliver proper inlet pressures and vent regulators to outside where required.

3.05 EXCAVATION AND BACKFILL

A. As specified in Section 22 1000.

END OF SECTION
SECTION 23-0500
COMMON HVAC MATERIALS AND METHODS

PART 1 GENERAL

1.01 DESCRIPTION

A. The provisions of the General Requirements, Supplementary Requirements, and Division 1 apply to the HVAC work specified in this Division.

B. The requirements of this Section apply to the HVAC systems specified in these Specifications and in other Division 23 sections.

C. Provide all items, articles, materials, equipment, operations and/or methods listed, mentioned, shown and/or scheduled on the Drawings and/or in these Specifications, including all labor, supervision, services, permits, fees, and incidentals necessary and required to provide a complete and operable facility with complete systems as shown, specified, and required by applicable codes.

D. The work shall include, but not be limited to, the following systems:
   1. Fuel supply system.
   2. Central heating and cooling equipment.
   3. Complete piping systems including insulation, valves, supports, etc.
   4. Air handling equipment including packaged equipment and exhaust fans.
   5. Air distribution systems including ductwork, terminal units, dampers, insulation, and air inlets and outlets.
   6. HVAC control system.
   7. Special systems as specified herein.

E. Advise subcontractor, suppliers, and vendors involved in the work specified in this Section of the applicable requirements.

1.02 QUALITY ASSURANCE

A. All work and materials shall conform to all applicable local and state codes and all federal, state and other applicable laws and regulations. All clarifications and modifications which have been cleared with appropriate authorities are listed under the applicable sections. All electrical products shall bear the label of a recognized testing laboratory such as UL or CSA.

B. Whenever the requirements of the Specifications or Drawings exceed those of the applicable code or standard, the requirements of the Specifications and Drawings shall govern.

C. Codes and Standards: Comply with the provisions of the following referenced codes, standards and specifications:
   1. Federal Specifications (FS)
   2. American National Standards Institute (ANSI)
   3. National Electrical Manufacturer's Association (NEMA)
   4. National Fire Protection Association (NFPA)
   5. Underwriters Laboratories, Inc. (UL)
   6. Factory Mutual (FM)
   7. International Building Code (IBC) with State and Local Amendments
   8. International Mechanical Code (IMC) with State and Local Amendments
   9. Uniform Plumbing Code (UPC) with State and Local Amendments
   10. American Society for Testing and Materials (ASTM)
   11. Americans with Disabilities Act (ADA)
   12. International Fire Code (IFC) with State and Local Amendments
   14. Manufacturers Standardization Society (MSS)
   15. American Gas Association (AGA)
D. Each piece of equipment furnished shall meet all detailed requirements of the Drawings and Specifications and shall be suitable for the installation shown. Equipment not meeting all requirements will not be acceptable, even though specified by name. Where two or more units of the same class of equipment are furnished, use product of the same manufacturer; component parts of the entire system need not be products of same manufacturer. Furnish all materials and equipment, new and free from defect and of size, make, type and quality herein specified or approved by the Architect. All materials shall be installed in a neat and professional manner.

E. All apparatus shall be built and installed to deliver its full rated capacity at the efficiency for which it was designed.

F. The Drawings and Specifications are complementary. What is called for by one shall be as though called for by both.

G. Drawings: Do not scale drawings for roughing-in measurements, nor use as shop drawings. Make field measurements and prepare shop drawings as required. Coordinate work with shop drawings of other specification divisions.

H. Field Wiring: It is the intent of these specifications that all systems shall be complete and operable. Refer to all drawings and specifications, especially the electrical drawings, to determine voltage, phase, circuit ampacity and number of connections provided. Provide all necessary field wiring and devices from the point of connection indicated on the electrical drawings. All equipment shall be installed in compliance with the Electrical Code and the equipment’s UL listing. Bring to the attention of the Architect in writing, all conflicts, incompatibilities, and/or discrepancies prior to bid or as soon as discovered.

1.03 WORK OF OTHER CONTRACTS
A. Work under this contract shall be conducted in a manner to allow for the future installations of such equipment or items listed in other sections of this Specification.

1.04 WORK OF OTHER DIVISIONS
A. Work under this Division shall be conducted in a manner to cooperate with the installation of such equipment or items as specified in other Divisions.

B. Plumbing piping systems and fixtures and fire suppression piping systems are specified under other Divisions of these Specifications except for provisions or items specifically noted on the Drawings or specified herein.

C. Consult all Drawings and Specifications in this project and become familiar with all equipment to be installed. Coordinate all aspects of the construction with the other trades on the job to ensure that all work and materials required to provide a complete and operational facility are included in the bid.

D. All sections of Division 23 are interrelated and shall be considered in their entirety when interpreting any material, method, or direction listed in any section of Division 23. Individual sections are not written for specific subcontractors or suppliers but for the general contractor.

1.05 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES (SUBMITTALS)
A. Submit in accordance with Division 1 full technical and descriptive shop drawing data on proposed materials and equipment as detailed in each section.

B. The Contractor shall verify that all equipment submitted can be delivered and installed within the time constraints of the construction period.

C. Include the manufacturer, type, style, catalog number, complete specification, certified dimensions, and description of physical appearance for each item and option submitted. Reproduction of catalog data sheets shall be clean and legible to show all details, including gauge of metal used.
D. Include only information on exact equipment to be installed, not general catalogs of the manufacturer. Where sheets show proposed equipment as well as other equipment, identify proposed equipment with rubber stamp arrow or similar concise method.

E. Submit with each copy a transmittal letter verifying that all included equipment submittals have been carefully considered for quality, dimensions, function, and have been coordinated with the Drawings and Specifications. Guarantee that proposed materials will meet or exceed the quality and function of those specified.

F. Include field wiring diagrams and connection diagrams for all control and/or low voltage systems, including floor plans.

G. Submittal Review: The submittal review process is a means to provide quality control. The action noted to be taken (or where conflicts with the contract documents are not noted) shall not be interpreted by the Contractor as automatic "change orders." Approval of the data for substitution and shop drawings shall not eliminate the contractor’s responsibility for compliance with Drawings or Specifications, nor shall it eliminate the responsibility for freedom from errors of any sort in the data discovered prior to or after the review process. Deviations, discrepancies, and conflicts between the submittals and the Contract Documents shall be called to the Architect’s attention in writing at the time of transmittal of the data.

H. Unless otherwise directed by Division 1, submittal data shall be in a 3-ring plastic binder with a clear plastic sleeve and a project identification sheet inserted. Arrange submittals numerically with specification sections identified on divider tabs. All required sections shall be submitted at one time.

1.06 PRODUCT SUBSTITUTION

A. Materials other than those specified may be approved for this project providing a written request is submitted to the Architect prior to bid in accordance with Instructions to Bidders. Requests shall include complete specifications, dimensions, manufacturer and catalog number for each item for which approval is desired. If, in the opinion of the Architect, the material is not complete or if it is not an acceptable substitute, he may reject it. The Architect’s evaluation will be based solely on the material submitted.

1.07 CHANGE ORDERS

A. All supplemental cost proposals by the Contractor shall be accompanied by a complete itemized breakdown of labor and materials without exception. At the Architect's request, the contractor's estimating sheets for the supplemental cost proposals shall be made available to the Architect. Labor must be separated and allocated for each item of work.

1.08 RECORD DOCUMENTS

A. Project Record (As-Installed) Drawings:
   1. Maintain a set of record drawings on the job site as directed in Division 1.
   2. Keep Drawings clean, undamaged, and up to date.
   3. Record and accurately indicate the following:
      a. Depths, sizes, and locations of all buried and concealed piping dimensioned from permanent building features.
      b. Locations of all valves with assigned tag numbers.
      c. Locations of all fire dampers and other airflow control devices.
      d. Changes, additions, and revisions due to change orders, obstructions, etc. Eradicate extraneous information.
      e. Model numbers of installed equipment.
   4. Make Drawings available when requested by Architect for review.
   5. Submit as part of the required Project Closeout documents. Final submittal will be in the form of reproducible drawings.
6. Quality of entire set of project record drawings to match the quality of the contract documents; quality to be judged by Architect. Computer-aided design drafting (CADD) shall be used to complete project record drawings. Use standards set in contract documents. Note field modifications, all addenda, and change order items on project record drawings. If deficiencies are found in either the quality or the accuracy of the drawings, they will be returned unapproved. Additional review of subsequent submissions shall be at the contractor's expense.

B. Operating and Maintenance Manuals: Submit five (5) sets of Operating and Maintenance Instructions, including manufacturer's service data, wiring diagrams, and parts lists and vendors for all serviceable items of equipment, valve charts, balancing data, final control diagrams showing final set points, and any additional equipment added by change order, bound in three-ring, vinyl or canvas covered, loose-leaf binders organized with index and thumb-tab markers for each classification of equipment or data. Comply with provisions of Section 01700 where applicable to the mechanical work.

C. Instruction Manual: Submit separate Instruction Manual 30 days prior to scheduling the required Instruction Period. Include the following:
   1. Description of each system and operational sequences.
   2. Seasonal system adjustments.
   3. Description and normal settings for time clocks, thermostats, fan and other motor switches, etc.
   5. Emergency measures upon system failure.

1.09 WARRANTY

A. Furnish, prior to application for final payment, three copies of written and signed guarantee effective a period of one year from date of completion and acceptance of entire project; agree to correct, repair and/or replace defective materials and/or equipment or the results of defective workmanship without additional expense to the Owner. Where no response satisfactory to the Owner has occurred within three working days from the written report of a warranty covered defect, the contractor shall agree to pay for the cost of repair of the reported defect by a contractor of the Owner's choice.

B. Where the manufacturer's guarantee exceeds one year, the longer guarantee shall govern and include the Contractor's labor.

PART 2 PRODUCTS

2.01 GENERAL

A. General: Provide all new materials and equipment, identical to apparatus or equipment in successful operation for a minimum of two years. Provide materials of comparable quality omitted here but necessary to complete the work. Maximum allowable variation from stated capacities, minus 5% to plus 10% as approved in each case.

B. Compatibility: Provide products which are compatible with other portions of the work and provide products with the proper or correct power and fuel-burning characteristics, and similar adaptations for the project.

C. Efficiency: Heating and cooling equipment shall comply with ASHRAE Standard 90.1-2001 and the State Energy Code. Where equipment efficiencies are indicated, the use of alternate or substitute manufacturer's equipment with lower efficiencies is not permitted.

D. Storage and Handling:
   1. Delivery: Deliver to project site with manufacturer's labels intact and legible.
   2. Handling: Avoid damage.
   3. Storage: Inside protected from weather, dirt and construction dust. Where necessary to store outside, elevate well above grade and enclose with durable, waterproof wrapping.
2.02 MOTORS

A. General: Motors shall conform to UL, CSA, and NEMA MG-1 and bear a permanently attached nameplate indicating compliance and motor characteristics. Provide motors meeting UL 507 standard where applicable.

B. Manufacturers: General Electric, Lincoln, Baldor, Wagner, Westinghouse, US Motors/Emerson or accepted substitute. Where selection of motor manufacturer is within Contractor's control (independent of equipment selection), provide motors produced by a single manufacturer to the greatest extent possible.

C. Temperature Rating: Class B insulation, except where otherwise indicated or required for service indicated.

D. Starting Capability: As required for service indicated, but not less than 5 starts per hour.

E. Phases and Current: 1/3 horsepower and smaller capacitor-start, capacitor-run single-phase; 1/2 horsepower and larger, squirrel-cage induction polyphase. Coordinate with actual current characteristics; specified in Division 16 and use no 230/460 voltage motors on 208 voltage power or vice versa.

F. Service Factor: 1.15 for polyphase; 1.25 for single-phase.

G. Construction: General purpose, continuous duty; NEMA design "B," except "C" for high starting torque applications.

H. Frames: For single phase motor sizes NEMA No. 48, except 56 for heavy-duty applications. NEMA "T" frames for 1 horsepower and larger polyphase motors. Special frame types as required for close coupled pumps and similar applications.

I. Bearings: Ball or roller, and design for thrust where applicable; double shielded and regreasable, except provide permanently sealed where not accessible for greasing. Sleeve-type bearings permitted only where indicated for fractional (1/6 hp or less) horsepower motors with direct drive loads. Minimum L-10 bearing life of 40,000 hours when used with minimum pitch sheaves per NEMA Table 14-1.

J. Enclosure Type: Unless otherwise indicated, open drip-proof for normal concealed indoor use, guarded where exposed to employees or occupants. Type II for outdoor use, except weather-protected Type I where adequately housed. Totally enclosed where explosion proof motors are required.

K. Overload Protection: Built-in thermal with internal sensing device for stopping motor, and for signaling where indicated on single phase motors.

L. Speed: Not faster than synchronous speeds of 1,800 RPM except on some pumps as approved in each case.

M. Efficiency: The manufacturer's highest (NEMA premium) efficiency motors tested under procedures recommended by NEMA MG-1 (IEEE Standard 112, Test Method B). Intermittent duty motors, operating less than 6 hours per day, shall comply with EPAct/EISA standards. Submit manufacturer's data if motor nameplate does not indicate minimum efficiency. Nominal full load efficiencies for 460 volt, 1,800 rpm motors:

<table>
<thead>
<tr>
<th>HP</th>
<th>Efficiency %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>87.5</td>
</tr>
<tr>
<td>2</td>
<td>89.5</td>
</tr>
<tr>
<td>3</td>
<td>89.5</td>
</tr>
<tr>
<td>5</td>
<td>89.5</td>
</tr>
<tr>
<td>7/2</td>
<td>91.0</td>
</tr>
<tr>
<td>10</td>
<td>91.7</td>
</tr>
<tr>
<td>15</td>
<td>93.0</td>
</tr>
<tr>
<td>20</td>
<td>93.0</td>
</tr>
<tr>
<td>25</td>
<td>93.6</td>
</tr>
</tbody>
</table>
N. Inverter Duty Motors: Where motors are controlled by an adjustable frequency drive, provide motors labeled “Inverter Duty,” complying with NEMA MG1-31, and meeting the requirements of the adjustable frequency drive manufacturer.

2.03 STARTERS AND SWITCHES

A. Manufacturers: General Electric, ITE, Allen Bradley, Square D, Cutler-Hammer, Cerus Industrial or accepted substitute. Provide starters by same manufacturer throughout project.

B. General: Provide each motor with starter or switch as approved and recommended by manufacturer of motor or equipment of which motor is a part.

C. Starter Characteristics: Type I general purpose enclosure with padlock ears and supports for mounting as indicated. Starter type and size as recommended by motor manufacturer. Use no starter smaller than NEMA Size 1.

D. Manual Switches: Provide on motors 1/3 horsepower and smaller except where automatic control or interlock is indicated. Include pilot light. Provide overload protection where not protected by internal motor overload protection.

E. Magnetic Starters: Provide for 1/2 horsepower and larger motors, and for smaller motors on automatic control or with interlock switch. Full voltage, across the line, single speed, non-reversing except where otherwise required. Include power on and running pilot lights, on-off-auto selector switch, external reset button, overload relay on each phase, and devices for coordination with control system (including fused transformer for control circuit). Provide automatic ambient temperature compensation for starter heaters.

2.04 GUARDS

A. Provide guards in accordance with State Safety Code and OSHA requirements over all rotating equipment including belts, shafts and couplings. Drive guards over belts and sheaves shall include 2-1/2" diameter access opening at shaft ends for speed counter.

2.05 DRIVES

A. Acceptable Manufacturers: Dayton, Gates, Browning.

B. General: "V" section belt drives, multiple as required. Provide variable pitch motor sheaves on all one or two belt drives and standard slide rails or approved means of adjustment for each motor with belt drive. Use standard section belts and no sheave smaller than cataloged industry standard; provide countersunk center on shaft ends to receive speed counter tip.

C. Selection: Size drive components based on 1.5 times installed motor horsepower. Where variable frequency drives are provided to modulate motor speed, select drives to allow application of full motor horsepower to the connected load at 60 hertz drive output, up to the maximum rated operating speed of the driven load.

2.06 ACCESS PANELS

A. Manufacturers: Inryco/Milcor, Bilco, Elmdor, Karp, Potter-Roemer or accepted substitute. Inryco/Milcor Style DW, K, or M panels as required by construction.

B. Construction: Flush style, fire rated in fire rated partitions and ceilings.

2.07 METERS AND GAUGES

A. General: Install meters and gauges where shown on the plans or specified elsewhere in these specifications.

B. Pressure-Temperature Test Plugs:
   1. ¼" or ½" NPT fitting of solid brass capable of receiving either an 1/8" OD pressure or temperature probe and rated for zero leakage from vacuum to 1000 psig. Neoprene valve core for temperatures to 200 deg. F., Nordel to 350 deg. F.
2. Provide for each test plug a pressure gauge adapter with 1/16” or 1/8” OD pressure probe.

3. Furnish a test kit containing one 2-1/2” dial pressure test gauge of suitable range, one gauge adapter with 1/16” or 1/8” OD probe and two 5” stem pocket test thermometers – one 0 to 220 degrees F and one 50 to 550 degrees F. Turn the kit over to the Architect.


C. Thermometers: Liquid-in-glass, adjustable stem, separable sockets, plus 40 to 240 degrees F range (unless indicated otherwise). Weiss numbers are listed. Equivalent Taylor, Trerice, Weksler or approved substitute.

1. Wide case (9”) in equipment rooms and all major equipment items. Weiss “9VS” series.
2. Narrow case (7”) in all other locations. Weiss “7VS” series.

D. Pressure Gauges: Install on suction and discharge of all pumps and where shown on Drawings 4-1/2” dial, 0-100 psig graduation pressure gauges with Ashcroft No. 1106 pulsation dampers and stop cocks. Weiss UGE-1 or equivalent Ashcroft, Marsh, Trerice, Weksler.

2.08 VALVES

A. General: Provide factory fabricated valves of the type, body material, temperature and pressure class, and service indicated. Bronze gate, globe and check valves shall comply with MSS-SP-80. Ball valves shall comply with MSS-SP-110. Iron gate and globe valves shall comply with MSS-SP-70. Iron check valves shall comply with MSS-SP-71. Butterfly valves shall comply with MSS-SP-67. Valve size same as connecting pipe size.

B. Acceptable Manufacturers: Milwaukee, Crane, Grinnell, Nibco, Hammond, Stockham, Legend, Apollo, Watts, and Walworth. Grooved end valves Victaulic, Tyco-Grinnell, Gruvlock, or accepted substitute. NIBCO numbers are given except as noted. Where possible, provide valves from a single manufacturer.

C. Valve Styles: See individual Division 23 sections for valve styles.

D. Butterfly Valve Operators: Locking lever for shut-off service; “Memory Stop” for lever handle with 10-position throttling plate for throttling service; gear operator with babbitt sprocket rim for chain-operated valves and gear operators on all 8” or larger valves.

E. Butterfly Valve Style: Lug-type with cap screws for all valves utilized for equipment isolation for servicing. Lug and grooved style valves shall be capable for use as isolation valves and recommended by manufacturer for dead-end service at full system pressure.

F. Insulated Valves: Install extended-stem valves in all piping specified as insulated, and arrange in the proper manner to receive insulation.

G. Multifunction Valves: Valves incorporating multiple functions including control valves, strainers, drain valves with retained caps, air vent valves, P/T ports, unions, pump flanges, check valves, and balancing valves are acceptable. Webstone, Nexus, Flow Design, Apollo, or accepted substitute.

H. Mechanical Actuators: Provide mechanical actuators with chain operators where indicated, where valves 4” and larger are mounted more than 7’ above the floor, and where manual operation is difficult because of valve size, pressure differential or other operating conditions. Drop chains to 6’-6” above the floor.

I. Selection of Valve Ends (Pipe Connections): Select and install valves with ends matching the types of pipe/tube connections.

2.09 HANGERS AND SUPPORTS

A. General: Provide factory-fabricated horizontal piping hangers, clamps, hanger rod, inserts, supports, etc., of the indicated MSS type and size. The Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry Practice SP-58 and SP-69 are referenced in this section.

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B. Manufacturers: B-Line, Carpenter & Paterson, Grinnell, Michigan, Superstrut, Tolco, Erico, or accepted substitute. Grinnell figure numbers in parentheses where applicable (or other manufacturers as noted).

C. Corrosion Protection: Provide materials which are zinc plated or factory painted to prevent corrosion. Prevent electrolysis in the support of copper tubing by the use of hangers and supports which are copper plated, plastic coated, or by other recognized industry methods.


E. Horizontal Piping Hangers and Supports:
1. Adjustable Clevis Hanger: MSS Type 1 (Fig. 260).
2. Adjustable Band Hanger: MSS Type 7 (Fig. 97), fabricated from steel.
3. Adjustable Swivel-Band Hanger: MSS Type 10 (Fig. 70).
4. Clamp: MSS Type 4 (Fig. 212, 216).
5. Double-Bolt Clamp: MSS Type 3 (Fig. 295A, 295H), including pipe spacers.
6. Adjustable Saddle-Support: MSS Type 36 (Fig. 258) and MSS Type 37 (Fig. 259), including saddle, pipe and reducer. Fabricate base-support from steel pipe and include cast-iron flange or welded-steel plate.
7. Channel Support System: Galvanized, 12 gauge channel and bracket support systems, single or double channel as indicated on the Drawings or as required by piping and equipment weights. Grinnell "Power Strut" channel. Acceptable Manufacturers: Super Strut, Globestrut, Bee, Kindorf or Unistrut.

F. Vertical Pipe Clamps:
1. Two-Bolt Riser Clamp: MSS Type 8 (Fig. 261).
2. Four-Bolt Riser Clamp: MSS Type 42 include pipe spacers at inner bolt-holes.

G. Hanger Attachment:
2. Turnbuckles: MSS Type 13 (Fig. 230).
3. Weldless Eye-Nut: MSS Type 17 (Fig. 290).
4. Malleable Eye-Socket: MSS Type 16 (Fig. 110R).
5. Clevises: MSS Type 14 (Fig. 299).

H. Building Attachments:
1. Concrete Inserts: MSS Type 18 (Fig. 282), steel or Grinnell Power-Strut PS349 continuous channel. Acceptable Manufacturers: Michigan Hanger, Globestrut, Unistrut, Super Strut.
2. Clamps: MSS Type 19 (Fig. 285, 281), Type 20, 21 (Fig. 225, 226, 131), Type 23 (Fig. 86, 87, 88), Type 25 (Fig. 227), Type 27 through 30 where applicable.

2.10 IDENTIFICATION MARKERS

A. Pipe Markers:
2. Acceptable Manufacturers: Brady B946 with arrow banding tape or similar Seaton, Zeston, MSI.

B. Duct Markers:
1. Adhesive duct markers 2¼"x14" with black text indicating contents on white background with directional flow arrow.
2. Acceptable Manufacturers: Brady B946 or similar Seaton, Zeston, MSI.

C. Nameplates:
1. Engraved nameplates, 1/16" thick, laminated 2-ply plastic, bottom ply white, outer ply black, letters formed by exposing bottom ply.
2. Size: 2" by 4" nameplates with 1/4" high letters.
D. Valve Tags:
1. 2” diameter, 18-gauge polished brass tags with 3/16” chain hole and 1/4” high stamped, black-filled service designation.
2. Acceptable Manufacturers: Seaton, Brady, MSI.

2.11 CONCRETE FOR MECHANICAL WORK

A. Classes and Applications: Provide strength classes with the following cement content and water/cement ratios for the indicated applications and similar required applications:
1. 4000 psi Class: 565 pounds cement/yard (6.0 sacks); 0.57 water/cement ratio. Provide 4000 Class for tanks, vaults, beam-type foundations and similar structures.
2. 3000 psi Class: 500 pounds cement/yard (5.25 sacks); 0.68 water/cement ratio. Provide 3000 Class for miscellaneous underground structural concrete, reinforced encasement, block type foundations (with smallest dimension at least 0.2 times largest dimension), curbs, pads, inertia blocks (unframed type), and similar structural support work.
3. 2500 psi Class: 450 pounds cement/yard (4.75 sacks); 0.75 water/cement ratio. Provide 2500 Class for plain encasement, thrust blocks, filling steel-framed units, and similar work.
4. Rough Grouting Class: 565 pounds cement/yard (6.0 sacks); 0.75 water-cement ratio; adjust aggregate sizes to facilitate placement. Use for rough grouting, not for setting equipment bases.
5. Backfill Class (Lean Concrete): 375 pounds cement/yard (4.0 sacks); 0.87 water/cement ratio. Use for filling where excavations are extended below point of support for mechanical work.

2.12 PENETRATION FIRE STOPPING

A. Through-penetration fire stopping system tested and listed by Underwriters Laboratories. 3M, Metacaulk, SpecSeal, or approved.

B. Select system for proper application based on wall construction, type of penetrating item, wall rating, etc.

PART 3 EXECUTION

3.01 LAYOUT AND COORDINATION

A. Site Examination: Before starting work, carefully examine site and all contract Drawings. Become thoroughly familiar with conditions governing work on this project. Verify all indicated elevations, building measurements, roughing-in dimensions and equipment locations before proceeding with any of the work.

B. Utility Locations: The location of existing utilities, wires, conduits, pipes, ducts, or other service facilities are shown in a general way only on the Drawings and are taken from existing records. Ascertain whether any additional facilities other than those shown on the plans may be present and determine the exact location and elevations of all utilities prior to commencing installation.

C. Sleeves, Inserts, Cast-in-Place Work: Provide sleeves, inserts, anchoring devices, cast-in-place work, etc. which must be set in concrete sequenced at the proper time for the project schedule.

D. Coordination:
1. The drawings are based on equipment of a certain manufacturer and may be identified as such. Where alternate manufacturers or approved substitutes are incorporated into the work, any required design changes are the responsibility of the contractor. Such changes may include changes in utility or system connection sizes, location, or orientation, service clearances, structural support or acoustic considerations.
2. Where the work must be sequenced and positioned with precision in order to fit into the available space, prepare accurate scale shop drawings showing the actual physical dimensions required for the installation and submit prior to purchase/fabrication/installation of any of the elements involved in the coordination.
3. Cooperate with other trades in furnishing material and information for sleeves, bucks, chases, mountings, backing, foundations and wiring required for installation of mechanical items.
4. Coordinate all work with other trades and determine in advance where interfacing of the mechanical work and other work are required to be connected together. Provide all materials and equipment to make those connections. Submit shop drawings showing required connections where special conditions exist.

E. Discrepancies: Report immediately any error, conflict or discrepancy in Plans, Specifications and/or existing conditions. Do not proceed with any questionable items of work until clarification of same has been made. Should rearrangement or re-routing of piping be necessary, provide for approval the simplest layout possible for that particular portion of the work.

3.02 UTILITY COORDINATION

A. Utility Coordination: Coordinate all aspects of the incoming utility services indicated with the city engineer, serving utility, and the off-street improvements contractor. Requirements of the utility company which exceed the provisions made on the Drawings or covered by these Specifications shall take precedence. Provisions made on the Drawings or Specifications in excess of the utility company's requirements shall take precedence. No additional compensation will be allowed the contractor for connection fees or additional work or equipment not covered in the Drawings or Specifications which are a result of policies of the serving utilities.

3.03 CONTINUITY OF EXISTING SERVICES

A. Existing water, power, heat, ventilation, air conditioning and other services shall remain in service during new construction work. Coordinate any interruption of these services with the Owner's representative a minimum of twenty-four (24) hours in advance. Arrange work to minimize number and extent of all interruptions.

B. Protect from damage active utilities existing and evident by reasonable inspection of the site whether shown or not on the Drawings. Protect, relocate or abandon utilities encountered in the work which are not shown on the Drawings or evident by inspection of the work as directed by the Architect. Maintain continuity of all utility services to existing buildings.

C. All necessary service interruptions of utilities shall be scheduled with the Director of Physical Plant. Minor interruptions will require a minimum of forty-eight (48) hours prior notification. Major shut down of any utility is to be scheduled between the hours of 5:30 p.m. and 6:00 a.m. and will require a minimum of seven (7) days prior notice.

3.04 MECHANICAL EQUIPMENT WIRING

A. Provide all mechanical equipment motors, automatic temperature, limit, float and similar control devices required, with wiring complete from power source indicated on Electrical Drawings.

B. Provide properly rated motor overload and undervoltage protection and all manual or automatic motor operating devices for all mechanical equipment.

C. Equipment and systems shown on the Drawings and/or specified, are based upon requirements of specific manufacturers which are intended as somewhat typical of several makes which may be approved. Provide all field wiring and/or devices necessary for a complete and operable system including controls for the actual selected equipment/system.

D. Provide all starters for mechanical motors. Review Electrical Specifications and Drawings to determine which mechanical motor starters will be provided under the Electrical Specification Sections and provide all others.

3.05 GENERAL INSTALLATION

A. Locating and Positioning Equipment: Observe all Codes, Regulations and good common practice in locating and installing mechanical equipment and material so that completed installation presents the least possible hazard. Maintain adequate clearances for repair and service to all equipment and comply with Code requirements.
B. Arrangement: Arrange piping parallel with primary lines of the building construction, and with a minimum of 7' overhead clearance in all areas where possible. Unless indicated otherwise, conceal all piping. Locate operating and control equipment properly to provide easy access, and arrange entire mechanical work with adequate access for operation and maintenance. Give right-of-way to piping which must slope for drainage. Set all equipment level or as recommended by manufacturer. Under no conditions shall beams, girders, footings or columns be cut for mechanical items. Casting of pipes into concrete is prohibited unless so shown on Drawings.

C. Drip Pans: Provide drip pans under all above ceiling in-line pumps and cooling coils. Locate pan immediately below piping and equipment, and extend a minimum of 6" on each side and lengthwise 18" beyond equipment being protected. Fabricate pans 2" deep, of reinforced 20 gauge galvanized sheet metal with watertight seams and rolled or hemmed edges. Provide 3/4" drainage piping, properly discharged to over floor drain or as shown on the Drawings. Comply with Mechanical Code for overflow protection and pipe sizing.

D. Access Panels: Provide access panels with proper backing reinforcement for all equipment, dielectric unions, valves and items requiring service and installed above ceilings, behind walls, or in furring, complete with correct frame for type of building construction involved. Exact size, number and location of access panels are not necessarily shown on Drawings. Use no panel smaller than 12" by 12" for simple manual access or smaller than 16" x 20" where personnel must pass through.

E. Adjusting: Adjust and calibrate all automatic mechanical equipment, temperature controls, float devices, etc. Adjust flow rates at each piece of equipment or fixture.

F. Building Vapor Barrier: Wherever the building insulation vapor barrier is penetrated by piping, hangers, conduits, etc., provide clear self-adhesive tape recommended by the insulation manufacturer around the penetrations.

G. Concrete Work: Coordinate with other work, particularly other concrete work and accessories. Comply with applicable provisions of Section 03310 for mechanical work concrete, including formwork, reinforcement, mix design, materials (use mix designs and materials accepted for Division 3 work where possible), admixtures, accessories, (including waterstops), placing of wet concrete, finishing, curing, protecting, testing, submittals and other requirements of the concrete work.

H. Housekeeping Pads: Construct minimum 3" thick with chamfered edges using 3000 psi concrete. Provide #4 reinforcing bars 8" on center in each direction and within 4" of each edge, centered in pad thickness. Provide 1/2" dowel with 3" embedment into floor slab for each 2 square feet of pad area. Dowels and equipment anchor bolts shall be spaced a minimum of 6" from pad edges.

3.06 VALVE INSTALLATION

A. General: Comply with the following requirements:
   1. Install valves where required for proper operation of piping and isolation of equipment, including valves in branch lines where necessary to isolate sections of piping, and where shown on the drawings. Install valves at low points in piping systems that must be drained for service or freeze protection.
   2. Locate valves in accessible spaces (or behind access panels) and so that separate support can be provided when necessary.
   3. Install valves with stems pointed up, in the vertical position where possible, but in no case with stems pointed downward from a horizontal plane.

B. Insulated Valves: Install extended-stem valves in all piping specified as insulated, and arrange in the proper manner to receive insulation.

C. Valve Access: Provide access panels to all valves installed behind walls, in furring or otherwise inaccessible.

D. Lubricant-Seal: Select and install plug valves with lubricant-seal except where frequent usage is indicated or can be reasonably expected to occur.
3.07 INSTALLATION OF HANGERS AND SUPPORTS

A. General: Proceed with the installation of hangers, supports and anchors only after the required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) the proper placement of inserts, anchors and other building structural attachments.

1. Install hangers, supports, clamps, and attachments to support piping and equipment properly from the building structure. Use no wire or perforated metal to support piping, and no supports from other piping or equipment. For exposed continuous pipe runs, install hangers and supports of the same type and style as installed for adjacent similar piping.

2. Prevent electrolysis in the support of copper tubing by the use of hangers and supports which are copper plated or by other recognized industry methods.

3. Support fire sprinkler piping independently of other piping and in accordance with NFPA Pamphlet 13.

4. Arrange supports to prevent eccentric loading of joists and joist girders. Locate supports at panel points only.

B. Provisions for Movement:

1. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends and similar units. Install specified seismic restraints to restrict excessive movement.

2. Install hangers and supports so that equipment and piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

3. Install hangers and supports to provide the indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded. Comply with the following installation requirements:

   a. Clamps: Attach clamps, including spacers (if any), to piping outside the insulated piping support. Do not exceed pipe stresses allowed by ANSI B31.

   b. Insulated Pipe Supports: Insulated pipe supports shall be supplied and installed on all insulated pipe and tubing.

   c. Load Rating: All insulated pipe supports shall be load rated by the manufacturer based upon testing and analysis in conformance with ASME B31.1, MSS SP-58, MSS SP-69 and MSS SP-89.

   d. Support Type: Manufacturer's recommendations, hanger style and load shall determine support type.

   e. Insulated Piping Supports: Where insulated piping with continuous vapor barrier or where exposed to view in finished areas is specified, install hard maple wood insulation shields (Elcen Fig. 216) or steel pipe covering protection shields (MSS type 39) at each hanger.

C. Pipe Support:

1. Vertical Spacing: Support at base, at equivalent of every floor height (maximum 10' as required by Code) and just below roof line.

2. Screwed or Welded Steel or Copper Piping: Maximum hanger spacing shall be as follows:

<table>
<thead>
<tr>
<th>Size</th>
<th>Steel</th>
<th>Copper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/4&quot; and smaller</td>
<td>7' span</td>
<td>6' span</td>
</tr>
<tr>
<td>1-1/2&quot; pipe</td>
<td>9' span</td>
<td>6' span</td>
</tr>
<tr>
<td>2&quot; pipe</td>
<td>10' span</td>
<td>10' span</td>
</tr>
<tr>
<td>2-1/2&quot; &amp; larger</td>
<td>12' span</td>
<td>10' span</td>
</tr>
</tbody>
</table>

3. Polyvinyl Chloride, Polypropylene and Other Plastic Pipe: Maximum hanger spacing and minimum rod diameters as follows:

   a. Continuous support 1/2" to 4" pipe size Fee & Mason No. 109 channels with Fee & Mason No. 108 hanger. Lay pipe directly into the channel with fittings or couplings placed in spaces between channel sections. Secure piping to the channel at intervals between hangers with a few turns of vinyl electrical tape.

   b. Non-Continuous Support: Maximum 4' spans or shorter if required by manufacturer for temperatures and pipe schedule.
c. Arrange supports to allow free movement, but restrict upward movement of lateral runs so as not to create reverse grade on drainage pipe. Use double bolt clamp or band hanger with restraint (Tolco fig. 25).

4. Install additional hangers or supports at concentrated loads such as pumps, valves, etc. to maintain alignment and prevent sagging.

5. Support Rod: Hanger support rods sized as follows:

<table>
<thead>
<tr>
<th>Pipe and Tube Size</th>
<th>Rod Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feet to Feet</td>
<td>Inch</td>
</tr>
<tr>
<td>1/2” to 4”</td>
<td>12.7</td>
</tr>
<tr>
<td>5” to 8”</td>
<td>27.0</td>
</tr>
<tr>
<td>10” to 12”</td>
<td>254.0</td>
</tr>
</tbody>
</table>

D. Adjust hangers and supports to bring piping to proper levels and elevations.

E. Provide all necessary structural attachments such as anchors, beam clamps, hanger flanges and brackets in accordance with MSS SP-69. Attachments to beams wherever possible. Supports suspended from other piping, equipment, metal decking, etc., are not acceptable.

F. Horizontal banks of piping may be supported on common steel channel member spaced not more than the shortest allowable span required on the individual pipe. Maintain piping at its relative lateral position using clamps or clips. Allow lines subject to thermal expansion to roll axially or slide. Size channel struts for piping weights.

G. Installation of drilled-in concrete anchors shall comply with the manufacturer’s instructions for working load, depth of embedment, and spacing between anchors and from the edge of the slab. Use only wedge-style anchors.

H. Seismic Restraints: Install restraints where recommended in SMACNA “Seismic Restraint Manual” and as required by code. Show analysis of supporting structure, anchorages, and restraints in accordance with OSSC Section 1613 and reference ASCE standard. Seismic restraint system components shall be approved by the California Office of Statewide Health Planning and Development (OSHPD). Acceptable Manufacturers: Amber/Booth, Mason Industries, Tolco, or approved.

3.08 HVAC SYSTEM IDENTIFICATION

A. Piping System: Indicate each pipe system by its generic name (abbreviated) as shown/scheduled/specifed. Comply with ANSI A13.1 for marker locations, letter sizes, and colors. Include arrows to show direction of flow and “Electric Traced” signs to identify heat cable wrapped piping. Locate pipe labels in accessible areas as follows:
   1. Near each valve, meter, gauge, or control device.
   2. Near equipment such as pumps, heat exchangers, water heaters, etc.
   3. At piping branch connections.
   4. At penetrations (each side) of walls, ceilings, and floors.
   5. At access panels and doors.
   6. At 25 foot maximum intervals. Provide a minimum of one label above each room where lift-out ceiling is installed. Reduce intervals in congested areas such as mechanical rooms.

B. Valve Identification: Tag all valves with brass disc and chain. Prepare valve charts indicating valve number, size, location, function and normal position. Use no duplicate numbers in Plumbing and Heating systems. Mount glazed frames containing one set of valve charts in the building mechanical room.

C. Equipment: Provide engraved plastic-laminate signs at locations of major equipment such as heat exchangers, pumps, etc. Identify equipment in field same as on drawings. Permanently mount in an appropriate and effective location.

D. Operation Tags: Where needed for proper and adequate information on operation and maintenance of mechanical systems, provide tags of plasticized card stock, either pre-printed or hand printed to convey the message; example: "DO NOT CLOSE THIS VALVE EXCEPT WHEN THE PUMP IS OFF."
3.09 EQUIPMENT CONNECTIONS

A. Provide complete connections for all items of equipment requiring such connections, including incidental piping, fittings, trim and labor necessary for a finished working installation.

B. Verify the rough-in and finish requirements for all equipment provided under other Divisions of the work and requiring HVAC piping or duct connections with equipment supplier and installer prior to rough-in.

3.10 PROTECTION

A. Protect all work and materials against loss or damage. Close all pipe openings with caps or plugs. At final completion, thoroughly clean and deliver all work and equipment in an unblemished new condition. Keep all motors and bearings in watertight and dustproof covers during entire course of installation.

B. Protect floors, walls, framing and sheathing where pipe cutting and threading operations are conducted with plastic sheathing under plywood sheets. Extend plastic sheathing beyond the plywood. Clean-up metal cuttings, oil, etc., daily or as necessary to prevent debris from being tracked beyond the protected area. Damages, as determined by the Architect, due to the pipe cutting/threading operation shall be repaired by the responsible trade.

3.11 PIPE PENETRATION FIRE STOPPING

A. Install as recommended by manufacturer and in accordance with the product’s UL listing. Below are the minimum installation requirements.
   1. Install specified penetrating item(s) with required annular spacing in proper size wall or floor opening. Support penetrating item(s) adequately on both sides of construction.
   2. Clean all opening and penetrating item surfaces in penetration area to remove loose debris, dirt, oil, wax, grease, old caulking, etc.
   3. If needed or required for gypsum or concrete block walls, install specified galvanized steel wire mesh or sleeve recessed and centered inside wall around penetrating item(s) so that it is snug against perimeter of opening.
   4. When required, install specified type and depth of backing material in annular space, recessed to required fill depth of fire stopping caulking.
   5. Gun, trowel, and/or pump fire stopping sealant to specified depth in annular space around penetrating item(s). Trowel sealant surfaces flush with wall or floor surfaces to a smooth, defect-free finish. Where required, apply specified size caulking bead around penetrating item(s) at zero annular contact areas and tool smooth.

3.12 MECHANICAL PAINTING

A. Minimum Requirements: Comply with minimum requirements of Division 9, Painting. All mechanical equipment, piping, insulation, etc., exposed in finished areas, storage rooms and other locations except mechanical equipment rooms will be painted under Section 09 90 00.

B. Painting Materials: Materials shall comply with Section 09 90 00, Painting and shall be compatible with the material to be painted.

C. Uninsulated Piping: Paint black or galvanized uninsulated piping located buried in ground, in concrete or masonry one (1) coat acid-resisting black paint. Paint black or galvanized uninsulated piping in moist equipment rooms, crawl spaces without vapor barriers, or exposed to weather one (1) coat black asphaltum varnish.

D. Iron Work: Paint hangers, rods, anchors, guides, threads of galvanized pipe, bases, supports, uncoated sheet metal and other iron work without factory finish, exposed to weather, located in moist concealed spaces and moist equipment rooms, one coat acid-resisting black paint. Apply one (1) coat Dixon’s Aluminum Graphite No. 209 paint over the (1) coat primer as recommended by paint manufacturer to all hot metal surfaces.
E. Piping in Mechanical Room: All insulated and uninsulated piping exposed in mechanical equipment rooms shall be painted. Painting is not required for cast iron, plastic, or glass waste piping, or for stainless steel piping, PEX tubing and soft copper tubing. Contractor shall submit proposed colors for approval. In lieu of painting, insulated piping may be covered with colored PVC insulation jacketing as specified in Section 23 0700, HVAC Insulation.

F. Insulated Piping and Other Insulated Surfaces: Paint insulated piping in half-round, split tile, or other inaccessible locations, one (1) coat asphalt emulsion.

3.13 TEMPORARY HEATING AND COOLING

A. Comply with requirements of Section 01500.

B. Permanent mechanical systems' equipment utilized for temporary heating, ventilating and cooling shall be started with all controls and safeties installed and operational. Start-up shall be done by a factory approved mechanic only.

C. Owner's warranties shall not be abridged by contractor's use of the permanent systems' equipment prior to final acceptance. Warranty period shall begin at final completion.

3.14 HVAC WORK CLOSEOUT

A. General: Refer to the Division 1 sections for general closeout requirements. Calibrate all equipment requiring same. Complete each system as shown or specified herein and place in operation except where only roughing-in or partial systems are called for. Each system shall be tested and left in proper operation free of leaks, obstructions, or contamination.

B. Record Drawings: Submit record set of drawings required in Section 01300, Submittals, or as previously specified in this Section.

C. Closeout Equipment/Systems Operations: Sequence operations properly so that work of project will not be damaged or endangered. Coordinate with seasonal requirements. Operate each item of equipment and each system in a test run of appropriate duration with the Architect present, and with the Owner's operating personnel present, to demonstrate sustained, satisfactory performance. Adjust and correct operations as required for proper performance. Clean and lubricate each system and replace dirty filters, excessively worn parts and similar expendable items of the work.

D. Operating Instructions: Conduct a walk-through instruction seminar for the Owner's personnel who are to be involved in the continued operation and maintenance of the HVAC equipment and systems. Provide written instructions outlining and explaining the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar features of the systems.

END OF SECTION
PART 1 GENERAL

1.01 DESCRIPTION
A. The requirements of this section apply to the vibration isolation for mechanical equipment specified elsewhere.

1.02 QUALITY ASSURANCE
A. Isolator Engineering: Selected and furnished by the equipment manufacturer. Select isolators for 98% efficiency unless indicated otherwise on the Drawings.
B. Manufacturer: Provide field installed isolation required from a single manufacturer where possible.

1.03 SUBMITTALS
A. Provide product data sheets on all vibration isolators and seismic restraints.
B. Provide itemized list showing the items of equipment or piping to be isolated, isolator type and model number selected, isolator loading and deflection, and reference to specified drawings showing frame and construction.
C. Provide manufacturer's drawings showing equipment frame construction for each item including dimensions, structural member sizes and support locations.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
B. Manufacturer Model Numbers: Amber/Booth figure numbers are listed unless indicated otherwise.

2.02 VIBRATION ISOLATORS
A. Types of Isolators:
   1. Open Spring: Series S.
   2. Housed Spring: Type CT.
   3. Hanger with Spring and Rubber Stop: Type BSR.
   4. Rubber-in-Shear: Types RV and RVD.
   5. Seismic Restraints: Mason Z-1011.
B. Spring Selection: Free standing, stable type with a one-to-one ratio on springs with deflections in excess of one inch. Provide with rails where indicated.
C. Noise and Vibration Barrier Hanger: For ductwork and piping where indicated. Target Enterprises Inc. "ARH-1" or accepted substitute.
D. Seismic and Start-Up Restraints: Select all isolators to withstand seismic loads equivalent two times the isolator load rating applied from any direction. Mason Industries type Z-1011 on all isolated equipment not utilizing isolators with integral restraints.
E. Flexible Pipe Connectors - Type SS: All stainless steel hose and braid with carbon steel connections. Male thread ends on flexible connectors 2" and smaller, and flanged connections on 1-1/2" and larger connectors.

2.03 EQUIPMENT FRAMES
A. Rigid Steel:
1. Mounting Frames and/or Brackets: Designed to carry the load of the equipment without causing mechanical distortion or stress to the equipment.

2. Welded Mounting Frames: I-beam or channel structural steel, with welded brackets to accept the isolators. Type SW.

PART 3 EXECUTION

3.01 INSTALLATION

A. General: Install vibration isolators and flexible connectors as specified herein, as shown on the Drawings and as recommended by manufacturer.

B. Duct Connections: Install flexible duct connections on all externally spring isolated air handling units including roof mounted units down through roof curbs (and/or to unit side duct connections).

C. Flexible Pipe Connections:
   1. Provide flexible connections on all piping to spring isolated equipment, where indicated on Drawings and for all coils mounted in spring isolated air handling units or plenums. Coils in rigid units and plenums do not require flexible connectors. Provide a flexible connection in both the supply and return connections to the coil as near the coil as possible.
   2. Install connectors in a straight line as recommended by the manufacturer without offsets or twists and support pipe without any load on flexible connectors. Minimum live length shall be as follows:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Minimum Live Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot; through 1-1/2&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>2&quot; through 2-1/2&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>3&quot; through 4&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>Over 4&quot;</td>
<td>18&quot;</td>
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</tbody>
</table>

D. Anchorage: Anchor all isolators to the floor, wall or ceiling structure and anchor points reinforced where necessary. Anchor bolts, cap screws, etc., shall not be continuous through the isolator such that vibrations are transmitted to the structure.

E. Adjustment: Adjustable during and after installation, to ensure sufficient clearance between vibration isolation element and rigid restraining device. Do not install isolators until they have been loaded and adjusted to achieve the specified static deflection and clearances.

F. Housekeeping Pads: Construct minimum 3" thick with chamfered edges using 3000 psi concrete. Provide #4 reinforcing bars 8" on center in each direction and within 4" of each edge, centered in pad thickness. Provide ½" dowel with 3" embedment into floor slab for each 2 square feet of pad area. Dowels and equipment anchor bolts shall be spaced a minimum of 6" from pad edges.

3.02 EQUIPMENT RESTRAINTS

A. All equipment shall be anchored to resist displacement including sliding, swinging, and overturning due to seismic forces. Friction due to equipment weight shall not be considered as anchorage.

B. Contractor shall submit shop drawings showing seismic restraint design for all equipment weighing 400 lbs. or more. Design shall show analysis of supporting structure, anchorages, and restraints in accordance with UBC Section 1630.

END OF SECTION
PART 1  GENERAL

1.01 DESCRIPTION

A. Work Included: After completion of the work of installation, test and regulate all components of the new heating, air conditioning and ventilating systems to verify air volumes and heating-cooling flow rates indicated on the Drawings.

B. Related Work: The requirements of Section 23-0500, Common HVAC Materials and Methods, also apply to this section.

C. Balancing Organization:
   3. Provide all necessary personnel, equipment, and services.

1.02 SUBMITTALS

A. Balancing Data: Include the following minimum information in the Operation and Maintenance Data, as specified in Section 23-0500.
   1. Names or initials of personnel performing the balancing.
   2. Dates balancing was performed.
   3. List of balancing instruments utilized.
   4. Weather conditions at the time of the test.
   5. Mechanical system descriptions.
   6. All motor rated voltages, amps, starter and overload protective device sizes.
   7. All motor operating data.
   8. Fan cfm, rpm, operating static pressures, driven and motor sheave data, and all drive changes necessitated to obtain design capacities. List actual minimum outside air volumes measured for each system.
   9. Type and size of filters installed in each filter bank.
   10. All supply, return and exhaust air outlet cfm readings.
   11. Electric heating elements voltage and amperage for each stage of heat.

1.03 DETAILED REQUIREMENTS

A. Adjusting and Balancing:
   1. Mechanic's Duties: Include demonstrating that the system is functioning and operable, start and stop the fan, make drive changes, clear system blockages and repair any defective and/or leaking portions of the system which may affect system performance.
   2. Prior to beginning the balancing work, obtain from the Architect the latest version of the mechanical drawings including addenda, revisions, change orders, etc.
   3. Adjust and balance all portions of the mechanical systems to produce indicated results within limits of minus 5 or plus 10 percent or as subsequently directed by the Architect.
   4. Balancing data may be spot checked with instruments similar to that used by the balancing firm.
   5. If, in the judgment of the Architect, the discrepancies warrant additional adjustment, readjust and rebalance the systems at no additional project cost.
   6. Adjust diffuser throws as shown on the drawings (shown as directional arrows)
   7. Set outside air intake dampers to modulate between min occupancy setting and max occupancy setting (as specified on drawings) as CO2 levels rise from minimum set point to maximum set point (as specified on drawings).

END OF SECTION
PART 1 GENERAL

1.01 DESCRIPTION
A. The requirements of this section apply to the insulation of mechanical equipment specified elsewhere in these specifications.
B. Related Work: The requirements of Section 23 0500, Common HVAC Materials and Methods, also apply to this section.

1.02 QUALITY ASSURANCE
B. Composite (Insulation, Jacket or Facing and Adhesives) Fire and Smoke Hazard Ratings: Not to exceed a flame spread of 25 or smoke development of 50 and containing less than 0.1% by weight deca-PDE fire retardant.
C. Component Ratings of Accessories (Adhesives, Mastics, Cements, Tapes, Finishing Cloth for Fittings): Same as "B" requirements above and permanently treated. No water soluble treatments.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING
A. General: In addition to the requirements specified in Section 23 0500, the following apply:
   1. Deliver insulation, coverings, cements, adhesives and coatings to the site in factory-fabricated containers with the manufacturer's stamp or label affixed showing fire hazard ratings of the products. Store insulation in original wrappings and protect from weather and construction traffic.
   2. Protect insulation against dirt, water, chemical and mechanical damage. Do not install damaged insulation. Remove such insulation from project site.

1.04 SUBMITTALS
A. Submit catalog data and performance characteristics for each product specified.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
A. Insulating Manufacturers: Johns Manville, Knauf, Armstrong, Owens-Corning, Pittsburgh Corning, Pabco, Imcoa, Nomaco, or Certain Teed. Johns Manville products are listed unless indicated otherwise.
B. Adhesive Manufacturers: Foster, 3M, Insul-Coustic, Borden, Kingco or Armstrong.

2.02 PIPING INSULATION
A. Interior and Exterior Piping Systems 50 to 850 Deg. F: Glass fiber preformed pipe insulation with a minimum K-value of 0.23 at 75 Deg. F, a minimum density of 3.5 pounds per cubic foot within all-service vapor barrier jacket containing less than 0.1% by weight deca-PDE fire retardant, vinyl or pre-sized finish and pressure sensitive seal.
B. Exterior Installations: Same as for interior installations except 0.016" aluminum finish jacket or, in coastal environments, 0.01" stainless steel.
2.03 DUCT INSULATION

A. Interior Above Grade Ductwork: Glass fiber formaldehyde-free blanket with "FSK" facing containing less than 0.1% by weight deca-PDE fire retardant, k value = 0.31 at 75 deg. F, 0.2 perms, and UL 25/50 surface burning rating. Johns Manville "Microlite."

B. Below Grade Ductwork: Insulate with foamed-in-place urethane insulation.

C. Exterior Above Grade Ductwork: Glass fiber board with "FSK" facing containing less than 0.1% by weight deca-PDE fire retardant, 3 pound density, k value of 0.23 at 75 deg. F and 0.2 perms. Install with 0.016" aluminum jacket. Johns Manville 800 Series Spin-Glas.

2.04 EQUIPMENT INSULATION

A. Equipment Temperatures Below 70 Deg. F: Flexible, closed cell, elastomeric sheet insulation of 5.5 #/cubic feet density and 0.27 thermal conductivity at 75 deg. F. Armstrong "Armaflex."

B. Equipment Temperatures From 70 to 450 Deg. F: Glass fiber 3 pound density insulation with a 0.23 thermal conductivity at 75 deg. F. Johns Manville "814 Spin-Glas" with "FSK" jacket containing less than 0.1% by weight deca-PDE fire retardant or finished as recommended by manufacturer.

C. Equipment Temperatures From 350 to 1200 Deg. F: Molded high temperature calcium silicate minimum 12.5 pound density and 0.4 thermal conductivity at 200 deg. F mean temperature. Glass cloth finish, Claremont Diplag or finished as recommended by insulation manufacturer.

D. Exterior Tanks and Equipment Insulation Covering: Same as interior insulation with weatherproof metal or finished as recommended by insulation manufacturer.

2.05 INSULATION ACCESSORIES

A. Insulation Compounds and Materials: Provide rivets, staples, bands, adhesives, cements, coatings, sealers, welded studs, etc., as recommended by the manufacturers for the insulation and conditions specified except staples not permitted on chilled water lines.

B. Interior Tanks and Equipment Insulation Covering: Finished metal jacket or as recommended by the manufacturer for insulation material specified.

C. PVC Protective Jacketing and Valve and Pipe Fitting Covers: Johns Manville Zeston 2000, Proto LoSmoke, or Ceel-Co Ceel-Tite 100 Series with precut fitting fiberglass insulation or approved.

D. Jacket Lap Sealing Adhesives: Foster Drion 85-75 contact cement or approved substitute.

E. Removable/Reusable Insulation Covers:
HVAC INSULATION
23-0700 - Page 3

1. 200 to 600 Deg. F Insulation Filler: Install 2-1/4# - 4#/cu. ft. glass fiber, 6# - 8#/ cu. ft. mineral wool or glass fiber/type E felted (9#/cu. ft.) flexible blankets and pads for large, irregular shaped equipment such as pump casings, bolting flanges, etc. For small common shapes such as valves, elbows, flanges, etc., install preformed flexible glass fiber pipe wrap, preformed glass fiber pipe covering or glass fiber/type E felted (9#/cu. ft.) insulation.

2. 600 - 1000 Deg. F Insulation Filler: Install 4# - 8#/cu. ft. refractory fiber felted, 8# - 10#/ cu. ft. mineral wool or glass fiber/type E felted (9#/cu. ft.) flexible blankets and pads. Install mineral wool pipe wrap, glass fiber/type E felted (9#/cu. ft.), laminated refractory fiber (4# - 6#/cu. ft.) with flexible glass fiber wrap or refractory (ceramic) fiber (6#/cu. ft.) preformed insulation.

3. Over 1000 Deg. F Insulation Filler: Install refractory (ceramic) fiber (6# - 8#/cu. ft.) blanket or pad insulation or 6#/cu. ft. preformed insulation.

4. Encasement, 200 to 600 Deg. F: Glass fiber cloth plain or silicon coated on both sides, knitted stainless steel mesh, glass fiber cloth laminate with aluminum, or stainless steel foil or hex wire mesh.

5. Encasement, 600 to 1000 Deg. F: Glass fiber cloth with stainless or monel wire insertion, knitted stainless steel mesh, or glass fiber cloth laminated with stainless steel foil.

6. Encasement, Over 1000 Deg. F: Refractory cloth with nickel or inconel wire insertion, knitted inconel mesh or ceramic cloth with nickel wire insertion.

7. Cold Encasement: Glass fiber cloth silicon coated both sides, knitted stainless steel mesh, glass fiber cloth laminate with aluminum or stainless steel foil or glass fiber cloth with nickel wire insertion, silicon coated both sides.

8. Stitching, 200 to 600 Deg. F: Glass fiber thread/PVC coated, staples - galvanized or stainless steel, galvanized or stainless steel hog rings, 0.010" - 0.15" dia/dead soft stainless steel wire.

9. Stitching, 600 Deg. F: Same as 200 to 600 Deg. F above except no galvanized staples or rings and PVC coated thread to 850 deg. F.

10. Attachments and Securements:
   a. Quilting: Stainless 2-hole washers, both sides with twisted 0.035" - 0.051" wire loops, 12 ga. stainless spindle/washer/ speed clip assembly or stainless 0.035" - 0.051" wire loops.
   b. Lacing and Hooks: Stainless 2-hole 12 gage bent wire lacing hooks, stainless 2-hole dished washer assembly with twisted 0.035" - 0.051" wire loops, 12 gage stainless spindle washer with built-in hook and speed clip or stainless 1-hole dished and flat washer riveted through the cloth.

PART 3 EXECUTION

3.01 PIPING INSULATION

A. General: Do not insulate underground piping except at joints and fittings on preinsulated piping unless indicated otherwise.

B. Domestic Water Piping:
   1. Insulate with glass fiber pipe covering, 1" thick for cold water piping and for 1" and smaller hot water piping; 1-1/2" for 1-1/4" and larger hot water piping.
   2. At contractor’s option and in accordance with Part 2 of this section, elastomeric insulation may be installed on domestic water piping in thicknesses equivalent to the glass fiber insulation. Installation shall comply with the manufacturer’s recommendation with joints and seams completely sealed. Insulate hot water return piping same as cold water piping.

C. Interior Rain Drains:
   1. Concealed: Insulate with 1" thick one pound density glass fiber blanket and continuous vapor barrier jacket.
   2. Exposed: Insulate with 3.5 pound density glass fiber insulation with continuous vapor barrier jacket.

D. Waste Lines: Insulate all pipe exposed to outside temperatures with 3/4" thick glass fiber pipe insulation with a vapor barrier jacket.
E. Refrigerant Piping Insulation: Insulate suction piping with minimum 1/2" thick foamed plastic or of thickness necessary to prevent condensation at 85 deg. F and 70% RH. Where possible, slip insulation over the piping as it is installed. Seal all joint and seams.

F. Pipe Fittings:
1. Insulate and finish all fittings including valve bodies, bonnets, unions, flanges and expansion joints with precut fiberglass insulation and preformed PVC covers sealed to adjacent insulation jacket for continuous vapor barrier covering over all fittings.
2. Provide removable/reusable insulation covers on 4" and larger valves, unions, flanges, pump casings, strainers and similar fittings or equipment requiring periodic service.

G. Protective Covering: Install continuous protective PVC or metal covering on all piping and fittings in mechanical rooms, accessible tunnels, attic spaces, accessible ceilings, etc., where insulation may be subject to damage. Install with rivets or cement seams and joints.

H. Piping Insulation Lap Seams and Butt Joints: Install insulation jacket in accordance with manufacturer's recommendation. Where jacket joint and lap seams have not adhered, remove affected section of insulation and reinstall or apply lap sealing adhesive in accordance with manufacturer's instructions.

3.02 DUCTWORK INSULATION

A. Ductwork: Insulate the following:
1. All supply ductwork with cooling.
2. All supply and return ductwork in systems routed in unconditioned spaces or exposed to the outside conditions.
3. All outside air intake ducts.
4. All ductwork required to be insulated by code.

B. Insulation Thickness: Select board and blanket insulation of thickness required to provide the R-value as required by code.

C. Fittings: Wire and duct adhesive as required. To prevent sagging on all rectangular or square ducts over 24" wide, install Gramweld or equal welding pins on the bottom. Maximum spacing 18" on center in both directions.

D. Installation: Applied with butt joints, all seams sealed with vapor seal mastic or taped with 2" wide vapor-proof, pressure-sensitive tape. Seal all penetrations with vapor barrier adhesive.

E. Internally Lined Ductwork: Where internally lined ductwork is indicated on the Drawings and/or specified, no exterior insulation is required. Select duct lining to provide the required R-value. Carefully lap the ends of the exterior insulation a minimum of 6" past the interior insulation unless otherwise shown. Seal the end of vapor barrier jacket to the duct with mastic where the vapor barrier is required. Duct lining is specified in Section 23 3000.

3.03 EQUIPMENT ROOM ITEMS

A. Items To Be Insulated: All equipment room items except the following:
1. Condensate receivers.
2. Cushion (expansion) tanks.

B. Materials:
1. 1-1/2" calcium silicate blocks applied with wire or bands as required. Finish with 1/2" thick smoothing coat of insulating cement and with glass cloth.
2. For equipment and piping systems operating below 350 deg. F., a 3 pound per cubic foot, 1-1/2" thick spun glass fiber blanket with organic binders and aluminum sheet metal exterior jacket may be substituted for the above insulation.
3. Install tank head finish per manufacturer's recommendations.
C. Manholes, Nameplates, Handholes, Cleanouts, Etc.: Do not insulate over manholes, ASME Code stamps, manufacturer's nameplates, handholes, cleanouts, etc. Provide neatly beveled edges at interruptions of the insulation. When surfaces are to operate below ambient saturation temperatures, provide removable sections of insulation to cover the above with vapor sealed edges. Provide appropriate tagging.

END OF SECTION
SECTION 23-3000
AIR DISTRIBUTION

PART 1  GENERAL

1.01  DESCRIPTION
A. Provide Air Distribution Materials as specified herein and as shown on the Drawings.

B. Material characteristics and size shall be as indicated on the Drawings.

C. Related Work: The requirements of Section 23 0500, Common HVAC Materials and Methods, also apply to this section.

1.02  QUALITY ASSURANCE
A. Air Distribution Equipment Rating: In accordance with AMCA certified rating procedures and bearing the AMCA label.

1.03  SUBMITTALS
A. Submit catalog data, construction details and performance characteristics for all manufactured materials.

B. Submit operating and maintenance data.

PART 2  PRODUCTS

2.01  SHEET METAL
A. Sheet Metal Materials:
1. General Material Requirements: Comply with the Mechanical Code and SMACNA’S “HVAC Duct Construction. Standards – Metal and Flexible, Third Edition” for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other perfections.

2. All interior ducts shall be constructed with G-60 or better galvanized steel conforming to ASTM A653/A653M and A924/A924M Standards, LFQ, chem treat. Exterior ductwork or duct exposed to high humidity conditions (that is: kitchen exhausts, etc.) shall be G-90 or better galvanized steel, conforming to ASTM A653/A653M and A924/A924M Standards, LFQ, chem. treat.


4. Tie Rods: Galvanized steel, ¼ inch (6 mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8 inch (10 mm) minimum diameter for lengths longer than 36 inches (900 mm).

5. Stainless Steel Sheets: Comply with ASTM A480/A480M, Type 304 or 316, and having a No. 2D finish for concealed ducts and No. 2B, No. 2D, No. 3 or No. 4 for exposed surfaces. Stainless steel shall be used for outside air plenums and outside air ductwork until mixed with return air.

B. Duct Fabrication requirements: Metal gauges, joints and reinforcement in accordance with Mechanical Code, ASHRAE and SMACNA standards. Ductwork shall be fabricated to the following pressure classifications:
1. Return and exhaust ducts: 1” negative.
2. Supply ducts from fan discharge to diffuser: 1” positive.
C. Acoustical Duct Lining: Line ducts with 1” thick lining for installation inside the building insulation envelope, and 2” for installation outside the building insulation envelope. Schuller "Linacoustic," Gustin Bacon "Ultra-Liner," or Owens Corning "Aeroflex" approved, meeting NFPA 90A requirements for maximum flame spread and smoke developed. Mechanically attach lining to sheet metal duct with Schuller Grip Nails or Gramweld welding pins. Apply fire-retardant type adhesive similar to Schuller No. 44 adhesive, Benjamin Foster 81-99, Insul-Coustic 22 or 3M equivalent on all leading edges, joints and seams.

D. Duct Joints for Sheet Metal Ducts: Prefabricated slide-on transverse duct connectors will be accepted. Duct constructed using prefabricated connection systems will refer to the manufacturer guidelines for sheet gage, intermediate reinforcement size and spacing, and proper joint reinforcements. "Ductmate System" by Ductmate Industries, Inc., Ward Duct Connectors, Inc., Mez Industries, Elgen, or acceptable substitute. Spiramir self-sealing round duct connector system meeting Class 3 leakage standards with EPDM o-ring seal.

E. Exposed to View Round Acoustic Supply Air Ductwork: Round and flat oval spiral seam galvanized sheet metal outer shell duct with 1” thick fiberglass insulation sandwiched between it and a perforated galvanized sheet metal inner liner. Provide factory manufactured fittings matching ductwork. United Sheet Metal, Rolock, Semco Air System, Robert Lloyd Sheet Metal, Arrow, Dees, Streimer Sheet Metal, Arjae Sheet Metal.

F. Exposed to View Spiral Seam Duct: Round and flat oval spiral seam duct shall be manufactured of galvanized steel sheet metal with spiral lock seam. Sizes up to 36” diameter or 36” wide shall be 22 gauge; sizes over 36” shall be 20 gauge. Reinforcement or bracing shall be as detailed on the Drawings. Matching fittings shall be manufactured of galvanized steel with continuous welded seams. Fittings up to 36” diameter or width shall be 20 gauge, fittings larger than 36” shall be 18 gauge.

G. Concealed Round Duct: Round and flat oval spiral seam duct shall be manufactured of galvanized sheet metal with spiral lock seam. Construction, gauges, and reinforcement in accordance with SMACNA standards. Fittings shall be manufactured of galvanized steel with spot welded or riveted and sealed seams or continuously welded seams. Snap lock longitudinal seam duct shall fully comply with SMACNA standards for duct gauge and seam type for appropriate pressure class. Adjustable elbows are prohibited.

H. Acoustical Duct: Double wall internally insulated duct and matching fittings with perforated galvanized steel inner wall, galvanized steel outer pressure shell and 1” thick fiberglass blanket. United "Acoustik-27" or accepted substitute.

I. Flexible Ductwork-Low Pressure: Insulated low pressure flexible duct, factory fabricated assembly consisting of a zinc-coated spring steel helix seamless inner liner, wrapped with a nominal 1" thick insulation for installation inside the building insulation envelope, and 2" for installation outside the building insulation envelope, 1 pound/cubic foot density fiberglass insulation. The assembly shall be sheathed in a vapor barrier jacket, factory vapor resistance sealed at both ends of each section. The composite assembly, including insulation and vapor barrier, shall meet the Class 1 requirements of NFPA Bulletin No. 90-A and be labeled by Underwriters Laboratories, Inc., with a flame spread rating of 25 or less and a smoke developed rating of 50 or under. The duct shall have factory sealed double air seal (interior and exterior) to assure an airtight installation. Genflex, ATCO, Wiremold, Thermaflex, Glassflex, Clevepak, Schuller, or accepted substitute.

2.02 ACCESSORIES

A. Manual Volume Dampers: Construct of material two gauges heavier than duct in which installed; single plate up to 12” wide; multiple over 12” wide. Hem both edges 1/2” and flange sides 1/2”. Use Young, Duro-Dyne, Elgen, MAT, or accepted substitute damper accessories. Young numbers are shown.
1. No. 605 bearing set with No. 403 regulator for dampers up to 24” long.
2. For dampers over 24” long use No. 660 3/8” rod, No. 656 end bearing and No. 403 regulator.
3. Where damper regulators are not readily accessible, use No. 660 or No. 661 rod extensions and No. 301 and No. 315 concealed damper regulators or MAT cable operated dampers as required.
Location of all volume dampers is not necessarily shown on Drawings; minimum required is one in each supply, return or exhaust main, and one in each branch.

B. Fire Dampers:
1. Provide dampers with rating equal to surrounding construction where penetrations are made through fire-resistant rated construction per applicable codes. Provide access panels of proper fire rating. Size dampers to maintain free area through damper same as unobstructed run of duct or opening.
2. Static Fire Dampers: Constructed and installed in accordance with NFPA No. 90A and UL labeled.
3. Dynamic Fire Dampers: Constructed and approved in accordance with UL Standard 555 for horizontal or vertical installations. Selection of dampers shall not exceed manufacturer’s recommended CFM at 4” of static pressure for unducted dampers and 8” of static pressure for ducted dampers.

C. Fire Rated Thermal Blanket and Diffuser Fire Damper: UL listed, non-asbestos ceramic thermal blanket for use on ceiling diffusers with curtain type fire damper to fit diffuser neck indicated.

D. Exterior Wall Louvers: Prefabricated extruded aluminum stormproof blades with frame to suit building construction. 1/2”, 16 gauge aluminum wire mesh on back side of all intake louveres and insect screen on exhaust/relief louvers. 4” deep, 37½ degree fixed drainable type blade, AMCA 500 tested for 800 fpm without water penetration, and maximum of 0.07” wg intake pressure loss and 0.09” wg exhaust pressure loss. Provide 70% PVDF protective coating in color selected by Architect, and stainless steel fasteners. Ruskin ELF375D as basic pattern on blade and frame, Greenheck, Cesco, Pottorff, or approved. Louvers shall be coated for seashore applications.

E. Gravity Exhaust Head Outside Air Intake:
1. Rectangular glass fiber or stainless steel cap with dampers curb connection, flashing, 1/2” mesh stainless steel bird screen and hinged access. Greenheck, Exitaire, Carnes, Acme, Powerline, Penn or accepted substitute.
2. Install with automatic damper in curb as indicated on the Drawings.

F. Locking Connection Straps: 1/2” wide positive locking steel straps or nylon self-locking straps. Panduit, Elgen, or accepted substitute.

G. Connection Fittings: Connections to non-metallic ducts manufactured sheet metal "spin-in" fittings. Genflex, Wiremold, Thermaflex, Glassflex, Clevepak, Schuller, or accepted substitute.

H. Access Doors In Sheet Metal Work:
1. Hollow core double construction of same or heavier gauge material as duct in which installed. Use no door smaller than 12” by 12” for simple manual access or smaller than 18” by 24” where personnel must pass through infrequently. Use 24” by 60” minimum for filters and more frequent maintenance. Use indicated Ventlok hinges and latches or equivalent Elgen on all doors.
   a. 100 series hinges and latches on low pressure system doors up to 18” maximum dimension.
   b. 200 series on larger low pressure system doors and 333 series on high pressure systems.
2. Construct doors up to 18” maximum dimension with 1” overlap, furr and gasket with 3/4” by 1/8” sponge rubber. Fit larger doors against 1-1/2” by 1/8” or angle frame and gasket with 3/4” by 1/8” sponge rubber or felt.

I. Visual Access Panels: Install visual access panels in inlet side of all coils, at all motorized dampers, and at all fire dampers where otherwise indicated on Drawings. Construct of 18 gauge steel, 20 gauge cold rolled cover, latex gasket and 1/4” plate glass. Minimum 12” by 12” unless indicated otherwise. Coordinate with manufacturer of air handling equipment, in mixing plenums, at coils, etc. Young Regulator Company No. 1311, or accepted substitute.
J. Anti-Backdraft Dampers: Connected, gasket-edged aluminum blades set in 14 gauge or heavier steel frame; nylon or Teflon bearings; equip with spring helper with tension adjustment feature or with adjustable counterweight and adjust to open when not more than 0.10" wg pressure is applied. Ruskin CBS-4, Greenheck, Pacific Air Products, Air Balance, Controlair or accepted substitute.

K. Splitter Dampers: Same specification as manual volume dampers except blade dimension in direction of air flow to be minimum 12" in all cases. Location as shown on Drawings. Splitter damper operators shall be as shown in SMACNA Low Velocity Duct Manual.

L. Opposed Blade Volume Damper: Install opposed blade volume damper in each zone supply duct on discharge of multi-zone units and where indicated on Drawings. Young No. 817 or accepted substitute.

M. Turning Vanes:
1. General Requirements: Comply with SMACNA’S “HVAC Duct Construction Standards-Metal and Flexible”; Figure 4-3 “Vanes and Vane Runners” and Figure 4-4 “Vane Support in Elbows”.
2. Turning Vanes shall be 2" or 4" double wall fabricated from the same material as the duct. Mounting rails shall have insert tabs that align the vanes automatically.
3. Acoustical Turning Vane: Shall be used in applications that require quiet operating systems. Mounting rails shall have insert tabs that align the vanes automatically.

N. Flexible Connections: Flexible duct connectors shall be used to isolate vibrations and noises that may be transmitted by fans or blowers to ductwork. The flexible duct connector is an air-tight and water proof flexible connection. Connectors will comply with NFPA 90A and NFPA 90B. Ventglass, Duro-Dyne, Elgen, or accepted substitute.

1. Indoor Flexible Connector Fabrics:
   a. Fire Retardant Neoprene coated Fiberglass resistant to chemicals, gasoline and grease:
      1) Meets NFPA 701
      2) Minimum Weight: 32 oz/sq.yd.
      3) Tensile Strength: 500 lbs in the warp and 500 lbs in the filling
      4) Service Temperature: -40 to 200 deg F
   b. Fire Retardant Neoprene coated Fiberglass for high pressure applications and large ducts:
      1) Meets NFPA 701
      2) Minimum Weight: 40 oz/sq.yd.
      3) Tensile Strength: 630 lbs in the warp and 465 lbs in the filling
      4) Service Temperature: 285 deg F
2. Outdoor Flexible Connector: Glass Fabric coated with weatherproof Hypalon resistant to UV Rays, ozone, chemicals, and grease.
   a. Meets NFPA 701
   b. Minimum Weight: 24 oz/sq.yd.
   c. Tensile Strength: 350 lbs in the warp and 250 lbs in the filling
   d. Service Temperature: -50 to 300 deg F

2.03 GRILLES, REGISTERS AND DIFFUSERS

A. Description: Provide grilles, registers and diffusers as shown on the Drawings.

B. Finishes:
   1. Steel: Flat white enamel prime coat, factory applied on ceiling diffusers. Others are to have a baked enamel finish, color as selected by Architect.
   2. Aluminum: Baked enamel finish selected by Architect unless indicated otherwise.

C. Manufacturers: Carnes, Krueger, Titus, Price, and Tuttle & Bailey are accepted substitutes where only Price model numbers are listed. Where other manufacturer's products are listed and/or "accepted substitute" is indicated, only the products or an accepted substitute for that item shall be provided. Titus numbers shown on plans. Other manufacturers approve.
D. Modular Core Ceiling Diffusers: 1 to 4-way pattern control. Pattern of distribution as indicated. Provide with opposed blade volume dampers and frame for unit as required. Price SMCD series or equal Titus. Provide Type 1 frame for hard lid ceiling. Diffuser face size shall be the same size in each room.

E. Modular Core Ceiling Return and/or Exhaust diffuser: Use in spaces containing ceiling diffusers and/or T-bar ceilings. Price SMCD. Match manufacturer of supply.

F. Sidewall or Ceiling Return, Exhaust or Relief Grille: Face bars parallel to long dimension on ceiling type and horizontal on wall type; bars set at 35 degrees to 45 degrees, spaced on 0.66” to 0.75” centers. Titus 350 series, Price 530 series or approved equal.

G. Sidewall Supply Grille or Register: Double deflection grille with face bars parallel to long dimension on ceiling type and horizontal on wall type; bars to be individually adjustable, spaced on 0.66” to 0.75” centers; key operated opposed blade volume damper. Titus 300RL, Price 520 Series or approved equal.

2.04 AIR FILTERS

A. Filter Gauges: Dwyer 2000-AF series or accepted substitute, across each filter bank. Provide option “LT” on all gauges exposed to conditions below 35 degrees F. Mount gauge securely at a point free of vibration.

B. Disposable Media, 30% Efficient Filters:
   1. Disposable, preformed media, pleated 2” thick cartridge type with minimum 16 gauge steel holding frames. Average ASHRAE test efficiency of 30% or greater with initial pressure drop across the clean filter bank not exceeding 0.3” wg when operating at full rated filter capacity. The filter media shall have an Underwriters Laboratories Class II listing.
   2. Apply industrial tape to all joints between frames and joints to adjacent sheet metal and/or caulking as required to prevent leakage. Provide specified filters for temporary heat and testing during construction and replace filters with new clean, specified filters prior to acceptance of project by Owner (two complete sets of media are required). Provide 0 to 1” wg filter gauge.
   3. Farr 30/30, Airguard DP2-40, Eco-Air C35 and American Air Filter Type AM-AIR 300X or approved substitute.

C. Filter Housing: Where indicated on the Drawings, provide factory fabricated, 16 gauge sheet metal filter housing with side, top, or bottom access door as indicated, duct or plenum mounting flanges and filter support and service tracks designed to hold the specified filters. Housing shall be the same manufacturer as filters.

PART 3 EXECUTION

3.01 EQUIPMENT INSTALLATION

A. Air Handling Equipment Installation and Arrangement: Install and arrange as shown on Drawings. Comply with the manufacturer's recommendations for installation, connection, and start-up.

B. Equipment Access Panels: Locate free of all obstructions such as ceiling bars, electrical conduit, lights, ductwork, etc.

C. Filters: Install specified filters or accepted substitute temporary construction filters in supply units and systems prior to start-up or use for drying and/or temporary heat. Replace prior to acceptance of project.

3.02 INSTALLATION OF GRILLES, REGISTERS AND DIFFUSERS

A. Size and air handling characteristics shall be as shown on the Drawings.

B. Locate, arrange, and install grilles, registers and diffusers as shown on the Drawings. Locate registers in tee-bar ceilings with diffusers centered on the tile unless indicated otherwise.
3.03 DUCTWORK INSTALLATION

A. Delivery, Storage and Handling:
   1. Protect shop fabricated and factory fabricated ductwork, accessories and purchased products from damage during shipping, storage and handling. Prevent end damage and prevent dirt and moisture from entering ducts and fittings with a polyethylene film with a high-tack pressure sensitive adhesive to attach to the ductwork and accessories.
   2. Where possible, store ductwork inside and protect from weather. Where necessary to store outside, store above grade and enclose with a polyethylene film with a high-tack pressure sensitive waterproof wrapping.

B. Support: Install ductwork with 1" wide strap cradle hangers not more than 8' on centers or as required by code. Support terminal units independent of adjacent ductwork. Attach to available building construction according to good practices for materials involved. Manufactured hanger system acceptable in lieu of fabricated hangers at contractors option. Ductmate “Clutcher” system or approved.

C. Fan and Air Handling Unit Flexible Connections: Install flexible connections in ductwork at all rotating equipment.

D. Elbows and Fittings: Construct elbows with throat radius equal to duct width in plane of turn or make them square and provide double wall, air foil turning vanes.

E. Fittings: Make transitions and take-offs as shown on Drawings. Provide volume dampers and splitter dampers as indicated on Drawings and as specified. Saddle tees are not allowed.

F. Acoustical Duct Lining: Acoustically line all fan unit intake and discharge plenums, all ductwork indicated as lined on the Drawings, all sheet metal ductwork specified per Section 23 0700 as insulated, where exposed to view or subject to damage in areas such as mechanical rooms, and, at the Contractor's option, all insulated ductwork specified in Section 23 0700. Line ducts with 1" thick lining for installation inside the building insulation envelope, and 2" for installation outside the building insulation envelope. Mechanically attach lining to sheet metal duct with Grip Nails or welding pins. Apply fire-retardant type water based adhesive on all leading edges, joints and seams. The duct size noted on the Drawings is the clear opening of the duct with lining. Insulation shall not reduce duct size listed. No high pressure/velocity duct systems, grease and moisture conveying duct systems or computer and health care supply duct systems shall be internally lined.

G. Manual Volume Dampers: Location of all volume dampers are not necessarily shown on the Drawings. Provide a minimum of one volume damper in each supply, return or exhaust branch. Install dampers in fiberglass ductwork (where fiberglass ductwork is allowed) with galvanized sheet metal sleeves of sheet metal gauges required for metal duct systems of the same dimensions.

H. Duct Insulation: Specified in Section 23 0700.

I. Sleeves: Provide galvanized sheet metal plaster ring around ductwork penetrating exposed finished walls. Sleeve and flash all duct penetrations through exterior walls in an air tight and weatherproof manner.

J. Plenums: Construct sheet metal plenums and partitions of not lighter than 18 gauge galvanized steel and reinforce with 1-1/2" by 1/2" by 1/8" angles as required to prevent drumming or breathing.

K. Access: Install necessary access opening and covers for cleaning, wiring or servicing motors, filters, fans, both entering and leaving air sides of coils, fire and/or smoke dampers and to other equipment located within or blocked by sheet metal work.

L. Sealing: Caulk, seal, grout and/or tape ductwork and plenums to make airtight at seams, joints, edges, corners and at penetrations. Solder all seams, joints, etc., on all ductwork exposed to the weather. Install specified tape in accordance with manufacturer's requirements using degreaser on surfaces to be taped and wiped to eliminate moisture.
M. Flexible Duct Connections:
1. Install in full extended condition, free of sags and kinks, using only the minimum length required to make the connection.
2. Make all joints and connections with 1/2" wide positive locking steel straps or nylon self-locking straps and make connections to non-metallic ducts with sheet metal sleeves or manufactured sheet metal "spin-in" fittings.
3. On vertically suspended ducts, secure with a minimum of three sheet metal screws on a maximum of 8" on center.

3.04 FIELD QUALITY CONTROL
A. Disassemble, reassemble, and seal segments of systems as required to accommodate leakage testing and as required for compliance with test requirements.
B. Conduct test, in presence of Architect, at static pressures equal to maximum design pressure of system or section being tested. If pressure classifications are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.
C. Determine leakage from entire system or section of system by relating leakage to surface area of test section.
D. Maximum Allowable Leakage: Comply with requirements for Leakage Classification 3 for round and flat-oval ducts, Leakage Classification 12 for rectangular ducts in pressure classifications less than and equal to 2-inch wg (both positive and negative pressures).
E. Remake leaking joints and retest until leakage is less than maximum allowable.
F. Leakage Test: Perform tests according to SMACNA's “HVAC Air Duct Leakage Test Manual.”

3.05 FIRE DAMPERS
A. Provide fire dampers with rating equal to surrounding construction where penetrations are made through fire resistant rated construction per applicable codes and installed in accordance with UL label requirements. Locate fusible links for easy service or replacement and provide access panels of proper fire rating. Size fire dampers to maintain free area through fire damper same as unobstructed run of duct. Where dampers are installed in forced air systems which may not shut down under fire conditions, dampers shall be UL "dynamic-rated" dampers.

3.06 SMOKE DAMPERS
A. Same as fire dampers above except provide complete wiring including electrical connections between field connected components and the fire alarm system specified in the electrical specifications.

3.07 NEW DUCTWORK CLEANING
A. Store all ductwork materials on pallets or above grade, protected from weather, dirt/mud and other construction dust.
B. Remove all accumulated dust, dirt, etc. from each duct section as it is being installed.
C. Prior to installation of diffusers, grilles and registers, install temporary system filters and cover all diffuser, grille and register openings with temporary 25% efficiency filter materials and start the fan systems. Operate fans a minimum of 8 hours. Remove all temporary filters at the end of that period.
D. Clean all diffusers, grilles and registers just prior to project final completion.

END OF SECTION
SECTION 23-5400
EXHAUST FAN

PART 1 GENERAL

1.01 DESCRIPTION
A. The requirements of this section apply to the Heating and Air Conditioning systems.
B. Equipment capacity and size shall be as indicated on the Drawings.
C. Related Work: The requirements of Section 23 0500, Common HVAC Materials and Methods, also apply to this section.

1.02 QUALITY ASSURANCE
A. Air Conditioning and Refrigeration Equipment Rating: Rated in accordance with ARI certified rating procedures and bear the ARI label.

1.03 SUBMITTALS
A. Submit catalog data, construction details and performance characteristics for each type and size of equipment.
B. Submit operating and maintenance data.

PART 2 PRODUCTS

2.01 EXHAUST FANS AND OUTSIDE INTAKE FANS
A. Ceiling Cabinet Exhaust Fan: Direct drive, forward curved centrifugal wheel, sleeve bearings, motor and wheel isolated from unit on vibration isolators; provide grille on inlet and duct connection with backdraft dampers on discharge. Size, capacity and controls as indicated on Drawings. Panasonic, Nutone or approved substitute.

PART 3 EXECUTION

3.01 INSTALLATION
A. General: Install and arrange equipment as shown on the Drawings and as recommended by the equipment manufacturer.
B. Piping: Refer to applicable sections for piping, ductwork, insulation, painting, etc.

3.02 AIR HANDLING INSTALLATION
A. Installation and Arrangement: Air handling equipment shall be installed and arranged as shown on the Drawings. Comply with the manufacturer's recommendations for installation connection and start-up.
B. Lubrication: All moving and rotating parts shall be lubricated in accordance with the manufacturer's recommendations prior to start-up.
C. Filters: Specified filters or approved temporary construction filters shall be installed in supply units prior to start-up or used for drying and/or temporary heat. Replace prior to acceptance of project.
3.04 CONTROLS

A. Wiring: In accordance with the National Electrical Code and local electrical codes.

B. Controls: Refer to applicable sections for control sequences.

END OF SECTION
PART 1 - GENERAL

1.01 Description

A. Furnish labor, supervision, permits, materials and equipment to complete the work required in Division 26 and by the contract documents.

B. It is the intention of this Section of the Specifications and the accompanying drawings to describe and provide for the furnishing, installing, testing and placing in satisfactory and successful operation all equipment, materials, devices and necessary appurtenances to provide a complete electrical system, together with such other miscellaneous installations and equipment hereinafter specified and/or shown on the Plans.

1.02 Contract Documents

A. The Contract Documents are complimentary, and what one affecting this Division requires shall be binding as if repeated herein.

B. Separation of this Division from other Contract Documents shall not be construed as complete segregation of the work.

C. Electrical work shall include both this Division as well as other Divisions as applicable, such as:
   1. Division 27, Communications
   2. Division 28, Safety & Security
   3. Division 33, Utilities.

1.03 Codes


B. Code requirements shall be considered a minimum guide for the work. Where contract documents require work materials in excess of Code minimum, install work as called for in contract documents.
1.04 Permits, Licenses and Taxes

A. The Contractor shall obtain and pay for all licenses, permits and inspections required by laws, ordinances and rules governing work specified herein. The Contractor shall arrange for inspection of work by the inspectors and shall give the inspectors all necessary assistance in their work of inspection. Division 26 Contractor shall make all necessary arrangements for installation of electrical services indicated on plans.

B. Utility installation fees will be paid by the Owner.

1.05 Layout and Coordination

A. See General Conditions.

B. Before starting work, carefully examine Architectural, Civil, Landscape, Structural, Plumbing, Heating, Ventilating and Air Conditioning Drawings to become thoroughly familiar with conditions governing work on this project. Verify elevations, measurements, rough-in requirements of equipment and its installation location before proceeding with the work. Install equipment with access as required by NEC.

C. Prior Installation. Any electrical work installed prior to approval of coordination drawings shall be at the Contractor's risk. Subsequent relocations required to avoid interferences shall be made without additional expense to the Owner. In case interference develops, the Engineer will decide which work shall be relocated, regardless of which was installed first.

D. The existence of any wires, conduits, pipes, ducts or other service facilities is shown in a general way only. The Contractor is responsible for making the exact determination of the location and condition of these facilities.

E. The Drawings indicate outlet and equipment locations, directions and locations of branch circuit wiring and homeruns. Verify all locations with actual field conditions.

F. The horsepower of motors and apparatus wattages indicated on the plans and in the panel schedules are estimated requirements of equipment furnished under other Divisions of this contract and bid shall be based on these sizes. Overload elements, contactors, circuit breakers, fuses, conductors, etc., shall be furnished to suit actual equipment installed. Advise Engineer of any equipment changes affecting electrical circuits.

G. The location of utilities indicated on the plans is taken from existing public records. The Contractor must determine the exact location and elevation of public utilities. The Contractor shall ascertain whether any additional facilities other than those shown on the Drawings may be present.
H. The general directions and location of homeruns are indicated on Drawings and are to be extended to panels as though routes were completely shown. No homeruns or branch circuits are to be combined. Items which are installed other than as shown on Drawings and without receiving prior written approval will be ordered removed and installed as shown without additional cost to Owner.

I. Owner shall not be responsible for any loss of unanticipated costs that may be suffered by the successful bidder as a result of such bidder’s failure to fully inform himself in advance in regard to all conditions pertaining to the work and character of the work.

J. Coordinate work with other crafts employed on the project. Should rearrangement or relocation of equipment be necessary, provide for approval the simplest layout possible for that particular portion of the work. Under no condition are beams, girders, footing or columns to be cut for electrical items unless so shown on Plans or written approval is obtained from the Architect or Engineer.

K. Special attention shall be given for the following items and all conflicts shall be reported to the Engineer before installation for decision and correction:
   1. Door swings; switches shall be located on the "strike" side of the door.
   2. Location of radiators, grilles, pipes, ducts and other mechanical equipment so that all electrical outlets, lighting fixtures and other electrical outlets and equipment are clear from and in proper relation to these items.
   3. Location of cabinets and counters so that electrical outlets and equipment are clear from and in proper relation to these items.
   4. Within the limits indicated on the drawings, the maximum practicable space for operation, repair, removal and testing of equipment shall be provided.
   5. Contractor shall coordinate with HVAC installer (if separate from the Contractor) to wire the HVAC system when the installer is ready for power.

L. Contractor shall consult the Architectural drawings for the exact height and/or location of all outlets, switches, lights, etc. specified herein or on the drawings.

M. Outlet locations shown on the drawings are approximate. Contractor shall study the building drawings in relation to spaces and equipment surrounding each outlet so that the lighting fixtures are symmetrically located according to ceiling tile and room layout. When necessary, with the Engineer's approval, outlet shall be relocated to avoid interference with structural features of the building.

N. Call to the attention of the Architect any error, conflict or discrepancy in Plans and/or Specifications. Do not proceed with any questionable items of work until clarification of same has been made.
O. Supplementary Details and Plans may be supplied as required and they will become a part of the Contract Documents. The Architect or Engineer reserves the right to make minor changes prior to installation of specific electrical systems in the location of the conduits, outlets, etc., from those shown on the plans without extra charge to the Owner.

P. Arrange work to reduce interruption of any existing service to minimum. When interruptions are unavoidable, consult Owner or Utility involved and agree in writing, with copy to the Architect, upon a mutually satisfactory time and duration.

1.06 Substitution Requests

A. Substitution of Equipment. (Prior To Bid).

1. Bids shall be based only upon the materials, construction and equipment specifically identified in the bidding documents, except as hereinafter provided.

2. If Contractors wish to use items of equipment other than those named in their base bid, Contractor shall apply in writing to the Engineer for approval of substitution at least 10 days prior to opening of bids, submitting with his request for approval complete descriptive and technical data on the items he proposes to furnish.

3. Equipment and materials proposed for substitution shall be similar in design and equal in quality and function to those specified.

4. Submittal shall be in triplicate with identification of the item to be substituted and clearly marked with all pertinent data depicting proper characteristics of proposed item.

5. Contractor's description of his proposed substitution shall specifically note all differences between the item specified and the proposed substitution.

6. If the Engineer approves any proposed substitution, such approval will be set forth in an Addendum or in writing to the person submitting equipment for approval.

7. Where a substitution alters the design or space requirements indicated, Contractor shall include all items of cost for the revised design and construction including cost of all allied trades.

8. Unless requests for changes in base bid specifications are received and approved prior to the opening of bids, as defined above, the successful Contractor will be held to furnish specified items under his base bid. After Contract is awarded, changes in specifications will be made only as defined under Substitution of Equipment. (After bid).

B. Substitution of Equipment or Materials. (After Bid).
1. After execution of the Contract, substitution of equipment or makes other than those specifically named in the Contract Documents will be approved by the Engineer for the following reasons only:

2. That the equipment proposed for substitution is equal to and/or superior to equipment named, in construction, efficiency and utility, and further that the equipment named in the specifications cannot be delivered to the job in time to complete the work in proper sequence to work of other Contractors, due to conditions beyond the control of the Contractor.

3. To receive consideration, requests for substitutions must be accompanied by documentary proof of equality or difference in price and delivery, if any, in the form of certified quotations from suppliers of both specified and proposed equipment.

4. In case of a difference in price, the Owner shall receive all benefit of the difference in cost involved in any substitution and the Contract altered by Change Order to credit Owner with any savings so obtained.

1.07 Submittals: Shop Drawings And Material Lists

A. In addition to the requirements of General Conditions of Division 01, submit manufacturers data and Shop Drawings and Material Lists as required by individual sections of Division 26 (and otherwise associated Divisions).

B. Before commencing work and within 30 days after award of contract, furnish six (6) copies of complete Shop Drawings and Material Lists to the Architect or Engineer.

C. Include only information on exact equipment installed; not complete "line" of manufacturer. Where sheets show proposed equipment as well as other equipment, identify proposed equipment with black arrow, underlining or circling. Contractor is not to use red. Diagrams for systems to be complete Drawings for specific system installed. "Typical" line diagrams not acceptable unless properly marked to indicate exact system for this project.

D. Single Submission. Data and shop drawings shall be supported and included in a single submission. Multiple submissions are not acceptable except where prior approval has been obtained from the Engineer. In such cases, a list of data to be submitted later shall be included with the first submission.

E. Shop Drawings. Shop drawings shall include complete construction details, dimensions, material descriptions, diagrams or pictures showing physical characteristics, performance and test data, description of operation, installation methods, wiring diagrams and any other data or information necessary for a complete evaluation. (Note: do not re-draw the contract drawings. The drawings to be submitted under this subsection are all the supplemental drawings and manufacturers' specification drawings which are not included in the contract drawings.) Shop drawings are in addition and supplemental to the contract drawings.
F. Identification. In addition to the requirements of Special Provisions, submittals shall be identified by the name of the system and applicable specification paragraph number.

G. Delivery Prior to Approval. No item of material or equipment shall be delivered to the site or installed, until approved. After the proposed materials have been approved, no substitution will be permitted except where approved by the Engineer.

H. Compliance. Should the Contractor fail to comply with the requirements of these provisions, the Engineer reserves the right to select any or all items of materials and systems. Selection shall be final and binding upon the Contractor. Materials so selected or approved shall be used in the work at no additional cost to the Owner.

I. Departures. If departures from the contract drawings are deemed necessary by the Contractor, details of such departures, including changes in related portions of the project and the reasons therefore, shall be submitted with the drawings. Where such departures require raceways or equipment to be supported otherwise than as shown, the details submitted shall include loadings and type and kind of frames, brackets, stanchions, or other supports necessary. Approved departures shall be made at no additional cost to the Owner.

J. Electrical Diagrams. A complete electrical connection diagram for each item of equipment furnished under Division 26, which has electrically controlled components having more than one automatic or manual control device, shall be submitted for approval. Wiring diagrams shall identify each component, and one diagram shall show all interconnected or interlocked components. It is understood that the contract electrical drawings do not have to be submitted or copied for inclusion in this submittal.

K. Contractor agrees that submittals processed by the Engineer are not change orders; that the purpose of submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.

L. Late submittals will not be considered an excuse for time extension for the project.

M. Data not in conformity with these requirements will be returned for resubmittal.

N. Organization:
1. Assemble Shop Drawings and submittal data in hard cover loose-leaf ring binder. Provide cover with permanently attached typewritten or printed
label with name of project, job number and heading reading "ELECTRICAL SUBMITTAL DATA".

2. Organize data in each set in basic categories listed in index for Division 26 (and otherwise associated Divisions). Provide submittal data with typewritten index having same sequence, numbering and wording as index for Division 26 (and otherwise associated Divisions). In addition, provide divider sheets between each section with identifying tabs having same designations as index. Organize material in each section in same order and identify with same number and wording as paragraphs of specification section.

3. Submit neat, clean copies of data, 8-1/2 inch by 11-inch size. Accordion fold required drawings to 8-1/2 inch by 11-inch size and include in submittal binder.

1.08 Electrical Equipment Operation and Maintenance Manuals

A. In addition to the requirements of the General Conditions of Division 01, submit manuals as required by individual Sections of Division 26 (and otherwise associated Divisions).

B. Provide all electrical equipment and control information. The purpose of this manual is to provide one comprehensive document that illustrates and describes all the electrical equipment and instrumentation installed in the plant.

C. For final acceptance of Division 26 work, provide to the Architect or Engineer six (6) copies of complete electrical operating and maintenance manuals for servicing of all equipment installed.

D. Information included must be exact equipment installed, not complete "line" of manufacturer. Where sheets show equipment installed as well as other equipment, identify installed equipment with black arrow, underlining or circling. Contractor is not to use red. Diagrams for each system to be complete Drawings for specific system installed. "Typical" line diagrams not acceptable unless properly marked to indicate exact system for this project.

E. Information shall include all revisions noted in shop drawings. Copies of stamped drawings are not acceptable.

F. Provide General Contractor’s name, contact person, telephone/fax numbers, include similar information for the sub-contractors.

G. Include all electrical devices provided under all Divisions. Coordinate with other Division Contractors. The Contractor shall coordinate with the Division 17 contractor and the Software Integrator to include pertinent documentation from their responsibilities in this submittal.
H. Manuals and documentation shall include calibration curves of every sensing device and a programming documentation sheet for every programmable device. The programming documentation sheet shall show the final operational value of every programmable parameter of every device. The purpose of this sheet is to provide maintenance personnel with a convenient source of information for programming the parameters of a replacement device should the old device fail.

I. Organization:

1. Assemble Shop Drawings and submittal data in hard cover loose-leaf ring binder. Contractor shall insert printed spine and cover title sheets to match font style and size of the rest of the plant O&M manual set. Coordinate with the General Contractor.

2. Organize data in each set in basic categories listed in index for Division 26. Provide submittal data with typewritten index having same sequence, numbering and wording as index for Division 26. In addition, provide divider sheets between each section with identifying tabs having same designations as index. Organize material in each section in same order and identify with same number and wording as paragraphs of specification section.

3. Submit neat, clean copies of data, 8-1/2 inch by 11-inch size. Accordion fold required drawings to 8-1/2 inch by 11-inch size and include in submittal binder.

1.09 Project Record Drawings

A. Maintain at the site one complete set of full-sized original prints for recording installed conditions (As-Builts). Keep record Drawings clean, undamaged and up to date as work progresses. Accurately indicate electrical work as actually installed with indications of all deviations, additions and omissions in red ink. Locate all buried exterior raceways or cables by actual dimensions from walls, center-lines or fixed points of reference.

B. The purpose of these Record drawings is to provide the Engineer with an easy to read, complete record of the installation so that at the end of the project the Engineer can revise the original contract drawings to represent the actual installation. Color-coded and highlighted notes shall be used if these would make the Record Drawings easier to read.

C. At the completion of the work, Contractor shall furnish the Engineer this original set of marked-up drawings. Final payment to the Contractor will not be authorized until these drawings have been submitted to and accepted by the Engineer.

1.10 Certificates

A. For final acceptance of Division 26 work (and that of otherwise associated Divisions), provide certificate of approval from the applicable regulatory and permit-
tting agencies certifying that the electrical work has been inspected and that the work conforms with the minimum requirements of the State Electrical Codes.

1.11 Warranty
A. See Division 01.

PART 2 - PRODUCTS

2.01 Materials
A. Unless otherwise specified, all material to be new of recent manufacture, carrying full factory warranty, UL approved or approved by local inspection authority.
B. All like materials shall be by the same manufacturer throughout the project.
C. All material shall be new and bear manufacturer’s name, model number, electrical characteristics and other identification and shall be the standard product of manufacturer regularly engaged in production of similar material.
D. Access Panels:
1. Provide access panels of adequate size for equipment requiring service and installed above plaster or gypsum board ceilings, behind walls or in furring.
2. Furnish complete with correct frame for type of building construction involved. Size, number and location of access panels is not necessarily shown on Drawings.
3. Use no panel smaller than 12 inches by 12 inches for simple manual access, nor smaller than 16 inches by 20 inches where personal must pass through.
4. Access panels shall maintain ceiling fire rating.
5. Acceptable Manufacturers: Milcor A, K, L, or M panels or equivalent Bilco or Potter - Roemer as required by construction.

PART 3 - EXECUTION

3.01 Excavation/Trenching
A. Provide trenching, backfilling, compaction, repaving or other site restoration as required by the work done in this Division.
B. Determine location of all existing underground gas, water, sewer, telephone and electric lines. Locate accurately on ground surface and for depth of same before excavation. Uncover by hand digging. Contractor shall be responsible for any
damage or interruptions to these utilities, caused by himself, and other costs incurred by these interruptions.

C. Do not undermine footings or bearing walls.

D. Use power-digging equipment only in direction away from existing facilities.

E. Exercise standard safety precautions in excavation near power cables by using insulated handles, rubber gloves and footwear, etc.

F. Do not place backfill until installation to be covered has been tested, inspected and approved.

G. Minimum conduit burial depth shall be 24 inches, unless otherwise noted.

H. Install a detectable six inch wide yellow vinyl tape with letter “Caution: Buried Electrical Line Below” 18 inches above all buried services conduit and wire not under structures.

I. Backfill:
   1. Backfill material for all trenches under paved areas shall be coarse sand or crushed rock, installed in layers not to exceed six inches and compacted to 95% of maximum density at optimum moisture content to preclude subsequent settlement.
   2. The top 18 inches of trenches in landscaped or grassed areas shall be backfilled with native soil and tamped.

J. Conduits piercing a building waterproof membrane shall be provided with flanges, using two neoprene washers, one washer on each side of membrane, between each flange and membrane.

K. All underground conduits which enter the building penetrating poured-in-place slabs:
   1. Shall be sloped to drain away from the building and shall be water sealed to prevent moisture from passing through the conduit into the building. All joints to be threaded and taped or glued to prevent entry of water into the conduits.
   2. Shall be poured-in-place, or provide with watertight conduit sleeves and rubber seals, Link-seal system by Thunderline Corporation or equivalent.
   3. Shall be rigid galvanized steel a minimum of 12-inches under the slab and 6-inches above the slab.

3.02 Cutting

A. Perform or arrange and pay for required cutting of concrete, masonry, wood, structural framing, etc.
B. Cutting or channeling of underpinning or structural members is not permitted without prior permission of the Engineer.

C. No weakening of structural parts is permitted and the Contractor will correct any work impaired.

3.03 Patching

A. Where trenching is done through existing paving, walks, curbs, etc., the Contractor is responsible to patch and repair these structures to original condition.

B. Patch all openings in and through concrete and masonry with dry pack.

C. In new work, patch and refinish all finished surfaces damaged by this contractor to match adjacent surface.

D. Where new electrical work is installed in the existing building, patch and refinish surfaces damaged to match existing. Refinishing to be as directed by the Architect or Engineer.

3.04 Framing And Blocking

A. Structural framing will be done by the Contractor.

B. Blocking required for sole use of electrical work such as fastening and support of outlet boxes, fixtures, panels, conduit, etc., will be by the Electrical Contractor.

3.05 Housekeeping Pads

A. Provide concrete housekeeping pad under Motor Control Centers, transformers, pumps, or any floor mounted switchboard.

3.06 Protection

A. Cap or plug all raceway openings during construction.

B. Protect all completed work against dirt, water or chemical damage, mechanical accident or injury.

C. Equipment found damaged or in other than new condition will be rejected as defective.

3.07 Sleeves

A. Where conduit passes through masonry or concrete, install sleeves during construction of same.

B. Where conduit must by necessity pass through beams or columns, install sleeves located as directed by Engineer.
3.08 Identification

A. Label complete electrical system to indicated use of each item of equipment or load served.

B. Identification of Disconnecting Means: Provide identification of disconnects in accordance with Section 110-22 and Section 240-83 of the National Electrical Code.

C. Identification of Conductors and Components for Distribution Systems Operating at Two or More Different Voltages: Identify components in accordance with Section 210-4(d) of the National Electrical Code. Required labeling shall be by Micarta plate.

D. Provide black laminated white core engraved nameplates with lettering not less than 3/16 inch high attached to the outside of junction boxes larger than 4-11/16 inch; surface mounted cabinets, panelboards, time switches; disconnect switches, starters, contactor, relays; subdistribution and branch circuit panelboards, dry transformers and other items indicating equipment or load served. At flush mounted cabinets, panelboards, time switches and similar items mount nameplate on inside of door at finished areas and on outside of door at mechanical, storage rooms and other non-public spaces. Attach nameplates with epoxy glue.

E. Flush mounted devices with stainless steel or plastic finish plates requiring identification to be engraved with lettering not less than 1/8 inch high with black color filling.

F. Provide typewritten circuit schedules for panelboards, cross-connect panels and terminal cabinets. Schedules shall be covered with minimum of 0.018 inch thick clear rigid plastic installed in permanently attached metal frame holder located on inside face of door. Schedules to use final assigned room names/numbers, loads not plan designations.

G. When making modifications to existing equipment or panelboards, provide labels as indicated in this section. Provide new typewritten circuit schedules for all modified panelboards.

H. At Main Distribution Panels provide black laminated white core engrave nameplates attached to panel exterior with epoxy glue. Size of nameplate and lettering as directed. Label distribution breakers, main breakers, sub-breakers and panel sections to identify all components and voltage and phase of system. In addition, provide master nameplate indicating project name, date, Architect (when applicable), Electrical Engineer, and Electrical Contractor. Lettering minimum of 1/4 inch high. Provide half-sized electrical one-line diagram(s) framed and mounted on wall near main distribution panel(s).

3.09 Installation
A. Wiring Requirements: Install wiring complete to every outlet with all devices shown and/or required. All wiring to be in raceways and concealed throughout finished areas unless specifically noted otherwise. For the purpose of electrical specifications, all areas, with the exception of boiler rooms, mechanical rooms and mechanical spaces, are to be considered as finished areas.

B. Provide raceway connections between outlets, outlets and panels and equipment and panels as shown on Drawings. Size raceways according to governing codes unless otherwise noted.

C. Locations:
   1. Verify all locations with actual field conditions, and plans to avert possible installation conflicts.
   2. Coordinate work with that of other trades to assure symmetrical placing of fixtures in respect to ceiling tile, grilles, etc.
   3. Cabinets: Where electrical outlets occur in face, decks or base of cabinets or in walls above counters, carefully coordinate with details and arrangements of same.
   4. Any work, which is incorrectly installed without prior verification with General Contractor, Architect, Engineer and Drawings, will be ordered removed and relocated and any damage to other work shall be repaired at no cost to the Owner.
   5. In general, locate outlets as indicated in symbol schedule on Drawings.

D. All mounting heights shown on drawings are from finish floor to centerline unless otherwise shown. Mounting heights at non-typical locations shown with (+) sign and height required noted adjacent to outlet. Outlets located in concrete block, brick or tile walls are to be adjusted in height to coordinate with modular joints of the materials.

3.10 Painting

A. Painting in general will be covered under another Division of this specification, except items furnished under this Division that are scratched or marred in shipment or installation and/or require custom painting.

B. Install equipment with manufacturer's standard finish and color unless otherwise specified. Refinish any marred or oxidized items restored to manufacturer's factory finish.

C. Required surfaces or equipment with no standard finish; clean off grease and scale. Restore to smooth finish. Give one coat of primer, two coats finish.

D. Paint and color as selected by Architect or Engineer.
E. All exposed conduits on painted walls shall be painted to match wall and trim colors. Conduit labels shall be neatly affixed and shall not be painted over.

F. All electrical equipment and conduit exposed in finished areas and on exterior walls shall be painted to match surrounding surfaces.

G. Contractor shall coordinate the timing of painting requirements.

H. Refer to architectural specifications for methods and materials.

3.11 Future Provisions

A. Provide pull line in each empty conduit provided for future installation of wiring.

B. In general, all wiring installed so it will not be necessary to remove existing conductors and repull additional wiring to install additional units. All spare conductors properly labeled and terminated in outlet boxes or at terminals in terminal cabinets.

3.12 Fire-Stopping

A. Where raceways penetrate floors, ceilings, ducts, chases and fire walls, provide fire stopping to maintain integrity of the fire assembly. The code authority having jurisdiction shall approve fire-stopping method.

B. Where electrical boxes exceeding 16 square inches are located in fire resistive walls, fire stopping shall be provided to maintain integrity of the fire assembly.

3.13 Continuity Of Service

A. Keep outages to occupied areas to a minimum and prearrange all outages with Owner, Engineer and utilities involved. Requests for outages shall state the specific dates and hours and the maximum durations, with the outages kept to these specified times. When power interruptions will last longer than 5 minutes and cover more than 10% of the building, or affect public areas, they shall be performed on the weekend between 1 and 5 AM.

B. Contractor shall coordinate with Owner or Engineer so that work can be scheduled not to interrupt operations, normal activities, building access, etc. Coordinate work with other crafts for proper scheduling.

C. No circuits shall be turned off without prior approval from Owner or Engineer. Coordinate with the operations, normal activities, building access, etc. Coordinate work with other crafts for proper scheduling.

D. This contractor shall be liable for any damages resulting from unscheduled outages or for those not confined to the preapproved times. Include all costs for overtime labor as necessary to maintain electrical services in the initial bid proposal.
Temporary wiring and facilities, if used, shall be removed and the site left clean before final acceptance. Requests for outages must be submitted at least (5) days prior to intended shutdown time.

E. When applicable, include in bid cost of minimum temporary power to Fire Alarm System, Security, Telephone/Data equipment and any other equipment designated by Owner, during time when primary building power has been interrupted.

3.14 Safety

A. The Drawings and the specifications do not include design or construction details or instructions relating to the Contractor's safety precautions or to means, methods, techniques, sequences or procedures required for the Contractor to perform his work.

B. The Contractor shall provide necessary shoring, railing, barricades, protective devices, safety instructions and procedures to perform the work safely and to comply with State Safety Requirements and OSHA requirements.

3.15 Cleanup

A. Contractor shall continually remove debris, cuttings, crates, cartons, etc., created by his work. Such clean up shall be done at sufficient frequency to eliminate hazard to the public, other workmen, the building or the Owner's employees. Before acceptance of the installation, Contractor shall carefully clean cabinets, panels, wiring devices, cover plates, light fixtures, etc., to remove dirt, cuttings, paint, plaster, mortar, concrete, etc. Blemishes to finished surfaces of apparatus shall be removed and new finish equal to the original applied.

3.16 Testing.

A. Test the entire electrical installation to assure compliance with code and proper system operation.

1. Circuit Tests. The Contractor shall test all wiring and connections for continuity and ground before any fixtures or other loads are connected. Tests shall be made with a 500 volt DC "Megger" type tester. If tests indicate faulty insulation (less than 2 megohms) such defects shall be corrected and tested again. Contractor shall provide all apparatus and material required to make tests and shall bear all expense of required testing.

2. Load Balancing. Checks shall be made for proper load balance between phase conductors and make adjustments as necessary to bring unbalanced phases to within 15% of average load.

3. Ground Testing. Measure the OHMIC value of the Electric Service Entrance metallic "System Ground" with references to "Earth Ground" using the "Multiple Ground Rod" method and suitable instruments. Maximum resistance to ground shall be less than 10 ohms. If this resistance cannot
be obtained with the ground system shown, notify the Engineer immediately for further instruction. Certify in writing to the Engineer that the grounding test has been made and that the requirements of this portion have been met for the "System Ground".


B. Materials and instrumentation shall be provided by the Contractor.

C. The Contractor shall notify the Engineer ten (10) working days prior to performance of any test.

D. The Contractor shall certify in writing that the above tests have been completed and shall provide documentation of test data.

3.17 Instruction Of Owner Employees

A. Instruct operation and maintenance personnel selected by Owner's representative at a single designated time in operation and maintenance of the entire electrical system and its components.

B. Electrical Contractor shall provide one 8-hour working day of instruction to Owner designated personnel. Software Integrator shall provide one 8-hour working day of instruction to Owner designated personnel after all equipment is fully operational and functional. The time for this instruction shall be scheduled shortly after start-up and at mutually agreed times. Contact Engineer for coordination.

C. Specific sections elsewhere in this Division may require additional training.

D. On completion of instructions, obtain from Owner certification in writing that demonstration had been given and instructions had been understood.

3.18 Demonstration Of Completed Electrical System And Controls

A. At the point of substantial completion of the project, the Electrical Contractor shall provide necessary personnel to demonstrate the essential features of the following electrical systems:

1. Service entrance equipment.
2. Lighting system.
3. Heating system.
4. Ventilation.

B. Demonstrate each system once after all malfunctions have been corrected.
C. Time. Demonstration shall be held upon completion of all systems at a date agreed upon in writing by the Owner or his representative. This time shall be in addition to the instruction allowances provided.

D. Attending Parties. The demonstration shall be held by the Contractor and Electrical Subcontractor in the presence of the Owner or his designated representative, Electrical Engineer, Project Engineer, and the Equipment Manufacturer's representative.

E. Demonstration.

1. Demonstrate the functions and locations of each system, and indicate its relationship to the Riser Diagram in the Drawings.

2. Demonstrate by "start-stop operation" and "automatic operation", how to work the controls, how to reset protective devices or replace fuses, and what to do in case of emergency.

3. All systems shall be exercised through operational tests in order to demonstrate achievement of the specified performance. Operational tests depend upon completion of work specified elsewhere in these Contract Documents. The scheduling of tests shall be coordinated by the Contractor among all parties involved so that the tests may proceed without delays or disruption by uncompleted work.

F. Certificate of Complete Demonstration. Submit a Job Completion Form found at the end of this Section. Provide documentation of all test data.

3.19 Payment for Work.

A. Payment for work under this Division shall be covered and included as part of the Basic Bid on the project, or as outlined under any schedules.

END OF SECTION
PART 1 - GENERAL

1.01 Description
   A. Provide conductors, cables, connectors, lugs, cable ties and terminations for all systems.
   B. Related work in other sections includes:
      1. Providing raceways and boxes, Section 26 0533, Raceways and Boxes.

1.02 Quality Assurance
   A. UL listed.

1.03 Submittals
   A. Submit product data sheets for primary service conductors, terminators and load break elbows per Section 26 0500.

1.04 Product Delivery, Storage And Handling
   A. Deliver conductors and cables in complete coils with UL label and bearing manufacturer's name, wire size and type of insulation.
   B. Store and handle material so as not to subject them to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation.
   C. Deliver conductors No. 10 and smaller in manufacturer's original unopened and undamaged cartons with labels legible and intact.

PART 2 - PRODUCTS

2.01 Secondary service entrance conductors: Copper 600 volt type "THW", "THHN", or "XHHN" stranded, unless otherwise noted. Sizes as shown on Drawings.

2.02 Feeder conductors:
   A. Copper, 600 volt, type “THW”, “THHN” or “XHHW” unless otherwise noted, sizes as shown on drawings.
   B. Aluminum conductors are acceptable as panelboard feeders as shown on drawings for copper sizes #2/0 AWG and above only.
C. Drawings are based on copper conductors, contractor to provide a list of conductor and conduit sizes to the Engineer for review for all aluminum conductors to be used. List to be provided prior to ordering material.

2.03 Branch circuit conductors:

A. Copper, minimum size No. 12 AWG. Conductors No. 12 and No. 10 AWG shall be soft drawn, solid copper. Conductors larger than No. 10 AWG to be stranded, soft-drawn copper. Use type "THW", “THWN”, or "THHN". Special conductor types where noted or required by code.

2.04 Splices, connections, terminations and cable ties:

A. Conductors No. 6 or larger, spliced, taped or terminated with solderless hydraulically applied crimp type connectors unless otherwise noted. T&B, Burndy or approved. Splices to be covered with heat shrink tubing of insulation value equal to wire insulation and wrapped with Scotch No. 33 electrical tape, half lapped.

B. Connectors: Conductors smaller than No. 6 made with 3M Company Hyflex No. 212 and No. 310, Ideal Wing-Nut, "T&B" Piggys, or approved spring connectors.

C. Lugs: Conductors No. 6 and larger, except on molded case circuit breakers, two hole, long barrel pressure tool set Thomas & Betts No. 54,000 series, Burndy "Hydent", Anderson Electric VCEL, or approved.

D. Terminal Strips:


2. All Other Systems: Molded base screw terminals "Buchanan" medium Duty Cat. 525 with tubular clamp flat base for direct mounting with center designation strip and W.H. Brady wire markers.

E. Cable ties: Thomas & Betts "Ty-Raps" of size and length required.

F. Color identification for feeder conductors: Brady B-500, vinyl cloth pipe banding tapes, Scotch Vinyl Plastic Electrical Tape No. 35, or approved.

G. Fluorescent lighting fixture ballast channel tap connectors: Electro-Products Division 3M Company "Scotchlock 567".

H. Cable and conductor identification: W.H. Brady wire markers.

PART 3 - EXECUTION

3.01 Inspection
A. Determine raceways are complete and clean of all foreign matter before installing conductors.

3.02 Delivery, Storage and Handling.

A. Deliver to site in new standard coils or reels with approved tag denoting length, wire size, insulation type and manufacturer's name.

B. Suitably protect from dirt, weather, and damage during storage and handling.

3.03 Wire Pulling.

A. Do not pull wire until all work of any nature is completed which might damage insulation or fill conduit with foreign material. Conduits shall be clean and dry before pulling wire.

B. Do not use mechanical means to pull #8 or smaller wires.

C. Exercise care in avoiding injury to wire or insulation during pulling.

D. Identify wires or circuits with wire markers after pulling. For all control wiring and telemetering systems, wire markers in junction boxes and at solenoids shall bear same numbers as terminal blocks. Keep accurate up-to-date as-built records.

3.04 General Installation

A. Circuiting. Install branch circuiting exactly as shown. Conduit may be routed at Contractor's best judgment unless directed otherwise. Home runs are diagrammatic for clarity, and may be grouped as desired. Size conduits accordingly with capacity for 25% future fill.

B. Feeder conductors: Wires shall be factory color-coded by integral pigmentation. Colored plastic tape permitted on No. 6 and larger where integral pigmentation impractical. Apply tape in spiral half-lap over exposed portions in manholes, boxes, panels, switchboards and other enclosures.

C. Branch circuit conductors: Identify with factory color conductors with separate color for each phase and gray or white for neutral.

D. All circuit conductors shall be identified with circuit number at all terminals, intermediate outlets, disconnect switches, circuit breakers, motor control centers, etc. Both ends of a given conductor shall be identified alike.

E. Install wire in conduit runs after concrete and masonry work is complete and after moisture is swabbed from conduits.

F. Apply pressure tool set lugs with tool specifically designed for application of lugs by lug manufacturer.
G. Leave six-inch single wire pigtails for connection of fixture leads and devices to branch circuits.

H. Make splices and taps only where specifically shown or approved in approved junction or splice boxes.

I. Neatly bundle and tie with cable ties conductors in panel gutters, wire gutters, motor control centers, dimmers, etc. where multiple conductors run in accessible wireways. Spacing as required to neatly group and support conductors.

J. Cable feeder and service conductors at switchboards and panel gutters. Feeder conductors cabled together as a group for one feeder and not combined in same cabling with other feeders. Cabled conductors supported from devices built into switchgear and not supported from terminals or lugs.

K. Install conductors carrying different voltages in separate raceways unless noted otherwise. Where installed in common wireways or gutters, identify neutral per NEC Article 200.

L. Quantity of conductors shown in any one raceway is not to be increased without specific permission of Engineer.

END OF SECTION
PART 1 - GENERAL

1.01 Description

A. Provide all raceways, fittings, outlet boxes, junction boxes, pull boxes and special boxes required for complete project. Install all systems in raceways unless specifically noted otherwise.

B. Not all conduits are shown. Where not specifically indicated, Contractor shall be responsible for sizing conduit per applicable codes for number of conductors.

C. Related work in other sections includes.
   1. Providing conductors, Section 26 0519, Conductors and Cables.
   2. Providing boxes, Section 26 2726, Wiring Devices and Floor Boxes.
   3. Providing supporting devices, Section 26 0529, Hangers and Supports.

1.02 Quality Assurance

A. UL listed.

1.03 Product Delivery, Storage And Handling

A. Deliver raceways with UL label and bearing manufacturer's name on each length.

B. Store and handle raceways and boxes so as not to subject them to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation.

C. Cap raceway ends until used.

D. Deliver fittings in manufacturer's original unopened and undamaged packages with labels legible and intact.

PART 2 - PRODUCTS

2.01 Rigid galvanized steel and IMC conduit:

A. Rigid galvanized conduit: Rigid steel zinc coated, manufactured in accordance with UL-6, ANSI, and Federal Specifications WW-C-540 standards.

B. Intermediate Metal Conduit (IMC): Zinc coated galvanized steel to comply with UL-1242, Type J and ANSI Standards.

C. Application:
1. Employed for runs embedded in concrete, concrete block, underground, wet or damp locations, where subject to mechanical injury, and where exposed within eight feet of floor.

2. Make threads watertight with bituminous sealer (solvent type cut back) before assembly where installed underground, in moist locations or where exposed to weather.

D. Fittings: Threaded iron or steel only, Thomas & Betts or O-Z/Gedney in sizes up to 1-1/2 inch plastic insulating type O-Z/Gedney type "A", or "T&B" 220 Series; sizes above 1-1/2 inch insulated metallic bussings O-Z/Gedney type "B" and "T&B" 1220 Series.

2.02 Rigid Stainless Steel conduit: Solid stainless steel.

A. Application: Required in most outdoor marine or corrosive environments or as specified.

B. Fittings: Threaded stainless steel. Erickson couplings, watertight split couplings (OZ or equivalent) permitted so long as all components are of the same stainless steel alloy and are waterproof.

2.03 Electrical metallic tubing (EMT): Steel zinc coated, to comply with ULI-797 and ANSI Standards.

A. Application:
   1. Dry locations only. May be used in framed construction, furred ceilings and above suspended ceilings.
   2. May be exposed in unfinished areas where not subject to damage.

B. Fittings: Connectors and couplings to be case steel. Preinsulated connectors and couplings up to one (1) inch trade size may be compression, indenter or setscrew type. Fittings above one (1) inch trade size shall be compression type. All connectors shall have insulated throats. Thomas & Betts, Steel City or approved.

2.04 Liquidtight flexible metal conduit: Zinc steel core with smooth gray abrasion resistant, liquidtight, polyvinyl chloride cover (with integral ground wire wound in steel core), to comply with UL 360 and ANSI Standards. Anaconda Sealtite type U.A. Electro Flex L4, Alflex Ultratite UL or EF or approved.

A. Application: For connection to equipment. Minimum size 3/4-inch for motor connections. Use 3/8-inch only for fixture and control wiring. Provide sufficient length of flexible conduit to avoid transmission of vibration.

B. Fittings: “Thomas & Betts" Supertite or approved.
2.05 Flexible metal conduit, to comply with UL360, ANSI Standards, and Federal Specification WW-6-566.

A. Application:
   1. Permitted only in dry locations where flexibility is required in length not over 18 inches.
   2. Minimum size required 1/2 inch, unless noted otherwise.
   3. Where flexibility is not required, flexible metal conduit is not to be used without written permission of the Architect or Engineer.

B. Fittings: Screw-in-type factory preinsulated "Thomas & Betts".

2.06 Non-metallic conduit: Polyvinyl chloride schedule 40 heavy wall UL listed for underground and exposed applications in accordance with National Electrical Code to comply with NEMA TC2. Carlon Electrical Products, PWC or approved.

A. Application:
   1. Permitted for runs embedded in concrete or underground in wet or damp locations.
   2. All conduit offsets and bends made with factory fittings.
   3. All 90 degree ells and conduit entrances into buildings to be with rigid galvanized conduit.
   4. PVC conduit installed under roadways or areas subject to heavy traffic shall be provided with a minimum of 36" cover.
   5. Galvanized rigid elbows shall be used for angles larger than 30 degrees where the conduit size is greater than one inch.
   6. Provide a ground wire sized per code in all PVC conduits. Conductor quantities indicated in conduits do not include ground wires unless otherwise noted.

2.07 Seals and Fittings:

A. Conduit plugs: Ideal "Conduloc" sizes 1/2 inch through one inch and T&B, Push Penny Plugs Series 1470 for 1-1/4 inch and larger, or approved for sealing conduits during construction. Steel City PL-200 series screwdriver slot threaded meter plugs or Killark Cat. No. CUP-O through CUP-9 for permanent plugs.

B. Floor and wall entrance fittings: O-Z/Gedney Electrical Mfg. Co. Type "FSK" entrance seal.

C. Expansion fittings: O-Z/Gedney Electrical Mfg. Co. Type ‘E’ expansion coupling with bonding jumper for up to four inch of movement.

D. Conduit seals: Vertical or horizontal type Crouse Hinds type "EYS" or approved.
E. Lead Roof Flashing Assembly: Open top caulk, six inch diameter skirt, Stoneman Engineering & Manufacturing Company No. S1000-4 for 1/2 inch diameter through eight inch diameter. Caulking compound G.E. Silicon Construction Seal-ant SCS-1200 or Dow Corning 781. Refer to Architectural.

F. Wall and floor fire and smoke barriers: Concrete floor type O-Z/Gedney Gedney Co. "Fire Seals" or approved. UL labeled fire barrier material installed in accordance with manufacturer's recommendations. 3M Branch Fire Barrier System; Chase Technology Corp. No. CTC PR-855; Fire Stopping Products SpecSeal, Putty, Sealant, Collars, and Mortar; or approved.

2.08 Pull lines: Polyline as manufactured by "Greenlee" or approved.

2.09 Underground Marking Tape:

A. Power: 6” wide, yellow, low density polyethylene, 4-mil thickness. Imprinted with “CAUTION – STOP DIGGING – BURIED ELECTRIC LINE BELOW” and current date. Somerset “Protect-A-Line” or approved.

B. Telephone/Data: Similar to Power tape except green.

2.10 Boxes

A. Pullboxes

1. Pullboxes: Galvanized steel (indoors) or cast metal (exterior or damp locations) construction, conforming to National Electrical Code, with screw-on cover.

2. Flush Mounted Pullboxes: Provide overlapping covers with flush-head retaining screws, finished in light grey enamel.

3. Box volumes shall meet NEC for size and number of entering conduits.

B. Weatherproof Outlet Boxes:

1. Provide corrosion-resistant cast metal weatherproof outlet wiring boxes, of the type, shape and size, including depth of box, with threaded conduit ends, cast metal face plate with spring-hinged waterproof cap suitably configured for each application, including face plate gasket and corrosion proof fasteners.

2. Weatherproof boxes to be constructed to have smooth sides, gray finish.

3. Boxes used in contact with soil shall be cast iron alloy with gasketed screw cover and watertight hubs.

4. Weatherproof Plates: Cast metal, gasketed, for switches and receptacles provide spring-loaded doors.

C. Weatherproof Junction and Pullboxes:
1. Provide galvanized sheet steel junction and pullboxes, with screw-on covers; of the type, shape and size, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

D. Knockout Closures: Provide three (3) piece punched-steel knockout closures.

PART 3 - EXECUTION

3.01 Installation

A. General Installation:

1. In general, install raceways concealed in construction except where shown otherwise on the Drawings or unless specifically approved by Architect or Engineer.

2. Unless otherwise noted, size raceways in accordance with Table in Appendix C of NEC for type "THW" conductors regardless of type of conductor specified.

3. Two or more conduits using the same routing: Mount on channel support system. Unistrut or approved.

4. Provide pull line and cap off watertight each empty conduit provided for future installation of wiring.

5. Conduit stubbed from a concrete slab or wall to serve an outlet under a table or to supply a machine shall have a rigid conduit coupling flush with the surface of the slab. Provide plug where conduit is to be used in future.

6. Allow minimum of 6 inches clearance at flues, steam pipes, and heat sources. Do not run conduits beneath boilers or heating units.

7. Dissimilar Metals: Avoid contact with pipe runs of other systems.

B. Lengths and Bends:

1. Maximum number of bends in any run shall be the equivalent of three (3) 90 degree bends (270 degrees total). Maximum length of any run shall be 100 feet, except as allowed in underground installations.

2. Junction and pull boxes shall be provided to maintain these limits. Do not locate pull boxes or junction boxes in finished areas unless specifically shown or special permission is obtained from Architect or Engineer.

C. Exposed raceways:

1. In finished areas run parallel with or at right angles to building structural lines and closely follow surfaces wired over. Conduits offset at panels, outlets, junction boxes, etc. Conduit 1-1/2 inch and larger suspended at locations as directed by Architect or Engineer.
2. In accessible void and furred spaces, conduit may be run in a direct line between outlets with long sweep bends and offsets closely following surfaces wired over. Suspend conduit 1-1/4 inch and larger to be run to allow maximum access to space and located as directed by Architect or Engineer.

3. For exposed runs, attach surface mounted conduit with clamps. Where conduit runs along the inside of exterior walls, mount to channel-type strut at required spacing.

D. Concealed raceways:

1. At inaccessible areas, raceways may be run in a direct line with long sweep bends and offsets. In cavity walls, run conduit in hollow spaces and do not chase interior or exterior masonry.

2. At accessible areas above lift-out or accessible ceiling areas, run conduit on top or bottom of lower cords or trusses or on underside of roof. Vertical extensions for wiring to ceiling outlets and fixtures kept to minimum length.

E. Underground raceways:

1. Use galvanized rigid steel or Schedule 40 PVC with galvanized rigid steel elbows and risers.

2. Maximum length of any run shall be 300 feet, less 50 feet for each equivalent 90-degree bend.

3. Install underground marking tape buried 6-8 inches below grade, directly above conduit.

4. Run in a direct line with long sweep bends.

5. Raceways inside of building run below slab in gravel fill.

   a. Rigid Galvanized: Minimum 24-inches below finish grade, unless noted otherwise.
   b. PVC: Where installed under roadways or areas subject to heavy traffic provide a minimum of 36-inches of cover. All other locations, minimum 30-inches below finish grade, unless noted otherwise.

7. Burial Depth – Primary Service: Minimum 48-inches below finish grade or as required by serving utility.

8. All underground raceways to be made water-tight with sealed threads or couplings.

9. Rigid Galvanized conduit shall be coated entire length with coal-tar material (Koppers Bitumastic 515) or with PVC jacket (15 mil. Minimum).
F. Penetrations, Seals & Plugs

1. All 90 degree ells and conduit entrances into buildings to be with rigid galvanized conduit. Coat with coal-tar material (Koppers Bitumastic 515)

2. Provide conduit seals at exits and entrances from hazardous locations (i.e. Chlorine storage or distribution rooms), freezer rooms and other locations as required by NEC Article 500.

3. Conduit penetrations of the electrical room walls and floor must “float” via backer rod or fiberglass and caulked air tights.

4. Provide conduit plugs at all raceway openings during roughing-in to prevent entrance of foreign matter.

5. Provide floor or wall entrance fittings at all points where raceways enter or exit below finish grade at tunnels, basements or trenches.

6. Any conduit leaving the building envelope (e.g., site lighting, roof mounted HVAC equipment, etc.) to be 3/4-inch minimum and must slope downward. Seal conduits at interior side of building. Pack non-hardening duct sealing mastic around wires in the raceway.

7. Provide wall or floor fire and smoke barriers to cut off all concealed draft openings (both vertical and horizontal) where raceways perforate fire walls.

8. Roof Penetrations:
   a. Provide roof-flashing assembly at locations where conduit pierces the roof.
   b. Locate conduit minimum six inches from roof curbs or flashing.
   c. Provide caulking compound between counter flashing and conduit for watertight seal.

G. Boxes

1. Verify location of all outlet boxes with actual field conditions and plans to avert possible installation conflicts. Architect or Engineer reserves the right to make minor changes prior to installation without cost to the Owner. Coordinate work with that of other trades.

2. Toe Spaces: Boxes for receptacle outlets in toe spaces to be mounted horizontally.

3. Above Counter: Boxes for devices above counter should be typically mounted vertically, however, due to unforeseen field modification in casework and backsplashes, please coordinate with the architect.

4. Extension rings: Do not add more than one to any box with maximum depth of box and extension ring not to exceed three inch unless specifically indicated otherwise.

3.02 Cleaning
A. Complete raceways system before pulling-in conductors.

B. Remove all foreign matter from raceways and blow out or vacuum smaller conduits and pull mandrel through larger conduits prior to installing conductors.

3.03 Painting

A. All exposed conduits on painted walls to be painted to match wall and trim colors.

END OF SECTION
SECTION 26 2400
SWITCHBOARDS AND PANELBOARDS

PART 1 GENERAL

1.01 Description

A. This Section shall include furnishing and installing switchboards, sub-distribution, and branch circuit panelboards with components as indicated. Incorporate switching and protective devices of the number, ratings and type shown and noted herein.

B. Switchboards to include necessary interconnections, instrumentation and control wiring for a complete and satisfactory operating system.

C. All panelboards and breakers to be fully-rated, Series rated panel boards and breakers are not acceptable.

1.02 Related work in other sections includes:

A. Providing concrete housekeeping pad for floor-mounted equipment under Division 03.

B. Providing identification, Section 26 500, Basic Electrical Materials and Methods.

C. Providing cable ties and lugs, Section 26 0519, Conductors and Cables.

D. Providing grounding, Section 26 0526, Grounding and Bonding.

1.03 Quality Assurance

A. American National Standards Institute (ANSI).

1. 67 Panelboards (ANSI/UL 67).
3. ANSI Z55.12 gray finishes for industrial apparatus and equipment.

B. Institute of Electrical and Electronics Engineers (IEEE).

1. Std. 141-76 Electric Power Distribution for Industrial Plants.

C. National Fire Protection Agency (NFPA).

1. NFPA 70 National Electrical Code.

D. Underwriters' Laboratory (UL).
Switchboards and Panelboards
26 2400 – 2

1. UL 50: Cabinets and Boxes.
2. UL 67 Panelboards.
3. UL 869: Service Disconnects.
4. UL 891: Dead-Front Switchboards.

E. National Electrical Manufacturers Association (NEMA)
   1. NEMA AB-1: Molded Case Circuit Breakers.
   2. NEMA KS-1: Enclosed Switches.
   3. NEMA PB-2: Dead-Front Distribution Switchboards.
   4. NEMA SG-5: Switchgear Assemblies.
   5. Test Switchboards in accordance with NEMA PB2 requirements.


1.04 Submittals

A. Shop Drawings
   1. Submit complete shop drawings with dimensions, components and internal connections in accordance with Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).

B. Switchgear: Submit shop drawings showing following:
   1. Bus ratings and arrangement.
   2. Frame size, trip setting, and interrupting rating of overcurrent devices.
   3. Manufacturer's recommended settings of time delays and ground fault sensing adjustments of adjustable circuit breakers which demonstrate selective coordination.
   4. Fault bracing rating of total assembly.
   5. Elementary wiring diagrams for metering and relay protection.
   6. Scale ranges of meters.
   7. Dimensioned elevation and plan views.
   8. Indicate top and bottom conduit entrance areas and dimensions.

C. Submit operation and maintenance data in accordance with Division 01 or Section 26 0500, Basic Electrical Materials and Methods (when included).

1.05 Product Delivery, Storage And Handling
A. Deliver with UL label and bearing manufacturer's name. Provide all equipment and each section with appropriate UL labels located in conspicuous places. Provide readily accessible nameplates.

B. Provide starters in manufacturers original cartons with labels intact.

C. Panelboard exterior trim separately packed to prevent damage during delivery and storage on site.

D. Upon receipt-open shipping carton and inspect for physical damage. Open switchgear and check interior condition. Prepare a written report of any damaged or unacceptable conditions.

E. Store and handle panelboards so as not to subject panels to corrosion or mechanical damage and in a manner to prevent damage from environment and construction operation. Keep switchboards wrapped or otherwise protected with plastic and stored on wood pallet on floor.

PART 2 PRODUCTS

2.01 Switchboards

A. Enclosure:

1. Provide free-standing and deadfront switchboards. Switchboard frame completely self-supporting and formed of code gauge steel rigidly welded and bolted together to support all cover plates, bussing and component devices. Steel base channels bolted to frame to rigidly support entire section for moving on rollers and floor mounting. Each switchboard section to have an open bottom and an individually removable top plate for installation and termination of conduit.

2. Provide screw held front covers and hinged doors. All front plates used for mounting meters, selector switches or other front mounted devices shall be hinged with all wiring installed and laced flexibility at the hinged side.


B. Bussing:

1. Switchboard bussing of sufficient cross-sectional area to meet UL Standard 891 temperature rise. Bus bars tin-plated extruded aluminum. Main bus with ampacity as shown in plans and rated to withstand a short circuit current rating of not less than 65,000 RMS symmetrical amperes. Through bus supports, connections and joints are to be bolted with hex-head bolts and Belleville washers.
2. The end section is to have bus bar provisions for future addition of a switchboard section. The provisions shall include the bus bars to be installed to the extreme side of the switchboard and prepunched to facilitate future bolted splice plates.

3. All extra space in distribution boards shall be bussed for future use.

4. Prior to bidding, confirm that equipment will fit within the physical space allocated on the drawings for switchgear. Do not attempt to use equipment which does not fit within the space allotted. Do not use space identified for future use.

5. A-B-C type bus arrangement, left-to-right, top-to-bottom, and front-to-rear, as viewed from the front.

6. Supply main bus splices between adjacent distribution sections.

7. Neutral Bus: Full size. Insulated from enclosure. Bond to ground bus in main service switchboard at one point, per code.

8. Ground Bus: 50 percent size. Furnish bus and lug extending entire length of switchboard. Firmly secure to each vertical section structure.

C. Breakers:

1. Branch molded case circuit breakers are to be totally front accessible and front connectable.

2. Breakers are to be mounted in switchboard to permit installation, maintenance, and testing without reaching over any line side bussing.

3. No common mounting brackets or electrical bus connectors.

4. Breaker connections requiring leaf and coil springs which could loosen or fly apart during a fault are not acceptable.

5. Each breaker, is to be furnished with an externally operable mechanical means to trip the circuit breaker, enabling maintenance personnel to verify the ability of the breaker trip mechanism to operate as well as exercising the breaker latch and operating mechanisms.

6. Molded case circuit breaker(s) with ratings indicated on Drawing. Each breaker to have visible ON/OFF identification.

7. Provide fixed mounted breaker(s) rated for 100 percent.

8. Provide breaker with remote shunt trip capability.


10. Provide breaker with ground fault protection where indicated on Contract Drawings. GFI protection may be an integral feature of main breaker or external sensing connected to breaker shunt trip.

2.02 Branch Circuit Panelboards:
A. Type:
1. NQOB for 120/208-volt panelboards with bolted breakers having minimum interrupting capacity of 22,000 amperes RMS symmetrical, unless noted otherwise at the bottom of the panel schedules. Breaker trip sizes and number of poles as indicated on the Drawings.

B. Bussing:
1. Copper or aluminum.
2. Tap Arrangement: Phase sequence type, permitting a two (2) or three (3) pole breaker to be installed at any location.
3. All bolts used to connect current-carrying parts together shall be accessible for tightening from the front of the panel.
4. Wiring terminals: Compression or set screw type for copper conductors; bolted to bus.

C. Construction: Flush or surface mounted as indicated with following:
1. Door with lock all keyed alike. National No. 68-226 flush panel.
2. Flush mounted panels: Concealed mounting hardware for exterior trim and door. No exposed fastenings or holes permitted. Flush mounted panel located side by side are to be of same length unless otherwise indicated. Flush panels of depth greater than available wall thickness provided with box type exterior trims with edges returned to wall. Depth of return as required making up difference in depth between panel and available wall depth. Panelboards 400 amp or less shall not exceed 6” depth.
3. Surface mounted panels: Completely metal enclosed. Exposed trim fastenings and hardware permitted. Surface mounted panels located side by side to be same height and depth.
4. Gutters minimum of five inch with six inch required at feeder end of panel or where feeder runs inside of gutters. Separate feeder lugs and terminals for each feeder connection with lugs as specified in Section 26 0519 Conductors and Cables. Split door split bus panels provided with two-inch separation of sections.

2.03 Circuit Breakers

A. See additional specific requirements under Switchboard Section.
B. Multiple breakers common trip.
C. Combination breaker and ground fault interrupter: 10,000 amps or 20,000 IC rated, bolted connection.
D. Breakers for panel switched lighting to be labeled "SWD" for multiple operations.
E. Location of circuit breakers in panels: Install circuit breakers in panels at locations as indicated in the panel schedules.

F. Main breaker, when so equipped, shall be individually mounted separate from branch breakers. Where used as service disconnect, breaker and panelboard shall be Listed for use as service entrance equipment.

G. Branch circuit breakers shall be bolt-on.

H. Provide circuit breaker handle guards to prevent accidental shut-off of equipment for breakers supplying obviously constant circuits for clocks, time switches, refrigeration, freezers, sound systems, fire alarm and other like systems as directed.

2.04 Identification:

A. Panelboards: In accordance with Section 26 0500. Locate nameplates attached to top center of interior trim. Nameplate to indicate panel, voltage and phase characteristics such as Panel 2AA, 120/208 volt, three phase. Panel labeling to correspond to distribution system labeling.

B. Circuit breakers: Number circuit breakers as indicated in panel schedules. Numbers engraved and filled in interior trim or permanently attached metal numbers equal to Wilson Heard markers or plastic numbers. Adhesive backed printed numbers not approved. Other methods of numbering as approved by Engineer.

C. Provide typewritten circuit schedules for panelboards, cross-connect panels and terminal cabinets. Schedules shall be covered with minimum of 0.018-inch thick clear rigid plastic installed in permanently attached metal frame holder located on inside face of door. Schedules to use final assigned room names/numbers, loads not plan designations.

D. When making modifications to existing equipment or panelboards, provide labels as indicated in this section. Provide new typewritten circuit schedules for all modified panelboards.

2.05 Panel finish:

A. All panels shall be provided with a rust-inhibiting phosphatized primer coating approved by the paint manufacturer.

B. At all finished areas factory finish to match adjacent surfaces. Rodda Baking Enamel.

C. In unfinished or utility areas standard factory industrial gray.

D. Paint sides, top and front of surface mounted panels.

2.06 Lugs:
A. In accordance with Section 26 0519, Conductors and Cables.

B. Compression or set-screw type, bolted to bus or CB output.

C. Provide double or feed thru lugs at panels where feeders are extended to additional panels.

D. Provide double capacity neutral lugs for all panelboards having an isolated bus.

E. Provide oversized lugs as required for aluminum panel feeders to accommodate sizes shown in feeder schedule on drawings.

2.07 Weatherproof Enclosures: All exterior mounted panelboards shall be provided with a minimum rated NEMA 3R enclosure.

2.08 Acceptable Manufacturers: Square-D, GE, Cutler-Hammer, or approved. For electronic grade panelboard suppression/filter system: GE, Current Technologies, Liebert, or approved.

PART 3 EXECUTION

3.01 Inspection

A. Coordinate NEC clearance requirements space provided to assure adequate clearances are maintained. Notify Engineer if space provided is inadequate for specified equipment and/or for maintaining required code clearances. Do not order equipment until any space inadequacies are resolved.

3.02 Installation

A. Prior to installation of switchgear and transforming layout the electrical rooms and obtain approval of the layout from the code authority having jurisdiction.

B. Install panelboard in accordance with manufacturer's written instructions.

C. Furnish and install three spare one-inch conduits from the top of each recessed panel, to an accessible point above the ceiling.

D. Conduit shall be securely fastened to all panelboards and sheet metal outlet, junction, and pull boxes with galvanized locknuts, and one bushing installed in accordance with standard practice. The full number of threads shall project through to permit the bushing to be drawn tight against the end of the conduit, after which the locknut shall be made up sufficiently tight to draw each into firm electrical contact with the box.

E. Do not install exterior trims until finish painting is completed. Clean interior of panel (construction dust, paint over-spray, etc…) prior to installation of exterior trim.
F. Keys: Collect all panel keys. Combine all keys on one key ring and submit at
time of substantial completion.

G. No low voltage wiring (less than 120 volt) to be installed in panel enclosures.

H. Breaker handle guards shall be provided on each circuit supplying obviously con-
stant loads to prevent accidental shutting off. Such loads are refrigeration, contac-
tor controlled circuits, freeze protection, etc.

I. Care shall be taken to terminate ground conductors from isolated ground recepta-
cles only on the isolated ground bus in a panel. Do not terminate bonding con-
ductors on an isolated ground bus.

J. Bolt panelboards to wall structure as required for appropriate seismic zone. Pro-
vide adequate backing as required.

K. All nameplates, labels, screws, bolts, or other hardware shall be in place prior to
acceptance.

L. Install floor-mounted equipment on a three-inch high concrete pad extending
three inches beyond front and sides of said equipment. Level and securely fasten
equipment to concrete pad.

M. Provide four-foot wide rubber insulation mats on floor in front of switchboard for
its entire length.

3.03 Power One-Line Diagram

A. Mount one-line diagram from Plans at main distribution assembly. Use a clean
copy and mount under clear plastic cover, set in a metal frame.

3.04 Field Test

A. Prior to energizing distribution equipment, perform following test and adjust-
ments according to manufacturer's recommendations and instructions.

B. Continuity check.

C. Insulation level (megger) tests.

D. Short circuit test.

3.05 Adjustment And Cleaning

A. Tighten bus connections and mechanical fasteners. Check bus-to-bus and break-
er-to-bus connection for correct torque tightening.

B. Tighten feeder and circuit breaker connections as recommended by the manufac-
turer.
C. Clean all foreign matter from interior and exterior of equipment and touch-up scratched or marred surfaces to match original finish.

D. Adjust interior trim to fit tight against exterior trims.

E. Check all moving mechanical parts for proper operation.

END OF SECTION
SECTION 31-1000
SITE CLEARING

PART 1 GENERAL
1.01 SECTION INCLUDES
A. Clearing and protection of vegetation.
B. Removal of existing debris.

1.02 RELATED REQUIREMENTS
A. Section 01-1000 - Summary: Limitations on Contractor's use of site and premises.
B. Section 01-5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
C. Section 01-7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.
D. Section 01-7419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
E. Section 31-2200 - Grading: Topsoil removal.
F. Section 31-2323 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

PART 2 PRODUCTS
2.01 MATERIALS
A. Fill Material: As specified in Section 31-2323 - Fill and Backfill

PART 3 EXECUTION
3.01 SITE CLEARING
A. Comply with other requirements specified in Section 01-7000.
B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.02 EXISTING UTILITIES AND BUILT ELEMENTS
A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
B. Protect existing utilities to remain from damage.
C. Do not disrupt public utilities without permit from authority having jurisdiction.
D. Protect existing structures and other elements that are not to be removed.

3.03 VEGETATION
A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by building structure, paving, playing fields, lawns, and planting beds.
B. Do not begin clearing until vegetation to be relocated has been removed.
C. Do not remove or damage vegetation beyond the limits indicated on drawings.
   1. 5 feet outside the of construction limits.
   2. Exception: Specific trees and vegetation indicated on drawings to be removed.
   3. Exception: Selective thinning of undergrowth specified elsewhere.
D. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
   1. At vegetation removal limits.
   2. Around trees to remain within vegetation removal limits; locate no closer to tree than at the drip line.
3. Around other vegetation to remain within vegetation removal limits.
4. See Section 01-5000 for fence construction requirements.

E. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.

F. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
   1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
   2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
   3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
   4. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.

G. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.

H. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.04 DEBRIS
   A. Remove debris, junk, and trash from site.
   B. Leave site in clean condition, ready for subsequent work.
   C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION
SECTION 31-2200
GRADING

PART 1  GENERAL
1.01  SECTION INCLUDES
A.  Removal of topsoil.
B.  Rough grading and shaping the site for site structures and building pads.
C.  Finish grading.

1.02  RELATED REQUIREMENTS
A.  Section 31-2316 - Excavation.
B.  Section 01575 - Temporary Erosion and Sedimentation Control.

PART 2  PRODUCTS
2.01  MATERIALS
A.  Topsoil:  See Section 31-2323.
B.  Other Fill Materials:  See Section 31-2323.

PART 3  EXECUTION
3.01  EXAMINATION
A.  Verify that survey bench mark and intended elevations for the Work are as indicated.
B.  Verify the absence of standing or ponding water.

3.02  PREPARATION
A.  Identify required lines, levels, contours, and datum.
B.  Stake and flag locations of known utilities.
C.  Locate, identify, and protect from damage above- and below-grade utilities to remain.
D.  Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
E.  Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

3.03  ROUGH GRADING
A.  Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
B.  Do not remove topsoil when wet.
C.  Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
D.  Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
E.  When excavating through roots, perform work by hand and cut roots with sharp axe.
F.  Stability:  Replace damaged or displaced subsoil to same requirements as for specified fill.
G.  Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04  FINISH GRADING
A.  Before Finish Grading:
   1.  Verify building and trench backfilling have been inspected.
   2.  Verify subgrade has been contoured and compacted.
B.  Remove debris, roots, branches, stones, in excess of 1/2 inch in size.  Remove soil contaminated with petroleum products.
C. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
D. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.05 TOLERANCES
A. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.
B. Top Surface of Finish Grade: Plus or minus 1/2 inch.

3.06 REPAIR AND RESTORATION
A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

3.07 FIELD QUALITY CONTROL
A. See Section 31-2323 for compaction density testing.

3.08 CLEANING
A. Leave site clean and raked, ready to receive landscaping.

END OF SECTION
SECTION 31-2316
EXCAVATION

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Excavating for building volume below grade, footings, and paving.
B. Trenching for utilities outside the building to utility main connections.

1.02  RELATED REQUIREMENTS
A. Section 31-2200 - Grading: Soil removal from surface of site.
B. Section 31-2200 - Grading: Grading.
C. Section 31-2323 - Fill: Fill materials, filling, and compacting.

1.03  PROJECT CONDITIONS
A. Verify that survey bench mark and intended elevations for the Work are as indicated.

PART 2  PRODUCTS - NOT USED

PART 3  EXECUTION

3.01  PREPARATION
A. Identify required lines, levels, contours, and datum locations.
B. See Section 31-2200 for additional requirements.
C. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

3.02  EXCAVATING
A. Excavate to accommodate new structures and construction operations.
   1. After footing excavation moisture condition and compact the subgrade to 88% of maximum dry density at 2% above optimum moisture. Refer to Soils Report.
B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
D. Cut utility trenches wide enough to allow inspection of installed utilities.
E. Hand trim excavations. Remove loose matter.
F. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31-2323.
G. Grade top perimeter of excavation to prevent surface water from draining into excavation.
H. Remove excavated material that is unsuitable for re-use from site.
I. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31-2200.
J. Remove excess excavated material from site.

END OF SECTION
SECTION 31-2323
FILL

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Filling, backfilling, and compacting for building volume below grade, footings, pile caps, slabs-on-grade, paving, site structures, utilities within the building, and other areas as noted in Drawings.
   B. Backfilling and compacting for utilities outside the building and paving areas and as shown in drawings.
   C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS
   A. Section 31-2200 - Grading: Site grading.
   B. Section 31-2316 - Excavation: Removal and handling of soil to be re-used.
   C. Section 330000 - Site Utilities.
   D. Section 321123 - Aggregate Base Course.
   E. Section 03-3000 - Cast-in-Place Concrete.

1.03 DEFINITIONS
   A. Finish Grade Elevations: Indicated on drawings.

1.04 REFERENCE STANDARDS
   A. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN/m³)); 2012.

1.05 SUBMITTALS
   A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
   B. Compaction Density Test Reports.

PART 2 PRODUCTS
2.01 FILL MATERIALS
   A. General Fill - Fill Type Class A: Use native or common material excavated from within limits of the project, free from vegetation and other detrimental material and containing no frozen ground. Maximum particle size shall be 3 inches. Engineer will make approval prior to placement. Compact to at least 95 percent of the maximum dry density, as determined by ASTM D 698.
   B. Granular Fill - Fill Type Class B: Use high quality dense-grade 1”-0 or 3/4”-0 inch crushed rock, with less than 5 percent passing the U.S. Standard No. 200 sieve, compact to at least 98 percent of the maximum dry density, as determined by ASTM D 698. Gradation shall conform to Section 02630 of ODOT/APWA 2008 Oregon Standard Specifications for Construction.
   C. Granular Fill - Fill Type Class B-1: Use high quality clean dense-grade 1/2” to 3/4” crushed rock, with less than 2 percent passing the U.S. Standard No. 200 sieve, compact to at least 98 percent of the maximum dry density, as determined by ASTM D 698. Gradation shall conform to Section 02630 of ODOT/APWA 2008 Oregon Standard Specifications for Construction.
   D. Sand - Fill Type Class C: Concrete angular sand; free of silt, clay, loam, friable or soluble materials, and organic matter.
   E. Drainrock Fill - Fill Type Class D: Use granular permeable material; coarse, clean, free drain open graded 1 or 3/4” crushed rock containing no fines or round rock.
   F. Topsoil - Fill Type Class F: Topsoil excavated on-site, and/or borrow source.
      1. Unclassified.
      2. Graded.
3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
4. Acidity range (pH) of 5.5 to 7.5.
5. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.

2.02 ACCESSORIES
   1. Flow Rate: 145 gal/min/sf.
   3. Grab Strength (ASTM D 4632): 100 lbs.
   4. Grab Elongation (ASTM D 4632): 50%.
   5. Amoco Style 4546 or equal.
B. Geotextile Filter Fabric: Same as above.

PART 3 EXECUTION

3.01 EXAMINATION
A. Identify required lines, levels, contours, and datum locations.
B. See Section 31-2200 for additional requirements.
C. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION
A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.
B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type B.
C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING
A. Fill to contours and elevations indicated using unfrozen materials.
B. Employ a placement method that does not disturb or damage other work.
C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
D. Maintain optimum moisture content of fill materials to attain required compaction density.
E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 8 inches compacted depth.
F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
G. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
H. Correct areas that are over-excavated.
   1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 95 percent of maximum dry density.
   2. Other areas: Use Fill Type A, flush to required elevation, compacted to minimum 98 percent of maximum dry density.
I. Compaction Density Unless Otherwise Specified or Indicated:
J. Reshape and re-compact fills subjected to vehicular traffic.
K. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.
3.04 FILL AT SPECIFIC LOCATIONS
   A. Use general granular fill (Type A) unless otherwise specified or indicated.
   B. Structural Fill:
      1. Use Fill Type Class B.
      2. Maximum depth per lift: 8 inches, compacted.
      3. Compact to minimum 98 percent of maximum dry density.
   C. Pervious Structural Fill at below slab locations - refer to Drawings:
      1. Use Fill Type B and C.
      2. Maximum depth per lift: 8 inches, compacted.
      3. Compact to minimum 95 percent of maximum dry density.
   D. Under Interior Slabs-On-Grade:
      1. Use Fill Type Class B-1 - clean crushed rock.
      2. Depth: 6 inches minimum directly below slab, Type Class B fill, depth inches as required
         below.
      3. Compact to 98 percent of maximum dry density.
      4. Place vapor barrier directly over "clean" rock layer.
   E. Over Subdrainage Piping at drainage areas as shown in drawings - behind retaining walls:
      1. Drainage fill, Fill Type Class D and geotextile fabric.
      2. Cover drainage fill with Fill Type Class F.
   F. At Lawn Areas and other Planting Areas:
      1. Use Fill Type Class F.
      2. Fill up to 6 inches below finish grade elevations.
      3. Compact to 90 percent of maximum dry density.
      4. See Section 31-2200 for topsoil placement.
   G. At Planting Areas Other Than Lawns and other planting areas:
      1. Use Fill Type Class F.
      2. Compact to 95 percent of maximum dry density.
      3. See Section 31-2200 for topsoil placement.

3.05 TOLERANCES
   A. Top Surface of General Filling: Plus or minus 1/2 inch from required elevations.
   B. Top Surface of Filling Under Paved Areas: Plus or minus 1/4 inch from required elevations.

3.06 FIELD QUALITY CONTROL
   A. See Section 01-4000 - Quality Requirements, for general requirements for field inspection and
      testing.
   B. Evaluate results in relation to compaction curve determined by testing uncompacted material in
      accordance with ASTM D 698 ("standard Proctor").
   C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

3.07 CLEANING
   A. See Section 01-7419 - Construction Waste Management and Disposal, for additional
      requirements.
   B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile
      area to prevent standing surface water.

END OF SECTION