



PUBLIC UTILITY DISTRICT NO. 1 of CHELAN COUNTY

P.O. Box 1231, Wenatchee, WA 98807-1231 • 327 N. Wenatchee Ave., Wenatchee, WA 98801
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May 6, 2015

Honorable Kimberly D. Bose, Secretary, and
Nathaniel J. Davis, Sr., Deputy Secretary
FEDERAL ENERGY REGULATORY COMMISSION
888 First Street, NE
Washington, DC 20426

VIA ELECTRONIC FILING

Re: Rocky Reach Hydroelectric Project No. 2145
Request for Approval of Daroga Park Group Camp Contract Plans and Specifications

Dear Ms. Bose and Mr. Davis:

On October 12, 2010, the Federal Energy Regulatory Commission (Commission) issued the “*Order Modifying and Approving Revised Recreation Management Plan*” for the Rocky Reach Hydroelectric Project (Project). Ordering Paragraph (C) requested that the Public Utility District No. 1 of Chelan County, Washington (Chelan PUD) shall file final construction drawings for the improvements at Daroga State Park, including erosion and sedimentation control measures, trash clean-up and removal provisions, a discussion of how the needs of the disabled were considered in the planning and design of the improvements.

In accordance with the above Order, Chelan PUD hereby files electronically, with this letter, each of the items listed below. Additionally, in accordance with License Article 302, hard copies will be filed with the Commission’s Director of Division of Dam Safety and Inspections and the Portland Regional Office by copy of this letter.

- Quality Control Inspection Plan (QCIP)
- Erosion and Sediment Control Plan (ESCP)
- Contract Plans and Specifications

Trash clean up during construction is the responsibility of the Contractor as described in General Conditions (GC) 62 - Cleanup. Following construction work provisions have been made to locate garbage dumpsters at key exit locations. Washington State Parks will be responsible to pick up and collect trash on a regular basis as well as contract with local waste management services for dumpster collection.

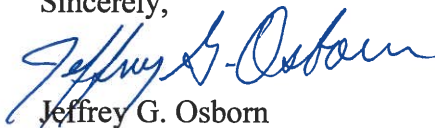
The needs of the disabled were taken into consideration on every aspect of the project design. The proposed shower facility (i.e., comfort station) is designed to meet the latest American Disabilities Act standards. These features are illustrated in the Exhibit T - Contract Drawings.

As part of the planning process, Chelan PUD submitted a building permit application to Douglas County, Washington. A permit is pending award of the contract to a qualified contractor.

Chelan PUD would appreciate any comments you may have as soon as practicable, as it would be helpful in our efforts to maintain the overall project schedule. Chelan PUD will not close the park to the public during the construction period of these major improvements proposed to begin September 2015 through May 2016. Construction of the remaining minor improvements as described in the approved recreation plan is tentatively scheduled for completion for May 2017.

Please contact Ray Heit at (509)661-4133 or me if you have any questions or require additional information.

Sincerely,



Jeffrey G. Osborn
Compliance Program Supervisor
(509) 661-4176
jeff.osborn@chelanpud.org

Enclosure: Electronic files for the QCIP, ESCP, and contract plans and specifications

cc: Commission's Director of Division of Dam Safety & Inspections (hard copy)
Commission's Portland Regional Office (two hard copies)

Quality Control and Inspection Plan

Daroga State Park Group Camp Improvements

Rocky Reach Hydroelectric
Project
FERC Project No. 2145

May 2015

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1. Introduction

Public Utility District No. 1 of Chelan County (Chelan PUD) owns and operates the Rocky Reach Hydroelectric Project (Project). Rocky Reach dam is located on the Columbia River approximately five miles north of Wenatchee, Washington. As a requirement of the Rocky Reach FERC license Chelan PUD also owns Daroga State Park. This park is located on the Rocky Reach reservoir, approximately 13 miles upstream of the Rocky Reach Project, as illustrated below.



In accordance with the FERC License Order dated February 19, 2009, and further clarified in the Rocky Reach Recreation Resources Management and Implementation Plan dated February 12, 2010, Chelan PUD will design and construct improvements to Daroga State Park, specifically construction of a new comfort station (ie. shower house) and install 50 amp RV pedestals at the existing group camp. Chelan PUD proposes to begin construction September 2015 and complete by May 2016.

The project was designed using a team of external consultants. Chelan PUD staff will oversee construction of the project with external consultant assistance as necessary. All construction

activities take place within the vicinity of the park and, therefore, no impacts or damage risk will be imposed on the Rocky Reach Project.

The scope of work for the project includes the following construction of a 1,120 square foot Shower Facility/Building (ie. comfort station), associated septic drain field system and seven (7) 50 amp RV pedestals with water supply.

2. Organization and Staffing Responsibilities

A. Titles, duties, and responsibilities of staff

An organizational chart for this project is presented in Appendix A. Responsibilities for maintaining quality assurance are as follows:

(1) Construction Manager

Casey Hall
Chelan PUD
327 North Wenatchee Avenue
Wenatchee, WA 98801

Chelan PUD
P.O. Box 1231
Wenatchee, Washington 98807
Telephone: (509) 661-4965 office
(509) 881-9302 mobile

- Review the Contractor's quality control documents and project reports.
- Provide quality assurance by personally observing or observing via an inspection team the construction on a full-time basis to ensure compliance with contract drawings and specifications.
- Maintain daily records of type, quantity, location, and quality of construction work.
- Conduct weekly construction progress meetings, prepare documentation of meeting discussions, and distribute copies of the discussions.
- Perform final inspection with project team and recommend acceptance of completed project.
- File daily progress reports, nonconformance reports, and environmental deficiency reports as appropriate (sample copies presented in Appendix C).

(2) Project Engineer/ Owner's Engineer, 1st Alternate

Courtney Hill, P.E.
Chelan PUD
327 North Wenatchee Avenue
Wenatchee, WA 98801

Chelan PUD
P.O. Box 1231
Wenatchee, Washington 98807
Telephone: (509) 661-4143 office
(509) 668-4143 mobile
(509) 884-3439 home

- Review contractor's submittals.
- Provide ongoing technical assistance/clarification, as needed.
- Provide on-site inspection, as requested, at critical phases of construction.
- Provide clarification of drawings and specifications.
- Provide project record drawings at completion of the project.
- Periodically review owner's quality control documents and project reports.

(3) Testing Service(s)

Testing services include geotechnical (density tests, compressive strength, etc.).

(4) Construction Contractor(s)

- Construct project to meet project specifications.
- Perform testing and inspection as necessary to control the quality of the work.
- Submit documents, material certificates, shop drawings, product data, and testing results to owner's engineer as specified in the *Technical Specifications*.
- Implement and monitor job site safety program and be responsible for job site safety.
- Implement and monitor construction techniques and procedures so that project quality control standards will be met as verified by Chelan PUD and site engineers.

B. Approval and rejection of work

The approval and rejection of work will be subject to the judgment of the construction manager.

C. Authority to stop work

The owner's construction manager will have the authority to stop work on the project.

D. Resumes

Resumes of key quality control personnel are included in Appendix B.

3. Inspection Plan and Field Practices

A. Inspection criteria

Criteria for evaluating the quality of work under the contract are contained in the specifications, drawings, and other contract documents. The following items will be completed to make effective use of the contract documents.

- Prior to the start of work at the site, the owner's construction manager and inspectors shall take the time to become familiar with the contract documents.
- The owner's construction manager and inspectors shall review relevant portions of the documents daily as the work progresses.
- The project manager shall ensure that the construction manager/inspector receives copies of any revisions to the contract documents in a timely manner and shall discuss the revisions to ensure a common understanding of them.

B. Inspection equipment and resources

The independent testing service will supply qualified personnel and appropriate testing equipment to satisfy the requirements of the Quality Control Inspection Plan (QCIP).

C. Contractor operations

The contractor is responsible for choosing equipment and methods adequate to perform the work specified in the contract documents and for actually achieving the required results. For this reason, the owner's construction manager will avoid direction or control of the contractor's operations. The owner's construction manager is responsible for verifying that the contract documents are being followed and the required results are being/have been achieved.

D. Coordination with Contractor's schedule

The contractor's proposed construction schedule will be submitted after the contract is awarded. The contractor will be required to notify the owner 24 hours in advance of starting, or restarting, on-site construction activities.

E. QCIP operations

The owner's construction manager and inspectors are chiefly responsible for observing details of the contractor's work as it progresses to verify that it meets requirements of the contract documents. This will require the owner's construction manager and Inspectors to:

- Be familiar with the contract documents, including the technical specifications and drawings.
- Be present at key times to verify and approve items as they come up.
- Be present to observe and document progress of the work as outlined below.
- Understand the intent of the drawings and specifications as a basis for exercising judgment, as appropriate, during the work.

The owner's construction manager and inspectors shall notify the contractor immediately upon discovery of any item of work, completed or in progress, which does not meet requirements of the contract documents.

If conditions are encountered that require redesign or substantial modification of the work, the Inspector shall contact the construction manager and engineer for guidance. The contact shall be made in a timely manner to avoid or minimize delay of the work.

If the owner's construction manager or Inspector observes work being performed by the contractor in such a way that it could negatively impact human safety or cause significant damage to property, he shall immediately notify the contractor. If the problem is not addressed by the contractor in a timely manner, the owner's construction manager or Inspector shall issue an order to the contractor to stop work until the apparent problem is resolved.

The owner's construction manager or designated Inspector also is present to serve as the interface between the contractor and the owner's other personnel on site. For this purpose, the owner's construction manager or Inspector will be present at all times when the contractor is working on the site.

F. Frequency of inspections

During construction, the independent testing service and engineer will perform site visits as required to comply with the specifications. Full-time observation services will be provided by the owner's construction manager during fieldwork. The engineer will provide on-site inspection during critical phases of the construction, as requested by the construction manager.

4. Documentation

The owner's construction manager is responsible to maintain certain records as the construction progresses. The types of documentation are outlined below, and sample forms are attached, as appropriate.

A. Daily Progress Reports

A Daily Progress Report (DPR) has been developed to document work progress, site conditions, and other relevant items. A report shall be filled out for each shift worked. A sample DPR form is presented in Appendix C.

B. Nonconformance Reports

A Nonconformance Report (NCR) form has been developed to document work that does not meet the project plans and specifications. Nonconforming work is defined as a deficiency in characteristic, documentation, or procedure that renders the work unacceptable with respect to the quality requirements for the project. A sample NCR form is presented in Appendix C.

An NCR shall be issued to the contractor when he/she presents any portion of their work as complete and a serious deficiency exists or a deficiency trend is occurring in subsequent similar work. NCRs are not to be used for documenting acknowledged incomplete "punch list" type work items or for problems relating to project design. If the Independent Testing Service determines that rework is necessary, it should be reworked and retested without an NCR being issued.

The Owner's Construction Manager is responsible for submitting NCRs. The NCRs shall be numbered sequentially. A copy of all NCRs shall be forwarded to the contractor and the Owner. The NCRs shall be reviewed weekly by the owner's construction manager to evaluate the contractor's compliance with corrective action requirements and to identify the need for follow-up action.

In the event of the contractor's failure to comply with the corrective action requirements of an NCR, either unsatisfactory work or failure to meet the time requirements, the following procedure will be implemented:

- The owner's construction manager will prepare a formal contract correspondence letter with a copy of the original NCR attached advising the Contractor of his/her failure to meet the corrective action requirements.

- Distribution of all such follow-up NCR correspondence shall be the same as the original NCR and shall be filed in the appropriate NCR file.

C. Environmental Deficiency Reports

An Environmental Deficiency Report (EDR) form has been developed to document any observed violations of environmental requirements of the contract documents and its resolution. A sample EDR form is presented in Appendix C.

D. Material Test Reports

Materials sampling and test reports will describe the type and location of the material being tested, as well as the date, time, and weather conditions when obtaining the sample or performing the test. A record of the tests performed, applicable standards, and test results shall be distributed to the Owner's Engineer and Contractor.

E. Maintenance of records

All documents, correspondence, and data pertaining to the project must be clearly identified, organized, and filed with the owner's construction manager. The owner's construction manager will maintain one set of record drawings in the field for use in preparing final record drawings.

F. Photographs

Photographs of significant construction activities will be taken throughout the construction period by the owner's construction manager. All photographs will be dated with identification, as appropriate, of the object being photographed.

5. Training

No formal training is proposed for this project.

6. Material Testing

The number and type of tests to be performed during construction are presented in the specifications and drawings. Material testing will be performed in accordance with the contract documents, by an independent testing service where appropriate.

7. Environmental Compliance

A. Environmental Compliance Plan

The proposed project required environmental permitting in the form of a Douglas County Shoreline Substantial Development Permit. Chelan PUD has obtained this permit and will require the Contactor to comply with provisions contained therein. In addition, the contractor will submit a detailed temporary Erosion and Sediment Control Plan for the project.

B. Frequency of inspections

Inspections for compliance with the design will take place on a daily basis.

C. Documentation and corrective actions

Documentation of any observed violations of environmental requirements of the contract documents will be included in an EDR along with its resolution.

8. Schedule

A. Start and finish dates

Construction of the various projects is proposed to begin March 2015 and complete by May 2016.

B. Anticipated construction sequence

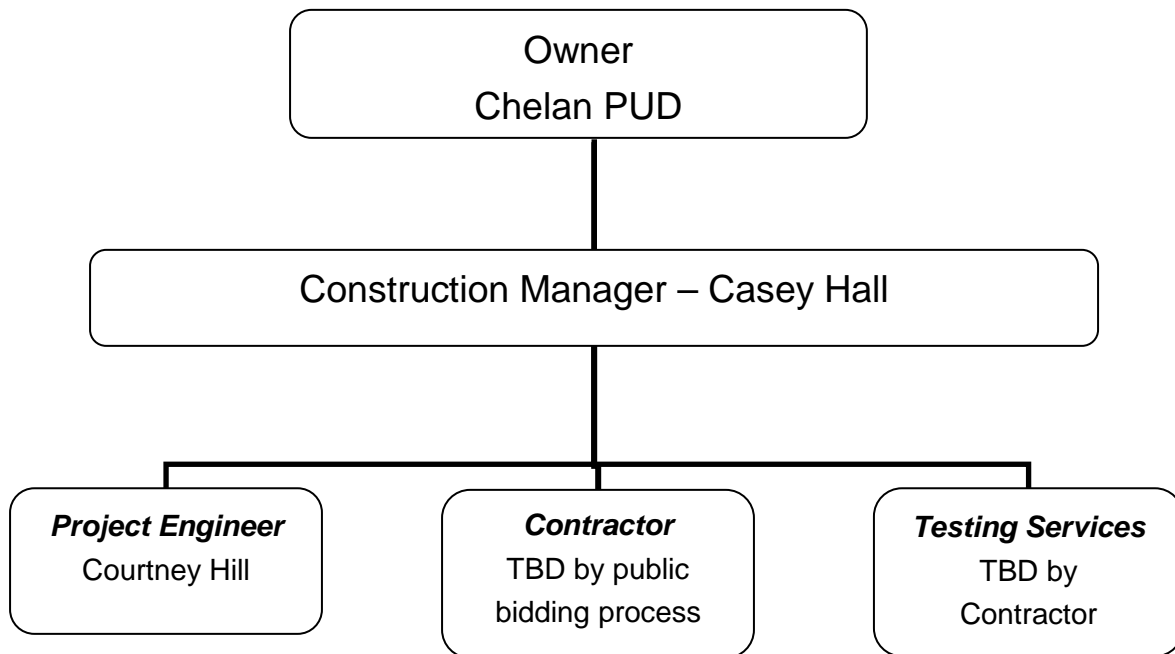
The construction sequence will generally begin with installation of site earthwork and utilities, then will progress to building construction and landscaping improvements.

9. Planned use of consultants

Consultants will be involved on a limited basis during construction for review of general conformance to the design.

Appendix A. Organizational Chart

Organizational Chart
Daroga State Park Cabin Loop & Group Camp
Rocky Reach Hydroelectric Project



Appendix B. QCIP Personnel Resumes

Casey J. Hall

Construction Manager, PUD No. 1 of Chelan County

Education

B.S. Construction Management, Central Washington University, 2001

Experience - PUD No. 1 of Chelan County (June 2008 to present)

- Entiat Park Revitalization
- North Wenatchee Reservoir
- Rocky Reach fishway modifications for improved Lamprey passage Ph I&II
- Dryden weir gravel removal project
- Entiat switchyard earthwork and construction
- Entiat 115kV transmission line project
- Cost estimating for a wide variety of District projects.

Experience - Goodfellow Bros. Inc., Construction Manager (June 2002 to May 2008)

Responsibilities: cost estimating, budgeting, scheduling crews/equipment, coordinating the work of subcontractors, facilitating changes in design and working with the owner to implement changes, coordinating material submittals, handling onsite problem resolution, maintaining master schedules, developed 'as built' drawings and conducting weekly safety meetings for heavy civil contractor.

Experience - Baugh - Skanska, Construction Manager/Intern (June 2000 to May 2002)

Responsibilities included subcontract management, project financial management, materials procurement, and subcontract development duties.

Internship position included developing knowledge and experience in the operation of a large construction company. Responsibilities included: estimating, scheduling and working with plans and specifications. Gained knowledge of electrical design, mechanical and HVAC systems. Introduced to surveying equipment: Total station, Theodolite and Transit.

SKILLS

- Proficiency in computer usage for personal and business applications.
 - Microsoft Programs: Word, Excel, PowerPoint, MS Project
 - Experience with AutoCAD, Oracle, Primavera, Trimble Terramodel design program for GPS equipment, Paydirt, Hard Dollar, ECMS, Maximo, Peoplesoft
- Knowledge in cost estimating procedures, construction safety and documentation, construction and project management in the public and private sectors

Courtney Hill, P.E.

Civil Engineer III, PUD No. 1 of Chelan County

Education

M.S. Civil Engineering, Brigham Young University, 1999

B.S. Civil Engineering, Brigham Young University, 1998

Professional Affiliations

Registered Professional Engineer, Washington State

Member, American Society of Civil Engineering

Continuing Education/Training

ASCE Seminars in Cost Estimating (2000), Shoreline Stabilization (2004), Pumping Systems (2005) and Water Hammer (2006)

Primavera Courses 102 & 106 (2006)

Experience - PUD No. 1 of Chelan County (October 2002 to present)

Entiat Park Revitalization (incl. Entiatqua Trail), 2010 to Present, T.P.C. \$9M

District's project engineer for development of new water well sources and transmission supply main from well field to hatchery complex; responsibilities included: developing feasibility/alternative analysis; overseeing drilling operations; leading and conducting design development; permitting including water rights, land easement, DOT and building; contract development and administration; and construction oversight

Chelan River Project, 2006 to 2009, T.P.C. \$16M

District's project engineer for the Low Level Outlet, responsibilities include: leading and coordinating design development with external design consultant and District stakeholders, contract development and administration

Other PUD Projects Include:

- Entiat Park Revitalization, 2010 to present, T.P.C. \$9M
- Daroga & Daroga State Park Pile & Dock Replacements, 2011 to present, T.P.C. \$1.3M
- Chelan Ridge Water System Improvements, 2004 to 2007, T.P.C. \$1M
- Chelan Hatchery Wells & Watermains, 2002 to 2010, T.P.C. \$4M
- Rock Island Hydro Park Irrigation Well, April 2005 to June 2006, T.P.C. ~\$100,000
- Dryden Wastewater Influent Metering, May 2004 to January 2005, T.P.C. ~\$100,000
- Dryden Canal Lining, 2004, T.P.C. ~\$500,000
- Tumwater Fishway – Fish Collection Improvements
- Dryden Right Bank Fishway – Fish Collection and Handling Improvements
- Various Park Shoreline Stabilization Projects
- Compliance with Ecology Water Measurement Rule

Other Employment Experience:

Franson-Noble Engineering, American Fork, UT, May 1999 to October 2002

- Otter Creek Dam Rehabilitation – design lead for fuse plug spillway
- Dairy Dam Construction – design lead for 30" twin outlets
- Combined Canals Reservoir – design lead for dam outlet
- Reinforced Concrete Domestic Water Reservoirs – design lead

Appendix C. Construction Management Sample Forms

Daily Progress Report				
_____ Project				Chelan County PUD
Date:	start shift:		end shift:	
Worked on:				
Delays:				
Contractor personnel on site:				
Visitors to site:				
Comments:				
				Inspector/date:

Nonconformance Report				NCR No.
_____ Project				
Description:				
Reference documents				
Spec. section:		Inspector/date:		
Drawing:		Engineer/date:		
Disposition:				
		Engineer/date:		
Action completed:				
		Inspector/date:		

Environmental Deficiency _____ Project			Report No.
Date/time:			
Description:			
Reference Documents			
Spec. Section:			
Drawing:			
Please correct the above deficiency by:			
Disposition:			
Sign and return this form when the deficiency is corrected.			
signature	date		

DAROGA STATE PARK CABIN LOOP AND GROUP CAMP PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY

SOIL EROSION AND SEDIMENT CONTROL PLAN

Public Utility Chelan PUD No. 1 of Chelan County (Chelan PUD) owns and operates the Rocky Reach Hydroelectric Project (Project). Rocky Reach Dam is located on the Columbia River approximately five miles north of Wenatchee, Washington. As a requirement of the Rocky Reach FERC license Chelan PUD also owns Daroga State Park. This park is located on the Rocky Reach reservoir, approximately 13 miles upstream of the Rocky Reach Project, as illustrated below.



In accordance with the FERC License Order dated February 19, 2009, and further clarified in the Rocky Reach Recreation Resources Management and Implementation Plan dated February 12, 2010, Chelan PUD will design and construct improvements to Daroga State Park, specifically construction of a new comfort station (ie. shower house) and install 50 amp RV pedestals at the existing group camp. Chelan PUD proposes to begin construction September 2015 and complete by May 2016.

The following constitutes the Soil Erosion and Sediment Control Plan (ESCP) as required in Article 302 of the FERC License Order.

1.0 SCOPE OF WORK

The scope of work for the project includes the following construction of a 1,120 square foot comfort station (ie. bathhouse), septic drain field system and seven (7) 50 amp RV pedestals with water supply.

Temporary and permanent erosion control devices will be employed during construction. The locations and details for these devices are as shown in the construction drawings. A temporary erosion control device consisting of a silt fence will be installed between the Columbia River and the project work site. The same area will receive a hydroseed coating following construction as a permanent erosion measure.

2.0 IMPLEMENTATION

All erosion control work will be performed under the direction of a contractor having experience installing and maintaining best management practices for controlling erosion during construction. The Contractor will be required to inspect, maintain and keep devices in a good working condition. Periodic reviews will be conducted by the Owner's Certified Erosion and Sediment Control Lead (CESCL).

The design specifications for this project contain an entire section (31 25 00) dedicated to erosion and sediment control. This specification section should be considered a primary component of this ESCP.

3.0 CONCLUSION

Construction of the Daroga State Park Group Camp Improvements includes the employment of both temporary and permanent sedimentation and erosion control devices consistent with Article 302 of the FERC license order as detailed herein and in the construction drawings.

Bid No. 15-04

Daroga State Park Group Camp Improvements

PUBLIC UTILITY DISTRICT NO. 1
of



CHELAN COUNTY

PROCUREMENT AND CONTRACT SERVICES

P.O. Box 1231 (98807)
327B North Wenatchee Avenue
Wenatchee, WA 98801
(509) 661-4479 or (888) 663-8121
http://www.chelanpud.org/cf/PCS_Bids



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EXHIBIT R	INSPECTION ELEMENTS – SUMMARY MATRIX	
EXHIBIT S	SPECIFICATIONS	
EXHIBIT T	CONTRACT DRAWINGS	



INSTRUCTIONS TO BIDDERS

ITB-1 RECEIPT AND OPENING OF BIDS

Public Utility District No. 1 of Chelan County, Washington (herein called the "District"), invites bids on the forms contained in these Contract Documents, (Exhibits). All blanks must be appropriately filled in. The envelopes containing the bids must be sealed, addressed and delivered to Christi VanWagner, Procurement and Contract Services, Public Utility District No. 1 of Chelan County, at office at 327B North Wenatchee Avenue, Wenatchee, Washington 98801 (P. O. Box 1231, Wenatchee, WA 98807) and designated as Bid No. 15-04 for Daroga State Park Group Camp Improvements. Bids will be publicly opened and read aloud at 2:00 p.m., Pacific Time, May 22, 2015. E-mail bids are not allowed. The District may waive any informalities or immaterial irregularities, as authorized by applicable law, or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof.

The District reserves the right to extend the time for receiving and opening bids. If the time is extended, notice of the extension(s) will be given prior to the originally specified due date to each entity which has been furnished the Contract Documents by the District.

Any bid received after the time and date specified may be marked as to date and time received and returned to Bidder unopened by the District. If a bid arrives by mail after the opening time and is postmarked by the post office, private carrier or courier of the Bidder sufficiently in advance of bid opening time to have normally reached the District prior to bid opening, and it is determined by the District that nonarrival on time was due solely to delay by the post office, private carrier or courier for which the Bidder was not responsible, such bid may be considered. Each Bid submitted shall constitute an offer to the District and shall be irrevocable for the period specified on the Bid Form.

ITB-2 PREPARATION OF BIDS / BID PRICE

Each bid must be submitted on the prescribed forms contained in the Contract Documents (Exhibits). All blank spaces for bid prices must be filled in, in ink or typewritten, signed, and shall include, but not limited to, the following:

- Original of the executed Bid Form and Bidder's Data (if applicable).
- Acknowledgment of receipt of Addenda to Contract Documents on Bid Form.
- Bid Bond, or certified or cashier's check.

Bidder's failure to properly complete or submit the above referenced documents may result in rejection of its bid if the omission is determined by the District to be material.

The Bid Price shall be all inclusive to include the furnishing of all materials, tools, equipment, all taxes (excluding Washington State sales tax on the Bid Price), licenses,



insurance, overhead, profit, and all miscellaneous items as required by the Contract Documents. The District will pay the Contractor for Washington State sales tax; this tax shall be shown as a separate item on invoices and will be paid on the basis of items received and accepted.

ITB-3 MONETARY REQUIREMENT

All Bid Proposals must be quoted in U.S. dollars.

ITB-4 CLARIFICATION / BID WITHDRAWAL

Any Bidder may submit data to clarify its bid in a sealed envelope at any time prior to the scheduled closing time for receipt of bids. A Bidder may withdraw its bid before the time set for opening sealed bids, but may not do so once that time arrives.

ITB-5 BID BOND OR DEPOSIT

Each bid must be accompanied by a certified or cashier's check, payable to the order of Public Utility District No. 1 of Chelan County, Washington, for a sum of 5% of the Total Lump Sum Bid Price or by a Bid Bond, in the form included in Exhibits of these Contract Documents, unless otherwise specified on the Bid Bond.

The Bid Bond shall be issued by a corporate surety licensed to do business in the State of Washington, and acceptable to the District. The Bid Bond shall be accompanied by a certified copy of the power of attorney authorizing the attorney-in-fact of the corporate surety to execute and deliver the Bond on behalf of the surety, together with a currently executed certificate of an authorized officer of the surety stating that the power of attorney is in full force and effect. The Bid Bond shall be at the expense of the Bidder.

The Bid Bonds, certified or cashier's checks of all Bidders will be returned without interest after the Contract has been awarded to the successful Bidder, except that of the successful Bidder which shall be retained until the Contract is executed, Insurance Certificate is submitted, and a bond to perform the Work, with surety Satisfactory to the District, is furnished in accordance with the Contract Documents. The District has estimated and each Bidder, by submitting its Bid Proposal, agrees that reasonable compensation for damages (monetary loss for, among other things, interference with the District's construction program and normal operations, the accurate amount of which is difficult or impossible to compute) resulting from failure, neglect or refusal to furnish a Performance and Payment Bond and Insurance Certificate(s) and execute the Contract shall be 5% of the amount of the Bid Price (unless otherwise specified on the Bid Bond in these Contract Documents). The amount of the certified or cashier's check or Bid Bond will be forfeited to the District as liquidated damages if Bidder fails to comply with the aforementioned requirements within 10 days after it is notified that it is the successful Bidder. In the event the District elects to declare a breach for such noncompliance, the defaulting Bidder shall not be the lowest responsible Bidder and the District may then select the lowest responsible Bidder and deliver a Notice of Award to such Bidder.



When the District rejects all Bid Proposals, all cashier or certified checks and/or Bid Bonds will thereupon be returned to the Bidders.

ITB-6 PERFORMANCE AND PAYMENT BOND

The successful Bidder must, within ten (10) days after it is notified that it is the successful Bidder by the delivery of a Notice of Award, furnish a Performance and Payment Bond which must be submitted on the form included in Exhibits of these Contract Documents. The Performance and Payment Bond shall be for 100% of the Contract Price plus Washington State sales tax. The Performance and Payment Bond shall extend through the warranty period of one year after final acceptance of the Work has been adopted by the District.. The Performance and Payment Bond shall be executed with a Satisfactory Surety authorized to issue surety bonds in the State of Washington. The Performance and Payment Bond shall be accompanied by a certified copy of the power of attorney authorizing the attorney-in-fact of the corporate Surety to execute and deliver the Bond on behalf of the Surety, together with a currently executed certificate of an authorized officer of the Surety stating that the power of attorney is in full force and effect. The actual cost of the Performance and Payment Bond shall be borne by the successful Bidder. At the District's sole discretion, authorization may be given to Contractor to begin the Work while finalizing minor deficiencies in the Performance and Payment Bond; progress payment(s), if any, may be withheld until the deficiency(ies) is corrected.

ITB-7 TIME OF COMPLETION AND LIQUIDATED DAMAGES

The Bidder shall base its bid upon the completion schedule included in the Contract Documents. Bidder (Contractor) agrees, unless otherwise specified, to commence Work on or before a date to be specified in a written Notice to Proceed issued by the District and to strictly comply with the completion schedule specified in the Contract Documents.

IMPORTANT: This Contract may contain a liquidated damages provision in Specific Requirements, based on the completion schedule.

ITB-8 EXAMINATION / CLARIFICATION OF CONTRACT DOCUMENTS

Each Bidder shall thoroughly examine and be familiar with the Contract Drawings, Specifications and other Contract Documents, and submission of a bid shall constitute an acknowledgment upon which the District may rely that the Bidder has thoroughly examined all Contract Documents. No claim for additional compensation will be allowed which is based upon a lack of knowledge of the Contract Documents.

If a Bidder requires clarification of the Contract Documents, the Bidder shall at once forward to the District a written request for interpretation, clarification, or qualification before submitting its bid. The Bidder making this request is solely responsible for its timely receipt. The District will reply only in the form of written Addenda. The District shall neither be bound by, nor responsible for, any explanations, interpretations, clarifications, or



qualifications of the Contract Document other than those given in written Addenda as specified in this paragraph. A BIDDER'S FAILURE TO FOLLOW THE PROCEDURE DESCRIBED IN THIS PARAGRAPH MAY BE A BASIS FOR REJECTING ITS BID. No interpretation, clarification, qualification, amendment, or modification shall be valid unless set forth in an Addendum issued by the District. The District shall not be bound by, and hereby objects to, any term, condition or other provision which is different from or in addition to that contained in the Contract Document or the written Addenda.

PLEASE NOTE THAT ATTEMPTS BY ANY BIDDER TO QUALIFY ITS BID PROPOSAL BY SUBMITTING WITH IT "STANDARD CONDITIONS," "STANDARD TERMS," MODIFICATIONS TO THE GENERAL AND/OR SPECIFIC REQUIREMENTS, OR THE LIKE, WITHOUT COMPLYING WITH THE PROCEDURES SET OUT IN THE IMMEDIATELY PRECEDING PARAGRAPH, MAY CONSTITUTE A BASIS FOR REJECTION OF THE BID. TO THE EXTENT ANY SUCH QUALIFICATIONS ACCOMPANY BIDDER'S BID PROPOSAL, THE DISTRICT SHALL BE ENTITLED TO CONSIDER THOSE STATEMENTS AS NULL, VOID AND OF NO EFFECT IN AWARD OF THE CONTRACT.

ITB-9 CHANGES TO CONTRACT DOCUMENTS

The District may revise or amend the Contract Documents any time prior to the bid opening by issuance of one or more written Addenda. Each Addendum will be sent to all prospective Bidders who have been furnished Contract Documents by the District and shall be construed as incorporated into the Contract Documents and shall become a part hereof. Bidder shall acknowledge receipt of each and every Addendum on the Bid Form.

ITB-10 EXCEPTIONS TO CONTRACT DOCUMENTS

The District may reject a Bid Proposal if it contains terms or conditions that are materially different from those contained in these Contract Documents. The District may, at its option, consider a Bid Proposal if it contains terms or conditions that are immaterially different from those contained in these Contract Documents by waiving such irregularity as an informality.

A proposal to substitute materials, processes or articles that are, in the District's sole judgment and opinion, equal to those required by these Contract Documents may not be considered materially different terms or conditions. The Bidder shall provide to the District adequate documentation to support that the substituted material is equal.

Terms or conditions in the Bid Proposal that are different from those contained in these Contract Documents, regardless of whether they would immaterially alter these Contract Documents, shall not be binding on the District, and the District hereby objects thereto unless the District, in writing, expressly and specifically accepts such different terms and conditions.



ITB-11 INTENT OF CONTRACT DOCUMENTS

All provisions of the Contract Documents are intended to be mutually cooperative and anything required in one and omitted from another shall be as binding as if called for in all, and in the event of a conflict in provisions, the Work shall be done in the manner most satisfactory to the District. It is the intent of the Contract Documents to include every requisite and necessity to properly furnish the entire Work, notwithstanding the fact that every item necessarily involved may not be particularly mentioned. All Work, when finished, shall be complete and in undamaged condition.

ITB-12 CONDITIONS OF WORK / EXAMINATION OF SITE

Each Bidder must inform itself fully of all conditions relating to the work of the Project and pertinent local conditions reasonably determined by inspection and inquiry, and the employment of labor thereon. Failure to do so will not relieve a successful Bidder (Contractor) of the provisions of its Contract. Insofar as possible, the Contractor, in carrying out its work, must employ such methods or means as will not cause any interruption of or interference with the tasks being accomplished by the District or other contractors and subcontractors in the same area or on the same improvement and/or Project to which these Contract Documents and the Work thereunder relate.

Each Bidder shall thoroughly examine and be familiar with the site of the proposed Project and submission of a Bid Proposal shall constitute an acknowledgment upon which the District may rely that the Bidder has thoroughly examined and is familiar with the site. Bidders must assume all responsibility for conclusions or assumptions which may be made as to the nature of materials to be excavated, the difficulties of making and maintaining the required excavation, and of doing other work affected by subsurface conditions at the site of the work. The failure or neglect of the Bidder to fully familiarize itself with the conditions at the Project site shall in no way relieve it of any obligations with respect to the Bid Proposal or to the Contract. No claim for additional compensation will be allowed based upon lack of knowledge of the site. Information or assistance for field inspection of the site by interested Bidders may be obtained by contacting Court Hill, Public Utility District No. 1 of Chelan County, Wenatchee, Washington, at (509) 661-4143, or toll free at (888) 663-8121, extension 4143.

ITB-13 QUALIFICATIONS OF BIDDER

Pursuant to RCW 39.06, the District shall not award the Contract to a Bidder who is not registered or licensed as may be required by Washington State law or does not meet the responsibility criteria pursuant to RCW 39.04. The District may make such investigations as it deems necessary to determine the ability of the Bidder to perform the Work, and the Bidder shall furnish to the District all such information and data for this purpose as the District may request. The District reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the District that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the Work contemplated therein.



IMPORTANT: Subcontractors are also subject to qualification by the District. See Instructions to Bidders, Evaluation Of Bids and Subcontractors, and General Conditions, Subcontractors, of these Contract Documents.

ITB-14 SUBCONTRACTORS

Each Bidder shall submit as part of the bid the names, addresses and telephone numbers of all Subcontractors with whom the Bidder, if awarded the Contract, will subcontract with for the performance of all or a portion of the Work. In no event shall Contractor subcontract for more than 50% of the Work. Pursuant to RCW 39.06, the Bidder must verify responsibility criteria for each first tier Subcontractor, and a Subcontractor of any tier that hires other Subcontractors. Verification shall include that each Subcontractor, at the time of subcontract execution, meets the responsibility criteria listed in RCW 39.04, possesses an electrical contractor license, if required by RCW 19.28, or an elevator contractor license, if required by RCW 70.87. Failure of the Bidder to name such Subcontractor(s) may render a Bid Proposal nonresponsive and therefore void.

ITB-15 BIDDER'S DATA

The following information shall be submitted with Bidder's Bid Proposal as additional Bid Evaluation Criteria. Failure to provide the requested information may result in rejection of Bidder's Proposal if the District determines the missing data is necessary to properly evaluate Bidder's Proposal.

1. Documentation showing Bidder has a minimum of three (3) years experience as a general contractor specializing in the construction of commercial building structures of a similar size and complexity as required in this contract.. At a minimum, documentation shall include the following information for a minimum of three similar projects:
 - a. Project Name;
 - b. Project owner's name and contact information;
 - c. Scope of work;
 - d. Contract original award amount, and actual completion amount, and the reason the amount differs (if different);
 - e. Contract original completion date, and actual completion date, and the reason that the dates differ.
2. Resume of Bidder's proposed project manager, showing a minimum of three years experience as a project manager on projects of a similar scope and complexity. Failure to provide proposed project manager during Contract period may constitute an act of default and a material breach of the Contract (see General Conditions, Termination for Default/Noncompliance).
3. Resume of Bidder's proposed site superintendent for actual work performed by the Bidder, showing a minimum of ten years experience as a site superintendent on projects of a similar scope and complexity. Failure to provide proposed site superintendent during Contract period may constitute an act of default and a material



breach of the Contract (see General Conditions, Termination for Default/Noncompliance).

4. Resume of Bidder's proposed site superintendent responsible for installing utilities, specifically the septic drain field system, listing three projects for which this site superintendent has demonstrated experience with projects of a similar scope and complexity.
5. If Bidder lacks sufficient experience as a general contractor on projects of similar scope and complexity, Bidder shall provide additional information with its bid describing how it plans to compensate for lack of similar experience. For example, if a Bidder is an earthwork general contractor who cannot demonstrate experience with building construction, that Bidder shall submit experience information for its building Subcontractor. This experience information shall include a list of building projects of similar size and complexity to the comfort station. Experience information shall include the items called for in items 1 through 3, above. In addition the Bidder shall provide a written plan detailing the roles and responsibilities of the general contractor and their Subcontractor for whose experience they are relying upon to demonstrate they are sufficiently qualified to perform the Work.

ITB-16 BIDDER RESPONSIBILITY CRITERIA

It is the intent of the District to award a Contract to the low responsible bidder. Before award, the Bidder must meet the following bidder responsibility criteria to be considered a responsible bidder. The Bidder may be required by the District to submit documentation demonstrating compliance with the criteria. The Bidder must:

- Have a current certificate of registration as a contractor in compliance with RCW 18.27, which must have been in effect at the time of submission of bid.
- Have a current Washington Unified Business Identifier (UBI) number.
- If applicable:
 - Have Industrial Insurance (workers compensation) coverage for the Bidder's employees working in Washington, as required in RCW 51.
 - Have a Washington Employment Security Department number, as required in RCW 50.
 - Have a Washington Department of Revenue state excise tax registration number, as required in RCW 82.
- Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065.

If applicable, additional bidder responsibility criteria may be specified in Instructions to Bidders, Specific Requirements, or elsewhere in these Contract Documents.

ITB-17 SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA

In accordance with the provisions of RCW 39.04.350, the District will consider the criteria at Evaluation of Bids, Bidder's Data, Specific Requirements and/or Specifications or elsewhere in these Contract Documents in evaluating Bidders and Bid Proposals. In the event that the District determines, after evaluating the criteria, that a Bidder is not responsible, the District



will provide written notification to Bidder of the reasons for the determination in compliance with RCW 39.04.350. A Bidder that receives notice that the District has determined them not to be responsible may appeal the determination within three (3) business days by presenting additional information to the District. The District will consider properly submitted additional information before issuing its final determination. If the District's final determination is that the Bidder is not responsible, the District will not execute a contract with another bidder until two (2) business days after delivery of the final determination to Bidder.

If a Bidder fails to supply information requested by the District concerning responsibility within the time and manner specified above, the District may base its determination of responsibility upon any information related to the supplemental criteria or may find the Bidder not responsible.

A potential Bidder may request that the District modify the supplemental criteria in a timely manner before the bid submittal deadline. The District will consider the request submitted by the potential Bidder and respond before the bid submittal deadline. If the District elects to change the criteria, the District will issue an Addendum to the bid documents identifying the new criteria, in accordance with RCW 39.04.

ITB-18 EVALUATION OF BIDS

In evaluating the bids, the following criteria, in addition to responsiveness of bid, responsibility of Bidder, and Bid Price, will be considered:

- Bidder's compliance with required time of completion.
- Experience, technical qualifications, skill, ability and capacity of the Bidder.
- Character and record of performance of the Bidder.
- Ability of the Bidder to perform the Contract within the time specified, taking into account all of the Bidder's existing business commitments.
- Thoroughness of Bidder's compliance with and completion of data requests to the extent it impacts the District's ability to compare Bid Proposals and verify compliance with Specifications.
- Qualifications and eligibility of Bidder to receive an award of the Contract under applicable laws and regulations.
- The financial qualifications of the Bidder.
- Such other information as may be secured having a bearing on the decision to award the Contract including, but not limited to, prior safety violations and lawsuits.
- Bidder's Data (See Instruction No. 15).

The District hereby reserves the right to evaluate the Subcontractors listed by the Bidder to perform categories of Work under the terms of the Contract using the same or similar evaluation criteria that apply to the Bidders themselves and may reject a bid if one or more listed Subcontractors is objectionable to the District.



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Additionally, in accordance with RCW 39.04.380, the State of Washington is enforcing a Reciprocal Preference for Resident Contractors. For any public works bid received from a nonresident contractor from a state that provides an in-state percentage bidding preference, a comparable percentage disadvantage must be applied to the bid of that nonresident contractor.

A nonresident contractor from a state that provides a percentage bid preference means a contractor that:

- a) is from a state that provides a percentage bid preference to its resident contractors bidding on public works contracts.
- b) at the time of bidding on a public works project, does not have a physical office located in Washington.

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

All nonresident contractors will be evaluated for out of state bidder preference. If the state of the nonresident contractor provides an in-state contractor preference, a comparable percentage disadvantage will be applied to their bid prior to contract award.

This section does not apply to public works procured pursuant to RCW 39.04.155, 39.04.280, or any other procurement exempt from competitive bidding.

For a public works bid received from a nonresident contractor from a state that provides an in-state percentage bidding preference, a Comparable Percentage Disadvantage (CPD) will be applied to the bid of that nonresident contractor. The CPD is the in-state contractor percent advantage provided by the contractor's home state.

For the purpose of determining the successful bidder, multiply the Nonresident Contractor bid amount by the CPD. The "bid amount" shall be the total of the base bid and all accepted alternate bid items. The CPD shall be added to the Nonresident Contractor bid amount which equates to the Nonresident Disadvantage Total. The Nonresident Disadvantage Total shall be compared to the Washington contractor bid amounts. The bidder with the lowest total shall be the successful bidder. See example below.

EXAMPLE:

Alaska Nonresident Contractor Bid Amount	\$100,000.00
Multiplied by the Alaska CPD	x 0.05
Alaska CPD Total	\$ 5,000.00
Alaska nonresident Contractor Bid Amount	\$100,000.00
Alaska CPD Total	\$ 5,000.00
Nonresident Disadvantage Total	\$105,000.00*



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*Note: If the Nonresident Disadvantage Total is lower than all other Washington contractor bid amounts, the Alaska nonresident Contractor is the successful bidder and will be awarded a contract for the bid amount of \$100,000.00.

If the Nonresident Disadvantage Total is higher than a Washington contractor bid amount, the successful Washington bidder will be awarded a contract for the bid amount.

ITB-19 CONTRACT AWARD

The District reserves the right to reject any or all bids, and to waive any informality or immaterial irregularity in the bids received. The District reserves the right to let the Contract, or any part thereof, in any combination determined to be in the District's best interests to the lowest responsible Bidder, whose bid will be most advantageous to the District, price and other factors considered.

The Contract award must comply with the State of Washington laws governing Public Utility Districts which provide that no Contract shall be let for more than 15% in excess of the District's estimated cost of the Work.

The acceptance of a Bid Proposal will be evidenced by a Notice of Award in writing signed by an authorized representative of the District's Procurement and Contract Services Department and delivered to the Bidder whose Bid Proposal is accepted. No other act of the District shall constitute acceptance of a Proposal. Timely acceptance of a Bid Proposal shall obligate the Bidder whose Bid Proposal is accepted to furnish a Performance and Payment Bond and Insurance Certificates, and to execute the Contract set forth in these Contract Documents.

ITB-20 MATERIAL IDENTIFICATION

Bidders must furnish descriptions of the items they propose to furnish. Whenever in the Specifications any material, process or article is indicated or specified by patent, number, proprietary name or name of manufacturer or any combination of these, such Specification shall be deemed to be used for the purpose of facilitating description of the material, process or article desired and shall be deemed to be followed by the words "Or Equal." Any Bidder (and the Contractor) may offer in the bid (or after Contract award) any material, process or article which shall be equal in every material respect to that so indicated or specified, provided that if the material, process or article offered by the Contractor after Contract award is different from that in its Bid Proposal and is not, in the opinion of the District, equal in every material respect, then the Contractor must furnish the material, process or article specified or one that in the opinion of the District is the equal thereof in every material respect. The District shall be the sole judge of the quality and suitability of the proposed substitution.

END OF INSTRUCTIONS TO BIDDERS



GENERAL CONDITIONS

GC-1 DEFINITIONS

The following definitions apply throughout these Contract Documents when the term or phrase is capitalized, unless the context clearly requires otherwise:

ACT OF GOD - Earthquake, flood, cyclone or other cataclysmic phenomenon of nature. A rain, windstorm, high water or other natural phenomenon of unusual intensity for a specific locality, but which might reasonably have been anticipated from historical records of the general locality, shall not be construed as an "Act of God" and no payment shall be made to the Contractor for damages to the Work or delays resulting therefrom.

ADDENDA - The written notices of modification or clarification of the Contract Drawings, Specifications, or other Contract Documents, which may be issued by the District to holders of Contract Documents prior to the opening of Bid Proposals. The singular of Addenda is Addendum.

APPROVED - Approval by the Engineer or Architect, and by appropriate government officials according to applicable codes, and consistent with any quality standards applicable to the Work in question.

ARCHITECT - The person or entity or its authorized representative employed by the District that is lawfully licensed to practice architecture.

AS-BUILT DRAWINGS - A marked set of prints prepared by the Contractor or the District Project representative in the field. They are Contract Drawing prints upon which the Contractor or inspector records all variations between the Work as it was reported by the Contractor as having been actually constructed and the Work as it was shown in the original Contract Drawings as they existed at the time the Contract was awarded. All Field Work Order/Change Orders should be reflected in appropriate marks on the As-built drawings.

AS DIRECTED - Direction given to the Contractor by the Project Engineer.

AS REQUIRED - Applicable codes, standards and/or Contract requirements as may be required for Satisfactory completion of the Work.

BID BOND - The approved surety bond form as provided in Exhibits, submitted by a Bidder and its Surety along with the Bid Proposal in satisfaction of RCW 54.04.080 and to guarantee payment of damages for failure or refusal of the successful Bidder to enter into a Contract with the District following Notice of Award of bid.



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BID PRICE(S) - The sum(s) stated on the Bidder's Bid Form (Exhibits) for which the Bidder offers to enter into a Contract with the District for the Work identified in the Contract Documents.

BID PROPOSAL - The written offer by the Bidder to perform the Work under the conditions specified and submitted on the Bid Form set forth in Exhibits, of these Contract Documents.

BIDDER - The person, entity or corporation that submits a Bid Proposal to the District for consideration and evaluation pursuant to the appropriate Advertisement for Bids and Contract Documents.

COMPLETION - Completion of all Contract Work, which is the last date on which Work was performed to complete the public improvement(s) specified in the Contract Documents to the reasonable satisfaction and acceptance by the District.

CONTRACT - The signed agreement covering the furnishing of the Work and payment therefore, a sample of which is located in Exhibits, of these Contract Documents, and all legal obligations created by execution of said agreement.

CONTRACT DOCUMENTS - All of the following documents included as the various parts of the Contract between the District and the Contractor:

- Addenda
- Advertisement for Bids
- Bid Proposal
- Bidder's Data
- Contract
- Contract Drawings
- Field Work Order/Change Orders
- General Conditions
- Instructions to Bidders
- Notice of Award
- Notice to Proceed
- Performance and Payment Bond
- Specifications
- Specific Requirements

The table of contents, titles, headings, running headlines and marginal notes contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect, limit, or cast light on the interpretation of the provisions to which they refer.

CONTRACT DRAWINGS - A pictorial description of the Work to be furnished or copies thereof, which is included as a part of the Contract Documents, as modified by Addenda, and/or Field Work Order/Change Orders to the Contract. "Contract Drawings" shall include



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the drawings issued to Bidders to delineate the scope of Work and "Construction Drawings" issued to the Contractor during Work to further describe the details of design. Only those drawings prepared on the standard title block sheet of the District shall be "Contract Drawings."

CONTRACT PRICE - The total sum stated on the Contract, including the cost of the required Performance and Payment Bond, but excluding Washington State sales tax, as adjusted by any Field Work Order/Change Orders, for which the Contractor agrees to perform all Work required by the Contract Documents.

CONTRACT TIME - The time designated in the Contract Documents for Completion of all Work on the Project required by the Contract Documents. The Contract Time may be modified only by Field Work Order/Change Order. Unless otherwise specified in these Contract Documents, the Contract Time shall begin to run from the date specified on the Notice to Proceed.

CONTRACTOR - The entity, person, firm or corporation whose Bid Proposal has been accepted by the District and who, together with the District, has executed the Contract to perform all Work required by the Contract Documents.

CONTRACTOR SUPERINTENDENT – The person who is assigned by the Contractor to perform, as set forth in General Conditions, Contractor's Superintendence, the Superintendence duties as necessary to furnish the Work required under the Contract.

DISTRICT - Public Utility District No. 1 of Chelan County headquartered in Wenatchee, Washington.

DOLLARS – Currency of the United States.

EFFECTIVE DATE – The date upon which the Contract, Addendum, Field Work Order/Change Order, or other official document takes effect.

ELECTRONIC TRANSMISSION – Telefacsimile, electronic mail, or other means of electronic transmission available to and satisfactory to the District to transmit documents or communications.

ENGINEER'S INSTRUCTION - A written statement and/or Construction Drawing delivered to the Contractor by the Engineer which directs the Contractor to perform any act or acts related to the Project or clarifies an issue concerning the Contract Drawings or Specifications.

ENGINEER, PROJECT ENGINEER, OR PROJECT MANAGER - The principal or authorized person designated by the District to be responsible for the inspection, measurement, and testing of the Work, and authorized to order changes to the Work on behalf of the District.



EXPERIENCE MODIFICATION RATE (EMR) - The rate available through Labor and Industries OSHA 200/300 forms that compares claim profiles that would be expected of an employer of similar size in the same industry. A value of 1.00 is average, meaning the frequency and severity of actual losses equaled the expected losses. A rate greater than 1.00 means the employer experiences worse than expected losses during the rating period. A rate less than 1.00 indicates the employer's losses were better than expected for the rating period. The rate is calculated using claims data from the three (3) most recently completed years excluding the expiring term.

FIELD WORK ORDER/CHANGE ORDER - A directive by the District made pursuant to General Conditions, Changes In The Work/Field Work Order/Change Orders, or written supplemental agreement entered into by the District and the Contractor to modify the Contract after its execution, with or without notice to Surety. The signature of the Contractor is not required for a directive. Such Field Work Order/Change Order must be authorized in writing by the District's Commission or, if for an amount within the authority granted by the Commission, by a District employee.

HAZARDOUS CHEMICAL - Any chemical which poses a physical or health hazard. OSHA 29 CFR 1910.

HAZARDOUS MATERIAL – Any substance or material in any form or quantity which poses an unreasonable risk to safety and health or property when transported in commerce. USDOT 49 CFR 302.

HAZARDOUS SUBSTANCE – Any substance designated under the Clean Water Act and the Comprehensive Environmental Response, Compensation and Liability Act as posing a threat to waterways and the environment when released. USEPA 40 CFR 302, OSHA 1910.120.

HOLD POINT - A mandatory verification point identified within the Inspection and Acceptance Test Plan, or otherwise provided by the Project Engineer, beyond which Work shall not proceed until mandatory verification is performed and written authorization is granted by the Inspector.

INSPECTION and ACCEPTANCE TEST PLAN - A document identifying methods and sequence for inspection of the Work, including frequency of inspection, characteristics to be inspected, data to be recorded, and referenced acceptance criteria. This Plan may include mandatory Witness Points and Hold Points, as defined herein.

INSPECTOR - The individual(s) designated by the District to inspect, measure and test the Work under the direction of the Engineer.

INSURANCE CERTIFICATE - A written verification from an insurance company authorized to issue insurance in the State of Washington verifying that the Contractor has obtained all insurance coverage required by these Contract Documents. This term shall include any and all attachments necessary to demonstrate compliance with all insurance conditions



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required by these Contract Documents, including the Insurance Coverage Checklist in Exhibits.

NOTICE OF AWARD - Written notification to the successful Bidder of the District's acceptance of the bid of said Bidder. A sample form can be found in Exhibits. Contract Time may start upon receipt of the Notice of Award if so specified in the Contract Documents.

NOTICE TO PROCEED - Written notification from the District to the Contractor, in the general form set forth in Exhibits, instructing the Contractor to commence the Work and stating the Completion date, if applicable.

OR EQUAL - Contractor-proposed substitution of specific materials or processes that are deemed by the District, in its sole discretion, to be equal in every material respect to that specified in the Contract Documents.

OWNER - Synonymous with the term "District."

PERFORMANCE AND PAYMENT BOND

"Payment Bond" - the District approved surety bond form furnished by the Contractor and its Surety as a guaranty for the payment and protection of all Subcontractors, companies, and persons supplying labor, materials, equipment or professional services and the payment of sales taxes in the prosecution of the Work as defined in the Contract Documents.

"Performance Bond" - the District approved surety bond form furnished by the Contractor and its Surety as a guaranty that the Contractor will execute, furnish, and guarantee the Work, pay sales tax and perform all of the requirements of the Contract.

Note: The District's approved bond form(s) is set forth in Exhibits.

PROJECT - The structure(s) or improvement(s) to be constructed and/or materials to be furnished and delivered, in whole or in part, through the performance of the Work specified in the Contract.

PROVIDE - To furnish, deliver and install, as specified.

REQUEST FOR PAYMENT - A written statement from the Contractor to the District requesting payment of some or all of the Contract Price and sales or use taxes for Work completed. A Request for Payment shall be prepared and processed in accordance with General Conditions, Time and Manner of Payment to Contractor. The District's specific form to be completed by the Contractor as a Request for Payment is set forth in Exhibits, as "Contractor's Application and Certificate for Payment."

SATISFACTORY - Satisfactory to the District.



SHOP DRAWING - A pictorial or other description of the details of proposed materials, equipment, methods of installation or other Work prepared by the Contractor or a Subcontractor and submitted for the approval of the District.

SPECIFICATIONS/TECHNICAL SPECIFICATIONS - The technical, engineering and manufacturing descriptions of the Work to be furnished which are included as a part of the Contract Documents as modified by Addenda, and/or Field Work Order/Change Orders to the Contract.

STOP WORK DIRECTIVE - A written statement delivered to the Contractor which directs the Contractor to discontinue work on all or portions of the Work.

SUBCONTRACTOR - Any person, entity or corporation, other than an employee of the Contractor, supplying any Work in connection with the Contract pursuant to an agreement with either the Contractor or any Subcontractor of the Contractor.

SUBSTANTIAL COMPLETION - When the Contract Work has progressed to the extent that the District has full use and benefit of the facilities, both from the operational and safety standpoint, and only minor incidental work, replacement of temporary substitute facilities, or correction or repair remains to physically complete the total Contract, the Engineer may determine the Contract Work is substantially complete.

SUPERINTENDENCE - The general and detailed direction and management by the Contractor as necessary to furnish the Work required under the Contract, whether at the Project site or at other locations.

SUPPLY CONTRACTOR - Any person, entity or corporation who furnishes any work or material directly to the District under another contract in connection with the Project.

SURETY - The person, entity or corporation who assumes the obligations of a surety by executing a surety bond (or bonds) payable to the District and to other indemnitees, as applicable, guaranteeing one or more of the following: the successful Bidder will execute a Contract, provide a Performance and Payment Bond as may be required by the Contract Documents, performance of the Contract either in whole or in part, and payment in full to all Subcontractors and laborers, materialmen, mechanics and suppliers to the Contractor and any Subcontractor.

UNIT PRICE - The amount bid by the Contractor for furnishing one (1) unit of Work when such units are furnished in the approximate quantities estimated, such quantities being subject to reasonable adjustment at such price.

WITNESS POINT - A mandatory notification point in the sequence of Work as specified by the Project Engineer, where notification to the Inspector is required for observation or examination of a specific work, an operation, or a test. Work may proceed beyond a



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Witness Point with or without inspection action by the District following written notification to the District.

WORK - All construction management, Superintendence, labor, materials, equipment and all component parts thereof, transportation and other facilities or services necessary to complete Contractor's obligations as specified in the Contract Documents and completion by Contractor of all documentation and receipt of all District approvals (or Acceptance) necessary pursuant to the Contract Documents.

GC-2 ACCESS TO RECORDS

The District and other authorized representatives of the State of Washington shall have access to any book, document, paper, and record of the Contractor which are pertinent to this Contract for the purposes of making audits, examination, excerpt, and transcriptions. In the event that it is determined that the Contractor has overbilled the District by 2% or more, the Contractor shall pay to the District, on demand, the cost of the audit.

All such records and all other records pertinent to this Contract and work undertaken pursuant to this Contract shall be retained by the Contractor for a period of six (6) years after the final acceptance of the Work pursuant to this Contract, unless a longer period is required to resolve audit findings or litigation. In such cases, the District may request, and the Contractor shall abide by, such longer period for record retention.

GC-3 CORPORATE AUTHORITY; BINDING SIGNATURES

Each of the individuals executing this Contract or any document required by the Contract Documents on behalf of the Contractor warrants they are an authorized signatory of the entity for which they are signing, and have sufficient corporate authority to execute this Contract.

GC-4 INTENT OF DOCUMENTS

Except as otherwise specifically provided in Specific Requirements or Specifications, the intent of the Contract Documents is to include all facilities, materials, equipment, supplies, management, Superintendence, labor, transportation, fuel, power, water and other utilities and all other services necessary for the proper performance of the Contract and the furnishing of all Work. It is the intent of the Contract Documents to specify and set forth a complete operational unit or system ready for use regardless of whether or not every detail has been set forth in the Contract Documents.

Any omission of details from the Contract Documents shall not be construed to mean that they are to be omitted by the Contractor or to affect in any way the completeness of the Work. The cost of such details shall be included in the Contract Price.



When materials, methods, labor or equipment are described in words which when so applied have well-known or technical trade meanings, these descriptions shall be held to refer to such meanings.

As a convenience to the Contractor and when appropriate, the Contract Documents attempt to show the approximate location of existing underground utilities and items to the extent that they are known, but neither the District nor the Engineer can or does purport to know or guarantee that all such utilities and items are shown or that indicated locations are accurate. The Contractor is to determine the exact location of all utilities and buried lines in the field. The Contractor shall comply with Chapter 19.122 RCW and call the Northwest Utility Notification Center (1-800-424-5555 or 811) before digging.

GC-5 CLARIFICATION OF CONTRACT DOCUMENTS

If, in the course of the Work, the Contractor requires clarification of the Contract Documents, Contract Drawings or Specifications, the Contractor shall immediately inform the Engineer in writing. The Engineer will promptly review the request for clarification and, if the District deems it necessary, issue additional information or an Engineer's Instruction or the District may issue a Field Work Order/Change Order. Any Work done after such discovery and until receipt of additional information, Engineer's Instruction, or Field Work Order/Change Order shall be at the Contractor's expense.

To avoid any disputes which might arise as to the meaning of anything contained in the Contract Documents, or any alleged error, omission or discrepancy therein, the Engineer's opinion as to the true intent and meaning, and the Engineer's interpretations thereof, shall be binding and final. All dimensions shall be taken from figures on the drawings and no dimensions measured from the drawings shall be valid. In the event dimensions are omitted, Work shall not be started until the necessary dimensions have been obtained from the Engineer in writing or on a Construction Drawing. In reading sizes, distances, angles, slopes and other measurements on drawings, the values used shall be those given in dimensions and figures and shall not be obtained by scaling.

GC-6 OWNERSHIP OF ENGINEERING DATA AND OTHER INFORMATION

All designs, design criteria, Contract Drawings, Specifications, computations, estimates, survey notes and other data prepared for this Project, whether prepared by the District or the Contractor, shall be the property of the District. Such data shall not be duplicated or used for other work by the Contractor without the express written consent of the District.

GC-7 WORK PRODUCT

All data, designs, drawings, calculations, information obtained, materials information and the results of all Work performed by Contractor hereunder in written, electronic or other form shall become the property of the District upon Completion of the Work performed and shall be delivered to the District prior to final payment. The District's "Drafting Standards and Specifications," if applicable, are provided in Specific Requirements or elsewhere in these



Contract Documents. Contractor shall comply with the referenced Drafting Standards and Specifications.

GC-8 COPYRIGHT

No reports, maps, specifications or other documents produced in whole or in part under this Contract shall be the subject of an application for copyright by or on behalf of the Contractor, or shall be deemed to be copyrighted by virtue of preparation by an engineer or architect or by virtue of any placement of a professional stamp on such reports, maps, specifications or other documents, including but not limited to engineers' and architects' stamps. Any result or materials suitable for copyright arising out of this Contract shall be owned and retained by the District. The District in its sole discretion shall determine whether it is in the public's interest to release or make available any patent or copyright.

GC-9 CONTRACT DRAWINGS AND INSTRUCTIONS

The District has prepared designs and sufficient Contract Drawings and Specifications. The Engineer may issue clarifying information during the term of the Contract by means of an Engineer's Instruction, drawing, and/or an Inspection and Acceptance Test Plan with Witness Points and Hold Points that add detail to the Contract Documents and facilitate the successful testing and Completion of the Contract Work. The Contractor shall be required to provide 48-hour notice to the District for Witness Points and Hold Points as provided in the Inspection and Acceptance Test Plan or otherwise provided by the Project Engineer during performance of the Work. All such Engineer's Instructions, Contract Drawings, Inspection and Acceptance Test Plan and other clarifying information shall be consistent with the Contract Documents and shall be developments thereof and reasonably inferable therefrom.

All Work shall be furnished in strict conformity with the Contract Documents and to the exact dimensions fixed thereby. The District reserves the right to make reasonable changes in dimensions and relocations of materials and equipment, provided that such changes or relocations are made prior to work on any item to be changed or relocated. Such changes or relocations shall be made at no additional cost to the District.

GC-10 CONTRACTOR'S COPIES OF DRAWINGS AND SPECIFICATIONS

Access to an electronic download of the complete set of Contract Documents will be provided to Bidder. Additional copies of Specifications and either full or reduced size Contract Drawings, if desired by the Contractor, will be furnished by the District and, at the District's discretion, the Contractor may be charged for the cost of reproduction, handling and mailing.

GC-11 REFERENCED STANDARDS & SPECIFICATIONS

Any Work on this Project not specified in the Contract Specifications shall be performed according to the manufacturer's recommendations and, where applicable, the current "State of Washington Standard Specifications for Road, Bridge and Municipal Construction"



prepared by the Washington State Department of Transportation (WSDOT) and Washington State Chapter of the American Public Works Association. The detailed Specifications herein contained shall supersede any provisions of the Washington Standard Specifications in conflict herewith and any manufacturer's recommendations.

UL Label: Where applicable, all materials and equipment for which Underwriters Laboratories, Inc. standards have been established, and their label service available, shall bear the appropriate UL Label.

Reference in the Specifications to codes, standards and specifications promulgated by local, state, and/or federal authorities, professional or technical associations, institutes or societies, are intended to mean the latest edition of each such code, standard or specification adopted and published as of the date of the Contract for this Project, except where otherwise specifically indicated. Each such code, standard or specification referred to shall be considered a part of the Specifications to the same extent as if reproduced therein in full. The following is a representative, though partial, list of such organizations together with the abbreviation by which each is identified:

- ACI American Concrete Institute
- AIA American Institute of Architects
- AISC American Institute of Steel Construction
- ANSI American National Standards Institute
- ASA American Standards Association
- ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
- ASME American Society of Mechanical Engineers
- ASTM American Society of Testing and Materials
- AWWA American Water Works Association
- AWS American Welding Society Code
- CSI Construction Specifications Institute
- IBC International Building Code
- IEEE Institute of Electrical and Electronics Engineers
- NEC National Electrical Code
- NEMA National Electrical Manufacturers Association
- NESC National Electric Safety Code
- NIST National Institute of Standards and Technology
- NFPA National Fire Protection Association
- UBC Uniform Building Code
- UL Underwriters Laboratories, Inc.
- UMC Uniform Mechanical Code
- UPC Uniform Plumbing Code



GC-12 MATERIALS AND EQUIPMENT FURNISHED BY DISTRICT

Materials or equipment specified in the Specific Requirements and/or the Specifications to be furnished by the District shall be conclusively deemed acceptable for the purpose designed if received in good condition. The Contractor may continue to use such materials or equipment until otherwise directed. However, if the Contractor discovers any defect in materials or equipment furnished by the District, the Contractor shall immediately inform the District of the same in writing and shall cease to use such defective items pending receipt of written instructions from the District.

Materials or equipment specified in the Specific Requirements and/or the Specifications to be furnished by the District shall be received by the Contractor F.O.B. the point of delivery specified, and in the absence of such Specification, receipt by the Contractor shall be F.O.B. the facilities of the supplier of the materials or equipment to be so furnished. The Contractor shall receive, load and unload, transport, store and properly protect from damage or loss all such material or equipment and the Contractor shall be responsible for loss or damage after receipt of material or equipment. The Contractor shall immediately report to the District in writing in a form and manner prescribed by the District the receipt of District-furnished material.

GC-13 WORKMANSHIP OF CONTRACTOR

All Work shall be such that its several component parts function as a workable system, with all accessories necessary for its proper operation, and the Work shall be completed with all components tested, properly adjusted, and in working order. The Work shall be performed in accordance with the Contract Documents and in conformity with the best accepted standard practice of the trade so as to contribute to maximum efficiency of operation, accessibility and appearance and minimum cost of operation, maintenance and future alterations and additions. All Work shall also be so performed such that the completed Work will conform and adjust to the existing facilities.

GC-14 COMPLIANCE WITH CONTRACT DOCUMENTS

All workmanship, equipment or material incorporated in the Work shall be provided in full conformance with the Contract Documents, and shall be of the best available grades of their respective kinds. Whenever material or an article or piece of equipment is identified on the Contract Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, etc., it is intended merely to establish a standard as to physical size, strength, function, performance, technical data, information, tests, ratings, etc. established by the manufacturer, and herein used by the Engineer in the design of this Project and indicates the minimum acceptable standard and is to be considered "Or Equal" unless otherwise specified.

Offers of substitution for items described in the Contract Documents as "Or Equal" will be considered only upon the written request of the Contractor, and no requests for substitutions will be acknowledged or considered from suppliers, distributors, manufacturers, or Subcontractors or any other source. Requests for approval of



substitution shall be made by submitting documentary evidence of equality in the form of, but not limited to, descriptive literature, samples, records of performance, certified copies of tests by independent recognized laboratories, and differences in price and delivery, if any, in the form of certified quotations from suppliers of both the specified material, equipment, method of construction or process, or Shop Drawings, and the proposed substitute. Contractor shall submit three (3) sets of all data to the Engineer. **NO PURCHASE SHALL BE MADE OR INSTALLATION PERFORMED BY CONTRACTOR WITHOUT THE ENGINEER'S PRIOR WRITTEN APPROVAL.**

If the Contractor is unable to secure all materials or equipment of the size, kind and type specified in these Contract Documents or those proposed as substitutes by the Contractor and accepted by the District as equal in every material respect to those specified, through no fault of its own, the Contractor shall immediately give written notice to the Engineer of the same. Thereafter, the District, at its option, may require the use of substitute materials or equipment of greater or lesser cost, and in such event, the Unit Price shall be adjusted for the difference in the price between the materials or equipment specified or previously accepted as substitutes equal in every material respect and the substitute materials or equipment accepted. The District at its sole discretion may refuse to accept any substitute material or equipment.

The Engineer shall have the final approval on whether a proposed substitution is approved as an "Or Equal."

GC-15 STORAGE OF MATERIALS AND EQUIPMENT

Materials and equipment shall be stored by the Contractor so as to insure the preservation of their quality and fitness for installation and use. When requested by the Engineer, the materials and equipment shall be placed on wooden platforms or other hard, clean surfaces, and not on the ground, and shall be placed under cover and heated adequately to prevent condensation or freezing. Stored materials and equipment shall be located so as to facilitate inspection. The Contractor shall be responsible for all damages to stored and installed materials and equipment that occur for any reason until Completion and final acceptance by the District. After final acceptance, the Contractor's responsibility shall be governed by the warranty provisions of General Conditions, Warranty, or as specified elsewhere in these Contract Documents.

GC-16 INSPECTION, ACCESS AND REJECTED WORK

The District, the Engineer, and their duly authorized representatives and other District employees shall at all times and for any purpose have access to the Project and the premises used by the Contractor, and the Contractor shall provide safe and proper access therefor. Furthermore, the Contractor shall arrange for the District, the Engineer and their duly authorized representatives, at all times, to have immediate access to all places of manufacture where materials are being manufactured, produced or fabricated for use under these Contract Documents, and the Contractor shall provide full facilities for determining whether all such machinery or materials are being made strictly in accordance with the



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Specifications and Contract Drawings. The Contractor shall, whenever so requested, give the Engineer access to the invoices, bills of lading, etc., and shall provide scales and assistance for weighing and/or measuring any of the materials or equipment.

Except as otherwise provided in the Contract Documents, all materials and Work shall be subject to inspection, examination and testing by the Engineer at any and all times during the Work. The Engineer will have the right to reject defective material and Work. Rejected Work shall be satisfactorily replaced with proper material, or reaccomplished if the material need not be replaced, and the Contractor shall remove rejected materials from the premises. If the Contractor fails to proceed at once with the replacement of rejected materials or the correction of defective Work, the District may, by contract or otherwise, replace such material or correct such Work and charge the cost thereof to the Contractor.

The Contractor shall provide without additional charge all facilities, labor and materials necessary for any inspections. Tests will be carried out in such manner that the Work will not be delayed. Access to and around the immediate Work site shall be continuously maintained so that inspections may be made at any time by the Engineer or any Inspector.

In the event it is considered necessary or advisable by the District at any time before final acceptance of the entire Work to make an examination of the Work which is partially or fully completed by disassembling, removing, tearing out and satisfactorily reassembling or reconstructing any portion thereof, upon written notice from the District, the Contractor shall promptly furnish all necessary facilities, labor and materials for such examination. If such Work is found to be defective in any material respect, or if it is found that such Work is not in conformity with the Contract Documents, the Contractor shall pay all the costs of such examination. If, however, such Work is found to meet the requirements of the Contract Documents, or is defective through no fault of the Contractor or its Subcontractors, additional costs in accordance with General Conditions, Changes In The Work/Field Work Order/Change Orders, shall be paid to the Contractor as full compensation for Work connected with such examination and the Contract Time shall be increased by the number of days required for disassembling and reconstructing.

The Contractor is not relieved of any obligations to fulfill the Contract as prescribed, and defective Work shall be corrected and unsuitable materials shall be rejected by the District and replaced by the Contractor, notwithstanding that the defective work and materials have been previously inspected by the Engineer or an Inspector.

GC-17 STOP WORK DIRECTIVE

Where, in the judgment of the Engineer, the Contractor or any Subcontractor is performing Work contrary to the conditions and terms of the Contract, where continued operations could cause damage, preclude further inspection, or render remedial action ineffective for any product or services provided by the Contractor or Subcontractor, the Engineer will notify the Contractor of any such situation in writing.

If, after this notification by the Engineer, the Contractor does not commence appropriate corrective action to the satisfaction of the Engineer, the Engineer may issue a Stop Work



Directive (SWD) stating the specific work to be discontinued and so notify the Contractor in writing.

If the District becomes aware of any potential WISHA or OSHA violation on the Project, the District may immediately issue to the Contractor a notice of a safety violation. The Contractor's Superintendent shall be required to sign all notices issued. The Contractor shall immediately perform necessary corrective measures so it is in compliance with WISHA and OSHA regulations. If the Contractor refuses to take corrective action or receives repeated violations, the District may issue a SWD. Nothing in this section shall relieve Contractor of the primary responsibility for the safety of the Work site.

Upon receipt of a SWD from the Engineer, the Contractor and the Subcontractor shall cease operations, including shipments, on any specified product or services to the extent mandated by the SWD. Work shall not resume until the Contractor has obtained a written authorization from the Engineer. A written authorization to resume further operations shall be granted only upon approval of the Contractor's written commitment to correct those conditions itemized on the SWD.

The issuance of a SWD shall constitute a non-excusable delay, and the Contractor shall not be entitled to time extension or additional compensation (either direct or consequential) due to the delay.

GC-18 WARRANTY

The Contractor warrants to the District that the Work shall perform and operate for the purpose(s) specified, shall be new and free from defects and deficiencies in material and workmanship, shall meet all Specifications, including those relating to performance contained or incorporated by reference in the Contract and that any assembly and/or installation will be performed in a competent manner in accordance with accepted industry standards.

The foregoing warranties shall apply to defects or deficiencies occurring within a period of one (1) year from the date of final acceptance of the Project by the District. Additional or different warranty requirements are required for this project. Refer to divisions in Exhibit S, Specifications.

If, during the warranty period, the Work is not available for normal use due to a failure to comply with the requirements of the Contract Documents or any warranty, the time of unavailability shall not be counted as part of the warranty period. If at any time during the warranty period the District notifies the Contractor of any failure to comply with the warranty, the Contractor shall promptly, and at the time the District directs, correct any noncompliance and remedy any damage to other items of the Work or any other property resulting from the noncompliance. The warranty period shall then be extended for any corrected Work until the expiration of an additional warranty period, that shall commence upon the acceptance by the District of the correction or the expiration of the original warranty period, whichever is later. In no event shall the warranty for an item of corrected Work extend for more than



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three (3) warranty periods as defined herein. All costs involved in correcting and remedying any noncompliance (including, but not limited to, the removal, replacement and reinstallation of items necessary to gain access, including all labor costs), shall be borne by the Contractor.

If the Work does not meet the warranties specified above, the Contractor, after receipt of written notice from the District, shall immediately correct any defect or deficiency, including nonconformance with the Specifications. The cost of labor, materials and equipment associated with such repair or replacement of the Work shall be borne by the Contractor. Contractor recognizes that performance of the repair or replacement may necessitate swing and graveyard shifts, working weekends, and acceleration of the Completion date for the overall Project, and agrees to perform same with sufficient personnel as required by the District. All cost of labor, whether straight time or overtime labor, materials and equipment associated with such repair or replacement during special shift work shall be borne by the Contractor.

In the event the Contractor fails to remedy any such defect or deficiency in a timely manner, the District may undertake such remedy as it deems reasonably necessary and the Contractor shall bear all costs reasonably associated with said remedial action by the District. The reasonable time for repairs/remedies shall be determined by the District.

The Contractor shall obtain written warranties from Subcontractors and suppliers of materials and equipment and shall deliver the original warranties to the District prior to final acceptance of the Project. Such warranties shall be in effect for the period specified in the Contract Documents and shall state that they run in favor of the District, regardless of whether contract privity exists between the warrantor and the District.

Neither the final payment, nor any other provision of the Contract, nor partial or entire use of the materials and/or equipment by the District shall relieve the Contractor of liability with respect to the warranties referred to in the Contract or any other warranties express or implied.

The warranty provided herein is in addition to, and not in lieu of, any other guarantees, warranties, rights or remedies that may otherwise be available under applicable law to the District, and shall not in any way limit the same.

GC-19 INDEMNITY

The Contractor covenants and agrees that it will indemnify and hold harmless the District and any and all of the District's officers, principals, agents and employees, from any liability, loss, damage, cost, charge or expense, whether direct or indirect, arising in any way out of the performance of this Contract (including, but not limited to contractual claims, lien claims, retainage claims, extra work claims, bodily injury and property damage) to which the District or said other indemnitees may be put or subject by reason of any act, action, neglect, omission or default under this Contract on the part of the Contractor or any Subcontractor or any of the Contractor's or Subcontractor's officers, principals, agents, or employees. The



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indemnity provision shall be specifically subject to RCW 4.24.115 (or as amended). Contractor's indemnity obligations shall survive the Completion and final acceptance of the Contract, and shall only terminate upon final satisfaction by the Contractor of all such suits, claims or other proceedings.

In the event any suit, claim or other proceeding shall be brought against the District or any of the District's officers, principals, agents or employees, at any time alleging facts that, if proven, would give rise to the indemnity obligation set forth in the preceding paragraph, the Contractor hereby covenants and agrees to assume the defense thereof and defend the same at the Contractor's own expense. Within the limits of the preceding paragraph, the Contractor agrees to pay all judgments that may be incurred by or obtained against the District or any other indemnitee under this section as a result of such suits, claims or other proceedings.

The Contractor's submission of a Bid Proposal under these Contract Documents and execution of the Contract constitutes Contractor's conscious and intentional acceptance of the terms of this section and the Contractor's express waiver of any and all statutory immunity provided by the Washington State Industrial Insurance Act, RCW Title 51, with regard to all rights of the indemnitees stated herein. **THE TERMS OF THIS SECTION, SPECIFICALLY INCLUDING THE PRECEDING WAIVER OF IMMUNITY, SHALL BE DEEMED MUTUALLY NEGOTIATED TO THE FULLEST EXTENT ALLOWED BY THE LAWS OF WASHINGTON APPLICABLE TO THE DISTRICT CONCERNING BIDDING AND AWARD OF CONTRACTS FOR PUBLIC WORKS.**

GC-20 SUBCONTRACTORS

The Contractor shall be and operate as an independent contractor in the performance of the Work and shall have complete control over and responsibility for all personnel and all tiers of Subcontractors performing the Work. In no event shall the Contractor be authorized to enter into any agreements or undertakings for or on behalf of the District or to act as or be an agent or employee of the District. Upon request by the District, Contractor shall provide a copy of any or all subcontracts.

The Contractor agrees that it is fully responsible to the District for the acts and omissions of its Subcontractors and of persons and/or entities either directly or indirectly employed by them as it is for the acts and omissions of persons employed by it directly. Contractor shall not utilize any Subcontractor or supplier to whom the District has a reasonable objection and District has notified the Contractor of same, and shall obtain the District's written consent before making any substitutions or additions to its list of Subcontractors.

If the District concludes that any portion of the Work subcontracted by the Contractor is not being prosecuted in accordance with the Contract Documents, the Contractor shall, upon request of the District, remove the Subcontractor performing such Work. Such removal shall not relieve the Contractor of its responsibility for the performance of the Work or complying with all other requirements of the Contract.



Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the District. The District's consent to or approval of any Subcontractor under the Contract shall not in any way create any contractual relationship between any such Subcontractor and the District and shall not relieve the Contractor of its obligations under the Contract and no such consent or approval shall be deemed to waive any provisions of the Contract.

Contractor shall require and set forth in its written contracts with Subcontractors that all Subcontractors are and shall be bound by the terms of the Contractor's Contract with the District, including, but not limited to the General and Specific Requirements, Specifications, Contract Drawings, Addenda, Field Work Order/Change Orders (which will be incorporated into the subcontract by reference), and shall assume toward Contractor the obligations and responsibilities that the Contractor assumes in and by the aforesaid documents towards the District.

GC-21 TERMINATION FOR DEFAULT / NONCOMPLIANCE

Acts of Default - Any of the following events constitute an act of default by the Contractor and a material breach of the Contract:

- The Contractor abandons the Work.
- The Contractor fails to supply workers with relevant experience and sufficient skills, suitable materials or suitable equipment or performs Work of a lesser quality than specified in the Contract Documents.
- The Contractor fails to fully maintain the schedule of Work or fails to fully meet any of the schedules or milestone dates specified in the Contract Documents.
- The Contractor violates laws, regulations or orders of any public body having jurisdiction, violates any policy of the District or does not comply with instructions or directives from the Engineer, or disregards the authority of the Project Engineer.
- The Contractor fails to make prompt payment for labor, materials, supplies, equipment or to Subcontractors.
- The Contractor fails to provide the approved Statement of Intent to Pay Prevailing Wages, Affidavit of Wages Paid, or fails to provide and maintain in effect the insurance required by the Contract Documents.
- The Contractor fails to comply with the conditions, Specifications or provisions of the Contract Documents.
- The Contractor is careless or incompetent as determined by the District.
- The Contractor ceases or is unable to pay its debts as they mature, or authorizes or takes any action under bankruptcy or reorganization, readjustment of debt, insolvency, liquidation or other similar laws, or proceedings under any such laws that are instituted against it.
- The Contractor assigns the Contract or sublets Work without first obtaining the District's permission.
- The Contractor receives a Stop Work Directive and fails to take corrective action.
- The Contractor receives multiple Stop Work Directives.



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- The Contractor fails to pay attorneys fees and costs as provided in General Conditions, Applicable Law/Court Costs/ Attorneys Fees.
- The Contractor is otherwise in violation of any material provision of the Contract.

Consequences of Default - If the Contractor fails to remedy any of the above acts of default within ten (10) days after the District delivers to it written notice of the default, the District may, without limiting any other remedy available to it, withhold any amounts otherwise due under the Contract and/or terminate the Contractor's right to proceed with all or any portion of the Work. The District shall also have the right, but shall not be obligated, to complete the Work by whatever method the District deems expedient, including employing another contractor(s) under any contract(s) the District deems advisable. The District may provide any labor or materials and perform all or any part of the Work which has been terminated. To complete the Work, the District shall have the right to take possession of materials and supplies and to use any or all of the materials, supplies, tools, equipment, and property furnished by the Contractor for the Work. The Contractor shall not remove any materials, tools, equipment or supplies from their location at the time of termination without the prior written consent of the District.

The expense of completing the Work, together with a reasonable charge for awarding and administering any contract(s), and the damages caused by the delays in completing the Work will be charged to the Contractor. The District will deduct the amounts described in the preceding sentence from any amounts which may be due or may become due to the Contractor. In case the expenses exceed the amounts due or to become due, the Contractor shall, upon notice from the District, promptly pay to the District the amount of the excess. The District shall not be required to obtain the lowest figures for Contract Completion, but may make those expenditures which in its sole discretion will best accomplish timely, quality Completion.

The District's termination of a Contractor shall not affect any rights of the District against the Contractor then existing or which may thereafter accrue. Any retention or payment of monies by the District due to the Contractor shall not release the Contractor from liability.

Noncompliance – The Contractor shall, upon receipt of written notice of noncompliance with any provision of this Contract and the action to be taken, immediately correct the conditions to which attention has been directed. Such notice, when served on the Contractor or its representative, shall be deemed sufficient. If the Contractor fails or refuses to comply promptly, the District Engineer may issue an order to suspend all or any part of the Work. When satisfactory corrective action is taken, an order to resume work shall be issued. No part of the time lost due to any such suspension order shall entitle the Contractor to any extension of time for the performance of the Contract or to reimbursement for excess costs or damages.

GC-22 TERMINATION FOR CONVENIENCE

The District may terminate the Contractor's right to proceed with all or any portion of the Work upon ten (10) days written notice to the Contractor. Upon receipt of any notice of



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termination, the Contractor shall immediately stop all work being performed unless the notice of termination expressly directs otherwise.

Upon receipt of any such notice, the Contractor shall, unless the notice states otherwise:

- stop the Work on the date and to the extent specified in the notice of termination;
- place no further orders or subcontracts for services, equipment or materials relating to the terminated portion of the Work;
- terminate all orders and subcontracts to the extent that they relate to the performance of Work terminated by the notice of termination as directed by the District;
- if requested by the District, assign to the District, in the manner and to the extent directed by it, all of the rights, title and interest of Contractor under the orders or subcontracts so terminated, in which case District shall have the right, if it elects to do so, to settle or pay any or all claims relating to the termination of such orders and subcontracts;
- if requested by the District, settle all outstanding liabilities and all claims arising out of the termination of orders and subcontracts, in a Satisfactory manner;
- deliver to the District, when and as directed by the District, all documents and all property and transfer title to such property to the District to the extent not already transferred; and
- to the extent requested by the District, assist the District in maintaining, protecting, and/or disposing of Work in progress, tools, equipment and materials acquired or utilized by Contractor relating to the Work.

In the event of such termination, Contractor waives any claim for damages, including but not limited to, any claims for loss of anticipated profits, and agrees to accept in full settlement of all claims by Contractor and any Subcontractors or suppliers such proportion of the Contract Price due to Contractor under this Contract as the Work actually completed bears to the entire Work to be performed by Contractor under this Contract, as determined by the District, less any payments already made to Contractor and less any amounts withheld by the District to settle claims against or to pay indebtedness of Contractor in accordance with the provisions of this Contract. In the event of such termination, Contractor shall be entitled to no payment beyond that specified in this paragraph and Contractor shall defend, indemnify and hold the District harmless of all claims for amounts other than the above, including but not limited to, all claims for lost profit, loss of business expectancy, and the like.

GC-23 CONTRACTOR'S CLAIMS

If at any time the Contractor claims that the District may, for any reason, owe it damages, additional payment, or a time extension, the Contractor must file a written claim with the District in strict compliance with this section. The written claim shall set out a detailed, factual statement of the claim for additional compensation or for additional time: (1) listing the date on which facts arose that gave rise to the claim; (2) identifying any documents and/or oral statements that support the claim; (3) listing for time extensions claimed the



specific dates for which the extension is sought and the reasons Contractor claims a time extension should be granted for the dates identified, and (4) listing for additional compensation sought a breakdown of labor, materials, equipment, overhead and any other amounts claimed. Contractor must deliver to the District a written notice that fully complies with the above requirements no later than ten (10) days after the event giving rise to the claim occurred and before proceeding with any Work upon which the claim is based. Failure to provide the written notification in strict compliance with the above requirements (including but not limited to contents of notice and time of notice) shall constitute an absolute waiver of any such claim. No act, admission or knowledge, actual or constructive, of the District or the Engineer or any District employee shall in any way constitute a waiver of the above requirements, unless the District provides the Contractor with an express, unequivocal written waiver of the specific requirement being waived.

Within a reasonable time after presentation of a claim, the District shall give the Contractor written notice of the District's decision on any claim of the Contractor. All such decisions of the District shall be final.

Pending final resolution of a claim, unless otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract.

GC-24 NOTICES

The District may inform the Contractor at the address given by the Contractor in its bid any written notice which the Contract Documents provide that the District shall give to the Contractor. Written notice delivered to the Contractor's Superintendent at the job site shall constitute notice to the Contractor. The Contractor may deliver, fax to the District's fax number, or mail to the District any notice which the Contract Documents provide that the Contractor shall give to the District. Written notice delivered to the District's Engineer at the job site shall constitute notice to the District.

GC-25 ASSIGNMENT OF CONTRACT

The Contractor agrees that it will not sell, assign, transfer or sublet this Contract or any part thereof or interest therein, either by power of attorney or otherwise, without the prior written consent of the District, and that any such sale, assignment, transfer or subletting, without such consent of the District, shall be null and void.

The Contractor shall not assign any monies due or to become due it under the Contract without the prior written consent of the District. No assignment of the rights given to the Contractor under the terms of the Contract Documents shall be valid unless it contains a provision that the funds to be paid to the assignee under the assignment are subject to all of the Contractor's obligations under the Contract, i.e. that the Contractor delegates its duties under the Contract and the assignee agrees to fully perform those duties. The District shall have the absolute right to reject the assignment to the proposed assignee. Any assignment made without the District's written consent shall be null and void. The original Contractor



shall remain liable for performing under the Contract to the extent the assignee does not perform or the assignee's Work is rejected by the District.

GC-26 WAIVER AND MODIFICATION

No waiver or modification of any provision of the Contract Documents shall be valid and binding upon the District unless the waiver or modification is in writing and signed by the District's Project Engineer with proper authority. A waiver shall neither be nor be construed to be a waiver of any past or future default or breach, nor a modification of any of the terms or conditions of the Contract, except to the extent expressly stated in the written waiver.

The failure of the District to insist upon strict compliance with any term or provision of the Contract Documents shall not constitute a waiver or relinquishment of any such term or provision but the same shall be and remain in full force and effect. The making of any payment by the District to the Contractor with or without knowledge of any breach of the Contract shall not be deemed to be a waiver of any breach or of any term or provision of the Contract Documents.

GC-27 PATENTS AND ROYALTIES

The Contractor shall pay the costs of all royalties, permits, taxes, licenses or other fees necessary for the performance of this Contract.

When notified and authorized in writing by the District, the Contractor shall defend, at the Contractor's expense, any suit or proceeding brought against the District so far as such suit or proceeding is based on a claim that the manufacture, sale or use of materials or equipment furnished by the Contractor as part of the Work under the Contract constitutes an infringement of any patent, and the Contractor shall pay all damages and costs awarded against the District, and shall otherwise hold the District harmless; provided that the Contractor's obligation shall not extend to a claim of infringement based upon the manufacture, sale or use of materials or equipment furnished by the Contractor in combination with materials or equipment not furnished under the Contract. If the Contractor refuses to defend such suit or if, in the opinion of the District, the Contractor does not tender an adequate defense to the claims made in such suit, the District may seek counsel to protect the District's interests. The Contractor shall be liable for the costs and attorneys fees associated with the District's actions in this regard.

In the event the manufacture, sale or use of materials or equipment is held to constitute infringement and the use of part or all of the Work is enjoined, the Contractor, at its expense, shall either obtain for the District the unqualified right to continue using said material or equipment for an indefinite period or shall replace the same with non-infringing material, or shall remove said material or equipment and refund to the District the purchase price and the transportation and installation costs thereof.



GC-28 SOFTWARE AND SOFTWARE LICENSES

For purposes of this Contract, third party software shall mean software and associated documentation licensed by Contractor from third parties, or Contractor obtained licenses from third parties to be licensed to the District, and included as part of any software deliverables, equipment deliverables or otherwise provided as part of this Contract under a license from such third parties. Contractor software shall mean software and associated documentation owned by Contractor.

For purposes of this Contract, Contractor grants to District a non-exclusive, perpetual, irrevocable, transferable license to use any Contractor software related documentation which may be included as part of, integrated into, or necessary for the proper function of the Work, or other equipment purchased under this Contract.

Prior to using any third party software product, which may be included as part of, integrated into, or necessary for the proper operation of any Work, or other equipment purchased under this Contract, Contractor shall provide to District copies of the license agreement from the licensor of the third party software and allow the District to review the license agreement and its terms. Prior to final acceptance, Contractor shall either assign to the District the licenses for the third party software or obtain such licenses in the District's name for the District's use of the third party software.

GC-29 PERMITS

Permits, licenses and easements of a temporary nature which are necessary only for and during the prosecution of the Work shall be secured and paid for by the Contractor, except those permits, licenses or easements of a temporary nature which are described in Specific Requirements or Specifications.

GC-30 LIABILITIES OF THE CONTRACTOR

The Contractor shall have the sole responsibility for furnishing the District with completed divisions of Work until said divisions are accepted in writing by the District. Materials or Work damaged, lost, stolen or destroyed prior to said acceptance by reason of any cause whatsoever, whether within or beyond the control of the Contractor, shall be repaired or replaced in their entirety by the Contractor solely at its own expense.

GC-31 APPLICABLE LAW/COURT COSTS/ATTORNEYS FEES

All applicable state and federal laws, municipal ordinances, administrative codes and the rules and regulations of all authorities having jurisdiction over the Contract shall apply to the Contract throughout, and they will be deemed to be included in the Contract the same as though herein written out in full. The Contractor shall fully comply with all state and federal laws, ordinances and regulations, and with all orders, permits, approvals, certifications, licenses, directives adopted or issued thereunder, including but not limited to all environmental legislation of which the Contractor is aware or shall subsequently become aware.



The Contract Documents and other writings of whatsoever nature which are a part of the Contract shall be construed for all purposes solely and exclusively in accordance with and pursuant to the laws of the State of Washington. The rights and obligations of Bidders, the District, and Contractor shall be governed by the laws of the State of Washington. Contractor submits to the exclusive jurisdiction of the courts of the State of Washington. Venue for any lawsuit arising from these Contract Documents or performance under the Contract shall be in Chelan County Superior Court, Chelan County, Washington.

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein.

Subject to General Conditions, Time and Manner of Payment to Contractor, the Contractor may bring no litigation on claims unless such claims have been properly raised and considered in the procedures of General Conditions, Contractor's Claims.

In the event it is necessary for either party to utilize the services of an attorney to enforce any of the terms of the Contract, the substantially prevailing party shall be entitled to compensation for its reasonable attorneys fees and costs whether or not legal action is initiated and regardless of whether the dispute is settled by trial, trial and appeal, arbitration, mediation, negotiation or otherwise and regardless of whether suit is formally filed. Failure to pay the costs and attorneys fees provided for herein shall constitute an event of default under this Contract.

The District is committed to equal employment opportunity for all qualified individuals without regard to age, sex, marital status, sexual orientation, race, religion, creed, color, national origin, disability, disabled veterans, recently separated veterans, other protected veterans, and armed forces service medal veterans or any other protected class. To this end, we support and cooperate fully with all applicable laws, regulations and executive orders, and hereby incorporate the requirements of 41 C.F.R. § 60-1.4(a), 60-741.5(a) and 60-300.5(a), and 29 C.F.R. part 471, if applicable.

All Work performed pursuant to this Contract shall be in compliance with statutory and regulatory provisions of the State of Washington relating to public works including, but not limited to, the following as the same may be applicable:

- Chapter 39.04 RCW relating to pollution and preservation of natural resources.
- Chapter 39.06 RCW relating to registration and licensing of contractors on public works.
- Chapter 18.27 RCW relating to registration of contractors.
- Chapter 39.08 RCW relating to contractor's bond.
- Chapter 39.12 RCW relating to prevailing wages on public works.
- Chapter 49.28 RCW relating to hours of labor.
- Chapter 49.60 RCW relating to law against discrimination.



- Chapter 54.04 RCW relating to contracts by Public Utility Districts.
- Chapter 60.28 RCW relating to withholding of retainage.
- Chapter 70.92 RCW relating to provisions for the aged and physically handicapped.
- Chapter 19.122 RCW relating to underground utilities.

GC-32 PUBLIC RECORD

Contractor acknowledges that the District is subject to the provisions of RCW 42.56 and that this Contract and all materials made available under or as a consequence of it (collectively for this Section called the “Materials”), shall be public records as defined in RCW 42.56. Any specific part of the Materials that is claimed by the Contractor to be Confidential Information or proprietary information must be clearly identified as such by the Contractor as set forth in General Conditions, Contractor Identification of Confidential Information.

GC-33 CONTRACTOR IDENTIFICATION OF CONFIDENTIAL INFORMATION

If Contractor considers any portion of the Materials to be protected from disclosure under the law, Contractor must clearly mark on each page and/or individual piece (collectively referred to in this Section as “Record”) (as opposed to marking only the first page or a cover page to a Record) on the bottom or top of each Record in a manner which makes the words immediately obvious and identifiable, the following words, all capitalized: “PROPRIETARY AND CONFIDENTIAL.” A Contractor which does not do this agrees, for itself and any Subcontractor, partner, or other person or entity whose Material is used in connection with or incorporated into the Contract, that each Record, which is not marked, may be inspected and copied by the public and further that the District may disclose the same to the public for such purposes.

If a request is made for inspection and/or copying of the Materials, the District will review the Materials to determine which Records contained therein are marked “PROPRIETARY AND CONFIDENTIAL.” Records which are not so marked may, in the District’s sole discretion, be disclosed by the District to the public for inspection and copying. For each Record appropriately marked as “PROPRIETARY AND CONFIDENTIAL,” the District will determine whether, in its opinion, the Record is exempt from inspection and/or copying under Washington law. If in its discretion the District determines that the Record is not exempt from disclosure to the public, the District will notify the Contractor of the request and the District’s decision that the Record will be disclosed. The District will allow the Contractor ten (10) days to file suit and obtain a court order to restrain disclosure by the District. Such action, if taken, shall be at the Contractor’s sole expense. If the Contractor fails or neglects to take such action within said time, the District will release all Records, which it has deemed it must disclose. The Contractor agrees and warrants that neither it, nor any Subcontractor, partner, or other person or entity, providing it with Material for inclusion in the Agreement, will have any claim whatsoever against the District arising out of either disclosure or any action taken by the District under this Section as long as the District follows the procedures in this Section.



Contractor further releases the District from any liability to the Contractor arising out of any such disclosure or action and agrees to indemnify and hold the District harmless from any claim whatsoever, including attorneys fees, made by any Subcontractor, partner, or other person or entity arising out of disclosure.

In addition to the Contractor, this section shall be binding on all Subcontractors, partners, persons or entities which have allowed their Materials to be used by the Contractor for purposes of making or performing under the Contract; provided, for purposes of notice by the District to a Contractor of a request for public records and the right to restrain disclosure as set out above, notice need only be given to the Contractor notwithstanding that others may have allowed the Contractor to use their Materials for, or as a result of, the Contract.

Contractor will have the sole obligation, if any, to notify Subcontractors, partners, or other persons or entities, regarding the public document disclosure issues set out in this Section.

GC-34 INSURANCE

1. **Liability Insurance.** The Contractor shall, at its own expense, carry and maintain Commercial General Liability Insurance including coverage for Contractual Liability and Completed Operations throughout the course of performance of the Work and for at least one (1) year following Completion and final acceptance of the Work. Such liability insurance shall indemnify the Contractor and its Subcontractors against loss from liability imposed by law upon, or assumed under Contract by, the Contractor or its Subcontractors for damages on account of such public liability, contractual liability, property damage, products liability or completed operations liability. SAID INSURANCE SHALL PROVIDE "OCCURRENCE" COVERAGE, NOT "CLAIMS MADE" COVERAGE. Said liability insurance shall have a limit of \$1,000,000 per occurrence and \$2,000,000 general aggregate for bodily injury, including personal injury and death and property damage."
2. **Automobile Insurance.** The Contractor shall, at its own expense, carry and maintain automobile liability insurance covering any auto, truck or other motor vehicle used by the Contractor in connection with the Work. Such coverage shall have a combined single limit per occurrence for bodily injury and property damage of not less than \$1,000,000.
3. The District shall be identified as an additional insured on all general liability policies required of the Contractor pursuant to these Contract Documents. The coverage afforded to the District as an insured shall be primary and not excess or contributing to any insurance held by the District or any District self insurance program. The insurance provided shall apply separately to each insured. This separate coverage requirement may be met by a cross liability clause, a severability of interest clause or an acceptable definition of the term "insured".
4. **Deductible.** No insurance policy required herein shall have a deductible or self-insured retention of more than \$50,000. In the event the Contractor's insurance



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program has a deductible in excess of \$50,000, the District reserves the right to waive the aforementioned condition following review and acceptance of Contractor's most current audited financial statement documenting financial security available to cover the deductible amount(s). Payment of deductibles and premiums are the sole responsibility of the Contractor. Deductible amounts applicable to any insurance specified under these Contract Documents shall be clearly set forth on the Insurance Coverage Checklist, Exhibits.

5. All insurance policies shall include a provision to the effect that the insurance policy shall not be subject to cancellation, lapse, or to reduction in the required limits of liability or amount of insurance until notice has been mailed to the District by the insuring company stating the date that such cancellation, lapse or reduction shall be effective, which date shall be not less than 30 days after the mailing of such notice. The Contractor shall not cause any insurance policy required under these Contract Documents to be canceled or permit any such policy to lapse unless replaced with no lapse in coverage.
6. Within ten (10) days after receipt of the Notice of Award, the Contractor shall file with the District certificates from its insurance companies certifying to the coverage of all insurance required herein. **IMPORTANT:** Work will not commence on the Project until the Contractor's Insurance Certificate, with required attachments, is received by and is acceptable to the District. The District reserves the right to determine the completeness and adequacy of the Contractor's Insurance Certificate, required attachments and the acceptability of deductible or self-insured retention levels. Renewal certificates are required prior to the expiration of the insurance policies. Failure to submit a renewal certificate or finalizing correction of minor deficiencies in the insurance documents to maintain compliance with the Contract may result in the withholding of progress payments until the deficiency(ies) is corrected.
7. All certificates of insurance shall be authenticated by the proper officer of the insurer and shall certify the name of those insured, the type and amount of the insurance, and the expiration date. Contractor shall submit with and as part of its Insurance Certificate a copy of all special or additional exclusions or endorsement riders and the completed Insurance Coverage Checklist. The Contractor's Insurance Certificate and attachments must clearly state the existence of all coverage and compliance with all insurance conditions required by these Contract Documents.
8. Delivery of Certificate. The completed Insurance Certificate with all necessary attachments shall be delivered to the District's Procurement & Contract Services Department.
9. Workers Compensation Insurance. In addition to such other insurance as may be required under this Contract, the Contractor and its Subcontractors, at their own expense, shall also maintain Workers Compensation Insurance in the amount and type required by law for all employees under this Contract who may come within the protection of workers compensation laws. Contractor hereby expressly waives its



rights of subrogation against the District for any workers compensation claims arising out of this Contract. The Contractor and its Subcontractors shall maintain employer's liability insurance (or Stop Gap) in an amount and form and with a company or agency Satisfactory to the District for the benefit of all employees not protected by worker's compensation laws. Evidence of employer's liability insurance (or Stop Gap) shall be included on the Insurance Certificate. It is the Contractor's and its Subcontractor's sole responsibility to purchase and maintain coverage in compliance with the United States Longshoremen & Harborworkers Act (USL&H), Jones Act, or any federal law, state statute, or local ordinance which may be applicable to this Project.

10. The insurance coverage and benefits required herein, or in any other Contract Document, shall not be deemed to limit the Contractor's liability to the District or any third party. In the event the minimum insurance limits specified in this Contract Document are less than the maximum amount of insurance in effect for the Contractor at the time of claim or loss which arises from or is connected to the Work, Contractor affirmatively agrees that all insurance limits available to it will be extended to the District as additional insured.

GC-35 COMMENCEMENT OF WORK

Unless otherwise specified, Contractor shall commence work upon receipt of the District's written Notice to Proceed. The Contractor shall not begin any onsite Work before the date specified on the Notice to Proceed, or as directed by the District, and the Work shall be carried on regularly and without interruption thereafter, with such force as to assure the Completion of the Work within the Contract Time stated in the Contract Documents unless otherwise directed in writing by the District.

GC-36 POST-AWARD CONFERENCE

Within approximately twenty (20) days following the issuance of a Notice of Award, a post-award conference may be held at District's facility on a date and time as mutually agreed upon by the Engineer and Contractor. The Contractor shall be represented at the meeting by the Contractor Superintendent. All aspects of the job will be discussed.

GC-37 PROGRESS, ORGANIZATION AND FACILITIES

The Contractor shall employ an ample force of employees and provide properly adapted and maintained construction facilities of sufficient capacity and efficiency to prosecute the Work in a workmanlike manner at the rate of progress necessary for Completion within the Contract Time.

Should the Contractor fail to maintain such rate of progress, the Engineer may require, at no additional expense to the District, additional employees and facilities be placed on the Work or a reorganization of facilities layout be effected in order that the rate of progress necessary for timely completion of the Work can be maintained.



GC-38 CONTINUITY OF UTILITY SERVICES

The Contractor shall make every effort to maintain continuity of utility services to District's customers. All outages required for Work shall be pre-approved by the District's Superintendent(s) or his designee. The Contractor shall take every precaution to avoid inadvertent service interruption of District customers. All unscheduled outages caused by the Contractor shall immediately be reported to the District's Superintendent(s) or his designee. Failure to comply with this section shall constitute reasonable cause for the District to immediately suspend the Contractor's Work activities and may result in termination or discontinuance of this Contract.

GC-39 WORK SCHEDULE

Within ten (10) days following award of the Contract, the Contractor shall furnish the Engineer a written schedule outlining in reasonable detail its proposed sequence of operations. The Contractor shall at no time change its schedule without the approval of the Engineer. The Engineer shall have the right to require changes in the schedule at any time to meet requirements of timely completion of the Work or outage constraints. The Engineer will inform the Contractor in writing as the Work proceeds as to the status of deliveries of materials to be furnished by the District, and as to the status of land right-of-way availability. Approval of the Contractor's schedule shall in no event be construed as relieving the Contractor of any responsibility in connection with its performance of the Work in the Contract Time specified.

Unless stipulated otherwise in the Contract Documents, the schedule shall be in the form approved by the Engineer, indicating the estimated duration and completion dates of all significant trade portions and phases of the Work.

GC-40 CHANGES IN THE WORK - FIELD WORK ORDER/CHANGE ORDERS

By proper action of its governing body or authorized designee and without invalidating the Contract, the District, at its discretion, may make any changes, including additions to or deductions from the Project, provided such changes are within the general scope thereof regardless of the size or magnitude of said change. It shall be the responsibility of the Contractor, before proceeding with any change, to satisfy itself that the execution of a Field Work Order/Change Order has been properly authorized on behalf of the District by its governing body or designee.

The Contractor agrees that it shall maintain a superintendent on site as required in General Conditions, Contractor's Superintendence. Contractor agrees that the superintendent shall have the authority to agree to and execute all Field Work Order/Change Orders on behalf of the Contractor. A Field Work Order/Change Order does not require the signature of the Contractor to be in effect. If the document is presented to the Contractor but not signed by the Contractor, then the requested change shall be carried out by the Contractor and payment will be based on the actual cost method as presented below.



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Charges or credits, if any, for the Work covered by the change shall be determined by one or more of the following methods, at the District's option:

- Unit Prices specified in the Bid Form, if any.
- Unit Prices specified in the Unit Price Schedule for Changed Work submitted with the Contractor's Bid Proposal, if any.
- An agreed lump sum.
- The actual cost, which is to include:
 - Labor, including foreman.
 - Materials entering permanently into the Work.
 - The ownership or rental cost of the facilities and equipment during the time of use on the Project. The equipment rental rates paid by the District shall not exceed rates as calculated by the Federal Highway Administration. For each hour of equipment use, the District shall pay the monthly rate divided by 176 plus the hourly estimated operating cost. The Contractor shall provide copies of current industry recognized and Approved rental rate sheets or Blue Book Rental Rate sheets verifying rates requested in changes or claims, as provided by Equipment Watch, with adjustments for region and model year for every piece of equipment claimed.
 - Engineering and transportation costs necessitated by the change.
 - The cost of the increased premium for the Performance and Payment Bond required to cover the additional Work.

The Contractor shall be allowed to include a fixed fee of 18% as complete compensation for all profit and overhead, including superintendence, administration, office expenses, B & O Tax and any other general expenses. If the changed work is done all or in part by a Subcontractor, the Subcontractor (or tier of Subcontractors) shall be allowed a fixed fee of 15% for all profit, overhead and all general expenses, and the Contractor shall be allowed a markup of 5% of Subcontractor's actual cost (before profit and overhead) to cover the Contractor's profit, overhead and all general expenses on the changed work performed by the Subcontractor.

The District will make the final determination of charges or credits for the Work covered by the Approved change. In the event the Contractor does not agree with the amount of charges or credits, Contractor shall submit a Contractor's claim in accordance with General Conditions, Contractor's Claims.

Differing Site Conditions.

Contractor shall promptly, and before the conditions are disturbed, give written Notice to the Engineer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in the Contract, or (2) unknown physical conditions are encountered at the site not reasonably foreseeable with due diligence, inquiry and/or investigation during the Bid period, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.



The Engineer shall investigate the site conditions promptly after receiving the written notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or time required for, performing any part of the Work under this Contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this section and the Contract modified in writing through a Field Work Order/Change Order.

No request by the Contractor for an equitable adjustment to the Contract under this section shall be allowed unless the Contractor has given the written notice required; provided that the time prescribed, General Conditions, Contractor's Claims, for giving written notice may be extended by the Engineer.

No request by the Contractor for an equitable adjustment to the Contract for differing site conditions shall be allowed if made after final payment under this Contract.

GC-41 DELAYS AND EXTENSIONS OF TIME

If the Contractor is delayed at any time in the progress of the Work by any of the causes listed below, the Contract Time may be extended by Field Work Order/Change Order for such reasonable time as the District shall determine. All decisions by the District regarding extensions of time shall be final. The Contractor agrees to complete the Work within the Contract Time as thus extended. Such extensions shall postpone the beginning of the period for payment of Liquidated Damages, if provided for in the Contract, but they and the events producing them shall not be grounds for claim by the Contractor for damages or for additional costs, expenses, overhead or profit or other compensation unless, and only to the extent that the District causes the delay, in which event the District shall compensate the Contractor and any Subcontractors suffering delay damages in the amount of their field expenses during the delay plus 15% of the field expenses as compensation for the cost of Superintendence, overhead, bond, profit and any other general expenses. The parties may, however, agree on a different amount if they so choose.

- Fire, strikes, lockouts, labor disputes, pickets, war, acts of the public enemy, Acts of God.
- Acts of performance or delays in performance caused by persons other than the Contractor and other than persons acting for and on behalf of the Contractor, including Subcontractors and suppliers.
- Causes beyond the control of the Contractor, the delays from which could not have been avoided through the exercise of reasonable care, prudence, foresight and diligence on its part and that of its Subcontractors.

All claims for extension of the Contract Time shall be made in writing and submitted to the District in accordance with General Conditions, Contractor's Claims, no more than ten (10) days after the Contractor knows or by reasonable diligence should know of the event causing or likely to cause the delay; otherwise, they shall be waived. In the case of a continuing cause of delay, only one (1) claim is necessary.



Avoidable delays in the prosecution or Completion of the Work, for which no time extension shall be granted, shall include all delays which in the opinion of the District could have been avoided by the exercise of care, prudence, foresight and diligence on the part of the Contractor. The following list is nonexclusive, but is representative of avoidable delays within the meaning of the Contract and shall not be a basis for an extension of the Contract Time:

- delays caused by rejected claims for extension of time or changed work by Contractor;
- delays caused due to rejected Work;
- delays to a part of the Work which may in themselves be unavoidable but do not necessarily prevent or delay the prosecution of other parts of the Work nor the completion of the whole Work within the Contract Time herein specified;
- reasonable loss of time resulting from the necessity of submitting Shop Drawings to the District for approval and from making of surveys, measurements, and inspection;
- such interruptions as may occur in the prosecution of the Work on account of the reasonable interference of other contractors employed by the District which do not necessarily prevent the Completion of the whole Work within the time agreed upon.

No claim for delay shall be allowed on account of the District's failure to furnish Contract Drawings until ten (10) days after a written request for such Contract Drawings has been made by the Contractor.

All changes of the Contract Time must be in writing and agreed upon by the District.

GC-42 SUSPENSION OF WORK

Whenever, in the District's opinion, a suspension of the Work is necessary either in whole or in part because of conditions unfavorable to prosecution of the Work or failure of the Contractor to carry out any of the provisions of the Contract, the District may immediately order suspension of the operation. Any suspension of the Work by the District shall in no case relieve the Contractor from its obligations under the Contract. The District shall not be required to pay for any standby time or damages arising from such a suspension. The Contractor shall not suspend operations without obtaining the prior written permission of the District.

In preparation for or during the suspension of the Work, Contractor shall take necessary steps at Contractor's expense to prevent damage to or deterioration of the Work.

GC-43 USE OF COMPLETED PORTIONS

Whenever, as determined by the District, the Project or any part thereof is in a condition suitable for use and the best interest of the District requires such use, the District may take possession of or use the Project or such part thereof.



All necessary repairs or renewals in the Project or part thereof so used, not due to ordinary wear and tear, but due to defective materials or workmanship or to the operations of the Contractor, shall be completed within the warranty period as specified in General Conditions, Warranty, in Specific Requirements, or elsewhere in these Contract Documents, and at the expense of the Contractor.

The use by the District of the Project or part thereof as contemplated in this Paragraph shall in no case be construed as constituting acceptance of the Project or any part thereof. Such use shall neither relieve the Contractor of any of its responsibilities under the Contract, nor act as a waiver by the District of any of the conditions thereof, provided, that the Contractor shall not be responsible for the cost of repairs or renewals required due to ordinary wear and tear as a result of such use or damage due to the District's negligence or misuse of the Project.

GC-44 WAGES PAID BY CONTRACTOR

The Contractor and its Subcontractors shall fully comply with all applicable provisions of RCW Chapter 39.12 concerning payment of prevailing wages, including the filing and payment of fees for all required statements and affidavits, and shall pay and provide wages and benefits to their employees employed in the performance of this Contract which are not less than those fixed by the Washington Department of Labor and Industries for work of like character. It shall be the responsibility of the Contractor to ensure that the appropriate classification of work and prevailing wage rate is paid for the county in which the Work is performed. The State of Washington prevailing wage rates applicable for this Project, which is located in Douglas County, may be found at the following website address of the Department of Labor and Industries: <https://fortress.wa.gov/lni/wagelookup/prvWagelookup.aspx>. Based on the bid submittal deadline of May 22, 2015 for this Project, the applicable Effective Date for prevailing wages for this Project is May 22, 2015. In the event the Project is not awarded within six (6) months of the bid submittal deadline of May 22, 2015, then the Effective Date on the Notice of Award shall be used. A copy of the applicable prevailing wage rates is also available for viewing in the Procurement and Contract Services Department at the District. Upon request, the District will mail a hard copy of the applicable prevailing wages for this Project. Questions regarding Prevailing Wage should be directed to the Prevailing Wage section of the Department of Labor & Industries, ESAC Division, P.O. Box 44540, Olympia, Washington 98504-4540 by calling (360) 902-5335 or on their web site at <http://lni.wa.gov/TradesLicensing/PrevWage/WageRates/default.asp>. It is the Contractor's responsibility to ensure with the Washington Department of Labor and Industries prior to bid opening that the most current version of the prevailing wage rates are utilized in the preparation of its Bid Proposal. The District does not guarantee that labor can be procured for the minimum wages shown on the referenced schedules. The rates listed are minimum only, below which the Contractor cannot pay. The Contractor may be required to furnish to the District at any time acceptable evidence of wage rates and amounts paid by it or its Subcontractors.



For all electrical line or substation maintenance and for all electrical line or substation construction Work under this Contract (including pole testing and tree trimming), the current prevailing wage rates for such Work shall be the current and prevailing wage rates, employee benefits and working conditions expressed through collective bargaining for the I.B.E.W., Local 77 construction membership. The Contractor may determine the wages in effect at the time this Contract is bid by contacting the International Brotherhood of Electrical Workers, Local Union No. 77, 2626 West Clearwater Avenue, Kennewick, Washington 99336 (509-783-4136).

Any dispute between the Contractor or any of its Subcontractors and the District over the appropriate wage rate under this provision or RCW Chapter 39.12 shall be subject to arbitration pursuant to RCW 39.12.060.

GC-45 TIME AND MANNER OF PAYMENT TO CONTRACTOR

IMPORTANT! No payment will be made to the Contractor until the Contractor and each and every Subcontractor has submitted to the District a "Statement of Intent to Pay Prevailing Wages" in compliance with RCW 39.12.040. Final payment for Work performed pursuant to these Contract Documents shall not be issued by the District until all requirements of RCW Chapter 39.12 have been satisfied.

In the event any dispute arises between the District, the Contractor, a Subcontractor, and any laborer, worker or mechanic, or any of them, as to what are the prevailing wage rates for work of a similar nature, which dispute cannot be settled by the parties in interest, including labor and management representatives, the matter shall be referred to the Director of the Department of Labor and Industries, whose decision shall be final, conclusive and binding on all parties involved in the dispute.

Unless otherwise specified, once per month the Contractor shall submit to the District, for Engineer approval, a detailed Contractor's Application and Certificate for Payment along with the Contractor's invoice for the value of the Work completed during the previous month. Within 30 days after receipt of a properly completed invoice or receipt of goods or services, whichever is later, the amounts so determined, less previous payments, and less such sums as the District may be entitled to retain under the provisions of the Contract, shall be paid to the Contractor (see General Conditions, Payments Withheld [Retainage]). All Application and Certificate for Payment forms and invoices shall be sent to the attention of the District's Accounts Payable Department and may be sent via email to: APDept@chelanpud.org.

If requested in writing by the District, the Contractor shall include with each Request for Payment (after the first) a statement under penalty of perjury that all Subcontractors have been paid less earned retainage as their interest appeared in the last payment received, and shall be accompanied by a signed receipt from the Subcontractors that they have received payment for the previous month's work (less earned retention) and a similar statement under penalty of perjury by these Subcontractors stating that all Subcontractors, suppliers, wages, fringe benefits and taxes arising out of such subcontracts have been paid



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as their interest appeared in the last payment received. No Request for Payment will be processed unless accompanied by both the statements and receipts requested.

Materials and equipment that are installed in place will be considered in determining the value of Work completed. Payment may be made, at the District's sole discretion, on the Contractor's receipted purchase invoice amount (i.e., Contractor's actual cost) of materials satisfactorily stored and on-hand.

The making of any payment to the Contractor under the Contract shall not relieve the Contractor of any of its obligations thereunder. The Contractor is obligated to complete the Contract in its entirety and to deliver to the District such completed Work as is specified in the Contract.

The Engineer may withhold approval of payment to such extent as may be necessary to protect the District from loss on account of:

- Defective Work not remedied.
- Claims filed or reasonable evidence indicating probable filing of claims.
- Failure of the Contractor to make payments properly to Subcontractors or for material or labor.
- A reasonable doubt exists that the Work can be completed for the outstanding balance of the Contract Price.
- Damage to another contractor.
- All security badges and/or keys have not been returned to the District.
- Failure of the Contractor to keep its Work progressing in accordance with its Work schedule.
- Failure of the Contractor to provide all drawings, manuals and other information required by the Contract.

Nothing in this paragraph or General Conditions, Acceptance and Final Payment, shall make any laborers, materialmen, suppliers or Subcontractors third party beneficiaries of this Contract or obligate the District to withhold any funds except in the District's sole discretion. Pursuant to RCW 39.76, when all or a part of a payment is going to be withheld for unsatisfactory performance or if the payment request does not comply with the requirements of the Contract, the District shall notify the Contractor in writing within eight (8) working days after receipt of the payment request stating specifically why part or all of the payment is being withheld and what remedial action must be taken by the Contractor to receive the withheld amounts. When the above grounds are removed, payment shall be made within 30 days for any amount withheld because of them.

IMPORTANT! No payment will be made to the Contractor for any Work performed under this Contract until a properly completed Insurance Certificate and/or the Performance and Payment Bond is received by the District. See General Conditions, Insurance, and Instructions to Bidders, Performance and Payment Bond.



Payments made to the Contractor shall not constitute acceptance by the District of Work that is defective or deficient, in whole or in part, regardless of whether the defect or deficiency is patent or latent or known or unknown, and such payments shall not constitute a waiver by the District of any rights or remedies it may otherwise have under these Contract Documents or otherwise.

GC-46 PAYMENTS BY CONTRACTOR

The Contractor shall pay: (a) for all transportation and utility services not later than the 30th day of the calendar month following that in which services are rendered; (b) for all materials, tools, and other expendable equipment to the extent of 90% of the cost thereof, not later than the 30th day of the calendar month following that in which such materials, tools, and equipment are delivered at the site of the Project, and the balance of the cost thereof not later than the 30th day following the completion of that part of the Work in or on which such materials, tools, and equipment are incorporated or used, and (c) to each of its Subcontractors, not later than the 10th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the Work performed by its Subcontractors to the extent of each Subcontractor's legitimate interest therein. The Contractor shall require, by an appropriate agreement with each Subcontractor, each Subcontractor to make payments to its suppliers and Subcontractors in a similar manner.

In the event a payment to a supplier or Subcontractor is disputed, the Contractor shall notify the District of such dispute.

GC-47 DETERMINATION OF QUANTITIES FOR PAYMENT

The quantity of Work to be paid for any item for which a Unit Price is fixed in the Contract shall be the number of units of Work satisfactorily completed in accordance with the Contract Documents, as determined by the Engineer. The quantity of Work to be paid for any item for which a lump sum price is fixed in the Contract shall be based on the percentage of Work satisfactorily completed in accordance with the Contract Documents, as determined by the Engineer. No payment will be made for Work done outside of the prescribed or ordered limits. Measurements and computations will be made by such methods as the Engineer may consider appropriate for the class of Work measured.

GC-48 PAYMENT FOR UNCORRECTED WORK

If, in the opinion of the Engineer, it is inexpedient, impractical, or otherwise not in the best interest of the District to correct Work which has been damaged, which is faulty, or which has not been furnished in accordance with the Contract, an equitable reduction in the Contract Price shall be made therefor. The District shall have the discretion to set a reasonable reduction in the Contract Price, taking into account the cost of repairing or replacing the nonconforming Work, the diminution in value of the Work if not required or replaced, or other means of calculating such reduction.



GC-49 PAYMENTS WITHHELD (RETAINAGE)

Pursuant to RCW 60.28 the District may be required to withhold an amount of 5% of all monies earned by the Contractor under this Contract as a trust fund for the protection and payment of any person who shall supply labor or materials for the carrying on of the Work and for any state taxes due under RCW Title 82.

The District shall have the right to withhold from payment to the Contractor and retain such an amount or amounts, in addition to the reserved percentage hereinabove described, as may be necessary to pay just claims for labor, materials, and services rendered in and about the Work. The District shall have the further right, acting as agent of the Contractor, to apply such retained amounts to the payment of such just claims. Nothing in this paragraph shall make any laborer, materialman, supplier, or Subcontractor third party beneficiaries under this Contract nor obligate the District to withhold any such funds.

At the Contractor's option, the monies reserved as retainage shall be held by the District, or deposited in an interest bearing account at a bank, or placed in escrow at a bank or trust company, all as more fully provided in RCW 60.28.

Pursuant to RCW 60.28, the Contractor may submit a bond in lieu of retainage that the District would otherwise keep under the terms of this Contract and pursuant to applicable law. In the event the Contractor fails at any time to pay persons protected under RCW 60.28 or the District has reason to believe that the District or other obligee under the bond has a claim against the retainage or for other good cause, the District may, at its option, resume retaining from monies earned by the Contractor such amount as it would otherwise be entitled to retain had the bond not been accepted. Notwithstanding the District's resuming such retainage, said bond shall remain in full force and effect to the extent of its penal sum, limited to the amount of retainage released to the Contractor. After the Contractor has paid protected persons or otherwise cured any default, the District may, at its option, again release retainage pursuant to the terms of the bond.

GC-50 ACCEPTANCE AND FINAL PAYMENT

When the Contractor has completed the Work in accordance with the terms of the Contract Documents, the Contractor shall submit to the Engineer the Certificate and Release statement concerning claims in the form provided in Exhibits of these Contract Documents and such other completed documents as may be required for the release of monies held.

The Certificate and Release shall be prepared on the basis of the Contract, including all authorized Field Work Order/Change Orders, inclusive of claims of the Contractor which have not been accepted by an executed Field Work Order/Change Order. The Certificate and Release shall constitute a waiver of all claims by the Contractor except for unsettled claims specifically stated in the Certificate and Release.

The Certificate and Release shall warrant that the Contractor has fully completed the Work included in the Contract and has fully paid for labor, materials, equipment, services, taxes and all other costs and expenses of every nature and kind whatsoever resulting from this



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Contract and certifies that all contractual conditions have been satisfied. Such Certificate and Release shall also state the amount and nature of all present and all future claims that the Contractor may have against the District relative to this Contract.

After receipt of a properly completed Certificate and Release, the Engineer will, within a reasonable time, make a recommendation to the District relative to acceptance of the Work. Such a recommendation shall not constitute a recommendation of acceptance of Work not furnished in accordance with the terms of the Contract.

Upon receipt of the Certificate and Release, and other documents necessary for the release of monies held and the Engineer's recommendation relative to acceptance of Work, the District will, within a reasonable time, take action on the Certificate and Release. Such action shall be subject to the conditions of the Performance and Payment Bond, legal rights of the District, required warranties, and correction of faulty Work after final payment. The District shall have the right to retain from any payment then due the Contractor, so long as any bills or claims against the Contractor remain unsettled and outstanding, a sum sufficient, in the opinion of the District, to provide for the payment of the same. It is also understood and agreed that, in case of any breach by the Contractor of the provisions hereof, the District may retain from any payment or payments which may become due hereunder, a sum sufficient, in the opinion of the District, to compensate for all damages occasioned by such breach, including such damages arising out of any delay on the part of the Contractor.

After the expiration of forty-five (45) days from the Completion of all Contract Work and after the District has received certificates from the Department of Revenue, Labor and Industries, and Employment Security Department and the District is satisfied that the taxes certified as due or to become due by the Department of Revenue, Labor and Industries, and Employment Security Department are discharged, and the claims of materialmen and laborers who have filed their claims, together with a sum sufficient to defray the cost of foreclosing the liens of such claims, and to pay attorneys fees, have been paid, the District may withhold from the remaining retained amounts for claims the District may have against the Contractor and shall pay the balance, if any, to the Contractor the fund retained by it or release to the Contractor the securities and bonds held in escrow.

If such taxes have not been discharged or the claims, expenses and fees have not been paid, the District shall either retain in its fund or in an interest bearing account, or retain in escrow, at the option of the Contractor, an amount equal to such unpaid taxes and unpaid claims together with a sum sufficient to defray the costs and attorneys fees incurred in foreclosing the lien of such claims, and shall pay, or release from escrow, the remainder to the Contractor.

In any event, the District will, within sixty (60) days after Completion of all Contract Work, release and pay in full to the Contractor the amounts retained or withhold from such retained funds a sum sufficient to pay the unpaid taxes, unpaid claims, attorneys fees and costs and claims the District may have against the Contractor as enumerated above and release the remainder, if any, to the Contractor.



If any liens or taxes remain unsatisfied after final payment is made, the Contractor shall refund to the District such amounts as the District may have been compelled to pay in discharging such liens or taxes, including all costs and reasonable attorneys fees.

The Contractor shall be responsible for payment to the District of all direct and indirect costs associated with the handling of taxes and liens and notices of intent to file liens. Such costs shall include, but not be limited to, administration, clerical, accounting and legal costs.

Any action taken by the District pursuant to this section shall not release or relieve Contractor and/or Contractor's successors, assigns, and agents from any past, present or future obligations, warranty, or duties under the Contract or pursuant to state, federal, or local law.

GC-51 CONTRACT COMPLETION

The Contract will be complete when all Work has been finished, the final inspection made by the Engineer and final acceptance of the Work has been adopted by District resolution. Issuance of any statement or submission of any form by the District relating to Project Completion to any government agency for the purpose of such agency's administrative functions shall not affect or modify the foregoing requirements for determination of Contract Completion as between the District and the Contractor.

GC-52 TAXES

The Contractor shall be liable for all federal, state and local taxes payable in connection with or arising from the Work. The cost of any and all such taxes shall be included in the Contract Price (except for Washington State sales taxes, an amount equal to which the District will pay to the Contractor in addition to the Contract Price in accordance with the procedures established in these Contract Documents). It is the responsibility of the Contractor to determine, in conjunction with the appropriate federal, state or local authorities, the nature and amount of any taxes payable as a result of the Work.

GC-53 DISTRICT OPERATIONS AND CONSTRUCTION

The Contractor shall schedule all Work so as not to interfere with the operations of the District. Where such interference is essential to prosecution of the Contract, special arrangements shall be made and the written consent of the Engineer shall be obtained prior to commencing the Work.

The District reserves the right to engage in activities in connection with the Work which are not included in the Contract, either by the District's employees or agents or by the use of other contractors or agencies and the employees or agents of the same.



GC-54 MODIFICATION OF WORK SCHEDULE

Whenever in the District's opinion it is necessary to do so in order to ensure the safe and proper Completion of the Contract, the District may determine the order of precedence and the time at which any portion or portions of the Work shall be commenced and carried on.

The District may modify the Work schedule when the Work is carried on in locations where the District is doing other work either by other contract or by its own employees or agents, in order that conflict may be avoided and so that the Work under this Contract will be harmonized with the work furnished under other contracts or being done in connection with the operations of the District. Nothing herein contained shall relieve the Contractor of any of its obligations or liabilities under the Contract.

GC-55 CONTRACTOR'S SUPERINTENDENCE

The Contractor shall give efficient Superintendence to the Work, using its best skill and attention. During the progress of the Work, the Contractor shall have in constant attendance at the Project site a competent superintendent and necessary assistants, all subject to the District's approval. The superintendent shall not be changed, except with the consent of the District, unless the superintendent ceases to be in the Contractor's employment. The superintendent shall represent the Contractor and all directions given to the superintendent shall be as binding as if given to the Contractor. Important directions shall be subsequently confirmed in writing upon written request. Contractor agrees that the superintendent shall have authority to execute any agreements on Contractor's behalf.

GC-56 LANDS PROVIDED BY DISTRICT

Unless otherwise provided in Specific Requirements or elsewhere in these Contract Documents, the District will provide the lands upon which the Work under this Contract is to be furnished, together with the right of access to such lands. The Contractor shall confine all equipment, storage of materials, and operations to such limits as may be directed by the District, and shall not unreasonably place materials on the premises.

GC-57 FACILITIES PROVIDED BY CONTRACTOR

The Contractor shall provide at its own expense and with no liability to the District any electrical and water facilities, unless otherwise specified in Specifications, and additional land and access thereto not shown on the Contract Drawings or described in the Specifications that may be required for temporary facilities or storage of materials. The Contractor shall confine its equipment, storage of materials and operation of its workers to those areas described in the Contract Drawings and Specifications and such additional areas as it may provide at its own expense. The District and/or Architect/Project Engineer will not assume any responsibility for the security or protection of any materials and equipment stored on the site or elsewhere by the Contractor.



GC-58 SURVEYS

The District will furnish the surveys necessary to establish certain bench marks, base lines and property boundaries specifically noted on the Contract Drawings and such surveys as may be specifically described in the Specific Requirements or Specifications.

All bench marks, base lines, property boundaries and other reference and construction points, as originally established by the District, shall thereafter be maintained by the Contractor who shall be responsible for keeping their accuracy and who shall pay to the District the reasonable cost of re-establishing them if they are disturbed.

The Contractor shall retain a licensed surveyor to lay out its work from established points and lines indicated on the Contract Drawings, shall furnish any required engineering for the layout from such points, and shall be responsible for the execution of the Work to such lines and grades. Contractor shall maintain and preserve said reference points and other selected layout points and lines until their removal is authorized. If destroyed prior to authorized removal, they will be accurately replaced by the Contractor at no expense to the District.

GC-59 PROTECTION OF PROPERTY

The Contractor shall continuously maintain adequate protection of all its Work, the District's property, and adjacent public and private property from damage, injury, or loss arising in connection with the Work. The Contractor shall report immediately, in writing, to the Engineer all pertinent facts relating to any property damage, bodily injury or personal injury. A written report detailing the ultimate disposition of the claim for injury or damage may be required by the Engineer. The Contractor shall remedy any damage, injury or loss and immediate response must be taken to rectify the damage. If the Contractor does not rectify the damage to the District's satisfaction and level of service, the District shall make any repairs necessary at the Contractor's expense.

The Contractor shall not enter upon public or private property for any purpose without obtaining permission from the proper public authority or private property owner.

Wherever Work under the Contract is undertaken on easements or rights-of-way over private property, or public right-of-way or franchise, all operations shall be confined to the limits of such easement, right-of-way, or franchise.

The Contractor shall protect and maintain all underground or above ground utilities and structures affected by the Work and all fences, and other improvements on property crossed by or adjacent to its operations, and any damage shall be repaired and restored by the Contractor at its expense in a Satisfactory manner. The Contractor will be held responsible for all damages caused by its Work to roads, trails, docks, ditches, walls, bridges, culverts, utilities, barricades, lights or other property, whether such damage be at the Project site, or caused from transporting or hauling to or from the site, and it shall repair or replace at its own expense all such damage in a Satisfactory manner, as determined by the District. Immediate response must be taken to rectify the damage. If the Contractor



does not rectify the damage to the District's satisfaction, and level of service, the District shall make any repairs necessary at the Contractor's expense. The Contractor shall be responsible for replacing damaged services to the District's customers at the Contractor's expense. The Contractor shall also be required to provide items, at its expense, such as potable water, portable generators, portable sanitation units, mail delivery, sanitation service, or any other necessities required or otherwise specified to carry out the Work.

The Contractor shall use all necessary precautions to avoid the destruction of surveying markers, including but not limited to, section corners, witness trees, property corners, mining claim markers, bench marks, triangulation stations, etc. If Contractor determines that it needs to disturb an existing survey monument, Contractor shall follow the permitting process defined in WAC 332.120 for temporary removal or destruction of the survey monument. If any such markers must be destroyed, the Contractor shall first notify the agency responsible for the marker as well as the Engineer. All costs of replacing markers will be borne by the Contractor.

The Contractor shall construct and maintain at its own expense such temporary barricades, fences, gates and other facilities as shall be necessary for preservation of crops, confinement of livestock and protection of persons and property. Before cutting a fence, the Contractor shall take necessary precautions to prevent the straying of livestock and shall prevent the loss of tension in or damage to adjacent portions of the fence. The Contractor shall immediately replace at its own expense all fences and gates that are cut, removed, damaged, or destroyed in the course of performance of the Work with new materials to the original standard, with the exception that undamaged gates may be reused. Makeshift repairs to fences and gates will not be acceptable.

GC-60 SAFETY REQUIREMENTS

The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and safety programs in connection with the Work. In the event that the Engineer or other District representatives are present for any purpose pursuant to this Contract, the Engineer and/or District representatives are not responsible for insuring adequate safety precautions and requirements are being followed by the Contractor, its agents, employees and Subcontractors.

The Contractor shall conduct the Work with due regard to adequate safety requirements and shall maintain its facilities and equipment in safe conditions. Contractor shall at its own cost and expense protect its employees, the District's employees and all other persons from risk of death, injury or bodily harm arising from or in any way connected with the Work under this Contract and any changes thereto. The Contractor shall conform to all current safety practices and shall strictly comply with all applicable federal, Washington State and local regulations regarding safety, including but not limited to, Occupational Safety and Health Act (OSHA), and Washington Industrial Safety and Health Act (WISHA), and all other regulatory agencies having jurisdiction. Contractor warrants that all equipment has been inspected and certified for its intended use in connection with the Work. Contractor shall ensure that all crew members have current licenses or certifications when necessary



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and applicable to the Work. Reports of all accidents shall promptly be submitted to the Engineer in writing, giving such data as may be required or requested.

The Contractor shall provide, erect, and maintain all necessary guards, barricades, temporary fences, suitable and sufficient warning lights, danger signals and signs, illumination, and shall take all necessary precautions for the protection of the Work and the safety of the public.

The Contractor shall meet all fire regulations and restrictions of each of the agencies having jurisdiction over any part of its operation.

If trench excavation in excess of four (4) feet is required for the completion of the Project described in the Contract Documents, then the Contractor shall be required to furnish the necessary safety systems to meet the applicable RCW and WAC at no additional cost to the District.

If Work under this Contract will take place in a Permit Required Confined Space pursuant to WAC 296-809, as now exists or as may be hereafter amended, the following shall be required:

- Contractor must provide a copy of the written permit required confined space program adopted by Contractor and verify that it is consistent with WAC 296-809-300. Such program must include but is not limited to provision, maintenance, and adequate training of employees for use of required equipment specified in WAC 296-809-400, implementation of a permit system required for entry.
- Contractor must certify that employee training required by WAC 296-809-400 has been accomplished. This certification must:
 - Contain each employee's name, the signatures or initials of the trainers, and the dates of training.
 - Contain a statement that the Contractor has made the certification available for inspection by the Contractor's employees and their authorized representatives.
- Contractor must designate rescue and emergency services upon which it will rely under WAC 296-809-50014. The Contractor shall provide a certification from the designated entity in a form similar to the following:

(Entity name) hereby declares its employees or representatives have been trained in rescue and emergency services necessary for permitted confined spaces as defined by WAC 296-809-400 and such rescue and emergency services will be made available to the Contractor during construction of (project name).

During construction, Contractor will coordinate entry operations with District personnel as required by WAC 296-809-500.

Upon completion of the work in the permitted confined space, Contractor will advise the District of any hazards confronted or created in the permitted confined space.



In addition to all other pre-qualifications and requirements, all Contractor personnel working in District substations or switchyards are required to watch a one (1) hour video at the District headquarters building that provides information about work practices and notifications required by the District when working inside these facilities. In addition, site-specific orientation of up to one (1) hour will be given to Contractor personnel at the jobsite prior to the start of any Work.

GC-61 DUST AND SMOKE CONTROL

The Contractor shall constantly maintain the entire Work area free from dust and smoke which would cause a hazard or nuisance to nearby streets, orchards, crops, residences, businesses, or the operations of others performing work in the area, by sprinkling and other approved methods as required.

The Contractor is cautioned that dust can be a severe problem in the locality of the Work. No separate payment will be made for dust and smoke control, which the Contractor is required to provide. All costs involved in dust and smoke control shall be included in the Contract Price.

In the event that the Contractor does not adequately control dust, the District reserves the right to contract separately for additional dust control, deduct the cost involved from the Contract Price and adjust periodic payments as may be required to properly account for those costs. Further, the District will not be responsible for any damage to the Work under the Contract resulting from separate dust control operations made necessary by the Contractor's failure to provide adequate dust control.

Contractor shall adhere to requirements of WAC 296-841 Airborne Contaminants.

GC-62 CLEANUP

At the time of suspension for an extended period of all or any portion of the Work, at termination of the Work for any reason, or at Completion but before final acceptance by the District, the Contractor at its own expense shall remove from the District's property and from all public and private property all of its equipment, unused materials that the District has made no payment for, temporary structures, rubbish, chemicals and waste materials resulting from its operations and leave the Project area in a neat and orderly fashion Satisfactory to the District. The Contractor shall at all times during the progress of the Work maintain the area in as neat and orderly a condition as operations will permit. In the event the Contractor fails to do so, the District may remove and store such equipment and unused materials and dispose of rubbish, chemicals and waste at the expense of the Contractor. The cost of such removal, storage, and disposal may, at the District's discretion, be deducted from any payment due the Contractor and from the Contract Price.



GC-63 SANITARY PROVISIONS

The Contractor shall furnish temporary toilet facilities of a type and number satisfactory to the government authorities having jurisdiction for all workers and inspectors employed on the Project. Such temporary toilet facilities shall be subject to the approval of the District as to location. The Contractor shall maintain the same in a sanitary condition from the beginning of the Work until Completion and shall then remove the temporary toilet facilities and disinfect the premises.

GC-64 SECURITY

Contractor and its employees, and any Subcontractor and its employees who may have access to District information and/or documents that are considered sensitive or confidential under the Federal Energy Regulatory Commission's (FERC) Critical Energy Infrastructure Information (CEII) regulations shall treat such information as confidential and follow control, distribution and destruction guidelines as set forth by the District in the Non-Disclosure Agreement or as otherwise directed by the District.

Contractor, Contractor employees, and each Subcontractor employee shall understand and comply with District Security's Badge Policy and Key Policy, and procedures as may be amended.

The District Security Department's Badge Program requires that all Contractors and Subcontractors working on District facilities carry a current, photo identification on their person. Depending on Contractor's or Subcontractor's duration of Work and location of work within District, District may require a District "access" identification badge or a District "day use" badge and/or District keys to be issued Contractor.

Before start of work, Contractor shall contact the Project Manager (District Sponsor) to schedule an appointment with District Security to determine the need for and/or the procedures for issuing District "access" or "day use" badges and/or District keys. If "access" badges and/or keys are required, Contractor, Contractor's employees and Subcontractor's employees must, prior to their start work date, complete a District Badge Request and/or District Key Request form and, on day of badge and/or key issue, show current photo identification in a form acceptable to the District Security Department.

A copy of District Security's instructions for requesting a badge and/or key issue will be provided by the Project Manager or Security.

Contractor or Subcontractors will immediately report to the Project Manager or Security Division regardless of date or time any loss of or misplacement of badges or keys, or removal of personnel from Contractor's work.

Final payment may not be made until all security badges and/or keys issued to Contractor's employees and Subcontractor's employees have been returned to the Project Manager or Security Division. Contractor acknowledges that if temporary key(s) have been issued, the keys are issued for a limited period of time, that they must not be duplicated, and that keys



are valuable items that require safeguarding. If key(s) are not returned within five (5) days of the Completion of Work or upon request by the Engineer (whichever occurs first), Contractor agrees to reimburse the District for associated re-keying expense.

GC-65 DRUG FREE WORKPLACE

The Contractor, Contractor's employees and its Subcontractors shall fully comply with all applicable provisions of 41 U.S.C § 701, the Drug-Free Workplace Act of 1988.

The Contractor and its Subcontractors shall immediately remove any employee from further work if it is determined that the person is not fit for duty for any reason including the employee's use of alcohol, controlled substances or legend drugs, as defined in the District's Fitness for Duty Policy and Guidelines, a copy of which is available from the District upon request.

The failure of the Contractor or any Subcontractor to comply with this paragraph shall be deemed a default of the Contract as set forth in General Conditions, Termination for Default / Noncompliance.

GC-66 VIOLENCE IN THE WORKPLACE

The carrying or possession of firearms or other weapons is prohibited at all times in District buildings or on District property, including District parking lots and in vehicles. The carrying or possession of firearms or other weapons is prohibited on any other District location while performing duties for the District under this Contract.

The Contractor and its Subcontractors shall immediately remove any employee from further work if it is determined that the person is carrying or in possession of firearms or other weapons, as defined in the District's Violence in the Workplace Policy, a copy of which is available from the District upon request.

The failure of any Contractor or its Subcontractors to comply with this paragraph shall be deemed a default of the Contract as set forth in General Conditions, Termination for Default/Non-compliance.

GC-67 SAFETY DATA SHEETS

Prior to mobilization to site, the Contractor shall provide to the District's Project Manager an Inventory List of Hazardous Chemicals, and Safety Data Sheets (SDS) for all hazardous products to be used on District property as a part of this Contract. The SDS shall, at a minimum, meet the following criteria:

- Be complete, legible and in the English language.
- Be current (no older than five [5] years or, if older than five [5] years, Contractor shall provide documentation from product manufacturer stating that the product is unchanged and the SDS is accurate).



The Contractor shall provide to the Project Engineer additional SDS for any products not initially listed on the Inventory List of Hazardous Chemicals that are used on District property. Contractor shall request from the Project Engineer any SDS for products furnished by the District.

The District reserves the right to disallow the use of any product or limit product application methods it deems to pose an unacceptable risk to District personnel or the environment. The District reserves the right to determine the acceptability of the SDS submitted by Contractor. Failure of the Contractor to submit the required SDS as stated above may result in a Stop Work Directive or withholding of progress payments until the deficiency(ies) is corrected.

Any hazardous waste generated by the Contractor must be properly disposed of by the Contractor or any Subcontractor. Products requiring SDS sheets that are not completely used by the Contractor shall be removed from District property by the Contractor at the completion of the Work, at Contractor's expense, unless specifically requested otherwise by the Engineer.

GC-68 CULTURAL RESOURCES

During performance of the Work by Contractor, in the event cultural resources are encountered on the Project Site, Contractor shall immediately stop all work at the Site and notify the District's Project Manager. Cultural resources are described as artifacts, burial sites, or other historical items. The Project Manager will notify the District's Cultural Resource Coordinator for further instructions and Contractor shall subsequently be given direction by the Project Manager. Any delay claims by Contractor as a result of any stop work due to encountering cultural resources shall be submitted in accordance with Contractor's Claims herein.

GC-69 INVASIVE SPECIES CONTROL

Invasive Species can include aquatic and/or terrestrial insects, plants, and/or animal organisms. The Contractor is required to ensure all equipment, material, and other potential invasive species' conveyances are free of any/all invasive species prior to arrival at Project site. Prior to mobilization to the Project site, the Contractor is required to provide to the District's Project Manager a signed affidavit, on the form provided as Exhibit P, stating Contractor is responsible to ensure, and has ensured, that all equipment, materials and other items arriving at the Project area from any locations other than Chelan, Douglas, Grant, or Okanogan Counties in Washington State are, and will be, free of all invasive species.

GC-70 HAZARDOUS SUBSTANCES AND ENVIRONMENTAL PROTECTION

Spill Response. Any release (spill) of a chemical or petroleum product to the ground, open waterway, sanitary sewer, storm drain or air, requires quick action on the part of those



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involved or anyone who notices the release. The District Project Manager shall be contacted immediately if there is a spill or if emergency conditions develop as a result of a spill. Promptly reporting and initiating a cleanup of the spill will mitigate further damage and prevent potential fines or penalties. The District's Project Manager will review the initial response and advise what additional response actions may be necessary. This includes contacting the necessary regulatory authorities, dispatching cleanup crews and fulfilling any reporting requirements.

Contractor shall be fully responsible for all cleanup expenses and any and all fines associated with spills caused by Contractor. No extension or changes in Contract Time shall result from spills caused by Contractor.

GC-71 CONFLICT AND PRECEDENCE

The Contract Documents are complementary and what is called for by any one of them shall be as binding as if called for by all. In the event there are any conflicting provisions or requirements in the component parts of the Contract, the Contract Documents shall take precedence in the following order:

- Field Work Order/Change Orders
- Contract
- Notice to Proceed
- Addenda
- Specific Requirements
- General Conditions
- Specifications
- Contract Drawings
- Invitation and Instructions to Bidders
- Bid Proposal
- Performance and Payment Bond

The District shall not be bound by and rejects any terms, conditions or provisions submitted after the Effective Date of the Contract unless agreed to in writing by the District.

END OF GENERAL CONDITIONS



SPECIFIC REQUIREMENTS

SR-1 SCOPE OF WORK / WORK TO BE PERFORMED BY CONTRACTOR

The Contractor shall furnish all labor, tools, equipment, supervision and specific materials to construct a 1,120 square foot comfort station (i.e. restroom), septic drain field system, and seven (7) 50 amp RV pedestals with water supply, as shown on the Contract Drawings, and as specified in the Contract Documents for the Daroga State Park Group Camp Improvements, located at 21947 SR 97, Orondo, WA 98843.

SR-2 COMPLETION SCHEDULE / CONTRACT TIME

Upon District issuance of the Notice of Award, the Contractor shall commence preparing submittals required by the Contract Documents and begin planning labor, supervision, materials, equipment, and logistics to perform the Work. Mobilization and onsite Work shall commence immediately after all of the following: 1) Notice of Award; 2) providing required Performance and Payment Bond; 3) providing required insurance certificates; 4) attending required post award conference; and 5) receipt of Notice to Proceed from the District.

The Contractor shall complete such Work in a diligent and workmanlike manner. A Notice to Proceed is anticipated to be issued with an Onsite Work start date of September 14, 2015. Substantial Completion is required to be achieved by April 15, 2016 and Final Completion achieved by April 29, 2016.

Within five days after District issuance of Notice of Award, the Contractor shall submit an overall project schedule in accordance with Exhibit S – Specification Section 01 30 00 Administrative Requirements. The schedule shall clearly identify the following milestone completion dates:

- September 14, 2015: Mobilization.
- October 2, 2015: Completion of comfort station footings, slab and all associated underground plumbing and electrical work.
- October 30, 2015: Completion of site civil and associated site electrical work.
- November 13, 2015: Completion of building shell (ie. masonry walls, windows, doors and roof sheathing), completion of interior framing.
- November 27, 2015: Completion of metal roof.
- December 31, 2015: Completion of rough plumbing, HVAC and electrical, completion of all wall and floor finishes preparatory to tile work.
- March 4, 2016: Completion of tile work.
- April 15, 2016: Substantial Completion. Completion of all finishes (ie. electrical, plumbing, painting, HVAC, etc.). Demobilization.



April 29, 2016: Final Completion.

The District considers the Contract Time sufficient to complete all Work. The Contractor agrees to complete the Work to the reasonable satisfaction of the District, free of all claims, liens and charges, within the Contract Time specified above. The Contractor's schedule for completion shall be based on a five (5) day, eight (8) hour per day work week. The Contractor shall not work after the hours of 5:00 p.m., before 8:00 a.m., or on Saturdays, Sundays or District holidays without the written consent of the Engineer.

All times and time limits stated in the Contract Documents shall be of the essence of the Contract. All references to days shall mean calendar days and the time within which acts are to be done shall be computed by excluding the first and including the last day, and if the last day is a Sunday or a legal holiday at the site of the Project, the act shall be completed on the next business day.

SR-3 EXPERIENCE MODIFICATION RATE (EMR)

The Contractor's Experience Modification Rate (EMR) will be submitted if not already on file with the District. If Contractor's EMR is in excess of one (1), the preconstruction meeting will include discussion on the issues that caused the high rate. The District will consider information as to how the Contractor has addressed in its safety program the issues resulting in the high rating. Notice to Proceed may be delayed until the issues have, to the District's satisfaction, been addressed.

SR-4 INSPECTION ELEMENTS - SUMMARY MATRIX

The Engineer has prepared an Inspection Elements-Summary Matrix (Matrix) (see Exhibit R) designed to provide inspection criteria, including Hold Points and Witness Points, to identify and ensure the Satisfactory completion of major inspection elements required for this Contract. Inspections shall be performed by the District in accordance with this Matrix during construction and completion of the Work.

Inspected items and criteria will be identified in the Matrix. The Matrix is intended to assist the District and the Contractor to ensure proper inspection and compliance with the Contract Documents. The Matrix is intended to include the major inspection elements of the Contract. The Matrix is not intended to be an exhaustive list of inspection elements or required Specifications. Additional elements/items may be tested and elements/items may be added to the Matrix as deemed necessary by the District or its designee to ensure and verify Satisfactory Completion of the Work in full conformance with the Contract Documents. In the event of any conflict between the Matrix and the Contract Documents, the Contract Documents shall control.

The Contractor shall be required to provide notice to the District as provided in the Matrix. Witness Points require 48-hour notice to the District prior to inspection. If the District is not present at the requested time, the Contractor may continue Work without inspection. Hold Points also require 48-hour written notice to the District prior to inspection. Hold Points



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require inspection and written authorization by the District prior to continuing Work on the inspected item or activity.

The District may begin inspection of Hold Points within the 48-hours notice given. However, sufficient time should be provided by the Contractor for the District to perform a thorough inspection of those items following their final completion or at the end of the 48-hours. Proceeding with activities subsequent to approval of a Hold Point, is contingent on the Contractor being provided written authorization. For example, a Contractor should not proceed with concrete placement until given written authorization (that reinforcing bar and form construction are approved). A failed inspection for rejected work shall not constitute cause for a delay claim or claim for additional compensation (see GC-16 and GC-40).

END OF SPECIFIC REQUIREMENTS



EXHIBITS

EXHIBIT A BID FORM

To: PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 327 NORTH WENATCHEE AVENUE
 WENATCHEE, WASHINGTON 98801

Having carefully examined the Contract Documents, including Specifications and Contract Drawings entitled Bid No. 15-04, Daroga State Park Group Camp Improvements, as well as the premises and conditions affecting the Work, the undersigned hereby proposes to furnish all labor and material and to perform all Work on the Project as required by and in strict accordance with the Contract Documents for the price(s) indicated below.

Chelan County PUD No. 1 BID PRICE SCHEDULE			
Item	Description	Unit	Bid Price
1.	Mobilization/Demobilization	LS	\$ _____
2.	Civil Site Work	LS	\$ _____
3.	Electrical	LS	\$ _____
4.	Plumbing	LS	\$ _____
5.	HVAC	LS	\$ _____
6.	Masonry	LS	\$ _____
7.	Tile	LS	\$ _____
8.	Metal Roof	LS	\$ _____
9.	Painting	LS	\$ _____
10.	General Carpentry	LS	\$ _____
11.	Landscaping	LS	\$ _____
12.	Trench Excavation Safety Systems	LS	\$ _____
TOTAL LUMP SUM BID PRICE (not to include WSST)			\$ _____



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We, the undersigned, agree that the price(s) as quoted in the Bid Price Schedule(s) are all-inclusive and include(s) all labor and material (except as stated in the Contract Documents for items to be furnished by the District), supplies, equipment, special tools, costs, insurance, required bonds, permits, all taxes (exclusive of Washington State sales tax), overhead, temporary construction and temporary facilities, cleanup, profit, and all miscellaneous items for a complete Project as specified.

We agree that we are satisfied as to the nature and location of the Work, the general and local conditions, and all other matters which can in any way affect the Work, the time required to complete the Work, or the cost thereof under these Contract Documents. Additional compensation shall not be requested because of our failure to be fully informed of the conditions under which the Work shall be performed.

We agree to commence Work, strictly comply with the Contract Time schedule, and complete the Work in its entirety as specified in Specific Requirements, Completion Schedule/Contract Time, of the Contract Documents.

We agree to enter into a written Contract with the District in the form included in the Contract Documents and to furnish the Performance and Payment Bond within ten (10) days of our receipt of the written Notice of Award. We also agree to furnish Insurance Certificates as required by the Contract Documents.

Receipt of Addenda Numbers _____, _____, _____, _____, is hereby acknowledged.

Included herein are the originals of the executed Bid Form, Noncollusion Declaration of Prime Bidder, List of Subcontractors, Bidder's Data, and Bid Bond, certified or cashier's check. If submitting a certified or cashier's check, identify number _____ and amount _____.

The District reserves the right to award the Contract or any part thereof in any combination which is determined to be most favorable to the District based on price, schedule and other considerations.

We agree that this Bid Proposal as submitted will remain in force for 45 days after the official opening of bids.

We certify that we have not been disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3).

Dated: _____ E-Mail: _____

(Complete, Registered Company Name)

Submitted by: _____

(Name of Bidder – typewritten or printed)

Per: _____



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(Signature and Title)

Address: _____
(Business Address – typewritten or printed)

Telephone: _____ Fax: _____

Contractor’s License No. (Pursuant to RCW 18.27): _____

Contractor’s State Registration No. (Pursuant to RCW 23.B.15):

Washington State Dept. of L&I Insurance Account No. (Pursuant to RCW 51):

Washington State Employment Security Account No. (Pursuant to RCW 50):

Washington State Unified Business Identifier (UBI) No:

Washington State Excise Tax Registration No. (Pursuant to RCW 82):

The Bidder must state status of Company as: (Check correct box and fill in as appropriate.)

- Individual, d/b/a _____, or
- General Partnership, names of partners _____, or
- Limited Partnership, names of partners _____, or
- Limited Liability Partnership, names of partners _____, or
- Limited Liability Limited Partnership, names of partners _____, or
- Corporation of the State of _____, or
- Limited Liability Company of the State of _____, or
- Joint Venture.



EXHIBIT B BID BOND

KNOW ALL MEN BY THESE PRESENTS: that _____ as Principal(s) (hereinafter called the Principal) and _____, as a Surety licensed to do business in the State of Washington (hereinafter called the Surety), are held and firmly bound unto Public Utility District No. 1 of Chelan County, Washington, (hereinafter called the Obligee) in the amount of 5% of the Total Lump Sum Bid Price submitted as part of this bid, for the payment of which, well and truly to be made, we bind ourselves, our heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

EXECUTED this ____ day of _____, 2015.

WHEREAS, said Principal is submitting herewith a Bid Proposal for:

Bid No. 15-04, Daroga State Park Group Camp Improvements

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal shall be awarded the Contract which said Principal has proposed to undertake, and shall enter into a Contract pursuant to such award and give bond for the faithful performance of the Contract, and payment in full to Subcontractors and laborers, materialmen and suppliers, then this obligation shall be null and void. Otherwise, the amount hereinabove specified in this Bond shall be paid to the Obligee as liquidated damages, all in accordance with Revised Code of Washington, Section 54.04.080.

(SURETY)
By _____

(PRINCIPAL)
By _____

Printed Name _____

Printed Name _____

Title _____

Title _____

Street Address _____

Street Address _____

Mailing Address _____

Mailing Address _____

City/State/Zip _____

City/State/Zip _____



EXHIBIT C LIST OF SUBCONTRACTORS

Each Bidder shall, in accordance with Instructions to Bidders, Subcontractors, submit as a part of its bid, the names of all Subcontractors with whom the Bidder, if awarded the Contract, will subcontract for the performance of the Work designated on a list to be submitted with the bid. Failure of a Bidder to name such Subcontractors may render a Bidder's bid non-responsive and therefore void.

List hereunder the Work to be performed and the name, address and telephone number of the corresponding Subcontractor who will perform the Work. The District, as part of its evaluation of bids, will review each Subcontractor utilizing the bid evaluation criteria established herein for evaluating the Bidder.

These Bid Documents may list certain specialty types of work in which the District has a particular interest in evaluating the Subcontractor designated by the Bidder. Such a listing will not relieve the Bidder from listing all the Subcontractors.

Name/Address/Telephone/Fax/E-Mail
of Person/Firm Performing Work

Description of Work to be Performed

PRIME CONTRACTOR:

_____	_____
_____	HVAC SUBCONTRACTOR
_____	PLUMBING SUBCONTRACTOR
_____	ELECTRICAL SUBCONTRACTOR
_____	MASONRY SUBCONTRACTOR
_____	UTILITY SUBCONTRACTOR
_____	PAINTING SUBCONTRACTOR
_____	LANDSCAPING SUBCONTRACTOR
_____	ROOFING SUBCONTRACTOR
_____	TILE SUBCONTRACTOR

OTHER SUBCONTRACTORS:

_____	_____
_____	_____
_____	_____

(Bidder shall attach additional sheets if necessary.)



EXHIBIT D NONCOLLUSION DECLARATION OF PRIME BIDDER

I declare, under penalty of perjury under the laws of the State of Washington that the following is true and correct:

1. I am the (officer title) _____ of _____, the Bidder who has submitted the attached Bid Proposal;
2. I am fully informed respecting the preparation and contents of the attached Bid Proposal and all pertinent circumstances respecting such bid;
3. I am fully aware that the laws of the State of Washington, Chapter 9.18 RCW, make it a gross misdemeanor for any person for himself or herself or as an agent or officer of any other person, persons, or corporation to in any manner enter into collusion or an understanding with any other person, persons, or corporation to prevent or eliminate full and unrestricted competition upon any public work or improvement;
4. Such bid is genuine and is not a collusive or sham bid;
5. Neither Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest have agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham bid in connection with the Contract for which the attached Bid Proposal has been submitted or to refrain from bidding in connection with such Contract, or have in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price of any other Bidder, or to secure through any advantage against the District or any person interested in the proposed Contract; and
6. The price or prices quoted in the attached Bid Proposal are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest.

Submitted By: _____
(Name of Bidder – typewritten or printed)

Per: _____
(Signature)

Title: _____



EXHIBIT E CONTRACTOR'S APPLICATION & CERTIFICATE FOR PAYMENT

Contractor Name:		Prepared by:	
Contractor Address:		Date Submitted:	
Contractor Phone:			
Contractor E-mail:			
Project:	Daroga State Park Group Camp Improvements	Contract No.:	15-04
Owner:	P.U.D. No. 1 of Chelan County	Invoice No.	
Engineer:			
Original Contract Amount:	\$		
Field Work Order/Change Order No.:		Amount:	\$
Adjusted Contract Amount:	\$		
	Detail	Previous Period	This Period
			To Date
<p>If more space is needed, an Excel spreadsheet, using the same formatting, may be attached to this form.</p>			
A.	TOTALS		
B.	Sales Tax on Applicable Items		
C.	SUBTOTALS		
D.	Less Retainage 5% on Item A		
	Less Previous Payments		
	NET		
AMOUNT DUE THIS PERIOD			

NOTE:
PLEASE REMEMBER TO SUBMIT A CONTRACTOR'S INVOICE IN ADDITION TO THIS FORM AND SEND ALL TO THE DISTRICT'S ACCOUNTS PAYABLE DEPARTMENT (APDept@chelanpud.org).



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Contractor warrants that:

A. All persons, firms, corporations and other entities furnishing labor, employee benefits, materials, equipment and/or services in connection with the Project, at the request of and for or on behalf of Contractor, have been or will be paid in full through the entire period stated above from funds already received or to be received from this payment. Neither Contractor nor any person, firm, corporation, or other entity who has furnished labor, employee benefits, materials, equipment and/or services to Contractor for the Project has any claim or any right to file a claim or lien against the District or the retainage on the Project, except as follows:

_____ (none, unless otherwise stated).

B. There are no federal, state, or municipal taxes, warrants, levies or other charges, unpaid or delinquent, which constitute an encumbrance, claim or lien against the District or the retainage on the Project. No government agency has a claim nor the right to file a valid claim, warrant, lien, levy or other encumbrance against the District or the retainage on the Project, except as follows:

_____ (none, unless otherwise stated).

C. The undersigned Contractor agrees to indemnify and hold the District harmless from any and all claims or liens which might be filed contrary to the warranties made above and to defend any such claims without any cost, expense or damage to the District.

D. Except as expressly listed in paragraphs A and/or B above, the undersigned Contractor, in consideration for the payment amount shown above, hereby forever releases the District from any and all claims arising under or in connection with the Project during the period covered (with the exception of claims for retainage) and accepts the payment amount stated above as full compensation and consideration (except for retainage) for the work performed upon the Project which is the subject of this payment, including, but not limited to, any and all Field Work Orders/Change Orders, miscellaneous charges, extra work, delays, impacts, etc.

E. This certification is made by the undersigned with a full understanding of the facts set forth herein, and for the purpose of inducing the District to make payment on the assurance that there are no liens, claims, or other encumbrances, except those described above, arising from the labor, materials, services and/or equipment furnished by Contractor, for the Project, which may be asserted in any way against the Project, the District, or the retainage on the Project.

F. The person signing this document, regardless of whether he/she is signing in a representative capacity, specifically represents that he/she has reviewed the relevant records of Contractor, and has personal knowledge that the contents of this application and certificate for payment are complete, accurate and true. The undersigned also represents that he/she has been duly authorized to sign this certificate and to make the representations set forth above on behalf of the Contractor and any entity claiming through the Contractor.

The undersigned Contractor certifies and declares under penalty of perjury under the laws of the State of Washington that the above is complete, accurate and true and that there is due and payable to the Contractor the amount listed after "Amount Due This Estimate."

_____ (Contractor)

By: _____ Date: _____



EXHIBIT F CERTIFICATE AND RELEASE

(Final Payment)

FROM: _____
(Name of Contractor)

TO: PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY (District)

REFERENCE BID NO. 15-04 ENTERED INTO THE ____ DAY OF _____, 20____
BETWEEN THE DISTRICT AND THE CONTRACTOR OF _____
(CITY, STATE)

FOR THE DAROGA STATE PARK GROUP CAMP IMPROVEMENTS LOCATED IN CHELAN COUNTY AND STATE OF WASHINGTON.

KNOW ALL MEN BY THESE PRESENTS:

1. The undersigned hereby certifies that there is due from and payable by the District to the Contractor under the Contract and duly approved Field Work Order/Change Order(s) the balance of \$_____.

2. The undersigned further certifies that in addition to the amount set forth in paragraph 1, there are outstanding and unsettled the following items which the Contractor claims are just, due and owing by the District to the Contractor:

(Itemize claims and amounts due - attach additional pages if necessary.)
(None, unless otherwise stated)

3. The undersigned further certifies that all Work required under this Contract, including Work required under Field Work Order/Change Order(s) numbered _____, has been performed in full compliance with the terms thereof; that all contractual conditions have been satisfied; that there exist no outstanding unpaid taxes owed by the Contractor to the State of Washington as a result of this Contract, and that there are no unpaid claims for materials, unpaid wages arising out of the performance of this Contract, and that the wage rates paid by the Contractor and all Subcontractors have fully conformed with the Contract provisions and state and federal laws and regulations relating to wage rates.

4. Except for the amounts stated under paragraphs 1 and 2 hereof, the undersigned has received from the District full and complete payment of all sums of money payable to the undersigned under or pursuant to the above mentioned Contract or any modification or change thereof.

5. In consideration of the payment of the amount stated in paragraph 1 hereof, the undersigned does hereby release the District from any and all claims arising under or by virtue of this Contract, except the amount(s) listed in paragraph 2 hereof; provided, however, that if for any reason the District does not pay in full the amount stated in paragraph 1 hereof, such deduction shall not affect the validity of this release, but the amount so deducted shall be automatically included under paragraph 2 as an amount which



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the Contractor has not released but will release upon payment thereof. The Contractor further certifies that upon the payment of the amount listed in paragraph 1 hereof, it shall release the District from any and all claims of any nature whatsoever arising out of the Contract or modification thereof and shall execute such further releases or assurances as the District may request.

6. This Certification and Release is in no way intended to, and shall not, operate to release and/or relieve Contractor and/or Contractor's successors, agents, and assigns from any past, present and/or future obligation, warranty or duty under the Contract and/or pursuant to statute and/or federal law.

Contractor represents the following relating to the hours worked by workers on this Project:

Total work hours for journeymen workers for each craft.

_____	_____
CRAFT	HOURS
_____	_____
CRAFT	HOURS
_____	_____
CRAFT	HOURS

Total work hours of apprentice workers for each craft.

_____	_____
CRAFT	HOURS
_____	_____
CRAFT	HOURS
_____	_____
CRAFT	HOURS

IN WITNESS WHEREOF, the undersigned has executed this instrument on behalf of the Contractor this ____ day of _____, 20____, and declares under penalty of perjury under the laws of the State of Washington that the matters stated herein are true, accurate and complete, and that it is fully authorized to act on behalf of the Contractor in this regard.

Submitted By: _____
(Name of Contractor – typewritten or printed)

Per: _____
(Signature)

Title: _____



EXHIBIT G INSURANCE COVERAGE CHECKLIST

THIS FORM MUST BE COMPLETED AND ATTACHED AS PART OF THE CONTRACTOR'S INSURANCE CERTIFICATE.

The following coverage or conditions are in effect:	Yes	No
This District, its officials, and employees are named on the general liability policy as additional insureds as respects: (a) activities performed for the District by or on behalf of the Named Insured, (b) products and completed operations of the Named Insured, and (c) premises owned, leased or used by the Named Insured. The policy includes Contractual Liability coverage. A copy of the additional insured endorsement(s) is attached to the Certificate of Insurance.		
Cross Liability Clause or Severability of Interests Clause (or equivalent wording in the definition of Insured).		
No Third-Party Over Action Exclusions apply to insurance required in the Contract.		
Coverage afforded the District, its officials and employees as Insured applies as primary and not excess or contributing to any insurance issued in the name of the District, or any District self-insurance program.		
Occurrence rather than claims-made coverage.		
Employer's liability insurance (or Stop Gap) is in effect and is evidenced on the Certificate of Insurance.		

Specify amount of deductible or self-insured retention applicable to each type of coverage shown on the Insurance Certificate (use an additional page if needed):

<u>Variety of Coverage</u>	<u>Deductible Amount</u>
_____	_____
_____	_____
_____	_____
_____	_____
Agency or Brokerage	Insurance Company
_____	_____
Address	Home Office
_____	_____
Name of Person to be Contacted	Authorized Signature
_____	_____
Telephone Number	Date

Note: Authorized signatures may be the agent's if agent has placed insurance through an agency agreement with the insurer. If insurance is brokered, authorized signature must be that of official of insurer.



EXHIBIT H INVENTORY LIST OF HAZARDOUS CHEMICALS

Prior to mobilization, the Contractor shall provide an inventory list and up to date, complete and legible copies of the Safety Data Sheets (SDS) for all hazardous products to be used on District property as a part of this Contract (see GENERAL CONDITIONS, SAFETY DATA SHEETS).

LIST OF HAZARDOUS PRODUCTS	SDS ATTACHED √ YES
SAMPLE	
FORM	

(Contractor shall attach additional sheets if necessary.)



EXHIBIT I NOTICE OF AWARD

Date _____

VIA FAX (____) ____-____

Contractor Name _____
Contractor Address _____
Contractor City, State, Zip _____

Re: Notice of Award
Bid No. 15-04, Daroga State Park Group Camp Improvements

The District has considered the Bid Proposal submitted by you for the above described Project in response to its Advertisement for Bid No. 15-04 dated _____. Your proposal is the lowest responsive proposal received by the District. You are hereby notified that the District accepts your proposal and that you are awarded the work described in Bid No. 15-04 for the amount of \$____.____ contingent upon the execution of a contract by both parties.

Please acknowledge receipt and acceptance of this Notice of Award by signing below and returning it by fax to my attention at 509-661-8113. Please also return the original signed fax copy by mail to my attention.

The District will mail a Contract Documents Packet to you for your completion.

- You may consider receipt of the packet as authorization to begin securing the Performance and Payment Bond (form will be enclosed) and Insurance required for this Project. The Performance and Payment Bond shall include Washington State Sales Tax.
- Applicable forms must be filed in accordance with RCW 39.12, Prevailing Wages on Public Works, and other District forms as outlined in the Bid Document.
- As provided in the Contract Documents, you are required to execute the Contract, to furnish the required Performance and Payment Bond, and to provide insurance certificate(s) within ten (10) days from the date of delivery of this Notice of Award. Failure to do so will entitle the District to consider all your rights arising out of the District's acceptance of your Bid Proposal as abandoned and award the Work covered by your Bid Proposal to another, or to re-advertise the Work or otherwise dispose thereof as the District may see fit.
- The Procurement and Contract Services Department is authorized to issue the Notice to Proceed following receipt and approval of all required documents.

If you have questions, please do not hesitate to contact me at 509-661-____ or via email at _____@chelanpud.org.

Respectfully,

Procurement and Contract Services

The individual executing this Notice of Award warrants he is fully authorized to bind his principal to the terms and conditions of this document.

CONTRACTOR NAME

Signature _____

Date _____



EXHIBIT J NOTICE TO PROCEED

TO: _____ DATE: _____

BID NO: _____ PROJECT NAME: _____

You are hereby notified to commence Work on the Project on _____, 20____, and you are to complete the Work on the Project within _____ consecutive calendar days thereafter. The date of Completion of all Work on the Project is _____, 20____.

SAMPLE

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY (DISTRICT)

BY: _____

TITLE: _____

Receipt of the above NOTICE TO PROCEED is hereby acknowledged and accepted:

Signature: _____

Title: _____

Company: _____

Date: _____

FORM



EXHIBIT K PERFORMANCE AND PAYMENT BOND

Bond No. _____

KNOW ALL MEN BY THESE PRESENTS, that we _____
(hereinafter called the "Principal"), as Principal, and _____
(hereinafter called the "Surety"), as Surety, are jointly and severally held and bound unto
Public Utility District No. 1 of Chelan County, Washington, (hereinafter called "Obligee") in
the sum of Dollars (\$____), together with all sums reflected in Field Work Order/Change
Order(s) to this Contract, lawful money of the United States of America for the payment of
which we jointly and severally bind ourselves and our heirs, executors, administrators,
successors and assigns, firmly by these presents.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH that, whereas on the
____ day of _____ 20____, the said Principal herein agreed to provide:
Daroga State Park Group Camp Improvements under Bid Number 15-04.

NOW, THEREFORE, if this Principal herein shall faithfully and truly observe, perform and
comply with all of the terms, conditions and provisions of the Contract, and shall well and
truly and fully do and perform all matters and things undertaken to be performed under the
Contract upon the terms thereof, and within the time prescribed therein, and all guarantees
and warranties arising thereunder, and shall pay all laborers, mechanics, Subcontractors,
materialmen and all persons who shall supply Principal or such Subcontractors with
provisions and supplies for the carrying on of such work and shall in all respects faithfully
perform said Contract according to law, then this obligation shall be satisfied; otherwise the
Bond shall remain in full force and effect.

No prepayment or delay in payment and no change, extension, addition or alteration of any
provision of said Contract, and no forbearance on the part of the Obligee shall operate to
relieve the Surety from liability on this Bond, and consent to make such change, extension,
addition or alteration without further notice to or consent of the Surety is hereby given.

This Bond is given in compliance with the laws of the State of Washington as contained in
Chapters 39.08 and 54.04, Revised Code of Washington, and all acts amendatory thereto.
No right of action shall accrue hereunder to or for the use of any person other than Obligee,
except such right of action as is given by the laws of the State of Washington to persons
performing labor upon or furnishing materials, or supplying provisions and supplies for the
carrying on of such work or the making of such improvements.

The Surety agrees this Performance and Payment Bond shall be governed by the laws of
the State of Washington. The Surety submits to the exclusive jurisdiction of the courts and
agrees to be bound by the laws in the State of Washington, USA. Venue for any action to
enforce or interpret this Performance and Payment Bond shall be in Superior Court for
Chelan County, Washington.



CONTRACT DOCUMENTS 15-04

WITNESS OUR HANDS this _____ day of _____, 20_____.

Address of Local Office and Agent for Surety Company:

Agent Name: _____

Agency Name: _____

Street Address: _____

Mailing Address: _____

Telephone Number: _____

Fax Number: _____

E-mail address: _____

SAMPLE

FORM

PRINCIPAL

SURETY

Printed Name of Principal

Printed Name of Surety

Mailing Address

Mailing Address

Street Address

Street Address

Signature of Principal

Signature of Attorney in fact



EXHIBIT L RETAINAGE INVESTMENT

Public Utility District No. 1 of Chelan County

Project No. 15-04 Contractor _____ Date _____

Pursuant to RCW 60.28.011, you have the option to have the monies reserved as retainage held by the District, or deposited in an interest bearing account at a bank, or placed in escrow at a bank or trust company and invested. Retainage funds shall be deposited with a public depository as approved by the State of Washington, Public Deposit Protection Commission. You may select which public depository should be used by the District. A listing of public depositories may be obtained through the Office of the State Treasurer, P. O. Box 40200, Olympia, WA 98504-0200, telephone (360-902-9000), home page <http://www.tre.wa.gov>. You are requested to complete and return this form as soon as possible. You may submit a bond in lieu of all or any portion of the retainage. The bond must be on the District approved bond form and from a bonding company meeting the standards the District has set, a copy of which standards may be obtained upon request from the District. The District reserves the right to refuse to accept such bond for good cause shown. Such bond shall be subject to all claims and liens and in the same manner and priority as applies to retained percentages.

Should you desire to have the retained monies placed in escrow and invested, please provide to the District's Accounts Payable Supervisor, P.O. Box 1231, Wenatchee, WA, 98807, the necessary forms for the completion of an escrow agreement with a bank or trust company and the District.

CONTRACTOR'S OPTION

- I request that the retainage be held by the District.
- I request that retainage be deposited by the District in an interest bearing account in a bank, mutual savings bank, or savings and loan association.
- I request that retainage be placed by the District in escrow with a bank or trust company.

Name of Public Depository for Deposit or Escrow

Address

City, State, Zip Code

Signature

Title



EXHIBIT M BOND IN LIEU OF RETAINAGE

KNOW ALL MEN BY THESE PRESENTS, that we _____, as Principal, and _____, as Surety, are held and firmly bound unto Public Utility District No. 1 of Chelan County, Washington (hereinafter "District"), and to claimants eligible to file a lien or claim against monies earned by the Principal and retained by the District pursuant to RCW 60.28 (hereinafter the District and all persons permitted by law to make claims against retainage shall be collectively referred to as "Obligees"), in the sum stated below, together with additional sums equal to 5% of all Field Work Order(s)/Change Order(s) to this Contract No. 15-04, to the payment of which, well and truly to be paid, we bind ourselves, our heirs, executors and successors jointly and severally, firmly by these presents.

The condition of the obligations is such, that whereas, on _____ the Principal and the District entered into a Contract for public improvement for Daroga State Park Group Camp Improvements and, whereas, pursuant to RCW 60.28, the District has retained or will retain funds from monies earned or to be earned by the Principal, regardless whether this Bond is submitted before the Principal begins performance under the Contract for public improvement, during said performance or after completion of said performance including additional work or Field Work Orders/Change Orders; and, whereas, the Principal has submitted to the District this bond executed by itself and the Surety, a corporation authorized to issue surety bonds in the State of Washington, in the penal sum of _____ Dollars, lawful money of the United States of America, together with additional sums equal to 5% of all Field Work Order(s)/Change Order(s) to this Contract No. 15-04, which sums total 5% of the Contract Price, and the Principal has requested the District, within thirty (30) days of delivery of the bond to the District, to release the monies retained; and the District has consented to permit Principal to file this bond, and within thirty (30) days thereafter to release the money so withheld.

NOW, THEREFORE, if the Principal shall indemnify the Obligees from all loss which Obligees may suffer by virtue of release of retainage to Principal, and shall pay any sum which claimants may recover on their claims, together with the cost of suit, attorneys fees and interest to which Obligees may be entitled in such action, then this obligation to be null and void, otherwise to be in full force and effect.

Provided, however, it is expressly understood and agreed:

1. This bond is given and accepted under and in accordance with the provisions of RCW 60.28 and is subject to all claims and liens and in the same manner and priority as set forth for retained percentages contained therein.
2. The Surety agrees this Bond in Lieu of Retainage shall be governed by the laws of the State of Washington. The Surety submits to the exclusive jurisdiction of the courts and agrees to be bound by the laws in the State of Washington, USA. Venue for any action to enforce or interpret this Bond in Lieu of Retainage shall be in Superior Court for Chelan County, Washington.



3. No right of action shall accrue upon or by reason hereof to, or for the use or benefit of, anyone other than the Obligees herein identified.

4. Principal shall accept like bonds from any Subcontractors or suppliers from which Principal has retained funds. Principal shall then release the funds retained or to be retained from the Subcontractor or supplier within thirty (30) days of accepting the bond from the Subcontractor or supplier.

5. The aggregate liability of the Surety under this bond for claims against this bond shall not exceed the penal sums of this bond unless Field Work Order(s)/Change Order(s), changes in quantities of work or materials provided or other amendments to the public improvement Contract increase the amount the District is required to retain, in which event the aggregate liability of the Surety shall increase by a sum equaling the increase in the Contract Price multiplied by the 5% as noted above.

6. The Surety acknowledges that increases in Contract Price may occur as identified in the preceding paragraph. The Surety hereby waives any defense of lack of notice of said increases, failure, sufficiency or lack of consideration, lack of consent, or statute of frauds, and the consequent increase in the retainage released to the Principal, against claims by the Obligees, or any of them.

7. In the event Principal fails at any time to pay persons protected under Washington law, RCW Chapter 60.28, or the District has reason to believe that the District or other Obligee has a claim against the retainage or for other good cause, the District may, at its option, resume retaining from monies earned by Principal such amount as it would otherwise be entitled to retain had this bond not been accepted. Notwithstanding the District's resuming such retaining, this bond shall remain in full force and effect to the extent of its penal sum, together with additional sums equal to 5% of all Field Work Order(s)/Change Order(s) to this Contract No. 15-04 limited to the amount of retainage released to the Principal. After Principal has paid protected persons or otherwise cured any default, the District may, at its option, again release retainage pursuant to this bond. Notwithstanding any action the District may take pursuant to this section, Surety shall remain liable as set forth above. It shall be no defense, by Surety or Principal, against any claim under this bond that the District should have resumed retaining monies.

WITNESS OUR HANDS this _____ day of _____, 20__.

Address of Local Office and Agent for Surety Company:

Agent Name: _____

Agency Name: _____

Street Address: _____



Mailing Address: _____

Telephone Number: _____

Fax Number: _____

E-mail address: _____

PRINCIPAL

SURETY

Printed Name of Principal

Printed Name of Surety

Mailing Address

Mailing Address

Street Address

Street Address

Signature of Principal

Signature of Attorney in Fact



EXHIBIT N CONTRACT

THIS CONTRACT, made by and between PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY, WASHINGTON, (hereinafter "District") and _____ doing business as an individual/a general partnership /a limited partnership/a limited liability partnership/a limited liability limited partnership/a corporation/a limited liability company/a joint venture in the State of _____, (hereinafter "Contractor"), sometimes collectively referred to as the "Parties".

RECITALS

1. The District issued an Invitation for Bid No. 15-04 dated _____, and amended on _____;
2. Contractor submitted a Bid Proposal in response to the Invitation for Bid, dated _____;
3. The District and the Contractor have agreed that the terms and conditions of this Contract shall govern Contractor's furnishing to the District the Daroga State Park Group Camp Improvements.

AGREEMENT

In consideration of the mutual covenants and agreements of the Parties herein contained and to be performed, the parties agree as follows:

1. The parties agree to incorporate the requirements of 41 C.F.R. §§ 60-1.4(a)(7), 29 C.F.R. Part 471, Appendix A to Subpart A, 41 C.F.R. § 60-300.5(a)ii and 41 C.F.R. §60-741.5(a), if applicable.
 - a. **This Contractor and Subcontractor(s) shall abide by the requirements of 41 C.F.R. 60-300.5(a). This regulation prohibits discrimination against qualified protected veterans, and requires affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified protected veterans.**
 - b. **This Contractor and Subcontractor(s) shall abide by the requirements of 41 C.F.R. 60-741.5(a). This regulation prohibits discrimination against qualified individuals on the basis of disability, and requires affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified individuals with disabilities. [60-741.5(d)]**

2. The Contractor shall commence and complete the Work described as follows:
 Bid No. 15-04
 Daroga State Park Group Camp Improvements

hereinafter referred to as the Project, for the Contract Price of _____ Dollars (\$_____) together with all additional or changed Work in connection therewith, under



CONTRACT DOCUMENTS 15-04

the terms as stated in the Contract Documents which are incorporated herein as though fully set forth as terms of this Contract; and at Contractor's cost and expense to furnish but not limited to all the materials, supplies, machinery, equipment, tools, Superintendence, labor, insurance, and other accessories and services necessary to complete said Project in accordance with the Contract Documents.

The Contractor shall commence Work on the Project on or before a date to be specified in a written Notice to Proceed by the District and to strictly comply with the Contract Time schedule.

3. The Contractor warrants to the District that it has the expertise and experience necessary to properly perform the Work in a timely manner and that its Proposal includes all of the functions and features necessary to properly perform and timely perform the Work pursuant to the Contract Documents.

4. The District agrees to pay the Contractor the Contract Price in accordance with the Contract Documents and otherwise perform the covenants and conditions required of the District set forth herein.

5. By executing this Contract the Contractor represents that the waiver of the Contractor's immunity under industrial insurance, Title 51 RCW, as set forth in the Contract Documents was mutually negotiated by the parties.

6. Contractor shall fully comply with all applicable federal, state and local laws, regulations and codes. The law of the State of Washington shall govern this Contract and all questions relating to it. The venue for any legal action involving the District related to this Contract shall be exclusively in the Chelan County Superior Court.

7. Unless the Contract is exempted by rules and regulations of the U.S. Secretary of Labor pursuant to Section 201 of Executive Order No. 11246, as amended, incorporated herein by reference are the provisions of Paragraphs 1 through 7 set forth in Section 202 of Executive Order No. 11246 as amended.

8. FURTHER TERMS, CONDITIONS AND COVENANTS of the Contract are set forth in the Contract Documents incorporated herein and by this reference made a part hereof, consisting of:

Instructions to Bidders
General Conditions
Specific Requirements
Contract Documents
Bidders Data (if applicable)

Specifications
Contract Drawings
Addenda
Performance and Payment Bond

Each of the individuals executing this Contract on behalf of the District and the Contractor warrant he/she is an authorized signatory of the entity for which he/she is signing, and have



CONTRACT DOCUMENTS 15-04

sufficient corporate authority to execute this Contract. The parties hereto have executed this Contract with an Effective Date of _____, 20____.

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY

CONTRACTOR

By: _____

By: _____

Print Name _____

Print Name _____

Title _____

Title _____



EXHIBIT O FIELD WORK ORDER/CHANGE ORDER

PROJECT NAME: Insert Project Name
FIELD WORK ORDER/CHANGE ORDER NO.: 1
MAXIMO NO: Insert number PURCHASE CONTRACT NO.: Insert no.
CONTRACT NUMBER: Insert number

TO: Insert Contractor Name
SUBJECT: Insert brief description of change
EFFECTIVE DATE: Insert Effective Date

Contractor is directed to comply with the following changes to Contract No. Insert number.

SAMPLE

DESCRIPTION OF WORK

Enter detailed description of change

CONTRACT PRICE ADJUSTMENT

The total Contract Price, exclusive of Washington State sales tax, shall be increased/decreased by \$ enter amount increased/decreased, for a revised Contract Price of \$ enter adjusted total contract amount.

FORM

TIME OF COMPLETION

The time for completion of the Work shall be increased by insert # of calendar days/shall be decreased by insert # of calendar days for a revised Contract Completion date of _____.

LEGAL EFFECT

The Contract is hereby modified to include the changes specified herein and this Field Work Order/Change Order is hereby made as a part of the Contract. The Work shall be performed and completed in strict compliance with the Contract Documents. The payments, as specified herein, shall constitute full compensation for furnishing all labor, materials, tools, equipment and incidentals as required to complete the Work.

The Contract Price adjustment and time extension (if required) in accordance to this Field Work Order/Change Order and pursuant to the Contract, as modified, shall also be in full payment and satisfaction of any rights or claims of the Contractor with respect to additional compensation, schedule adjustments due to specific or overall impacts including acceleration, inefficiencies, and schedule recovery, harm, damages, losses, costs, overhead, profit or expenses of the Contractor (including but not limited to the subcontractors, suppliers, laborers and materialmen of any tier) arising out of or due to any



CONTRACT DOCUMENTS 15-04

change or delay of the Work resulting directly or indirectly from this Field Work Order/Change Order.

This Field Work Order/Change Order will supplement and amend the Contract only insofar as specifically provided herein. All provisions of the Contract will apply hereto and, except as expressly provided herein, all other terms and conditions of the Contract shall remain unchanged and in full force and effect.

IN WITNESS WHEREOF, the District hereby directs the Contractor to comply with the changes to the Contract as of the Effective Date. If executed by Contactor, the Contractor acknowledges, approves and accepts the terms and conditions of this Contract change as of the Effective Date. The undersigned warrants that he/she has the authority to execute this document and to bind his/her principal in accordance with the Contract Documents.

Field Work Order/Change Order Acknowledged, Approved and Accepted:

CONTRACTOR:** Insert Contractor's Name

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY, WASHINGTON

By: _____
Contractor's Superintendent or other
Authorized Signator

By: _____
Initiator

Date: _____

Date: _____

***A mutually signed agreement is encouraged, however, the Contractor's signature is not required for a directive.*

By: _____
Project Manager

Date: _____

By: _____
Department Director*

Date: _____

By: _____
Managing Director*

Date: _____

By: _____
General Manager*

Date: _____

**If necessary, pursuant to Resolution 08-13325*



EXHIBIT P INVASIVE SPECIES CONTROL AFFIDAVIT

Invasive Species can include aquatic and/or terrestrial insects, plants, and/or animal organisms. Contractor, in accordance with the Contract Documents, General Conditions GC-69, understands that it is required to ensure that all equipment, material, and other potential invasive species' conveyances are free of any/all invasive species prior to arrival at the Project site. Contractor hereby warrants that it has ensured, and will continue to ensure throughout the execution of the work, that all equipment, materials, and other items arriving at the Project area from any locations other than Chelan, Douglas, Grant, or Okanogan Counties in Washington State are, and will be, free of all invasive species.

The undersigned certifies and declares under penalty of perjury under the laws of the State of Washington that the matter stated herein is true and accurate, and warrants that he/she is fully authorized to act on behalf of Contractor in this regard.

Contractor Name: _____

Signed By: _____
Signature

Title _____



Inspections Elements – Summary Matrix

Name of Project:	15-04 Daroga State Park Group Camp Improvements	Notes: 1) Indicate specification reference with criteria. 2) Results and Inspector's name can be placed in last two columns.
Responsible Party:		

DESCRIPTION: 15-04 Daroga State Park Group Camp Improvements											
No.	Identification of Item to be Inspected	Inspection Schedule / Date	Inspection Conditions	Characteristics to be Inspected	Acceptance Criteria	Inspection Method / Test	Extent of Inspection	Inspector	Witness / Hold Point	Results	Inspection Report Reference
SECTION NUMBER AND INSPECTION CRITERIA											
DIVISION 01 - GENERAL REQUIREMENTS											
1.	Site Specific Accident Prevention Program		Field	Contractors Manual On Site	Section 011100	Visual	Mobilization to Site		Hold		
2.	SDS		Field	Contractors SDS Manual On Site	Section 011100	Visual	Mobilization to Site		Hold		
3.	Contractors Site Orientation		Field	Completed On Site With Crewmembers	Section 011100	Visual	Mobilization to Site		Hold		
DIVISION 03 - CONCRETE											
SECTION 033000 – CAST-IN-PLACE CONCRETE											
1.	Formwork		Field, Submittals	Smooth or rough finished formwork, alignment, plumb, bracing in place, exterior corners are chamfer, facing of formwork free of rust	Section 033000, ACI 117, ACI 301	Visual	Before Placement		Hold		
2.	Reinforcement		Field/Submittal	Bar sizes, quantity, location match approved Shop Drawings, embedment items in place, forms clean of debris. Saddle in place were required	Section 033000 ACI 315,	Visual	Before Placement		Hold		



DESCRIPTION: 15-04 Daroga State Park Group Camp Improvements											
No.	Identification of Item to be Inspected	Inspection Schedule / Date	Inspection Conditions	Characteristics to be Inspected	Acceptance Criteria	Inspection Method / Test	Extent of Inspection	Inspector	Witness / Hold Point	Results	Inspection Report Reference
SECTION NUMBER AND INSPECTION CRITERIA											
3.	Vapor Retarder		Field	Placed in location and limits indicated on drawings, no punctures, joints lapped 6"	Section 033000 ASTM E 1643,	Visual	Before Placement		Hold		
4.	Joints		Field	Placed at locations shown on Contract Drawings, depth as indicated in specifications	Section 033000	Visual	Periodic		Witness		
5.	Concrete Placement		Field	Concrete placement per Contract Specifications	Section 033000	Visual	Continuous		Witness		
6.	Concrete Testing		Field	Cylinder, air, slump testing taken at intervals specified within the Contract Specifications, verify correct mix design for application	Section 033000, ASTM C172, ASTMC143/C143M, ASTM C39, ASTM C42	Visual / Testing Agency	Periodic		Witness		
7.	Concrete Finishing		Field	Surface application as shown in Contract Drawings, applied as specified	Section 033000	Visual	During Finishing		Witness		
8.	Concrete Curing		Field/Submittal	Concrete curing procedure used as specified within the contract specification and approved submittals	Section 033000, Approved Submittals	Visual	Periodic		Witness		



DESCRIPTION: 15-04 Daroga State Park Group Camp Improvements											
No.	Identification of Item to be Inspected	Inspection Schedule / Date	Inspection Conditions	Characteristics to be Inspected	Acceptance Criteria	Inspection Method / Test	Extent of Inspection	Inspector	Witness / Hold Point	Results	Inspection Report Reference
SECTION NUMBER AND INSPECTION CRITERIA											
DIVISION 04 - MASONRY											
SECTION 040500 – MASONRY MORTAR AND GROUT											
1.	Mortar and Grout Products		Submittal	Compliance with specifications	Section 040500	Review	Submittal		Witness		
2.	Mortar Mix		Field	Proportions of site prepared mortar, Construction of mortar joints	International Building Code, ASTM C270 and ACI530	Visual	Periodic		Witness		
3.	Grout Mix		Field	Slump, specimens	Specifications, International Building Code, ASTM C270 and ACI530	Visual, compressive strength testing (by Contractor)	Periodic		Witness		
4.	Grout Mix		Field	Placement	In accordance with Drawings, grout space is clean	Visual	Continuous		Witness		
SECTION 042200 – CONCRETE UNIT MASONRY											
1.	Cement Masonry Unit (CMU) Product, reinforcing steel and anchorages		Submittal	Compliance with specifications	Section 042200	Review	Submittal		Witness		
2.	Reinforcing steel, anchorages and CMU Units		Field	Placement	In accordance with Drawings	Visual	Witness		Hold		
DIVISION 05 - METALS											
SECTION 055000 – METAL FABRICATIONS											
1.	Structural Steel Members		Field/Shop	Material identification of Grades, Sizes and shapes of steel members match approved Shop Drawings,	Contract Drawings	Visual	Periodic		Witness		



DESCRIPTION: 15-04 Daroga State Park Group Camp Improvements											
No.	Identification of Item to be Inspected	Inspection Schedule / Date	Inspection Conditions	Characteristics to be Inspected	Acceptance Criteria	Inspection Method / Test	Extent of Inspection	Inspector	Witness / Hold Point	Results	Inspection Report Reference
SECTION NUMBER AND INSPECTION CRITERIA											
2.	Pre- Welding		Field/Shop	Welding procedures, Fit-Up of Fillet Welds	Contract Drawings, AWS D1.1/D1.1M, AISC 360 Table N5.4-1	Visual	Periodic		Hold		
3.	Weld Inspection		Field/Shop	Certified welders, visually inspect all welds, field test as required in the specifications	Contract Drawings, AWS D1.1/D1.1M, AISC 360 Table N5.4-2	Visual / Testing Reports	Periodic		Hold		
4.	Post-Welding		Field/Shop	Welds cleaned; weld size, length and location; weld quality	Contract Drawings, AWS D1.1/D1.1M, AISC 360 Table N5.4-3	Visual	Each Joint or Member		Hold		
5.	Structural Steel Fasteners, Connectors, and Anchors		Field	Meet Requirements of specifications, and approved submittals	Contract Drawings	Visual	Periodic		Witness		
6.	Steel Shop Coat		Field	Steel shop coat applied, touch up after erection	Contract Drawings	Visual	Periodic		Witness		
7.	Structural Steel Erection		Field	Steel erection matches approved Shop Drawings and details, all attachment points bolted, welded as detailed within specifications, members plumb	Contract Drawings	Visual	Periodic		Witness		
DIVISION 06 – WOODS, PLASTICS AND COMPOSITES											
SECTION 061000 – ROUGH CARPENTRY											
1.	Lumber Grade		Field	Meets grades specified on Contract Drawings	Section 061000, Contract Drawings	Visual	Periodic		Witness		



DESCRIPTION: 15-04 Daroga State Park Group Camp Improvements											
No.	Identification of Item to be Inspected	Inspection Schedule / Date	Inspection Conditions	Characteristics to be Inspected	Acceptance Criteria	Inspection Method / Test	Extent of Inspection	Inspector	Witness / Hold Point	Results	Inspection Report Reference
SECTION NUMBER AND INSPECTION CRITERIA											
2.	Fasteners		Field	Meets material requirements in Contract Specifications	Section 061000, Contract Drawings	Visual	Periodic		Witness		
3.	Steel Framing hangers		Field/Submittal	Meets material requirements detailed in contract	Section 061000, Contract Drawings	Visual	Periodic		Witness		
4.	Sill Sealer, Flexible Flashing		Field/Submittal	Meets material requirements detailed in contract	Section 061000, Contract Drawings	Visual	Periodic		Witness		
5.	Framing		Field	Level, plumb, no member splicing between supports, securely attached with fastening indicated on Contract Drawings, see Section 06100	Section 061000, Contract Drawings	Visual	Periodic		Witness		
6.	Sheathing Materials		Field	Meets grade specified, fastener type	Section 061000 Contract Drawings	Visual	Periodic		Witness		
7.	Sheathing Installation		Field	Attachment pattern meets building codes and structural notes	Section 061000, Contract Drawings	Visual	Periodic		Witness		



DIVISION 07 – THERMAL AND MOISTURE PROTECTION										
SECTION 071100 - DAMPPROOFING										
1.	Dampproofing		Field/Submittal	Material meets specification, and approved submittals, clean surface application	Section 071100, ASTM C 578	Visual	Periodic		Witness	
SECTION 072000 – INSULATION										
1.	Perimeter Board Insulation and Blanket Insulation		Field/Submittal	Material meets specification, and approved submittals	Section 072100, ASTM C 578	Visual	Periodic		Witness	
2.	Flexible Blanket Insulation		Field	Undamaged product, thickness, entire envelope insulated, fit around obstructions, water piping on warm side of insulation. See Section 072000	Section 072000	Visual	Periodic		Witness	
3.	Foamed in-place		Field	Material meets specification, and approved submittals	Section 072000, ASTM C 578	Visual	Periodic		Witness	
SECTION 076000 – PREFORMED METAL ROOFING										
1.	Metal Roof Panel material		Field/Submittal	Meets specification requirements and approved submittals	Section 076000	Visual	Periodic		Witness	
2.	Panel Sealant Material, Underlayment, Panel Fasteners, Snow Guards, Roof Curbs, Sheet metal Accessories		Field	Meets Specification requirements and approved submittals	Section 076000	Visual	Periodic		Witness	



3.	Metal Roof Installation		Field	Underlayment, metal roof panel Installation,	Section 076000	Visual	Periodic		Witness		
4.	Flashing Materials		Field/Submittal	Meets specification requirements and approved submittals	Section 076000	Visual	Periodic		Witness		
5.	Flashing Installation		Field	Flashing dimensions and angles, color match to approved submittal, attachment, See Section 07620	Section 076000	Visual	Periodic		Witness		
SECTION 079200 – CAULKING AND SEALANTS											
1.	Sealant Materials		Field/Submittal	Sealants meet specification requirements and approved submittals	Section 079200	Visual	Periodic		Witness		
2.	Sealant Field Adhesion Test		Field	Test adhesion to substrates	Section 079200, ASTM C 1193						
3.	Joint Sealant Backing		Field/Submittal	Sealants meet specification requirements and approved submittals	Section 079200	Visual	Periodic		Witness		
4.	Sealant Installation		Field	Joints clean, prime joints where recommended, adjacent surfaces protected, backing installed, application per Specification	Section 079200	Visual	Periodic		Witness		



DIVISION 08 -- OPENINGS											
SECTION 081100 – STEEL DOORS AND FRAMES											
1.	Doors and Frames Delivery and Storage		Field	Crated or cardboard wrapped, store under cover	Section 081100	Visual	Periodic		Witness		
2.	Standard Hollow Metal Doors		Field	Hollow metal frames meet requirements of specifications and approved submittals	Section 081100	Visual	At installation		Hold		
3.	Standard Hollow Metal Frames		Field	Hollow metal doors meet requirements of specifications and approved submittals	Section 081100	Visual	At installation		Hold		
4.	Door Finish		Field	Standard primer applied	Section 081100, ANSI/SDI A250.10	Visual	At Installation		Hold		
5.	Frames		Field	Plumb, aligned, braced, and anchored as specified, See Section 081100	Section 081100	Visual	At Installation		Witness		
6.	Frames		Field	Frames Fully Grouted	Section 081100	Visual	At Installation		Witness		
7.	Hollow Metal Doors		Field	Fit in frames, installation tolerances as specified	Section 081100	Visual	At Installation		Witness		
SECTION 085113 - ALUMINUM WINDOWS											
1.	Windows		Field	Vinyl windows meets requirements of specifications and approved submittals	Section 085113, Submittals	Visual	Periodic		Witness		



2.	Window Hardware		Field	Window hardware meets requirements of specifications and approved submittals	Section 085113, Submittals	Visual	Periodic		Witness		
3.	Window Installation		Field	Level, plumb, square, sill members set with gasket or sealant. Comply with manufacturers written recommendations	Section 085113	Visual	During Installation		Witness		
SECTION 087000 – FINISH HARDWARE											
1.	Door Hardware Materials		Field	Hardware meets requirements of specifications and approved submittals.	Section 087000	Visual	At Delivery		Witness		
2.	Door Hardware Installation		Field	Follow manufacturers written instructions per Contract Specifications	Section 087000	Visual	Periodic		Witness		
SECTION 088000 – GLASS AND GLAZING											
1.	Glazing Units		Field	Material meets requirements of Specifications, sizes and materials match approved Glazing Schedule, See Section 088000	Section 088000	Visual / Submittal	During Installation		Witness		
2.	Glazing Installation		Field	Per manufacturers requirements and project specifications	Section 088000	Visual / Submittal	During Installation		Witness		



DIVISION 09 - FINISHES											
SECTION 092116 – GYPSUM BOARD											
1.	Gypsum Wall Board and Products		Field	Material meets requirements of specifications and approved submittal information	Section 092116	Visual / Submittal	During Installation		Witness		
2.	Gypsum Wall Board Installation		Field	Installation and finish as required in the Contract Specifications	Section 092116	Visual	Periodic		Witness		
SECTION 093000 – TILING											
1.	Tile and Associated Materials		Field/ Submittal	Verify products provided meet requirements of specifications and approved submittals	Section 093000	Visual / Submittal	Product Delivery		Hold		
2.	Tile Installation		Field	Waterproof membranes installed, temperature of work area is controlled, installation follows schedules, joint width See Section 093000	Section 093000, TCA's Handbook for Ceramic Tile Installation, ANSI A108.1A	Visual	Periodic		Witness		
SECTION 099100 – PAINTING											
1.	Paint and Primer Materials		Field	Verify products provided meet requirements of specifications and approved submittals. Paint tests (color, material, adhesion, test, thickness test)	Section 099100 ASTM D16-93a, ASTM D 335 A&B	Visual / Submittal	Periodic		Witness		



2.	Paint Surface Prep		Field	Moisture content of substrate cannot exceed 15% for wood, 4% concrete lighting levels, ambient temperature, sealants and caulking complete. Surfaces cleaned as stated in specifications	Section 099100	Visual / Gauge	Before painting		Hold		
3.	Paint Application		Field	Apply per manufacturers recommendations and Contract Specifications, See Section 09900	Section 099100 Master Painters Institute	Visual	Continuous		Witness		
SECTION 099700 – SPECIAL COATINGS											
1.	Concrete Floor Sealer			Verify products provided meet requirements of specifications and approved submittals. Paint tests (color, material, adhesion , test, thickness test)	Section 099700	Visual / Submittal	Periodic		Witness		
2.	Surface Prep		Field	See specifications	Section 099700	Visual / Gauge	Before sealing		Hold		
3.	Application		Field	Apply per manufacturers recommendations and Contract Specifications, See Section 099700	Section 099700	Visual	Continuous		Witness		



DIVISION 10 - SPECIALTIES											
SECTION 100000 – MISCELLANEOUS SPECIALTIES											
1.	Fire Extinguishers and Cabinets		Field	Verify products provided meet requirements of specifications and approved submittals	Section 100000	Visual / Submittal	At Delivery		Hold		
2.	Coat Hooks		Field	Verify products provided meet requirements of specifications and approved submittals	Section 100000	Visual / Submittal	At Delivery		Hold		
3.	Benches		Field	Verify products provided meet requirements of specifications and approved submittals	Section 100000	Visual / Submittal	At Delivery		Hold		
SECTION 101400 – IDENTIFYING DEVICES											
1.	Building Signage		Field	Verify products provided meet requirements of specifications and approved submittals	Section 101400	Visual / Submittal	At Delivery		Hold		
SECTION 102100 – TOILET PARTITION and BENCH											
1	Toilet, Urinal, Shower Compartment Materials		Field	Verify products provided meet requirements of specifications and approved submittals	Section 102100	Visual / Submittal	At Delivery		Hold		
2.	Toilet Compartments Installation		Field	Confirm blocking installed in walls at locations for partition anchoring. Locate partition to occur at masonry or tile joints, See Section 093000	Section 102100	Visual	Periodic		Hold		



3.	Benches		Field	Verify products provided meet requirements of specifications and approved submittals and are installed in accordance with Drawings	Section 102100 And Drawings	Visual / Submittal	At Delivery		Hold		
SECTION 102800 – TOILET AND BATH ACCESSORIES											
1.	Toilet Accessory Materials		Field/Submittal	Verify products provided meet requirements of specifications and approved submittals	Section 102800, Submittals	Visual	At Delivery		Hold		
2.	Toilet Accessory Installation		Field	Verify blocking in place for accessory installation. Mounting heights and locations match drawings, straight and plumb	Section 102800	Visual	Periodic		Witness		
3.	Grab Bars		Field	Verify blocking in place for accessory installation. Mounting heights and locations match drawings, straight and plumb	Section 102800	Visual	Periodic		Witness		
4.	Shelves and Mop Holders		Field	Verify blocking in place for accessory installation. Mounting heights and locations match drawings, straight and plumb	Section 102800	Visual	Periodic		Witness		
5.	Mirror Materials		Field	Mirrors Meet specifications and approved submittals.	Section 102800	Visual	At Delivery		Witness		



6.	Mirror Installation		Field	Follow manufacturers written instructions per Contract Specifications	Section 102800	Visual	Periodic		Witness		
DIVISION 11 – EQUIPMENT											
1.	Token Dispenser		Field/Submittal	Verify products provided meet requirements of specifications and approved submittals	Section 111400, Submittals	Visual	At Delivery		Hold		
DIVISION 22 – PLUMBING											
SECTION 220519 – METERS AND GAUGES FOR PLUMBING PIPING											
1.	Meters and Gauges		Field/ Submittal	Verify products provided meet requirements Verify labels placed in correct locations	Section 220519	Visual	Installation		Witness		
SECTION 220523 – GENERAL DUTY VALVES FOR PLUMBING PIPING											
1.	Valves		Field/ Submittal	Verify products provided meet requirements Verify labels placed in correct locations	Section 220529	Visual	Installation		Witness		
SECTION 220529 – HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT											
1.	Hangers and supports		Field/ Submittal	Verify products provided meet requirements Verify labels placed in correct locations	Section 220529	Visual	Installation		Witness		



SECTION 220553 – IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT										
1.	Labels		Field/ Submittal	Verify products provided meet requirements Verify labels placed in correct locations	Section 220553	Visual	Installation		Witness	
SECTION 220700 – PLUMBING INSULATION										
1.	Piping Insulation, Jackets and Accessories		Field/Submittal	Verify products provided meet requirements of specifications and approved submittals	Section 220700, Submittals	Visual	At Delivery		Hold	
2.	Piping Insulation, Jackets and Accessories Installation		Field	Install in accordance with manufacturers recommendations, pipe tested before installation	Section 230700	Visual	At Completion		Witness	
SECTION 221116 – DOMESTIC WATER PIPING										
1.	Plumbing Products		Field/ Submittal	Verify products provided meet requirements of specifications and approved submittals, valves in shipping containers and labeled	Section 221116	Visual	At Delivery		Witness	
2.	Piping installation		Field	Piping parallel and perpendicular to walls, dielectric couplings located at dissimilar metal connection locations. Access at valves. See Section 15145. Verify welding per ASME Section IX.	Section 221116 ASME B31.9,	Visual	Periodic		Witness	



3.	Unions		Field	Installed downstream of valves at equipment or apparatus	Section 221116	Visual	Periodic		Witness		
4.	Hangers		Field	Spacing	Section 221116	Visual	Periodic		Witness		
SECTION 221119 – DOMESTIC WATER PIPING SPECIALTIES											
1.	Plumbing Specialties		Field/Submittal	Verify products provided meet requirements of specifications and approved submittals	Section 221119 Submittals	Visual	At Delivery		Hold		
SECTION 221316 – SANITARY WASTE AND VENT PIPING											
1.	Sanitary Waste and Vent Piping		Field/Submittal	Verify products provided meet requirements of specifications and approved submittals	Section 221316 Submittals	Visual	At Delivery		Hold		
SECTION 221319 – SANITARY WASTE PIPING SPECIALTIES											
1.	Waste Piping Specialties		Field/Submittal	Verify products provided meet requirements of specifications and approved submittals	Section 221319, Submittals	Visual	At Delivery		Hold		
SECTION 223300 – ELECTRIC DOMESTIC WATER HEATERS											
1.	Water Heaters		Field/Submittal	Verify products provided meet requirements of specifications and approved submittals	Section 223300, Submittals	Visual	At Delivery		Hold		
SECTION 224000 – PLUMBING FIXTURES											
1.	Plumbing Fixture Materials		Field/Submittal	Verify products provided meet requirements of specifications and approved submittals	Section 224000, Submittals	Visual	At Delivery		Hold		



2.	Plumbing Fixture Installation		Field	Install per Contract Specifications and manufactures recommendations	Section 224000	Visual	Periodic		Witness		
DIVISION 23 – HEATING VENTILATION AND AIR CONDITIONING											
SECTION 230500– COMMON WORK RESULTS FOR HVAC											
1.	HVAC		Field/Submittal	Verify products provided meet requirements of specifications and approved submittals	Section 230500, Submittals	Visual/Submittal	Installation		Hold		
2.	HVAC Installation		Field/Submittal	Installation, Per specifications	Section 230500	Visual	Installation		Witness		
SECTION 230513 – COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT											
1.	HVAC Equipment		Field/Submittal	Verify products provided meet requirements of specifications and approved submittals	Section 230513, Submittals	Visual/Submittal	Installation		Hold		
SECTION 230553 – IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT											
1.	Nameplate, Tags, Pipe Marker Label Materials.		Field/Submittal	Verify products provided meet requirements of specifications and approved submittals	Section 230553, Submittals	Visual	At Delivery		Hold		
2.	Nameplate, Tags, Pipe Marker Label Installation		Field	Installation completed after painting, See Section 230553 for all labeling requirements,	Section 230553	Visual	At Completion		Witness		



SECTION 233113 – HVAC DUCTS AND CASING											
1.	Duct Material		Field/Submittal	Verify products provided meet requirement of specifications and approved submittals	Section 233113	Visual	Periodic			Witness	
2.	Ductwork Installation		Field	Hangers spaced as specified, duct size, provide temporary closures for ducts during construction	Section 233113	Visual	Periodic			Witness	
SECTION 230593 – TESTING, ADJUSTING AND BALANCING FOR HVAC											
1.	Commissioning Tests		Field	Testing of HVAC system per Section 15012	Section 230593	Visual / Test Report	During Commissioning			Hold	
SECTION 230700 – HVAC INSULATION											
1.	HVAC Insulation Materials		Field/Submittal	Meets Specification, provided	Section 230700	Visual/Submittal	Product arrive			Hold	
2.	HVAC Insulation Installation		Field	Meets Specification	Section 230700	Visual	Installation			Witness	
3.	Piping Insulation, Jackets and Accessories		Field/Submittal	Verify products provided meet requirements of Specifications and approved submittals	Section 220700, Submittals	Visual	At Delivery			Hold	
4.	Piping Insulation, Jackets and Accessories Installation		Field	Install in accordance with manufacturers recommendations, pipe tested before installation	Section 230700	Visual	At Completion			Witness	



SECTION 233113– METAL DUCTS											
1.	HVAC Duct Materials		Field/Submittal	Meets specification, provided	Section 233113	Visual/Submittal	Product arrive		Hold		
2.	HVAC Duct Installation		Field	Meets Specification	Section 233113	Visual	Installation		Witness		
SECTION 233300– AIR DUCT ACCESSORIES											
1.	HVAC Duct Accessories Materials		Field/Submittal	Meets specification, provided	Section 233300	Visual/Submittal	Product arrive		Hold		
2.	HVAC Duct Accessories Installation		Field	Meets Specification	Section 233300	Visual	Installation		Witness		
3.	Air Diffusers, Grilles, Louvers, and Roof Hoods		Field/Submittal	Verify products provided meet requirement of Specifications and Approved submittals	Section 233300	Visual	Periodic		Witness		
4.	Air Diffusers, Grilles, Louvers, and Roof Hoods		Field	Location, ductwork visible behind air outlets painted	Section 233300	Visual	Periodic		Witness		
SECTION 233423– HVAC POWER VENTILATORS											
1.	HVAC power ventilators materials		Field/Submittal	Meets specification, provided	Section 233423	Visual/Submittal	Product arrive		Hold		
2.	HVAC power ventilators installation		Field	Meets Specification	Section 233423	Visual	Installation		Witness		
DIVISION 26 – ELECTRICAL											
SECTION 260500 – ELECTRICAL GENERAL REQUIREMENTS											
1.	Electrical Device Nameplates		Field/Submittal	Meets specification, provided at all electrical devices	Section 260500	Visual	At Completion		Hold		



2.	Functional Tests		Field	Testing of all electrical equipment as specified. Submit functional test procedure.	Section 260800	Visual / Report	At Completion		Hold		
SECTION 260526 – GROUNDING											
1.	Grounding Materials		Field	Ground Rods correct size and length, Ground cable correct size	Section 260526, NEC	Visual	Periodic		Hold		
2.	Ground Installation		Field	Depth of Grounding Correct and spacing. Bond made to ground rod secure	Section 260526, NEC	Visual	Periodic		Witness		
3.	Ground testing		Field	Ground testing OHM Values meet specification	Section 260526, NEC	Visual / Complete Test Report for Voltage Testing	Periodic		Witness		
SECTION 260533 – RACEWAYS, FITTINGS AND SUPPORTS											
1.	Raceway		Field	Sized as detailed within the specifications and per NEC	Section 260533	Visual	Periodic		Witness		
2.	Raceway and Fittings		Field	Material provided meets the requirements of project specifications. See Section 260533	Section 260533, Submittal	Visual	Periodic		Hold		
3.	Trenching		Field	Primary power 36" depth minimum, secondary 30" depth Minimum, 3" of sand bedding provided	Section 260533	Visual	Periodic		Witness		



4.	Conduit		Field	All joints glued conduit spacers in place, 12" separation of conduit from any other utility in trench. Number tags placed at each end of conduit run	Section 260533	Visual	Periodic		Witness		
5.	Hand Holes		Field	Plumb and set at finish grade	Section 260533	Visual	Periodic		Witness		
SECTION 260519 - WIRE AND CABLE											
1.	Wire and Cable Materials		Field	Verify wire is correct gauge for application as detailed within the Contract Drawings. Lighting and circuit conductors shall be per NEC requirements	Section 260519, NEC	Visual	Periodic		Hold		
2.	Wire Installation		Field	Wire color coding as specified, terminal marking completed as specified, voltage testing complete, no visible conductor damaged	Section 260519, NEC	Visual / Complete Test Report for Voltage Testing	Periodic		Witness		
SECTION 260529 – WIRING DEVICES											
1.	Wiring Devices		Field/Submittal	Verify products provided meet requirement of specifications and approved submittals	Section 260529	Visual	Periodic		Hold		



2.	Wiring Device Installation		Field	Plates, outlets and switch covers match colors specified. Mounting heights for switches and outlets as specified	Section 260529	Visual	Periodic		Witness		
SECTION 260800– EQUIPMENT TESTING											
1.	Equipment Testing		Field/Submittal	Verify Testing Third party testing agency is qualified for the work	Section 260800	Visual/Submittal	Periodic		Hold		
SECTION 262416 – PANELBOARDS											
1.	Panel Boards and Circuit Breakers		Field/Submittal	Verify products provided meet requirement of specifications and approved submittals	Section 262416	Visual	Periodic		Witness		
2.	Panel Board Installation		Field	Damage, proper alignment, anchored, bolted connections,	Section 262416	Visual	After Installation		Witness		
SECTION 262700 – SERVICE AND METERING											
1.	Service Metering Materials		Field/Submittal	Meets Local Utility requirements	Section 262700, Douglas County PUD	Visual/Submittal	Before Installation		Hold		
2.	Service Metering		Field	Installed per Douglas County PUD requirements	Section 262700, Douglas County PUD	Visual	Periodic		Hold		
SECTION 262816 – DISCONNECT AND SWITCHES											
1.	Disconnect and Switches Materials		Field/Submittal	Meets Specification for material	Section 262816	Visual/Submittal	Before Installation		Hold		
2.	Disconnect and Switches Installation		Field	Installed per Specification	Section 262816	Visual	Periodic		Witness		



SECTION 264710 – RV LOAD CENTERS											
1.	RV Load Center Products		Field/Submittal	Verify products provided meet requirement of specifications and approved submittals	Section 264710	Visual	Periodic		Hold		
2.	RV load Center Installation		Field	Load center plumb, backfill around load center compacted	Section 264710, NEC 551.77A	Visual	Periodic		Witness		
SECTION 265119 – LED LIGHTING											
1.	Lighting Products		Field/Submittal	Verify products provided meet requirement of specifications and approved submittals	Section 265119	Visual	Periodic		Hold		
2.	Lighting Installation		Field	Install as specified within Section 265119	Section 265119	Visual	Periodic		Witness		
DIVISION 31 - EARTHWORK											
SECTION 311000 – SITE CLEARING											
1.	Tree ,Vegetation and Clearing Limits Fencing		Field	Location, Assembly	Section 311000	Visual	Before Clearing and Grubbing		Hold		
2.	Utility Locates		Field	Utilities in work area are located	Section 312000	Visual / Locate Number	Before Excavation Work Begins		Hold		
3.	Clearing and Grubbing		Field	Clear and Grub to depth indicated/ to limits on Contract Drawings	Section 311000	Visual	Periodic		Witness		
4.	Tree Removal		Field	Remove trees and stumps as indicated in the Specifications and noted on Contract Drawings	Section 311000	Visual	Periodic		Witness		



5.	Silt Fence		Field/Submittal	Material meets Specifications, posts installed at specified interval, installed on slope correct way, silt fence fabric toed in	Section 312500, Erosion Control Plan	Visual	Periodic		Witness		
SECTION 312000 – EARTHWORK											
1.	Excavation		Field	Lines and Grades indicated on the Contract Drawings	Section 312000	Visual	Periodic		Witness		
2.	Embankment/Fill		Field/Submittal	Density Test, tested at frequency indicated in the Specifications. Lift Thickness	Section 312000, ASTM D1557, ASTM D2487	Visual / Testing Agency	As Indicated In Specifications		Witness		
3.	Subgrade Condition Before Embankment Placement		Field	Density Test, tested at frequency indicated in Specifications.	Section 312000, ASTM D1557, ASTM D2487	Visual / Testing Agency	As Indicated In Specifications		Witness		
4.	Import Material; Crushed Rock for Utilities, Backfill and Pipe Bedding Materials		Field/Submittal	Meets Specifications, tested at frequency indicated in Specifications	Section 312000, WSDOT 9-03.9(3), WSDOT	Visual	As Indicated in Specifications		Witness		
5.	Base Aggregate for Concrete Footings		Field/Submittal	Meets Specifications, tested at frequency indicated in Specifications. Placement depth	Section 312000	Visual	Periodic		Witness		
6.	Trench Excavation		Field	Trench width and depth. Trench alignment	Section 312000, Contract Drawings	Visual	Continuous		Witness		



7.	Trench Backfill		Field/Submittal	Lift thickness and specified backfill used. Density testing completed at intervals described in Contract Documents	Section 312000, In Field Density Tests ASTM D1557, WSDOT 7-09.3(9-11) 95%	Visual / Tests	Periodic		Witness		
8.	Backfill at Structures and Pavements		Field/Submittal	Lift Thickness and specified backfill used, density testing completed at intervals described in Contract Documents	Section 312000, In Field Density Tests ASTM D1557, WSDOT 2.03.3(14)D 95%	Visual / Tests	Periodic		Witness		
9.	Crushed Rock Surfacing		Field/Submittal	Lift thickness and specified backfill used, density testing completed at intervals described in Contract Documents	Section 312000, In Field Density Tests ASTM D1557, 95%	Visual / Tests	Periodic		Witness		
DIVISION 32 - EXTERIOR IMPROVEMENTS											
SECTION 321216 – ASPHALT PAVING											
1.	Hot Mix Asphalt		Field/Submittal	Lift thickness, compaction requirements, and tack coat applied at overlay areas. Clean joints, verify tack coat at joints.	Section 321216, WSDOT 5-04	Visual	Periodic		Witness		



SITE IRRIGATION											
1.	Pipe Fittings, Sprinklers, Controllers, Valves and Other Materials		Field	Verify material meets approved submittals	Matches Existing	Visual	Periodic		Witness		
2.	Irrigation System Installation		Field	Layout, alignment in trench, deviations in pipeline location noted. Proper separation of pipes in common trench, Locate tape, depth of pipe to invert.	Repair to condition prior to construction	Visual	Periodic		Witness		
SECTION 329200 – IRRIGATED TURF											
1.	Seed Mix		Field	Meets Specification and approved submittal, application rate	Section 329200	Visual	Before Installation		Hold		
2.	Fertilizer		Field	Meets Specification and approved submittal, application rate	Section 329200	Visual	Before Installation		Hold		
3.	Organic Amendment		Field	Meets Specification and approved submittal, application rate	Section 329200	Visual	Before Installation		Hold		
4.	Lawn Area Prep		Field	Procedures in Specification are followed.	Section 329200	Visual	Periodic		Witness		



DIVISION 33 - UTILITIES											
SECTION 331100 – DISINFECTING OF WATER UTILITY DISTRIBUTION SYSTEM											
1.	Pipe Preparation		Field	Verify pipe ends are removed of burrs, no dirt or scale in pipe before assembly	Section 331100	Visual	Periodic		Witness		
2.	Pipe Installation		Field	Alignment of pipe in trench, pipe installed to line and grade indicated on Drawings, pipe joints lay-up stream, pipe completely sunk home at joint, deflection.	Section 331100	Visual	Periodic		Witness		
3.	Fittings		Field	Installed at locations specified, restraints installed as required, thrust blocks as shown, damage repaired to coatings	Section 331100	Visual	Periodic		Witness		
4.	Tracer Wire		Field	Installed and secured to pipe, valves and fittings	Section 331100	Visual	Periodic		Witness		
5.	Disinfection and Testing		Field/Submittal	Disinfection follows approved procedures and plans submitted by the Contractor	Section 331100	Visual	Continuous		Hold		
6.	Pressure Testing		Field/Submittal	Calibrated gauge, testing follows approved plan provided by the Contractor, head loss for tested section of pipe is calculated, duration of test.	Section 331100	Visual	Continuous		Hold		



SECTION 333600 – SANITARY SEWERAGE PIPING											
1.	Pipe and Fittings		Field	Materials used meet specifications and approved submittals, check for defects in material	Section 333600, Approved Submittals	Visual	Periodic		Witness		
2.	Septic Pump Station		Field/Submittal	Pump meets Specifications and approved submittals	Section 333600, Approved Submittals	Visual	Periodic		Witness		
3.	Sewer Pipe Installation		Field	Alignment, proper grade, bedding thickness, pipe centered in trench, pipe joints set full depth in bell.	Section 333600	Visual	Periodic		Witness		
4.	Sewer Pipe Testing, Leakage Testing		Field	WSDOT Standard Specification for sewer pipe testing.	Section 333000 WSDOT 7-17.3(2)F	Visual / Test Report	Continuous		Hold		

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DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 10 00 – SUMMARY OF WORK

PART 1 – GENERAL

1.1 BACKGROUND

The District is the Owner of Daroga State Park (Park), including all properties on which it resides. Washington State Parks & Recreation Commission is the District's contract operator for Daroga State Park. This project fulfills, in part, obligations of the Rocky Reach Comprehensive Settlement Agreement dated February 3, 2006.

1.2 PROJECT SCOPE

Work to be performed under these Specifications consists of furnishing all labor, materials, and equipment necessary for construction of the Daroga State Park Group Camp Improvements Project, which includes but is not limited to construction of a 1,120 square foot comfort station (ie. restroom), septic drain field system and seven (7) 50 amp RV pedestals with water supply.

1.3 PROJECT LOCATION

A. General Location: approximately eight miles upriver from Orondo, WA between State Route 97 and the Columbia River.

B. Daroga State Park Physical Address:

Daroga State Park
21947 SR97
Orondo, WA 98843

C. Project Contacts:

1. Owner: Public Utility District No. 1 of Chelan County ("District")

- Parks Manager: Ray Heit
(O) 509-661-4133
- Project Manager: Courtney Hill, P.E.
(O) 509-661-4143 (C) 509-668-4143
- Construction Manager: Casey Hall
(O) 509-661-4965 (C) 509-881-9302
- Construction Inspector: Bob Moyer
(O) 509-661-4882 (C) 509-881-5023

2. Washington State Parks:

- Park Manager: Dennis Lotts, 509-881-5912
- Area Manager: Matt Morrison, 509-669-4414

1.4 CONTRACTOR USE OF PREMISES

- A. Contractor has limited use of park premises for construction operations as indicated in the Contract Drawings. Use of premises beyond limits identified shall be coordinated with the District and Washington State Parks.
- B. Parking Lots: Designated parking areas may be used for stockpiling/staging.
- C. Public information announcements will be made by the District when construction Work impacts park use. Contractor shall identify construction activities impacting park operations and then coordinate with District and Park Ranger to make information available to the public.
- D. Daroga State Park Group Camp A will be open until October 15 and closed until May 15, 2016. Group Camp B will be closed for the entire contract period. Contractor shall ensure safety of park visitors at all times during performance of Work. Limited closures or other impacts to the Park including campsites shall be of a short duration and coordinated with State Parks.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 10 00



DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 11 00 – SAFETY

PART 1 – GENERAL

1.1 DESCRIPTION

- A. The District's goal is zero injuries and accidents and the District expects the Contractor to have the same goal.
- B. The Contractor is solely responsible for the safety of its employees and maintaining safe working conditions at the Work site.
- C. Safety precautions shall be implemented to protect those individuals working at the Project site during the construction period.
- D. The District reserves the right to immediately stop any work or activity that is deemed to be inherently unsafe or in violation of established safe work practices. Costs relating to lost time and productivity due to Stop Work Directive for safety reasons shall not be grounds for additional consideration, compensation to the Contractor, or extension of Milestone Dates. See General Conditions.
- E. Contractor shall participate in weekly safety site inspections with the District's representative to identify and correct hazards and unsafe working conditions.
- F. Contractor shall provide all scaffolding, safety equipment, including hard hats, safety glasses, hearing protection, respirators, first aid supplies, etc., and work platforms required to perform the Work. Contractor shall provide temporary lighting in the work areas to ensure the Work can be performed properly and safely.

1.2 REFERENCES, SPECIFICATIONS, CODES AND STANDARDS

Washington Administrative Code (WAC)	
Title 296-24	General Safety and Health Standards
Title 296-62	General Occupational Health Standards
Title 296-155	Safety Standards for Construction Work
Title 296-800-140	Accident Prevention Program
Title 296-809	Confined Space
Title 296-800	Safety and Health Core Rules
Title 296-841	Airborne Contaminants

1.3 ACCIDENT PREVENTION PROGRAM

Contractor shall submit a written Accident Prevention Program 20 days after Notice of Award that conforms to all applicable federal, state, or local safety requirements at all times Work is being performed on site. Contractor written Accident Prevention Program shall include, as a minimum:

- A. Name of the Contractor employee and name of the District employee designated and made responsible for coordinating the Safety Program and rescue operations.
- B. Procedures to ensure that all Work is performed in compliance with District, Chelan County, WISHA, and Federal OSHA-requirements for the use of safety equipment.
- C. Procedures for identifying unsafe conditions and steps for taking corrective action.
- D. Procedure to inform workers of the actions to be followed should an accident or emergency situation occur, including evacuation routes, locations of “safe areas” to account for all Contractor employees, frequency Contractor informs workers of such actions and how to inform new employees that join the workforce throughout the duration of the Contract. Contractor personnel working in proximity of water shall be required to wear life jackets.
- E. Contractor personnel shall be required to comply with WISHA Regulations when working adjacent to water.
- F. Schedule and hold weekly safety meetings for Contractor personnel.
- G. Contractor shall discuss and review in advance the planned activities for major portions of the Work with its employees and address safety issues related to the Work and ensure safe work practices are being used during the performance of the Work.
- H. The latest District policies on “No Smoking”, “Violence in the Workplace”, and “Fitness for Duty” shall apply to all Contractor employees working on District property. The policies shall be provided to Contractor upon request to the District.
- I. Job Hazard Analysis for the specific Work that is being performed.

1.4 ACCIDENT AND INJURY REPORTING

Accidents involving equipment or employee(s) resulting in injury to employee or damage to equipment occurring on the Project site shall be reported to the District verbally and immediately after such incident followed by a detailed written incident report within 24-hours of occurrence. Failure to report accidents or injuries to the District may result in immediate shutdown of Work.

1.5 EMERGENCY NOTIFICATION PROCEDURE

- A. The Contractor shall be responsible for developing and implementing an Emergency Notification Procedure. Contractor shall submit the Emergency Notification Procedure for District approval.
- B. This procedure shall be used to notify all Contractor employees in designated Work areas in the event of an emergency.
- C. The Contractor shall provide emergency notification equipment and train its employees, including affected District personnel, on the use of this equipment. Contractor shall demonstrate the Emergency Notification Procedure to the District prior to commencing Work on site. Contractor supplied emergency notification equipment shall be maintained in good working order and tested routinely.
- D. Washington Administrative Code Section 296-800-140 requires employers to develop an Accident Prevention Program.

1.6 CONTRACTOR SITE ORIENTATION

- A. The District has developed an Accident Prevention Program Orientation Checklist (Appendix 01 11 00-1). The checklist is not intended to be all inclusive. Contractor shall complete the checklist prior to commencement of Work and maintain documentation of completion, as well as documentation of Contractor and employee safety plans, inspections and meetings. Contractor shall be responsible for reviewing checklist information and procedures with its employees.
- B. Contractor shall be responsible for observing and educating its employees with regard to any and all safety regulations, procedures and equipment requirements applicable to and consistent with the type of work being performed.

1.7 WORK AREA ENVIRONMENT

- A. Contractor shall maintain a neat, clean, and safe work environment complying with all applicable regulations, laws, and codes during all site Work. Where there is a conflict in regulations, codes or laws, the most stringent shall apply.

- B. Contractor shall keep the Work area free from accumulations of waste material or rubbish at all times. Upon completion of the Work, the Contractor shall remove all rubbish, tools, equipment, surplus materials, and chemicals from the site. All lay-down, storage, staging and work areas shall be completely cleaned and restored to the original condition that existed prior to beginning the Work.
- C. During disassembly, scraping, blasting, grinding, welding, brazing, painting and other work that could generate airborne contaminants, smoke, fumes or other irritants, Contractor shall provide air ventilation, cleaning, dust collection, containment or other applicable systems and equipment to prevent personnel hazard or irritation. Contractor shall verify the effectiveness of all engineering controls and Personal Protective Equipment (PPE) by performing an exposure assessment when personnel are exposed to contaminants. Contractor shall verify proper operation of ventilation equipment at the beginning of each shift. Contractor shall continue to monitor personnel exposed to contaminants As Required in WAC 296-62.

1.8 FIRE PREVENTION

- A. The Contractor shall be responsible for fire prevention during the performance of the Work.
- B. Proper firefighting equipment shall be present in locations as prescribed by Washington Administrative Code 296-24 Part G-2.
- C. Contractor shall provide appropriate and Approved flammable liquid storage cabinets to be used for storage of all solvents, resins, and other flammable liquids.
- D. The Contractor shall be responsible for all damage from fire due directly or indirectly to its own activities, to those of its employees, and to those of its Subcontractors and employees.

1.9 HOT WORK PERMIT (HWP)

- A. A Hot Work Permit (Appendix 01 11 00-2) is required for activities involving welding, cutting, the use of open flames, or that otherwise result in the generation of fire ignition potential (e.g. sparks).
- B. The HWP shall define the scope of Work, identify the hazards, and establish the necessary controls to maintain the risk at an acceptable level. The HWP shall be obtained prior to the start of Work. The procedures and controls specified therein shall remain in effect for the duration of the activity. Contractor issued HWP's shall be issued by the Contractor's Site Superintendent or Site Safety Representative, prior to the start of Work requiring the HWP.

- C. The Contractor issuing the HWP, along with the worker(s) performing the subject task, shall inspect the Work area prior to the start of Work. The Hot Work Permit Checklist (01 11 00-2) shall be used to identify and evaluate the hazards.
- D. The controls necessary to mitigate the hazards shall be identified and documented on the permit. At a minimum, these shall include the Work practices and controls specified in the Hot Work Permit Checklist.
- E. The worker performing the hot work shall re-evaluate the hazards on a daily basis or whenever working conditions change. Additional controls shall be distinguished and implemented as may be required.
- F. Hot Work Permits shall be task or activity specific. Blanket permits that address routine and reoccurring work or activities in multiple locations are prohibited unless specifically authorized by the District.
- G. The Hot Work Permit shall be posted in the immediate work area and a copy provided to the District.
- H. All workers affected by execution of the permit shall be advised of the activity and any related hazards prior to the start of Work.
- I. The permit holder shall ensure that the controls specified in the hot work permit are implemented prior to the start of Work and remain in effect for the duration of the activity.
- J. When Work has been completed, the expired or cancelled permit shall be returned to the District.

1.10 FALL PROTECTION WORK PLAN

For any work activities where fall hazards of 10-feet or more exist, the Contractor shall develop and implement a fall protection work plan in accordance with WAC 296-155-24605.

PART 2 – PRODUCT (NOT USED)

PART 3 – EXECUTION (NOT USED)

APPENDICES

Appendix 011100-1, Contractor Safety Orientation Checklist
Appendix 011100-2, Hot Work Permit

END OF SECTION 01 11 00



Contractor Safety Orientation Checklist

Orientation presented by: _____ Date: _____

Company contracted: _____

Contract Title: *(Bid/SA #, Location/Project name, e.g.)* _____

District Project Manager: _____

Please route original document once completed to the Safety/HR Dept. Admin; retain a copy for your records if needed.

The Chelan County PUD (“District”) has developed the following checklist to promote a general understanding of safety standards, guidelines and procedures that must be followed while working on District property. As used herein, the word “Contractor” includes consultants. Contractors must complete the checklist prior to commencement of work and maintain documentation of completion, as well as documentation of Contractor-employee safety plans, inspections, and meetings. Accident prevention programs submitted by the contractor must meet the requirements of WAC 296-800-140.

This orientation will be required annually and if necessary repeated if new information and/or work location changes. This orientation does not address all procedural items that a Chelan County PUD employee overseeing a project would typically review with the contractor.

Contractors are responsible for reviewing checklist information and procedures with their employees. The checklist is not designed to cover every safety issue applicable to Contractors’ work. Contractors are responsible for observing and educating their employees with regard to any and all safety regulations, procedures and equipment requirements applicable to employment in general, as well as those specifically applicable to their type of work. The Contractor is solely responsible for the safety of the Contractor’s employees and the work site.

Initials are required for each section. If section(s) do not apply write NA

CHECKLIST

INTRODUCTIONS

_____ The Contractor shall be introduced to the applicable facility supervisors, safety and maintenance personnel.

CONTROL ROOM

_____ The Contractor shall be made aware of the location and the function of the Control Room. Contractor shall provide the Control Room an emergency phone number list and list of on-site employees. A copy of the contract work plan (accurate) will be provided to the Control Room.

EMERGENCY NUMBERS

_____ Contractors working at Hydro plants should notify the Hydro Facility Control Room after calling the emergency number 911 or 9911. Hydro Facility Control Room phone numbers are:

Location	Outside number	From Plant telephone
<i>Rocky Reach Dam</i>	<i>509-662-8705</i>	<i>Ext. 6000</i>
<i>Rock Island Dam</i>	<i>509-661-4007</i>	<i>Ext. 5000</i>
<i>Chelan Dam</i>	<i>509-682-2612</i>	<i>Ext. 4227</i>
<i>System Operations</i>	<i>509-661-4000</i>	<i>Ext. 4000</i>

MEDICAL FACILITIES

Discuss the location of the nearest first aid station or medical facility

<i>Confluence Health (Wenatchee Valley Hospital, aka "The Clinic")</i>	<i>820 N Chelan Ave</i>	<i>Wenatchee</i>	<i>509-663-8711</i>
<i>Confluence Health (Central Washington Hospital)</i>	<i>1201 S Miller St</i>	<i>Wenatchee</i>	<i>509-662-1511</i>
<i>Cascade Medical Center</i>	<i>871 Commercial St</i>	<i>Leavenworth</i>	<i>509-548-5815</i>
<i>Lake Chelan Community Hospital</i>	<i>503 E Highland Ave</i>	<i>Chelan</i>	<i>509-682-3300</i>

EMERGENCY RESPONSE PLAN (ERP)

Contractors will be made aware of the facility's ERP. The ERP deals with major emergencies that may arise such as fire or a major accident. Discuss assembly areas, evacuation routes and alternate evacuation routes. In the event of an emergency, contractors will be notified by District staff or audible alarm and they should report the emergency meeting area immediately. Once all employees and contractors are accounted for, they will be able to leave the site should the situation warrant. Contractors shall also make the District aware of any company specific emergency response plan or signals (audible or visual) that could affect District workers in the area.

CHECK-IN/CHECK-OUT

The Contractor shall be instructed on proper check-in/check-out procedures.

PARKING

The Contractor will be shown where to park vehicles. Coordinate special arrangements (i.e. work at spillway) with appropriate plant supervisor.

VEHICLES, TOOLS & EQUIPMENT

Vehicles must be kept in safe operation condition. Only qualified equipment operators are to operate equipment.

Tools, electrical cords, rigging equipment and machinery shall be in good condition and inspected before use

JOB SAFETY ANALYSIS

A job safety analysis (tailgate) is required daily to ensure hazards are identified and mitigated.

SAFETY EQUIPMENT (PPE)

All safety equipment will be supplied by the contractor. Unless agreed upon Chelan County PUD will not loan or provide any safety and health equipment. Approved hard hats are required but not provided by the District for outside contractor employees. Contractor must supply their employees with hard hats and enforce the wearing of these items while working on District construction projects. Other PPE such as special footwear and protective clothing may be required depending on the task and activities being performed.

INCIDENT REPORT

Any injury, property damage, safety concern or close call must be immediately reported to a Chelan County PUD representative as practical.

FIRE EXTINGUISHERS

The Contractor will be made aware of the location of District fire extinguishers. Contractors must provide fire extinguishers as required by regulations and per contract.

FLAMMABLES

Flammable liquids shall be stored in and dispensed from approved containers. Flammables and combustibles must be separated by a distance of no less than 20 feet. Oxygen cylinders must be separated from fuel gas cylinders by a distance of no less than 20 feet or by a five foot fire wall unless said cylinders are in use.

HOUSEKEEPING

Proper housekeeping and maintaining a neat work area is required. This includes removal of trash and rubbish daily, and removal of all unused chemicals, paints, etc. from the site when project is completed.

LADDERS/FALL PROTECTION

Ladders must be in good condition and must be made secure near the top. Scaffolding shall be of substantial construction with guardrails and toe boards installed. Fall protection must be provided when employees are exposed to a fall greater than 10 feet. On walking/working surfaces, fall protection must be provided at 4 feet. Where fall protection is required, a fall protection plan must be provided that meets the requirements of WAC 296-155, Part C-1.

OVERHEAD WORK

When overhead work is necessary, precautions must be taken to prevent fall of persons and materials. The area underneath the work operation shall be barricaded off and labeled with appropriate warning signs.

DISTRICT PERMITS/CLEARANCES

Permits/clearances must be obtained for the following operations **BEFORE** work begins:

ENERGY ISOLATION (Lockout /Tag out)

Required for work on any equipment that may have live or stored energy that could cause injuries or property damage if started accidentally or released. Do not shut off or make connections to live electric, gas, air, water, or process lines without the prior authorization *Affected workers will require certification by training and a test.*

CONFINED SPACE PERMIT

Permit required for any workers who enter permit required confined spaces. Confined spaces must be cleaned, purged, and ventilated before employees are allowed to enter them. Life lines, harnesses, and supplied air respirators may be required. An attendant will be required for all permit confined space entries. All work in confined spaces must meet the requirements of WAC 296-809 and employees must be properly trained in accordance with this regulation. Contractors entering confined spaces must submit a confined space program. **List all permit-required confined spaces here:**

HOT WORK PERMIT

Required for all open flame, spark-producing, or heat producing activities on-site. This includes, but is not limited to: welding, cutting, grinding, soldering, brazing, and heat producing chemicals. **Control Room must be notified before work begins.**

Other permits may be required for special procedures or unusual work conditions. Your District contact will coordinate permit requests for the specific area where the work is being performed.

SAFETY BARRICADES AND SIGNAGE

Safety barricades must be in place at open man holes, floor holes, catch basins, and excavations. Appropriate lights must be installed if holes are to be left open after daylight hours.

SPILL PREVENTION

Spill prevention and District procedures for spill clean-up, including notification of Chelan County PUD personnel, will be reviewed for contractors who would be using any petroleum-based products or hazardous materials on District property. The contractor should ensure that the spill is contained before leaving the area to report the spill. Contractors are responsible for providing spill containment kits

HAZARDOUS MATERIALS (WASTE)

Waste that is generated on District property that is designated “Dangerous Waste” per WAC 173-303 needs to be stored & labeled properly by the contractor. The contractor needs to work with Environmental to ensure proper transfer of the waste at the point of generation. Unused hazardous material product need to be removed at the end of the job by the contractor.

RIGHT-TO-KNOW

WAC’s Right to Know (Hazard Communication) – This program is a WAC requirement (WAC-296-800-170) requiring employers to ensure all employees, including all contractors on-site, are aware of any hazards that they may be exposed to in the workplace. Contractors will be made aware of recognized chemical hazards and the location of Safety Data Sheets (SDS). Contractors must provide to the Project Manager prior to the start of work MSDS Sheets for all products brought to District Facilities and must make the District aware of when and where hazardous products are being used. SDS’s must be current, legible and in English. All chemical containers must be properly labeled.

SUBSTATION/SWITCHYARD TRAINING/ORIENTATION (If applicable)

Anyone entering a District substation for any reason is required to have this training on an annual basis. Contact Safety and Health Dept. to become authorized.

REGULATORY COMPLIANCE

All federal, state, local and District safety, health and environmental regulations and rules must be observed by all employees of outside contractors. Contractor supervisors shall ensure that all of their employees are aware of and comply with the rules and regulations.

VIOLATORS WILL NOT BE PERMITTED TO WORK AT DISTRICT FACILITIES

Contractor Owners and employees attending:

PRINT NAME

SIGNATURE

Orientation given by: _____ Date: _____

SAMPLE
Please Note: Original must be forwarded to the Safety/HR Admin.

FORM



CHELAN COUNTY PUD

HOT WORK PERMIT

Revised August 2012

All temporary operations involving open flames or producing heat and/or sparks require a Hot Work Permit. This includes, but is not limited to: brazing, cutting, grinding, soldering, thawing, welding and work with heat producing chemicals (epoxies). etc.

INSTRUCTIONS

1. **Verify precautions listed at right or do not proceed with work.**
2. **Complete the hot work permit and forward the top copy to your supervisor.**
3. **Post the bottom copy in the vicinity of the work.**

DATE	WORK ORDER #
LOCATION (BUILDING & FLOOR)	
BRIEF DESCRIPTION OF WORK	
NAME OF PERSON DOING WORK	

The above location has been examined, the precautions checked on the checklist have been taken to prevent fire and it is safe to begin hot work procedures.

SIGNED: _____
(Person Doing Hot Work)

SIGNED: _____
(Fire Watch)

TIME WORK STARTED:
Date _____ Time _____ AM/PM

TIME WORK ENDED:
Date _____ Time _____ AM/PM

PERMIT EXPIRES:
Date _____ Time _____ AM/PM

THIS PERMIT VALID FOR NO MORE THAN 24 HOURS!

HOT WORK CHECKLIST

- Sprinklers and hose streams serviceable/operable
- Hot work equipment in good condition (leads, cords, torches, etc.)
- Fire extinguisher available and charged.
- Smoke alarms disabled if necessary.
- Control room/system operations/facility management contacted.

REQUIREMENTS WITHIN 35 FEET OF WORK

- Dust, lint, debris, flammable liquids and oil/oil deposits removed
- Explosive atmosphere in area eliminated.
- Combustible floors (wood, tile) wet down or covered with fire blankets
- Flammable and combustible material removed where possible. Otherwise, materials are protected with fire blankets, guards or metal shields.
- All floor and wall openings covered.
- Areas beneath hot work are protected.

WORK ON WALLS OR CEILINGS

- Combustibles/flammables moved away from other side of wall.

WORK IN CONFINED SPACES

- Confined space cleaned of all combustibles (grease, oil, vapors). See Coatings & Lead-Heavy Metals below.
- Containers purged of flammable liquids/vapors.
- Follow confined space procedures.

FIRE WATCH/HOT WORK AREA MONITORING

- Fire watch will be provided during and for 30 minutes after work, including lunch and coffee breaks.
- Fire watch is supplied with an extinguisher.
- Fire watch is trained in the use of extinguishing equipment and is familiar with emergency evacuation procedures.
- Fire watch may be required for opposite side of walls, and above or below floors and ceilings.

COATINGS

- All coated surfaces must be considered hazardous until proved otherwise. No grinding, welding or cutting is permitted on coated surfaces until the coating has been removed using lead binding chemical methods (no Methylene Chloride) or the use of the DCM Needle Scaler or low speed sander with HEPA VAC attachment.

LEAD – HEAVY METALS

- Poured Sockets, Soldering of Copper Piping, Soldering, Silver Soldering, Lead/Oakum Pipe Joints. These tasks are known to pose health risks & follow CCPUD Respirator Guidelines. Lead Awareness training must be followed.

WELDING

- CCPUD Respirator Guidelines must be followed.

VENTILATION

- Smoke Eater, Negative Air Machine, etc.

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 22 00 – MEASUREMENT AND PAYMENT

PART 1 - PART 1 – GENERAL

1.1 SCOPE

The Bid Price for each item shall constitute full compensation for furnishing all equipment, tools, labor, materials, appurtenances, and incidentals and performing all operations necessary to construct and complete the various bid items in accordance with the Contract. Payment for each item shall be considered as full compensation, notwithstanding that minor features may not be mentioned herein. Work paid for under one item will not be paid for under any other item.

1.2 MEASUREMENT

Measurements for all items shall be as indicated in these Specifications for lump sum Bid Price items, are outlined in detail in this section of the Specifications, and further are designated in the Bid Price Schedule in the Contract Documents, Exhibit A – Bid Form.

1.3 PAYMENT

Payment for all Work will be made at the Contract lump sum Bid Price as indicated in the Bid Price Schedule, payment of which shall constitute full compensation, for a complete installation. Payment will be made based on percentage complete for each bid item. The Contractor shall submit their assessment of percent complete for each bid item with each progress payment. The District will make the final determination of the percent complete for each bid item as part their review and approval of progress payments.

1.4 INDIVIDUAL BID ITEMS

A. Item 1 – Mobilization/Demobilization

1. Measurement: Lump Sum (LS)
2. Payment: The Contractor shall be paid 70 percent (70%) of the Bid Price for Mobilization/Demobilization when Work commences at the job site for the Project. Upon completion of all work for the Project, including cleanup, the remaining 30 percent (30%) for Mobilization/Demobilization shall be paid. Total payment for Mobilization/Demobilization shall not exceed more than ten percent (10%) of the Total Lump Sum Bid Price. The District will not pay for any additional and/or second mobilization and demobilization costs incurred because of suspension of Work due to unsuitable weather, or

phasing of the Contractor's Work. Costs for the following components shall be incorporated into the lump sum item for Mobilization/Demobilization:

- a. Bonds and insurance
- b. Mobilization of equipment and materials.
- c. Project meetings
- d. Pre- and post-construction documentation
- e. Permits and licenses
- f. Submittals
- g. Invoice preparation
- h. Administration costs
- i. Construction schedule(s)
- j. Temporary facilities
- k. Traffic control
- l. Construction surveying
- m. Dust control
- n. Erosion and sediment control devices
- o. SPCC plan and spill kit materials
- p. Field offices and storage sheds (if necessary)
- q. General clean-up
- r. Project record drawings
- s. Operation and maintenance manuals (if applicable)
- t. Demobilization
- u. Contract closeout

B. Item 2 – Civil Site Work

Measurement: Lump Sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to construct all civil site work including but not limited to earthwork associated with general building foundation excavation, utility installations (ie. septic sewer system, domestic water utility and electrical utility trenching). This item may also include minor site finishing, such as providing asphalt, as coordinated with the Landscaping bid item.

C. Item 3 – Electrical

Measurement: Lump Sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to provide RV pedestals and general building electrical. Also includes installation of electrical conduit in trenches provided under civil site work.

D. Item 4 – Plumbing

Measurement: Lump sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to provide plumbing for the new comfort station.

E. Item 5 – HVAC

Measurement: Lump sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to provide Heating, Ventilation and Air Conditioning for the new comfort station.

F. Item 6 – Masonry

Measurement: Lump sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to provide masonry.

G. Item 7 – Tile

Measurement: Lump sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to provide all tile.

H. Item 8 – Metal Roof

Measurement: Lump Sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to provide metal roof.

I. Item 9 – Painting

Measurement: Lump Sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to provide painting.

J. Item 10 – General Carpentry

Measurement: Lump Sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to provide general carpentry (rough and finish). This item shall include the cost for all items not specifically called for in other bid items such as concrete footings and slabs, framing and all other general finishes associated with the Comfort Station.

K. Item 11 – Landscaping

Measurement: Lump Sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to provide general landscaping, including but not limited to sprinkler irrigation modifications, final grading, irrigated turf, asphalt paving and all other work necessary to leave the site in a finished condition.

L. Item 12 – Trench Excavation Safety Systems

Measurement: Lump sum.

Payment: The lump sum price for Trench Excavation Safety Systems shall be full compensation for all labor, tools, equipment and material to insure construction of safe trenches in accordance with RCW Chapter 49.17, RCW 39.04.180.

1.5 PROJECT MATERIALS ON HAND

The Contractor will not be paid for materials on hand.

PART 2 - PRODUCT (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 22 00

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 013000 – ADMINISTRATIVE REQUIREMENTS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section describes the requirements and procedures for all correspondence, document and drawing submittals to the District, Engineer and all parties involved with the Contract. The District reserves the right to revise or modify these procedures as necessary to facilitate proper and consistent communication between related parties.
- B. This section provides examples of forms to be used by the Contractor in the Appendices. Alternate forms may be used subject to approval by the District.

1.2 PROJECT CORRESPONDENCE

- A. Correspondence between the Contractor and the District will be handled through the District's document management website, also known as cpudprojects.org website (found on the internet at www.cpudprojects.org). All correspondence (as listed in this section) will be posted to the website. The website utilizes Microsoft® Internet Explorer (which is required). The following are also required for efficient correspondence processing:
 - B. A high speed internet connection; (Internet Explorer ONLY)
 - C. Document scanning capability;
 - D. Bluebeam® or Adobe® Acrobat Professional for use and creation of PDF (*.pdf) files;
 - E. Autodesk® Design Review for viewing DWF (*.dwf) files
 - F. Acceptable file formats are as listed in paragraph 1.11 Submittals, sub-paragraph H, Format of this Section.
 - G. The District will provide hands-on website training for use of the District's project management website after Contract award. Each Contractor employee requesting website access must be Approved by the District's Security Director. After approval, the user will be assigned a user name and password for use accessing the cpudprojects.org website.
 - H. The cpudprojects.org website utilizes a specific "Smart Number" file naming convention described further in paragraph 1.9, Serialized Correspondence Numbering (Smart Numbering) (see this Section).
 - I. The following Project correspondence will be utilized for the duration of the Contract:
 - 1. Serialized Letters

2. Serialized Speedy Memos
3. Records of Conversation (telephone and personal contacts)
4. Emails
5. Serialized Contractor Submittals
6. District Submittal Responses

1.3 SERIALIZED LETTERS

- A. Serialized letters shall be used for all correspondence from any Project entity that addresses **Contract scope, budget, schedule or other contractual issues.**
- B. Serialized letters shall be posted to the cpudprojects.org website and followed immediately by the signed original via regular or express mail, by courier service or hand carried to the District.
- C. If the District determines that there is any change to the Contract scope, budget, or schedule, then the District will issue a Field Work Order/Change Order (FWO/CO).
- D. All Serial Letters shall include (on the first page):
 1. Contract Number and Title
 2. Sender's Name
 3. Sender's Company Name
 4. Date: MM/DD/YYYY
 5. Serial Letter Number
- E. Additionally, each page shall indicate page number and total number of pages, formatted as "Page X of Y", and Serial Letter Number.

1.4 SERIALIZED SPEEDY MEMOS

- A. Speedy Memos (Appendix 013000-3) shall be used for **requesting information, clarifications or interpretations of the Contract.** Speedy Memos may be initiated by Contractor, District or Engineer.
- B. It is Contractor's responsibility to initiate a Serialized Letter identifying any contractual changes that may result from a Speedy Memo response.
- C. Speedy Memos shall be posted to the cpudprojects.org website. No hard copy is required.

1.5 TELEPHONE AND PERSONAL CONTACT RECORDS

Telephone and personal contact discussions (except meeting minutes), and particularly those which could result in a change to scope, schedule or budget, shall be recorded by the Contractor on a Record of Conversation Form

(Appendix 013000-4). Completed Record of Conversation Forms shall be posted to the cpudprojects.org website within 3-days of the conversation.

1.6 E-MAIL COMMUNICATIONS

- A. Parties to the Project may use e-mail for items other than those identified in the list of Project correspondence.
- B. **E-mail shall not be used for official correspondence, as direction to proceed, or to alter terms of the Contract.**
- C. E-mail may be used as a mechanism to transmit courtesy copies of other documents. Each e-mail shall contain a single subject and the contents shall clearly describe the subject matter. In rare cases similar subjects may be combined in a single e-mail if necessary for understanding. The subject line shall reference the following:
 - 1. Contract Number
 - 2. Project Name
 - 3. Subject Matter

1.7 SERIALIZED CONTRACTOR SUBMITTALS

- A. The Contractor Submittal & District Reply Form (Appendix 013000-2) shall be used as the cover sheet for all Contractor submittals. Contractor shall post the cover sheet and attachments combined as one (1) document to the cpudprojects.org web site. Documents shall be checked by Contractor before being submitted. All drawings shall be stamped by Contractor as having been checked, including the name or initials of the person checking the drawings and the date.
- B. If documents are changed subsequent to the original submittal, Contractor shall post the revised document(s) in accordance with the naming convention to the cpudprojects.org website for information or review and approval consistent with the original requirement.
- C. Re-submittals shall have the same number and title as the original submittal with a numeric revision code (example: 1504-XXXX-S-001-1) added to the submittal cover sheet and file name until submittal is Approved with no further action required.
- D. **New submittals shall not be combined with re-submittals.**

1.8 DISTRICT SUBMITTAL RESPONSE

- A. Any work undertaken by the Contractor prior to submittal approval shall be at the Contractor's sole risk.
- B. The Engineer will respond to submittals within two (2) calendar weeks after posting to the cpudprojects.org web site.

- C. Engineer will mark **Submittal Status** with one of the following:
- ANR**Approval Not Required
 - APP**Approved
 - AAR**Approved as Revised
 - NOT APP**.....Not Approved
- D. Engineer will mark **Action Required** by the Contractor with one (1) of the following:
- NR**.....No Action Required
 - REV**Revise and Resubmit for Approval
 - RSR**Revise and Submit for Record
 - SR**Submit for Record (As-Built, O&M Manual, QA/QC Dossier)

Submittal Status	Description
Approval Not Required	Applicable to documents submitted for information only.
Approved	Document is approved for use.
Approved As Revised	Document is approved for use with incorporation and resolution of comments.
Not Approved	Document is not approved for use.

Action Required	Description
No Action Required	No action on the part of Contractor is required.
Revise and Resubmit for Approval	Contractor shall revise, take required action and incorporate comments, if any and repost the document addressing all comments within two (2) weeks of the District's posted response.
Revise and Resubmit for Record	Contractor shall revise and resubmit the document as part of the Final Record Documents.
Submit for Record (As-Built, O&M Manual, QA/QC Dossier)	Contractor shall resubmit the document as part of the Final Record Documents.

1.9 SERIALIZED CORRESPONDENCE NUMBERING (SMART NUMBERING)

- A. Serial numbers shall begin at 0001 for each type of correspondence from each sender. Numbers shall be consecutive. Correspondence initiated by Subcontractors shall be routed and tracked through the Contractor. The Engineer shall approve all deviations to this requirement. If a deviation is

agreed to in writing, then Subcontractors shall be bound by the same requirements as the Contractor, as provided herein.

- B. Correspondence Smart Numbers and file names for this Project shall be formatted as follows:

Document Type	Numbering Convention And File Name
Serial Letters	1504-XXXX–L0001-0
Speedy Memos	1504-XXXX–M0001-0
Submittals	1504-XXXX–S-001-0
Example: 1504-HHI-L0001-0	
1504:	(Bid Number)
HHI:	(Contractor Designation, e.g. Hyundai Heavy Industries)
L0001:	(Correspondence Type and sequential number)
0:	(Revision number)
L0001-0	Letter Number 0001, Revision 0;
M0009-C1	Speedy Memo Number 9, revision C1 (Revisions are with alpha characters (0, A, B, C...) If a Memo needs to be revised prior to a response, then use sequential numbering, following that revision alpha character.
S-054-3	Submittal Number 54, Revision 3 (Revision with sequential numeric character (0, 1, 2, 3....))

- C. The District will assign Contractor codes for all parties involved.

1.10 ADDRESS INFORMATION

All Project correspondence shall be addressed as follows:

US Mail:

PUD #1 of Chelan County
Bid 15-04 Daroga State Park – Group Camp Improvements
 Attention: Court Hill, Project Engineer
 Post Office Box 1231
 Wenatchee, WA 98807-1231

Physical Address, (Fed Ex, UPS, oversized mail):

PUD #1 of Chelan County
Bid 15-04 Daroga State Park – Group Camp Improvements
 Attention: Court Hill, Project Engineer
 327 North Wenatchee Ave
 Wenatchee, WA 98801

1.11 SUBMITTALS

A. General:

1. The Contractor is required to provide information to support its engineering, design, fabrication and installation process and provide this information in sufficient detail to demonstrate the Work is being performed in accordance with these Contract Documents.
2. The required submittals are not limited to those listed in Required Submittals (Appendix 013000-1). The District or Engineer may, at any time throughout the duration of the Contract, require the Contractor to provide additional information pertaining to the Work. The Contractor shall comply by providing the information in the form of a Submittal.
3. Documents and Shop Drawings shall be posted to the cpudprojects.org website for information, or review and approval. Contractor shall supply complete documentation and Shop Drawings for the equipment provided in accordance with the format and procedures established by these Contract Documents.
4. Non-paper submittal items such as hardware, samples, material items, etc. that cannot be posted to the District's cpudprojects.org website shall be sent to the Project Manager along with a signed Contractor Submittal/District Reply cover sheet (Appendix 013000-2).
5. Documents shall be submitted in a timely manner to support Contractor's engineering, design and fabrication process. All delays due to untimely submittal of documents to District shall be the responsibility of the Contractor. Contractor shall arrange the submittal schedule such that no more than 25 documents or Shop Drawings are posted per week, except as otherwise Approved in writing (in advance), by the Engineer, or in the case of As-Built Drawings.
6. It is in the Contractor's best interest to post submittals and re-submittals far enough in advance of the District's submittal review time so that mobilization and construction start dates are not delayed while waiting for submittal approval. The District has the right to delay work if required pre-construction submittals are not approved. Onsite work will not be allowed to proceed prior to the approval of the Contractor's Work plan, safety plan, and QA/QC plan. No increase in Contract Price or extension of the Completion date will be allowed if this delay occurs.
7. The Contractor shall provide equipment documentation and Shop Drawings in sufficient detail for the District's Engineer to review with the intent of verifying the Work is being performed in accordance with these Specifications. Where both design calculations and drawings are prepared, they shall be posted together to allow complete review.
8. Contractor shall be responsible for the accuracy and correctness of dimensions and details on the documents and Shop Drawings. The

approval of such documents and Shop Drawings by the Engineer shall not relieve Contractor of this responsibility.

9. Information and product data submittals shall be in a clean, consistent and orderly electronic format. Product items shall be highlighted or otherwise distinctly identified. Sloppy and difficult to interpret submittals will be returned with a Revise and Resubmit response.
10. Any document required by this Specification which is produced by a sub-supplier, or Subcontractor shall first be reviewed and noted as being approved by Contractor and then submitted to the Engineer for review and approval.
11. Contractor shall assume all responsibility and risk for conditions due to any error on Shop Drawings regardless of drawing approval or field acceptance of material or delivery.
12. Any fabrication or other Work performed in advance of Contractor's receipt of review comments and approval shall be entirely at Contractor's risk. After review, Contractor shall not deviate in any way from the design, details, dimensions, or other information shown on the Shop Drawings without the written approval of Engineer.
13. The Contractor shall maintain one (1) hard copy set of all approved and pending submittals at the Project site in the Contractor's Field Office.

B. Documents and Drawings

1. Documents and drawings submitted by the Contractor, as a minimum, refer to information specifically required in the submittal schedule and elsewhere in this Specification. This information shall include all drawings, diagrams, illustrations, manufacturer's product data, catalog data, brochures, performance charts and other information required to illustrate distinct portions of work.
2. Documents and drawings shall include all the details necessary for fabrication, assembly, installation, repair and maintenance of furnished items. The minimum drawings required are specified in individual sections of the technical Specifications. Contractor shall furnish detailed fabrication drawings (Shop Drawings) and procedures for installation and assembly of all items provided.
3. If standard drawings or catalog cut sheets are submitted, the applicable items and devices furnished shall be clearly marked, e.g., arrows pointing to text, text highlighted, and/or items enclosed with boxes, separating the intended item from others on the page (Appendix 013000-5).
4. Failure of the Contractor to submit drawings conforming to specified formats and drafting standards may result in a reduction of payment (as bid) to the Contractor as determined by the District.

C. Substitutions

In accordance with the Contract Documents, the Contractor may propose a product substitution unless a product is otherwise specified as sole source. In the event a product other than that specified is submitted, the Contractor shall clearly indicate the item is a proposed substitute. Differences between the product specified and the substitute proposed shall be clearly marked in the submittal.

D. Submittal Schedule

1. Contractor shall prepare and submit a Submittal Schedule inclusive of all drawings, calculations, procedures, and other documentation specified in the Contract Documents. The Submittal Schedule shall be prepared and submitted in Microsoft Excel (*.xls) or other approved file format. The Submittal Schedule shall reflect submittal number, revision, description, anticipated submittal date, actual submittal date, District reference number (if applicable) and Specification section number.
2. The Submittal Schedule shall be updated and maintained over the course of the Contract. The Submittal Schedule shall be updated and resubmitted monthly to reflect changes and for Progress Meetings, or as requested by Engineer.

E. District's Review

1. The purpose for requiring Contractor submittals is to permit the District's Engineer to monitor the Contractor's progress and to determine conformance with the intent of these Specifications.
2. Contractors and Subcontractors who use unapproved documents do so at their own risk and may be required to repeat activities that were performed if the document used is subsequently rejected by Engineer.
3. Submittals reviewed by the Engineer do not become Contract Documents and are not Change Orders.
4. Engineer review, acceptance, or approval of schedules, Shop Drawings, lists of materials, and procedures submitted or requested by the Contractor shall not add to the Contract amount and additional costs shall be solely the obligation of the Contractor.
5. The District will not be precluded, by virtue of review, acceptance, or approval, from obtaining a credit for fabrication and/or construction savings resulting from allowed concessions in the Work or materials provided. Any savings shall be mutually agreed upon by the Engineer and the Contractor.
6. The Engineer's review of Contractor submittals is not intended to be a rigorous engineering analysis of the Contractor's design or proposal. Engineer reserves the right to require the Contractor to make changes to Contractor's submittals, which may be necessary, in their opinion, to

make the Work conform to the provisions and intent of these Specifications. Any additional cost to correct a submittal, including work to maintain the schedule that may result from any delay to review a re-submittal, shall be solely the obligation of the Contractor.

7. The District will not be responsible for furnishing engineering or other services to protect the Contractor from additional costs accruing from submittals.

F. Language

All documents (i.e. Shop Drawings, data, manuals, plans, procedures, calculations, schedules, digital photographs, etc.) submitted to the Engineer shall be in the English language. Dual language is acceptable on drawings, provided all information is also provided in English. All elevations shall be dimensioned in feet unless otherwise indicated.

G. Format

1. The listed software and file formats shall be used for all submitted documentation or as Approved by the Engineer.
2. All software used shall be the latest version or as Approved by the Engineer. Contractor development of AutoCAD files for submittal shall comply with District Drafting Standards as provided in the Contract Documents.

Software	File Format	Usage Examples
MathCAD®	MCD (*.mcd)	Engineering calculations
Microsoft® Word	DOC (*.doc)	Text files, forms
Microsoft® Excel	XLS (*.xls)	Spreadsheets, forms, calculations
Microsoft® Access	MDB (*.mdb)	Databases
Bluebeam® or Adobe Acrobat®	PDF (*.pdf)	Text, pictures, reports, manuals, calculations
Audio editing	WAV (*.wav)	Audio files
Digital Photograph editing	JPG (*.jpg)	Digital photographs, scanned files
Autodesk® AutoCAD®	DWG (*.dwg)	Shop Drawings
Autodesk® DWF Viewer™	DWF (*.dwf)	Shop Drawings

H. Drawings

Project Drawings include the following:

1. Contract Drawings (provided by District with the Bid);
2. Conformed Drawings, incorporate addenda, if any. May be provided by District to Contractor at the Post-Award Conference. If issued, Conformed Drawings become the Contract Drawings;

3. Shop Drawings (all drawings provided by Contractor or Subcontractor As Required by Contract);
 4. Reference Drawings (may be provided by District with Bid or at Contractor’s request – all dimensions and locations of existing equipment shall be field verified, as necessary, by Contractor). These Reference Drawings may be hard copy and/or electronic;
 5. Contractor Project Record Drawings – hard copy Contract Drawings marked-up by the Contractor during the course of work and submitted to the District at Substantial Completion.
- I. Electrical Shop Drawings
1. Electrical Shop Drawings; schematics, wiring drawings, and panel layout drawings shall be in accordance with established District practice, as reflected in sample drawings provided as part of the Contract Drawings or Reference Drawings, for typical arrangement, layout, and format, or as Approved by Engineer.
 2. Electrical Shop Drawings shall have sufficient detail to facilitate installation and maintenance of items including terminal block identification, component values for resistors, capacitors, etc., and industry standard designations on all semiconductor devices.
- J. Contractor Project Record Documents
1. The Contractor shall maintain at the jobsite, in the Contractor’s Field Office, one (1) complete set of Contract Documents, including all drawings (Contract Drawings, Reference Drawings and Shop Drawings), Specifications, Addenda, and Field Work Order/Change Orders that are part of the Contract as awarded, and one (1) complete set of all Contractor prepared drawings.
 2. Each of these documents shall be clearly marked “Project Record Copy,” and shall be maintained in a clean and neat condition available for District and Contractor personnel, and shall not be used for any other purpose during the performance of the Work.
 3. The Contractor shall record on the Project Record Copy all deviations in the actual Work from the Contract Drawings, Reference Drawings or Shop Drawings. This shall include changes to the Work resulting from any Change Orders, or which may be required during assembly, installation or inspection of the Work. Markings to the Contractor’s project record drawings shall be in accordance with District color coding described in this specification.
- K. Information shall be recorded concurrently with construction progress within 24-hours after receipt of information that a change to a Contract Drawing, Reference Drawing or Shop Drawing has occurred. Work shall not be covered or concealed until the change is recorded.

- L. The Contractor's project record shall be submitted to the District at Substantial Completion. Acceptance of the Project record is required by the District as a condition of final acceptance. Incomplete or otherwise deficient records may constitute a deduction in the mobilization/demobilization pay item.
- M. The Contractor shall maintain documents in a clean, dry, legible condition and in good order. Record documents shall not be used for in-the-field purposes.
- N. Documents shall be made available at all times for observation by the District and the Engineer.
- O. Making Entries on Drawings: Using an erasable colored pencil (not ink or indelible pencil), Contractor shall clearly describe the change by marking it on the drawing and providing a note As Required. These entries shall be dated.

Color Coding:

GREEN is used when showing information deleted from drawings.

RED is used when showing information added to drawings.

BLUE and circled in blue is used to show notes. The entry shall be highlighted by a "cloud" drawn around the area or areas affected.

- P. Calculations

The District shall have the right to review any and all of the Contractor's calculations, including all manual and computerized design calculations. If specified and/or requested by the District, the Contractor shall provide all backup calculations, assumptions, flow charts, computer program documentation, and all other data necessary for proper review of the material by the District.

- Q. Digital Photographs

1. Digital photographs shall be taken to record and demonstrate progress throughout the duration of the Contract.
2. All digital photographs shall be submitted in JPG (*.jpg) file format or other District Approved file format. Photos shall have sufficient resolution values and pixel count to clearly show the documented Work in the photos when printed in 8-inch x 10-inch format. Acceptable digital photograph resolution values and pixel count shall remain at the discretion of the District and Approved by the Engineer.
3. Identify photographs with:
 - a. Chelan County PUD
 - b. Date: MM/DD/YYYY
 - c. Project designation

- d. Photograph details
 - e. Contract number
 - f. Time
 - g. Location
 - h. Contractor's name
 - i. Job reference number
4. The photograph identification data shall be added to the photograph by including it in the 'meta-data' section of the JPG file.
 5. Submit digital photographs following Project correspondence procedure on a bimonthly basis or after significant progress. Digital photographs shall be submitted in electronic format to the Engineer, unless directed otherwise by the Engineer.

1.12 PROJECT SCHEDULES

A. General

1. The Contractor shall prepare and maintain Project schedules. Schedules shall be prepared and maintained in a District Approved software format. Schedule logic shall be included and the critical path calculated and indicated.
2. Schedules shall be updated to reflect all changes and to show progress, and submitted at least 2-days prior to each scheduled Progress Meeting. Updates shall indicate actual progress against a baseline schedule established at the beginning of the Project. Additionally, the Schedule shall be updated and resubmitted within 5-working days of any change known by the Contractor that could cause actual completion dates to exceed the Milestone Completion Dates specified in the Contract Documents.

B. Overall Project Schedule

1. The Contractor shall prepare and maintain a time scaled CPM (Critical Path Method) Schedule showing all significant activities from Contract award to final closeout. This Schedule shall show all major events, activities, milestones, and completion dates required for Completion of the Work.
2. The Overall Schedule shall include, as a minimum, the start date, duration time in days and the completion date for the following work items:
 - a. Planning and Design
 - b. Submittal preparation
 - c. District response to Submittals

- d. Re-submittals (preparation and review) as applicable
 - e. Procurement and Fabrication
 - f. Mobilization
 - g. Shipment & Delivery of equipment/material to Job Site
 - h. Construction (as a rollup)
 - i. Construction Phases (as children to the rollup)
 - j. Substantial Completion
 - k. Milestone Completion Dates stated in Specific Requirements Completion Schedule/Contract Time.
 - l. Demobilization
3. The Contractor shall assign such forces and perform the Work in such a manner as to assure compliance with the Approved schedule and the Contract. The Contractor shall inform the Engineer of any schedule changes.

1.13 CONTRACT CLOSE-OUT SUBMITTALS

Record Drawings: At Substantial Completion, as determined by the District, submit one (1) complete, marked-up hard copy set of full-size Contract Drawings and any Shop or Reference Drawings as part of Project Record submittal.

Operation and Maintenance Manuals: See Specification Section 017823, Operation & Maintenance Manuals.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

APPENDICES

Appendix 013000-1, Required Submittals

Appendix 013000-2, Contractor Submittal and District Reply Form

Appendix 013000-3, Speedy Memo Form

Appendix 013000-4, Record of Conversation Form

Appendix 013000-5, How To Properly Identify Embedded Documents, Catalog Cut Sheets, etc.

END OF SECTION 01 30 00

Appendix 01 30 00-1, Required Submittals

Note: This list is not meant to be all-inclusive. All items permanently installed shall be submitted for Approval prior to installation.

Section Number	Activity /Description	Required Date
01 11 00	Site Specific Accident Prevention Program including Emergency Notification Procedure	Within 20 days after Notice of Award
01 30 00 and SR's	Overall Project Schedule	5 days following Notice of Award
01 30 00	Schedule Updates	As stated in Section 01 30 00
01 30 00	Project Record Drawings	At Substantial Completion
01 78 23	Operation & Maintenance Manuals	Prior to Final Completion
03 20 00	Shop Drawings showing reinforcement detailing	No less than 30 days following Notice of Award
03 30 00	Concrete mix designs	No less than 30 days following Notice of Award
03 30 00	Concrete Placement Checklist	Prior to request for District final inspection of reinforcement and formwork
04 22 00	Manufacturer documentation	No less than 30 days prior to Work on-site
05 50 00	Product data and shop drawings	No less than 30 days prior to Work on-site
06 10 00	ICC-ES evaluation reports	No less than 30 days prior to Work on-site
07 11 00	Written warranty and manufacturer's data and samples	No less than 30 days prior to Work on-site
07 20 00	Manufacturer's Data and Samples	No less than 30 days prior to Work on-site
07 60 00	List and samples of material, color guide and samples, shop drawings and warranties	No less than 30 days prior to Work on-site
07 92 00	Manufacturer's literature, instructions, performance data and warranty	No less than 30 days prior to Work on-site
08 11 00	Shop Drawings and Manufacturer's Technical Data	No less than 30 days prior to Work on-site

Appendix 01 30 00-1, Required Submittals

Note: This list is not meant to be all-inclusive. All items permanently installed shall be submitted for Approval prior to installation.

08 51 13	Product Data and Samples	Within 30 days of Notice of Award
08 70 00	Hardware & Keying Schedule, warranties	No less than 30 days prior to Work on-site
08 80 00	Product data and 12-inch square samples	Within 30 days of Notice of Award
09 21 16	Product data	Within 30 days of Notice of Award
09 30 00	Product data and Samples of tile and grout	Within 30 days of Notice of Award
09 91 00	Paint Product data and color samples, Mockups	No less than 30 days prior to any painting on-site
09 97 00	Product data and certifications	No less than 30 days prior to Work on-site
10 00 00	Manufacturer's information, guarantees, operating and maintenance instructions, Shop Drawings and Samples	No less than 30 days prior to Work on-site
10 14 00	Shop Drawings and product data	Within 45 days of Notice of Award
10 21 00	Shop Drawings, Samples and O&M Instructions	Within 30 days of Notice of Award
10 28 00	Product data	Within 30 days of Notice of Award
11 14 00	Product data	No less than 30 days prior to Work on-site
22 05 19	Product data	No less than 30 days prior to Work on-site
22 05 23	Product data	No less than 30 days prior to Work on-site
22 05 29	Product data	No less than 30 days prior to Work on-site
22 05 53	Product data	No less than 30 days prior to Work on-site

Appendix 01 30 00-1, Required Submittals

Note: This list is not meant to be all-inclusive. All items permanently installed shall be submitted for Approval prior to installation.

22 05 93	Certified TAB reports and calibration reports	No less than 10 days after Work on-site
22 07 00	Product data	No less than 30 days prior to Work on-site
22 11 16	Product data and Shop Drawings	No less than 30 days prior to Work on-site
22 11 19	Product data	No less than 30 days prior to Work on-site
22 13 16	Product data	No less than 30 days prior to Work on-site
22 13 19	Product data	No less than 30 days prior to Work on-site
22 33 00	Product data	No less than 30 days prior to Work on-site
22 40 00	Product data	No less than 30 days prior to Work on-site
23 05 13	Product data	No less than 30 days prior to Work on-site
23 05 53	Product data	No less than 30 days prior to Work on-site
23 05 93	Preliminary Data, Balancing Report, Commissioning Report	30 days after Notice of Award, Prior to TAB Work and prior to Final Completion
23 07 00	Product data	No less than 30 days prior to Work on-site
23 31 13	Product data and shop drawings	No less than 30 days prior to Work on-site
23 33 00	Product data	No less than 30 days prior to Work on-site
23 34 23	Product data	No less than 30 days prior to Work on-site
26 05 19	Catalog data	No less than 30 days prior to Work on-site

Appendix 01 30 00-1, Required Submittals

Note: This list is not meant to be all-inclusive. All items permanently installed shall be submitted for Approval prior to installation.

26 05 26	Product data	No less than 30 days prior to Work on-site
26 05 29	Catalog data	No less than 30 days prior to Work on-site
26 05 33	Catalog data	No less than 30 days prior to Work on-site
26 08 00	Test Results	No more than 5 days after testing Work on-site
26 22 00	Catalog data	No less than 30 days prior to Work on-site
26 24 16	Catalog data	No less than 30 days prior to Work on-site
26 27 00	Catalog data	No less than 30 days prior to Work on-site
26 28 16	Catalog data	No less than 30 days prior to Work on-site
26 47 10	Catalog data	No less than 30 days prior to Work on-site
26 51 19	Catalog data	No less than 30 days prior to Work on-site
31 10 00	Site Preparation & Clearing Plans	Prior to Mobilization on-site
31 20 00	Test Reports and samples	Within 30 or more days prior to use on-site
31 25 00	Product Data and samples	No less than 30 days prior to Work on-site
32 12 16	Product data, mix designs, test reports and certificates	No less than 30 days prior to Work on-site
32 92 00	Product data and Samples	No less than 30 days prior to Work on-site
33 11 00	Procedures, methods and plans for pressure testing and disinfection	No less than 30 days prior to Work on-site

Appendix 01 30 00-1, Required Submittals

Note: This list is not meant to be all-inclusive. All items permanently installed shall be submitted for Approval prior to installation.

33 11 16	Product and As-Built data	No less than 30 days prior to Work on-site
33 36 00	Product data, test reports, manufacturer's installation instructions, shop drawings, project record documents	No less than 30 days prior to Work on-site

END OF APPENDIX

Appendix 01 30 00-2, Contractor Submittal & District Submittal Reply

CONTRACTOR SUBMITTAL & DISTRICT SUBMITTAL REPLY			
Submittal No.: Appendix 01 30 00-2 Submittal Coversheet			
TO:	_____, Project Manager P.U.D. No. 1 of Chelan County P.O. Box 1231 Wenatchee, WA 98807-1231 Project Managers Phone Number	Contract:	Bid No & Project Name HERE
		Date Submitted:	DATE of Submittal
FROM:	_____, Project Manager Contractor Contractor Street Address Contractor City, State, Zip Contractor Phone Number	Approved Submittal Schedule Date:	N/A
Submittal Type:	<input checked="" type="checkbox"/> Shop Drawing	<input type="checkbox"/> Administrative	<input type="checkbox"/> Sample
No. of Copies:	<input type="checkbox"/> Quality Control	<input type="checkbox"/> Contract Closeout	<input type="checkbox"/> "Or-Equal"/Substitute

CONTRACTOR SUBMITTAL						DISTRICT REPLY		
To embed document: Right click on file, drop cursor in the Embed the Document column, Edit, Paste Special, Paste, Files, check Display as icon box, name the document, then select OK								
No.	CPUD REF-if app	Spec & Para No.	Description of Item: (Drawing or Brochure No., Type Size, Model No., etc.)	Embed the Document (not drawings)	Contract Variation N-or-Y	STATUS *	ACTION**	Reviewed by & Date
1.								
2.								
3.								
4.								
5.								
6.								

Contractor Comments:

Contractor hereby certifies that (i) contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By CONTRACTOR: _____, **Project Manager** (Date)

District Comments:

Review is for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the contract documents. The Contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions for fabrication processes; for techniques of assembly; and performing the work safely.

By DISTRICT: _____, **Project Manager** (Date)

STATUS *	ACTION **
ANR – Approval Not Required	NR – No Action Required
APP – Approved	REV – Revise and Resubmit for Approval
AAR – Approved as Revised	RSR – Revise and Submit for Record
NOT APP – Not Approved	SR – Submit for Record



Appendix 01 30 00-3; Sample Speedy Memo

SPEEDY MEMO				
Speedy Memo Number: Appendix 013000-3 SpeedyMemo <small>(For reply, right click memo number, select "Update Field")</small>				
Date:				
To:				
From:				
Project:	(type bid number and name of project here)			
Regarding:				
0-Description/Request:				
Requested Due Date				
Attachments			By:	
Copy:	Contractor	Date:		
	CPUD			
A-Response (Contractor/District Name):				
Requested Due Date				
Attachments			By:	
Copy:	Contractor	Date:		
	CPUD			
<i>Action Required:</i>				
<i>Action Completed:</i>				
B- Response (Contractor/District Name):				
Requested Due Date				
Attachments			By:	
Copy:	Contractor	Date:		
	CPUD			
<i>Action Required:</i>				
<i>Action Completed:</i>				
<input type="checkbox"/> Follow Up	<input type="checkbox"/> Variance	<input type="checkbox"/> DWG/Spec Revision	<input type="checkbox"/> Field Work Order/Change Order	
<input type="checkbox"/> Other:				
By:			Date:	

Appendix 01 30 00-4, Sample Record of Conversation Form

RECORD OF CONVERSATION			
Check one:		<input type="checkbox"/> Phone Call	<input type="checkbox"/> Personal Contact
Date:		Time:	ROC No. 1504-XXXX-RXXXX-0
Project:	Contract: (bid number and name of project here)		
Person(s) Talked With:		Company / Phone Number:	
Conversation Summary:			
Significant Decisions:			
Required Actions/Follow-up:			
Signature:		Date:	
Distribution:			

Appendix 01 30 00-5, How To Properly Identify Embedded Documents, Catalog Cut Sheets, Etc.

DSD 2210 A, S, M

M22 x1

Module 1

Features

- With amplifier
- Static function
- Lower frequency limit 0 Hz
- Sensor housing has to be aligned to the pole wheel

Dimensions

Model overview

Type	Part nr.	Connections	Housing thread	Weight	Operating T°C	Notes
DSD 2210.01 BTV	3742-03750	Cable 5 m	M22x1	565	25 - 45	Standard
DSD 2210.01 BTV	3742-03745	Cable 5 m	M22x1	525	42 - 110	Standard
DSD 2210.01 ATV	3742-04170	Connector	M22x1	130	25 - 45	Standard
DSD 2210.01 AAV	3742-04171	Connector	M22x1	130	42 - 110	Standard
DSD 2210.01 MTV	3742-04148	Protective hose 5 m	M22x1	1300	25 - 45	Standard
DSD 2210.08 BTV	3742-04120	Cable 5 m	M22x1	290	25 - 45	Standard

Differential Ferrostat Sensor

Type DSD 2210
Version A, S, M

Technical data

Supply
Power Supply: Stable voltage 8...20 V D.C. max. superimposed A.C. voltage 25 mVrms; reverse polarity protection; max. consumption: max. 15 mA (without load).

Input
Frequency range: 0 Hz...20 kHz
Noise immunity: Cable shield connected to the supply negative pole. Noise generator between housing and electronics.
Pole wheel: 2.0 kV/10° surge (level 4 in accordance with IEC 60741); 2.0 kV/1° 1MHz damped resonance (class II in accordance with IEC 255-4); Ferromagnetic toothed wheel, i.e. LM27-2, involute gear form preferred. Module ≥ 1 min. tooth width 6 mm, side offset with min. tooth width < 0.2 mm, eccentricity < 0.2 mm.
Data wheel sensor (p.p.s.)
Module 1: 0.1...0.5 mm
Module 2: 0.1...1.5 mm
Module 4: 0.1...1.5 mm

Output
Signal output: Square wave signals from push-off stage, D.C. coupled to the supply; negative pole in reference voltage; rise time 20 ns.
Output voltage (E₀): = supply voltage - 3.5 V at I = 30 mA.
Output voltage (E₁): = 1.5 V at I = 25 mA.
Short circuit proof with reverse polarity protection.

Connections

Shield to be connected with 0 V of power supply.

Mechanical
Protection class: IP68 (steel), IP67 (stainless steel), IP50 (jack connector).
Vibration immunity: 5 g, in the range 5...2000 Hz.
Shock immunity: 50 g, during 20 ms, half sine wave.
Operating temperature: Acc. to model overview.
Insulation: Housing, cable screening and electronics galvanically isolated (500V/50 Hz) min.
Housing: Stainless steel, burst side hermetically sealed, electronic components potted in a chemical- and high-speed synthetic resin.
Dimensions according to model overview and dimensional drawing.
Weight: Acc. to model overview.
Operating instructions: 374E-63870, version with integral cable; 374E-63860, version with integral connector.

Versions

Version BT (01): PVC cable; Part nr. 8244-37381, 3-core, 3 x 0.75 mm², stranded wire (Metal net isolated from housing); grey; outer Ø = max. 7.4 mm, bending radius = min. 110 mm, weight 85 g/m.
Standard length for version BT 5 m.

Version BT (20): PVC cable; Part nr. 8244-37665, 3-core, 3 x 0.22 mm² (AWG 24), stranded wire (hermetic sealing with continuity conductor, insulated from housing); grey; outer Ø = max. 4.2 mm, bending radius = min. 60 mm, weight 25 g/m.
Standard length for version BT 5 m.

Version SH: Teflon cable; Part nr. 8244-30058, 3-core, 3 x 0.22 mm² (AWG 24), stranded wire (Metal net isolated from housing); white; outer Ø = max. 4.5 mm, bending radius = min. 60 mm, weight 22 g/m.
Standard length for version SH 5 m.

Version MT: Protection hose over PVC cable; Tube 8250-26924 made of profile milled steel pipe with PVC cover; grey; stainless steel and neoprene; continuous Ø8 and acid resistant; outer Ø = 14 mm, bending radius = min. 40 mm, weight 130 g/m.
Standard length for version MT 5 m.

Version A: Connection plug; Part nr. 8204-26732

0401B-VATH-M0114-0 Att1 w-remarks.pdf

0401B-VATH-M0114-0 Att1 w-remarks.pdf

End of Appendices

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 78 23 – OPERATION AND MAINTENANCE MANUALS

PART 1 - GENERAL REQUIREMENTS

1.1 DESCRIPTION

- A. The Contractor shall furnish Operation and Maintenance (O&M) Manuals for all products and equipment furnished under this Contract. O&M Manuals shall be submitted and Approved before Final Completion.
- B. The Contractor shall be responsible for ensuring complete information on individual interrelated product and equipment components provided by Subcontractors, suppliers and manufacturers.

1.2 SCOPE

- A. O&M Manuals shall describe recommended procedures in detail. A detailed theory of operation shall be provided for all equipment. A schedule shall give recommended times for maintenance, lubrication, calibration, and replacement of parts.
- B. O&M Manuals shall include a complete set of drawings with details including dimensions, component values, and industry standard component designations where appropriate.
- C. A parts identification list, with appropriate illustrations identifying each numbered part and its location in the assembled equipment, shall be included. All parts shall be identified using industry standard designations or dimensions to the fullest extent possible.

1.3 CONTENTS

- A. The following general information shall be provided:
 - 1. Names addresses and telephone numbers of Contractor, Subcontractors and equipment/material suppliers for warranty and maintenance contact.
 - 2. Certificates of equipment warranty with the start and expiration of the warranty period clearly described.
 - 3. Service agreements with equipment manufacturers as applicable.
 - 4. Description of instances that may affect the validity of the warranty.
 - 5. Instrument list including identification and alarm and trip settings.
- B. Maintenance Schedule:
 - 1. The first volume in the set shall contain a maintenance schedule. The schedule shall be in a tabular format that describes routine maintenance

activities with specific reference to applicable sections of the O&M manual.

2. The table shall also identify reoccurrence intervals and durations for performing maintenance activities.

C. Equipment Sections:

1. The major sections of the manual shall have the following contents as appropriate.
2. Equipment specifications that include the following:
 - a. Nameplate Ratings including: voltage, amperage, kW, power factor, RPM, horsepower, temperature, etc., as appropriate.
 - b. Factory Settings including: temperature, travel speed, limits of travel, etc. Where there is a range to these values, state as: "Normal Operating Range".
 - c. Factory Trip Settings as applicable to the equipment.
 - d. Dimensions and Weight of major components.
 - e. Performance curves.
 - f. Engineering data.

D. Test data from factory tests and acceptance tests.

E. System/equipment description and operating theory, including a description of significant equipment, components and functions for a complete understanding of the design and operation of the equipment or system. Diagrams and part lists shall be included or referred to as appropriate.

F. Operating Instructions shall be written in a logical sequence, including systematic (step-by-step) procedures for operation.

G. Maintenance instructions including:

1. Recommended procedures for meeting warranty requirements ensuring optimal performance and longevity of the provided equipment.
2. Recommended maintenance schedule with references to the appropriate procedures.

H. Guide to troubleshooting with references to the appropriate maintenance procedures.

I. Part descriptions and diagrams, including references to drawings and manufacturers' part numbers as applicable.

J. Instructions for repair and adjustment, including recommended clearances, bolt torques, pressure settings, etc.

K. Lubrication instructions for the service intended, including charts or tables indicating items to be lubricated, recommended frequencies, and grade and type of lubricant to be used in accordance with AGMA, NLGI, SAE specifications, as applicable. Where the Contractor or the supplier has

- installed a lubricant or oil prior to shipment to the Project site, the "Brand Name" as well as the specification shall be indicated.
- L. A listing of the oil, fuel, and other fluid quantities required for filling and operation of fluid-containing systems.
 - M. Any special handling or storage requirements.
 - N. A list of any special tools required for maintenance or repairs.
 - O. Recommended spare parts, including identification, nomenclature, part numbers, required number of parts, recommended list of spare parts to be stocked at the Project, actual spare parts supplied under this Contract and instructions for ordering spare parts.
 - P. Parts catalogs shall include the names and addresses of suppliers of parts. All data shall match the actual equipment furnished. Standard catalog cut sheets and diagrams will not be acceptable unless all irrelevant parts are marked out and relevant parts are identified by heavy arrows Or Equal suitable marking at each side of the applicable data.
 - Q. Drawings:
 - 1. Assembly and installation drawings.
 - 2. Drawings showing relations of component parts of equipment and systems.
 - 3. Control and interlock system diagrams.
 - 4. Logic and flow diagrams.
 - 5. Communication diagrams.
 - 6. Schematic and wiring diagrams.
 - R. List of relay and alarm settings.
 - S. Software: Full documentation of software. Identify system or equipment and make available control logic and screen graphics, both in printed and electronic format. Include original manufacturer's instructions.
 - T. Programming instructions for all software based equipment. A complete listing of all software parameters shall be included.

1.4 FORMAT

- A. O&M Manuals shall be printed on 20-pound weight minimum, 8½ by 11-inch bright white paper and bound in rigid hard cover binders (Wilson-Jones 365, Avery Dennison Heavy Duty EZD series or District Approved equal). Binder width(s) shall be a maximum of 3-inches. Binders shall be such that pages are locked in place and do not inadvertently fall out.. Punched holes shall be arranged such that they do not remove or obliterate data.
- B. Indexes shall be provided for each O&M Manual, including dividers and tabs to separate sections of each binder. Vinyl binder sheets for CD media storage for software and data shall be included in the appropriate O&M Manual. For

CD/DVD media storage, use Fellowes CD Binder Sheets, #95304 or District Approved equal.

- C. Text shall be manufacturer's printed data, or be neatly typewritten suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs. All standard catalog cut sheets, manufacturer's printed data or descriptive literature, parts sheets, illustrations, etc., shall either be original manufacturer sheets or reproduced copies equal in clarity and durability to the original copies. At least one (1) O&M Manual shall contain all original copies of such data – that copy shall be identified as containing originals.

1.5 ORGANIZATION

- A. Identify each volume with typed or printed cover and title page as follows:

<p>PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY DAROGA STATE PARK GROUP CAMP IMPROVEMENTS OPERATION AND MAINTENANCE MANUAL VOLUME NUMBER X OF Y CONTRACT NUMBER 15-04 [DATE] [NAME AND ADDRESS OF CONTRACTOR/EQUIPMENT SUPPLIER]</p>
--

- B. The table of contents shall contain all volumes, chapters, appendixes and a master index. Where more than one volume is required, each subsequent volume shall contain an index for the contents within that respective volume. Each volume shall not be broken between chapters, appendixes, and indexes. Each sheet in the binder shall be numbered and an index provided for ready reference to the data.
- C. All chapters, appendixes and indexes shall be adequately separated and identified by standard line indexes.

1.6 DRAWINGS

- A. O&M Manuals shall contain As-Built Contract and Shop Drawings (As Required) to ensure correct illustration of completed installation.
- B. Drawings may be reduced to 11-inches by 17-inches folded to 8-½ inches by 11- inches.
- C. Reduced drawings shall be inserted into O&M Manuals using:
 - 1. Ring Binder Insert Strips, Cardinal #21110;

2. 11x17 Fold out Sheet Protectors, Avery® #75256 or;
 3. Other District Approved equal.
- D. Where reduction of drawings is impractical, fold and insert drawings in vinyl, multi-page capacity sheet protectors, Avery® #PV119XL-25 (74171) Or Equal. Insert drawing with title and number viewable from front side of page, when inserted into sheet-protector.

1.7 ELECTRONIC

Electronic copies of O&M Manuals, once Approved, shall be provided. All provided files shall maintain the formats and standards As Required in Section 013000, Administrative Requirements. All files shall be named for the section of the O&M Manual that is represented within the file or as Approved by the Engineer. All PDF (*.pdf) files shall also be accompanied by the associated 'native' files used to create those PDF (*.pdf) files. PDF (*.pdf) 'native' files shall also follow the required file formats and standards. Electronic files shall be submitted on CD ROM.

1.8 SUBMITTAL PROCEDURE

Contractor shall submit the following in accordance with the Submittal Schedule in Exhibit S - Section 013000, Administrative Requirements.

1.9 O&M MANUAL OUTLINE

- A. Submit detailed outline, which includes the Table of Contents of O&M Manual prior to preparation of Draft Manuals.
- B. Draft O&M Manuals:
 1. Submit two (2) bound copies of Draft O&M Manuals; one(1) in hard copy and one (1) in electronic format.
 2. The Engineer shall review the Draft O&M Manuals in accordance with the Project Correspondence Procedures.
- C. Final O&M Manuals:
 1. Submit revised Final O&M Manuals, one (1) hard copy and one (1) electronic, incorporating the comments from the Draft O&M Manuals for review by Engineer.
 2. If rejected, one (1) copy will be returned to the Contractor with the Engineer's comments for revision and re-submittal.
 3. Once accepted, submit an additional four (4) hard copies for a total of five (5) Final O&M Manuals and one (1) copy in electronic format.
 4. O&M Manuals used for on-site training shall be additional, and provided for each session, unless otherwise Approved by Engineer.

- D. The District's acceptance as “Approved” or “Approved as Revised” shall apply to the general content and shall not relieve the Contractor from the entire responsibility for correctness.
- E. Regardless of approval status, the Contractor shall be responsible for updating the appropriate sections of the O&M Manuals As Required to incorporate any changes to the Work resulting from drawing revisions, change orders, as-found conditions, etc. which affect the content of the O&M Manuals throughout the life of the Contract, in accordance with Exhibit S - Section 013000, Administrative Requirements.

PART 2 - PRODUCT (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 78 23

DIVISION 03 – CONCRETE

SECTION 03 20 00 – CONCRETE REINFORCING

PART 1 – GENERAL

1.1 STANDARDS

- A. Comply with requirements set forth in ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures", except where more exacting requirements are specified in the Contract Documents.
- B. Bars shall be bent cold and details of reinforcement shall conform to ACI 318-83, Section 7. Welding of reinforcing steel shall be by certified welders in conformance with details on Drawings and with the American Welding Society's Recommendations for Welding Reinforcing Steel (A.W.S. D1.4, latest edition).
- C. Abbreviations Used in This Section
 - 1. ACI: American Concrete Institute, P.O. Box 19150, Redford Station, Detroit, Michigan, 48219
 - 2. ASTM: American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania, 19102.
 - 3. CRSI: Concrete Reinforcing Steel Institute, 38 S. Dearborn Street, Chicago, Illinois, 60603.

1.2 SUBMITTALS

- A. Submit drawings to District showing bending and placing of all reinforcing.
 - 1. Drawings shall include diagrammatic elevations of all walls at a scale sufficiently large to show clearly the position and erection marks of marginal bars and their dowels and splices.
 - 2. Review shall extend only to general arrangement and correspondence with the Drawings and Specifications and shall not relieve the Contractor from complying with the requirements of the Contract Documents as to dimensions, laps, lengths, fit and all other details.
 - 3. Do no fabrication before receipt of reviewed drawings from the District. See Section 03 30 00 and 04 22 00 for additional reinforcement and design requirements.

1.3 STORAGE

- A. Pile reinforcement at the site to prevent excessive rusting or fouling with grease and/or coating that will interfere with bond. Store so as to maintain identifications after bundles are broken.

1.4 COORDINATION

- A. Coordinate work with other trades so as not to interfere with their work. Bring interferences between trades to District's attention and resolve before any concrete is poured.

1.5 SPECIAL INSPECTION and TESTING

- A. Refer to Division 1 for cost information and general requirements.

PART 2 – PRODUCT

2.1 MATERIAL

- A. Reinforcing Bars: Shall be deformed bars conforming to ASTM, A615, (S1), Grade 60, unless otherwise noted. Grade 60 for masonry work. Each bundle shall be accompanied by identification of heat number and grade.
- B. Welded Wire Fabric: Shall conform to requirements of ASTM, A185, furnished in flat sheets. Gauges and dimensions shall be as noted on the Drawings. Provide exterior slabs on grade unless noted otherwise.
- C. Accessories: Conform to CRSI, "Manual of Standard Practice for Reinforced Concrete Construction". Include all devices necessary for proper placing, spacing, supporting and fastening steel reinforcement in place. Metal or plastic accessories, except where noted otherwise. Colored concrete block chairs and spacers only at architectural exposed concrete. Use concrete blocks or metal chairs to support reinforcement in slabs.
- D. Non-Shrink Grout: Masters Builders 'Embeco', or approved.
- E. Reinforcing Bars to be Furnished to Other Trades: All standard type reinforcing bars required for reinforcing masonry work shall be furnished properly cut and shaped as indicated on the Drawings.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. All reinforcing steel shall be detailed in conformance with ACI "Manual of Standard Practice For Detailing Reinforced Concrete", except as otherwise shown.
- B. Placing: Reinforcement shall be accurately placed in accordance with Structural Drawings and reviewed shop drawings and securely tied at intersections with 16-gauge black annealed wire. It shall be maintained in proper position by chairs, bar supports, or other approved devices. Bars in footings shall be supported on precast concrete blocks. Support securely so that bars may be walked upon without displacement and fasten to prevent movement before and during placing of concrete.
 - 1. Bars shall be free from loose, flaky rust, mud, mill scale, oil or other coating that will reduce bond.
- C. Laps and Splices: Bars shall lap 40 diameters, or 24" minimum, unless otherwise indicated on Drawings. Splices in adjoining horizontal bars shall be staggered at least 6 feet. Where this is not feasible, submit suggestions for the District's consideration. Horizontal bars shall be hooked around corners not less than 30 diameters, or a minimum of 24", unless otherwise shown on Drawings.
 - 1. Lap wire fabric a minimum of one full mesh on sides and ends, but not less than 8".
 - 2. Wherever conduit, piping, inserts, sleeves and other embedded items interfere with the placing of reinforcing steel as shown or called for, the Contractor shall consult the District and secure from him in writing the method of procedure

before pouring any concrete. Bending or field cutting of bars around openings or sleeves will not be permitted.

- D. Bends shall generally be made prior to placement. No bars partially embedded in hardened concrete shall be field bent unless specifically so detailed or approved.
- E. Concrete cover of bars shall conform to IBC requirements as a minimum and as may otherwise be detailed or noted on the drawings.
- F. Welding: Shall be done by welders certified by a third party quality control agency, such as Washington Association of Building Officials (WABO). Conform to requirements of the American Welding Society Standard Code of Arc and Gas Welding in Building Construction.
- G. Non-shrink grout shall be mixed and placed in strict accordance with manufacturers' printed instructions.
- H. Inspection: Contractor's job superintendent shall personally inspect placement of all reinforcing steel to ensure proper installation, in accordance with Design Drawings and reviewed shop drawings. He shall sign a daily log and note in his Progress Report his approval prior to pouring of concrete.

END OF SECTION 03 20 00

DIVISION 03 - CONCRETE

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 SCOPE

- A. The Extent of concrete work, excluding incidental patching, is shown on the Drawings.

1.2 STANDARDS

- A. Codes and Standards: Comply with the provisions of the following codes, specifications and standards, except as otherwise shown or specified:
 1. ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures".
 2. ACI 318 "Building Code Requirements for Reinforced Concrete".
 3. ACI 347 "Recommended Practice for Concrete Formwork".
 4. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
 5. ACI 605 "Recommended Practice for Hot Weather Concrete".
 6. ACI 306 "Recommended Practice for Cold Weather Concrete".

1.3 SUBMITTALS

- A. Submit mix design for approval no less than 30 days following Notice of Award. Mix designs shall be substantiated by test results for the various strengths and types of concrete required.
- B. Prior to request for District final inspection of reinforcement and formwork submit "Concrete Placement Checklist". An example is provided at the end of this section. An electronic form may be requested from the District's Project Manager.

1.4 QUALITY ASSURANCE

- A. Workmanship: The workmanship must be equal to the best practice in modern construction. Contractor shall exercise the greatest possible care to make a uniform dense concrete of required strength, true to elevations and lines shown on the Drawings.
 1. All concrete work which does not conform to the specified requirements, including strength, tolerances, finishes, or due to excessive imperfections shall be corrected or removed and recast as directed by the District at the Contractor's expense without time extension therefore. The Contractor shall also be responsible for the cost of corrections to any other work affected by, or resulting from, corrections to the concrete work.
- B. Concrete Sampling and Testing: Materials and installed work may require testing and retesting by the District's inspection laboratory as directed by the District. Refer to Division 1 for cost information and general requirements.

- C. Samples of all materials required for analysis and tests in the amounts required, shall be furnished to the testing laboratory free of charge. Not less than 50 lbs. of the fine aggregate and not less than 100 lbs. of each grading of coarse aggregate proposed for use shall be delivered to the laboratory. These samples shall be selected to represent fairly the average quality and grading of the respective aggregates. Deliver aggregate samples not less than 30 days before first scheduled date for pouring of concrete. Portland Cement samples will be taken for testing by the laboratory from the bins of the concrete producer selected by the Contractor. If cement for mixes is obtained from certified pretested bins, the laboratory will omit this sampling and testing.
- D. Specimens will be taken by testing laboratory/special inspector. Contractor shall provide labor, and material as required, to assist testing laboratory in preparing specimens for testing, and job storage facilities for making and storage of specimens. Assist in packing specimens for shipping.
1. Delivery of specimens will be done by testing laboratory/special inspector.
 2. The Testing Laboratory may:
 - a. Make an analysis of aggregate in accordance with ASTM C33-80.
 - b. Test cement in accordance with ASTM C150 unless cement will be furnished from certified pretested bins.
 - c. Design mixes to obtain the minimum strength specified.
 - d. Make a complete inspection of the producer's plant prior to start of operation to verify that the plant is equipped with an approved metering device for determining the moisture content of the fine aggregate and the adequacy of all other quality controls.
 - e. Make and cure concrete test specimens for each strength of concrete in accordance with ASTM C31-69. Make not less than one set of three identical compression test specimens from concrete obtained from each one hundred (100) cubic yards or fraction thereof placed each day.
 - f. Make slump tests in accordance with ASTM C143-69 to control slump. Make one test for each batch of each strength of concrete and at least one test per hour during a continuous concrete pour.
 - g. Make air entrainment tests in for each batch of each strength of concrete.
 - h. Keep an identification record of cylinders taken and concrete poured. Mark all cylinders from each set with the same number on one end and enter this number in a record book for this purpose with the date, time and location in the Building.
 - i. Make compression tests in accordance with ASTM C39-66. Where Type I cement is used, test one cylinder at 7 days and one cylinder at 28 days. Where Type III cement is used, test one cylinder at 3 days and one cylinder at 7 days. The third cylinder shall used as a check cylinder when required. If report is satisfactory, dispose of third sample; if report is unsatisfactory, test third sample at age selected by District.
 - j. Assume full responsibility for transportation of test specimens from job site to laboratory. Submit test reports to the District.

- E. Evaluation of tests shall proceed promptly so as not to impede progress of the Work. Strengths of concrete shall be considered satisfactory if the average of any three consecutive strength tests of the laboratory cured specimens representing each specified strength of concrete is 15% greater than the specified strength, and if not more than 10% of the strength tests have values not more than 10% less than the specified strength.
1. If strength tests fail to meet the minimum requirements, the concrete represented by such tests shall be considered questionable and shall be subject to further testing.
 2. The District may require test cores of hardened structure to be taken by the testing laboratory in accordance with ASTM C42-77 and C39-80. If test indicates core specimen below required strength, remove the concrete in question and replace it without cost to the District.

1.5 COORDINATION

- A. Schedule the work and notify other trades in ample time so that provisions for their work can be made without delaying progress of the Project. Any patching or cutting made necessary by failure or delay in complying with this requirement shall be at the Contractor's expense.

PART 2 – PRODUCT

2.1 MATERIALS

- A. Form Materials: Unless specified or detailed otherwise, construct all formwork with new plywood or clean steel forms, to provide continuous straight, smooth, exposed surfaces. Vertical surfaces not over 12" high may be formed with new dimension lumber or stock steel forms. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.
- B. Form Ties: Adjustable length removable or snap-off metal ties (with plastic cone heads) designed to prevent spalling of concrete during removal (and to receive pre-cast concrete plugs as specified). Any portion of ties remaining in wall after removal shall be at least 1-1/2" below formed concrete surface.
- C. Reinforcing Materials: See Section 03 20 00.
- D. Concrete Materials:
1. Cement shall conform to "Specifications for Portland Cement", ASTM C150, Type I or II.
 2. Aggregate shall conform to ASTM C33, except as modified herein. Aggregates shall be uncoated, clean and thoroughly washed before using and shall not contain disintegrated granite, shale or decomposed laminated pieces.
 3. Fine aggregate shall be concrete sand, as available from established, approved local sources.
 4. Maximum size of aggregate shall be 1-1/2" for standard weight concrete, but not larger than 1/5 of the depth of slabs or 3/4 of the minimum clear distance between reinforcing bars and forms.

5. Water shall be clean and free from oil, acid, alkali, vegetable matter, organic matter and other deleterious substances.
 6. Water Reducing Agent(s) (Plasticizers): Sika 'Plastiment' or Master Builders' 'Pozzolith'.
 7. Air-entraining admixture shall be per ASTM C260.
- E. Related Materials:
1. Joint Filler Strips: 'Ceramar' by W.R. Meadows, or approved, 3/8" thickness x 3" deep, or as otherwise detailed or noted.
 2. Liquid Joint Sealer: 'Master Seal SL2' paving joint sealant, or approved.
 3. Membrane forming curing compound, if and where allowed, shall conform to ASTM C309, Type 1.
 - a. Day-Chem Rez Cure, J-11-W, conforming to ASTM C309, Type 1, Class A. or Dayton Superior, Safe Cure and Seal, conforming to ASTM C309, Type I.
 - b. Day-Chem J-11 curing compound may be used at all below grade surfaces such as footings and foundation walls.

2.2 CONCRETE FORMWORK

- A. Forms: Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by the concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.
1. Formwork shall be designed to be readily removable without impact, shock or damage to concrete surfaces and adjacent materials and surfaces.
 2. Forms shall be in compliance with ACI 347 construct to sizes, shapes, lines and dimensions shown and to obtain accurate alignment, location, grades, level and plumb work in the finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features as shown or required in the Work. Solidly butt joints of forms and provide back-up at joints to prevent leakage of water and/or cement paste. Use vinyl foam tape at joints of formwork for all architecturally exposed concrete. Voids, honeycombing, sand pockets, fins, etc., may be cause for rejection.
 3. Fabricate forms for easy removal without hammering or prying against the concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.
 4. Provide temporary openings where formwork is inaccessible for cleanout, for inspection before concrete placement by District/Project Engineer or Special Inspector, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of water or cement paste. Locate temporary openings on forms at inconspicuous locations as approved.
- B. Cleaning and Tightening: Before inspection of forms and reinforcing steel thoroughly clean forms and adjacent surfaces to receive concrete. Remove wood chips, sawdust or other debris just before concrete is placed. Retighten forms after placement of concrete, and as required, to eliminate any concrete or water leakage.

- C. Form for exterior slabs, walks, and steps to finish elevations indicated on Drawings and as otherwise required to provide positive drainage away from building(s) and off concrete surfaces.
1. Where not otherwise indicated, typical drainage slope shall be 1/4" per foot.

2.3 PROPORTIONING and DESIGN of MIXES

- A. Provide the following class of concrete, except as otherwise specified or noted on Drawings:
1. 3,000 psi at 28-day
 2. 5.5 sack cement/cu.yd. of concrete (minimum)
 3. 6.0 gallons of water/sack of cement (maximum)
- B. Exterior Concrete Slabs and Sidewalks shall be as follows:
1. 4,500 psi at 28-day
 2. 6.5 sack cement/cu. yd. of concrete (minimum)
 3. .35 water/cement ratio
 4. 6.5% air entrainment
- C. Submit mix design for approval, substantiated by test results for the various strengths and types of concrete required. Obtain District's approval of mix before delivery of material to job.
- D. Air-entrained concrete shall be in strict accordance with agent manufacturer's printed instructions and shall be limited to the following:
- E. For concrete slabs (pavement)/walks exposed to weather, use 6.5% of entrained air, by volume, as determined by procedure prescribed in ASTM C231.
- F. For other concrete surfaces exposed to weather, use 4% of entrained air, by volume, per ASTM C231.
- G. For concrete at all other locations, use of air-entraining agents not permitted, except where approved by the District.

PART 3 – EXECUTION

3.1 CONCRETE MIXING

- A. Mixing Concrete: Consistency of mix shall be obtained with the minimum amount of water required to produce a concrete that will flow sluggishly into the forms, work properly into the corners, angles, and reinforcement without excessive puddling, spading or vibrations and without permitting the materials to segregate or free water to collect on the surface.
- B. Maximum slump of all concrete measured in accordance with ASTM C143 shall be as follows: All slabs on grade: 2" for concrete which has plasticizer additive added (prior to addition of plasticizer); 3" for other slabs where no plasticizer additive is added; all other concrete, 4".
- C. Ready-mixed concrete shall be used in accordance with the Specifications and ASTM C-94-74a. Discharge and place concrete not later than one hour after the addition of water. Mix concrete for a minimum of 10 minutes, at least 3 minutes of

which must be immediately prior to discharge at the site. No additional water to be added at the site.

3.2 CONVEYING and PLACING CONCRETE

- A. Do not place concrete until the forms and reinforcement have been completed and all preparations for the pour have been made, and have been inspected and approved by the District or his authorized representative.
- B. Notify District (and Special Inspector) not less than 48 hours before placing concrete.
- C. Clean formwork thoroughly, removing all loose dirt, scrap lumber and other debris from forms and footing trenches before pouring.
- D. In no case shall concrete be placed on standing water, muddy, soft or spongy areas. Subgrade conditions shall conform in all respects to requirements of Section on 'Earthwork' hereinbefore.
- E. Pours of concrete once started, shall be carried on as a continuous operation until the section of approved size and shape is completed.
- F. Depositing of concrete shall be continuous, or in layers, or bands, of such thickness that no concrete will be deposited on, or against, concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section.
- G. Vibration shall follow immediately upon deposit so as to minimize entrapped air between concrete and form and to blend two layers.
- H. Slabs: Before placing slabs, removable screed shall have been installed at edges of walls and at as many intermediate locations as necessary to ensure correct elevations and true planes. Surfaces shall be defined by fair lines and be free from irregularities.
 - 1. Place concrete on damp (not wet) firm earth, or drainage fill where so indicated on Drawings. Rod to uniform surface true to plane within 1/4" in 10' in any direction.
 - 2. Form slabs with control joints conforming to details on Drawings. Install joint filler strips, wherever slabs abut vertical surfaces, and at all construction/expansion joints in exterior slabs and exposed interior slabs on grade. Control joints in exterior slabs are not to be more than 12'0" o.c. in any dimension, and at exposed interior slabs not more than 16'-0" in any dimension, in any case, unless specifically dimensioned otherwise on Plans. Refer to details on Drawings for finish tooling pattern of joints in exposed exterior slabs.
 - 3. All interior slabs control joints shall be sawcut within **8 hours** of the pour with a "green concrete" saw blade. Cutting times may be extended 4 hours when ambient temperatures are below 60s.
 - 4. Where Drawings call for sealing compound finish at exposed control joints, joint filler material shall be installed with depth as required to bring top to 3/4" below surface of slab. Fill remainder of joint with paving joint sealant.
 - 5. Prepare slabs for finishing by tamping concrete with special tools to force the coarse aggregate away from the surface and then screed to the required level.

- I. Cold Weather: When the mean daily temperature of the atmosphere is less than 50 degrees F., the contractor shall institute cold weather concreting precautions and practices in accordance with ACI standard recommended practice for winter concreting ACI 604 (306). Admixtures shall be used in all concrete to reduce the mixing water requirements and to control the rate of hardening in keeping with specifications requirements and prevailing job site temperatures. Exterior walks shall not be poured in freezing weather and shall be maintained at an surrounding air temperature of 40 degrees for a period of 28 days. No additional time will be given for delays to concrete placement due to ambient air temperatures or snow cover.
- J. Hot Weather: Arrangements for installation of windbreaks, shading, fog spraying, sprinkling, ponding or wet covering of a light color shall be made in advance of placement, and such protective measures shall be taken as quickly as concrete hardening and finishing operations will allow.
- K. Changes in Temperature: Curing temperature of all concrete shall be as uniform as possible. Changes shall not exceed 5 degrees F. in any one hour or 50 degrees F. in any 24-hour period.

3.3 PROTECTION and CURING

- A. Leave forms in place not less than the period specified herein 7 days following the pour for curing, unless adequate provision is made to keep the surfaces of the concrete wet, or to prevent evaporation by application of a suitable, approved, membrane.
 1. Concrete shall be protected from damage during removal of formwork and from injury resulting from the storage or movement of materials during construction.
- B. Apply Fluid applied curing compounds at a rate of 200 square feet per gallon and apply a second coat at a rate of 400 square feet per gallon. Curing compounds at slabs on grade shall be trowel applied. Exposed edges of footings and foundation walls may be spray applied.
 1. When forms are removed prior to end of prescribed curing time, continue curing for the prescribed time as specified above.

3.4 SLAB FINISHES

- A. Smooth trowel finish shall be provided at all interior slab surfaces, unless specifically noted or scheduled otherwise. Trowel by hand or machine to hard, dense surfaces, free from trowel marks. Do not absorb wet spots with neat cement or mixture of sand and cement. Wait until surfaces are dry enough for proper troweling. Chemical dryers not permitted.
 1. Trowel to uniform surface, true to plane, as indicated:
 - a. **FF 25/FL 20**, per the F-Number system.
 - b. Testing of surfaces shall occur 72 hours after slab installation and shall be performed by the Contractor.
- B. At exterior slabs and walks, not otherwise noted, lightly brush wet troweled surface with soft hair broom, all strokes perpendicular to walks or flow lines, or in direction as indicated on Drawings, to create moderately abrasive, uniform, non-skid surface. Where called for on Drawings, "smooth trowel" finish at exterior slabs and walks shall be "sweat" finish (not hard troweled) as approved.

1. Mark off slabs as indicated or directed; round edges to 1/2" radius with 1-1/2" wide smooth edging tool. Unless otherwise indicated or detailed, edge all sections of brushed slabs with 1-1/2" wide smooth edging along all edges and both sides of all joints.

3.5 FINISHES OF FORMED SURFACES

- A. Standard Rough Form Finish: For formed concrete surfaces not exposed to view in the finish work or covered by other construction, unless otherwise shown or specified. Concrete surface may retain the texture imparted by the form facing material used, with significantly defective areas repaired and patched as specified. Form tie holes to be filled flush with formed concrete surface with cement grout.
- B. Standard Smooth Finish: For formed concrete surfaces exposed to view, or that are to be covered with a coating material applied directly to the concrete or a covering material bonded to the concrete such as waterproofing, dampproofing, painting or other similar system, provide as-cast concrete surface as obtained with the form facing material, with defective areas repaired and patched as specified, and fins and other projections on the surface completely removed and smoothed. Form tie holes to be filled and finished flush with formed concrete surface with cement grout.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets and similar unformed surfaces occurring adjacent to formed surfaces, strikeoff smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise shown.
- D. Miscellaneous Finish Patching: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete the work.

3.6 CONCRETE SURFACE REPAIRS

- A. Repair and patch defective areas with cement mortar immediately after removal of forms, but only as acceptable to the District/Engineer. Surface defects, as such, include color and texture irregularities, cracks, spawls, air bubbles, honeycomb, rock pockets and holes left by tie rods and bolts; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning.
 1. Cut out honeycomb, rock pockets, voids over 1/2" diameter and holes left by tie rods and bolts, down to solid concrete, but in no case, to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Before placing cement mortar, thoroughly clean, dampen with water and brush-coat the area as acceptable to District.
 2. For surfaces exposed to view, blend white Portland cement and standard Portland cement so that when dry, patching mortar will match color of surrounding surfaces. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- B. Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of District/Engineer.

- C. Test unformed surfaces, such as monolithic slabs, for smoothness and to verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope. Replace such slabs, etc., which cannot be repaired satisfactorily and approved by District.
- D. Repair finished unformed surfaces that contain defects which adversely affect durability of concrete. Surface defects include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets and other objectionable conditions.
- E. Correct high areas in unformed surfaces by grinding, if approved by District, after concrete has cured at least 14 days.
- F. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas to the nearest joint or edge on all sides and replacing with fresh concrete. Finish repaired areas to match adjacent concrete.
- G. All concrete slabs shall be tested with a straight edge in the presence of the District/Engineer prior to construction of walls, etc which would preclude removal and replacement of new concrete slabs. All high areas and low areas shall be repaired prior to acceptance and beginning of adjacent work.

END OF SECTION 03 30 00



Concrete Placement Checklist

Project	_____	Subcontractor	_____
Placement Number	_____	Date of Placement	_____
Start Time	_____	Finish Time, Duration	_____
Drawing	_____	Specification	_____
Strength of Mix	_____	Mix Design No.	_____
# of Cylinder Req.	_____	Type of Curing	_____

	Required	Actual
Total Cubic Yardage (CY)	_____	_____
Air Temperature	_____	_____
Temperature of Concrete	_____	_____
Slump	_____	_____

Concrete placement, Description and Location	
1	
2	
3	
4	
5	

Pre-Placement Approvals

The following items shall be initialed by the appropriate subcontractor prior to the placement of concrete. If not applicable, subcontractor shall state "N/A".

Item	Initial	Date	Item	Initial	Date
EXCAVATION			REINFORCING STEEL		
Excavation location (survey check)			Size and spacing in compliance		
Subgrade location (survey check)			Laps, Splices in compliance		
Subgrade compaction (by geotech)			Wall/Col. Dowel spacing/proj		
Vapor Barrier in Place, seams taped			Rebar clean		
			Form Clearance OK		
FORMWORK					
Line and grade verified			MECHANICAL/FIRE		
Adequate ties and bracing			Sleeves set, wrap, cap, extended		
Blockouts in place			Piping complete		
Exp. joints and waterstop in place			Floor Drain Slopes set		
Chamfer strips in place			Trap Primers in place		
Form surfaces in good condition					
Screeds set			ELECTRICAL		
Slopes or depressed slabs?			Sleeves set, wrap, cap, extended		
			Conduit complete,		
EMBEDS			Max Conduit Laps		
Misc/Struct Steel embeds			Grounding complete		
Anchor Bolts			NOT tied to Rebar (SE?)		
Metal Panel embeds			NOT horizontal in col. (SE?)		
Curtainwall embeds			Floor Boxes set square, level		
Masonry embeds/Brick ledge					



			SHORING		
SAFETY			Shoring required		
Dowels Capped			Re-shoring required		
Openings Covered					
Guard Rails / Scaffolds			PLACEMENT/FINISHING		
Pour Watch			Man Access		
Signage in place			Pump Locations		
Emergency Procedure			Debris removed from Forms		
			Dewatering Complete		
			Notify After Hours Security		
			Slump Adjustment Method		
			Truck Batch QC Frequency		
			Cure Plan		
			Sawcutting plan		
			Temp Heat / Weather Protection		
			Confirm floor slopes/ recesses		
			Lighting for Late Work		
			Vapor Barrier Treatment		

Third Party Insp. _____ Date _____

Contractor Supt. _____ Date _____

Contr. Quality Mgr. _____ Date _____

Owner _____ Date _____

END OF APPENDIX 03 30 00-1

DIVISION 04 – MASONRY

SECTION 04 05 00 – MASONRY MORTAR and GROUT

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide masonry mortar and grout in conjunction with work of Section 04 22 00.

1.2 SUBMITTALS

- A. If ready-mixed mortar is used, furnish certificates from mixing plant stating that mortar delivered to project conforms to these specifications.
- B. Samples: Refer to Section 04 22 00.

1.3 QUALITY ASSURANCE

- A. Tests and Special Inspection: Refer to Section 04 22 00.

PART 2 – PRODUCT

2.1 MATERIALS

- A. Sand shall be natural grey sand conforming to ASTM C-144 and IBC requirements.
- B. Portland Cement: Conform to ASTM C-150, Type 1.
- C. Hydrated Lime: Conform to ASTM C-206, Type "S" or ASTM C-207, Type "S".
- D. Mortar colors shall be inorganic mineral oxides, manufactured by Richard Coulston, J. Lee Smith, Ricketson, 3-M Company, or approved.
- E. Waterproofing admixture shall be Horn "Hydratite", Master Builders "Omicron", Euclid Chemical "Integral Waterpeller", or approved.
- F. Accelerator shall be plasticizing agent, "Anti-Hydro", "Trimix", or approved.
- G. Retardant shall be plasticizing agent, Sika "Plastiment", Sonneborn "Sonotard", or approved.
- H. Other materials shall conform to requirements of International Building Code, current edition, and be specifically approved by the District.

2.2 SETTING MORTARS

- A. Factory Blended Mortar Mix: Portland cement, lime and sand mortar, Type S.
 - 1. Bonsal American Amerimix 400 or equivalent.
- B. Reinforced masonry walls and exterior veneer; IBC Type "S".
- C. Mortar Mixing: Shall conform to requirements of International Building Code and ASTM Specification C270, latest edition.
- D. Mortar Color: Add color selected by District, in proportions recommended by manufacturer, to mortar as determined by sample panels.
- E. Waterproofing admixture shall be added, in proportions recommended by manufacturer, to mortar where exposed to weather or in contact with earth.

Waterproof cement, of type specified, may be used and waterproofer omitted, at Contractor's option.

- F. Accelerator or retardant shall be added to mixes only when required by weather conditions and as approved by the District.

2.3 GROUTED REINFORCED UNIT MASONRY WALL GROUT

- A. 1 part by volume Portland cement, 0 to 1/10 part hydrated lime, 2-1/4 to 3 parts sand, 1 to 2 parts gravel, maximum 3/8" aggregate mixed to achieve $f'c = 2,000$ psi at 28 days.

- 1. Conform to ASTM C476.

- B. Slumps: Shall exceed 8" and shall be as required to produce consistency for pouring without segregation.

- C. Mix of Grout: Shall be plastic, suitable for pumping without separation of constituents, and mixed thoroughly.

2.4 REINFORCED MORTAR BED FOR 1" BRICK VENEER

- A. Conform to Tile Council of America, Inc., method No. W251-79.

- B. Membrane: 15# roofing felt or 4 mil polyethylene film.

- C. Metal Lath: Galvanized expanded metal, self-furring type.

- D. Scratch Coat: 1 part Portland cement, 1/2 part lime, and 4 parts dry sand to 5 parts damp sand or 1 part Portland cement, 3 parts dry sand to 4 parts damp sand.

- E. Mortar Bed: 1 part Portland cement, 1/2 part hydrated lime and 5 parts damp sand to 1 part Portland cement, 1 part hydrated lime and 7 parts damp sand, by volume.

- F. Bond Coat: Portland cement paste.

END OF SECTION 04 05 00

DIVISION 04 – MASONRY

SECTION 04 22 00 – CONCRETE UNIT MASONRY

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide a concrete unit masonry system at exterior and interior walls, including all lintels framing, corner units, sills, and end units as required for a complete and finished system.

1.2 STANDARDS

- A. All materials procedures and workmanship shall conform strictly to all applicable provisions of:
 - 1. ASTM C90
 - 2. Recommendations of National Concrete Masonry Association.

1.3 SUBMITTALS

- A. Submit the following in accordance with 01 30 00 no less than 30 days prior to Work on-site:
 - 1. Manufacturer's published literature.
 - 2. Documentation all concrete units have been thoroughly cured at the plant before shipment.
 - 3. Documentation all concrete units conform to requirements of this Specification.
- B. Sample Panels: Obtain sample units and construct 2' x 4' sample panel, at location directed. Show bond, jointing, tooling, and mortar color if required as directed. Continue to build panels, until acceptable panel is produced and obtain District's written approval on dated and identified panel which is to remain on the job until all work of this Section is complete. The approved sample shall be the basis for accepting work of this Section.
 - 1. Sample panels may be integrated into the final work if properly erected and accepted by the District.

1.4 QUALITY ASSURANCE

- A. Inspection and Testing.
 - 1. Special inspection may be done by a testing laboratory/special inspector, selected by the District.
 - 2. Special Inspection of reinforcement placement prior to grouting is required for all Grouted Reinforced Masonry Construction in accordance with requirements of IBC, latest edition.
 - 3. Testing: Mortar and grout test specimens shall be taken by Testing Laboratory/Special Inspector during period of Masonry Construction in accordance with IBC Chapter 17.

4. Furnish and deliver to the special inspector, without charge, identified samples of blocks, mortar and grout required for testing.
5. Each such mortar (and grout) test specimen shall exhibit a minimum ultimate compressive strength as specified.
6. Remove and reconstruct as directed, any work for which tests taken do not pass these standards, at no additional cost to the District.

1.5 CODES, PERMITS and FEES

- A. Requirements of the International Building Code, latest edition, if more rigid than those herein, shall govern.

1.6 JOB CONDITIONS

- A. Deliver and store materials in dry and protected areas off the ground to prevent contamination by mud, dust, or other items likely to cause staining or other defects. Cover materials as necessary to protect from elements. Replace damaged materials at no cost to the District.
- B. Coordinate with all other trades whose work relates to concrete masonry installation for placing of all required blocking, subframing, backing, furring, electrical, mechanical blockouts, sleeves, etc.
- C. Do no masonry work in freezing weather unless approved means are provided for heating materials and masonry is protected from frost until mortar has reached design strength. Anti-freeze ingredients are NOT PERMITTED to be added to mortar or grout.
- D. Protect masonry construction from direct exposure to wind and sun when erected in an ambient air temperature of 99 degrees F. in the shade with the relative humidity less than 50%.
- E. Do no work in rainy weather unless materials and work are protected by cover.
- F. Cover tops of walls with non-staining, waterproof covering before stopping work for the day. Clean top surfaces of loose mortar when stopping work.

PART 2 – PRODUCT

2.1 MATERIALS

- A. Concrete Masonry Units:
 1. CMU-1: 8x8x16, standard, smooth face.
 - a. Include applicable sill, bond beam, corner, end, and cap profiles as indicated on the drawings and any additional profiles required for a complete and watertight system.
 2. CMU-2: 6x6x16, standard, smooth face.
 - a. Include applicable bond beam, end and cap profiles as indicated on the drawings and any additional profiles required for a complete and watertight system.
- B. Mortar: See Section 04 05 00.
- C. Grout: See Section 04 05 00.

- D. Reinforcing Steel: Conforming to requirements of Section 03 20 00.
- E. Admixtures: May be used only with the written approval of the District.
- F. Other Materials: All other materials not specifically described, but required for a complete and proper installation of concrete unit masonry, shall be as selected by the Contractor subject to conformance to the above specified standards and the prior approval of the District.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Inspection:

1. Prior to all work of this Section, carefully inspect the installed work of all other trades, and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that concrete masonry may be completed in accordance with all pertinent codes and regulations, the reference standards and the Construction Documents.
3. Verify all measurements shown on Drawings by taking field measurements; proper fit and attachments of all concrete masonry is required. The Contractor shall make any reasonable change due to discrepancies between Drawings and actual on-site conditions at no additional cost to the District.

B. General Workmanship:

1. Lay all masonry plumb, level and true to line, unless otherwise indicated on Drawings. Keep bond plumb and uniform. Rack courses back to higher level without tothing. Lay out face coursing to minimize cutting or jumping of bond. Cut out, refill and retool any defective joints. Clean exposed surface free from stain and daubs. Rinse with clear water. Remove all efflorescence. Embed all bolts, ties, etc., into solid grout for full length and depth.
2. Build in panel boxes, anchors, grounds, flashings, expansion joints and all other necessary incidental work. Install embedded structural items detailed on Drawings. Build chases and recesses into walls at time walls are constructed, so that structural stability and weather resistance of wall is maintained.
3. Wetting of masonry units not permitted, unless as approved in writing by the District.

C. Concrete Block Masonry Workmanship:

1. Lay with nominal 3/8" bed and head joints in running bond, strike mortar joints flush, then tool to concave rodded joint before mortar sets hard. Tool head joints first.
2. Where coursing requires less than full length units, cut with saw and shape ends to match factory ends. Bond each course at corners and intersections.
3. Do not use chipped or cracked masonry units. If any such are discovered in a finished wall, promptly remove and replace with new units to the approval of the District at no additional cost to the District.
4. Reinforce as noted on Drawings and provide one #5 at corners, sides and heads of openings. Grout all units containing reinforcing with specified concrete grout.

Grouting shall be done in maximum 4'-0" high lifts, as approved by inspection agency.

5. Horizontal bond beams at 4'0" o.c. vertically, unless shown otherwise on Drawings. Provide one (1) #5 continuous bar in bond beams, unless detailed otherwise.

3.2 CLEANING

- A. Thoroughly clean exposed surfaces, whether or not they are to be pointed, stained or sealed, using mild muriatic acid solution or approved cleaner, and rinsing thoroughly with clean water. Leave surfaces clean, free from mortar and other stains.
- B. Brush (interior) surfaces with stiff brush to remove all visible efflorescence, after building has been heated a minimum of one week. Make final cleaning of all efflorescence, as necessary, at completion of job.

END OF SECTION 04 22 00

DIVISION 05 – METALS

SECTION 05 50 00 – METAL FABRICATIONS

PART 1 – GENERAL

1.1 SUMMARY

- A. Requirements of this Section apply to all custom fabricated metal assemblies and components, and any modifications to specified stock assemblies or components unless specifically superseded by the manufacturer's standards. These requirements may be cross-referenced from other sections of the specifications, e.g., cabinets/casework, baggage handling system, etc.

1.2 SUBMITTALS

- A. Per Division 1 and GENERAL CONDITIONS, submit the following no less than prior to Work on-site:
1. Shop Drawings showing complete details of construction, including locations, marking, quantities, materials, sizes and shapes; and indicate all methods of connecting anchoring, fastening, bracing and attaching to work of other trades, for all items in this Section.
 2. Where welded connectors, concrete or masonry inserts, are required to receive work, show size and locations required.

1.3 QUALITY ASSURANCE

- A. In addition to complying with all pertinent codes and regulations, comply with the following:
1. "Design, Fabrication and Erection of Structural Steel for Building" AISC, 9th edition.
 2. American Society for Testing and Materials, latest edition (ASTM).
 3. American Welding Society's "Code for Welding in Building Construction" D1.1, latest edition (AWS).
- B. In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards, the provisions of the more stringent shall govern.

1.4 DELIVERY, HANDLING and STORAGE

- A. Deliver and store materials to keep out of inclement weather, dust and mud. Keep materials free from corrosion.
- B. Use all means necessary to protect miscellaneous metal before, during and after installation and to protect the installed work and materials of all trades.

PART 2 – PRODUCT

2.1 GENERAL

- A. Metal for all fabrications shall be steel, as specified, except where specified or noted.
- B. All steel pieces exposed to weather, including items embedded in concrete with less than 1" cover at any point, shall be hot zinc galvanized after fabrication, unless otherwise specified or noted.

2.2 MATERIALS

- A. Steel Plates, Shapes, Angles and Rods: ASTM A36 Steel, galvanized finish.
- B. Fastenings: Supply all angles, bolts, plates, lags, anchors, and other items to support properly, and secure all items furnished in this Section.
 - 1. All bolts shall be galvanized where galvanized metals are supported.
- C. Other Materials: All other materials not specifically described, but required for complete and proper installation of metal fabrications as detailed and specified herein, shall be new, free from rust, staining or corrosion, best quality of their respective kinds, and subject to the prior approval of the District prior to fabrication.

2.3 SCHEDULE OF CERTAIN METAL FABRICATIONS

- A. Metal fabrications shall include, but not be limited to, the following items:
 - 1. Toilet Partition Supports and Brackets:
 - a. 2" square galvanized tube, with end cap on exposed ends.
 - b. 1/8" galvanized steel plate, fabricated as shown on drawings.
 - 2. Bench Supports.
 - a. 2" diameter galvanized round steel tube.
 - b. 8" diameter galvanized steel pipe collar.
 - 3. Fasteners
 - a. Provide galvanized steel fasteners, including bolts, screws, washers, nuts, etc. as required for attachment of the above fabrications to benches and toilet partitions.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Prior to fabrication or installation of any work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where installation of the work of this Section may properly commence.
- B. Make all required measurements in the field to ensure proper and adequate fit of miscellaneous metal items. Verify that miscellaneous metal may be fabricated and installed in strict accordance with the original design, the reviewed shop drawings, and codes and regulations.
- C. In the event of discrepancy, immediately notify the District. Do not proceed with fabrication or installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 FABRICATION

- A. Form to accurate sizes and shapes, with true lines and angles. Punch and shear to leave clean surfaces. Weld or rivet permanent connections as detailed or noted and in conformance with best trade practice, grind exposed welds and edges smooth. Do not use screws or bolts where they can be avoided. When used, countersink heads and draw up tight; nick threads to prevent loosening. Provide holes and connections required for work of other trades.
- B. Detail joints and fastenings for ample strength and stiffness; conceal wherever possible. Where exposed at exterior, form joints for weather resistance.
- C. Welding of other metals shall conform to applicable American Welding Society standards and best trade practices.
- D. Shop Treatment: After fabrication, remove rust scale, grease and oil by wire brushing and chemical cleaning. Touch up galvanized metal surfaces damaged in fabrication with "Galv-weld", "Galvicon", or approved.

3.3 INSTALLATION

- A. Coordinate installation schedule with the schedules other trades to ensure orderly and timely progress of the total work.
- B. Erect and install all framing and miscellaneous metal items in strict accordance with the Drawings, the reviewed shop drawings, and the referenced standards, aligning straight, plumb, and level within a tolerance of 1 in 200. Provide blocking wherever required for proper installation of other items.
- C. Install expansion bolts, HS bolts, and other manufactured items in strict accordance with manufacturer's printed instructions and recommendations (including minimum embedment of expansion bolts).
- D. After the erection and installation are complete, touch up all shop priming coats damaged during transportation and erection, using the priming paint specified for shop priming.

END OF SECTION 05 50 00

DIVISION 06 – WOODS, PLASTICS, and COMPOSITES

SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 – GENERAL

1.1 QUALITY ASSURANCE

- A. Grading Rules: Conform with all applicable requirements of the Western Wood Product's Association's "Western Lumber Grading Rules", latest edition, and as specifically required hereinafter.
 - 1. Each piece of lumber or plywood used for structural framing shall be graded and marked with grade and trademark of WWPA, except that a certificate of grade from grading organization may be accepted in lieu of grade and trademarks when approved by District. Trademark of manufacturer shall also appear on each piece.
- B. Moisture Content: Maximum moisture content shall be 19 percent.
- C. Plywood Grades: Conform to American Plywood Association (APA) standard grades and specifications.
- D. Glued Laminated Members shall be manufactured/fabricated (in a AITC member fabrication plant) in accordance with ANCI/AITC A190.1-1983 and conform to all requirements and recommendations of WWPA and the American Institute of Timber Construction.
 - 1. Each member shall bear the AITC inspection stamp and combination/stress grade, or submit manufacturer's certification that glu-lam members meet these standards and specified combination/stress grade prior to incorporation of members into the Work.
- E. Engineered Lumber shall bear a stamp or stamps noting the name and plant number of the manufacturer, the grade, the NER or ICC-ES report number, and the quality control agency. All members shall be manufactured with an approved adhesive.
- F. Additional Reference Standards: Conform with all requirements of U.S. Department of Commerce Commercial Standards and American Wood Preservers Association Standards, as they apply.

1.2 DELIVERY, STORAGE and HANDLING

- A. Deliver and store lumber on sills and cover for protection.

1.3 COORDINATION

- A. Coordinate work with other trades (electrical, mechanical, plumbing, etc.) and do all cutting and patching required to accommodate their work, unless otherwise specified. Protect adjacent work as required.

1.4 MEASUREMENTS

- A. Verify all dimensions shown on Drawings by taking field measurements; proper fit and attachment of all parts is required. Before commencing work, check all lines and levels indicated and such other work as has been completed. Should there be any discrepancies, immediately report in writing to District. In event of failure to do so, be responsible for correction of any errors.

PART 2 – PRODUCT

2.1 MATERIALS

- A. Reference Drawings for information regarding Structural Framing Members. The most stringent shall govern materials used on this project.
- B. Framing lumber shall be kiln dried or MC 19 Douglas Fir or Hem-Fir graded in accordance with W.C.L.B. Grading Rules for West Coast Lumber No. 17 and grade marked by WWPA.
 - 1. All framing lumber shall be stress grade. All sides shall be surfaced. Grades shall be as follows:
 - a. Plates, Trimmers, Stringers, Misc.: Douglas Fir/Larch No. 2, S-Dry.
 - b. Blocking (Non-Structural): Douglas Fir/Larch No. 3 and better, S-Dry.
 - c. Prefabricated Wood Trusses: Shall be factory manufactured trusses of dimension and configuration required, 2 x 4 and 2 x 6 members (as detailed), Manufacturer engineered in conformance with building code, HUD Handbook 4950.2, "Design Criteria for Trussed Rafters", and loads as indicated on Drawings. Truss manufacturer shall provide all accessory items such as blocking, bridging, etc. required for a complete, engineered, roof framing system.
 - d. Glu-Lam Beams: Laminated Douglas Fir/Larch combination 24F-V8 DF/DF, no camber required. Exterior glue only for beams, any portion of which is exposed to the exterior.
 - e. Plywood Roof Sheathing: Shall be APA, Group 1, C-D Ext, Exposure 1. Thickness as noted on Drawings.
 - 1) Panel clips at unsupported edges.
 - f. Plywood Soffit Board: Shall be APA, Group 1, A-B Ext, Exposure 1. Thickness as noted on Drawings.
 - g. Oriented Strand Board (OSB) Wall Sheathing: Shall be APA, Group 1, Exposure 1. Thickness as noted on Drawings.
 - h. Felt Underlay (Building Paper): 30 lb. asphalt impregnated paper felt; product of Nationally Recognized Manufacturer. Minimum grade of roofing felt shall be ASTM D-226-89 Type II.
 - i. Gable Vents: Provide galvanized sheet metal, painted on site to match roofing, louvered and mesh screened attic vents, sized as detailed on Drawings.
 - j. Connection Hardware: Pre-manufactured anchors, hangars, and connectors as manufactured by Simpson Strong-tie or equal.
 - 1) Provide all connecting hardware shown or noted on Drawings, specified herein and as required to complete work.
 - 2) All hardware shall conform to the requirements of the IBC and be capable of supporting applied loads.
 - k. Nails: Unless otherwise noted, common wire nails, galvanized if exposed to exterior, meeting Federal Specification FF-N-101, of the types and sizes required by IBC.-II-B1.

- I. Screws: Standard domestic manufacture, bright steel, except galvanized for exterior use and of brass, bronze, aluminum or stainless steel when used to attach items made of those materials.
 - 1) Types, head configurations and sizes as noted on Drawings.
- m. Bolts: Standard mild steel, square or hex head lag bolts with companion nuts and steel plate washers, or carriage bolts with companion nuts and cut washers where so indicated. Bolts, nuts and washers, wholly or partially exposed on exterior shall be galvanized.
- n. Powder Actuated Fasteners: Federal Specification GGG-D-777a, install as per manufacturer's printed directions. Charge shall be powerful enough to prevent spalling of concrete.
- o. Miscellaneous Clips, Steel Assemblies: Conforming to ASTM A36.

PART 3 – EXECUTION

3.1 WORKMANSHIP

- A. All rough carpentry shall produce joints true, tight, and well nailed with all members assembled in accordance with the Drawings and with all pertinent codes and regulations.
 1. Carefully select all members; select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing or making proper connections. Cut out and discard all defects which will render a piece unable to serve its intended function; lumber may be rejected by the District, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.
 2. Do not shim sills, joists, short studs, trimmers, headers, lintels, or other framing components without receiving prior approval from the District.

3.2 INSTALLATION

- A. Nailing: Use only common wire nails or spikes of the type and dimension, and spacing, required by IBC Table 2304.9.1, except where otherwise specifically noted in the Drawings. For conditions not covered in the IBC, provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike; provided, however, that 16d nails may be used to connect two pieces of two inch (nominal) thickness. Do all nailing without splitting wood, preboring as required; replace all split members.
- B. Plywood (Diaphragm) Nailing: Nail spacing shall conform to IBC Table 2304.9.1 and additionally to notations and schedules on Drawings.
- C. Bolts: Drill bolt holes 1/32" larger than bolt diameter. Use square plate or large washers under heads and nut where they bear against wood. Retighten bolts immediately prior to final inspection.
- D. Lag Screws and Screws: Subdrill, use square plate or large washers under lag screw heads when they bear on wood.

- E. Typical Framing: Standard 16" o.c. Western (Platform) Framing, except as otherwise shown or noted on Drawings. Conform to IBC minimum requirements for headers, structural blocking, bridging, etc., and any more stringent requirements shown on the Drawings.
1. Provide solid bearing to concrete masonry walls below all beam and header bearing points.
 2. In addition to all framing operations normal to the fabrication and erection indicated on the Drawings, install all backing required for the work of other trades.
 3. Set all horizontal or sloped members with crown up. Do not notch, bore, or cut members for pipes, ducts, conduits, or other reasons except as shown on the Drawings or as specifically approved in advance by the District.
 4. Make all bearings full, unless otherwise indicated on the Drawings. Finish all bearing surfaces on which structural members are to rest so as to give sure and even support; where framing members slope, cut or notch the ends as required to give uniform bearing surface.
 5. Erection, anchorage and bridging of roof truss framing system to be per truss manufacturer's standards and engineering design.
- F. Nailers and nailing strips shall be provided as necessary for the attachment of finish materials. Nailers used in conjunction with roof deck installation shall be installed flush with the roof deck system. Stacked nailers shall be assembled with spikes or nails spaced not more than 18 inches on center and staggered. Beginning and ending nails shall not be more than 6 inches from nailer end. Ends of stacked nailers shall be offset approximately 12 inches in long runs and alternated at corners. Anchors shall extend through the entire thickness of the nailer. Strips shall be run in lengths as long as practicable, butt jointed, cut into wood framing members when necessary, and rigidly secured in place.
- G. Sheathing: Install sheathing panels with long dimension running across (normal to) direction of supporting members. Provide support of all panel edges by means of "ply clips". Blocking, T & G joints, or other approved means per APA recommendations may be used in lieu of clips. Nailing as specified hereinbefore.
1. Unless otherwise indicated, blocking shall be 2" (nominal) thickness and of ample width and length to accommodate possible variations in item location.
- H. Accessory Items: Install accessory items, where occurring, in strict accordance with best trade practice, per manufacturer's instructions when applicable, and as detailed or noted on the Drawings.

3.3 TERMITE CONTROL and DECAY PREVENTION

- A. Remove all wood, including form lumber, scrap lumber, shavings and sawdust in contact with ground. Leave no wood buried in any fill or backfill.
- B. All wood (e.g., sillplates and ledgers) in direct contact with concrete or masonry shall be pressure treated with approved preservative in oil in accordance with AWPA U1, Commodity Specifications A or F) for above ground use.
- C. Ends of joists, blocking, etc., in direct contact with concrete or masonry shall be treated after cutting by soaking ends, for minimum length of 12", in 5% solution of pentachlorophenol for not less than 15 minutes.

3.4 CLEAN UP

1. Keep the premises in a neat, safe, and orderly condition at all times during execution of this portion of the work, in accordance with requirements of General Conditions and Division 01.
2. At the end of each working day, or more often if necessary, thoroughly sweep all surfaces where refuse from this portion of the work has settled. Remove the refuse to the area of the job site set aside for its storage. Upon completion of this portion of the work, thoroughly broom clean all surfaces.

END OF SECTION 06 10 00

DIVISION 07 – THERMAL and MOISTURE PROTECTION

SECTION 07 11 00 – DAMPPROOFING

PART 1 – GENERAL

1.1 SCOPE OF APPLICATION

- A. Apply to all below grade exterior earth faces of concrete footings, foundations, walls, etc., unless specifically indicated not to receive dampproofing.

1.2 COORDINATION

- A. Coordinate work under this Section closely with work of all adjacent trades. Whenever the watertightness of the dampproofing is dependent on other trades, assume full responsibility for watertightness of the finished installation.

1.3 WARRANTY

- A. Submit the following in accordance with 01 30 00 no less than 30 days prior to Work on-site:
 - 1. Submit a written warranty stating that all liquid dampproofing is unconditionally warranted to be watertight for a period of 2 years.
 - 2. Product Data.

1.4 DELIVERY, HANDLING and STORAGE

- A. Deliver materials to job site in manufacturer's original, unopened packaging and adequately protect against damage while temporarily stored at site.
- B. Use all means necessary to protect the installed work of this Section.
- C. In the event of damage, immediately make all repairs and replacements necessary to the approval of the District and at no additional cost to the District.

PART 2 – PRODUCT

2.1 MATERIALS

- A. Materials designated for a specific application shall be the products of one manufacturer.
- B. Liquid Dampproofing: "MasterSeal 614" by BASF, or approved, below grade exterior dampproofing for trowel application and "MasterSeal 610" spray applied primer coat.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Surface Condition: Examine all subsurfaces and verify that they are in proper condition to receive work of this Section. Do not proceed until improper conditions are corrected. Surface must be clean and free of foreign matter. All cracks, voids, honeycombs, etc., shall be filled and repaired with mortar to provide a sound structural surface and to allow dampproofing to properly bridge joints.
- B. Application: Do work only in dry weather and apply in strict accordance with manufacturer's written specifications and instructions.
1. Not less than 2 coat (plus prime) application. Allow first coat to dry to "tacky" state (24 hours) before applying second.
 2. Prior to applying full strength (trowel) coat, prime surface by spraying thoroughly with a liquid of specified dampproofing primer cut a maximum of 20% (50%) with clean water (gasoline or solvent).
 3. Use dampproofing as it comes from container. Apply by troweling on a continuous unbroken film, free from pin holes or other surface breaks. Minimum coverage per coat: 8 gals/100 sf.

END OF SECTION 07 11 00

DIVISION 07 – THERMAL and MOISTURE PROTECION

SECTION 07 20 00 – INSULATION

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Provide and install all thermal insulation indicated on Drawings or required herein, except insulation for mechanical work specified in DIVISIONS 22 and 23.

1.2 LABELS

- A. Manufacturer's labels required on each piece or package of insulation. Do not remove labels or open packages until District inspects and approves. Clearly identify contents, brand name, applicable standard, and R-value.

1.3 DELIVERY, HANDLING and STORAGE

- A. Delivery materials to Project site in manufacturer's original packaging. Store materials off the ground. Protect against weather, condensation, and damage.

1.4 SUBMITTALS

- A. Submit manufacturer's data and samples no less than 30 days prior to Work on-site.

PART 2 – PRODUCT

2.1 MATERIALS

A. Type 1 Insulation:

- 1. R-10 Perimeter Insulation (concealed/below grade): Dow Chemical 'Styrofoam-Square Edge', 2" thick unless otherwise noted.

B. Type 2 Insulation:

- 1. R-38 Flexible Blanket Insulation (Attic): Manville, Certainteed, or Owens-Corning Fiberglass, un-faced, with flame spread rating not over 25.

C. Type 3 Insulation:

- 1. Foamed in place: Dow Chemical sprayed polyurethane foam insulation or equal.

2.2 SCOPE OF APPLICATION

- A. Blanket Insulation: Install unfaced insulation full height in exterior frame walls, soffits where noted, and foil face insulation at vertical surfaces in attics above wall lines.

- B. Perimeter Insulation: At entire perimeter of building, from slab as detailed, to top of footing or to at least 24" below finished grade.

- C. Rigid Roof Insulation: Above roof sheathing on all roof and canopy/overhang areas.

- D. Foamed in place insulation: At all ungrouted cavities in exterior walls and all walls between restroom and janitor/utility space.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. In accordance with manufacturer's directions for the specific application with recommended adhesives or fastening devices. Fit insulation together snugly. Maintain integrity of insulation over entire area or warm space side.
- B. Install flexible blanket insulation with ends and edges tight, supported by friction until such time vapor barrier can be installed.
- C. Install with foil faced insulation with facing on attic/room side. Pin insulation to vertical components of gable end trusses and other framing members, tape all penetrations of fasteners and seams of insulation and tape edges at sheathing and other framing members/penetrations for a fully sealed vapor barrier.
- D. Install insulation to attain maximum R-value possible for finished assembly.

3.2 CLEAN UP

- A. Remove and dispose of excess materials, litter and debris, leaving work areas and site in a clean condition.

END OF SECTION 07 20 00

DIVISION 07 – THERMAL and MOISTURE PROTECTION

SECTION 07 60 00 – PREFORMED METAL ROOFING

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide all preformed metal roofing attachments, spacers, blocking, closure strips, coping, cap flashing, flashing collars, caulking, clips, cants, etc., as required by the manufacturer, as shown on the Drawings, and as specified herein. The Preformed Metal Roofing installation shall be a complete and watertight assembly in all respects.

1.2 STANDARDS

- A. In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations contained in "Architectural Sheet Metal Manual", latest edition, of the Sheet Metal and Air Conditioning Contractors' National Association, Inc., (SMACNA), and recommended details and procedures of the National Roofing Contractors' Association (NRCA), insofar as they are applicable.

1.3 SUBMITTALS

- A. Submit the following in accordance with 01 30 00 no less than 30 days prior to Work on-site:
 - 1. List and samples of materials to be used, identifying manufacturers and any suggested detail revisions. Incorporate any required detail revisions, as approved by the District, in the Project at no additional cost to the District.
 - 2. Roof color guide and actual color samples.
 - 3. Submit complete shop drawings of all flashing and sheet metal proposed to be furnished and installed to the District for his review. Allow ample time for revision and resubmittal as may be necessary.
 - 4. Product warranties.

1.4 WARRANTIES

- A. The Contractor shall unconditionally warrant in writing the watertightness of all roofing related work for a period of two years from date of acceptance of the Work by the District.
- B. In addition, provide the manufacturer's standard twenty (20) year warranty against cracking, peeling and fading (not to exceed 5 N.B.S. units) for metal roofing finish.

1.5 QUALITY ASSURANCE

- A. Standards and Workmanship: All work shall be done by a preformed metal roofing contractor approved by the manufacturer and the District. All work shall be installed in strict accordance with roofing materials manufacturers' directions and recommendations, highest standards of trade practice and all applicable codes and regulations.

- B. Coordination: Coordinate work of this Section closely with framing, plumbing vents, exhaust ducts and any other adjacent trades so as to ensure a complete and watertight assembly in all respects.
- C. Pre-Application Requirements: Review preformed metal roofing detail drawings and specifications with metal roofing manufacturer to verify that materials are properly used.

1.6 DELIVERY, HANDLING and STORAGE

- A. Deliver materials to job site in manufacturer's original protective wrapping. Fully protect against wetness, exposure to sun's rays and other damage while temporarily stored. All materials designated for a specific application shall be the products of one manufacturer.

1.7 JOB CONDITIONS

- A. Verify all dimensions shown on Drawings by taking field measurements; proper fit and attachment of all parts is required.
- B. Construction Traffic: Protect roofing materials and take precautions to prevent damage of new, preformed metal roof surfaces during and after construction. Repair any damaged materials immediately at no additional cost to District.

PART 2 – PRODUCT

2.1 GENERAL

- A. Except as otherwise indicated or approved, all components of the preformed metal roof shall be the products of the same manufacturer and shall meet the minimum standards of applicable ASTM Standards and/or Federal Specifications.

2.2 MATERIALS

- A. Metal Roofing: Metal Sales Maxi-Batten. See Instructions to Bidders for “Or Equal” determination.
 1. Roofing system shall have an Underwriter’s Laboratory Class 90 wind uplift performance rating when tested by UL580.
 2. Fastening clips shall be UL90 rated, formed from 21-gauge steel, coated with protective zincalume coating.
 3. Finish: Fluorocarbon (PVDF) Finish, color to be selected by Owner.
 4. Provide full length panels.
 5. All metal flashing and trim, required for a watertight installation and as required by the drawings shall be provided from the same manufacturer as the panels and in the same color.
 6. All rivets shall be color matched.
- B. Synthetic Sheet Flashings: Gates "Contourflash", "Nervastral", or approved elastomeric flashing sheet material of specific type and thickness recommended by manufacturer for particular application.

- C. Underlayments and Ice Shield: See Sections 06 10 00.
- D. Pre-Fabricated Pipe Flashing Collars: "Oatey", Buildex "Dektite", or approved, monolithic EPDM elastomeric collar units.
- E. Miscellaneous: Furnish any required caulking, nails, clips, cants, etc., required for a proper completion of installation whether shown or called for, or as required by the manufacturer for his application as directed. Rivets, clips, straps, etc. exposed in roof, flashing, soffits, gutters, downspouts, etc. shall be color matched.

PART 3 – EXECUTION

3.1 FABRICATION

- A. Fabrication: Shop fabricate all custom shapes and components as required by Drawings and actual job conditions. Fabricate all components for expansion type concealed clip attachment.

3.2 INSTALLATION

- A. Prior to commencing preformed metal roofing operations, roof sheathing deck shall be smooth and sound with nailers, curbs and cants, fascia blocking, etc., in place and complete. All items required by other sections for building into roofing shall be on hand and ready to install.
- B. Remove all extraneous materials from roof deck; sweep clean and free of all objects which may puncture underlayment. The only materials allowed on the roof deck to be roofing materials in process of application and roofers' appliances and tools. Deck shall be dry, with no visible moisture or frost present.
- C. Entire roof area must be covered with a ice shield, lapped horizontally starting at the eave. Lap all edges a minimum of 6". Underlayment and insulation shall be installed directly ahead of roofing metal installation to alleviate wind damage and loose fitting portions of underlayment.
- D. Roofing Application: Apply preformed metal roofing assembly in strict accordance with manufacturers' printed directions and recommendations, and as detailed on the Drawings. Maximum spacing of main attachment clips shall be 24" o.c.
- E. All attachments shall be concealed type allowing for movement of expansion and contractions of all components over 24" in any dimension without buckling or loosening. All joints shall be interlocked with no surface or exposed fastenings.
- F. Furnish and install all required miscellaneous flashing collars around mechanical penetrations, trims, flashing, clips, channels, and other accessory items required for proper completion of work under this Section.

3.3 CLEANING

- A. Remove all excess materials and debris from site. Touch up damaged painted areas with manufacturer approved touch-up paint.

END OF SECTION 07 60 00

DIVISION 07 – THERMAL and MOISTURE PROTECTION

SECTION 07 92 00 – CAULKING and SEALANTS

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide all caulking and sealing work as shown on the Drawings or required for a reasonably air tight and totally moisture tight building. Certain types and applications of caulking, related to specific trade applications may be specified elsewhere, and take precedence over this Section for the work of the Section wherein they appear.

1.2 WARRANTY

- A. Provide a written guarantee warranting caulking to be free of all defects in materials and workmanship for a period of 5 years from date of acceptance of building. Leakage, hardening, staining, separation, crumbling, running, melting will be considered defects; replace all defective caulking at no cost to the District.

1.3 SUBMITTALS

- A. Submit manufacturers' published literature, including instructions for application, for specified products and accessories as applicable, including manufacturers' specifications, physical characteristics and performance data.

1.4 QUALITY ASSURANCE

- A. Installation of caulking shall be performed only by workmen thoroughly skilled and specially trained in the techniques of caulking, and who are completely familiar with the published recommendations of the manufacturer of the caulking material being used.

1.5 DELIVERY, HANDLING AND STORAGE

- A. Deliver caulking and sealant materials to site in manufacturers' original sealed containers.
- B. Store all caulking materials and equipment under conditions recommended by its manufacturer. Do not use materials stored for a period of time exceeding the maximum recommended shelf-life of the material.
- C. Use all means necessary to protect caulking materials before, during and after installation and to protect the installed work and materials of all other trades. In the event of damage, immediately make all repairs and replacements necessary to the approval of the District.

PART 2 – PRODUCT

2.1 CAULKING AND SEALANT

- A. All caulking and sealant materials, unless otherwise specifically approved by the District, shall be a single component, high performance, primerless, non-sagging type. Color approved by the District where exposed to view.

1. Sealant - General Use, Interior and Exterior: Silicone based building sealant, GE 'Silpruf', Master Seal "DegaSeal 100", Dow Corning 795, Tremco 'Spectrum 2', Rhodorsil 5C, or as approved by District. Color to be selected from manufacturer's standards.
2. Sealant-Toilet Rooms/Showers: GE 'Sanitary 1700', Dow Corning 786 or approved equal, mildew resistant silicone based sealant.
3. Back-Up Material: Foamed polyethylene or polystyrene rod stock, sizes as required by joint conditions, "Ethaform SB", PRC "Minicel", or approved.
4. Butyl Tape: Extruded polyisobutylene tape CL-50 as manufactured by Chemical Sealing Corp. "Cushion-Lock".
5. Horizontal Joint Sealant: See Section 03 30 00.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Examine subsurfaces and verify that they are in proper condition before commencing work of this Section. Do not proceed until improper conditions are corrected.
- B. Preparation:
 1. Clean and prepare surfaces to which sealant is to be applied, per manufacturers' recommendations.
 2. All surfaces shall be dry and free from loose materials.
 3. Prime surfaces if recommended by manufacturer.
- C. Required Application (General Use): Where identified as "Sealant", "caulk", or "calk" on Drawings, provide complete sealing system, including back-up as follows:
 1. Where more than 1/2" deep, install back-up rod compressed a minimum of 30% to within 1/4" of surface.
 2. Where 1/2" deep or less, apply tape to bottom of joint to prevent adhesion of sealant.
- D. Other locations of application include, but are not limited to the following:
 1. Apply a bead of approved silicone sealant at all window area connections.
 2. Apply bead of approved sealant at top of all plastic laminate countertops at wall to provide a continuous seal.
 3. Apply bead of approved sealant around connection of accessories at wall, such as grab bars, towel bars, paper dispensers, soap dishes, etc., provided on or within walls to protect structural elements from moisture.
 4. Apply a bead of approved sealant at connection of plumbing fixtures to wall surface, such as wall hung lavatories, urinals, etc.
 5. Apply a continuous bead of approved sealant at vinyl or concrete flooring to base of floor sink, floor mounted water closets, and/or tub/shower unit.
 6. Apply a full bead of approved sealant behind reinforced fiberglass panels at joint of floor to wall board. Color: white.

7. Apply a full bead of approved sealant between all interior walls and casework, doorways, and relite frames. Color as selected.
8. Apply a full bead of approved silicone sealant along with required backer rod at all penetrations of the exterior wall for miscellaneous items such as utility piping, set any exterior electrical boxes, bolts, signage connections, etc. in approved sealant for watertight application. Color shall match color of exterior wall finishes.

3.2 APPLICATION

- A. Apply materials in strict accordance with manufacturer's printed directions; observe manufacturer's requirements regarding temperature control, useability of materials and protection of adjacent surfaces.
- B. Make sealing surface slightly concave, free of wrinkles and skips, uniformly smooth and with perfect adhesion along both sides of joint.
- C. Protect adjacent surfaces from excess material; leave joints in a clean, neat condition.
- D. Defective joints shall be removed, cleaned and replaced at no additional cost to the District.

3.3 PROTECTION

- A. Protect all finished joints for at least 24 hours.
- B. Protect from dust, moisture, and other harmful substances during installation.
- C. Do not allow silicone sealants to touch glass surfaces; all glass touched by silicone shall be replaced with clean glass.

3.4 CLEANING

- A. Clean adjacent surfaces free of sealant and caulking compound or soiling; clean as work progresses.
- B. Use solvent or cleaning agent as recommended by manufacturer of sealant or caulking compound.
- C. Do not scratch or otherwise damage visible surfaces.

END OF SECTION 07 92 00

DIVISION 08 – OPENINGS

SECTION 08 11 00 – STEEL DOORS and FRAMES

PART 1 – GENERAL

1.1 STANDARDS

- A. In addition to complying with all pertinent codes and regulations conform to latest edition of "Recommended Specifications, Standard Steel Doors and Frames, SDI 100", published by Steel Door Institute, Keith Building, Cleveland, Ohio 44115, as District judges them applicable and as modified herein.
- B. Manufacture all labeled doors in strict accordance with the specifications and procedures of Underwriters' Laboratories, Inc., Warnock Hersey, or Factory Mutual.
- C. In certifications and shop drawings, comply with nomenclature established in American National Standards Institute publication A123.1, "Nomenclature for Steel Doors and Steel Door Frames".
- D. In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards or these Specifications, the provisions of the more stringent shall govern.

1.2 SUBMITTALS

- A. Submit the following in accordance with 01 30 00 no less than 30 days prior to Work on-site:
 1. Shop drawings of all metal doors and frames showing dimensions, cut-outs, reinforcements, joints and welds to the District for review.
 2. Manufacturers' technical data including certification of conformance with this specification.

1.3 QUALITY ASSURANCE

- A. For installation of metal doors and frames, and installation of finish hardware, specified elsewhere, on metal doors and frames, use only personnel who are thoroughly trained and experienced in the skills required and who are completely familiar with the manufacturers' recommended methods of installation as well as the requirements of this work.

1.4 DELIVERY, HANDLING and STORAGE

- A. Deliver, store and handle all metal doors and frames in a manner to prevent damage and deterioration.
- B. Provide packaging such as cardboard or other containers, separators, banding, spreaders, and paper wrappings as required to completely protect all metal doors and frames during transportation and storage.
- C. Store doors upright, in a protected dry area, at least 1" off the ground and with at least 1/4" air space between individual pieces; protect all prefinished and hardware surfaces as required.

- D. Use all means necessary to protect the installed work and materials of all other trades.
- E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the District and at no additional cost to the District.

PART 2 – PRODUCT

2.1 GENERAL

- A. All metal doors and frames specified herein shall be provided by one manufacturer.
- B. Doors at fire rated openings shall be UL or NBFU certified and labeled, for minimum protection as shown on door schedule. If minimum required protection cannot be provided with openings as may be indicated, provide next higher protection (labeling) which does have required testing, approved and certified label.

2.2 MANUFACTURERS

- A. Design is based on products as manufactured by Steelcraft. Equivalent products by Curries, Ceco, or S.W. Fleming (with approved primer coat), acceptable without prior approval. Other manufacturers' products must be approved in accordance with the Instructions to Bidders.

2.3 METAL DOORS

- A. Doors shall be made of cold-rolled steel, gauge per construction type. Doors shall be reinforced, stiffened, sound deadened and insulated with the scheduled type core completely filling the inside of the doors and laminated to both inside faces of the panels.
- B. Doors shall have continuous vertical mechanical interlocking joints at lock and hinge edges with visible edge seams filled with epoxy.
- C. Doors shall have beveled (1/8" in 2") lock edges.
- D. Hinge reinforcing shall be 8-gauge for 1-3/4" doors.
- E. Lock reinforcing shall be 16-gauge and closer reinforcing 12-gauge.
- F. Adequate reinforcing shall be provided for other hardware as described in Section 08700, Hardware. All doors shall be bonderized and finished as standard with one coat of baked-on rust inhibiting prime paint capable of passing a 500-hour salt spray and 1000-hour humidity test, in accordance with Federal Standard 141 of ASTM Specification B117, as certified by an independent laboratory.
- G. Factory lites in doors with standard stop and snap-in aluminum trim to sizes as indicated in the door schedule on the Drawings. UL rated doors to have steel trim.
- H. Furnish all exterior doors, with snap-in vinyl top cap.
- I. Glazing: Per Section 08 80 00 for glass types and per IBC for safety glass in doors.

J. DOOR CONSTRUCTION TYPES

- 1. Type 1: Steelcraft L-16, insulated, R = 7.7 polystyrene core with all edge seams filled with epoxy. Full flush door of cold rolled steel.

2.4 HOLLOW METAL FRAMES

- A. Frames shall be preformed of 16 - gauge, cold-rolled steel, 2" faces, in depths as indicated on Drawings and as required to properly fit (the various) wall configurations.
- B. Frames shall be set up and arc welded at reinforced mitered corners (welded unit).
- C. Frames for interior doors shall be supplied with factory installed rubber bumpers; 3 per strike jamb at single doors, and 2 per head for pair of doors.
- D. Frames for 1-3/4" doors shall have 8-gauge steel hinge reinforcing and be prepared for 4-1/2" x 4-1/2" standard weight template hinges unless specified hardware requires otherwise.
- E. Strike reinforcing shall be 16-gauge and prepared for ANSI - 115.1 Universal Strike.
- F. Strike jambs shall have a 16-gauge reinforcing and be prepared for strikes as required for specified hardware.
- G. Metal plaster guards shall be provided for all mortised cutouts.
- H. Reinforcings for surface closers shall be 12-gauge steel. Adequate reinforcing shall be provided for other hardware as described in Section 08 70 00, Hardware.
- I. Grout: Unless otherwise noted on Drawings, installed frames shall be fully grouted with:
 - 1. IBC Type "O" mortar, or "fine" grout per ASTM C270 at all exterior openings and all openings in concrete or masonry walls.
- J. Finishes: Pre-clean and shop prime each door and frame for finish painting, as specified under Section 09 90 00 of these Specifications. Touch up shop prime before starting any finish painting.
- K. All doors and frames shall be bonderized and finished, as standard, with one coat of baked-on, rust inhibiting prime paint, capable of passing a 500-hour salt spray and 1000-hour humidity test, in accordance with Federal Standard 141 or ASTM Specification B117, as certified by an independent laboratory.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Prior to installation of metal doors and frames, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that metal doors and frames may be installed in strict accordance with all pertinent codes and regulations, the original design, approved shop drawings, and manufacturers' recommendations.
- C. In the event of discrepancy, immediately notify the District. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 INSTALLATION

- A. Install all metal doors and frames in strict accordance with all pertinent codes and regulations, the approved shop drawings, and the manufacturers' recommendations, anchoring all components firmly in position for long life under hard use.
- B. **All hollow metal frames shall be fully grouted.** Caulk around metal frames to adjacent wall as required and approved.
- C. Finish Hardware: Install all finish hardware in strict accordance with the manufacturers' recommendations, eliminating all hinge-bound conditions and making all items smoothly operating and firmly anchored into position.

END OF SECTION 08 11 00

DIVISION 08 – OPENINGS

SECTION 08 51 13 – ALUMINUM WINDOWS

PART 1 – GENERAL

1.1 SUBMITTALS

A. Within 30 days of the Notice of Award, submit the following:

1. Manufacturers' published literature, including manufacturers' specifications, physical characteristics and performance data.
2. Samples of specified materials and required finishes. Obtain review comments before start of fabrication.

1.2 WARRANTY

- A. Windows: warrant for one year against defects in material or workmanship under normal use.
- B. Finish: warrant all finish metal work for 2 years.
- C. Insulating glass units: See Section 08 80 00.

1.3 JOB CONDITIONS

- A. Measurements: Verify all dimensions by taking field measurements; proper fit and attachment of all component parts is required.
- B. Coordination: Coordinate work and scheduling of the work of this Section with other trades for coordination of size of reveals, locations of anchorage, etc.

1.4 DELIVERY, HANDLING AND STORAGE

- A. Protect materials from scratches and staining. Store materials in location safe from damage by other trades. Protect material once it is placed from damage from other trades until acceptance by District.

PART 2 – PRODUCT

2.1 MANUFACTURER

1. For purposes of designating type and quality of work of this Section, Drawings and Specifications are based upon products of Marlin Windows, Inc. Whenever substitute products are to be considered, supporting technical literature, samples, drawings and certified performance data must be submitted in order to make a valid comparison of the products involved.
2. Equal products by prior approved manufacturers may be substituted. All approvals prior to bid are subject to shop drawing approval.

2.2 WINDOW FRAMING

- A. Marlin Series 7505, commercial windows conforming to ANSI/AAMA HC65.

1. 2-1/4" depth sections with a minimum wall thickness of .094. Frame and sash members shall have a rigid polyurethane thermal barrier as an integral part of the extrusion which shall eliminate all direct contact between interior and exterior aluminum sections. Glazing stops to be extruded aluminum with a minimum wall thickness of .050.
2. Framing members, transition members, mullions, adapters and mountings shall be extruded of aluminum with alloy and temper consistent with the method of manufacture. All screws, miscellaneous fastening devices and internal components shall be of stainless steel, or plated or corrosion resistant materials of sufficient strength to perform the functions for which they are used. Glass framing members shall provide for flush glazing on all sides with through sight lines, and no projecting stops or face joints. The system shall provide fully resilient settings for glass and panels by use of elastomeric gaskets on both sides of the glass.
3. Finish: All exposed members shall be free of scratches and other noticeable surface blemishes. All aluminum shall be given a caustic etch and anodic oxide treatment to conform to Aluminum Association Standard AA-M21C22A34, satin aluminum, which is an Architectural Class 1 anodic coating with integral color. Permanodic finish shall be obtained on all exposed aluminum sections by buffing and etching followed by an anodic treatment to produce a high density aluminum oxide coating.
 - a. Anodized finish to be dark bronze.

2.3 MATERIALS

- A. Use concealed fastenings throughout.
- B. Provide interior and exterior neoprene glazing beads as required having a minimum of 1/2" grip surface on glass. All glazing shall be flush type. Any individual lite shall be accessible for removal or replacement from the exterior or without removing unit frames, disturbing building structure or any finish surface.
- C. Sections shall be extruded from 6063-T5 aluminum alloy (ASTM B221-54T alloy GS 10A T5).
- D. Anti-Corrosion Isolation Materials: Zinc Chromate Primer or Butyl Rubber Tape, as appropriate to condition(s).

PART 3 – EXECUTION

3.1 FABRICATION

- A. All assemblies shall be secured internally by means of face clips of special form, in such a manner so as to be positively held against accidental disassembly in the event of glass breakage. Face clips shall be such a design so as to provide a non-reversible snap action, and prevent metal-to-metal contact of the face and gutter sections.
- B. Performance: Aluminum framing shall meet or exceed the following performance requirements:
 1. Washington State Energy Code, Class 60.

2. The grid framing system shall not leak when tested in accordance with ASTM #331-68 at a test pressure of 7.5 P.S.F.
 3. When tested in accordance with ASTM E330, the maximum deflection of any member shall not exceed 1/175 of its span and when the load is removed there shall be no evidence of permanent deformation or damage when tested under a load of 20 P.S.F.
 4. Glazing assemblies shall be certified and labeled in accordance with U-factor and solar heat gain coefficient by an independent agency certified by NFRC. Assembly U-values shall meet or exceed the prescriptive values shown on the drawings.
- C. Glazing: See Section 08 80 00.

3.2 INSTALLATION

- A. Items in this Section shall be set in their correct locations as shown in the details and shall be level, square, plumb, and at proper elevations and in alignment with other work by mechanics skilled in this type of work.
- B. Isolate all aluminum components from any steel, or other metals more than 1 place removed from aluminum on the galvanic scale, with specified anti-corrosion material as required and appropriate to the particular condition.
- C. All joints between metal and masonry and between interior or glass framing and mullion members shall be tightly sealed in order to secure a watertight job. All materials shall be carefully screwed in place using backing, masonry plugs, or anchor straps as required. Take care not to distort shape of frame or stress joints. Where moldings are joined, they shall be accurately cut and fitted to result in a tightly closed joint.
- D. After erection, Contractor shall adequately protect exposed portions of the window framing from damage by grinding and polishing machines, plaster, lime, acid, cement or other harmful compounds.

3.3 CLEAN UP

- A. Remove protective materials and clean with plain water, or water with soap or household detergent. Replace materials damaged through use of other cleaning materials under this Contract.
- B. Touch up minor nicks and scratches with matching finish as approved by Architect.
- C. Protection: At completion of installation protect all members against damage by other trades. Mark glass by application of decals. Remove protections and clean as specified above for final inspection and acceptance.

END OF SECTION 08 51 13

DIVISION 08 – OPENINGS

SECTION 08 70 00 – FINISH HARDWARE

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. The extent of finish hardware is shown on the Drawings and in the schedules. Finish hardware is hereby defined to include all items known commercially as builder's hardware as required for swing doors, (sliding doors, etc.) except certain special types of hardware specified in the same section as the door and/or door frame.
- B. Hardware, which is part of the following articles, as well as separate items of hardware listed below, are not included in this Section of the Specifications.
 - 1. Cabinet hardware, fastenings, brackets and other hardware specified to be, (or customarily), furnished with special doors, gates, specialty items, etc.

1.2 SUBMITTALS

- A. Conform to Division 1, and further requirements as follows:
 - 1. The Contractor shall submit required number of copies of a complete hardware schedule, in a vertical format, for the District's approval. Hardware for **each door** shall be separately listed in numerical order. List hardware symbols opposite each item. Schedules prepared in a horizontal coded form will not be accepted.
 - 2. Submittal(s) shall include manufacturers' catalog 'cuts' covering all significant data on all items other than the exact (manufacturers' number) items specified herein. If approved, requested copies will be returned.
 - 3. Corrections or changes in the first submittal must be incorporated promptly and the required number of copies of the revised schedule returned to the District.
 - 4. Hardware schedules are intended for coordination of the work. Review and acceptance by the District does not relieve the Contractor of its responsibility to fulfill the requirements as shown and specified.
 - 5. Include a copy of Schedule showing **exact** final installation in the Operating Instructions and Maintenance Manual for general work.

1.3 QUALITY ASSURANCE

- A. Acceptable Manufacturers and their product numbers are specified herein.
 - 1. The Contractor's supplier(s) shall be by well recognized builders' hardware supplier who has been furnishing hardware in the same area as the Project for a period of not less than 2 years and who has in his employment an experienced hardware consultant who is available at all reasonable times during the course of the Work for Project hardware consultation to the District and Contractor.

1.4 WARRANTY REQUIREMENTS

- A. In addition to requirements of the GENERAL CONDITIONS, also warrant that repair service and replacement parts for all items specified herein, shall be available from local sources. See certain items following for additional specific guarantee requirements.

PART 2 – PRODUCT

2.1 MANUFACTURERS

- A. The numbers shown in the Hardware Groups are taken from the catalogs of the following manufacturers and are for the purpose of establishing quality, design, function and finish. Except as listed, no substitutions will be allowed, except in strict accordance with procedures specified. The District may require that requests for approval of items other than shown be accompanied by physical samples of items proposed for substitution.

<u>Item</u>	<u>Numbers Used</u>	<u>Approved Substitutions</u>
Butts	Hager	Stanley, McKinney, Ives
Locks/Latchsets	Schlage	Corbin, Best
Closers	LCN	Norton, Stanley
Kickplates	Hagar	Builder's Brass, Rockwood
Wall, Floor Stops, Pulls	Hagar	Glynn-Johnson, Rockwood
Silencers	Hagar	Ives, Trimco
Thresholds	Pemko	Zero, Sager, National
Door Seals	Pemko	Zero, Sager, National
Latchguard	Rockwood	Pemko
Cylinders Cores	Schlage	None
Misc. Brackets	Builder's Brass	None

2.2 FINISHES

- A. Unless specifically indicated otherwise, architectural hardware items shall be furnished in the following finishes:
- B. Butts, locks, latchsets, door stops and miscellaneous items: dull chrome (US 26D)
- C. Exit Devices:
- D. Push and Pull Plates: Dull stainless steel (US32D).
- E. Door Closers: Aluminum lacquer.
- F. Plastic Kickplates: Color as selected by the District.

2.3 KEYING FOR BUILDING LOCKS

- A. Any locks installed during the normal period of construction shall be temporary locks, or if permanent, without permanent cylinder cores or keys. All secure doors must be operative for access and exit during construction with construction locks or cores.
- B. At the completion of the Project, State Parks will provide and install the final interchangeable cores at all locks.

2.4 BUTTS

- A. All butts shall have concealed bearings.
- B. Provide non-removable pins (NRP) for all exterior doors and for reverse bevel, interior, lockable doors.

- C. Width of butts shall be as required to clear projecting trim or structural conditions to obtain maximum degree of opening.
- D. Provide: 1-1/2 pair butts for doors from 61" to 90" in height
- E. Provide: One extra butt for every 30" exceeding 90" in height.

2.5 LATCH AND LOCKSETS

- A. Lever Lockset Design: Shall be Schlage 06 (D Rhodes).
- B. Provide all Locks and Deadbolts with wrought box strikes.
- C. In addition to guarantee requirements specified above, locks shall carry a 1 year guarantee of satisfactory performance.

2.6 DOOR CLOSERS

- A. Arms shall permit maximum degree of opening permitted by wall conditions. All closers shall function in conformance with current Federal (HEW) Handicapped Access Requirements; including hold open time and maximum allowable horizontal force required to operate.
- B. Furnish all closers on exterior doors with heavy duty (EDA) arms.
- C. Furnish closers with key valves for speed, latching and back checking adjustments.
- D. In addition to guarantee requirements specified above, provide District with a 5 year performance guarantee, for closers.

2.7 DOOR STOPS AND SILENCERS

- A. Types are listed in hardware schedule.
- B. Provide floor stops of proper type and height to suit door clearance.
- C. Provide toggle bolts or machine screws and tamp-ins as required. Plastic or fiber anchors will not be permitted.
- D. Provide door silencers at all openings not scheduled to receive perimeter weatherstripping or gasketing. Rubber insert type proper for application, as approved.

2.8 HARDWARE GROUPS

GROUP NO.	ITEMS REQUIRED	MANUFACTRER NO.	REMARKS
HW-1	Hinges	AB700-NRP 4 ½ x 4 ½	US 32D
	Deadlock	L463BD (ANSI E06091)	US 32D
	Pull	10L (12")	US 32D
	Push Plate	30S (4 x 16)	US 32D
	Kickplate	194S (door width x 18"h)	US 32D
	Weatherseal	S88D	
	Threshold	158 A	
	Sweep	315_N A	
	Stop	256W	US 26D
	Closer	4111 EDA	Alum
HW-2	Hinges	AB700 4 ½ x 4 ½	US 32D
	Lockset	L9496BD 06 Rhodes	US 32D
	Weatherseal	S88D	
	Threshold	158 A	
	Sweep	315_N A	
	Closer	4111 H-Cush-N-Stop	Alum
HW-2	Hinges	AB700-NRP 4 ½ x 4 ½	US 32D
	Lockset	L9465BD 06 Rhodes	US 32D
	Weatherseal	S88D	
	Threshold	158 A	
	Sweep	315_N A	
	Latch Guard	320CL	US 32D
	Closer	4111 H-Cush-N-Stop	Alum

PART 3 – EXECUTION

3.1 PRODUCT HANDLING

- A. Provide secure lockup for hardware delivered to the Project, but not yet installed. Control the handling and installation of hardware items which are not immediately replaceable so that the completion of the work will not be delayed by hardware losses, both before and after installation.

3.2 COORDINATION

- A. Coordinate Hardware with other Work: Tag each item or package separately, with identification related to the final hardware schedule; include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of the thicknesses, profile, swing, security, and similar requirements indicated, as necessary for proper information in the Contract Documents. Deliver individually packaged hardware items at the times and to the locations (shop or field) for installation by the Contractor.
- B. Templates: Furnish hardware templates to each fabricator of doors, frames, and other work to be factory-prepared for the installation of hardware. Upon request, check the shop drawings of such other work, to confirm that adequate provisions will be made for the proper installation of hardware.
 1. Have templates available not more than 10 days after receipt of approved hardware schedule.

3.3 HARDWARE MOUNTING HEIGHTS

- A. In the absence of a hardware installation requirement in another Section of this Specification, the following recommendations shall be used as a guide:
1. Top Hinge: 5" header rabbet to top of hinge.
 2. Bottom Hinge: 10" finish floor to bottom hinge
 3. Center Hinge: Equal distance between top and bottom hinges
 4. Latch/Locksets: 40" finish floor to center lever (or as required by exit device requirements)
 5. All other hardware shall be installed as recommended by the manufacturers.

3.4 INSTALLATION

- A. Install each hardware item in compliance with the manufacturers' instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, reinstall each item. Do not install surface-mounted items until finishes have been completed.

3.5 ADJUSTMENT AND CLEANING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite type if no other recommended). Replace units which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
- B. All doors, when installed and ready for use, shall function in conformance with current Federal (HEW) Requirements for Handicapped Access; including hold open time and maximum allowable horizontal force required to open. Adjust all hardware as required.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make a final check and adjustment of all hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- D. Instruct District's personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware, or scheduled District's instruction session, per Division 01, as directed.

END OF SECTION 08 70 00

DIVISION 08 – OPENINGS

SECTION 08 80 00 – GLASS and GLAZING

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide Type 1 Glass at all exterior glazed openings. Coordinate with Section 08 51 13 for aluminum framing sections.

1.2 STANDARDS

- A. Comply with all applicable standards of the Flat Glass Jobbers Association's Glazing Manual. Tempered or safety glass, as approved, where required by codes, ordinances or federal regulations and standards.
- B. Each piece of glazing shall bear manufacturer's label certifying type and grade. Do not remove labels until approved by District.

1.3 SUBMITTALS

- A. Within 30 days of Notice of Award, and per Division 1, submit:
 - 1. 6" square samples of each specified glass type. Have each sample bear manufacturers' label, material identification and use destination. All samples shall be banded to prevent sharp edges.

1.4 WARRANTY

- A. Warrant all glass and glazing for a period of 2 years. All insulating glass shall be guaranteed for 10 years against seal failure.

1.5 JOB CONDITIONS

- A. Measurements
 - 1. Verify all glass dimensions by taking field measurements before any glass is shipped to job site.
- B. Coordination
 - 1. Coordinate work with components to be glazed to prevent delay in work.
- C. Inspection
 - 1. Examine all subsurfaces to receive work of this Section and verify that they are in proper condition to commence work of this Section.
- D. Delivery, Handling and Storage
 - 1. Deliver and store materials in protected areas. Protect glass, whether installed or not, against damage; replace broken or defective glass at no cost to District.

PART 2 – PRODUCT

2.1 MANUFACTURER

- A. Pittsburg Plate Glass Co., Libby Owens Ford Glass Co., American Saint Gobain Corporation, Environmental Glass Products, Rohm & Haas, or as approved by District.

2.2 MATERIALS

A. Glazing Types:

1. Type 1: Factory (shop) fabricated 1" insulating units formed from 2 sheets of first quality 1/4" tempered float glass. Provide Low-E coatings and gas filled units as required to conform to the required U-Value and SHGC. Maximum U-Value = 0.30, Maximum SHGC = .35

- a. Fabricate from one sheet of clear glass and one sheet of sight obscuring glass (frosted).

2. Mirrors: See Section 10 28 00.

- B. Setting Blocks: Hard rubber or clear grain softwood.

- C. Sealants: See Section 07 92 00.

- D. Glazing Gaskets: Ball Brothers Co., Industrial Rubber Goods Division, #102-160, or as approved, extruded neoprene; free of porosity, surface defects, dimensional irregularities and conforming to physical properties of ASTM C502.

- E. Glazing Tape: DAP #1202, or as approved.

2.3 FABRICATION

- A. Insulating glass units shall be fabricated in a fully equipped commercial fabrication shop and only by skilled workmen thoroughly familiar with all materials and well experienced in the processes involved.

- B. All glass shall be **machine washed** prior to assembly of insulating units.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Do no glazing in damp or rainy weather.

- B. Have surfaces receiving glass clean, dry and free of foreign matter. Prepare, clean and prime (as required), surfaces to which sealant is to be applied, per sealant manufacturers' recommendations.

- C. Install glass glazing types at locations shown on Drawings and according to glass manufacturers' recommended maximum size limitations and placement of any setting blocks. Make all adjacent glass in same glazed areas consistent in type and thickness, unless otherwise noted, directed, or required by code.

- D. Keep labels indicating manufacturer, quality and thickness on glass until installation has been approved by District. Absence of label constitutes cause for rejection.

3.2 PROTECTION and CLEANING

- A. On completion of work and just prior to job completion date, clean and wash all glass thoroughly. Use no abrasives, implements or methods likely to result in scratched surfaces. Replace any scratched, defective or broken glass caused by improper.

END OF SECTION 08 80 00

DIVISION 09 – FINISHES

SECTION 09 21 16 – GYPSUM WALLBOARD

PART 1 – GENERAL

1.1 STANDARDS

- A. Comply with all applicable requirements of "American Standard Specifications for the Application and Finishing of Gypsum Wallboard", by the American Standards Association, except where more stringent requirements are called for herein, in local codes, or by manufacturer of materials.

1.2 SUBMITTALS

- A. Within 30 days of the Notice of Award prepare and submit successive groups of two identical samples of surface texture(s) as required and directed and obtain District's approval before proceeding with texturing. Samples shall be a minimum of 2-foot square pieces of same type(s) wallboard used in the work, prime sealed and painted as specified. Approved sample(s) shall be retained as criteria for approval of finished work.

1.3 QUALITY ASSURANCE

- A. Employ only qualified journeymen mechanics in this work; apprentices may be employed on the work under the direction of qualified journeymen in accordance with trade regulations.
- B. Conform particularly to code requirements to achieve fire ratings of walls, ceilings, etc., which require joint taping or surfacing of gypsum assemblies, even when finishing is not required for decorative purposes.
- C. Provide temporary coverings and coordinate work, as required so that adjacent surfaces are protected from materials and operations specified in this Section.

1.4 COORDINATION

- A. Work herein requires coordination with trades whose work connects with, is concealed by, or is affected by, gypsum wall and ceiling finishing. Schedule this work to not cover incomplete or uninspected work. Redo work which must be removed due to premature concealment of work of other trades.
- B. Advise all trades of requirements and conditions that their work must meet in order to obtain the best quality of gypsum wallboard finishing.

1.5 JOB CONDITIONS

- A. Ventilation: Do not proceed with joint taping and finishing until the interior is enclosed adequately to control ventilation and circulation in conjunction with temporary heat, to achieve stabilization of framing and proper drying, setting and curing finishing compounds.
- B. Lighting: Do not proceed with the work in any room unless lighting level of 15 candlepower per square foot is available.

PART 2 – PRODUCT

2.1 MATERIALS

- A. “Exterior Gypsum Ceiling Board” USG, or equal products by Gold Bond or Georgia-Pacific, sag-resistant, water-resistant panels at all interior ceilings and soffits.
 - 1. Conform to ASTM C1396.
 - 2. 4' x 8' or 12' sheets, thicknesses as noted on Drawings.
- B. Cement Board: USG Durarock or equal product. Provide assembly with exterior tape and base coat.
- C. Screws: USG, or equal, Type S, of length proper for conditions.
- D. Nails: Cement coated, of lengths as required.
- E. Gypsum Wallboard Accessories: 26-gauge, USG Beadex.
 - 1. “J” Mold – B9J, 5/8” , tape in metal edge protection.
 - 2. Others - As required.
- F. Joint Compound and Tape: Typically, USG's "Dura-Bond" and "Perf-a-Tape" or equal. Fiberglass mesh tape and adhesive at WR board locations.
- G. Gypsum Wallboard Primer: ASM approved PVA product(s).

PART 3 – EXECUTION

3.1 INSPECTION

- A. Inspect surfaces and conditions before starting work and verify they are in proper condition to commence work of this Section. Do not proceed until improper conditions are corrected.

3.2 INSTALLATION

- A. Gypsum Board Installation: Conform strictly to applicable requirements of the Standard Specifications. Screw apply board to metal framing; if option is used, nail board at wood framing. Maximum attachment spacing 12" o.c. Install metal corner reinforcement at all external corners. Install J molding, or trim where called for, at all exposed drywall edges or edges at dissimilar materials
 - 1. Where ceilings abut differing wall materials such as masonry, concrete, wood, etc., install approved metal edge trim with applied vinyl insert or minimum 1/2" self-adhesive weatherstripping. Conceal flange of metal trim reinforcement with at least 2 coats compound.
- B. Gypsum Wallboard Taping and Finishing: Apply embedding or all-purpose compound to dimples at fastener heads, marred spots and joints in gypsum wallboard surfaces that are to receive further painting, coatings, or wallcovering finishes, or that are required to be taped for fire ratings, code requirements or sound control. Center tape over joint and embed in uniform layer of joint compound of sufficient width and depth to provide firm and complete bond. Apply skim coat while embedding tape.
 - 1. Finish joints with a sufficient number of coats of compound, sanded or sponged as required, to achieve a monolithic surface without ridges, protrusions, dents or

other visible imperfections in the surface, ready to receive specified surface finish.

- C. Attachment and Finishing to Trims: Provide trims as specified, detailed and noted on the Drawings and install to best suit the conditions of the work. Trims requiring finishing with joint compound shall be filled and subsequently finished to meet the finish requirements of the gypsum wallboard joints. Trims that are adhesively attached with tape compounds are specifically included in this Section.
 - 1. Conceal flanges of metal reinforcement with at least 2 coats compound. When completed, compound shall extend approximately 8" to 10" on each side of metal nosing.
 - 2. Provide all exposed fastener heads with sufficient coats of joint compound and sand as necessary to completely conceal trim.
- D. Taping not required on gypsum wallboard surfaces that are above ceilings, behind acoustic tile, in concealed spaces, behind rigid surface paneling or on base layers of multi-layer systems, except as required for fire resistance ratings; on draft stops in attic spaces; under ceramic tile on water resistant board or tile backer types of gypsum wallboard; and where tongue and groove edged backer board is installed to achieve fire resistance ratings for the assembly as installed.
- E. Moisture in Dry-Type Compounds: Allow coats of taping and finishing compounds which achieve their bond, strength, and hardness through drying (as opposed to chemical setting), to dry to a maximum of 15% moisture content before subsequent coats or finishes are applied.

3.3 CLEAN UP and PATCHING

- A. Prior to application of surface finishes, clean and repair all surface damage or imperfections caused by the work in this Section. Clean up adjacent surfaces which may be damaged by joint compound splatters, etc. Leave the surfaces ready to receive final surface finishes, as specified hereinafter.

END OF SECTION 09 21 16

DIVISION 09 – FINISHES

SECTION 09 30 00 – TILING

PART 1 – GENERAL

1.1 STANDARDS

- A. Conform with all applicable requirements of ANSI Standard A137.1 (latest edition) and the "Tile Handbook" of the Tile Council of America. Tile shall bear the seal of Tile Council of America, Inc., and be equal to or exceed Standard Code conforming to ANSI A137.1. Provide Master Grade certificates when so required.
- B. All tiles shall be set by expert journeymen tile setters.

1.2 SUBMITTALS

- A. Within 30 days of Notice of Award and in accordance with procedures defined in Division 1, submit complete line of samples of each type of tile specified (and matching soap holders where indicated on the drawings and specified).
- B. Prepare and submit sample panels of each type tile with colored grout, control joint sealant, etc., as may be required for District's approval. Approved sample panel(s) will serve as quality control criteria for finished work.

1.3 COORDINATION

- A. Coordinate with all other trades whose work affects, connects with or is concealed by tile installation. Before proceeding, make certain all required inspections have been made.
- B. Examine all subsurfaces to receive work and verify that they are in proper condition to commence work of this Section. Do not proceed until any improper conditions have been corrected.

1.4 DELIVERY, HANDLING and STORAGE

- A. Deliver all manufactured materials in original, unbroken containers bearing name of manufacturer, brand and grade seals in accordance with ANSI standards. Keep materials dry, clean and protected against deterioration in any form.

PART 2 – PRODUCT

2.1 MATERIALS

A. Tile

- 1. Floor Tile: 2" x 2", porcelain tile. Olympia Tile + Stone, Quebec Series. Color to be selected.
 - 2. Wall Tile: 6" x 6" and 6" x 12" polished porcelain tile. Crossville, Inc. RetroActive Series, with Hydrotect. Color to be selected, including 1 base color and 1 accent colors. Provide with matching cove base trim.
- B. All required tile trim pieces, as indicated on Drawings and required for proper installation, shall be manufactured pieces furnished by the Manufacturer of the various tile types.

- C. Shower Soap Dish: Ceramic/porcelain, molded soap dish, to match wall tile in size and white in color. (1) at each new shower, see drawings.
- D. Mortar Cement Bond Coat: Latex - Portland Cement Mortar meeting the requirements of ANSI A118.4.
- E. Mortar Sand: ASTM C-144.Lime: Hydrated lime, ASTM C-206, Type S or C-207, Type S.
- F. Grout: Polymer modified tile grout conforming to ANSI A188.7, sanded. Color to be selected for each tile type.
- G. Anti-Fracture Membrane: N.A.C. Products, Inc. ECB 36" x 40 mil self bonding modified bitumen fiber sheet membrane, or equal.
- H. Waterproofing Membrane: N.A.C. Products, Inc. Strataflex thin-bed waterproof membrane consisting of a 40 mil, self-adhering, two-component sheet membrane. The reinforced fiber sheet is laminated to a polymer modified elastomeric base sheet which is capable of extra heavy duty service per ASTM C-627. Joints shall be a 2" overlapping self-sealing design to form a watertight seal. Provide with waterproofing accessories as available from the manufacturer and required for a complete and watertight installation.
 - 1. Membrane shall conform to ANSI A118.7.
- I. Joint Sealant: Bostik, Chem-Calk 550 two component, pourable, horizontal grade urethane sealant. Custom color as required to match adjacent grout joints.
- J. Grout Sealer: Bostik, CeramaSeal, Magic Seal water-based penetrating sealer. (Could be used as a tile sealant, non kitchen/oil areas)
- K. Tile and Grout Sealer: Bostik, Cerama Seal, Silox 8, solvent based penetrating sealer. (Use in kitchen, oil areas).
- L. Adhesive: Epoxy conforming to ANSI A118.3.

PART 3 – EXECUTION

3.1 TILE INSTALLATION ASSEMBLIES

- A. Refer to Tile Council Handbook and select each system as noted to fit the construction as stated below, submit for District's review and approval.
 - 1. Interior Slabs on Grade, Showers/Wet Conditions: F122
 - 2. Interior Walls, Frame, Showers/Wet Conditions: W244, omit underlayment at CMU walls. Provide membrane at all shower area walls, and within 4' of chase side wall of shower.

3.2 INSTALLATION

- 1. Basic Installation Specification: ANSI A108.
- 2. Conform to Tile Council of America recommendations for the assemblies specified above.
- 3. Lay out tile work so that where possible no tiles less than half size occur. In any event install no cut tiles above first course up from the bottom or away from first vertical course at internal and external corners. Align all joints, vertically and horizontally.

4. Cut and drill neatly without marring tile. Rub smooth any necessary cuts with a fine stone and set no cut edge against any fixture, cabinet, or other tile without a joint at least 1/16" wide. Cut, fit, adjust and establish tiles neatly and accurately to accommodate accessories, interruptions, chases, returns, mechanical and electrical outlets. Maximum variation shall be 1/8" ± in 10' when a straight edge is laid on the surface in any direction.
5. Maintain straight and uniform joints throughout field of work.
6. Install all required trim pieces as detailed for the various tiles specified.
7. Prepare grout mix in strict accordance with manufacturer's instructions and referenced standards. Tint to color as directed, preparing samples for District's approval as required.
8. Thoroughly wash out joints and saturate with clean water before grouting. Thoroughly grout into all joints to fill entire length and depth.
9. Apply grout flush with face of tiles making a neatly finished, smooth surface. Prevent staining of grouted joints.
10. Apply sealer to horizontal all tile type grout and tile urfaces per manufacturer's recommendations.

3.3 CLEAN UP and PROTECTION

1. Wipe surfaces clean after grouting (and prior to sealing), remove all traces of mortar and grout. Do not use acid solution for cleaning glazed tile.
2. Close spaces to traffic or other work until tile is firmly set, grout cured(, and sealer is dry). Protect from damage until acceptance. Repair all damaged work at no additional cost to District.

END OF SECTION 09 30 00

DIVISION 09 – FINISHES

SECTION 09 91 00 – PAINTING

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Provide all painting and finishing work as specified herein and as noted on the Drawings. ALL surfaces, including existing items, surfaces and galvanized metals, shall be painted or finished as part of this work, unless specifically noted as not to receive a finish.
- B. Certain items may be specified to be shop primed (or finished) in other Sections. Any required priming not so specified elsewhere in this specification shall be provided as a part of the work of this Section.
- C. Surfaces Not to be Painted or Finished:
 - 1. Drywall or plaster permanently concealed from view.
 - 2. Wood (or plastic) structural/framing elements permanently concealed from view.
 - 3. Concrete slabs and curbs.
 - 4. Factory finished paneling, equipment and other devices with an approved factory applied finish, unless specifically noted otherwise in the Specification Finish Schedule or on the Drawings.
 - 5. Finish hardware, except where primed for a paint finish.
 - 6. Plumbing fixtures; toilet room accessories, except as noted otherwise.
 - 7. Lighting fixtures and electrical devices except as noted otherwise.
 - 8. Concealed rough hardware.
 - 9. Glass, plastic, ceramic tiles.
 - 10. Areas noted as "unfinished" or "existing to remain" on Finish Schedules, or "existing finish to remain" on Drawings.
 - 11. Galvanized toilet partition supports and hardware.
- D. All surfaces and items not excluded above shall receive the various paint finishes, as scheduled.

1.2 FURNISHED, BUT NOT INSTALLED

- A. For the District's maintenance purposes for touch up, furnish one properly labeled and sealed quart can of each type of finish coat of each color taken from the batch mix furnished for the work. Deliver to the District's representative before final payment and obtain a signed receipt therefore.

1.3 STANDARD SPECIFICATIONS

- A. Except as otherwise specified, all work of this Section shall conform strictly to the standards for material and workmanship, set forth in the "Architectural Painting Specification Manual" published by the Master Painter Institute as distributed by the Washington State Council of PDCA, P.O. Box 6906, Tacoma, WA 98417, Phone: (509) 460-5880, Fax: (253) 265-3042.

1.4 DEFINITIONS

- A. The term "MPI" refers to Master Painters Institute, and "APSM" refers to Architectural Painting Specification Manual. Refer to various sections for general definitions and to the APSM glossary for technical terms and industry colloquialisms.

1.5 INSPECTIONS AND TESTS

- A. Comply with all requirements of APSM, Chapter 6 - Quality Assurance Programs.
- B. The APSM Inspection and Warranty Program is not a required part of the Work.
- C. Prior to starting any portion of this work, the Contractor shall also examine respective surfaces and verify that they are in proper condition to commence work of this Section. Do not proceed until improper conditions have been corrected.

1.6 APPROVED MANUFACTURERS

- A. ONLY the approved paint products of the paint manufacturers listed in APSM, Chapter 5, under "Product List" may be used unless a specific manufacturer is listed in Finishing Schedule. When substitutes are proposed, use only those substitutes that are approved by MPI and the District in writing.
- B. The District will furnish the Contractor a Paint and Finishing Color Schedule of colors selected either from manufacturers' stock colors as submitted by Contractor or specially requested color mixes. For bidding purposes and unless otherwise specified, refer to the Finish Schedules and paint or finish the following to match adjacent surfaces:
 - 1. Access doors, registers, primer coated butts, primer coated door closers, exposed piping in finished spaces, electric conduit and panels exposed in finished spaces, exposed uncovered ductwork.
- C. Allow in Contract for one uniform color specific to each scheduled paint system, except that ceiling color may be different than wall color.

1.7 SUBMITTALS

- A. No less than 30 days prior to any painting on-site submit samples of all finishes, selections, etc., to the District per Section 01 30 00.
- B. Samples: Prepare with type of paint or finish and application specified on prepared substrate, including species and texturing if specified, to which paint is to be finally applied, minimum samples each not less than 12" x 12" with banded, finished edges, if required. Approval(s) of prepared stain and finish samples shall be based on actual **color** of the sample(s), **not** stain number or formulation. Refer to "Color Uniformity" hereafter. Furnish additional samples as required until colors, finishes and textures are approved. Retain approved samples to be used as the quality standards for final finishes.
- C. Additional Stock: Provide the District with 1 gallon of paint for each finish system and color used on the project after approval of the paint colors and at the time work begins. Paint shall be from the same mix batch as that paint used on the project.

1.8 ENVIRONMENTAL CONDITIONS

- A. Conform to all requirements of APSM unless otherwise specified hereinafter. Disregard of working in accordance with provisions set forth in these following paragraphs may cause warranty to be voided.

- B. Weather Conditions: Do no exterior work on unprotected surfaces if it is raining or moisture from any other source is present, or expected before applied paints can dry or attain proper cure without damage thereto. Allow surfaces wetted by rain or other moisture source to dry and to attain temperatures and conditions specified hereinafter before proceeding with work, or continuation of previously started work.
- C. Temperatures: Do no painting work when temperatures on the surface or of the air in the vicinity of the painting work are below plus 50 degrees F. or below those temperatures recommended by the manufacturer for the material type used. The minimum temperatures for latex finishes to be not less than plus 45 degrees F. for interior work and plus 50 degrees F. for exterior work, unless specifically approved in writing by the District and Paint Inspection Agency. See APSM.
- D. Lighting: Minimum of 15 candle power per square foot on surfaces to be painted or finished.
- E. Ventilation: Provide continuous ventilation as required for various materials used in the spaces scheduled, but not less than recommended by the paint and finish manufacturer for drying.
 - 1. Follow moisture test per APSM.
 - a. 12% for concrete and masonry
 - b. 15% for wood
 - c. 12% for plaster and gypsum board

1.9 PROTECTION

- A. Adequately protect other surfaces from paint and damages caused by this work. Also adequately protect painted areas from damage by others such as painted doors, etc.
- B. Make good any damage caused by failure to provide suitable protection.
- C. Removal of Flammable Rubbish: Place all materials which may constitute a fire hazard in closed metal containers and daily remove from site.
- D. Removal of Hardware and Miscellaneous Items: Coordinate the work so that electrical outlets and switch plates, mechanical diffusers, escutcheons, registers, surface hardware, fittings and fastenings, are removed prior to starting work of this Section and reinstalled upon completion of the work.

PART 2 – PRODUCT

2.1 GENERAL

- A. Provide paint, varnish, stain, enamel, lacquer, fillers, and related products for prime, intermediate and finish coats, of types, brand and manufacture listed in APSM, Chapter 5, latest edition, factory labeled for positive identification, in accordance with Finishing Schedule hereafter.
- B. Materials not specifically noted in APSM such as linseed oil, shellac, thinners or other materials shall be quality not less than required by published Federal or State Specification Standards, and as manufactured by approved firms.

2.2 FINISHING SCHEDULE

A. Exterior Surfaces:

1. Concrete Block Surfaces: Exterior 4.2C, "Premium Grade"; block filler, 2-coats W.B. Light Industrial Coating, gloss level 5.
2. Ferrous Metal (Not Galvanized): Exterior 5.1D, "Premium Grade"; alkyd metal primer and 2-coats alkyd, gloss level 5.
3. Non-Ferrous Metal (Including Galvanized Steel): Exterior 5.3B Alkyd, "Premium Grade"; 3 coats, 1-coat cementitious primer, 2-coats approved exterior alkyd enamel, gloss level 5.
4. Galvanized Sheet Metal: Exterior 5.3H, "Premium Grade"; pretreatment primer, W.B. primer, 2-coats exterior latex, gloss level 5.
5. Wood Trim: Exterior 6.3K, "Premium Grade; oil/alkyd primer, 2-coats latex, gloss level 5.
6. Wood Paneling (Soffits): Exterior 6.4G, "Premium Grade; oil/alkyd primer, 2-coats latex, gloss level 5.
7. **All exterior mechanical grilles and louvers shall be painted whether galvanized or not, unless finished in anodized aluminum, or a pre-selected fluorocarbon finish.**
8. Miscellaneous Surfaces: Any other surfaces not noted "not to receive finish" and/or not specifically scheduled above, shall be finished with an approved APSM system for that particular substrate. Choice of exact approved APSM system of finish shall be at Contractor's option.

B. Interior Surfaces:

1. Concrete Block Surfaces: Interior 4.2G, "Premium Grade"; latex block filler, 2-coats epoxy, gloss level 5.
2. Exposed Ferrous Metal (Latex): Interior 5.1Q "Premium Grade"; rust inhibitive alkyd primer and 2-coats interior latex enamel, gloss level 5. (Primer may be omitted where items, such as door frames, are finished with a factory applied primer.)
3. Exposed Non-Ferrous Metal (Including Galvanized): Interior 5.3A "Premium Grade"; pre-treatment primer, cementitious primer, 2-coats interior latex enamel, gloss level 5.
4. Wood Trim: Interior 6.3U "Premium Grade"; alkyd primer/sealer, 2-coats latex, gloss level 5.
5. Gypsum Wallboard: Interior 9.2A; "Premium Grade"; 1-coat latex primer sealer and 2-coats interior latex, gloss level 4.
6. Miscellaneous Surfaces: Any other surfaces not noted "not to receive finish" and/or not specifically scheduled above, shall be finished with an approved APSM system for that particular substrate. Choice of exact approved APSM system of finish shall be at Contractor's option.

PART 3 – EXECUTION

3.1 PREAPPLICATION PREPARATION

- A. Conditions of Surfaces: Do not proceed until any discovered defects have been corrected and surfaces approved by the District and specifying authority. Conform to APSM, Surface Preparations, as to surface conditions and preparations for each various surface to be painted or finished.
- B. Starting work under this Section implies acceptance of the surface and substrate.

3.2 APPLICATION

- A. Comply with requirements of APSM total program specifically, and as follows:
 - 1. Paint applied to concrete, may be applied by brush, roller or airless spray equipment provided all requirements for adhesion, coverage, film thickness, color, and texture are consistently achieved.
 - 2. Special coatings, sealers, etc., shall be applied only by method(s) specifically recommended by manufacturer.
 - 3. Each succeeding pigmented coat shall be distinguishably lighter than the previous coat. Tint all prime and undercoats to a color similar to, but darker than, finish coat.

3.3 COMPLETION AND CLEAN-UP

- A. On completion of the work, carefully clean all glass, hardware, frames, etc, and remove all misplaced paint and finish spots, spills, splatters, etc., and leave the work neat and clean to the satisfaction of the District. Request final inspection from the Inspection Agency and/or MPI, if any.

END OF SECTION 09 91 00

DIVISION 09 – FINISHES

SECTION 09 97 00 – SPECIAL COATINGS

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide floor sealer at all interior concrete slabs not scheduled to receive other finish material.

1.2 SUBMITTALS

- A. Submit the following in accordance with 01 30 00 ne less than 30 days prior to Work on-site:
 - 1. Complete list of all materials and equipment proposed to be furnished and installed under this portion of the work, giving manufacturers' name, catalog cuts and catalog number for each item where applicable. Accompanying the materials list, furnish copies of the manufacturers' current recommended method of installation for the special coating and sealer materials.
 - 2. Certification from the Contractor/Applicator that:
 - a. Materials conform to the requirements of the Specifications.
 - b. Surfaces to receive special coating and sealer materials are clean and at a moisture content considered to be a "dry state" which will not cause efflorescence on the coating by moisture evaporating.
 - c. Materials were applied in strict accordance with the manufacturers' current recommendations.

1.3 QUALITY ASSURANCE

- A. All materials applied by an experienced applicator must be approved by District and manufacturer of material or his distributor.

1.4 DELIVERY, HANDLING and STORAGE

- A. Deliver materials in original sealed containers, clearly marked with manufacturers' name, brand name, and type of material.
- B. Clearly mark percentage of silicon or acrylic resin on label of each container.
- C. Use all means necessary to protect the liquid water repellent materials from freezing or intrusion or foreign matter, before, during and after application and to protect the installed work and materials of all other trades.
- D. In the event of damage, immediately make all repairs and replacements necessary to the approval of the District and at no additional cost to the District.
- E. Store materials in areas where temperatures are not less than 50 degrees F. or over 85 degrees F., unless otherwise authorized by manufacturer.

1.5 JOB CONDITIONS

- A. Do not proceed with application of materials when ambient temperature is less than 50 degrees F., or when low temperature of 40 degrees F. or less is predicted within a period of 24 hours after application.
- B. Do not apply sealer in wet conditions or within 3 days after surfaces become wet from moisture.
- C. Protect bituminous or asphaltic coatings from overspray. Clean overspray from glass and metal using xylene or mineral spirits; follow with ammonia base window cleaner to remove haze left by solvent.

PART 2 – PRODUCT

2.1 GENERAL

- A. All special coating and sealer materials shall be the product of one manufacturer and shall be either the one upon which the design is based, similar products of approved acceptable manufacturers or as approved in advance by the District.

2.2 MATERIALS

- A. Sealer – Concrete Floors: BASF MasterProtect H 400, 40% concentration, transparent penetrating water repellent liquid or prior approved manufacturer.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Examine all subsurfaces to receive work and verify that they are in proper condition to commence work of this Section. Do not proceed until improper conditions have been corrected.
- B. Provide adequate ventilation. Allow no open flame in or near work area.
- C. Verify that all special coating and sealer materials can be installed in accordance with all pertinent codes and regulations, the original design, and the referenced standards

3.2 PREPARATION

- A. Verify that substrate has cured a minimum of 8 days prior to application of waterproofing, is free of soil, tars, oils, mortar smear, efflorescence and other contamination. Make certain that surface temperature is not less than 40 degrees F., that there is no surface moisture present, and that precipitation is not expected within 4 hours.
- B. Repair and fill all cracks and voids in mortar joints and elsewhere by pressing caulking firmly into crack. Color of caulking shall be selected to closely match color of mortar. Use urethane or polysulfide caulking. Obtain approval of conditions of surface by District and manufacturer or his distributor before start of application.
- C. Remove dirt if necessary by scrubbing and allowing to dry thoroughly.

3.3 INSTALLATION

- A. Use only equipment approved by material manufacturer and perform all work in accordance with manufacturers' printed instructions and recommendations.
- B. Roller apply sealer, Spray application not permitted for finished surfaces.
- C. Unless otherwise directed, clean and seal floors just prior to Substantial Completion.

END OF SECTION 09 97 00

DIVISION 10 – SPECIALTIES

SECTION 10 00 00 – MISCELLANEOUS SPECIALTIES

PART 1 – GENERAL

1.1 SUBMITTALS

- A. No less than 30 days prior to Work on-site, and in accordance with provisions of Division 1, submit:
 - 1. Complete Manufacturers' Information on all items intended for installation under work of this Section.
 - 2. Guarantees, Operating and Maintenance Instructions and parts replacement ordering information as part of O & M Manuals.
 - 3. Shop Drawings: Submit brochures and/or shop drawings of all items showing sizes of members, methods of construction and mounting techniques.
 - 4. Samples: Where specifically stated herein under the particular item of work, submit a minimum of 2 samples.

1.2 DELIVERY, HANDLING and STORAGE

- A. Deliver and store all items in dry, protected areas. Keep free of corrosion or other damage. Replace any damaged items or parts at no cost to District.

1.3 COORDINATION

- A. Coordinate with all trades whose work relates in any way to items specified herein. Ensure that all blocking, backing, access, etc., is provided as work progresses.

1.4 MEASUREMENTS

- A. Verify all dimensions shown on Drawings by taking field measurements; proper fit and attachment of all parts is required.

PART 2 – PRODUCT

2.1 MATERIALS

- A. Fire Extinguishers and Cabinets: Fire extinguishers and cabinets shall be provided in locations shown, ready for service by being charged just prior to date of Substantial Completion or early occupancy. Construction, installation and identification shall meet all codes, regulations and requirements of safety authorities. Mount top of fire extinguisher cabinets at 4'-6" above finish floor or as otherwise indicated on Drawings. All cabinets shall be sized to properly house the extinguisher provided.
 - 1. Fire extinguishers shall be J.L. Industries, Larsen Mfg. Co., Norris Industries, General, or approved. Cosmic 5E, 5 lb. dry chemical type, sized 14-5/8 x 6, enameled steel shell with pressure indicating gauge. UL rated 2A-10BC.
 - 2. Cabinets shall be J.L. Industries', or approved equal, Academy #1025 G10 or #1027 G10, as required for thickness of wall at each location, unless specifically noted for installation without cabinet. Finish as selected by District.

B. Coat Hooks: Knape & Vogt #2038.

C. Benches:

1. Hardwood Top – Locker Room: RSC (Robinson Steel Co.) Hardwood Locker Room Bench Top, 42" x 12" x 1 ¼"
2. Hardwood Top – Restrooms: RSC (Robinson Steel Co.) Hardwood Locker Room Bench Top, 42" x 18" x 1 ¼".
3. Supports – RSC (Robinson Steel Co.) 304 Stainless Steel Pedestal, 2" dia. support with 8 ¼" diam. flange plates welded top and bottom. Overall height is 16 ¼".

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install all items per details on Drawings, manufacturers' printed installation instructions and any additional requirements specified. All wall mounted items shall be securely fastened to solid backing or blocking.
- B. Provide all anchorage devices required to install the item and its appurtenances, complete. Furnish anchorage requirements in ample time when required to be built in by other trades.

END OF SECTION 10 00 00

DIVISION 10 –SPECIALTIES

SECTION 10 14 00 – IDENTIFYING DEVICES

PART 1 – GENERAL

1.1 SUMMARY

- A. This section applies to all signage mounted in or on building(s).

1.2 SUBMITTALS

- A. Within 45 days of Notice of Award, submit complete shop drawings to the District which show all sizes, graphic layout, finishes, details of manufacture and manufacturers' recommended installation techniques.
- B. Accompanying the shop drawings, submit specified number of copies of a complete list of all materials proposed to be furnished and installed under this portion of the work, giving manufacturers' name, catalog number, and catalog cut for each item where applicable.

1.3 Submit 2 samples of each item, unless otherwise specified hereinafter.

- A. All submittals to be made in strict accordance with requirements specified in DIVISION 1.

1.4 CODES, PERMITS and FEES

- A. Signage shall comply fully with all applicable codes and regulations in effect at time of installation including Washington State Handicapped Accessibility Code and Federal ADA requirements. Where provisions of pertinent codes, regulations and standards conflict with these Specifications or Drawings, the more stringent provisions shall govern JOB CONDITIONS

1.5 DELIVERY, STORAGE and HANDLING

- A. Deliver and store materials in dry, protected areas. Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replace any damaged parts at no additional cost to the District.

1.6 COORDINATION

- A. Coordinate with all other trades whose work relates to this work for placing of all required blocking, backing, etc., to ensure proper locations.

PART 2 – PRODUCT

2.1 MANUFACTURERS

- A. Custom manufactured by a sign shop with a minimum of 5 years experience fabricating exterior signs, or a nationally recognized manufacturer.

2.2 MATERIALS

A. Metal Signs:

1. 3105-H18, .080" aluminum blank stock. Cut sign to size and apply mineral spirits or naphtha to clean surface and degrease in a bath of trichloroethylene or perchlorethylene vapor.
 - a. Radius all corners.
2. Exterior retroreflective sheets cut to size
 - a. Images shall have a white symbol/text and border on a brown background.
3. Apply sheets and set with a heat lamp vacuum applicator.

B. Other Materials: All other materials not specifically described, but required for a complete and proper installation of the work of this Section, shall be new, first quality of their respective kinds, and subject to prior approval of the District.

2.3 SIGN SCHEDULE

A.	<u>Location</u>	<u>Door#/Room#</u>	<u>Mounting Location</u>	<u>Size</u>	<u>Sign Content</u>
1.	Door 2		Exterior Wall	12" x 12"	International Symbol for Men IS1
2.	Door 3		Exterior Wall	12" x 12"	International Symbol for Women IS2
3.	Door 5 and 6/Exterior Wall			12" x 12"	International Symbol for Men and Women IS3

PART 3 – EXECUTION

3.1 INSPECTION

- A. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that all identifying devices may be installed in accordance with all pertinent codes and regulations, the original design, and the referenced manufacturer standards

3.2 INSTALLATION

- A. Locations/Mounting Heights shall be as indicated on the drawings, or, if not so indicated, as directed and approved. In any case all signs required to conform to above cited handicapped access regulations shall be mounted at heights of between 48" and 60" above floor or grade, and at locations easily reachable (horizontally) from a finished floor or slab surface
- B. Anchorage: Furnish and install all anchorage as required to secure all devices to the construction, as detailed on Drawings or as necessary to install complete. Provide anchorage in ample time when required to be built in by other trades
- C. Install in strict conformance with the manufacturers' recommendations and as approved by the District.

3.3 CLEANING

- A. Prior to Substantial Completion, clean all identifying devices of fingerprints or other marks in accordance with the manufacturers' directions

END OF SECTION 10 14 00

DIVISION 10 – SPECIALTIES

SECTION 10 21 00 – TOILET PARTITION and BENCH

PART 1 – GENERAL

1.1 SUMMARY

- A. Fabrication and installation of the toilet partitions and bench is included in this section along with all required hardware.
- B. Reference Section 05 50 00 for support posts and brackets.

1.2 SUBMITTALS

- A. Within 30 days of Notice of Award, and in accordance with requirements of Division 1, SUBMIT:
 - 1. Shop Drawings: Manufacturers' standard brochures and shop drawings of all items showing sizes of members, hardware, methods of construction, mounting and installation techniques, etc., for District's review prior to fabrication.
 - B. Samples: Manufacturers' standard colors and hardware for selection and review by the District prior to fabrication.
 - C. O & M Instructions: Manufacturers' operation and maintenance instructions, parts replacement ordering information, etc., all as a part of the O & M Manuals.

1.3 DELIVERY, HANDLING and STORAGE

- A. Deliver and store all items in dry, protected areas. Keep free of corrosion or other damage. Replace any damaged items or parts at no cost to District.

1.4 COORDINATION

- A. Coordinate with all trades whose work relates in any way to items specified herein. Ensure that all blocking, backing, access, etc., is provided as work progresses to ensure a complete operating installation.

1.5 MEASUREMENTS

- A. Verify all dimensions shown on drawings by taking field measurements; proper fit and attachment of all parts is required.

PART 2 – PRODUCT

2.1 MATERIALS

- A. Bench: King StarBoard ST, 1 ½" high-density polyethylene sheet as manufactured by King Plastic.
 - 1. Color - Seafoam, unless otherwise selected by the District.
 - 2. Ease all edges to 1/8".
 - 3. See Section 05 50 00 for supports.

- B. Toilet Partition Panels: King Plasti-Bal with MicroShield (or Bobrick Sierra Series), 1" high density polyethylene sheet, as manufactured by King Plastic.
 - 1. Color – to be selected by the District.
 - 2. Texture – to be selected by the District.
 - 3. Ease all edges to 1/8".
 - 4. See Section 05 50 00 for supports.
- C. Toilet Partition Hardware as manufactured by Bobrick for the Sierra Series or equal toilet partition manufacturer:
 - 1. Hinges, full-height, self closing stainless steel hinges.
 - 2. 14 gauge sliding door lock and 11 gauge keeper, stainless steel.
 - 3. Clothes hook with bumper, projecting no more than 1 1/8" from the face of door.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Review and inspect surfaces adjacent to area of installation and determine whether work of this Section can proceed. Verify that toilet partitions and benches may be installed in complete accordance with original design, reviewed shop drawings, manufacturers' written recommendations and current building codes (i.e., Handicap Accessibility Code).
- B. Repair any damage done to finish surfaces while executing work of this Section.

3.2 INSTALLATION

- 1. Erect doors and side panels in a sturdy substantial manner, straight, true and plumb with all horizontal lines level. Doors and hardware shall operate smoothly.
- 2. Partitions and pilasters shall be fitted rigidly to walls and floors.
- 3. The clearance at wall shall be as shown on the drawings. All evidence of drilling, cutting and fitting room finish shall be concealed in the work. The clearance at vertical edges of door shall be uniform from top to bottom and shall not exceed 3/16".

3.3 ADJUSTMENT and CLEANUP

- A. Upon completion of the installation, and as a condition of its acceptance, visually inspect the entire work of this Section, adjust all components for proper operation and straight alignment and touch-up all scratches and abrasions to be completely invisible.
- B. Finish surfaces shall be cleaned and left free of imperfections.

END OF SECTION 10 21 00

DIVISION 10 – SPECIALTIES

SECTION 10 28 00 – TOILET and BATH ACCESSORIES

PART 1 – GENERAL

1.1 SUBMITTALS

- A. Within 30 days of Notice of Award, and in accordance with requirements of Division 1, submit:
 - 1. Complete manufacturers' information on all items intended for installation under work of this Section, including shop installation drawings and details, prior to ordering.
 - 2. Operating and Maintenance instructions and parts replacement ordering information as a part of O & M Manuals.

1.2 DELIVERY, HANDLING and STORAGE

- A. Deliver and store all items specified herein in dry, protected areas. Keep free of corrosion or other damage. Replace any damaged items at no cost to District.

1.3 COORDINATION

- A. Coordinate with all other trades whose work relates to items specified herein for placing of all required backing and furring to ensure proper locations.
- B. Items required to be recessed, semi-recessed, etc., shall have templates provided to Contractor to ensure a proper rough opening is provided.
- C. For OFCI and OFOI items, obtain templates and instructions from District in ample time to provide blocking, backing, openings, etc.

1.4 MEASUREMENTS

- A. Verify all dimensions shown on Drawings by taking field measurements; proper fit and attachment of all parts is required.

PART 2 – PRODUCT

2.1 MATERIALS

- A. Hand Dryer: Bobrick #B-708, surface mounted hand dryer, 115V AC, 20 amp, 2300 watts, 50/60 Hz, Single Phase.
- B. Toilet Paper Dispensers (TP): TO BE PROVIDED BY STATE PARKS.
- C. Toilet Seat Cover Dispensers (TSCD): NOT REQUIRED.
- D. Soap Dispensers (SD): TO BE PROVIDED BY STATE PARKS, Contractor to provide backing.
- E. Sanitary Napkin Receptacle (SNR): Bobrick #B-254 surface mounted, stainless steel napkin disposal. Women's side only (3 total).

F. Grab Bars:

1. GB-1: 42" x 54" L shaped grab bar with stand-off mounting on long side.
 - a. Tubing: 1 ½" o.d. 18 gauge stainless steel tubing.
 - b. Flanges: 3 1/8" diameter 13 gauge flanges, concealed mounting.
 - c. Escutcheons: 22 gauge stainless steel.
 - d. Finish: Peened safety grip.
2. GB-2: 18" grab bar, matching construction of GB-1.
3. GB-3: 48" straight grab bar, matching construction of GB-1.
4. GB-4: 32" straight grab bar, matching construction of GB-1.

G. Shelves and Mop Holders:

1. Janitorial Shelf: Bobrick B-239 x 34 utility shelf with mop holders and hooks. Provide 1 in each janitor room, mount as shown on elevations or as directed, if not shown.
2. Lavatory Shelf: Bobrick B-295 x 16 stainless steel utility shelf.

H. Mirrors:

1. MR-1: Shall have rolled formed frame of 3/4" x 3/4" type 304 stainless steel angle with satin finish. Frame shall have continuous integral stiffener on all sides for added strength; welded, ground and polished corners. No. 1 quality, 1/4" polished plate glass mirror with 15-year guarantee against spoilage. 20 gauge galvanized steel back.
2. Bobrick B-290 series, or equal by Bradley, or approved, sized and location per Drawings. Install on concealed wall hanger and secure with theft proof locking screws.

I. Robe Hooks: Bobrick B-2116, heavy duty clothes hook with concealed mounting

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install items per respective manufacturers' published instructions and reviewed shop drawings.
- B. Securely attach to proper blocking/backing or framing, using concealed fastening wherever possible. All exposed attachment hardware shall be vandal resistant type of stainless steel, or other approved rust-resistant finish.
- C. Adhesive installations not permitted.

END OF SECTION 10 28 00

DIVISION 11 – EQUIPMENT

SECTION 11 14 00– PEDESTRIAN CONTROLLED EQUIPMENT

PART 1 – GENERAL

1.1 SUBMITTALS

- A. No less than 30 days prior to Work on-site, and in accordance with requirements of Division 1, submit:
 - 1. Complete manufacturers' information on all items intended for installation under work of this Section, including shop installation drawings and details, prior to ordering.
 - 2. Operating and Maintenance instructions and parts replacement ordering information as a part of O & M Manuals.

1.2 DELIVERY, HANDLING and STORAGE

- A. Deliver and store all items specified herein in dry, protected areas. Keep free of corrosion or other damage. Replace any damaged items at no cost to District.

1.3 COORDINATION

- A. Coordinate with all other trades whose work relates to items specified herein for placing of hardware and hood vent in proper location.
- B. Items required to be recessed, semi-recessed, etc., shall have templates provided to Contractor to ensure a proper rough opening is provided.

1.4 MEASUREMENTS

- A. Verify all dimensions shown on Drawings by taking field measurements; proper fit and attachment of all parts is required.

PART 2 – PRODUCT

2.1 Token Dispenser

- A. American Changer Model No. AC1005 rear load bill changer with the following options:
 - 1. Stainless steel faceplate with token decal and manual
 - 2. Audit Printer
 - 3. Payout preset at 2 coins per \$1.00
 - 4. Bill acceptor preset to accept \$1, and \$5 bills only
 - 5. Hopper to dispense tokens that are 260 alloy, 0.900 inch diameter, 0.067 inch thick and 5 grams in weight
 - 6. Furnished with two (2) sets of keys

- B. Manufacturer: American Changer & Hoffman Mint, 1400 NW 65th place, Ft. Lauderdale, FL 33309, Contact: Helen Cianciaruso, phone: 800-741-9840 ext. 308, email: Helan@americanchanger.com

2.2 Token Meters:

- A. Greenwald #4310-G4 rotary activated meter, with the following options:
 - 1. Stainless steel
 - 2. Token operated, to accept 260 alloy, 0.900 inch diameter, 0.067 inch thick and 5 grams in weight.
 - 3. Furnished with two (2) sets of keys
- B. Manufacturer: Greenwald Industries, 212 Middlesex Avenue, Chester CT 06412.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install items per respective manufacturers' published instructions and reviewed shop drawings.
- B. Securely attach to proper blocking/backing or framing, using concealed fastening wherever possible. All exposed attachment hardware shall be vandal resistant type of stainless steel, or other approved rust-resistant finish.
- C. Adhesive installations not permitted.

END OF SECTION 11 14 00

DIVISION 22 – PLUMBING

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SECTION 22 40 00 – PLUMBING FIXTURES

SECTION 22 - PLUMBING

SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Piping materials and installation instructions common to most piping systems.
 2. Transition fittings.
 3. Dielectric fittings.
 4. Mechanical sleeve seals.
 5. Sleeves.
 6. Escutcheons.
 7. Grout.
 8. Plumbing demolition.
 9. Equipment installation requirements common to equipment sections.
 10. Painting and finishing.
 11. Concrete bases.
 12. Supports and anchorages.

1.2 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
1. ABS: Acrylonitrile-butadiene-styrene plastic.
 2. CPVC: Chlorinated polyvinyl chloride plastic.
 3. PE: Polyethylene plastic.
 4. PVC: Polyvinyl chloride plastic.

5. PEX: Cross-linked Polyethylene plastic
- G. The following are industry abbreviations for rubber materials:
1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 2. NBR: Acrylonitrile-butadiene rubber.

1.3 PRODUCT SELECTION PROCEDURES

- A. Where the specifications list one or more manufacturers, provide product by one of the named manufacturers on the list that complies with specification requirements.
- B. Other manufacturers of products which may meet the specification requirements, but are not listed in the specifications will be considered, subject to prior approval, Submit one copy of a prior approval request to the Engineer, listing all pertinent product information indicating compliance with the specifications requirements,. Prior approval requests must be received by the Engineer at least 7 days prior to the project bid date. A list of products given prior approval will be listed by Addendum to the project.

1.4 SUBMITTALS

- A. Comply with all of the requirements of Division 01 – General Requirements, Section 013000 - Administrative Requirements.

1.5 SUBSTITUTIONS

- A. Comply with the requirements listed in the Instructions To Bidders ITB-10 - Exceptions to Contract Documents.

1.6 SUPERVISION

- A. Comply with the requirements of the Contract Documents.

1.7 SCHEDULE OF VALUES

- A. Comply with all of the requirements of Division 01 – General Requirements, Section 012200 – Measurement and Payment.

1.8 CODES, FEES AND RELATED COSTS

- A. Comply with all of the requirements of the General Conditions presented in the specifications.
- B. Requirements of Regulatory Agencies:
 1. In addition to requirements specified in General Conditions, GC-11 Referenced Standards and Specifications, the Contractor shall comply with the latest edition of the current local and/or state ordinances and codes as noted below:

Building Codes:

IFC - International Fire Code
IMC - International Mechanical Code

Industry Standards, Codes and Specifications:

AIEE - American Institute of Electrical Engineers
AMCA - Air Moving & Conditioning Association
ASA - American Standards Association
IBR - Institute of Boiler & Rating Manufacturers

SMACNA - Sheet Metal and Air Conditioning Contractors National Association, Inc.
ARI - Air Conditioning and Refrigeration Institute
FIA - Factory Insurance Association
FM - Factory Mutual
OSHA - Occupational Safety and Health Act
ADC - Air Diffusion Council
WISHA - Washington Industrial Safety & Health Act
APWA - Standard Specification for Municipal Public Works
WDOE - Washington Department of Ecology
WSEC - Washington State Energy Code

1.9 PROJECT RECORD DOCUMENTS

- A. Comply with all of the requirements of Division 01 – General Requirements, Section 017823 – Operations & Maintenance Manuals.

1.10 CONCRETE BASES, CURBS AND HOUSEKEEPING PADS

- A. All concrete bases, curbs and housekeeping pads as required for the work of Division 22, shall be provided under the work of Division 22.

1.11 SUPPORTS

- A. Provide all pipe stands, mounting brackets and metal bases required for plumbing material and equipment.
- B. Provide all necessary supplementary steel for support or attachment of plumbing material and equipment in shafts and between building structural members. Steel shall be painted with one coat of rust-inhibiting primer.

1.12 LISTED EQUIPMENT

- A. The Washington State Electrical Code requires that all materials, devices, appliances, and equipment, shall be of a type that conforms to applicable standards or be indicated as acceptable by the established standards of the Underwriters Laboratories, Inc. or other electrical product testing laboratories which are accredited by the department.
- B. This statement is being interpreted by the State Electrical Inspector as follows: It is understood that many specialty items such as cast iron boiler, certain items of air handling equipment and other building components are not available with a UL label covering the entire piece of equipment. The State will impose no requirement that an item of equipment be UL labeled unless it is available as UL labeled item from at least two manufacturers. Electrical components of unlabeled equipment, such as motors, shall be labeled if they are available from at least two manufacturers.
- C. If any building component is available with UL or other Washington State approved label from at least two manufacturers, an identical or similar unlabeled component shall not be acceptable for installation in the State of Washington. Should any such component be installed in the State of Washington, it shall either be inspected and labeled by a UL representative or other authority approved by the State or it shall be replaced with a UL labeled component, before the building will be accepted by the State Electrical Inspector.

- D. The engineer has attempted to select UL listed components on this project. However, it must be understood that catalog data on which he bases his selection are not necessarily always current. Components are continually added to the UL approved listings. Conversely, a manufacturer may make a change in a product line, voiding the previous UL approval shown in the catalog. These changes commonly take place after the project has been released for bidding.
- E. Consequently, it shall be the sole responsibility of the Contractor (through his suppliers and equipment manufacturers) to purchase and install only equipment bearing the UL or other approved label whenever that equipment so labeled is available. The Contractor, should install any equipment without the proper UL label, shall bear the entire cost of correction to the satisfaction of the Washington State Electrical Inspector.

1.13 TEST LOG DATA

- A. The Contractor shall keep a three-ring notebook in the construction job office for the sole purpose of filing test data. The test data shall include the testing and flushing of all piping on the project. All log data test entries shall be signed by the Contractor's Superintendent and the District's representative or the code authority having jurisdiction.

1.14 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. At the completion of the project, at such time as designated by the Architect, an operational and maintenance instruction period for the District shall take place. Contractor shall have present during this entire period his superintendent, foremen of various portions of the project, and manufacturer's service representatives (factory trained) for all equipment requiring periodic maintenance. All operational and maintenance instructions shall be presented under direct supervision of the Architect.
- B. Contractor shall provide sign in sheet and shall be responsible for all parties present to sign in. After instruction is complete and accepted by the District, Contractor shall provide letter to the Architect indicating that the instructions have been completed and accepted, and District shall sign same.

1.15 OPERATION AND MAINTENANCE MANUALS

- A. Comply with all of the requirements of Division 01 – General Requirements, Section 017823 – Operations & Maintenance Manuals.

1.16 PROJECT CLOSEOUT

- A. Contractor shall review the following specific checklist items prior to requesting inspection for Substantial or Final completion. The signed and dated checklist items shall be submitted with the request for Substantial or Final completion:

<u>Item</u>	<u>Verified By</u>	<u>Date</u>
All shipping tie-downs removed	_____	_____

All equipment with motors have specified motor with correct horsepower voltage and individual control heaters are adequate.	_____	_____
All equipment with electrical connections have wiring completed with proper voltage /phase	_____	_____
Pump impellers rotate in proper direction	_____	_____
Pumps rotate at specified RPM	_____	_____
All equipment operational	_____	_____
Valves installed where indicated on the drawings and left in proper position (open or closed as required)	_____	_____
All piping systems flushed, cleaned, chlorinated, tested and free from leaks	_____	_____
All piping systems piping insulation complete	_____	_____
All valves tagged	_____	_____
All piping systems labeled and with flow arrows	_____	_____
All plumbing fixtures installed, properly connected and operational.	_____	_____
All plumbing fixtures cleaned	_____	_____

1.17 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

1.18 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling and during the progress of the work to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.19 COORDINATION

- A. Coordinate the location of all piping to determine that it clears all openings and structural members, that it may be properly concealed and that it clears cabinets, lights and all equipment having fixed locations. No extra payments will be allowed where piping and/or ductwork must be offset to avoid other work, or where minor changes are necessary to facilitate installation.
- B. Drawings do not attempt to show complete details of building construction which affect the mechanical installation. Contractor shall refer to the Architectural, Structural, Electrical drawings for additional building details which affect installation of his work.
- C. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.
- D. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- E. Access panels shall be provided for all plumbing items requiring access that are concealed behind finished surfaces. All access panels required for the work of Division 22, size 24"x24" and under, shall be provided under the work of Division 22. Coordinate the location of all access panels with Architect.

PART 2 - PRODUCTS

2.1 ACCESS DOORS

- A. Provide access doors suited for installation in masonry, tile, wood or other wall and ceiling surfaces as indicated on drawings or where required for easy access to shut valve off and access to trap primers. Provide fire rated access doors for installation in fire rated wall or ceiling assemblies.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Elmdor/Stoneman; Div. of Acorn Engineering Co.
 - 2. MIFAB, Inc.
 - 3. Milcor Inc.
- C. Lightweight Flush Access Doors and Frames with Exposed Trim: Fabricated from lightweight metal.
 - 1. Locations: Wall and ceiling surfaces.
 - 2. Door: Minimum 0.018-inch thick steel sheet.
 - 3. Frame: Minimum 0.045-inch thick extruded aluminum with 1-1/4-inch wide rolled flange.
 - 4. Hinges: Fully concealed, continuous piano type.
 - 5. Latch: Screwdriver-operated cam latch.

- D. Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.
1. Locations: Wall and ceiling surfaces.
 2. Fire-Resistance Rating: Not less than 1-1/2 hours in walls and 3 hours in ceilings.
 3. Temperature Rise Rating: 250 deg F at the end of 30 minutes.
 4. Door: Flush panel with a core of 2" thick mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036 inch.
 5. Frame: Minimum 0.060-inch thick sheet metal with 1-inch wide, surface-mounted trim.
 6. Hinges: Fully concealed, continuous piano type.
 7. Automatic Closer: Spring type
 8. Latch: Self-latching device operated by knurled knob with interior release.

2.2 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- H. Solvent Cements for Joining Plastic Piping:
1. ABS Piping: ASTM D 2235.
 2. CPVC Piping: ASTM F 493.
 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 4. PVC to ABS Piping Transition: ASTM D 3138.

2.3 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Eclipse, Inc.
 - d. Epco Sales, Inc.
 - e. Hart Industries, International, Inc.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
 - 1. Manufacturers: Subject to compliance with requirements, provided products by one of the following:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Epco Sales, Inc.
 - d. Watts Industries, Inc.; Water Products Div.
- E. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.
 - 1. Manufacturers: Subject to compliance with requirements, provided products by one of the following:
 - a. Perfection Corp.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Victaulic Co. of America.

2.4 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Manufacturers: Subject to compliance with requirements, provided products by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.
 - e. Link-Seal
2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Carbon steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.5 SLEEVES

- A. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- B. PVC Pipe: ASTM D 1785, Schedule 40.

2.6 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Type: With concealed hinge, set screw or spring clips, and chrome-plated finish.
- G. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

PART 3 - EXECUTION

3.1 FLUSHING AND CLEANING OF PIPING SYSTEMS

- A. Piping systems shall be flushed and cleaned as indicated under Division 22 Sections specifying piping systems.

- B. Domestic water piping systems shall be chlorinated as indicated under Division 22 Sections specifying domestic water piping.
- C. Piping systems shall be flushed, cleaned and chlorinated as indicated under Section 221116 Part 3 – Execution, 3.10 “Cleaning and Disinfection”, A through D.

3.2 PRESSURE TESTING OF PIPING SYSTEMS

- A. Each system of piping shall be tested as indicated under Division 22 Sections specifying piping systems, after portions of mechanical work are completed. Tests shall be made in presence of District's representatives. Adequate advance written notice of tests shall be given to Architect and other agencies having jurisdiction.
- B. Furnish all tools, materials, fuel, air, water, gases, pumps, gauges, blowers, instruments, test equipment and personnel required for tests. Make all provisions for removal of test equipment and draining of pipes after tests. Submit documentation of all test results.
- C. Subject all systems and connections to tests prior to painting, insulation, or concealment.
- D. Tests may be made on isolated portions of systems to facilitate general progress of installation. Any revisions made in the systems will require retesting of the affected portions of the systems.
- E. System components with working pressure below test pressure shall be removed from the system during the testing period. Contractor shall be responsible for any damage during testing.
- F. Should a system fail to meet the test, it shall be repaired and retested until proper results are obtained.
- G. Contractor shall pretest systems prior to requesting witnessed test.
- H. All tests shall be entered into the test log.
- I. Certification: Submit certificates of approval from agencies having jurisdiction. Work not considered complete until all certificates have been submitted.

3.3 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Install valves, thermometers, pressure gauges, cleanout fittings, indicating equipment or any other specialties requiring reading, adjusting, inspection, repairing, removal or replacement such that they are conveniently and accessibly located with reference to the finished building. Thermometers and pressure gauges shall be installed to be easily read from floor or catwalk.
- C. Do not permit electrical conduit and lights to be supported or hung from the mechanical utilities, or piping.
- D. Do not permit tee bar or fixed plaster ceilings to be supported or hung from the mechanical utilities or piping.
- E. Piping for mechanical systems shall not be installed in any switchgear room, transformer vault, telephone room, or electric closet, rooms except as indicated.

- F. Piping shall not be installed to run over any electrical panel. Contractor shall be required to move at its expense any pipe or duct run over an electrical panel regardless of where it is shown on the drawings.
- G. In all rooms where piping runs over motor control centers, electrical bus duct or other electrical equipment, provide aluminum or galvanized pan or gutter under pipes (reinforced to prevent sagging). Edges of pans shall turn up 2" on all sides with corners welded or soldered watertight. Pan width 1" wider than pipe hanger. Pans shall be supported by pipe hangers and drain clear of electrical work. Provide: " copper drain pipe for each pan terminating above nearest floor drain. Shop drawings shall be submitted showing proposed shielding at each location.
- H. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- I. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- J. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- K. Install piping to permit valve servicing.
- L. Install piping at indicated slopes.
- M. Install piping free of sags and bends.
- N. Install fittings for changes in direction and branch connections.
- O. Install piping to allow application of insulation.
- P. Select system components with pressure rating equal to or greater than system operating pressure.
- Q. Install escutcheons suitable for the application for penetrations of walls, ceilings, and floors, to completely cover opening.
- R. Install sleeves for pipes passing through new above grade concrete and masonry walls, and new concrete floor and roof slabs. Sleeves are not required for core-drilled holes.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.
 - 4. Except for underground wall penetrations, and fire rated penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint.
- S. Underground, Exterior-Wall Pipe Penetrations: At below grade exterior walls, separating below grade from finished spaces, seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for sufficient annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- T. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- U. Verify final equipment locations for roughing-in.
- V. Install access panels for all piping accessories requiring access for operation, service or maintenance.
- W. Install dielectric fittings at connections of dissimilar piping materials.

3.4 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.

3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 5. PVC Nonpressure Piping: Join according to ASTM D 2855.
 6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
1. Plain-End Pipe and Fittings: Use butt fusion.
 2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- M. PEX Pipe Fitting: Join tubing and fittings according to the following:
1. PEX Press fittings shall be manufactured from UNS C83600 Bronze and meet the requirements of ASTM F 877 tested as a system with PEX tubing. The PEX Press sleeve shall be manufactured out of a 304 grade or better stainless steel and have a view hole incorporated in it to ensure proper PEX tubing insertion.
 2. PEX Crimp fittings and rings shall be manufactured to the requirements of ASTM F1807 (brass) and or ASTM F2159 (poly alloy). The PEX Crimp connection shall be made by use of a full circle crimp tool designed to crimp F1807 copper crimp rings.
 3. PEX adaptor fittings shall conform to one of the following ASTM standards; F 877, F 1807, F 2159 or ASTM B1.20.1 and be listed to the CAN.B137.5. The adapter fittings shall mate to NPT threads, copper tubing, copper fittings or ProPress fittings.
 4. Manifolds: Acceptable manifolds shall include:
 - a. Copper Manifolds: shall be copper material having a male or female solder or ProPress inlet. All outlets shall be PEX Press or ProPress fittings. Shall be provided by the Cross-linked Polyethylene system manufacturer.
 - b. Polymer Manifolds: Shall be plastic material having a male NPSM thread or PEX crimp inlets. All outlets shall be PEX Press, PEX Crimp or PEX compression connections provided by the PEX system manufacturer.

3.5 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.6 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Provide aisles, or space around equipment suitable for complete service and inspection of equipment. Maintain minimum 6'6" headroom in all access aisles. Provide minimum clearances at electrical equipment per NEC.
- C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- D. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- E. Install equipment to allow right of way for piping installed at required slope.
- F. Label Pressure Vessels in accordance with the State Boiler and Unfired Pressure Vessels Inspection Law. Frame and mount a certificate showing approval under this law adjacent to each respective piece of equipment. Pay all costs and fees for certificates, inspections, filing and labeling.
- G. Provide equipment with WISHA- OSHA approved drive and shaft guards for all exposed, rotating drive shafts and drive connections between motors and driven equipment including, pumps, compressors, etc. Guards shall include heavy duty steel frames securely fastened for easy removal to the equipment frame. Guards, in general, shall be solid sheet metal with tachometer cutout at shafts where applicable. Guards may be provided by the equipment manufacturer or fabricated by this Contractor to the manufacturer's clearances, configurations, etc.
- H. Provide a service engineer for equipment start-up as indicated under division 22 Sections specifying equipment. Service engineer shall be a factory-trained and certified engineer in the employ of the factory, or the employee of the sales representative. Where Contractor is the sales representative, it must employ a factory trained and certified person to do this service work and shall have a letter from the manufacturer stating that he/she is qualified for start-up of equipment furnished.

3.7 CONCRETE BASES, CURBS AND HOUSEKEEPING PADS

- A. Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 - 1. Construct reinforced concrete bases, curbs and housekeeping pads of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18 inch centers around the full perimeter of the base.
 - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions and directions furnished with items to be embedded.

5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Comply with the requirements of Division 03 – Concrete and 033000 Cast-In-Place Concrete.

3.8 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Provide shop drawings showing sizing, design and location of supplementary steel and sizing calculations stamped by a structural engineer registered in the state in which the project resides.
- C. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
- D. Field Welding: Comply with AWS D1.1. Do not weld to building structural components without written approval of the Structural Engineer.

3.9 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Furnish and cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

END OF SECTION 22 05 00

DIVISION 22 - PLUMBING

SECTION 22 05 19 - METERS AND GAUGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Thermometers.
 - 2. Gauges.
 - 3. Test plugs.

1.2 DEFINITIONS

- A. CR: Chlorosulfonated polyethylene synthetic rubber.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.3 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 METAL-CASE, LIQUID-IN-GLASS THERMOMETERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Palmer - Wahl Instruments Inc.
 - 2. Terice, H. O. Co.
 - 3. Weiss Instruments, Inc.
 - 4. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
 - 5. Miljoco
 - 6. Tel Tru
- B. Case: Die-cast aluminum, 9 inches long.
- C. Tube: Red or blue reading, spirit filled, mercury free, with magnifying lens.
- D. Tube Background: White background with black figures and markings.
- E. Window: Glass or clear acrylic.
- F. Connector: Adjustable type, 180 degrees in vertical plane, 360 degrees in horizontal plane, with locking device.
- G. Stem: Copper-plated steel, aluminum, or brass for thermowell installation and of length to suit installation.
- H. Accuracy: Plus or minus 1 percent of range or plus or minus 1 scale division to maximum of 1.5 percent of range.

2.2 THERMOWELLS

- A. Manufacturers: Same as manufacturer of thermometer being used.
- B. Description: Pressure-tight, socket-type metal fitting made for insertion into piping and of type, diameter, and length required to hold thermometer.

2.3 PRESSURE GAGES

- A. Provide pressure gauges with valves and snubbers.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ashcroft Commercial Instrument Operations; Dresser Industries; Instrument Div.
 - 2. Ernst Gage Co.
 - 3. Eugene Ernst Products Co.
 - 4. KOBOLD Instruments, Inc.
 - 5. Miljoco Corp.
 - 6. Palmer - Wahl Instruments Inc.
 - 7. Terrice, H. O. Co.
 - 8. Weiss Instruments, Inc.
 - 9. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.
 - 10. Winters Instruments.
 - 11. Tel Tru
- C. Direct-Mounting, Dial-Type Pressure Gages: Indicating-dial type complying with ASME B40.100.
 - 1. Case: Dry type, drawn steel or cast aluminum, 4-1/2-inch diameter.
 - 2. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
 - 3. Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.
 - 4. Movement: Mechanical, with link to pressure element and connection to pointer.
 - 5. Dial: Satin-faced, nonreflective aluminum with permanently etched scale markings.
 - 6. Pointer: Red or other dark-color metal.
 - 7. Window: Glass.
 - 8. Ring: Stainless steel.
 - 9. Accuracy: Grade A, plus or minus 1 percent of middle half scale.
 - 10. Vacuum-Pressure Range: 30-in. Hg of vacuum to 15 psig of pressure.
 - 11. Range for Fluids under Pressure: Two times operating pressure.

- D. Pressure-Gage Fittings:
1. Valves: NPS 1/4 brass or stainless-steel needle type.
 2. Snubbers: ASME B40.5, NPS 1/4 brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.

2.4 TEST PLUGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Flow Design, Inc.
 2. MG Piping Products Co.
 3. National Meter, Inc.
 4. Peterson Equipment Co., Inc.
 5. Sisco Manufacturing Co.
 6. Terrice, H. O. Co.
 7. Watts Industries, Inc.; Water Products Div.
- B. Description: Corrosion-resistant brass or stainless-steel body with core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping.
- C. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F.
- D. Core Inserts: One or two self-sealing rubber valves.
1. Insert material for water service at 20 to 200 deg F shall be CR.
 2. Insert material for water service at minus 30 to plus 275 deg F shall be EPDM.
- E. Test Kit: Furnish one test kit(s) containing one pressure gage and adaptor, two thermometers, and carrying case. Pressure gage, adapter probes, and thermometer sensing elements shall be of diameter to fit test plugs and of length to project into piping.
1. Pressure Gage: Small bourdon-tube insertion type with 2- to 3-inch- diameter dial and probe. Dial range shall be 0 to 200 psig.
 2. Low-Range Thermometer: Small bimetallic insertion type with 1- to 2-inch-diameter dial and tapered-end sensing element. Dial ranges shall be 25 to 125 deg F.
 3. High-Range Thermometer: Small bimetallic insertion type with 1- to 2-inch-diameter dial and tapered-end sensing element. Dial ranges shall be 0 to 220 deg F.
 4. Carrying case shall have formed instrument padding.

PART 3 - EXECUTION

3.1 THERMOMETER APPLICATIONS

- A. Install liquid-in-glass thermometers in the outlet of each domestic, hot-water storage tank.

- B. Provide the following temperature ranges for thermometers:
 - 1. Domestic Hot Water: 30 to 180 deg F, with 2-degree scale divisions.
 - 2. Domestic Cold Water: 0 to 100 deg F, with 2-degree scale divisions.

3.2 GAGE APPLICATIONS

- A. Install dry-case-type pressure gages for inlet and discharge of each pressure-reducing valve.
- B. Install dry-case-type pressure gages at suction and discharge of each pump.

3.3 INSTALLATIONS

- A. Install direct-mounting thermometers and adjust vertical and tilted positions.
- B. Install remote-mounting dial thermometers on panel, with tubing connecting panel and thermometer bulb supported to prevent kinks. Use minimum tubing length.
- C. Install thermowells with socket extending to center of pipe and in vertical position in piping tees where thermometers are indicated.
- D. Install direct-mounting pressure gages in piping tees with pressure gage located on pipe at most readable position.
- E. Install remote-mounting pressure gages on panel.
- F. Install needle-valve and snubber fitting in piping for each pressure gage.
- G. Install test plugs in tees in piping.
- H. Install permanent indicators on walls or brackets in accessible and readable positions.
- I. Install connection fittings for attachment to portable indicators in accessible locations.
- J. Install thermometers and gages adjacent to machines and equipment to allow service and maintenance for thermometers, gages, machines, and equipment.
- K. Adjust faces of thermometers and gages to proper angle for best visibility.

END OF SECTION 22 05 19

DIVISION 22 - PLUMBING

SECTION 22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the following for copper or steel piping systems:
 - 1. Bronze ball valves.
 - 2. Bronze lift check valves.
 - 3. Bronze swing check valves.
 - 4. Iron swing check valves.
 - 5. Iron, grooved end, swing check valves
 - 6. Bronze gate valves.
 - 7. Iron gate valves.
 - 8. Bronze globe valves.
 - 9. Valve Schedules

1.2 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

1.3 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Division before, during and after installation and to protect the installed work and materials.
- B. Replacement: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the District.

1.4 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.

- B. Obtain all valves from single source, from single manufacturer, wherever possible.
- C. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- D. Selection of valve trim materials shall be as recommended by manufacturer for pressure, temperature and application.
- E. Valve Sizes: Same as upstream piping unless otherwise indicated.
- F. Valve Actuator Types:
 - 1. Gear Actuator: For quarter-turn valves NPS 8 and larger.
 - 2. Handwheel: For valves other than quarter-turn types.
 - 3. Handlever: For quarter-turn valves NPS 6 and smaller.
 - 4. Chainwheel: Device for attachment to valve handwheel, stem, or other actuator; of size and with chain for mounting height, as indicated in the "Valve Installation" Article.
- G. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
 - 1. Gate Valves: With rising stem.
 - 2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
 - 3. Butterfly Valves: With extended neck.
- H. Valve-End Connections:
 - 1. Flanged: With flanges according to ASME B16.1 for iron valves.
 - 2. Grooved: With grooves according to AWWA C606.
 - 3. Solder Joint: With sockets according to ASME B16.18.
 - 4. Threaded: With threads according to ASME B1.20.1.

2.2 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Conbraco Industries, Inc.; Apollo Valves.
 - 2. Crane Co.; Crane Valve Group; Crane Valves.
 - 3. Crane Co.; Crane Valve Group; Stockham Valves
 - 4. Crane Co.; Crane Valve Group; Jenkins Valves
 - 5. Hammond Valve.
 - 6. Milwaukee Valve Company.
 - 7. NIBCO INC.
 - 8. Red-White Valve Corporation.
 - 9. Victaulic
 - 10. Anvil International, Inc.

2.3 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

1. Description:

Standard: MSS SP-110.
SWP Rating: 150 psig.
CWP Rating: 600 psig.
Body Design: Two piece.
Body Material: Bronze.
Ends: Threaded or solder.
Seats: PTFE or TFE.
Stem: Bronze.
Ball: Chrome-plated brass.
Port: Full.

B. Three-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

1. Description:

Standard: MSS SP-110.
SWP Rating: 150 psig.
CWP Rating: 600 psig.
Body Design: Three piece.
Body Material: Bronze.
Ends: Threaded or solder.
Seats: PTFE or TFE.
Stem: Bronze.
Ball: Chrome-plated brass.
Port: Full.

2.4 BRONZE LIFT CHECK VALVES

A. Class 125, Lift Check Valves with Nonmetallic Disc:

1. Description:

Standard: MSS SP-80, Type 2.
CWP Rating: 200 psig.
Body Design: Vertical flow.
Body Material: ASTM B 61 or ASTM B 62, bronze.
Spring: 316 stainless steel
Ends: Threaded or solder.
Disc: NBR, PTFE, or TFE.

2.5 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:

1. Description:

Standard: MSS SP-80, Type 3.

CWP Rating: 200 psig.

Body Design: Horizontal flow.

Body Material: ASTM B 62, bronze.

Ends: Threaded or solder.

Disc: Bronze.

2.6 IRON SWING CHECK VALVES

A. Class 125, Iron Swing Check Valves with Metal Seats:

1. Description:

Standard: MSS SP-71, Type I.

CWP Rating: 200 psig.

Body Design: Clear or full waterway.

Body Material: ASTM A 126, gray iron with bolted bonnet.

Ends: Flanged.

Trim: Bronze.

Gasket: Asbestos free.

Disc: Spring-operated, ductile iron or stainless steel.

Body Material: ASTM A 126, gray iron.

Style: Globe, spring loaded.

Ends: Flanged.

Seat: Bronze.

2.7 IRON, GROOVED-END SWING CHECK VALVES

A. 300 CWP, Iron, Grooved-End Swing Check Valves:

1. Description:

CWP Rating: 300 psig.

Body Material: ASTM A 536, ductile iron.

Seal: EPDM.

Disc: Spring operated, ductile iron or stainless steel.

2.8 BRONZE GATE VALVES

A. Class 125, RS Bronze Gate Valves:

1. Description:
 - Standard: MSS SP-80, Type 2.
 - CWP Rating: 200 psig.
 - Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
 - Ends: Threaded or solder joint.
 - Stem: Bronze.
 - Disc: Solid wedge; bronze.
 - Packing: Asbestos free.
 - Handwheel: Malleable iron.

2.9 IRON GATE VALVES

- A. Class 125, NRS, Iron Gate Valves:
 1. Description:
 - Standard: MSS SP-70, Type I.
 - CWP Rating: 200 psig.
 - Body Material: ASTM A 126, gray iron with bolted bonnet.
 - Ends: Flanged.
 - Trim: Bronze.
 - Disc: Solid wedge.
 - Packing and Gasket: Asbestos free.
- B. Class 125, OS&Y, Iron Gate Valves:
 1. Description:
 - Standard: MSS SP-70, Type I.
 - CWP Rating: 200 psig.
 - Body Material: ASTM A 126, gray iron with bolted bonnet.
 - Ends: Flanged.
 - Trim: Bronze.
 - Disc: Solid wedge.
 - Packing and Gasket: Asbestos free.

2.10 BRONZE GLOBE VALVES

- A. Class 125, Bronze Globe Valves with Bronze Disc:
 1. Description:
 - Standard: MSS SP-80, Type 1.
 - CWP Rating: 200 psig.
 - Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
 - Ends: Threaded or solder joint.

Stem and Disc: Bronze.
Packing: Asbestos free.
Handwheel: Malleable iron.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves according to manufacturer's written instructions.
- B. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- C. Locate valves for easy access and provide separate support where necessary.
- D. Install valves in horizontal piping with stem at or above center of pipe.
- E. Install valves in position to allow full stem movement.
- F. Install chainwheels on operators for butterfly gate globe valves NPS 4 and larger and more than 96 inches above floor. Extend chains to 60 inches above finished floor.
- G. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Lift Check Valves: With stem upright and plumb.

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball, butterfly, or gate valves.
 - 2. Butterfly Valve Dead-End Service: Single-flange (lug) type.

3. Throttling Service: Globe valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves with the following end connections unless noted otherwise:
 1. For Copper Tubing, NPS 2 and Smaller: Threaded or solder-joint end.
 2. For Copper Tubing, NPS 2-1/2 and larger: Flanged ends.
 3. For Steel Piping, NPS 2 and Smaller: Threaded ends.
 4. For Steel Piping, NPS 2-1/2 and larger: Flanged ends.
 5. For Grooved-End Copper Tubing and Steel Piping: Valve ends may be grooved.

3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

- A. Pipe NPS 2 and Smaller:
 1. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
 2. Bronze Swing Check Valves: Class 125, bronze disc.
 3. Bronze Lift Check Valves: Class 125, non-metallic disc
 4. Bronze Globe Valves: Class 125, bronze disc.

3.6 SANITARY SEWERAGE AND SUMP PUMP DISCHARGE PIPING VALVE SCHEDULE

- A. Pipe NPS 2 and Smaller:
 1. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
 2. Bronze Gate Valves: Class 125, RS.
 3. Bronze Swing Check Valves: Class 125, bronze disc.
 4. Bronze Lift Check Valves: Class 125, non-metallic disc
- B. Pipe NPS 2-1/2 and Larger:
 1. Iron Swing Check Valves: Class 125, metal seats.
 2. Iron, Grooved-End Swing Check Valves: 300 CWP.
 3. Iron Gate Valves: Class 125, NRS or OS&Y.

END OF SECTION 22 05 23

DIVISION 22 - PLUMBING

SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following hangers and supports for plumbing system piping and equipment:
 - 1. Steel pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Metal framing systems.
 - 4. Thermal-hanger shield inserts.
 - 5. Fastener systems.
 - 6. Roof Pipe stands.
 - 7. Pipe positioning systems.
 - 8. Equipment supports.

1.2 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.3 PERFORMANCE REQUIREMENTS

- A. Provide supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
- B. Provide equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.4 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Manufacturers: Subject to requirements provide products by one of the following:
 - 1. ERICO/Michigan Hanger Co.
 - 2. Anvil

3. Pipe Shields, Inc..
4. PHD Manufacturing, Inc.
- C. Galvanized, Metallic Coatings: Pre-galvanized or hot dipped.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.2 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.3 METAL FRAMING SYSTEMS

- A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.
- B. Manufacturers: Subject to requirements provide products by one of the following:
 1. ERICO/Michigan Hanger Co.; ERISTRUT Div.
 2. Power-Strut Div.; Tyco International, Ltd.
 3. Thomas & Betts Corporation.
 4. Uni-strut Corp.; Tyco International, Ltd.
- C. Metallic Coatings: Manufacturer's standard finish for indoor use, hot dip galvanized for outdoor use.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.4 THERMAL-HANGER SHIELD INSERTS

- A. Description: 100-psig minimum, compressive-strength insulation insert encased in sheet metal shield.
- B. Manufacturers: Subject to requirements provide products by one of the following:
 1. ERICO/Michigan Hanger Co.
 2. Pipe Shields, Inc.
 3. Anvil.
 4. PHD Manufacturing, Inc..
- C. Insulation-Insert Material: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass with vapor barrier. 360 degree insert, 180 or 360 degree shield.
- D. Insert Length: Extend 2 inches beyond sheet metal shield.

2.5 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers: Subject to requirements provide products by one of the following:
 - a. Hilti, Inc.
 - b. ITW Ramset/Red Head.
 - c. Masterset Fastening Systems, Inc.
 - d. MKT Fastening, LLC.
 - e. Powers Fasteners.
- B. Mechanical-Expansion Anchors: Insert-wedge-type stainless steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 1. Manufacturers: Subject to requirements provide products by one of the following:
 - a. B-Line Systems, Inc.; a division of Cooper Industries.
 - b. Empire Industries, Inc.
 - c. Hilti, Inc.
 - d. ITW Ramset/Red Head.
 - e. MKT Fastening, LLC.
 - f. Powers Fasteners.

2.6 PIPE STANDS FOR ROOF APPLICATION

- A. Pipe Stands, General: Factory fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.
- B. Compact Pipe Stand: One-piece plastic unit with integral-rod-roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.
 1. Manufacturers: Subject to requirements provide products by one of the following:
 - a. MIRO Industries.
- C. Low-Type, Single-Pipe Stand: One-piece plastic base unit with plastic roller, for roof installation without membrane penetration.
 1. Manufacturers: Subject to requirements provide products by one of the following:
 - a. MIRO Industries.
- D. High-Type, Single-Pipe Stand: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
 1. Manufacturers:
 - a. MIRO Industries.
 2. Base: Plastic.
 3. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.

4. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.
- E. High-Type, Multiple-Pipe Stand: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.
 1. Manufacturers: Subject to requirements provide products by one of the following:
 - a. MIRO Industries..
 2. Bases: One or more plastic.
 3. Vertical Members: Two or more protective-coated-steel channels.
 4. Horizontal Member: Protective-coated-steel channel.
 5. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.
- F. Polyethylene Foam Block, Multiple-Pipe Stand: Polyethylene foam block with integral strut channel for receiving standard strut clamps and accessories. Standard, heavy duty or plenum type.
 1. Manufacturers: Subject to requirements provide products by one of the following.
 - a. ERICO/Michigan Hanger Co.; Pipe Pier

2.7 PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, system of metal brackets, clips, and straps for positioning piping in pipe spaces for plumbing fixtures for commercial applications.
- B. Manufacturers: Subject to requirements provide products by one of the following:
 1. C & S Mfg. Corp.
 2. HOLDRITE Corp.; Hubbard Enterprises.
 3. Samco Stamping, Inc.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated stationary pipes, NPS 1/2 to NPS 30.

2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24), if little or no insulation is required.
5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4), to allow off-center closure for hanger installation before pipe erection.
6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of non-insulated stationary pipes, NPS 3/4 to NPS 8.
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 8.
8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 2.
10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of non-insulated stationary pipes, NPS 3/8 to NPS 8.
11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of non-insulated stationary pipes, NPS 3/8 to NPS 3.
12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
16. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.

20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
 21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
 22. PEX Tubing horizontal and vertical pipe hanger and support materials to be provided and installed as recommended by PEX Tubing manufacturer.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weld-less Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.

9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- K. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
- L. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
- M. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.

- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- F. Roof Pipe Stand Installation:
 - 1. Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
- G. Pipe Positioning System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer to Division 22 Section "Plumbing Fixtures" for plumbing fixtures.
- H. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- I. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- J. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- K. Install lateral bracing with pipe hangers and supports to prevent swaying.
- L. Install building attachments within concrete slabs or attach to structural steel. Provide supplementary steel for support and attachment of hangers in shafts and between building structural members. Do not weld to building structural members without written approval of the Structural Engineer. Install additional attachments at concentrated loads, including valves, flanges, and strainers, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- M. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment. Provide welded support at elbows on pump suction and discharge piping and extend elbow support to floor.
- N. Coordinate location of hangers with respect to light fixtures and other building components. Piping shall be supported by independent hangers and shall not be supported from ductwork, duct supports or other piping. Hanger rods shall not penetrate ductwork.
- O. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands or metal framing systems to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

END OF SECTION 22 05 29

DIVISION 22 – PLUMBING

SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Pipe labels.
 - 4. Valve tags.
 - 5. Warning tags.

1.2 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

1.3 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
 - 1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 - 2. Letter Color: White.
 - 3. Background Color: Black.
 - 4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
 - 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 - 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 - 7. Fasteners: Stainless-steel rivets or self-tapping screws.

8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number.

2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White.
- C. Background Color: Red.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pre-tensioned Pipe Labels: Pre-coiled, semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
 2. Lettering Size: At least 1-1/2 inches high.

2.4 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
 1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 2. Fasteners: Brass wire-link or beaded chain; or S-hook.

- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
1. Valve-tag schedule shall be included in operation and maintenance data.

2.5 WARNING TAGS

- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
1. Size: 3 by 5-1/4 inches minimum.
 2. Fasteners: Brass grommet and wire.
 3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
 4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

- A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
1. Near each valve and control device.
 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 5. Near major equipment items and other points of origination and termination.
 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
- B. Pipe Label Color Schedule:
1. Low-Pressure, Compressed-Air Piping:
 - a. Background Color: Yellow.

- b. Letter Color: Black.
- 2. Medium-Pressure, Compressed-Air Piping:
 - a. Background Color: Yellow.
 - b. Letter Color: Black.
- 3. Domestic Water Piping:
 - a. Background Color: Yellow.
 - b. Letter Color: Black.
- 4. Sanitary Waste and Storm Drainage Piping:
 - a. Background Color: Yellow.
 - b. Letter Color: Black.

3.4 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except for the following: check valves; valves within factory-fabricated equipment units; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
 - 1. Valve-Tag Size and Shape:
 - a. All Valve Tags: 1-1/2 inches, round.
 - 2. Valve-Tag Color:
 - a. All Valve Tags: Natural.
 - 3. Letter Color:
 - a. All Valve Tags: Black.

3.5 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 22 05 53

DIVISION 22 – PLUMBING

SECTION 22 07 00 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Insulation Materials:
 - a. Mineral fiber, Preformed Pipe Insulation
 - b. Flexible Elastomeric Pipe Insulation.
 - c. Mineral Fiber Blanket Insulation.
 - d. Mineral Fiber Pipe and Tank Insulation.
 - 2. PVC fitting Covers
 - 3. Field Applied Jackets
 - 4. Insulation Installation Requirements
 - 5. Piping Insulation Schedule
 - 6. Field Applied Jacket Schedule
 - 7. Minimum Pipe Insulation Thickness Table

1.2 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
 - 1. Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.4 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application and equipment Installer for equipment insulation application. Establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing, where required.

1.5 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

1.6 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. General:
 - 1. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
 - 2. Products shall not contain asbestos, lead, mercury, or mercury compounds.
 - 3. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
 - 4. Thermal conductivity of all insulation materials (k-value) at mean temperature shall be as noted in Part 3 Minimum Pipe Insulation Thickness Table.
 - 5. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corp.; Duct Wrap.
 - b. Johns Manville; Microlite.
 - c. Knauf Insulation; Duct Wrap.
 - d. Owens Corning; All-Service Duct Wrap.
 - e. Aeroflex USA Inc.
 - f. Armacell LLC; AP Armaflex.
 - g. RBX Corporation
 - h. Einsulation, Inc.
- B. Mineral-Fiber, Preformed Pipe Insulation:
 - 1. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied vapor barrier all purpose jacket, self sealing lap (ASJ-SSL).
- C. Flexible Elastomeric Pipe Insulation:
 - 1. Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
- D. Mineral-Fiber Blanket Insulation:
 - 1. Mineral or glass fibers bonded with a thermosetting resin, with FSK facing. Comply with ASTM C 553, Type II and ASTM C 1290, Type I.

E. Mineral-Fiber, Pipe and Tank Insulation:

1. Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ or FSK facing, complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 2.5 lb/cu. ft. or more.

2.2 PVC FITTING COVERS

A. Factory fabricated, molded one-piece, high-impact-resistant, UV-resistant PVC fitting covers with insulation inserts, complying with ASTM D 1784, Class 16354-C.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto PVC Corporation; LoSmoke.
 - d. Speedline Corporation; SmokeSafe.
2. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical groove type fittings.

2.3 FIELD-APPLIED JACKETS

A. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto PVC Corporation; LoSmoke.
 - d. Speedline Corporation; SmokeSafe.
2. Adhesive: As recommended by jacket material manufacturer.
3. Color: White.
4. Provide factory-fabricated fitting covers to match jacket.

B. Metal Jacket:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Products, Division of ITW; Metal Jacketing Systems.
 - b. PABCO Metals Corporation; Surefit.
 - c. RPR Products, Inc.; Insul-Mate.

2. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105 or 5005, Temper H-14.
 - a. Sheet and roll stock ready for shop or field sizing or factory cut and rolled to size.
 - b. Finish and thickness are indicated in field-applied jacket schedules.
 - c. Factory-Fabricated Fitting Covers: Same material, finish, and thickness as jacket.
 - 1) Shapes: Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows, Tee covers, Flange and union covers, end caps, beveled collars, valve covers.
3. Stainless-Steel Jacket: ASTM A 167 or ASTM A 240/A 240M.
 - a. Sheet and roll stock ready for shop or field sizing or factory cut and rolled to size.
 - b. Material, finish, and thickness are indicated in field-applied jacket schedules.
 - c. Factory-Fabricated Fitting Covers: Same material, finish, and thickness as jacket.
 - 1) Shapes: Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows, Tee covers, Flange and union covers, end caps, beveled collars, valve covers.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
 1. Verify that systems and equipment to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

3.3 GENERAL INSULATION INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, flanges, valves, and specialties.

- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. On cold piping with vapor barrier, hangers shall not penetrate insulation. Provide insulation inserts with vapor barrier at hanger locations, such that hanger encircles insulation. At supports and anchors other than hangers, seal penetrations in insulation with vapor barrier mastic.
- K. On piping with field applied jackets, hangers, supports and anchors shall not penetrate jacketing or insulation.
- L. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement. Replace damaged insulation or insulation facings with new sections of insulation.
- O. Insulation shall be continuous through walls, floors, or sleeves with thickness same as adjacent piping.
- P. Do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Manholes.
 - 5. Handholes.
 - 6. Cleanouts.

3.4 MINERAL-FIBER PREFORMED PIPE INSULATION INSTALLATION

- A. Insulation Installation on Straight Pipes and Tubes:
 - 1. Draw jacket tight and smooth.

2. Cover circumferential joints with manufacturer's 3-inch- wide self adhesive strips, of same material as insulation jacket.
 3. For longitudinal joints, clean and dry surface to receive self-sealing lap and secure self sealing lap.
 4. Where vapor barriers are indicated, apply vapor-barrier mastic at ends adjacent to pipe flanges and fittings, or other open ends and protrusions.
- B. Insulation Installation on Pipe Fittings, Elbows, Flanges and Valves:
1. Install PVC fitting cover insulation inserts to thickness of adjacent piping and install PVC fitting covers.
 2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands. Install PVC fitting covers.
 3. Seal fitting covers with manufacturers recommended adhesive.

3.5 FLEXIBLE ELASTOMERIC PIPE INSULATION INSTALLATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Fittings and Elbows:
1. Install mitered sections of pipe insulation.
 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Valves and Pipe Specialties:
1. Install preformed valve covers manufactured of same material as pipe insulation when available.
 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 3. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 FIELD-APPLIED JACKET INSTALLATION

- A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and 1-1/2" overlap at end joints; for horizontal applications, install with longitudinal seams arranged to shed water. Seal with manufacturer's recommended adhesive.
1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- B. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.7 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Cold Water Above Grade:
 - 1. Insulation shall be Mineral-Fiber, Preformed Pipe Insulation, Type I: minimum 1 inchthick, for all pipe sizes.
- B. Domestic Cold Water Below Grade:
 - 1. No insulation required.
- C. Domestic Hot and Re-circulated Hot Water Above Grade:
 - 1. Insulation shall be Mineral-Fiber, Preformed Pipe Insulation, Type I: minimum 1 inchthick, for all pipe sizes.
- D. Domestic Hot and Re-circulated Hot Water Below Grade:
 - 1. Insulation shall be Flexible Elastomeric pipe insulation: minimum 1 inchthick, for all pipe sizes.
- E. Stormwater and Overflow Piping Above Grade:
 - 1. Insulation shall be Mineral-Fiber, Preformed Pipe Insulation, Type I: minimum 1/2 inch thick, for all pipe sizes.
- F. Roof Drain and Overflow Drain Bodies:
 - 1. Insulation shall be 1-1/2" thick Mineral-Fiber Blanket insulation.

3.8 FIELD APPLIED JACKETING SCHEDULE

- A. All insulated exposed piping risers in finished spaces shall be provided with either a PVC or Aluminum field applied jacketing on the piping to a distance of 8 feet above finished floor level.

END OF SECTION 22 07 00

DIVISION 22 – PLUMBING

SECTION 22 11 16 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
 2. Encasement for piping.
 3. Piping Schedule

1.2 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14 for plastic, potable domestic water piping and components.
- C. Comply with NSF 61 for potable domestic water piping and components.

1.3 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type K or ASTM B 88, Type L water tube, drawn temper.
1. Cast-Copper Solder-Joint Fittings: ASME B16.18, pressure fittings.
 2. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
 3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
 4. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

5. Copper Pressure-Seal-Joint Fittings:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Elkhart Products Corporation; Industrial Division.
 - 2) NIBCO INC.
 - 3) Viega; Plumbing and Heating Systems.
 - b. NPS 2and Smaller: Wrought-copper fitting with EPDM-rubber O-ring seal in each end.
 - c. NPS 2-1/2 to NPS 4 Cast-bronze or wrought-copper fitting with EPDM-rubber O-ring seal in each end.
6. Copper-Tube Extruded-Tee Connections:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) T-DRILL Industries Inc.
 - b. Description: Tee formed in copper tube according to ASTM F 2014.
7. Grooved-Joint Copper-Tube Appurtenances:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Anvil International.
 - 2) Shurjoint Piping Products.
 - 3) Victaulic Company.
 - b. Copper Grooved-End Fittings: ASTM B 75 copper tube or ASTM B 584 bronze castings.
 - c. Grooved-End-Tube Couplings: Copper-tube dimensions and design similar to AWWA C606. Include ferrous housing sections, EPDM-rubber gaskets suitable for hot and cold water, and bolts and nuts.

2.3 ENCASEMENT FOR PIPING

- A. Standard: ASTM A 674 or AWWA C105.
- B. Form: Sheet or Tube.
- C. Material: LLDPE film of 0.008-inch minimum thickness.

2.4 TRANSITION FITTINGS

- A. General Requirements:
 1. Same size as pipes to be joined.
 2. Pressure rating at least equal to pipes to be joined.
 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

- C. Sleeve-Type Transition Coupling: AWWA C219.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cascade Waterworks Manufacturing.
 - b. Dresser, Inc.; Dresser Piping Specialties.
 - c. Ford Meter Box Company, Inc. (The).
 - d. JCM Industries.
 - e. Romac Industries, Inc.
 - f. Smith-Blair, Inc; a Sensus company.
 - g. Viking Johnson; c/o Mueller Co.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Provide all excavation, backfill and bedding as required for the work. Comply with requirements in Division 31 Section "Earthwork" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

- A. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- B. Install domestic water piping graded back to central points for drainage at low points. Provide drain valve with hose connection at low points.
- C. Install seismic restraints on piping, when required. Comply with requirements in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment" for seismic-restraint devices.
- D. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
- D. Apply appropriate tape or thread compound to external pipe threads.
- E. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- F. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Braze Joints" Chapter.

- G. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- H. Pressure-Sealed Joints: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.
- I. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- J. Copper-Tubing Grooved Joints: Roll groove end of tube. Assemble coupling with housing, gasket, lubricant, and bolts. Join copper tube and grooved-end fittings according to AWWA C606 for roll-grooved joints.
- K. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- L. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.4 VALVE INSTALLATION

- A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for valve installations.
- B. Install shutoff valves in all branch piping that serves batteries of three or more plumbing fixtures, and on each water supply to plumbing fixtures that do not have supply stops, and on supplies to all equipment requiring water connections. Shutoff valves may or may not be shown on the drawings.
- C. Install ½" or ¾" drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping. Drain valves are specified in Division 22 Section "Domestic Water Piping Specialties."
 - 1. Hose-End Drain Valves: At low points in water mains, risers, and branches.
- D. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves.

3.5 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs: MSS Type 1, adjustable, steel clevis hangers
 - 3. Multiple, Straight, Horizontal Piping Runs: MSS SP-69 trapeze pipe hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

- D. Install coated hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 - 4. NPS 2-1/2: 108 inches with 1/2-inch rod.
 - 5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
 - 6. NPS 6: 10 feet with 5/8-inch
- E. Install supports for vertical copper tubing every 10 feet.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Provide interior shutoff valve. Use transition fitting to join dissimilar piping materials.

3.7 IDENTIFICATION

- A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Piping Inspections:
 - 1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - 2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
 - 3. Re-inspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for re-inspection.
 - 4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- C. Piping Tests:
 - 1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
 6. Prepare reports for tests and for corrective action required.
- D. Domestic water piping will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

3.9 ADJUSTING

- A. Perform the following adjustments before operation:
1. Close drain valves, hydrants, and hose bibbs.
 2. Open shutoff valves to fully open position.
 3. Open throttling valves to proper setting.
 4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.
 - b. Adjust calibrated balancing valves to flows indicated.
 5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.10 CLEANING AND DISINFECTION

- A. Clean and disinfect potable and non-potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.

2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- B. Prepare and submit reports of purging and disinfecting activities.
- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.
- D. Clean and disinfect Pex tubing per manufacturer's recommendations.

3.11 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Under-building-slab, domestic water, building service piping, NPS 3 and smaller, shall be:
 1. Hard copper tube, ASTM B 88, Type K; wrought-copper solder-joint fittings; and brazed joints.
- E. Under-building-slab, domestic water piping, NPS 3 and smaller, shall be:
 1. Hard copper tube, ASTM B 88, Type K; wrought-copper solder-joint fittings; and brazed joints.
- F. Aboveground domestic water piping, NPS 2 and smaller, shall be one of] the following:
 1. Hard copper tube, ASTM B 88, Type L; wrought- copper solder-joint fittings; and soldered joints.
 2. Hard copper tube, ASTM B 88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.
 3. Hard copper tube, 2" size, ASTM B 88, Type L; grooved-joint copper-tube appurtenances; and grooved joints.

- G. Aboveground domestic water piping, NPS 2-1/2 to NPS 8, shall be one of the following:
1. Hard copper tube, ASTM B 88, Type L; wrought- copper solder-joint fittings; and soldered joints.
 2. Hard copper tube, ASTM B 88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.
 3. Hard copper tube, ASTM B 88, Type L; grooved-joint copper-tube appurtenances; and grooved joints.

END OF SECTION 22 11 16

DIVISION 22 – PLUMBING

SECTION 22 11 19 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following domestic water piping specialties:
1. Vacuum breakers.
 2. Backflow preventers.
 3. Water pressure-reducing valves.
 4. Thermostatic mixing valves.
 5. Strainers.
 6. Outlet boxes.
 7. Hose bibbs.
 8. Wall hydrants.
 9. Drain valves.
 10. Water hammer arresters.
 11. Trap-seal primer valves.
 12. Trap-seal primer systems.

1.2 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. NSF Compliance:
1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
 2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."
- C. Backflow prevention devices shall be approved by the Cross Connection Control Committee of the AWWA for their respective size and application.

1.3 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 VACUUM BREAKERS

- A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ames Co.
 - b. Cash Acme.
 - c. FEBCO; SPX Valves & Controls.
 - d. Rain Bird Corporation.
 - e. Toro Company (The); Irrigation Div.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Plumbing Products Group; Wilkins Div.
 2. Standard: ASSE 1001.
 3. Size: NPS 1/4 to NPS 3 (DN 8 to DN 80), as required to match connected piping.
 4. Body: Bronze.
 5. Inlet and Outlet Connections: Threaded.
 6. Finish: Chrome plated.
- B. Hose-Connection Vacuum Breakers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cash Acme.
 - b. MIFAB, Inc.
 - c. Watts Industries, Inc.; Water Products Div.
 - d. Woodford Manufacturing Company.
 - e. Zurn Plumbing Products Group; Light Commercial Operation.
 - f. Zurn Plumbing Products Group; Wilkins Div.
 2. Standard: ASSE 1011.
 3. Body: Bronze, non-removable, with manual drain.
 4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
 5. Finish: Chrome or nickel plated.
- C. Pressure Vacuum Breakers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ames Co.
 - b. FEBCO; SPX Valves & Controls.
 - c. Toro Company (The); Irrigation Div.
 - d. Watts Industries, Inc.; Water Products Div.
 - e. Zurn Plumbing Products Group; Wilkins Div.
 2. Standard: ASSE 1020.

3. Operation: Continuous-pressure applications.
 4. Pressure Loss: 5 psig maximum, through middle 1/3 of flow range.
 5. Size: NPS ½ to NPS 2
 6. Accessories:
 - a. Valves: Ball type, on inlet and outlet.
- D. Spill-Resistant Vacuum Breakers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Watts Industries, Inc.; Water Products Div.
 2. Standard: ASSE 1056.
 3. Operation: Continuous-pressure applications.
 4. Size: NPS 3/8 to NPS 1.
 5. Accessories:
 - a. Valves: Ball type, on inlet and outlet.

2.2 BACKFLOW PREVENTERS

- A. Intermediate Atmospheric-Vent Backflow Preventers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cash Acme.
 - b. FEBCO; SPX Valves & Controls.
 - c. Watts Industries, Inc.; Water Products Div.
 - d. Zurn Plumbing Products Group; Wilkins Div.
 2. Standard: ASSE 1012.
 3. Operation: Continuous-pressure applications.
 4. Size: NPS 1/2 NPS 3/4.
 5. Body: Bronze.
 6. End Connections: Union, solder joint.
 7. Finish: Rough bronze.
- B. Reduced-Pressure-Principle Backflow Preventers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ames Co.
 - b. FEBCO; SPX Valves & Controls.
 - c. Watts Industries, Inc.; Water Products Div.
 - d. Zurn Plumbing Products Group; Wilkins Div.
 2. Standard: ASSE 1013.

3. Operation: Continuous-pressure applications.
 4. Pressure Loss: 12 psig maximum, through middle 1/3 of flow range.
 5. Size: NPS ¾ to NPS 10
 6. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
 7. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
 8. Configuration: Designed for horizontal, straight through flow.
 9. Accessories:
 - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; outside screw and yoke gate-type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.
 - b. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.
- C. Double-Check Backflow-Prevention Assemblies:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ames Co.
 - b. FEBCO; SPX Valves & Controls.
 - c. Watts Industries, Inc.; Water Products Div.
 - d. Zurn Plumbing Products Group; Wilkins Div.
 2. Standard: ASSE 1015.
 3. Operation: Continuous-pressure applications, unless otherwise indicated.
 4. Pressure Loss: 5 psig maximum, through middle 1/3 of flow range.
 5. Size: NPS ¾ to NPS 10
 6. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 (DN 65) and larger.
 7. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
 8. Configuration: Designed for horizontal, straight through flow.
 9. Accessories:
 - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; outside screw and yoke gate-type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.
- D. Beverage-Dispensing-Equipment Dual check Valve with Intermediate Vent Backflow Preventers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Watts Industries, Inc.; Water Products Div.

- b. Zurn Plumbing Products Group; Wilkins Div.
 2. Standard: ASSE 1022.
 3. Operation: Continuous-pressure applications.
 4. Size: NPS 1/4 or NPS 3/8.
 5. Body: Stainless steel.
 6. End Connections: Threaded.
- E. Beverage-Dispensing Equipment, Dual-Check-Valve Backflow Preventers:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cash Acme.
 - b. Watts Industries, Inc.; Water Products Div.
 2. Standard: ASSE 1032.
 3. Operation: Continuous-pressure applications.
 4. Size: NPS 1/4 or NPS 3/8.
 5. Body: Stainless steel.
 6. End Connections: Threaded.
- F. Backflow-Preventer Test Kits:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. FEBCO; SPX Valves & Controls.
 - b. Watts Industries, Inc.; Water Products Div.
 - c. Zurn Plumbing Products Group; Wilkins Div.
 2. Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test-procedure instructions.

2.3 WATER PRESSURE-REDUCING VALVES

- A. Water Pressure Reducing Valves, Standard Capacity:
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Watts Series U5B pressure reducing valve, or a comparable product by one of the following:
 - a. Cash Acme.
 - b. Zurn Plumbing Products Group; Wilkins Div.
 2. Standard: ASSE 1003.
 3. Pressure Rating: Initial working pressure of 200 psig
 4. Size: NPS ½ to NPS 2
 5. Design Outlet Pressure Setting: Adjustable from 25 psig to 75 psig.
 6. Body: Bronze
 7. Include integral thermal expansion bypass.

8. Include integral strainer.
 9. End Connections: Threaded
- B. Water Pressure Reducing Valves, High Capacity:
1. Basis-of-Design Product: Subject to compliance with requirements, provide Watts Series 223B pressure reducing valve, or a comparable product by one of the following:
 - a. Cash Acme.
 - b. Zurn Plumbing Products Group; Wilkins Div.
 2. Standard: ASSE 1003.
 3. Pressure Rating: Initial working pressure of 300 psig
 4. Size: NPS ½ to NPS 3
 5. Design Outlet Pressure Setting: Adjustable from 25 psig to 75 psig.
 6. Body: Bronze
 7. Include integral thermal expansion bypass.
 8. Provide with strainer assembled with a nipple.
 9. End Connections: Threaded

2.4 HOSE BIBBS

- A. Hose Bibbs:
1. Standard: ASME A112.18.1 for sediment faucets.
 2. Body Material: Bronze.
 3. Seat: Bronze, replaceable.
 4. Supply Connections: NPS 3/4 threaded or solder-joint inlet.
 5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
 6. Pressure Rating: 125 psig.
 7. Vacuum Breaker: Integral non-removable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
 8. Finish for Equipment Rooms: Rough bronze.
 9. Finish for Service Areas: Chrome or nickel plated.
 10. Finish for Finished Rooms: Chrome or nickel plated.
 11. Operation for Equipment Rooms: Wheel handle.
 12. Operation for Service Areas: Operating key.
 13. Operation for Finished Rooms: Operating key.
 14. Include operating key with each operating-key hose bibb.
 15. Include integral wall flange with each chrome- or nickel-plated hose bibb.

2.5 WALL HYDRANTS

- A. Non-freeze Wall Hydrants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company.
 - b. MIFAB, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Watts Drainage Products Inc.
 - e. Woodford Manufacturing Company.
 - f. Zurn Plumbing Products Group; Light Commercial Operation.
 - g. Zurn Plumbing Products Group; Specification Drainage Operation.
 2. Standard: ASME A112.21.3M for exposed-outlet, self-draining wall hydrants.
 3. Pressure Rating: 125 psig.
 4. Operation: Loose key.
 5. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
 6. Inlet: NPS 3/4.
 7. Outlet: Exposed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
 8. Nozzle and Wall-Plate Finish: Rough bronze.
 9. Operating Keys(s): One with each wall hydrant.
- B. Non-freeze, Hot- and Cold-Water Mixing Wall Hydrants:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Josam Company.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Watts Drainage Products Inc.
 - d. Woodford Manufacturing Company.
 - e. Zurn Plumbing Products Group; Specification Drainage Operation.
 2. Standard: ASME A112.21.3M for exposed-outlet, self-draining wall hydrants.
 3. Pressure Rating: 125 psig.
 4. Operation: Wheel handle.
 5. Casings and Operating Rods: Of length required to match wall thickness. Include wall clamps.
 6. Inlets: NPS 3/4.
 7. Outlet: Exposed.
 8. Box: Deep, flush mounting with cover.
 9. Box and Cover Finish: Polished nickel bronze.

10. Vacuum Breaker: Non-removable, manual-drain-type, hose-connection vacuum breaker complying with ASSE 1011 and with garden-hose thread complying with ASME B1.20.7 on outlet.

2.6 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

B. Gate-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-80 for gate valves.
2. Pressure Rating: Class 125.
3. Size: NPS 3/4.
4. Body: ASTM B 62 bronze.
5. Inlet: NPS 3/4 threaded or solder joint.
6. Outlet: Garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.7 WATER HAMMER ARRESTERS

A. Water Hammer Arresters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AMTROL, Inc.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. PPP Inc.
 - e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - f. Watts Drainage Products Inc.
 - g. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Metal bellows.

4. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

2.8 TRAP-SEAL PRIMER VALVES

A. Supply-Type, Trap-Seal Primer Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. MIFAB, Inc.
 - b. PPP Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Watts Industries, Inc.; Water Products Div.
2. Standard: ASSE 1018.
3. Pressure Rating: 125 psig minimum.
4. Body: Bronze.
5. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

B. Flush Valve Type, Vacuum Breaker Trap Primer:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Sloan
 - b. Zurn
2. One piece, chrome plated vacuum breaker flush connection assembly, with water diverter.
3. 3/8" chrome plated elbow and tube connection from vacuum breaker to wall.
4. Chrome plated wall flange and fittings to connect to 1/2" NPT pipe.

2.9 TRAP-SEAL PRIMER SYSTEMS

A. Trap-Seal Primer Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. PPP Inc.
2. Standard: ASSE 1044,
3. Piping Connection: NPS 3/4, ASTM B 88, Type L; copper, water tubing.
4. Cabinet: Recessed or Surface-mounting as indicated, steel box with stainless-steel cover.
5. Electric Controls: 24-hour timer, solenoid valve, and manual switch for 120-V ac power.

6. Vacuum Breaker: ASSE 1001.
7. Number Outlets: 4 thru 30
8. Size Outlets: NPS 1/2.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.

3.2 BACKFLOW PREVENTER INSTALLATION

- A. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
 1. Install backflow preventers a maximum of 5 feet above the floor, with adequate front and rear clearance for testing purposes, unless otherwise required by the authority having jurisdiction.
 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to floor drain. Locate air-gap device attached to or under backflow preventer.
 3. Test each backflow preventer according to authorities having jurisdiction and the device's reference standard.

3.3 PRESSURE REGULATOR INSTALLATION

- A. Install water pressure regulators with inlet and outlet shutoff valves and bypass. Install pressure gages on inlet and outlet.
- B. Set field-adjustable pressure set points of water pressure regulating valves.

3.4 STRAINER INSTALLATION

- A. Install Y-pattern strainers in locations as indicated and as follows:
 1. On upstream side of each water pressure-reducing valve.
 2. On upstream side of each reduced pressure or double check valve assembly backflow preventer.
- B. Install blow-down valve with hose end connection on each Y-strainer.

3.5 WATER HAMMER ARRESTER INSTALLATION

- A. Install water hammer arresters in locations as indicated and at all quick closing and solenoid valves in water piping according to PDI-WH 201.

3.6 TRAP PRIMER INSTALLATION

- A. Install supply-type, trap-seal primer valves or flush valve type vacuum breaker trap primers for all floor drains, with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

- B. Install trap primer valves in accessible locations. Where necessary to conceal in wall, install trap primer valves behind key operated, locking access panel.
- C. Connect trap primer valves to nearest commonly utilized cold water line.
- D. Provide shutoff valve for each trap primer valve.

END OF SECTION 22 11 19

DIVISION 22 – PLUMBING

SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following for soil, waste, and vent piping inside the building:
 - 1. Pipe, tube, and fittings.
 - 2. Special pipe fittings.
 - 3. Piping Application Schedule.

1.2 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.
- C. LLDPE: Linear, low-density polyethylene plastic.
- D. NBR: Acrylonitrile-butadiene rubber.
- E. PE: Polyethylene plastic.
- F. PVC: Polyvinyl chloride plastic.
- G. TPE: Thermoplastic elastomer.

1.3 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

1.4 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.2 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 74, Service class.
- B. Gaskets: ASTM C 564, rubber.
- C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.3 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.

- B. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
1. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
 - a. Manufacturers: Subject to requirements provide products by one of the following:
 - 1) ANACO.
 - 2) Fernco, Inc.
 - 3) Ideal Div.; Stant Corp.
 - 4) Mission Rubber Co.
 - 5) Tyler Pipe; Soil Pipe Div.
 2. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.
 - a. Manufacturers: Subject to requirements provide products by one of the following:
 - 1) ANACO.
 - 2) Clamp-All Corp.
 - 3) Ideal Div.; Stant Corp.
 - 4) Mission Rubber Co.
 - 5) Tyler Pipe; Soil Pipe Div.
 3. Heavy-Duty, Shielded, Cast-Iron Couplings: ASTM A 48/A 48M, two-piece, cast-iron housing; stainless-steel bolts and nuts; and ASTM C 564, rubber sleeve.
 - a. Manufacturers: Subject to requirements provide products by one of the following:
 - 1) MG Piping Products Co.

2.4 STEEL PIPE AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade A or B, Standard Weight or Schedule 40, galvanized. Include ends matching joining method.
- B. Drainage Fittings: ASME B16.12, galvanized, threaded, cast-iron drainage pattern.
- C. Pressure Fittings:
 1. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe. Include ends matching joining method.
 2. Malleable-Iron Unions: ASME B16.39; Class 150; hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface; and female threaded ends.

3. Gray-Iron, Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.
 4. Cast-Iron Flanges: ASME B16.1, Class 125.
 5. Cast-Iron, Flanged Fittings: ASME B16.1, Class 125, galvanized.
- D. Grooved-Joint Systems:
1. Manufacturers: Subject to requirements provide products by one of the following:
 - a. Anvil International.
 - b. Star Pipe Products; Star Fittings Div.
 - c. Victaulic Company.
 - d. Ward Manufacturing, Inc.
 2. Grooved-End, Steel-Piping Fittings: ASTM A 47/A 47M, galvanized, malleable-iron casting; ASTM A 106, galvanized-steel pipe; or ASTM A 536, galvanized, ductile-iron casting; with dimensions matching steel pipe.
 3. Grooved-End, Steel-Piping Couplings: AWWA C606, for steel-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

2.5 COPPER TUBE AND FITTINGS

- A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
1. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.
- B. Hard Copper Tube: ASTM B 88, Types L and M, water tube, drawn temper.
1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 2. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.
 3. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.6 ABS PIPE AND FITTINGS

- A. Solid-Wall ABS Pipe: ASTM D 2661, Schedule 40.
- B. ABS Socket Fittings: ASTM D 2661, made to ASTM D 3311, drain, waste, and vent patterns.
- C. Solvent Cement and Adhesive Primer:
1. Use ABS solvent cement that has a VOC content of 325 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.7 SPECIAL PIPE FITTINGS

- A. Flexible, Non-pressure Pipe Couplings: Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition pattern. Include shear ring, ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
1. Manufacturers: Subject to requirements provide products by one of the following:
 - a. Dallas Specialty & Mfg. Co.
 - b. Fernco, Inc.
 - c. Logan Clay Products Company (The).
 - d. Mission Rubber Co.
 - e. NDS, Inc.
 - f. Plastic Oddities, Inc.
 2. Sleeve Materials:
 - a. For Cast-Iron Soil Pipes: ASTM C 564, rubber.
 - b. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 - c. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- B. Shielded Non-pressure Pipe Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
1. Manufacturers: Subject to requirements provide products by one of the following:
 - a. Cascade Waterworks Mfg. Co.
 - b. Mission Rubber Co.
- C. Rigid, Unshielded, Non-pressure Pipe Couplings: ASTM C 1461, sleeve-type reducing- or transition-type mechanical coupling molded from ASTM C 1440, TPE material with corrosion-resistant-metal tension band and tightening mechanism on each end.
1. Manufacturers: Subject to requirements provide products by one of the following:
 - a. ANACO.
- D. Pressure Pipe Couplings: AWWA C219 metal, sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.
1. Manufacturers: Subject to requirements provide products by one of the following:
 - a. Cascade Waterworks Mfg. Co.
 - b. Dresser, Inc.; DMD Div.
 - c. EBAA Iron Sales, Inc.

- d. Ford Meter Box Company, Inc. (The); Pipe Products Div.
 - e. JCM Industries, Inc.
 - f. Romac Industries, Inc.
 - g. Smith-Blair, Inc.
 - h. Viking Johnson.
2. Center-Sleeve Material: Manufacturer's standard.
 3. Gasket Material: Natural or synthetic rubber.
 4. Metal Component Finish: Corrosion-resistant coating or material.

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Provide all excavation, backfill and bedding as required for the work. Refer to Division 31 Section Earthwork for excavating, trenching, and backfilling.

3.2 PIPING APPLICATION SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 4 and smaller shall be any of the following:
 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless cast-iron soil pipe and fittings standard, shielded, stainless-steel couplings; and hubless-coupling joints.
 3. Steel pipe, drainage fittings, and threaded joints.
 4. Copper DWV tube, copper drainage fittings, and soldered joints.
- C. Aboveground, soil and waste piping NPS 5 and larger shall be any of the following:
 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.
 3. Steel pipe, drainage fittings, and threaded joints.
- D. Aboveground, vent piping NPS 4 and smaller shall be any of the following:
 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.
 3. Steel pipe, drainage fittings, and threaded joints.
 4. Copper DWV tube, copper drainage fittings, and soldered joints.
 5. Solid-wall ABS pipe, ABS socket fittings, and solvent-cemented joints, except in spaces used as HVAC air plenums.

- E. Aboveground, vent piping NPS 5 and larger shall be any of the following:
 - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 - 2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.
 - 3. Steel pipe, drainage fittings, and threaded joints.
 - 4. Solid-wall ABS pipe, ABS socket fittings, and solvent-cemented joints, except in spaces used as HVAC air plenums.
- F. Underground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:
 - 1. Extra-Heavy class, cast-iron soil piping; gaskets; and gasketed joints.
 - 2. Hubless cast-iron soil pipe and fittings; heavy-duty shielded, stainless-steel, heavy-duty shielded, cast-iron and rigid, unshielded couplings; and hubless-coupling joints.
 - 3. Solid wall ABS pipe, ABS socket fittings, and solvent-cemented joints.
- G. Underground, soil and waste piping NPS 5 and larger shall be any of the following:
 - 1. Extra-Heavy class, cast-iron soil piping; gaskets; and gasketed joints.
 - 2. Hubless cast-iron soil pipe and fittings; heavy-duty shielded, stainless-steel and heavy-duty shielded, cast-iron couplings; and hubless-coupling joints.
 - 3. Solid wall ABS pipe, ABS socket fittings, and solvent-cemented joints.
- H. Aboveground sanitary-sewage force mains NPS 1-1/2 and NPS 2 shall be any of the following:
 - 1. Hard copper tube, Type L; copper pressure fittings; and soldered joints.
 - 2. Steel pipe, pressure fittings, and threaded joints.
- I. Aboveground sanitary-sewage force mains NPS 2-1/2 to NPS 6 shall be any of the following:
 - 1. Hard copper tube, Type L; copper pressure fittings; and soldered joints.
 - 2. Steel pipe, pressure fittings, and threaded joints.
 - 3. Grooved-end steel pipe, grooved-joint system fittings and couplings, and grooved joints.
- J. Underground sanitary-sewage force mains NPS 4 and smaller shall be any of the following:
 - 1. Hard copper tube, Type L; wrought-copper pressure fittings; and brazed joints.
 - 2. Steel pipe, pressure fittings, and threaded joints.
- K. Underground sanitary-sewage force mains NPS 5 and larger shall be any of the following:
 - 1. Steel pipe, pressure fittings, and threaded joints.

3.3 PIPING INSTALLATION

- A. Basic piping installation requirements are specified in Division 22 Section "Common Work Results for Plumbing."
- B. Install seismic restraints on piping, where required.
- C. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- D. Install cleanout fitting with closure plug inside the building in sanitary force-main piping.
- E. Install underground, steel, force-main piping.
- F. Install underground, copper, force-main tubing according to CDA's "Copper Tube Handbook."
- G. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- H. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- I. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- J. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
 - 1. Horizontal Sanitary Drainage Piping:: 2 percent (1/4"/ft) downward in direction of flow for piping NPS 3 and smaller; 2 percent (1/4"/ft) downward in direction of flow for piping NPS 4 and larger, unless specifically indicated otherwise. If specifically indicated otherwise, slope no less than 1 percent (1/8"/ft) downward in direction of flow.
 - 2. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- K. Install ABS soil and waste drainage and vent piping according to ASTM D 2661.
 - L. Install underground ABS soil and waste drainage piping according to ASTM D 2321.
- M. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.4 JOINT CONSTRUCTION

- A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."

- B. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- C. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.
- D. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.
- E. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.
- F. Grooved Joints: Assemble joint with keyed coupling, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

3.5 HANGER AND SUPPORT INSTALLATION

- A. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment." Install the following:
 - 1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 2. Install individual, straight, horizontal piping runs according to the following:
 - a. MSS Type 1, adjustable, steel clevis hangers.
 - 3. Multiple, Straight, Horizontal Piping Runs: MSS P-69 trapeze hangers.
- B. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.
- E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 60 inches (1500 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 3 (DN 80): 60 inches (1500 mm) with 1/2-inch (13-mm) rod.
 - 3. NPS 4 and NPS 5 (DN 100 and DN 125): 60 inches (1500 mm) with 5/8-inch (16-mm) rod.
 - 4. NPS 6 (DN 150): 60 inches (1500 mm) with 3/4-inch (19-mm) rod.
 - 5. NPS 8 to NPS 12: 60 inches with 7/8-inch rod.
- F. Install supports for vertical cast-iron soil piping every 15 feet.
- G. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4 (DN 32): 84 inches (2100 mm) with 3/8-inch (10-mm) rod.
 - 2. NPS 1-1/2 (DN 40): 108 inches (2700 mm) with 3/8-inch (10-mm) rod.
 - 3. NPS 2 (DN 50): 10 feet (3 m) with 3/8-inch (10-mm) rod.
 - 4. NPS 2-1/2 (DN 65): 11 feet (3.4 m) with 1/2-inch (13-mm) rod.
 - 5. NPS 3 (DN 80): 12 feet (3.7 m) with 1/2-inch (13-mm) rod.

6. NPS 4 and NPS 5 (DN 100 and DN 125): 12 feet (3.7 m) with 5/8-inch (16-mm) rod.
 7. NPS 6 (DN 150): 12 feet (3.7 m) with 3/4-inch (19-mm) rod.
 8. NPS 8 to NPS 12: 12 feet with 7/8-inch rod.
- H. Install supports for vertical steel piping every 15 feet.
- I. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 1-1/4 (DN 32): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.
 2. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 96 inches (2400 mm) with 3/8-inch (10-mm) rod.
 3. NPS 2-1/2 (DN 65): 108 inches (2700 mm) with 1/2-inch (13-mm) rod.
 4. NPS 3 to NPS 5 (DN 80 to DN 125): 10 feet (3 m) with 1/2-inch (13-mm) rod.
 5. NPS 6 (DN 150): 10 feet (3 m) with 5/8-inch (16-mm) rod.
 6. NPS 8 (DN 200): 10 feet (3 m) with 3/4-inch (19-mm) rod.
- J. Install supports for vertical copper tubing every 10 feet.
- K. Install hangers for ABS piping with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 1-1/2 and NPS 2 (DN 40 and DN 50): 48 inches (1200 mm) with 3/8-inch (10-mm) rod.
 2. NPS 3 (DN 80): 48 inches (1200 mm) with 1/2-inch (13-mm) rod.
 3. NPS 4 and 5 (DN 100 and 125): 48 inches (1200 mm) with 5/8-inch (16-mm) rod.
 4. NPS 6 (DN 150): 48 inches (1200 mm) with 3/4-inch (19-mm) rod.
 5. NPS 8 to NPS 12 (DN 200 to DN 300): 48 inches (1200 mm) with 7/8-inch (22-mm) rod.
- L. Install supports for vertical ABS piping every 48 inches.
- M. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect drainage and vent piping to all equipment and fixtures requiring drainage and vent piping.

3.7 TESTING AND INSPECTION

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
 3. Re-inspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- B. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- C. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, as a minimum, as indicated in the Uniform Plumbing Code.
1. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 2. Prepare reports for tests and required corrective action.
- D. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 2. Cap and subject piping to static-water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 4. Prepare reports for tests and required corrective action.

3.8 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.9 PROTECTION

- A. Exposed ABS Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

END OF SECTION 22 13 16

DIVISION 22 – PLUMBING

SECTION 22 13 19 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following sanitary drainage piping specialties:
 - 1. Cleanouts.
 - 2. Floor drains.
 - 3. Sanitary Floor Drains
 - 4. Air-admittance valves.
 - 5. Roof flashing assemblies.
 - 6. Miscellaneous sanitary drainage piping specialties.
 - 7. Flashing materials.

1.2 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. FRP: Fiberglass-reinforced plastic.
- C. HDPE: High-density polyethylene plastic.
- D. PE: Polyethylene plastic.
- E. PP: Polypropylene plastic.
- F. PVC: Polyvinyl chloride plastic.

1.3 COORDINATION

- A. Coordinate size and location of building penetrations.

1.4 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 CLEANOUTS

- A. Cleanouts for Copper DWV and Steel Piping:
 - 1. For exposed above grade piping, provide manufacturer's standard cleanout of material suitable for piping system being utilized.
 - 2. For concealed above grade piping, provide manufacturer's standard cleanout or cleanout tee of material suitable for piping system being utilized. Closure plugs shall be drilled and tapped to accept round, flat, stainless steel cover plate, with screw.
- B. Cleanouts for ABS Below Grade Piping:

1. Cleanouts utilized shall be cast iron floor cleanouts with adapters to connect to piping system being utilized.
- C. Exposed Cast Iron Cleanouts:
1. Basis-of-Design Product: Subject to compliance with requirements, provide J. R. Smith Series 4420C (spigot ferrule) or 4512S (cleanout tee) or a comparable product by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Tyler Pipe; Wade Div.
 - d. Watts Drainage Products Inc.
 - e. Zurn Plumbing Products Group
 2. Standard: ASME A112.36.2M.
 3. Size: Same as connected drainage piping
 4. Body Material: Hub-and-spigot, cast-iron soil pipe or Hubless, cast-iron soil pipe spigot ferrule of cleanout tee as required to match connected piping.
 5. Closure: Countersunk, cast bronze, taper thread plug.
 6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
- D. Cast Iron Floor Cleanouts:
1. Basis-of-Design Product: Subject to compliance with requirements, provide J. R. Smith Series 4020/4031/4025 or a comparable product by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB
 - c. Tyler Pipe; Wade Div.
 - d. Watts Drainage Products Inc.
 - e. Zurn Plumbing Products Group
 2. Standard: ASME A112.36.2M for threaded, adjustable housing cleanout.
 3. Size: Same as connected branch.
 4. Type: Threaded, adjustable housing.
 5. Body or Ferrule: Cast iron.
 6. Outlet Connection: Inside calk, No hub or Speedi- set.
 7. Closure: Slotted Cast-iron plug, gasket seal or taper thread.
 8. Adjustable Housing Material: Cast iron with threads.
 9. Frame and Cover Material and Finish: Nickel-bronze, copper alloy in finished areas, cast iron in unfinished areas.
 10. Frame and Cover Shape: Round unless otherwise indicated.
 11. Top Loading Classification: Medium Duty.

12. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.

E. Cast-Iron Wall Cleanouts:

1. Basis-of-Design Product: Subject to compliance with requirements, provide J.R. Smith Series 4422C (spigot ferrule) or Series 4532S (Cleanout tee) or a comparable product by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Tyler Pipe; Wade Div.
 - d. Watts Drainage Products Inc.
 - e. Zurn Plumbing Products Group
2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hub-and-spigot, or no hub cast-iron soil pipe spigot ferrule or cleanout tee as required to match connected piping.
5. Closure: Countersunk, cast bronze plug, drilled and threaded.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Wall Access: Round, flat, stainless-steel cover plate with screw.

2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains:

1. Basis-of-Design Product: Subject to compliance with requirements, provide J.R. Smith floor drains with features and accessories as scheduled on the Drawings or a comparable product by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.
 - c. Tyler Pipe; Wade Div.
 - d. Watts Drainage Products Inc.
 - e. Zurn Plumbing Products Group
2. Standard: ASME A112.6.3.

2.3 SANITARY FLOOR DRAINS

A. Cast Iron Sanitary Floor Drains:

1. Basis-of-Design Product: Subject to compliance with requirements, provide J.R. Smith "Sani-ceptor", cast iron, acid resistant coated interior, sanitary floor drains with features and accessories as scheduled on the Drawings or a comparable product by one of the following:
 - a. Josam Company; Josam Div.
 - b. MIFAB, Inc.

- c. Tyler Pipe; Wade Div.
- d. Watts Drainage Products Inc.
- e. Zurn Plumbing Products Group

2.4 AIR-ADMITTANCE VALVES

A. Fixture Air-Admittance Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Oatey.
 - b. ProSet Systems Inc.
 - c. Studor, Inc.
2. Standard: ASSE 1051, Type A for single fixture or Type B for branch piping.
3. Housing: Plastic.
4. Operation: Mechanical sealing diaphragm.
5. Size: Same as connected fixture or branch vent piping.

B. Stack Air-Admittance Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ProSet Systems Inc
 - b. Oatey.
 - c. Studor, Inc.
2. Standard: ASSE 1050 for vent stacks.
3. Housing: Plastic.
4. Operation: Mechanical sealing diaphragm.
5. Size: Same as connected stack vent or vent stack.

C. Wall Box:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ProSet Systems Inc
 - b. Oatey.
 - c. Studor, Inc.
2. Description: White plastic housing with white plastic grille, made for recessed installation. Include bottom pipe connection and space to contain one air-admittance valve.
3. Size: About 9 inches wide by 8 inches high by 4 inches deep.

2.5 ROOF FLASHING ASSEMBLIES

A. Roof Flashing Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Acorn Engineering Company; Elmdor/Stoneman Div.
 - b. Thaler Metal Industries Ltd.
- B. Description: Manufactured assembly made of 4.0-lb/sq. ft., 0.0625-inch-thick, lead flashing collar and skirt extending at least 10 inches from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.

2.6 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

- A. Open Hub Drains:
 1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, or no-hub cast-iron, soil-pipe fittings. Include P-trap, riser section; and where required, increaser fitting..
 2. Size: Same as connected waste piping with increaser fitting of size indicated.
 3. Provide factory fabricated cast iron, auxiliary inlet fitting with NPS 1/2 trap primer inlet.
- B. Auxiliary Inlet Fittings:
 1. Description: Factory fabricated, cast iron, auxiliary inlet fitting with threaded inlet and threaded or spigot outlet, and integral NPS ½ side trap-seal primer valve connection.
 2. Size: Same as drain outlet.
- C. Air-Gap Fittings:
 1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
 2. Body: Bronze or cast iron.
 3. Inlet: Opening in top of body.
 4. Outlet: Larger than inlet.
 5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.

2.7 FLASHING MATERIALS

- A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:
 1. General Use: 4.0-lb/sq. ft., 0.0625-inch thickness.
 2. Vent Pipe Flashing: 3.0-lb/sq. ft., 0.0469-inch thickness.
- B. Copper Sheet: ASTM B 152/B 152M, of the following minimum weights and thicknesses, unless otherwise indicated:
 1. General Applications: 12 oz./sq. ft..
 2. Vent Pipe Flashing: 8 oz./sq. ft.
- C. Solder: ASTM B 32, lead-free alloy.

PART 3 - EXECUTION

3.1 CLEANOUT INSTALLATION

- A. Install cleanouts in aboveground piping and building drain piping where indicated and according to the following, unless otherwise indicated:
 - 1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
 - 2. Locate at each change in direction of piping greater than 45 degrees.
 - 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
 - 4. Locate at base of each vertical soil and waste stack.
- B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

3.2 FLOOR DRAIN INSTALLATION

- A. Install in locations as indicated on drawings.
- B. Provide grates as scheduled and adjust as required for level installation with finished floor.
- C. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
- D. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- E. Provide trap primer connection for all floor drains unless otherwise indicated

3.3 AIR ADMITTANCE VALVE INSTALLATION

- A. Install fixture air-admittance valves on fixture drain piping only where indicated on drawings.
- B. Install stack air-admittance valves at top of stack vent and vent stack piping only where indicated on drawings.
- C. Install air-admittance-valves in wall boxes recessed in wall, where indicated.

3.4 AIR GAP FITTING INSTALLATION

- A. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.

3.5 FLASHING INSTALLATION

- A. Vent Flashing: Install flashing on all pipes penetrating roof assembly. Flash with copper or lead sheets which extend a minimum of 10" in all directions from the pipe and extend up pipe at least 6" above the roof membrane. Make watertight with counterflashing pipe fitting.

- B. Floor Drain Flashing: Install flashings for all floor drains not located on slab on grade. Flash with lead or copper sheet flashing clamped to drain flashing ring, and extending a minimum of 10" beyond flashing ring in all directions. Apply mastic to sheet flashing.

3.6 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 22 13 19

DIVISION 22 – PLUMBING

SECTION 22 33 00 - ELECTRIC DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following electric water heaters:
 - 1. Commercial, Standard, Storage electric water heaters.
 - 2. Domestic Hot Water Compression tanks.

1.2 QUALITY ASSURANCE

- A. Source Limitations: Obtain same type of electric water heaters through one source from a single manufacturer, wherever possible.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. ASHRAE/IESNA 90.1-2004 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004.
- D. ASME Compliance: Where indicated, fabricate and label commercial water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
- E. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for all components that will be in contact with potable water.

1.3 WARRANTY

- A. Warranty Period(s): From date of Substantial Completion:
 - 1. Commercial Electric Water Heaters: Three year Limited Tank and Parts Warranty

1.4 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 COMMERCIAL ELECTRIC WATER HEATERS

- A. Commercial, Standard, Storage Electric Water Heaters: Comply with UL 1453 requirements for storage-tank-type water heaters.
 - 1. Manufacturers: Subject to compliance with requirements, provide product by manufacturer as scheduled on the drawings or a comparable product by one of the following:
 - a. Bock Water Heaters, Inc.
 - b. Bradford White Corporation.

- c. Lochinvar Corporation.
 - d. PVI Industries, LLC.
 - e. Rheem Water Heater Div.; Rheem Manufacturing Company.
 - f. Ruud Water Heater Div.; Rheem Manufacturing Company.
 - g. Smith, A. O. Water Products Company.
 - h. State Industries, Inc.
2. Storage-Tank Construction: ASME-code, steel vertical arrangement.
 - a. Tappings: ASME B1.20.1 pipe thread.
 - b. Pressure Rating: 150 psig.
 - c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending lining material into tappings.
 3. Factory-Installed Storage-Tank Appurtenances:
 - a. Anode Rod: Replaceable magnesium.
 - b. Drain Valve: Corrosion-resistant metal complying with ASSE 1005.
 - c. Insulation: Comply with ASHRAE/IESNA 90.1.
 - d. Jacket: Steel with enameled finish.
 - e. Heating Elements: Electric, screw-in or bolt-on immersion type arranged in multiples of three.
 - f. Temperature Control: Adjustable immersion type thermostat.
 - g. Controls: 120 volt control circuit powered by fused transformer with magnetic contactors, and solid state modulating step control, housed in control compartment with hinged door.
 - h. Element fusing: Per NEC
 - i. Safety Controls: High-temperature-limit and low-water cutoff devices or systems.
 - j. Relief Valves: ASME rated and stamped and complying with ASME PTC 25.3, for combination temperature and pressure relief valves. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than water heater working-pressure rating. Select one relief valve with sensing element that extends into storage tank.

2.2 DOMESTIC HOT WATER COMPRESSION TANKS

- A. Description: Steel, ASME, pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air pre-charge to minimum system-operating pressure at tank.
 1. Manufacturers: Subject to compliance with requirements, provide product by manufacturer as scheduled or noted on the drawings or a comparable product by one of the following:
 - a. AMTROL Inc.
 - b. Armstrong Pumps, Inc.

- c. Honeywell Sparco.
 - d. Smith, A. O.; Aqua-Air Div.
 - e. State Industries, Inc.
 - f. Taco, Inc.
 - g. Watts Regulator Co.
 - h. Wessels Co.
2. Construction:
- a. ASME for 150 psig working pressure.
 - b. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1, pipe thread.
 - c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
 - d. Air-Charging Valve: Factory installed.
 - e. Steel legs or integral ring mount base for vertical installation where noted or scheduled.

PART 3 - EXECUTION

3.1 WATER HEATER INSTALLATION

- A. Install floor mounted electric water heaters on concrete housekeeping pads.
 1. Exception: Omit concrete housekeeping pads if installation is on stand, bracket, suspended platform, or direct on floor is indicated.
- B. Install floor mounted electric water heaters located in unconditioned spaces or on concrete floors or concrete housekeeping pads on an incompressible, insulation pad with a minimum thermal resistance of R-10.
 1. Exception: Omit R-10 insulation pads if installation is on stand, bracket, suspended platform.
- C. Install water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
- D. Install combination temperature and pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain or other termination point as indicated..
- E. Install thermometer on outlet piping of water heaters.
- F. Fill water heaters with water.
- G. Charge domestic hot water compression tanks with air.

3.2 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, confirm proper operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 4. Set water heater thermostats for supply hot water temperature as required.
- B. Remove and replace water heaters that do not pass tests and inspections and retest as specified above.

END OF SECTION 22 33 00

DIVISION 22 – PLUMBING

SECTION 22 40 00 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following plumbing fixtures and trim:
 - 1. Plumbing fixtures and trim as scheduled on the drawings

1.2 QUALITY ASSURANCE

- A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of a specific type, through one source from a single manufacturer, wherever possible..
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.
- D. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- E. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible. Provide fixtures complete with fittings, supports, fastening devices, faucets, valves, traps and appurtenances required.
- F. Provide vitreous ware of non-absorbent china of even color and unmarked.
- G. Provide porcelain lined ware constructed of smooth, sound iron castings, properly finished and provided with first quality high temperature enamel.
- H. Provide fittings, trim and escutcheons of heavy brass castings, properly finished and chrome plated.
- I. Warranty all fixtures not to craze, color or scale.

1.3 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 VITREOUS CHINA FIXTURES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product by manufacturer as scheduled on the drawings, or a comparable product by one of the following:
 - 1. American Standard
 - 2. Eljer
 - 3. Kohler

4. Mansfield
5. Briggs

2.2 MANUAL METERING FAUCETS (0.5 gpm)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product by manufacturer as scheduled on the drawings, or a comparable product by one of the following:
1. T&S Brass
 2. Symmons
 3. Delta
 4. Chicago Faucet

2.3 CONCEALED, HYDRAULIC FLUSH VALVES (W/C=1/6 gpm & Urinal=0.125 gpm)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product by manufacturer as scheduled on the drawings, or a comparable product by one of the following:
1. Sloan Royal
 2. Zurn Auqa-Sense

2.4 WASTES AND SUPPLIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product by manufacturer as scheduled on the drawings, or a comparable product by one of the following:
1. American Standard
 2. Kohler
 3. Elkay
 4. Just
 5. McGuire
 6. Speedway
 7. Dearborn Brass

2.5 FIXTURE CARRIERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product by manufacturer as scheduled on the drawings, or a comparable product by one of the following:
1. J.R. Smith
 2. Zurn
 3. Josam
 4. Wade
 5. Mifab
 6. Watts Drainage

- B. Determine from drawings, required hand and type.

2.6 TOILET SEATS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product by manufacturer as scheduled on the drawings, or a comparable product by one of the following:
 1. Olsonite
 2. Church
 3. Kohler
 4. Beneke
 5. Bemis

2.7 UNDER SINK PIPING COVERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product by manufacturer as scheduled on the drawings, or a comparable product by one of the following:
 1. Truebro
 2. Plumberex

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.
- B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions. Set fixtures and connect to soil, waste, vent and water supplies in neat, finished, uniform manner.
- B. Install carrier supports, affixed to building substrate, for wall-mounting fixtures. Select carriers as recommended by fixture manufacturer.
- C. Install counter-mounting fixtures in and attached to casework. Cut counter tops in casework for installation of counter mounted fixtures. Retain qualified and experienced personnel for cutting counter tops in casework.
- D. Install fixtures level and plumb according to roughing-in drawings. Install fixtures at height and location as indicated on the Architectural drawings, or as directed by the Architect.
- E. Install flushometer valves for ADA accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.

- F. Install tanks for ADA accessible, tank-type water closets with lever handle mounted on wide side of compartment.
- G. Install undersink piping covers for exposed waste piping and hot water risers and stops at ADA accessible sinks and lavatories.
- H. Install escutcheons at piping wall penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings.
- I. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color.

3.3 FIELD QUALITY CONTROL

- A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.
- B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
- E. Install fresh batteries in sensor-operated mechanisms.

3.4 ADJUSTING

- A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Adjust water pressure at fixtures to produce proper flow and stream.
- C. Replace washers and seals of leaking and dripping faucets and stops.

3.5 CLEANING

- A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:
 - 1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
 - 2. Remove sediment and debris from drains.
- B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.6 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 40 00

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING

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DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING

SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. General Requirements
 - 2. Access Doors
 - 3. Equipment Installation Common Requirements.
 - 4. Concrete Bases, Curbs and Housekeeping Pads.
 - 5. Supports and Anchorages.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.4 PRODUCT SELECTION PROCEDURES

- A. Where the specifications list one or more manufacturers, provide product by one of the named manufacturers on the list that complies with specification requirements.
- B. Other manufacturers of products which may meet the specification requirements, but are not listed in the specifications will be considered, subject to prior approval. Submit one copy of a prior approval request to the Engineer, listing all pertinent product information indicating compliance with the specifications requirements. Prior approval requests must be received by the Engineer at least 7 days prior to the project bid date. A list of products given prior approval will be listed by Addendum to the project.

1.5 SUBMITTALS

- A. Comply with all of the requirements of Division 01 – General Requirements, Section 013000 - Administrative Requirements.

1.6 SUBSTITUTIONS

- A. Comply with all of the requirements listed in the Instructions To Bidders ITB-10 Exceptions to Contract Documents.

1.7 SUPERVISION

- A. Comply with all of the requirements of the Contract Documents – Specific Requirements SR-1.

1.8 SCHEDULE OF VALUES

- A. Comply with all of the requirements of Division 01 – General Requirements, Section 012200 – Measurement and Payment.

1.9 CODES, FEES AND RELATED COSTS

- A. Comply with all requirements of the General Conditions presented in the specifications.
- B. Requirements of Regulatory Agencies:
 - 1. In addition to requirements specified in General Conditions, GC-11 Referenced Standards and Specifications, the contractor is to comply with the latest edition of the current local and/or state ordinances and codes as noted below:

Building Codes:

- IFC - International Fire Code
- IMC - International Mechanical Code

Industry Standards, Codes and Specifications:

- AIEE - American Institute of Electrical Engineers
- AMCA - Air Moving & Conditioning Association
- ASA - American Standards Association
- IBR - Institute of Boiler & Rating Manufacturers
- SMACNA - Sheet Metal and Air Conditioning Contractors National Association, Inc.
- ARI - Air Conditioning and Refrigeration Institute
- FIA - Factory Insurance Association
- FM - Factory Mutual
- OSHA - Occupational Safety and Health Act
- ADC - Air Diffusion Council
- WISHA - Washington Industrial Safety & Health Act
- APWA - Standard Specification for Municipal Public Works
- WDOE - Washington Department of Ecology
- WSEC - Washington State Energy Code

1.10 PROJECT RECORD DOCUMENTS

- A. Comply with all of the requirements of Division 01 – General Requirements, Section 017823 – Operations & Maintenance Manuals.

1.11 CONCRETE BASES, CURBS AND HOUSEKEEPING PADS

- A. All concrete bases, curbs and housekeeping pads as required for the work of Division 23, shall be provided under the work of Division 23.

1.12 SUPPORTS

- A. Provide all pipe stands, mounting brackets and metal bases required for HVAC material and equipment.
- B. Provide all necessary supplementary steel for support or attachment of HVAC material and equipment, in shafts and between building structural members. Steel shall be painted with one coat of rust-inhibiting primer.

1.13 LISTED EQUIPMENT

- A. The Washington State Electrical Code requires that all materials, devices, appliances, and equipment, shall be of a type that conforms to applicable standards or be indicated as acceptable by the established standards of the Underwriters Laboratories, Inc. or other electrical product testing laboratories which are accredited by the department.
- B. This statement is being interpreted by the State Electrical Inspector as follows: It is understood that many specialty items such as cast iron boiler, certain items of air handling equipment and other building components are not available with a UL label covering the entire piece of equipment. The State will impose no requirement that an item of equipment be UL labeled unless it is available as UL labeled item from at least two manufacturers. Electrical components of unlabeled equipment, such as motors, shall be labeled if they are available from at least two manufacturers.
- C. If any building component is available with UL or other Washington State approved label from at least two manufacturers, an identical or similar unlabeled component shall not be acceptable for installation in the State of Washington. Should any such component be installed in the State of Washington, it shall either be inspected and labeled by a UL representative or other authority approved by the State or it shall be replaced with a UL labeled component, before the building will be accepted by the State Electrical Inspector.
- D. The engineer has attempted to select UL listed components on this project. However, it must be understood that catalog data on which he bases his selection are not necessarily always current. Components are continually added to the UL approved listings. Conversely, a manufacturer may make a change in a product line, voiding the previous UL approval shown in the catalog. These changes commonly take place after the project has been released for bidding.
- E. Consequently, it shall be the sole responsibility of the Contractor (through his suppliers and equipment manufacturers) to purchase and install only equipment bearing the UL or other approved label whenever that equipment so labeled is available. The Contractor, should he install any equipment without the proper UL label, shall bear the entire cost of correction to the satisfaction of the Washington State Electrical Inspector.

1.14 TEST LOG DATA

- A. The Contractor shall keep a three-ring notebook in the construction job office for the sole purpose of filing test data. The test data shall include the testing and flushing of all HVAC piping, duct testing and other testing requirements on the project. All log data test entries shall be signed by the Contractor's Superintendent and the District's representative or the code authority having jurisdiction.

1.15 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. At the completion of the project, at such time as designated by the Architect, an operational and maintenance instruction period for the District shall take place. Contractor shall have present during this entire period his superintendent, foremen of various portions of the project, and manufacturer's service representatives (factory trained) for all equipment requiring periodic maintenance. All operational and maintenance instructions shall be presented under direct supervision of the Architect.
- B. Contractor shall provide sign in sheet and shall be responsible for all parties present to sign in. After instruction is complete and accepted by the District, Contractor shall provide letter to the Architect indicating that the instructions have been completed and accepted, and District shall sign same.

1.16 OPERATION AND MAINTENANCE MANUALS

- A. Comply with all of the requirements of Division 01 – General Requirement, Section 017823 – Operatins & Maintenance Manuals.

1.17 PROJECT CLOSEOUT

- A. Contractor shall review the following specific checklist items prior to requesting inspection for Substantial or Final completion. The signed and dated checklist items shall be submitted with the request for Substantial or Final completion:

<u>Item</u>	<u>Verified By</u>	<u>Date</u>
All shipping tie-downs removed	_____	_____
All equipment with motors have specified motor with correct horsepower voltage and individual control heaters are adequate.	_____	_____
All equipment with electrical connections have wiring completed with proper voltage/phase	_____	_____
Fan wheels and pump impellers rotate in proper direction	_____	_____
Fans and pumps rotate at specified RPM	_____	_____
All equipment operational	_____	_____

All volume dampers installed where indicated on the drawings and left in open position prior to balancing	_____	_____
All insulation complete on HVAC piping systems and duct systems	_____	_____
All grilles, registers and diffusers connected to system and properly installed.	_____	_____
All ductwork installed and sealed	_____	_____
Clean filters installed in all air handling systems	_____	_____
Control System fully operational	_____	_____

1.18 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling and during the progress of the work to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.
- C. Protect ductwork from the elements during transportation, construction and storage. Acoustically lined ductwork shall not be stored outside at any time. When internally lined ductwork is on the job site, all openings shall be completely sealed to prevent entrance of construction dust.
- D. Openings in all types of ductwork (grilles, registers, diffusers, duct openings, etc.) shall be completely sealed at the end of each working day and during the progress of the construction as feasible to prevent entrance of construction dust and debris. Ductwork may be unsealed after all of the construction spaces served by the ductwork have been completely cleaned, painted and approved by the District and Architect.

1.19 TEMPORARY HEATING, VENTILATION AND AIR CONDITIONING

- A. Air moving equipment is not to be operated for any purpose, including but not limited to temporary heating/cooling of the construction space, testing and balancing, commissioning, etc., until all of the construction spaces served by the air moving equipment have been completed, cleaned, painted and approved by the District or the Architect.

1.20 COORDINATION

- A. Coordinate the location of all piping and ductwork to determine that it clears all openings and structural members, that it may be properly concealed and that it clears cabinets, lights and all equipment having fixed locations. No extra payments will be allowed where piping and/or ductwork must be offset to avoid other work, or where minor changes are necessary to facilitate installation.

- B. Drawings do not attempt to show complete details of building construction which affect the mechanical installation. Contractor shall refer to the Architectural, Structural, Electrical drawings for additional building details which affect installation of its work
- C. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for piping and ductwork installations.
- D. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- E. Access panels shall be provided for all Division 23 items requiring access that are concealed behind finished surfaces. All access panels required for the work of Division 23, size 24"x24" and under, shall be provided under the work of Division 23. Coordinate the location of all access panels with Architect.

PART 2 - PRODUCTS

2.1 ACCESS DOORS

- A. Provide access doors suited for installation in masonry, tile, wood or other wall and ceiling surfaces. Provide fire rated access doors for installation in fire rated wall or ceiling assemblies.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Elmdor/Stoneman; Div. of Acorn Engineering Co.
 - 2. MIFAB, Inc.
 - 3. Milcor Inc.
- C. Lightweight Flush Access Doors and Frames with Exposed Trim: Fabricated from lightweight metal.
 - 1. Locations: Wall and ceiling surfaces.
 - 2. Door: Minimum 0.018-inch-thick steel sheet.
 - 3. Frame: Minimum 0.045-inch-thick extruded aluminum with 1-1/4-inch- wide rolled flange.
 - 4. Hinges: Fully concealed, continuous piano type.
 - 5. Latch: Screwdriver-operated cam latch.
- D. Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.
 - 1. Locations: Wall and ceiling surfaces.
 - 2. Fire-Resistance Rating: Not less than 1-1/2 hours in walls and 3 hours in ceilings.
 - 3. Temperature Rise Rating: 250 deg F at the end of 30 minutes.
 - 4. Door: Flush panel with a core of 2" thick mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036 inch.
 - 5. Frame: Minimum 0.060-inch-thick sheet metal with 1-inch-wide, surface-mounted trim.

6. Hinges: Fully concealed, continuous piano type.
7. Automatic Closer: Spring type
8. Latch: Self-latching device operated by knurled knob with interior release.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Provide aisles, or space around equipment suitable for complete service and inspection of equipment. Maintain minimum 6'6" headroom in all access aisles. Provide minimum clearances at electrical equipment per NEC.
- C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- D. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- E. Install equipment to allow right of way for piping installed at required slope.
- F. Label Pressure Vessels in accordance with the State Boiler and Unfired Pressure Vessels Inspection Law. Frame and mount a certificate showing approval under this law adjacent to each respective piece of equipment. Pay all costs and fees for certificates, inspections, filing and labeling.
- G. Provide equipment with WISHA-OSHA approved drive and shaft guards for all exposed, rotating drive shafts and drive connections between motors and driven equipment including, pumps, compressors, etc. Guards shall include heavy duty steel frames securely fastened for easy removal to the equipment frame. Guards, in general, shall be solid sheet metal with tachometer cutout at shafts where applicable. Guards may be provided by the equipment manufacturer or fabricated by the Contractor to the manufacturer's clearances, configurations, etc.
- H. Provide a service engineer for equipment start-up as indicated under division 23 Sections specifying equipment. Service engineer shall be a factory-trained and certified engineer in the employ of the factory, or the employee of the sales representative. Where Contractor is the sales representative, it must employ a factory trained and certified person to do this service work and shall have a letter from the manufacturer stating that he/she is qualified for start-up of equipment furnished

3.2 CONCRETE BASES, CURBS AND HOUSEKEEPING PADS

- A. Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 1. Construct reinforced concrete bases, curbs and housekeeping pads of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.

3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Comply with the requirements of Division 03 – Concrete and 033000 Cast-In-Place Concrete.

3.3 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Provide shop drawings showing sizing, design and location of supplementary steel and sizing calculations stamped by a structural engineer registered in the state in which the project resides.
- C. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.
- D. Field Welding: Comply with AWS D1.1. Do not weld to building structural components without written approval of the Structural Engineer.

3.4 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Furnish and cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor HVAC materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

END OF SECTION 23 05 00

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING

SECTION 23 05 13 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for single-phase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.2 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Provide all motors as required by Division 23 specifications.
- B. Comply with requirements in this Section except when stricter requirements are specified in HVAC equipment schedules or Sections.
- C. Comply with NEMA MG 1 unless otherwise indicated.
- D. Nameplates in accordance with NEMA MG 1.
- E. Any motor sized between 1/12th HP (62 watts) but less than 1.0 HP (746 watts) shall be an EC motor.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
- C. Motors shall be rated for the supply voltage. Motors rated 460/230V or 460/230/208V shall not be acceptable for 208/200V systems.

2.3 SINGLE-PHASE MOTORS

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
 - 1. Permanent-split capacitor.
 - 2. Split phase.
 - 3. Capacitor start, inductor run.
 - 4. Capacitor start, capacitor run.

- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 23 05 13

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING

SECTION 23 05 53 - IDENTIFICATION FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Equipment labels.

1.2 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

1.3 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 2. Letter Color: White.
 3. Background Color: Black.
 4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 7. Fasteners: Stainless-steel rivets or self-tapping screws.
 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

END OF SECTION 23 05 53

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Balancing Air Systems:

1.2 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An entity engaged to perform TAB Work.

1.3 SUBMITTALS

- A. Submit the following no less than 10 days after Work on-site:
 - 1. Certified TAB reports.
 - 2. Sample report forms.
 - 3. Instrument calibration reports, to include the following:
 - a. Instrument type and make.
 - b. Serial number.
 - c. Application.
 - d. Dates of use.
 - e. Dates of calibration.

1.4 QUALITY ASSURANCE

- A. TAB Subcontractor Qualifications: Engage a TAB entity certified by AABC OR NEBB.
 - 1. TAB Field Supervisor: Employee of the TAB Subcontractor and certified by AABC OR NEBB.
 - 2. TAB Technician: Employee of the TAB Subcontractor and who is certified by AASBC OR NEBB.
- B. TAB Report Forms: Use standard TAB Subcontractor's forms approved by Architect.
- C. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

1.5 DESCRIPTION OF THE WORK

- A. Balance all air system supply, return and exhaust air to the quantities as indicated on the drawings.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 TAB SPECIALISTS

- A. Subject to compliance with requirements, engage one of the following:
 - 1. TESTCOMM LLC
 - 2. Maiani Construction Services (Northwest Engineering Service, Inc.)

3.2 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
- B. Examine systems for installed balancing devices.. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine equipment performance data including fan and pump curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- G. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- H. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- I. Examine operating safety interlocks and controls on HVAC equipment.
- J. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.3 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Complete system-readiness checks. Verify the following:
 - 1. Permanent electrical-power wiring is complete.
 - 2. Automatic temperature-control systems are operational.
 - 3. Equipment and duct access doors are securely closed.
 - 4. Balance dampers are open.
 - 5. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 - 6. Windows and doors can be closed so indicated conditions for system operations can be met.

3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.
 - 1. Comply with requirements in ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 - 2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 23 Section "HVAC Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- C. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- D. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- E. Verify that motor starters are equipped with properly sized thermal protection.
- F. Check dampers for proper position to achieve desired airflow path.
- G. Check for airflow blockages.
- H. Check condensate drains for proper connections and functioning.

- I. Check for proper sealing of air-handling-unit components.
- J. Verify that air duct system is sealed as specified in Division 23 Section "Metal Ducts."

3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
 - 2. Measure fan static pressures as follows to determine actual static pressure:
 - a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
 - b. Measure static pressure directly at the fan outlet or through the flexible connection.
 - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
 - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
 - 3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
 - a. Report the cleanliness status of filters and the time static pressures are measured.
 - 4. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
 - 1. Measure airflow of submain and branch ducts.
 - a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 - 2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
 - 3. Re-measure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.
- C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
 2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.7 TOLERANCES

- A. Set HVAC system's air flow rates and water flow rates within the following tolerances:
1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent .
 2. Air Outlets and Inlets: Plus or minus 10 percent .

3.8 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 2. Include a list of instruments used for procedures, along with proof of calibration.
- B. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
 2. Name and address of the TAB Subcontractor.
 3. Project name.
 4. Project location.
 5. Architect's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of TAB supervisor who certifies the report.
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
 13. Notes to explain why certain final data in the body of reports vary from indicated values.
 14. Test conditions for fan performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Fan drive settings including settings and percentage of maximum pitch diameter.
 - e. Other system operating conditions that affect performance.
- C. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches (mm), and bore.
 - i. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
 - j. Number, make, and size of belts.
 - k. Number, type, and size of filters.
 2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches (mm), and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
 3. Test Data (Indicated and Actual Values):
 - a. Total air flow rate in cfm .
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.

- d. Discharge static pressure in inches wg .
 - e. Outdoor airflow in cfm .
 - f. Return airflow in cfm .
 - g. Outdoor-air damper position.
 - h. Return-air damper position.
- D. Fan Test Reports: For supply, return, and exhaust fans, include the following:
- 1. Fan Data:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in inches (mm), and bore.
 - h. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
 - 2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches (mm), and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
 - g. Number, make, and size of belts.
 - 3. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm (L/s).
 - b. Total system static pressure in inches wg (Pa).
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg (Pa).
 - e. Suction static pressure in inches wg (Pa).
- E. Instrument Calibration Reports:
- 1. Report Data:
 - a. Instrument type and make.
 - b. Serial number.
 - c. Application.

- d. Dates of use.
- e. Dates of calibration.

END OF SECTION 23 05 93

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING

SECTION 23 07 00 - HVAC INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Insulation Materials:
 - a. Mineral Fiber Blanket Insulation.
 - b. Mineral Fiber Flexible Rectangular Duct Lining Insulation
 - c. Mineral Fiber Rigid Rectangular Duct Lining Insulation
 - d. Mineral Fiber Flexible Round Duct Lining Insulation
 - e. Mineral Fiber Rigid Round Duct Lining Insulation
 - f. Flexible Elastomeric Pipe Insulation
2. Insulation Installation Requirements
3. Duct Insulation Schedule
4. Minimum Pipe Insulation Thickness Table
5. Minimum Duct Insulation Table

1.2 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.4 COORDINATION

A. Coordinate clearance requirements with HVAC Installer for equipment and duct insulation application. Establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.5 SCHEDULING

A. Schedule insulation application after testing systems. Insulation application may begin on segments that have satisfactory test results.

1.6 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. General:

1. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
2. Products shall not contain asbestos, lead, mercury, or mercury compounds.
3. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
4. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corp.; Duct Wrap.
 - b. Johns Manville; Microlite.
 - c. Knauf Insulation; Duct Wrap.
 - d. Owens Corning; All-Service Duct Wrap.
 - e. Aeroflex USA Inc.
 - f. Armacell LLC; AP Armaflex.
 - g. RBX Corporation
 - h. Einsulation, Inc.

B. Mineral-Fiber Blanket Insulation:

1. Mineral or glass fibers bonded with a thermosetting resin, with FSK facing. Comply with ASTM C 553, Type II and ASTM C 1290, Type I.

C. Mineral Fiber Flexible Rectangular Duct Lining Insulation:

1. Mineral or glass fibers bonded with a thermosetting resin, flexible, airstream surface coated with acrylic surface treatment. ASTM C 1071, Type I. NFPA 90A and 90B compliance, UL listed.

D. Mineral Fiber Rigid Rectangular Plenum Duct Liner Board Insulation:

1. Mineral or glass fibers bonded with a thermosetting resin, rigid, airstream surface coated with acrylic surface treatment and factory applied edge coating. ASTM C 1071, Type II. NFPA 90A and 90B compliance, UL listed.

E. Mineral Fiber Preformed Round Duct Lining Insulation:

1. Mineral or glass fibers bonded with a thermosetting resin, preformed round, self-supporting, airstream surface coated with acrylic surface treatment. NFPA 90A and 90B compliance, UL listed.

F. Mineral Fiber Round Duct Lining Insulation Board:

1. Mineral or glass fibers bonded with a thermosetting resin, kerfed board, airstream surface coated with acrylic surface treatment. NFPA 90A and 90B compliance, UL listed.
- G. Flexible Elastomeric Pipe Insulation.
1. Closed-cell, sponge or expanded rubber materials. Comply with ASTM C 534, Type I for tubular materials

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
1. Verify that systems and equipment to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSULATION INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, flanges, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. On piping with field applied jackets, hangers, supports and anchors shall not penetrate jacketing or insulation.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement. Replace damaged insulation or insulation facings with new sections of insulation.
- N. Insulation shall be continuous through walls, floors, or sleeves with thickness same as adjacent piping.
- O. Do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Manholes.
 - 5. Handholes.
 - 6. Cleanouts.

3.4 MINERAL FIBER BLANKET INSULATION INSTALLATION

- A. Insulation installation on exterior of ductwork and plenums:
 - 1. Secure with adhesive and insulation pins.
 - 2. Apply adhesives according to manufacturer's recommended coverage rates per unit area.
 - 3. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 - 4. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Impale insulation over pins and attach speed washers.
 - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

5. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.5 MINERAL FIBER DUCT AND PLENUM LINING INSULATION INSTALLATION

- A. Installation on interior of rectangular ducts and plenums:
 1. Secure with adhesive and insulation pins per manufacturer's installation instructions.
 2. Black acrylic coated side of ductwork shall face the airstream.
 3. Apply adhesives according to manufacturer's recommended coverage rates per unit area.
 4. All exposed and leading edges shall be coated with factory or field applied edge coating. Shop or field cuts shall be coated with edge treatment of approved adhesive.
 5. Metal nosings shall be installed over transversely-oriented liner edges facing the airstream at forward discharge and at any point where lined duct is preceded by unlined duct.
 6. Duct dimensions on the drawings for lined ductwork are inside clear dimensions of the ductwork after lining has been installed.

3.6 MINERAL FIBER ROUND DUCT LINING INSULATION INSTALLATION

- A. Installation on interior of round ductwork:
 1. Shop install in round ductwork and fittings, according to manufacturer's written installation instructions.
 2. Duct dimensions on the drawings for lined ductwork are inside clear dimensions of the ductwork after lining has been installed.

3.7 FLEXIBLE ELASTOMERIC PIPE INSULATION INSTALLATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Fittings and Elbows:
 1. Install mitered sections of pipe insulation.

2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Valves and Pipe Specialties:
1. Install preformed valve covers manufactured of same material as pipe insulation when available.
 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 3. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated

3.8 DUCT AND PLENUM INSULATION REQUIREMENTS

- A. Ductwork to be insulated:
1. All supply air ductwork.
 2. All Outside Air ductwork.
 3. All return air ductwork within the mechanical room.
- B. Ductwork which does not require insulation:
1. Return air ductwork within conditioned space and not in mechanical room.
 2. Exhaust air ductwork within conditioned space.

3.9 DUCT AND PLENUM INSULATION SCHEDULE

- A. Exterior Duct and Plenum Insulation:
1. Fresh Air Plenum (at louver) and Exhaust/Relief Plenum (at louver)
 - a. Mineral Fiber Blanket Insulation. Insulation thickness and density shall be as required to provide the thermal resistance as required by the Washington State Energy Code. See Table B on the following page.

3.10 MINIMUM DUCT INSULATION TABLE PER THE WASHINGTON STATE ENERGY CODE

TABLE B
Duct Insulation

Duct Type	Duct Location	Insulation R-Value
Supply, Return & Exhaust	Not within conditioned space: On exterior of building, on roof, in attic, in enclosed ceiling space, in walls, in garage, in crawl spaces in concrete, or in ground	R-6 ¹
Outside Air Intake	Within conditioned space	R-7
Supply, Return, Outside Air Intake	Not within conditioned space: Outside of the Building.	R-8
Supply air ducts within conditioned space with HVAC equipment supply air temperature <55 or >105EF	Within conditioned space	R-3.3

- A. NOTE: Requirements apply to both supply and return ducts, whether heated or mechanically cooled. Mechanically cooled ducts requiring insulation shall have a vapor retarder, with a perm rating not greater than 0.5 and all joints sealed.
1. With approved weatherproof barrier.
- B. Insulation Types: Minimum densities and out of package thickness. Nominal R-values are for the insulation as installed and do not include air film resistance.
- C. Installed:
1. R-3.3: 1.0" 1.5 to 3.0 lb/cu.ft. duct liner, mineral or glass fiber blanket or equivalent to provide an installed total thermal resistance of at least R-3.3.
 2. R-5.3: 2.0" 0.75 lb/cu.ft. mineral or glass fiber blanket, 1.5" 1.5 to 3.0 lb/cu.ft. duct liner, mineral or glass fiber blanket, 1.5" 3.0 to 7.0 lb/cu.ft. mineral or glass fiber board or equivalent to provide an installed total thermal resistance of at least R-5.3.
 3. R-7: 3.0" 0.75 lb/cu.ft. mineral or glass fiber blanket, 2.0" 1.5 to 3.0 lb/cu.ft. duct liner, mineral or glass fiber blanket, 2.0" 3.0 to 7.0 lb/cu.ft. mineral or glass fiber board or equivalent to provide an installed total thermal resistance of at least R-7.

END OF SECTION 23 07 00

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING

SECTION 23 31 13 - METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Sheet Metal materials
 - 2. Single-wall rectangular ducts and fittings.
 - 3. Single-wall round ducts and fittings.
 - 4. Sealants and gaskets.
 - 5. Hangers and supports.
 - 6. Ductwork Static Pressure Classifications
 - 7. Duct Sealing
 - 8. Duct Schedule

1.2 QUALITY ASSURANCE

- A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."
- B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6.4.4 - "HVAC System Construction and Insulation."

1.3 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for 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 imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G90 (Z275).
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.

2.2 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. Material: Galvanized Steel.

- B. General Fabrication Requirements: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Proprietary transverse joint systems, such as manufactured By Ductmate Industries may be utilized. Install in strict accordance with manufacturer's published construction standards and installation requirements.
- D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- E. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Provide types as indicated on the drawings. Where not specifically indicated, select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- F. Turning Vanes: Provide double construction turning vanes for all square elbows, constructed and installed in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. Material: Galvanized Steel.
- B. General Fabrication Requirements: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
- C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. Proprietary transverse joint systems, such as manufactured By Ductmate Industries may be utilized. Install in strict accordance with manufacturer's published construction standards and installation requirements.

- D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- E. Tees and Laterals: Provide types as indicated on the drawings. Where not specifically indicated, select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- F. Elbows: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows," and Figure 3-6, "Flat Oval Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.4 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
 - 1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
 - 2. Tape Width: 3 inches .
 - 3. Sealant: Modified styrene acrylic.
 - 4. Water resistant.
 - 5. Mold and mildew resistant.
 - 6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 - 7. Service: Indoor and outdoor.
 - 8. Service Temperature: Minus 40 to plus 200 deg F.
 - 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
 - 10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Water-Based Joint and Seam Sealant:
 - 1. Application Method: Brush on.
 - 2. Solids Content: Minimum 65 percent.
 - 3. Shore A Hardness: Minimum 20.
 - 4. Water resistant.

5. Mold and mildew resistant.
 6. VOC: Maximum 75 g/L (less water).
 7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 8. Service: Indoor or outdoor.
 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Flanged Joint Sealant: Comply with ASTM C 920.
1. General: Single-component, acid-curing, silicone, elastomeric.
 2. Type: S.
 3. Grade: NS.
 4. Class: 25.
 5. Use: O.
 6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

2.5 HANGERS AND SUPPORTS

- A. Unless otherwise indicated or detailed, comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Section IV "Hangers and Supports"
- B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."
- C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- D. Trapeze and Riser Supports:
 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

PART 3 - EXECUTION

3.1 DUCTWORK STATIC PRESSURE CLASSIFICATIONS

- A. 1" Water Gage Systems:
 1. All supply air ductwork
 2. All return air ductwork.
 3. All exhaust air ductwork

3.2 DUCT SEALING

- A. All ductwork with static pressure classification of ½" water gage and above shall be sealed in accordance with the requirements of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and in accordance with the requirements of the Washington State Energy Code, as follows:

1. Static Pressure Classification ½" to 3" wg: Seal all transverse joints and longitudinal seams. Spiral lock seams in round ductwork do not require sealing, however other seams shall be sealed.
2. Duct tape is not permitted as a sealant on any ducts.

3.3 DUCT SCHEDULE

- A. General: Ductwork configurations as indicated on the drawings (rectangular and round) are designed to accommodate clearances within the building for duct routing. Substitution of ductwork of different configuration than shown on the drawings shall not be made without approval of the Engineer.
- B. Single Wall Rectangular Ductwork:
 1. Provide in locations as indicated on the drawings.
- C. Single Wall Round Ductwork:
 1. Provide in locations as indicated on the drawings.

3.4 DUCT INSTALLATION

- A. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- B. Offsets in Ductwork: All offsets necessary in ductwork are not shown on the drawings. Provide all offsets required without additional cost. Offset angles to be as small as possible.
- C. Field Changes to Ductwork: Changes such as those required to suit the size of factory fabricated equipment actually furnished shall be designed to minimize losses in pressure and performance due to sudden expansion or contraction. Transitions shall be used in field changes as well as modifications to connecting ducts.
- D. Duct Sizes:
 1. Duct dimensions indicated on the drawings for internally lined single wall ductwork refer to inside clear dimensions inside the lining.
- E. Install round ducts in maximum practical lengths.
- F. Install ducts with fewest possible joints.
- G. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- H. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- I. Exposed Ductwork:
 1. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
 2. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
 3. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
 4. Repair or replace damaged sections and finished work that does not comply with these requirements.

- J. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer.

END OF SECTION 23 31 13

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING

SECTION 23 33 00 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Manual volume dampers.
 2. Backdraft Dampers
 3. Control Dampers
 4. Damper Operators
 5. Grilles, Registers and Diffusers
 6. Flexible Connectors.
 7. Flexible Ducts.
 8. Exterior Louvers

1.2 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 MANUAL VOLUME DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Air Balance Inc.; a division of Mestek, Inc.
 2. American Warming and Ventilating; a division of Mestek, Inc.
 3. McGill AirFlow LLC.
 4. METALAIRE, Inc.
 5. Nailor Industries Inc.
 6. Pottorff; a division of PCI Industries, Inc.
 7. Ruskin Company.
 8. Vent Products Company, Inc.
 9. Durodyne.
- B. Standard, Steel, Rectangular Manual Volume Dampers:
1. Dampers up to 12"x12" size:
 1. Standard leakage rating.
 2. Suitable for horizontal or vertical applications.
 3. Frame: 22 gage galvanized steel

4. Blades: Single blade, 22 gage galvanized steel with center V-groove for reinforcement.
5. Blade Axle: 3/8" square steel shaft, full length of damper blade.
6. Bearings: Molded synthetic
7. Hand Quadrant: Locking hand quadrant with 2" stand off bracket.
2. Dampers larger than 12"x12", up to 48"x48" in size:
 1. Standard leakage rating.
 2. Suitable for horizontal or vertical applications.
 3. Frame: 16 gage galvanized steel formed into structural hat channel with tabbed corners for reinforcement.
 4. Blades: Multiple opposed blades, maximum 8" width, 16 gage galvanized steel with 3 longitudinal grooves for reinforcement.
 5. Blade Axles: 1/2" hex, positively locked into damper blades.
 6. Bearings: Molded synthetic
 7. Control Shaft: 3" x 3/8" square plated steel.
 8. Linkage Assembly: Out of airstream.
 9. Hand Quadrant: Locking hand quadrant with 2" stand off bracket.
 10. For dampers larger than 48" in any dimension, provide multiple opposed blade damper modules, with locking quadrant for each module.
- C. Standard, Steel, Round, Manual Volume Dampers
 1. Dampers up to 16" diameter:
 1. Standard leakage rating.
 2. Suitable for horizontal or vertical applications.
 3. Frame: 20 gage galvanized steel
 4. Blade: Single blade, 20 gage galvanized steel.
 5. Blade Axle: 3/8" square steel shaft, full length of damper blade.
 6. Bearings: Molded synthetic, or oilite
 7. Hand Quadrant: Locking hand quadrant with 2" stand off bracket.

2.2 RELIEF DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Air Balance Inc.; a division of Mestek, Inc.
 2. American Warming and Ventilating; a division of Mestek, Inc.
 3. Cesco Products; a division of Mestek, Inc.
 4. Duro Dyne Inc.
 5. Greenheck Fan Corporation.
 6. Nailor Industries Inc.

7. Pottorff; a division of PCI Industries, Inc.
 8. Ruskin Company.
 9. SEMCO Incorporated.
 10. Vent Products Company, Inc.
- B. Rectangular Relief Dampers:
1. All control dampers (motorized or gravity) must be classified as low leakage dampers.
 2. Description: Counterbalanced
 3. Frame: 6063T5 extruded aluminum, 0.125 wall thickness, mitered corners.
 4. Blades: 6063T5 extruded aluminum, 0.070 thickness, parallel blades.
 5. Blade Seal: Extruded vinyl.
 6. Bearings: Synthetic
 7. Linkage: Aluminum tiebars
 8. Counterbalance: Zinc plated bar on blades, adjustable setting.
 9. Operational Pressure:
 1. Blades start to open: 0.01" w.g.
 2. Blades fully open: 0.05" w.g.
 10. Mounting: Horizontal (upward or downward airflow) or vertical.
 11. Maximum Air Velocity: 2000 FPM
 12. Maximum Permitted Leakage Rate for each backdraft type of damper shall not exceed the following:
 1. All gravity control dampers shall have a maximum leakage rate of no more than 20 cfm/sf at 1.0" w.g. when tested in accordance with standard AMCA 500D.
 2. Gravity control dampers with at least one dimension smaller than 24" is permitted to have a maximum leakage rate of no more than 40 cfm/sf at 1.0" w.g. when tested in accordance with standard AMCA 500D.

2.3 CONTROL DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ruskin
 2. Greenheck
 3. Louvers & Dampers
 4. Pottorf
 5. Tamco
- B. Frame: 6063T5 extruded aluminum hat channel with .081" minimum wall thickness. Mounting flanges on both sides of frame.
- C. Blades: 4" wide 6063T5 heavy gauge extruded aluminum, airfoil shaped blades.

- D. Linkage: Concealed.
- E. Axles: ½" plated steel hex.
- F. Bearings: Molded synthetic.
- G. Seals: Extruded TPR blade edge seal and flexible metal compression type jamb seals.
- H. Control Shaft: 6"x1/2" diameter. Outboard support bearing.
- I. All motorized control dampers shall be classified as Class 1A low leakage dampers.
- J. Maximum Permitted Leakage Rate for each type of damper shall not exceed the following:
 - 1. All motorized control dampers shall have a maximum leakage rate of no more than 4 cfm/sf at 1.0" w.g. when tested in accordance with standard AMCA 500D.

2.4 DAMPER OPERATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Belimo
- B. 24V, 2 position (open/closed), spring return, or modulating spring return as required by the specified Sequence of Operations.

2.5 GRILLES, REGISTERS AND DIFFUSERS

- A. Manufacturers: Subject to compliance with requirements, provide products as scheduled on the drawings, or a comparable product by one of the following:
 - 1. Titus
 - 2. Kreuger
 - 3. Anemostat
 - 4. Tuttle and Bailey
 - 5. Hart & Cooley
 - 6. Carnes
- B. Comparable products to those scheduled shall meet scheduled certified catalog ratings as to noise criteria, pressure drops and throw.

2.6 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ductmate Industries, Inc.
 - 2. Duro Dyne Inc.
 - 3. Ventfabrics, Inc.
- B. Description: Metal edged, coated heavy glass fabric.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.

- D. Metal Edged Connectors: Strip of fabric permanently attached to 2 strips of minimum 24 gage galvanized sheet metal.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 - 1. Minimum Weight: 26 oz./sq. yd..
 - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 - 3. Service Temperature: Minus 20 to plus 200 deg F

2.7 FLEXIBLE DUCTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Thermaflex
 - 2. Flexmaster U.S.A., Inc.
 - 3. McGill AirFlow LLC.
 - 4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Insulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene vapor-barrier film.
 - 1. Pressure Rating: 6-inch wg positive and 1-inch wg negative.
 - 2. Maximum Air Velocity: 4000 fpm.
 - 3. Temperature Range: Minus 20 to plus 250 deg F
 - 4. Insulation:
 - 1. R-Value: R-4.2 (minimum) when duct is in conditioned space.
 - 2. R-Value: R- 6.0 (minimum) when duct is in unconditioned space.
 - 3. R-Value: R- 8.0 (minimum) when duct is outside or in ventilated attic.
- C. Flexible Duct Connectors:
 - 1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, or nylon duct tie strap in sizes 3 through 18 inches, to suit duct size.
 - 2. Provide two (2) clamps at each flexible duct connection.

2.8 EXTERIOR LOUVERS

- A. Manufacturers: Subject to compliance with requirements, provide products as scheduled on the drawings, or a comparable product by one of the following:
 - 1. Ruskin
 - 2. American Warming and Ventilating
 - 3. Greenheck
 - 4. ACME
 - 5. Pottorf
 - 6. Louvers and Dampers

- B. Comparable products to those scheduled shall meet scheduled certified catalog ratings as to free area, pressure drop and water penetration.
- C. Louvers shall be AMCA licensed, with air performance and water penetration data ratings based on tests in accordance with AMCA publication 511.
- D. 6" Deep Aluminum Louvers
 - 1. Type: Stationary
 - 2. Frame: 6063T5 extruded aluminum, 0.081" nominal wall thickness, with downspouts in jambs and mullions.
 - 3. Frame Style:
 - 4. Mullions: Hidden mullions allowing continuous line appearance up to 120".
 - 5. Blades: Extruded aluminum, 0.081" nominal wall thickness, drainable blades.
 - 6. Blade Angle: 35 degrees.
 - 7. Blade Spacing: Approximately 6" center to center.
 - 8. Screen: 1/2" Removable Expanded Aluminum Bird Screen located on the interior. .
 - 9. Free Area: As scheduled.
 - 10. Water Penetration: Beginning point of water penetration: 0.01 oz./SFT at 1023 FPM
 - 11. Factory Finish: As scheduled.
 - 12. Accessories: Extended sill.

PART 3 - EXECUTION

3.1 MANUAL VOLUME DAMPER INSTALLATION

- A. Install manual volume dampers in locations as indicated and at points on supply, return, and exhaust systems where branches extend from larger ducts.
- B. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
- C. Install manual volume dampers as far from the outlet as possible.
- D. After installation, operate dampers to verify full range of movement, and set dampers to the full open position.

3.2 BACKDRAFT DAMPER INSTALLATION

- A. Install backdraft dampers in the locations as indicated on the drawings.
- B. All gravity backdraft dampers shall be protected from direct exposure to the wind.

3.3 CONTROL DAMPER INSTALLATION

- A. Provide in locations as indicated.

- B. Where control dampers are used in conjunction with HVAC economizer cycle, outside air control dampers shall be parallel blade and return air control dampers shall be opposed blade. Other control dampers may be parallel or opposed blade type.
- C. Control Damper Power Wiring: All power wiring for control damper operators, except control dampers in packaged HVAC equipment, shall be provided under the work of Division 26.

3.4 GRILLES, REGISTERS AND DIFFUSERS INSTALLATION

- A. Install in locations as indicated on the mechanical drawings, and in accordance with the reflected ceiling plan where indicated. Where locations indicated on the drawings are not feasible, or there is a discrepancy between locations shown on the mechanical drawings and the Architectural drawings, notify the Engineer before proceeding with installation.
- B. Make duct connections to grilles, registers and diffusers as detailed on the drawings.
- C. Paint interior of metal ducts that are visible through registers, grilles or diffusers and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized steel primer.

3.5 FLEXIBLE CONNECTOR INSTALLATION

- A. Provide flexible connectors between fans and ducts, between fans and casings, between fans and plenums, between ducts of dissimilar metals and in locations as indicated.

3.6 FLEXIBLE DUCTWORK INSTALLATION

- A. Flexible ductwork shall only be installed on supply, return and exhaust ducts at the grille register or diffuser connection, unless otherwise indicated.
- B. Install flexible ducts no more than 3 feet in length and containing not more than one 45 degree offset.
- C. Flexible ducts shall be installed as one piece, without intermediate joints.
- D. Connect flexible ductwork airtight to equipment and metal ductwork with fire retardant mastic and steel clamp or cinch type nylon duct tie.

END OF SECTION 23 33 00

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING

SECTION 23 34 23 - HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Ceiling Mounted Ventilators
 - 2. Square, Inline Duct-Mounted Ventilators

1.2 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. AMCA Compliance: Products (other than ceiling exhaust fans) shall comply with performance requirements for sound and airflow and shall be licensed to use the AMCA-Certified Ratings Seal.
- C. Project Altitude: Base fan-performance ratings on actual Project site elevations.
- D. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.
- E. UL Standard: Power ventilators shall comply with UL 705.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fans as factory-assembled unit, to the extent allowable by shipping limitations, with protective crating and covering.
- B. Disassemble and reassemble units, as required for moving to final location, according to manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.

1.4 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCTS

2.1 CEILING MOUNTED, INLINE, DIRECT DRIVEN EXHAUST FAN

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Broan
 - 2. Acme Engineering & Mfg. Corp.
 - 3. Breidert Air Products.
 - 4. Carnes Company HVAC.

5. Greenheck.
 6. Loren Cook Company.
 7. Penn Ventilation.
 8. Twin City
- B. Description: Ceiling-mounted, inline, direct-driven centrifugal exhaust fan consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, and accessories.
- C. Construction: The fan wheel housing and integral outlet duct shall be injection molded from a specially engineered resin exceeding UL requirements for smoke and heat generation. The outlet duct shall have provision for an aluminum backdraft damper with continuous aluminum hinge rod. The inlet box shall be minimum 22 gauge galvanized steel. Motor shall be isolation mounted to a one piece galvanized stamped steel integral motor mount/inlet. A field wiring compartment with disconnect receptacle shall be standard. To accommodate different mounting positions, an adjustable pre-punched mounting bracket shall be provided. Unit shall be shipped in ISTA Certified Transit Tested Packaging.
- D. Fan Wheels: Wheel shall be centrifugal forward curved type, injection molded of polypropylene resin. Wheel shall be balanced in accordance with AMCA Standard 204-05 Balance Quality and Vibration Levels for Fans.
- E. Motor: Motor shall be open drip proof type with permanently lubricated bearings and include impedance or thermal overload protection and disconnect plug. Motor shall be furnished at the specified voltage.
- F. Accessories:
1. Variable-Speed Controller for Direct-Drive Units: Solid-state control to reduce speed from 100 to less than 50 percent.
 2. Disconnect Switch: Non-fusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
 3. Dampers: Backdraft damper; factory set to close when fan stops. Backdraft dampers shall a maximum leakage rate not to exceed 40 cfm/sf of damper area when tested in accordance AMCA Standard 500 at 1.0 inch w.g.

2.2 DUCT MOUNTED, DIRECT DRIVE CENTRIFUGAL SQUARE INLINE

- A. Manufacturers: Subject to compliance with requirements, provide products as scheduled on the drawings, or a comparable product by one of the following:
1. Breidert Air Products.
 2. Broan Mfg. Co., Inc.
 3. Carnes Company HVAC.
 4. Greenheck.
 5. Loren Cook Company.
 6. NuTone Inc.
 7. Penn Ventilation.
- B. Description: Fan shall be a duct mounted, direct driven centrifugal square inline.

- C. Construction: The fan shall be of bolted construction utilizing corrosion resistant fasteners. Housing shall be minimum 18 gauge galvanized steel with integral duct collars. Bolted access doors shall be provided on three sides, sealed with closed cell neoprene gasketing. Housing shall be pre-drilled to accommodate universal mounting feet for vertical or horizontal installation. Unit shall bear an engraved aluminum nameplate. Name plate shall indicate design air flow and static pressure. Unit shall be shipped in an ISTA certified transit tested packaging.
- D. The cabinet shall be acoustically lined.
- E. Fan Wheel: Wheel shall be centrifugal backward inclined, constructed of 100% aluminum including a precision machined cast aluminum hub. Wheel inlet shall overlap an aerodynamic aluminum inlet cone to provide maximum performance and efficiency. Wheel shall be balance in accordance with AMCA standard 204-05, balance quality and vibration levels for fans. .
- F. Motor: Motor shall be an electronically commutated motor rated for continuous duty and furnished with an internally mounted potentiometer speed controller.
- G. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.
- H. Accessories:
 - 1. Provide factory disconnect.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install power ventilators in accordance with manufacturer's recommendations.
- B. Install power ventilators level and plumb.
- C. Make duct connections to power ventilators using flexible connectors.
- D. Install units with clearances for service and maintenance.
- E. Label units according to requirements specified in Division 23 Section "Identification for HVAC Equipment."

END OF SECTION 23 34 23

CERTIFICATION PAGE

I hereby certify that these contract documents were prepared by me or under my direct supervision and that I am a duly licensed engineer under the laws of the State of Washington.



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DIVISION 26 – ELECTRICAL

SECTION 26 05 00 – ELECTRICAL GENERAL REQUIREMENTS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope

1. This section specifies general requirements for electrical work. Detailed requirements for specific electrical items are specified in other sections, but are subject to the general requirements of this section. The electrical drawings and schedules included in this project manual are functional in nature and do not specify exact locations of equipment or equipment terminations.
2. The Contractor shall examine all mechanical and civil drawings and Specifications to determine actual locations, sizes, materials, and ratings of all equipment provided by others.
3. Items of Work shown on drawings and not specified, or mentioned in the specifications and not shown on the drawings, shall be considered required as if they had been both specified and show on the Drawings. In the event of conflicting specified or drafted requirements the more stringent requirement shall govern. Any work or material omitted from the description of the work but which is clearly implied shall be furnished by the Contractor as though specifically stated. The Drawings and Specifications contemplate a finished piece of Work of such character and quality as described in and reasonably inferred from them, and fitting with the Work of other Contractors and the Owner. The Contractor agrees that the failure to show details or repeat on any drawings the figures or notes given on another shall not be cause for additional charges or claims.
4. When record drawings are provided with the contract drawing set, they constitute the best available information pertaining to the relevant systems at the time of design. Their accuracy is specifically not guaranteed and they are provided only for the Contractor's convenience. It is the Contractor's responsibility to field verify these record drawings prior to use. Actual field conditions are specifically and entirely the responsibility of the Contractor. Deviation of the record drawings provided from actual field conditions shall not constitute a basis for any increase in time allowed for completion or compensation for the Contractor.
5. As outlined in ITB's the Contractor shall notify the Engineer in writing of perceived discrepancies, errors, or omissions in the Contract Documents prior to bid. The Engineer shall provide clarification to resolve these issues prior to bid. The Contractor shall resolve its questions regarding the perceived inconsistency, errors, or omissions in the Contract Documents prior to bid. Failure of the contractor to resolve his questions prior to bid shall result in the residual issues of the aforementioned kind providing no basis of claim for an increase in compensation for the Work or the time allowed for the completion of the contract and the Engineer's interpretation shall govern.

B. Definitions

1. Provide: Furnish and install.

2. Contractor: The party who furnishes and installs all tools, materials, and equipment to complete the work shown and implied in the drawings and these Specifications. This includes the Contractor, the Electrical Subcontractor, Control System Integrator, and all other Subcontractors.
3. Control System Integrator / System Integrator/ Integrator: The party that furnishes all control components and designs, the detailed control wiring diagrams, and layout and assembly of the custom control panels.
4. Control System: All equipment, instruments, and wiring for control and monitoring of all operating equipment. This shall also include custom control panels, packaged control panels, and control equipment furnished with other systems and mechanical equipment. All sensing, transmitting, indicating, control and recording of all functions as specified and shown shall also be included in the control system.
5. Elementary or Schematic or Control Diagram: Shows, by means of graphic symbols, the electrical connections and functions of a specific circuit arrangement. The schematic diagram shows all circuit functions without regard to the actual physical size, shape, or location of the component devices or parts.
6. Single-Line Diagram/ One-Line Diagram: Shows, by means of lines and graphical symbols, the course of the electrical distribution system and the components, devices, or parts used therein.
7. Wiring Diagram or Connection Schematic: Includes all of the devices in a system and shows their physical relationship to each other, including terminals and interconnecting wiring in assembly. This diagram shall be (a) in a form showing interconnecting wiring only by terminal designation (wireless diagram), or (b) a panel layout diagram showing the physical location of devices plus the elementary diagram.
8. Interconnection Diagram: Shows all external connections between terminals of equipment and outside points, such as motors and auxiliary devices. References shall be shown to all connection diagrams that interface to the interconnection diagrams. Interconnection diagrams shall be of the continuous line type. Bundled wires shall be shown as a single line with the direction of entry / exit of the individual wires clearly shown. Each wire identification as actually installed shall be shown. The wire identification for each end of the same wire shall be identical. All devices and equipment shall be identified. Terminal blocks shall be shown as actually installed and identified in the equipment complete with individual terminal identification. All jumpers, shielding and grounding termination details not shown on the equipment connection diagrams shall be shown on the interconnection diagrams. Wires or jumpers shown on the equipment connection diagrams shall not be shown again on the interconnection diagram. Signal and DC circuit polarities and wire pairs shall be shown. Spare wires and cables shall be shown.
9. Arrangement, Layout, or Outline Drawings: Shows the physical space and mounting requirements of a piece of equipment. Diagrams may also indicate ventilation requirements and space provided for connections or the location to which connections are to be made.

1.02 GENERAL DESCRIPTION OF WORK

- A. The Contractor shall provide all labor, material, tools, equipment and services required to complete the furnishing, installation, wiring, connection, calibration, adjustment, testing and operation of all electrical equipment, devices and components as indicated and implied by the plans and these Specifications. General descriptions include:
1. Complete the procurement, installation, wiring, connection, calibration, adjustment, testing and operation of all electrical devices, components, accessories and equipment that is not shown or specified but which is nonetheless required to make the systems shown and specified function properly.
 2. Complete the wiring to, connection to, adjustment and calibration of, and testing of furnished electrical components.
 3. Install all equipment so it shall be readily accessible for maintenance. Installations shall have electrical clearances in accordance with NEC and shall be installed in locations that will provide adequate cooling.
 4. Check electrical equipment prior to installation so that defective equipment is not installed.
 5. Provide field services of qualified technicians to supervise and check out the installation of the equipment, to supervise and check out interconnecting wiring, to conduct start-up of operation of the equipment, and to correct any problems that occur during start-up.
 6. Provide circuit breakers, conduit, wire and installation for all items that require electrical power.

1.03 PROJECT DESCRIPTION

A. General

In general, the project shall consist of all electrical construction required to make a complete and fully operational system. The following is a general description of the work anticipated to be provided by the Electrical Contractor:

1. Provide new electrical service equipment per Specification 26 27 00.
2. Provide new power distribution including feeders, branch circuits, panels, transformers, and other equipment.
3. Provide new interior and exterior lighting systems.
4. Provide new data and communications equipment, cabling and connections.
5. Provide power and control connections for all mechanical equipment required for the project.
6. Provide electrical equipment and installation for sewer pump station.
7. Provide new RV pedestals and related equipment.
8. Additional electrical work as shown on the drawings and specifications.

1.04 TEMPORARY OPERATION AND CONSTRUCTION POWER

- A. The Contractor shall provide a separately metered temporary power service for construction power. The temporary service shall provide:
 - 1. Power for operation of all equipment during testing.
 - 2. Power for operation of all equipment until certificate of occupancy is obtained.
- B. All coordination with the utility and associated construction costs for temporary construction power shall be paid for by the Contractor. The Contractor shall pay for the energy costs as billed by the utility on the construction power meter.
- C. The Contractor may use existing power feeder if coordinated and agreed to by the District.

1.05 TEMPERATURE RATINGS OF EQUIPMENT TERMINATIONS

- A. All materials shall conform to the National Electrical Code Article 110-14C. Wiring and circuit breakers on this project are designed for 75 deg C operation above 100 amperes; 60 deg C for 100 amperes and below. All products furnished on this project shall have electrical terminations rated for 60 deg C for ampacities of 100 amperes and below, and rated for 75 deg C for ampacities above 100 amperes.
- B. These requirements cover all electrical equipment provided under this Contract.

1.06 STANDARDS AND CODES

The Contractor shall provide all permits, licenses, approvals and other arrangements for work on this project and all fees shall be paid for by the Contractor. The Contractor shall include these fees in the bid price.

A. References

This section contains references to the following documents. They are part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

- 1. National Electrical Code (NEC)
- 2. Underwriters' Laboratories, Inc. (UL)
- 3. National Electrical Manufacturers Association (NEMA)
- 4. Canadian Standards Association (CSA)
- 5. Electrical Testing Laboratories (ETL)
- 6. Factory Mutual (FM)

B. Identification of Listed Products

- 1. All materials and equipment specified herein shall be within the scope of Nationally Recognized Testing Laboratory (NRTL) examination services, be approved by the NRTL for the purpose for which they are used, and shall bear the appropriate listing label.

2. Equipment listed/labeled by an NRTL shall be as dictated by the latest printing of the *Electrical Testing Laboratories Accreditation Report* available from the State of Washington Department of Labor and Industries, Electrical Inspection Division. Any NRTL listing/labeling shall be as accepted by the local authority having jurisdiction.
3. When a product is not available with a testing laboratory listing for the purpose for which it is to serve, the product may be required by the inspection authority to undergo a special inspection at the manufacturer's place of assembly. All costs and expenses incurred for such inspections shall be included in the original contract price.

1.07 SITE FAMILIARIZATION

As outlined in the ITB's the Contractor shall become familiar with all features of the site which may affect the execution of the work prior to submitting a bid. The Contractor shall take all field measurements necessary for the work and shall assume full responsibility for their accuracy. The Contractor shall take full responsibility for locating and avoiding all substructures and utilities. Any damage to existing equipment or utilities shall be repaired or replaced by the Contractor at the Contractors expense.

1.08 AREA CLASSIFICATIONS

The following classification of areas shall be used as a reference in determining application of material covered by this Section unless specifically shown otherwise on the drawings. Areas that fall under two or more of the following classifications shall conform to the minimum requirements of all of the area classifications listed for that area.

A. Outdoor and Damp Areas: Vaults, all outdoor areas

Raceways shall be galvanized rigid steel (GRS). Conduit entrances shall be threaded and fittings shall have gasketed covers. Threaded fastening hardware and rods shall be stainless steel. Raceway supports such as channel, clamps, and brackets shall be stainless steel or aluminum. Panels and boxes shall be NEMA 4X - aluminum, stainless steel or FRP (or as shown on the drawings). Enclosures shall be mounted 1 inch from walls to provide an air space unless specifically shown otherwise. Device boxes shall be cast, copper free aluminum.

B. Below Grade Areas:

Conduits shall be Schedule 40 PVC, or as indicated on the drawings. Transitions and sweeps from below grade to above grade shall be GRS or PVC coated GRS.

C. General Purpose Areas: All other areas not described above

Raceways shall be GRS. Raceways concealed in walls or ceilings for general purpose lighting and receptacle circuits may be EMT. Exposed boxes shall be NEMA 12. Concealed boxes may be NEMA 1. Boxes poured in concrete shall be cast copper free aluminum.

1.09 ELECTRICAL SUBMITTALS

- A. Electrical submittals shall be submitted in accordance with Exhibit S Section 013000 Administrative Requirements.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. General

Equipment and materials shall be new and free from defects. All material and equipment of the same or a similar type shall be of the same manufacturer throughout the work. Standard production materials shall be used wherever possible.

B. Equipment Finish

Unless otherwise specified, electrical equipment and materials shall be painted by the manufacturer.

C. Galvanizing

Where specified, galvanizing shall be in hot dipped.

2.02 NAMEPLATES

A. Nameplates shall be provided on all electrical devices. This includes, but is not limited to: motor control equipment, MCC cubicles, control stations, junction boxes, panels, motors, instruments, switches, indicating lights, meters, and all electrical equipment enclosures.

B. Nameplates shall also be provided on all electrical panel interior equipment. This includes but is not limited to: relays, circuit breakers, power supplies, terminals, contactors, and other devices.

C. Nameplates shall be made of 1/16" thick machine engraved laminated phenolic having engraved black filled letters not less than 3/16" high on white background or as shown on the drawings or other sections of the Specifications. Nameplates on the interior of panels shall be white polyester with printed thermal transfer lettering and permanent pressure sensitive acrylic; Tyton 822 or equal. All nameplates shall include the equipment name and number (and function, if applicable).

D. Warning nameplates shall be provided on all panels and equipment which contain multiple power sources or which may have energized circuits with the main disconnecting means in the off position. Lettering shall be white on red background.

E. All nameplates shall be secured to equipment with stainless steel screws/fasteners. Epoxy glue may be used where fasteners are not practical as determined by the Engineer.

PART 3 - EXECUTION

3.01 GENERAL

A. Storage and Installation Environment

1. The Contractor shall store all electrical equipment in a dry environment free from dust, moisture, sprays or vapors which may be detrimental to their new condition. After installation of equipment, the Contractor shall take care to protect all equipment from all dust, moisture, paint and other spray, harmful vapors.

2. Equipment shall not be installed in indoor areas until the area is covered, dry and finished to the point that other work will not create dust, vapors, or moisture. Equipment with integral heaters and fans shall not be installed until power is available at the location, and the heater and fan shall be energized within 6 hours of the equipment being installed.

B. Housekeeping

1. The premises shall be kept free of accumulated materials, rubbish and debris at all times. Surplus material, tools and equipment must not be stored at the job site. Upon completion of the project, all equipment and fixtures shall be cleaned and in proper condition for their intended use.
2. Lamps and fluorescent tubes shall be cleaned and defective units replaced at the time of final acceptance.

3.02 TESTS

- A. The Contractor shall conduct testing for installed feeder cables and motors in accordance with Sections 260519. Grounding shall be tested in accordance with Section 260526.
- B. Functional testing shall be performed in accordance with the requirements of Section 260800. Prior to functional testing, all protective devices shall be adjusted and made operative. Prior to energization of equipment, the Contractor shall perform a functional checkout of the control circuit. Checkout shall consist of energizing each control circuit and operating each control, alarm or malfunction device and each interlock in turn to verify that the specified action occurs. The Contractor shall submit a description of the proposed functional test procedures prior to the performance of the functional checkout.
- C. The Contractor shall verify motors are connected to rotate in the correct direction. Verification may be accomplished by momentarily energizing the motor, provided the Contractor confirms that neither the motor nor the driven equipment will be damaged by reverse operation.

3.03 ACCEPTANCE OF WORK

- A. Prior to Final Completion, the Engineer will perform one or more site observation trips to develop a “punch list” of items deemed incomplete. The Contractor and its electrical Subcontractor shall be present while these inspections are taking place and shall be available for opening cabinets and operating and adjusting the system as is necessary for the Engineer to verify all equipment is installed and operates to the requirements of the contract documents.
- B. The Contractor shall complete all items of work, including wire markers, nameplates, final tests and final test reports prior to requesting final acceptance inspections. All equipment shall be checked for proper operation and all signals verified for correct calibration and wiring. Fixtures shall have been cleaned, and burned out or defective lamps shall have been replaced.

3.04 TRAINING

- A. The Contractor shall provide training in accordance with the specific requirements in other sections of these Specifications. In addition to training required in other Sections of the Specifications, the Contractor shall conduct specifically organized training sessions in the overall operation and maintenance of the electrical system for personnel employed by the Owner. The training sessions shall be conducted to educate and train the personnel in operation and maintenance of all components of the electrical system outside the training requirements in the other sections of these Specifications. Training shall include, but not be limited to, the following:
1. Preventative maintenance procedures
 2. Trouble-shooting
 3. Calibration
 4. Testing
 5. Replacement of components
 6. Equipment operation
- B. At least two training sessions, each at least four (4) hours in duration, or as deemed necessary by the Owner, shall be conducted at the facility after start-up of the system. The Contractor shall prepare and assemble specific instruction materials for each training session and shall supply such materials to the Owner at least one (1) week prior to the time of the training.

END OF SECTION 26 05 00

DIVISION 26 – ELECTRICAL

SECTION 26 05 19 – WIRE AND CABLE

PART 1 – GENERAL

1.01 DESCRIPTION

This section specifies conductors and cables rated to 600 volts used for power, lighting, receptacle, signal, and control circuits.

1.02 STANDARDS AND CODES

- A. All materials and equipment specified herein shall be within the scope of Nationally Recognized Testing Laboratory (NRTL) examination services, be approved by the NRTL for the purpose for which they are used, and shall bear the appropriate listing label.
- B. Equipment listed/labeled by an NRTL shall be as dictated by the latest printing of the Electrical Testing Laboratories Accreditation Report available from the State of Washington Department of Labor and Industries, Electrical Inspection Division. Any NRTL listing/labeling shall be as accepted by the local authority having jurisdiction.
- C. When a product is not available with a testing laboratory listing for the purpose for which it is to serve, the product may be required by the inspection authority to undergo a special inspection at the manufacturer's place of assembly. All costs and expenses incurred for such inspections shall be included in the original Bid Price.

1.03 SUBMITTALS

No less than 30 days prior to Work on-site submit all catalog data in accordance with the Section 013000, Appendix 013000-1, Required Submittals. Show material information and confirm compliance with these Specifications.

PART 2 - PRODUCTS

2.01 GENERAL

With the exception of lighting, communication, paging, security and receptacle circuits, the type, size and number of conductors shall be as specified on the Contract Drawings. Lighting and receptacle circuit conductors are unscheduled and shall be sized by the Contractor in accordance with the NEC to limit voltage drop to 3 percent. Number and types of communication, paging, and security cables shall be as required for the particular equipment provided.

2.02 LIGHTING AND RECEPTACLE BRANCH CIRCUIT CONDUCTORS

- A. Lighting conductors shall be stranded except for 12 AWG which shall be solid. Minimum conductor size shall be 12 AWG.

B. Conductors shall be provided with the following characteristics:

1. Voltage: 600 volts
2. Conductor: Bare soft annealed copper, Class B stranded per ASTM-8; solid per ASTM B-3
3. Insulation: THWN/THHN, 90 degree C dry, 75 degree C wet polyvinylchloride (PVC)
4. Jacket: Nylon
5. Flame resistance: UL 83
6. Manufacturer: Okonite; Southwire; Or Equal

2.03 POWER AND CONTROL CONDUCTORS

A. Power Conductors:

Single conductor cable shall be stranded and shall be used in conduits for power circuits.

Conductor shall be provided with the following characteristics:

1. Voltage 600 volts
2. Conductor: Uncoated, soft annealed copper, Class B stranded per ASTM B-3 or B-8
3. Insulation: XHHW-2, 90 degrees C continuous rating, wet or dry
4. Manufacturer: Okonite, Southwire; Anaconda; Or Equal

B. Control Conductors:

Single conductor cable shall be stranded and shall be used in conduits for control circuits.

Conductor shall be provided with the following characteristics:

1. Voltage 600 volts
2. Conductor: Uncoated, soft annealed copper, Class B stranded per ASTM B-3 or B-8
3. Insulation: THHN/THWN, 90 ° C dry, 75 ° C wet, cross-linked polyethylene (XLP), (CSPE) per ICEA S-66-524
4. Jacket: Polyvinylchloride (PVC)
5. Manufacturer: Okonite, Southwire; Anaconda; Or Equal

2.04 SIGNAL CABLES

A. General

Signal cable shall be provided for instrument signal transmission, alarm, communication and any circuit operating at less than 100 volts. Cables shall be color coded black and white for pairs or black, white and red for triads. Circuit shielding shall be provided in addition to cable shielding. Circuits shall be provided in compliance with the instrument manufacturer's recommendations.

B. Single Circuit

Cable shall consist of one pair or triad, 18 AWG conductors with 15 mils of 90 degree C polyvinylchloride (PVC) insulation, 4 mils nylon conduit or jacket, twisted on a 2-inch lay, and covered with a 100 percent 1.35 mil aluminum-Mylar tape shield with 18 AWG 7-strand tinned copper drain wire and a 45 mil PVC jacket overall. Cable shall be UL listed, Type TC, rated 600 volts. Cable shall be Okonite, Okoseal N TYPE P-OS, Or Equal.

C. Multiple Circuit

Cable shall consist of four or more pairs or triads which are made up of 18 AWG conductors with 15 mils of 90 degree C PVC insulation, 4 mils nylon jacket, twisted on a staggered lay 1-1/2 to 2-1/2 inches, and covered with a 100 percent 1.35 mil aluminum-Mylar tape shield with 22 AWG 7-strand tinned copper drain wire. Overall cable shield shall be 2.35 mil aluminum-Mylar tape with a 20 AWG 7-strand tinned copper drain wire. Cable shall be UL listed, Type TC, 600 volts. Cable shall be Okonite, Okoseal-N Type SP-OS, Or Equal.

2.05 PORTABLE CORD

Portable cord shall be UL listed, Type SO for 10 AWG and smaller. Cords with conductors larger than 10 AWG shall be UL listed, Type G. Cords shall contain an equipment grounding conductor. Cable characteristics shall be as follows:

- A. Conductors: Flexible rope stranded per ASTM B189 and B33. Conductors shall be coated except ground conductors may be uncoated.
- B. Insulation: Insulation shall be ethylene propylene(EPR) as per ICEA S-68-516 and rated for continuous operation at 90 degrees C.
- C. Jacket: Heavy-duty neoprene as per ICEA S-68-516
- D. Manufacturer: Okonite Or Equal

2.06 CONNECTORS

- A. Pre-insulated connectors for splices and taps in conductors 10 AWG and smaller shall be Ideal Industries "Wing Nut" or 3M Company "SCOTCHLOCK", Or Equal. For 8 AWG and larger conductors shall be T&B compression connectors, Or Equal. Compress using manufacturer's recommended die and tools.
- B. Waterproof silicone filled "wing nut" type connectors or spade/lug type terminations and terminals and coated with liquid insulation shall be used for all connections of wire to cord to removable equipment provided with integral cords (such as floats, transmitters, limit switches, etc.) in junction boxes in underground handholes or outdoor junction boxes. Insulators shall be Thomas and Betts multi splice insulator MSLT112-4, Or Equal.

2.07 SPLICE INSULATION

- A. Splice insulation shall be equal or greater than the insulation level of the conductor used.
- B. All permanent splices that are underground or in damp or corrosive environments shall be insulated with cast epoxy type insulation which covers the jacket of all cords and the insulation on all wire. Epoxy splice shall be Scotch #3570 Or Equal.

2.08 WIRING SCHEDULE

Refer to cable schedule on Contract Drawings for description of conductors required.

2.09 MOTOR TERMINAL SPLICE INSULATION

Motor terminal splice insulation in the motor connection box shall be provided which will withstand constant vibration and abrasion without degrading the insulation of the splice. A product shall be used that is specifically designed for the purpose of motor terminations in accordance with the following:

- A. Motor splices in general purpose areas: bolted splice with a TY-RAP boot type insulator, Thomas and Betts Splice insulator Series MSC, Or Equal. Splices using wire larger than 8 AWG may be heat shrinkable motor connection stub splices, Raychem, MCK-V series, Or Equal.
- B. Motors in outdoor, damp, or corrosive environments: waterproof motor stub insulator, Thomas and Betts multi splice insulator MSLT112-4, Or Equal. Splices using wire larger than 8 AWG may be heat shrinkable motor connection stub splices, Raychem, MCK-V series, Or Equal.

2.010 WIRE MARKERS

Field installed wire markers shall be T&B SMS pre-printed clip-on markers, Or Equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Each power and control conductor shall be identified at each terminal to which it is connected.
- B. Pulling wire and cable into conduit or trays shall be completed without damaging or putting undue stress on the cable insulation. Soapstone, talc or UL listed pulling compounds are acceptable lubricants for pulling wire and cable. Grease is not acceptable. Raceway construction shall be complete, cleaned, and protected from the weather before cable is placed in the raceway.

3.02 600 VOLT CONDUCTOR AND CABLE

- A. Conductors in panels and electrical equipment, 6 AWG and smaller, shall be bundled and laced at intervals not greater than 6 inches, spread into trees and connected to their respective terminals. Lacing shall be made up with plastic cable ties. Lacing is not necessary in plastic panel wiring duct. Conductors crossing hinges shall be bundled into groups not exceeding 12 and shall be so arranged that they will be protected from chafing when the hinged member is moved.
- B. Slack shall be provided in junction and pull boxes, and handholes. Slack shall be sufficient to allow cables or conductors to be routed along the walls of the box. Amount of slack shall be equal to largest dimension of the box. Where plastic panel wiring duct is provided for wire runs, lacing is not required.
- C. Solid wire shall not be lugged, nor shall electrical spring connectors be used on any except for solid wires in lighting and receptacle circuits. Lugs and connectors shall be installed with a compression tool.

- D. All splices and terminations are subject to inspection by the Engineer prior to and after insulating. Terminations at 460 volt motors shall be made by bolt-connecting the lugged connectors. Connections shall be insulated and sealed with factory-engineered kits. Bolt connection area shall be kept free of mastics and fillers to facilitate rapid stripping and re-entry. Motor connection kits shall accommodate a range of cable sizes for both in-line and stub-type configurations. Connection kits shall be independent of cable manufacturer's tolerances.
- E. In-line splices, where Approved, shall be made with tubular compression connectors and insulated as specified for motor terminations, except that conductors 10 AWG and smaller may be spliced using self-insulating connectors. Splices and tees in underground handholes or pull boxes shall be insulated using Scotch-cast epoxy resin splicing kits. Terminations at devices with 120 volt pigtail leads shall be made using self-insulating tubular compression connectors.
- F. Terminations at solenoid valves, 120 volt motors, and other devices furnished with pigtail leads shall be made using self insulating tubular compression connectors.
- G. In the case where multiple field located instrumentation and control devices require parallel or series wiring configuration, it shall be done at one location in one junction box or marshalling enclosure with terminals. Interconnection of instrumentation and control devices shall not be done within conduit bodies (i.e. LBs, condulets, etc.).

3.03 SIGNAL CABLING

- A. Circuit runs shall be of individually shielded twisted pairs or triads. In no case shall a circuit be made up using conductors from different pairs or triads. Triads shall be used wherever 3-wire circuits are required. Terminal blocks shall be provided at instrument cable junctions unless otherwise specified. Signal circuits shall be run without splices between instruments, terminal boxes, or panels.
- B. Shields shall not be used as a signal path, except for coaxial cable circuits operating at radio frequencies.
- C. Unless otherwise specified, shields shall be bonded to the signal ground bus at the control panel and isolated from ground and other shields at other locations. Terminals shall be provided for running signal leads and shield drain wires through junction boxes.
- D. Spare circuits shall be terminated on terminal blocks at both ends of the cable run and be electrically continuous through terminal boxes. Shield drain wires for spare circuits shall not be grounded at either end of the cable run. Terminal boxes shall be provided at instrument cable splices. If cable is buried or in raceway below grade at splice, an instrument stand shall be provided as specified with terminal box mounted approximately 3 feet above grade.
- E. Cable for paging, telephone, and security systems shall be installed and terminated in compliance with the manufacturer's recommendations.

3.04 PORTABLE CORD

Portable cord feeding permanent equipment, such as pendant cords, pumps, cranes, hoists and portable items shall have a wire mesh cord grip of flexible stainless steel wire to take the tension from the cable termination. Connection of portable cords to permanent wiring shall be accomplished with the use of terminals. In-line taps and splices shall be used only where specified.

3.05 COLOR CODING

- A. Wiring shall conform to the following color code, unless otherwise specified.
- B. Insulation on phase conductor sizes 8 AWG and smaller shall be colored, 6 AWG and larger may have black insulation with plastic tape of the appropriate color from the table below.
- C. Insulation on the grounded conductor (neutral) sizes 6 AWG and smaller shall be colored; 4 AWG and larger may have black insulation with plastic tape of white or gray in accordance with the table below:

Description	240/120V	208Y/120V	480Y/277V	Control
Phase A (Left, Top, Front)	Black	Black	Brown	--
Phase B (Center, Center, Center)	Red	Red	Orange	--
Phase C (Right, bottom, Back)	N/A	Blue	Yellow	--
Neutral	White	White	Gray	White
Ground	Green	Green	Green	Green
120 VAC Control	--	--	--	Red
120 VAC Control	Neutral	Neutral	--	White
DC Control (+)	--	--	--	Purple
DC Control (-)	--	--	--	Gray
External Source	--	--	--	Yellow

- D. All control wiring in control panels or other enclosures that is powered from an external source and is not disconnected by the control panel disconnect shall be terminated at a disconnecting terminal block (with energization indicator light) upon entering the enclosure. The color of the wire shall then be changed to yellow to identify it as being powered from an external source. Provide identification nameplate on exterior of enclosure to indicate sources of external power.
- E. All wiring in industrial machines and equipment shall be in accordance with NFPA 79. Notify Owner of any deficiencies noted during installation.

3.06 TERMINAL MARKING

All terminals in instrument and relay compartments, motor control centers, in control panels, instrument panels, field panels and control stations, as well as connections to mechanical equipment shall have reference number and letter referencing connected equipment.

3.07 WIRE BENDING RADIUS

The radius of bends in all non-shielded wire (conductors and cables) shall not be less than eight (8) times the outside diameter of the wire. Shielded or lead covered wire shall not be bent to a radius less than twelve (12) times the diameter of the wire. Any wire installed with bends less than the allowed diameter and which the Engineer deems has caused that insulation to be damaged, shall be removed and new wire shall be installed.

3.08 GENERAL TESTS

- A. The Contractor shall perform voltage, current and resistance tests as required to complete the Electrical System Test Report form provided at the end of this section. Test reports shall be submitted to the Engineer prior to final acceptance by the Owner. The Contractor shall inform the Engineer of scheduled testing a minimum of 5 days prior to the testing. Testing shall not take place unless the Engineer or Owner Representative is present to witness the testing.
- B. The Contractor shall undertake all such corrective measures if the test results indicate corrective measures are required. No additional compensation will be paid for corrective measures.
- C. Test Scope
 - 1. The Contractor shall provide all material, equipment, labor and technical supervision to perform tests and inspections as specified herein.
 - 2. It is the intent of these tests to assure that all electrical equipment as supplied and installed by the Contractor is operational within the industry and manufacturer's tolerances and is installed in accordance with the design documents.
 - 3. The tests and inspection shall determine the suitability for energization.
- D. Conductor Tests
 - 1. Following the completion of installation, the following conductors shall be tested:
 - a. All 480 volt power feeders.
 - b. Service and feeder conductors.
 - c. All new grounding; measure ground resistance at each ground rod.
- E. Visual and Mechanical Inspections
 - 1. Inspect exposed section for physical damage.
 - 2. Verify cable is supplied and connected in accordance with Specifications and one line diagram, and that phases are labeled correctly.
- F. Electrical Tests
 - 1. Perform insulation resistance test on each cable in reference to ground and adjacent conductors in the same raceway.
 - 2. Perform continuity test to ensure proper cable connection.
- G. Test Values
 - 1. Insulation resistance tests shall be performed at 1000 volts DC for one-half minute.
 - 2. Minimum megger readings at 20 degrees C shall be one megohm.
 - 3. The maximum acceptable reading for an individual ground rod shall be 25 ohms as required by the NEC and measured by the three rod method. The composite ground electrode shall have a maximum acceptable reading of 15 ohms.

3.09 ELECTRICAL SYSTEM TEST REPORT - 600V CABLE

A. Electrical System Description Data

SERVICE DESCRIPTION:	
nominal voltage, phase to phase	
phase to neutral - single or three phase	
number of conductors	

SERVICE CONDUCTORS:	
phase size and insulation type	
neutral size and insulation type	
ground size and insulation type	

SERVICE DISCONNECT DESCRIPTION:	
circuit breaker or disconnect switch	
size (amps)	
fuse (amps)	

MEASURED CONDITIONS	DATA			
	Operating Load Voltage	Volts	Vab	Vbc
		Van	Vbn	Vcn
Operating Load Feeder Current	Amps	Ia	Ib	Ic
Conductor Insulation	Megohms	a-b	b-c	c-a
Resistance (record the indicated measurement for each of the following circuits:)	Megohms	a-g	b-g	c-g

END OF SECTION 26 05 19

DIVISION 26 – ELECTRICAL

SECTION 26 05 26 – GROUNDING

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. This specification describes the requirements for the grounding of electrical systems and equipment.
- B. Installation shall be in accordance with the National Electrical Code (NEC).

1.02 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCT

2.01 **MATERIALS**

- A. Ground wire: Soft drawn bare stranded copper wire, sized as noted on the drawings.
- B. Terminals and connectors: Burndy Hyground compression system.
- C. Exothermic type weld: Erico Cadweld process, or Furseweld/T&B corp. Exothermic welding system.
- D. Rod Electrodes: Copper clad (minimum 0.010 jacket) ground rods minimum ¾" diameter x 8' long.
- E. Grounding Electrode conductors and bonding conductors: Copper conductors, bare or insulated, as shown on drawings.

PART 3 - EXECUTION

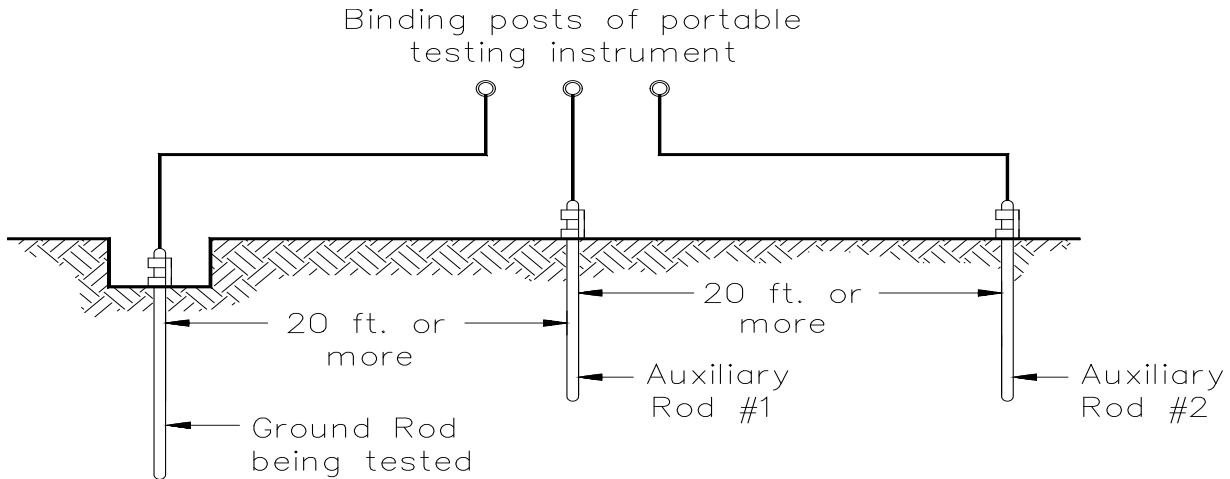
3.01 PREPARATION

- A. All contacting surfaces of ground connections shall be cleaned to bright metal before connection is made.

3.02 INSTALLATION

- A. Grounding conductors: Install in PVC conduit where subject to damage. All grounding conductors smaller than #6 AWG must be protected.
- B. Connections and splices: Provide as required and as shown on drawings.
 - 1. Connections, taps, and splices shall be made by compression connectors, Burndy Hyground compression system.
- C. Provide equipment grounding conductor in all PVC conduits.

ELECTRICAL GROUND ROD TEST REPORT



GROUND ROD RESISTANCE TESTING

PROCEDURE:

To measure ground resistance, two additional temporary grounds, consisting of short rods 2 or 3 ft long, shall be driven in the ground at least 20 ft. away from the rod being tested. A direct-reading ground resistance tester shall then be connected to the three ground rods by means of insulated leads. The battery operated ground resistance tester reads the resistance of the ground rod being tested directly in ohms. The ground rod location / designation and its measured ohm value shall be recorded in chart below.

GROUND ROD LOCATION / DESIGNATION	OHM VALUE
1.	*
2.	*
3.	*
COMPOSITE GROUND	*

* Ohm value of a single ground rod shall not exceed 15 Ohms. If additional ground rod(s) are added, the "composite" ground electrode shall have a maximum acceptable reading of 15 Ohms which shall be recorded in chart above.

END OF SECTION 26 05 26

DIVISION 26 – ELECTRICAL

SECTION 26 05 29 – WIRING DEVICES

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. This section covers furnishing and installing all receptacles, switches and other wiring devices indicated on the drawings.

1.02 STANDARDS AND CODES

- A. All materials and equipment specified herein shall be within the scope of Nationally Recognized Testing Laboratory (NRTL) examination services, be approved by the NRTL for the purpose for which they are used, and shall bear the appropriate listing label.
- B. Equipment listed/labeled by an NRTL shall be as dictated by the latest printing of the *Electrical Testing Laboratories Accreditation Report* available from the State of Washington Department of Labor and Industries, Electrical Inspection Division. Any NRTL listing/labeling shall be as accepted by the local authority having jurisdiction.
- C. When a product is not available with a testing laboratory listing for the purpose for which it is to serve, the product may be required by the inspection authority to undergo a special inspection at the manufacturer's place of assembly. All costs and expenses incurred for such inspections shall be included in the original contract price.

1.03 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit product data.

PART 2 - PRODUCT

2.01 GENERAL

- A. Wiring devices shall be UL approved for the current and voltage specified and shall comply with NEMA WD-1. Devices shall contain provisions for back wiring and side wiring with captively held binding screws. Devices shall be brown except those located in finished areas, which shall be ivory.

2.02 RECEPTACLES AND PLUGS

- A. General:
 - 1. Receptacles shall be grounding type.
- B. 120 volt Receptacles:
 - 1. Indoor Clean Areas: Receptacles shall be duplex 20 ampere, NEMA 5-20R, and shall accept NEMA 5-15P and 5-20P plug caps. Receptacles shall be Hubbell 5362, General Electric 4108-2, or equal. Where the manufacturer of cord connected equipment requires an isolated ground, a receptacle with isolated ground shall be provided. Isolated ground receptacles shall be Hubbell IG-5362, Arrow-hart 6766, or equal.

2. Outdoor, Process or Corrosive Areas: Receptacle shall be duplex, 20 ampere, NEMA 5-20R, and shall accept NEMA 5-15P and 5-20P plug caps. Receptacle and plug caps shall be corrosion resistant with polycarbonate weatherproof lift covers. Manufacturer shall be Hubbell 53CM62/ 53Cm21, General Electric, or equal.
- C. 250V Receptacles:
1. Receptacles shall be duplex 15 ampere, NEMA, 6-15R, and shall accept NEMA 6-15P plug caps. Receptacles shall be Hubbell 5662, Arrow Hart 5662, or equal. Plug caps shall be Hubbell 5666-C, Arrow-Hart 6866, or equal.
- D. Plug Caps
1. Male plug caps for 120 volt and 250 volt receptacles shall be of the cord grip armored type with heavy phenolic housing, of the same manufacture as the receptacle. Plug caps shall be rated 15 amperes. One plug cap shall be provided for every four receptacles furnished, with a minimum of two plug caps being provided. Plug caps shall be delivered to the Construction Manager.
- E. Three Phase Receptacles and Plugs:
1. Receptacles shall be suitable for 480 volt, 3-phase, 4-wire service, with ampere ratings as specified. Receptacles and plugs shall be designed so that the grounding pole is permanently connected to the housing. The grounding pole shall make contact before the line poles are engaged when the plug is connected to the receptacle housing. The plug sleeve shall also make contact with the receptacle housing before the line and load poles make contact. Receptacles shall be provided complete with cast back box, angle adapter, gaskets, and a gasketed screw-type, weathertight cap with chain fastener. Each receptacle shall be provided with one plug. Receptacles shall be Crouse-Hinds “Arktite,” Appleton “Powertite,” or equal.

2.03 SWITCHES

- A. General Purpose (Indoor, clean areas):
- B. General purpose switches shall be quiet AC type, specification grade, and shall be provided in accordance with rated capacities as required. Switches shall match receptacles in color. Switches shall be manufactured by General Electric, Hubbell, or equal, as follows:

	<u>15A, 120-277V</u>		<u>20A, 120 - 277V</u>	
	<u>G.E. Co.</u>	<u>Hubbell</u>	<u>GE. Co.</u>	<u>Hubbell</u>
Single:	GE5931	1201	GE5951	1221
Three-way:	GE5933	1203	GE5953	1223
Four-way:	GE5934	1204	GE5954	1224
SPST momentary:	GE5953	1206	--	--
Three position center off momentary:	GE5935	1556	--	1557

C. Switches for Outdoor and Corrosive Areas

Switches shall be 20 amp pressswitch type with weatherproof/ corrosion resistant neoprene plate as manufactured by Hubbell or Arrow-Hart as follows:

	<u>Hubbell with 17CM50 plate</u>	<u>Arrow-Hart with 2881 plate</u>
Single pole:	1281	2991
Double pole:	1282	2992
3-way:	1283	2993
4-way:	1284	2994

Switches shall be mounted in “FS” type copper-free aluminum or PVC mounting boxes.

2.04 DEVICE PLATES

- A. Device plates shall be provided with switches. In noncorrosive indoor areas, receptacle device plates shall be made of sheet steel, zinc electroplated with chrome finish as manufactured by Crouse-Hinds, Appleton, or equal. Device plates in corrosive or outdoor areas shall be corrosion-resistant/marine-duty type. Device plates for explosion-proof equipment shall be factory provided with the equipment.
- B. Device plates shall be provided with engraved laminated phenolic nameplates with 1/8 inch white characters on black background. Nameplates for switches shall identify panel and circuit number and area served. nameplates for receptacles shall identify circuit and voltage if other than 120 volts, single phase.

2.05 PLUG STRIPS

- A. Plug strips shall be manufactured of sheet steel with the receptacles mounted on the front cover. The front cover shall be removable. Plug strips shall be Plugmold, or equal.
- B. Plug strips for office and laboratory areas shall have single 3 wire, 20 ampere grounding type receptacles mounted along the strip on a single circuit.
- C. Plug strips for work benches in shop and laboratory areas shall have 3 wire, 20 ampere grounding type duplex receptacles mounted along the strip on the circuits specified. Sufficient space shall be provided behind the receptacles for ten 12 AWG conductors in accordance with the NEC space rules.

PART 3 - EXECUTION

3.01 GENERAL

- A. Boxes shall be independently supported by galvanized brackets, expansion bolts, toggle bolts, or machine or wood screws as appropriate. Wooden plugs inserted in masonry or concrete shall not be used as a base to secure boxes, nor shall welding or brazing be used to attachment.
- B. Wiring devices shall be tested for correct connections.

3.02 POSITION OF OUTLETS

- A. All outlets shall be centered with regard to building lines, furring and trim, symmetrically arranged in the room. Set outlets shall be set plumb and extend flush outlets to the finished surface of the wall, ceiling or floor without projecting beyond same. All receptacles, switches and outlets shown on the drawings shall be installed symmetrically along trim and where necessary, set the long dimension of the plate horizontal or gang in tandem.

3.03 MOUNTING HEIGHTS

- A. Unless otherwise noted, wall mounted outlet devices shall generally be 24 inches above the floor, 18 inches in architecturally treated areas, 6” counter tops or backsplashes. Switches shall be 48 inches above the floor. All measurements are to centerline of device.

END OF SECTION 26 05 29

DIVISION 26 – ELECTRICAL

SECTION 26 05 33 – RACEWAYS, FITTINGS, AND SUPPORTS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This section specifies raceways for electrical conductors including fittings and supports. Raceways shall be provided for power, control, instrumentation, grounding, lighting, receptacles, and signaling systems. Raceways consist of conduits, tubing, and tray systems. For the purpose of this specification, conduit and tubing is described collectively as conduit.

1.02 STANDARDS AND CODES

- A. All materials and equipment specified herein shall be within the scope of Nationally Recognized Testing Laboratory (NRTL) examination services, be approved by the NRTL for the purpose for which they are used, and shall bear the appropriate listing label.
- B. Equipment listed/labeled by an NRTL shall be as dictated by the latest printing of the *Electrical Testing Laboratories Accreditation Report* available from the State of Washington Department of Labor and Industries, Electrical Inspection Division. Any NRTL listing/labeling shall be as accepted by the local authority having jurisdiction.
- C. When a product is not available with a testing laboratory listing for the purpose for which it is to serve, the product may be required by the inspection authority to undergo a special inspection at the manufacturer's place of assembly. All costs and expenses incurred for such inspections shall be included in the original contract price.

1.03 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit catalog data showing material information and conformance with Specifications.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Material
 1. All materials shall be new, free from defects, of current manufacture, of quality specified or shown. Each type of material shall be of the same manufacturer throughout the work.
- B. Unscheduled Raceway
 1. With the exception of lighting, communication, paging, security and receptacle circuits, the type and size of raceway shall be as specified on the drawings or schedules. Lighting and receptacle raceway are unscheduled and shall be sized by the contractor in accordance with the NEC. Minimum size shall be 3/4 inch for exposed and 1 inch for embedded raceway.

2. The number and size of communication, paging, and security raceways shall be as required for the particular equipment provided subject to the minimum sizes specified above. The type of raceway shall be in accordance with paragraph 260500-3.01.

C. Scheduled Raceway

1. The size and type of raceway shall be as specified on the drawings or schedules. In case of conflicts between the drawings and paragraph 3.01, the drawings shall prevail.

2.02 RACEWAY

A. Application:

1. All conduits shall be Galvanized Rigid Steel (GRS), unless otherwise noted or specifically allowed in Section 26 05 00, 1.08 Area Classification.
2. All connections to vibrating equipment or motors shall be liquidtight flexible metallic conduit.
3. All underground power, control and telephone conduits shall be Schedule 40 PVC, meeting standard TC-2.

B. Rigid Steel Conduit

Rigid conduit shall be steel, hot dipped galvanized. Final conduit terminations shall be by means of threaded hubs or double locknuts and insulating grounding type bushings.

C. Liquid Tight Flexible Metallic Conduit

Flexible conduit shall be interlocking single strip, hot dipped galvanized and shall have a polyvinyl chloride jacket extruded over the outside to form a flexible watertight raceway.

D. Nonmetallic Conduit

Nonmetallic conduit shall be electrical grade Schedule 40 PVC, meeting NEMA standard TC-2. All conduit, pipe, sweeps and fittings shall be gray in color. All pipe shall be in either 10 or 20 foot sections with on extended bell end. Conduit shall be in standard diameters. Conduit, fittings and solvent cement shall all be manufactured by the same manufacturer. All couplings shall be the extended type.

E. PVC Coated Rigid Steel Conduit

PVC coated conduit shall have a polyvinylchloride (PVC) coating and shall be bonded to the galvanized outer surface of rigid steel conduit. The bond between the PVC coating and the conduit surface shall be greater than the tensile strength of the plastic. The thickness of the PVC coating shall be a minimum of .035" (35 mil) (40 mil nominal).

F. Aluminum Conduit

Aluminum conduit shall be rigid ANSI C80.5, threaded.

G. Electrical Metallic Tubing (EMT)

EMT shall be UL 797 and ANSI C80.3, steel tubing, hot-dip galvanized. EMT fittings shall be ANSI/NEMA FB 1, steel, raintight, insulated throat, compression type.

2.03 FITTINGS AND BOXES

A. Material

Materials for fittings and boxes shall be chosen to satisfy the requirements of Paragraph 26 05 00. 1.08 - Area Classification. All screws, nuts, bolts, and other hardware used with fittings and boxes shall be stainless steel unless installed in general purpose areas.

B. Unions

All unions of the type designated as UNF and UNY and shall be suitable for use in moist atmospheres. Unions shall be of cast ferrous alloy, electroplated with zinc.

C. Locknuts

All locknuts used in general purpose areas shall be extra heavy steel electroplated with zinc for sizes $\frac{3}{4}$ inch to 2 inches. Locknuts larger than 2 inches shall be of malleable iron, electroplated with zinc. Locknuts used in damp and outdoor areas shall be stainless steel. Locknuts in corrosive areas shall be FRP.

D. Bushings

All bushings shall be steel or malleable iron threaded type electroplated with zinc or hot-dip galvanized. Bushings shall have a molded-phenolic or nylon insulating collar.

1. Grounding Bushings: Grounding-type bushings shall have a projecting portion drilled for the size grounding cable used and shall be provided with a clamp or set screw for securing the cable. In addition, a set screw shall be provided to securely lock the bushing to the conduit. Grounding bushings shall be GEDNEY Type IBC-LS, Type BL, or T&B No. 3870 through 3880, or equal.
2. Bushed Openings: Bushings for protection of cables passing through metal boxes or troughs shall all be phenolic type and shall be OZ Type ABB, or equal.
3. Hubs for connection of conduit to boxes shall be of zinc. Hubs for use in damp or corrosive areas shall be non metallic or aluminum to match the raceway. The hubs shall provide a liquidtight connection to the box and an insulating bushing for the wiring. Hubs shall be Thomas and Betts bullet type, or equal.

E. Liquidtight Flexible Metallic Conduit Connectors:

Connectors for liquidtight flexible metallic conduit shall be electroplated zinc malleable iron. An O-ring gasket and an approved grounding insert shall be part of the unit. Where applicable, 45 degree and 90 degree fittings may be used. Liquid-tight connectors shall be by O.Z. GEDNEY, or equal.

F. Expansion Fittings

1. Expansion fittings in exposed runs shall be weatherproof type and shall be provided with an external bonding jumper. The expansion fittings shall allow for 4 inch longitudinal movement and shall be designed so that when completely assembled the end of each conduit entering the fitting is bushed. Fittings shall be O.Z. GEDNEY Type EX, or equal.
2. Deflection fittings in embedded runs shall be of the watertight type and shall be provided with an internal bonding jumper. The expansion material shall be neoprene and shall allow for $\frac{3}{4}$ inch movement in any direction. Fittings shall be O.Z. GEDNEY Type DX, or equal.

G. Junction Boxes

1. Junction boxes, device boxes, fixture support boxes, oblong, round and rectangular conduit fittings (condulets) shall be of the same material as required by the area classification for the raceway. Junction boxes for use in general purpose areas shall be zinc electroplated cast ferrous alloy. Integrally cast threaded hubs or bosses shall be provided for all conduit entrances and shall provide for full 5 thread contact on tightening. Drilling and threading shall be done before finishing.
2. Cover plates shall be of similar cast ferrous alloy material and finish. Full body neoprene gaskets shall be provided with all covers and shall fastened with stainless steel screws.
3. NEMA 12 boxes shall be of heavy gauge sheet steel, or cast metal. All NEMA 12 boxes shall be provided with a 5 mil thick light gray thermo-epoxy finish, and designed so that moisture will drain away from the gasketed cover joint. Covers for sheet steel boxes shall have turned edges, ground smooth to form a tight seal against the gasket when the cover is closed.

2.04 CONDUIT & CABLE SUPPORTS

A. Conduit Supports

Hot-dip galvanized framing channel shall be used to support groups of conduit. Individual conduit supports shall be one-hole galvanized malleable iron pipe straps used with galvanized clamp backs and nesting backs where required. Conduit supports for PVC or epoxy coated rigid steel and PVC conduit systems shall be one hole PVC or epoxy coated clamps or PVC conduit wall hangers.

B. Ceiling Hangers

Ceiling hangers shall be adjustable galvanized carbon steel rod hangers as specified. Straps or hangers of plumber's perforated tape are not acceptable. Unless otherwise specified, hanger rods shall be 1/2-inch all-thread rod and shall meet ASTM A193. Hanger rods in corrosive areas and those exposed to weather or moisture shall be stainless steel.

C. Racks

Racks shall be constructed from framing channel. Galvanized channels and hanger rods shall be steel, hot dip galvanized, 1.5 oz. / sq. ft. after fabrication. Field cuts shall be re-galvanized by the Galv-A-Weld process or by GAL-VAN-IZE as manufactured by LAWSON Products Inc., or equal. Channels attached directly to building surfaces shall be 14 gauge minimum thickness, 1-5/8 inch deep. Channel section shall be sufficient to limit deflection to 1/360 of span.

Framing channels on all exterior areas and in corrosive areas shall be aluminum stainless steel, or fiberglass. All hardware shall be stainless steel. Channel section shall be sufficient to limit deflection to 1/360 of span. Framing channel shall be as manufactured by Unistrut or equal.

2.05 CONDUIT SCHEDULE

Refer to conduit schedule on drawings for raceway sizing and routing description.

2.06 CONDUIT TAGS

Conduit tags shall be corrosion resistant and remain legible after exposure to abrasion or aggressive fluids. Tags shall be crosslinked polyolefin construction. Manufacturer shall be Impact Industries, or equal.

2.07 HANDHOLES

Handholes shall be precast concrete with checker plate, galvanized, traffic covers designed for H-20 loading. Dimensions shall be as specified on the drawings, or as required to meet minimum sizes as required by the NEC. Handholes shall be construction of 3000 psi reinforced concrete.

2.08 UNDERGROUND MARKING TAPE (DETECTABLE TYPE)

Underground marking tape shall be for location and early warning protection of buried power and communication lines. Tape shall be detectable by a pipe / cable locator or metal detector from above the undisturbed ground. Tape shall be nominally 2 inches wide with a type B721 aluminum foil core laminated between two layers of 5 mil thickness polyester plastic. The plastic color shall be red for electrical lines and orange for telephone lines. A warning shall be imprinted continuously along the length, with message reading similar to: "CAUTION - STOP DIGGING - BURIED ELECTRIC (TELEPHONE) LINE BELOW." Tape shall be Brady "Detectable Identoline"; Services and Materials "Buried Underground Tape, Detectable", or equal.

PART 3 - EXECUTION

3.01 3.01 CONDUIT

A. General

1. The Contractor shall limit the number of directional changes of the conduit to a total not more than 270 degrees in any run between pull boxes. Conduit runs shall be limited to 400 feet, less 100 feet or fraction thereof, for every 90 degrees of change in direction. No more than four bends will be allowed in any single run. Bends and offsets shall be avoided where possible but, where necessary, shall be made without flattening or kinking, or shall be factory preformed bends. Turns shall be made with case metal fittings or conduit bends. Welding, brazing or otherwise heating of conduit is not acceptable.
2. Where required for pulling cable and as necessary to meet the requirements of the previous Paragraph, the Contractor shall provide cast junction or pull boxes. Pull boxes used for multiple conduit runs shall not combine circuits fed from different MCCs, switchboards, or switchgear.
3. Conduit entering NEMA 1 type sheet steel boxes or cabinets shall be secured by locknuts on both the interior and exterior of the box or cabinet and shall have an insulating grounding or bonding bushing constructed over the conduit end. Conduit entering all other boxes shall be terminated with a threaded hub. Cast boxes and nonmetallic enclosures shall have threaded hubs. Joints shall be made with standard couplings or threaded unions. Metal parts of nonmetallic boxes and plastic coated boxes shall be bonded to the conduit system. Running threads shall not be used in lieu of conduit nipples, nor shall excessive thread be used on any conduit. The ends of conduit shall be cut square, reamed and threaded with straight threads.

4. Unless otherwise specified, conduit entering field equipment enclosures shall enter the bottom or side of the box. Where conduit comes from above, it shall be run down beside the enclosure and a tee conduit and drip leg shall be installed.
5. When new conduit is added to areas which are already painted, the conduit and its supports shall be painted to match the existing facilities. Where new conduit is used to replace existing conduit, the existing conduit and supports shall be removed, resulting blemishes shall be patched and repainted to match original conditions. Similarly, if existing conduits are to be reused and rerouted, resulting blemished shall be corrected in the same manner.

B. Conduit Support

1. Exposed conduit shall be run on supports spaced not more than 10 feet apart and shall be constructed with runs parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceiling. No conduit shall be routed within 6 inches of any object operating above 30 degrees C.
2. Where three or more conduits are located in a parallel run, they shall be spaced from the wall using framing channel. Support systems shall be galvanized steel unless otherwise specified.
3. Conduit rack and tray supports shall be secured to concrete walls and ceilings by means of cast-in-place anchors. Individual conduit supports shall use cast-in-place anchors, die-cast, rust-proof alloy or expansion shields. Wooden plugs, plastic inserts or gunpowder-driven inserts are not acceptable as a base to secure conduit supports.

C. Trench Preparation

1. All trenching will be at a depth sufficient to allow installation of primary conduit with a minimum of 36" cover.
2. All trenching for secondary service runs to to meters will be at a depth sufficient to allow installation of all secondary conduits with a minimum of 30" of cover.
3. Construct the trench so that the bottom provides a firm, stable, and uniform support for the full length of the conduit. Clear the bottom of any rocks or debris that might damage the conduit.
4. Increase the trench depth, if necessary, to minimize grade changes and eliminate bends in the conduit system.
5. When crossing existing utilities, slope the trench to avoid the obstacle. Keep the slope gradual so as to minimize conduit bending.
6. Install a minimum of 3" sand bedding material to provide a flat surface that will not damage the conduit system.

D. Conduit Assembly and Placement

1. All conduit cuts shall be made using a fine tooth saw. All burrs and rough edges shall be removed.
2. Apply a liberal and uniform coat of PVC cement to the conduit and bell end. Assemble the pieces while the surfaces while the surfaces are wet and fluid. Slip the conduit straight into the bell end, while slightly twisting until it bottoms. Hold the joint for 15 seconds so the conduit will not push out.

3. Let conduit joints cure completely before placing the conduit in permanent position.
4. All conduits (primary, secondary, control and communications) shall be placed at a common depth in a common trench.
5. Place conduit banks directly on sand-bedded bottoms.
6. Use conduit base spacers for bottom row of conduit. Place spacers at 5 foot intervals.
7. Stagger bell ends between layers to facilitate bank assembly.
8. See additional details provided on the electrical drawings.

E. Conduit Separation

1. Signal conduits shall be separated from AC power or control conduits. The separation shall be a minimum of 12 inches.

F. Conduit Seals for Hazardous or Corrosive Areas

1. Each conduit passing from a hazardous or corrosive area into a non-hazardous or non-corrosive area shall be provided with a sealing fitting which may be located on either side of the boundary. The seal shall be located at the boundary in accordance with the NEC.
2. Seal fittings for conduit systems in hazardous atmosphere locations shall be hot-dip galvanized case ferrous alloy. Sealing compound shall be hard type, Chico A, or equal, UL listed for explosion-proof sealing fittings. Sealing compound shall be non-hardening type for corrosive areas. Provide reducing bushings and larger seals as required to meet NEC 25% fill.

3.02 HANDHOLES

- A. Handholes shall be set plumb to limit the depth of standing water to a maximum of 2 inches. Handhole covers, unless otherwise specified, shall be set at grade.

3.03 RACEWAY NUMBERING

- A. Each conduit shall be provided with a number tag at each end and in each handhole and/or pullbox.

END OF SECTION 26 05 33

DIVISION 26 – ELECTRICAL

SECTION 26 08 00 – EQUIPMENT TESTING

PART 1 – GENERAL

1.01 DESCRIPTION

This section specifies the acceptance testing of electrical materials, equipment and systems. The Contractor shall provide all labor, tools, material, power, and other services necessary to provide the specified tests.

The testing specified in this section shall be performed by the Contractor, or by a Testing Agency (testing firm) independent of the Contractor. If required, the Contractor shall obtain the services of the Testing Firm and allow time in the construction schedule for tests to take place.

1.02 TESTING COSTS

All costs for testing equipment and personnel shall be paid for by the Contractor. Work associated with coordination by the Contractor such as opening panels, disconnecting and re-terminating wire and cables etc., for the testing to be performed, shall also be responsibility of the Contractor.

1.03 CONTRACTORS REQUIREMENTS

The Contractor shall be responsible to inform the Testing Firm and the Engineer when equipment is on site or installed, whichever is appropriate, for the equipment to be tested.

The Contractor shall provide support to the Testing Firm for equipment that may need adjustment or operation. The Contractor shall open panels, disconnect equipment, and perform any other work necessary as directed by the Testing Firm to properly test the equipment.

1.04 TESTING CRITERIA

All tests of equipment listed in Part 3 of this section will be conducted in accordance with the National Electrical Testing Association.

1.05 APPLICATION

Requirements for testing in accordance with this section are specified in this and other sections of Division 26 05 00. Where testing in accordance with this section is required, the required tests, including correction of defects where found, and retesting, shall be completed prior to energization of material, equipment, or systems.

1.06 SUBMITTALS

- A. Submit test results no more than 5 days following testing.

PART 2 - PRODUCTS

2.01 TESTING EQUIPMENT AND MATERIALS

Test instruments shall be calibrated to references traceable to the National Bureau of Standards and shall have a current sticker showing date of calibration, deviation from standard, name of calibration laboratory and technician, and date recalibration is required.

2.02 PRODUCT DATA

Functional checkout procedures shall be provided in accordance with Section 26 05 00. The Contractor shall provide proposed functional test procedures 30 days prior to performing functional checkout tests.

PART 3 - EXECUTION

3.01 GENERAL

The Contractor shall inform the Testing Firm and the Engineer when equipment and systems are ready for testing. The Contractor shall coordinate the time a minimum of five (5) days in advance of when testing is to take place, for the Testing Firm to schedule test equipment with the Engineer. The Contractor shall provide the necessary space and support equipment for the testing.

At conclusion of the testing, the Contractor shall perform necessary work to return the equipment to operation, if applicable.

Equipment that does not pass initial testing shall be repaired or replaced by the Contractor at no additional cost to the Owner. Repaired or replaced equipment shall be re-tested. The Contractor shall inform the Testing Firm and the Engineer the repair or replacement has been completed. If the equipment fails to meet the specified criteria a second time, all subsequent testing and Engineer witnessing shall be at the Contractors expense until the equipment performs as specified.

3.02 EQUIPMENT TO BE TESTED

The following tests will be conducted on the equipment listed. A brief description of the testing is included so that the Contractor can anticipate the extent of work involved in preparation for the testing to take place.

All systems and devices shall be completely tested, and functional tests shall be performed to demonstrate the proper operation of each system in accordance with Section 26 05 00.3.02.

All power feeders shall be tested in accordance with Section 26 05 19, and grounding tests shall be performed in accordance with Section 26 05 26.

END OF SECTION 26 08 00

DIVISION 26 – ELECTRICAL

SECTION 26 22 00 – DRY TYPE TRANSFORMERS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section specifies dry-type transformers rated 600 volts and less used for power distribution, lighting and control purposes.

1.02 MATERIALS

- A. All materials will be new, free from defects, of current manufacture, of quality specified or shown. Each type of material will be of the same Manufacturer throughout the work.

1.03 STANDARDS AND CODES

- A. All materials and equipment specified herein will be within the scope of Nationally Recognized Testing Laboratory (NRTL) examination services, be approved by the NRTL for the purpose for which they are used, and will bear the appropriate listing label.

1.04 EQUIPMENT SIZE

- A. Electrical equipment will fit in the space provided on the plan drawings or as specified. Equipment heights will not exceed those shown or specified. Larger equipment will not be considered equivalent or acceptable.

1.05 SUBMITTALS

- A. No less than 30 days prior to Work on-site Submit all catalog data in accordance with the Submittals requirements. Show material information and confirm compliance with these specifications.

PART 2 - PRODUCTS

2.01 ACCEPTABLE PRODUCTS

- A. Reference drawings for transformer size and windings. Transformers will conform to ANSI/IEEE C57.12.01 and ANSI/ UL 506. The voltage, frequency, number of phases and KVA rating will be as specified. Transformers will be General Electric, Square D, Westinghouse, or equal.

2.02 INSULATION

- A. Transformers 15 KVA and above will have a Class 220 insulation system in accordance with NEMA ST20. Transformers 2 KVA and less will be designed not to exceed 80 degrees C temperature rise. Transformers 3 KVA and greater will be designed not to exceed 115 degree C temperature rise.

2.03 COILS

- A. All transformer coils will be copper or aluminum. Transformer coils 15 KVA and above will be impregnated with varnish. Transformer coils 10 KVA and below will be encapsulated.

2.04 WINDING CONFIGURATION

- A. Transformers will have electrically isolated primary and secondary windings. Primary and secondary winding configurations will be as specified. Provisions will be made to permit separate grounding of the neutral conductor and enclosure. Single-phase transformers will be the four winding type.

2.05 TRANSFORMER TAPS

- A. Transformers 15 KVA and above will be provided with two 2-1/2 percent full capacity taps above normal voltage and four 2-1/2 percent full capacity taps below rated voltage on the primary winding.

2.06 TERMINAL COMPARTMENTS

- A. Terminal compartments will be sized to permit termination of cables specified. Terminal connections will be made in the bottom third of the enclosure. The terminals will be copper and sized for cable specified.

2.07 ENCLOSURES

- A. Transformers rated 15 KVA and smaller will be provided with weatherproof, non-ventilated enclosures.
- B. Indoor transformers rated greater than 15 KVA will be provided with drip proof, ventilated enclosures. Outdoor transformers will have weatherproof enclosures.

2.08 MOUNTING

- A. Transformers 15 KVA and below will be suitable for wall mounting. Transformers 20 KVA and larger will be floor mounting type.

2.09 SOUND LEVELS

- A. The sound levels will not exceed the following values:

	<u>KVA</u>	<u>dB</u>
a.	10-45	42
b.	50-150	45
c.	225-300	50
d.	500	54

2.10 TRANSFORMER EFFICIENCY

- A. Transformers will be energy efficient, and will meet the following minimum ratings:

Single Phase		Three Phase	
kVA	Efficiency (%)	kVA	Efficiency (%)
15	97.7	15	97.0
25	98.0	30	97.5
37.5	98.2	45	97.7
50	98.3	75	98.0
75	98.5		

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Transformers will include internal "rubber-in-shear" isolation mounts selected per Manufacturer's recommendations or will be installed with "KORFUND" or equal external vibration isolators. Wall mounting will be allowed on masonry. Mounting hardware will be per Manufacturer's instructions. Transformers with enclosures designed for floor mounting where suspended from above will be suspended on a trapeze constructed of a minimum of two horizontal structural channels hung from threaded rod attached to structural slab with inserts. Channel rod and inserts will be sized for not less than 400% load safety factor. Transformer raceway connections will be flexible metal conduit as specified hereinbefore for equipment subject to vibration.

3.02 CONNECTION

- A. 208/120 volt three phase and 120/240 volt single phase secondary transformers will be considered "grounded neutral separately derived systems" and neutral will be grounded accordingly to the building ground grid utilizing a direct connection.

3.03 IDENTIFICATION

- A. The transformer will be identified with nameplates indicating rating and primary source.

END OF SECTION 26 22 00

DIVISION 26 – ELECTRICAL
SECTION 26 24 16 – PANELBOARDS

PART 1 – GENERAL

1.01 DESCRIPTION

This section specifies electric panelboards for general lighting and power distribution.

1.02 STANDARDS AND CODES

All materials and equipment specified herein shall be within the scope of Nationally Recognized Testing Laboratory (NRTL) examination services, be approved by the NRTL for the purpose for which they are used, and shall bear the appropriate listing label.

Equipment listed/labeled by an NRTL shall be as dictated by the latest printing of the Electrical Testing Laboratories Accreditation Report available from the State of Washington Department of Labor and Industries, Electrical Inspection Division. Any NRTL listing/labeling shall be as accepted by the local authority having jurisdiction.

When a product is not available with a testing laboratory listing for the purpose for which it is to serve, the product may be required by the inspection authority to undergo a special inspection at the manufacturer's place of assembly. All costs and expenses incurred for such inspections shall be included in the original contract price.

1.03 EQUIPMENT SIZE

Electrical equipment shall fit in the space provided on the plan drawings or as specified. Equipment heights shall not exceed those shown or specified. Larger equipment shall not be considered equivalent or acceptable.

1.04 SUBMITTALS

No less than 30 days prior to Work on-site submit the following in compliance with these specifications:

1. Manufacturer's certification that bus bracing is capable of withstanding the specified short circuit condition.
2. Quantity and rating of circuit breakers provided with each panelboard.

PART 2 - PRODUCTS

2.01 ACCEPTABLE PRODUCTS

Panelboards shall be General Electric, Square D, Cutler Hammer, or equal.

Service entrance panelboards shall be Square D I-Line style, or approved equal.

2.02 PANELBOARDS

Panelboards shall be provided with a rating at the proper voltage and current for intended use with tin-plated copper bus bars. Panels shall have 100 percent neutral, with equipment ground bar, unless noted otherwise.

2.03 CIRCUIT BREAKERS

The following interrupting capacity shall be considered minimum. Other ratings shall be as specified on the drawings.

240V and 208Y/120V Panelboards 10,000 AIC symmetrical

Breakers shall be mounted in panelboards so that breaker handles operate in a horizontal plane. Common trip shall be provided on all multiple pole breakers. Circuit breaker shall be the bolt-on type.

Spare breakers shall be provided where indicated, complete for future connection of wiring circuits. Where "Space" is indicated for breakers, bussing and breaker mounting hardware shall be provided in the panelboards; with steel knockouts in dead front metal closure of unused part of panel. If any steel knockouts are removed, breakers shall be provided in such spaces or approved cover plates. Open spaces are not permitted.

2.04 CABINET

Panelboard cabinets shall be flush or surface as indicated with tight closing doors without play when latched. Where two cabinets are located adjacent to each other in finished areas, matching trim shall be provided of the same height.

Cabinets shall be sized with sufficient dimensions to allow for future expansion and addition of circuit breakers within the panelboards as indicated on drawings.

Doors shall be provided with a lock for each cabinet door. All electrical distribution equipment locks shall be keyed identically.

2.05 FINISH

Panelboard cabinet shall be fabricated from hot-dip galvanized steel in accordance with UL 50. Panelboard fronts shall have a gray (or color as shown on the drawings), baked enamel finish.

2.06 SURGE ARRESTERS

Surge arresters, with indicators, shall be provided where shown on the one-line diagrams to protect against overvoltage transients. Arresters shall be JOSLYN SURGE TEC series with protective capacitor, GE model 9L18, or equal.

2.07 SYSTEM OF NUMBERING AND BUS ARRANGEMENT

Bus arrangement shall be as shown on the Panel Schedules on the drawings.

2.08 SERVICE ENTRANCE PANELBOARD

Service entrance equipment shall contain molded case circuit breakers indicated on the drawings. C.T. space, if required, shall be designed per the serving utilities requirements.

The panelboard shall be of the general purpose indoor construction type for bottom or rear feed. The panelboard shall be designed so that an additional pull section is not required. The panelboard size shall not exceed the space provided as shown on drawings.

The panelboard shall be deadfront with front only accessibility. The panelboard framework shall be code gauge steel, rigidly welded and bolted together to support all cover plates, bussing and component devices during shipment and installation. Panelboard construction shall include a lifting means.

The panelboard shall meet all applicable UL, NEMA, NEC and local code requirements for service entrance equipment and shall contain all barriers required to isolate fused and non-fused conductors.

Panelboard shall be braced for a minimum available fault current of 30,000 amperes, symmetrical.

The panelboard shall contain neutral and ground busses with provisions for bonding.

2.09 CIRCUIT BREAKERS

The circuit breakers shall be molded case, thermal magnetic. The molded case circuit breakers as mounted in the panelboard, shall be UL listed as suitable for use as service equipment.

PART 3 - EXECUTION

3.01 MOUNTING

Secure in place with top of cabinet at 6' - 6', unless otherwise noted. Top of cabinet and trim shall be level.

Fasten panelboard with machine screws with oval countersunk heads, finish hardware quality, with escutcheons or approved trim clamps. Clamps accessible only when dead front door is open are acceptable. Surface mounted panelboards with fronts greater than 48 inches vertical dimension shall have trim hinged at right side in addition to hinged door over dead front.

3.02 CIRCUIT INDEX

Each branch circuit panelboard shall be provided with as built information for each panelboard by circuit with its proper load designation. Panelboard index card shall be mounted inside the door of each panelboard in a clear plastic sleeve. One spare blank card shall be provided for each card used.

3.03 DEAD FRONT CLOSURES

All openings in dead front shall be closed with closures manufactured for the purpose or install spare breakers.

END OF SECTION 26 24 16

DIVISION 26 – ELECTRICAL

SECTION 26 27 00 – SERVICE AND METERING

PART 1 - GENERAL

1.01 DESCRIPTION

This section specifies the new electrical service, pad-mounted transformer and service entrance equipment.

1.02 SCHEDULING WORK WITH THE UTILITY COMPANY

The Contractor shall be fully and completely responsible for all scheduling and coordination with the utility company. The Contractor shall coordinate and schedule power outages, power service for operation and construction, and power service as required by the facility prior to Certificate of Occupancy.

1.03 CONTRACTOR/UTILITY INTERFACE RESPONSIBILITIES

The electrical utility providing service to these facilities is Douglas County PUD. The Contractor shall comply with all utility company standards and requirements.

General Utility requirements are listed on the PUD website at douglasspud.org.

All conduit and materials shall be installed in accordance with Douglas County PUD standard drawing A-01 dated 3/19/2015. Call 509-881-2227 with any questions related to DCPUD conduit requirements.

Utility company charges for the new service shall be paid by Chelan County PUD.

The following describes the general separation of Contractor and Utility responsibilities:

A. Contractor

1. Provide all earthwork, trenching, backfill, conduit, and other materials and labor for the new electrical service. Note: The location shown on the drawings are approximate. Confirm all final locations with Utility prior to installation.
2. Install Utility provided TBX transformer pad.
3. Provide 2" sch 40 PVC fiber conduit and 3" sch 40 PVC primary conduit from pole to transformer pad. Cap fiber conduit for future use.
4. Provide 1" sch 40 PVC fiber conduit from transformer pad to fiber stub up area outside of pad. Cap for future use.
5. Provide 2" sch 40 PVC fiber conduit from fiber stub up area near pad to service area. Cap for future use.
6. Provide (2) 3" sch 40 PVC secondary conduits from transformer pad to CT enclosure.
7. Provide CT enclosure with landing pads and meter base, per DCPUD requirements.
8. Provide all secondary materials downstream of CT enclosure.

B. Utility

1. Provide new primary service pole.
2. Inspect Contractor trenches and conduit installation prior to backfill.
3. Furnish single phase transformer TBX transformer vault to Contractor for installation.
4. Furnish new pad mount transformer, and install on Contractor-installed utility vault.
5. Provide primary riser on pole.
6. Provide primary conductors and connections.
7. Provide secondary conductors and connections from transformer to CT enclosure.
8. Provide CTs and utility metering equipment.
9. Energize new service.

1.04 QUALITY ASSURANCE

The Contractor shall comply with all serving Utility company standards and requirements.

The Contractor shall call the Utility for inspection of all materials and trenching.

Call 509-881-2366 for DCPUD ditch inspections.

1.05 STANDARDS AND CODES

All work involving service installation shall be done in accordance with Douglas County PUD standards and the National Electrical Code (NEC).

Service equipment shall be listed and labeled by UL as "Suitable for Use as Service Equipment".

1.06 SUBMITTALS

No less than 30 days prior to Work on-site submit the following:

Prior to submittal to the Engineer, the Contractor shall submit all equipment and construction details (such as size, mounting height, location of equipment, etc.) to the serving Utility for verification of compliance to the Utility's requirements.

1. CT enclosure, landing pads and accessories.
2. Meter base.
3. Letter of Acceptance of material from Utility.

PART 2 - PRODUCT

2.01 SURGE ARRESTERS

Surge arresters, with indicators shall be provided, where shown on the One-Line Diagrams to protect against overvoltage transients. Surge arresters shall be JOSLYN, Square D, GE, or equal.

PART 3 - EXECUTION

3.01 GROUND ELECTRODE SYSTEM

The grounded conductor and ground bus shall be connected to the grounding electrode system, via the grounding electrode conductor as indicated on system One-Line Diagram.

The grounding electrical system shall be bonded as indicated in Article 250 of the National Electrical Code.

3.02 UNDERGROUND SECONDARY SERVICE

Install in accordance with Section 26 05 33.

END OF SECTION 26 27 00

DIVISION 26 – ELECTRICAL

SECTION 26 28 16 – DISCONNECTS AND SWITCHES

PART 1 - GENERAL

1.01 DESCRIPTION

This section specifies all disconnects, fused and unfused, required by code for equipment furnished under this and other Divisions of these specifications.

1.02 STANDARDS AND CODES

All materials and equipment specified herein shall be within the scope of Nationally Recognized Testing Laboratory (NRTL) examination services, be approved by the NRTL for the purpose for which they are used, and shall bear the appropriate listing label.

Equipment listed/labeled by an NRTL shall be as dictated by the latest printing of the Electrical Testing Laboratories Accreditation Report available from the State of Washington Department of Labor and Industries, Electrical Inspection Division. Any NRTL listing/labeling shall be as accepted by the local authority having jurisdiction.

When a product is not available with a testing laboratory listing for the purpose for which it is to serve, the product may be required by the inspection authority to undergo a special inspection at the manufacturer's place of assembly. All costs and expenses incurred for such inspections shall be included in the original contract price.

1.03 SUBMITTALS

No less than 30 days prior to Work on-site submit catalog data.

PART 2 - PRODUCT

2.01 DISCONNECTS

Disconnect switches shall be heavy duty type, shall be horsepower rated, quick-make, quick-break construction. Switch blades shall open all ungrounded conductors and shall be single throw, unless otherwise noted.

Disconnect switch enclosures shall be suitable for location in which mounted in accordance with Paragraph 260500.1.08.

Fusible disconnects shall be as specified above with fuse space and clips to accept Class R fuses. Fusible disconnects shall only be utilized where required by equipment manufacturer to meet UL installation requirements.

2.02 MANUFACTURER

Disconnect switches shall be manufactured by Cutler Hammer, or Square D.

PART 3 - EXECUTION

3.01 INSTALLATION

Switches shall be mounted at locations shown on plans. Installation shall be in accordance with the following methods:

A. Mounting

Disconnects shall be fastened securely to supporting structure at walls and stands:

1. Wood screws or lag screws to wood boards or timbers
2. Machine bolt to metal framing or plates
3. Expansion anchors to concrete walls
4. Expansion toggle wing bolts or sleeve anchors to hollow block
5. Provide 1 inch spacers to set enclosure out from concrete or block wall

B. Stands and Supports

Disconnect stands and support shall be constructed of and secured by:

1. Corrosion-resistant materials and finishes
2. Unistrut-type materials for fabrication
3. Expansion anchors for bolts in concrete floor
4. Machine bolt to metal framing or plates
5. Wood screws or lag screws to wood boards or timber
6. Backing plate for mounting units.
7. Fasten stand securely to floor
8. Dimensions as required by equipment to be mounted

C. Arrangement

Disconnects shall be arranged for driven equipment use or function:

1. Similar units adjacent
2. Adequate space for operation and servicing

D. Mounting Height

Disconnect mounting height:

1. Center of handle shall be 4 feet 6 inch above the finished floor or work platform.

3.02 IDENTIFICATION

Nameplates shall be provided for all disconnects in accordance with Section 260500. Nameplate to state load designation and power source equipment.

END OF SECTION 26 28 16

DIVISION 26 – ELECTRICAL

SECTION 26 47 10 – RV LOAD CENTERS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This section specifies the enclosed load centers and assemblies intended for RV power distribution.
- B. Submit all catalog data in accordance with the Submittals requirements in Section 260100. Show material information and confirm compliance with these Specifications.

1.02 STANDARDS AND CODES

- A. All materials and equipment specified herein will be within the scope of Nationally Recognized Testing Laboratory (NRTL) examination services, will be Approved by the NRTL for the purpose for which they are used, and will bear the appropriate listing label.
- B. Products and installation shall comply with NEC article 551 for installations in RV parks.

1.03 SUBMITTALS

- A. No less than 30 days prior to Work onsite submit catalog data showing material information and conformance with Specifications.

PART 2 - PRODUCTS

2.01 RV LOAD CENTERS

- A. Load centers shall be UL listed 125 amp, 120/240V single phase. Short circuit rating 10,000 RMS amps.
- B. Load centers shall be pedestal mount galvanized steel 16 gauge construction, UL listed, rated NEMA 3R, with ASA 61 grey powder coat finish. Each station shall include provisions for padlock and in-use cover to allow cords to exit while maintaining NEMA 3R integrity.
- C. Each load center shall include loop feed lugs capable of each accepting (2) #6-350 MCM cables, and up to (3) 2-1/2" conduits. The load center shall include the following equipment, and configured as shown on the drawings:
 - 1. 50 amp 2 pole 120/240V circuit breaker and NEMA 14-50R receptacle.
 - 2. 30 amp 1 pole 120V circuit breaker and NEMA TT-30R receptacle.
 - 3. 20 amp 1 pole 120V circuit breaker and NEMA 5-20R GFCI style receptacle.
- D. Load centers shall be Milbank #U5200-XL-75-LPC direct bury single head pedestal, or Engineer approved equal.

2.02 SPECIAL ACCESSORIES

- A. Each pedestal shall include internal night light kit, 5 Watt fluorescent lamp, photocell control, factory wired to 20 amp circuit. Milbank #LPC, or equal.
- B. Each pedestal shall include a water shroud assembly. See drawing details for water connection requirements.
- C. Each pedestal shall have a nameplate located above light strip on exterior of panel door and read: "RV Site ## Please keep panel door closed (down) at all times".

PART 3 - EXECUTION

3.01 MOUNTING

- A. Boxes shall be direct burial installed at the depth and with materials as shown on the drawings and as recommended by the manufacturer. Wiring devices shall be tested for correct connections.
- B. Load centers shall be installed at each RV stall to meet the requirements of NEC 551.77A

END OF SECTION 26 47 10

DIVISION 26 – ELECTRICAL
SECTION 26 51 19 – LED LIGHTING

PART 1 – GENERAL

1.01 SCOPE

- A. Provide lighting equipment complete and operational as indicated on the plans. All fixtures are to be new (unless noted otherwise), complete with lamps and fully operational in conformance with code and U.L. listing requirements.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Division 01 General Requirements, apply to this Section.
- B. Lighting controls required to meet Washington State Energy Code.

1.03 SUMMARY

- A. Section Includes:
 - 1. Interior solid-state luminaires that use LED technology.
 - 2. Lighting fixture supports.

1.04 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color rendering index.
- C. LED: Light emitting diode
- D. Lumen: Measured output of lamp and luminaire, or both.
- E. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.05 CATALOG NUMBERS

- A. Model and series numbers indicate design intent in terms of fixture quality and general requirements. The actual fixtures submitted shall correspond with the number of lamps, wattage, ceiling type and any other specific performance and installation requirements specified or shown on drawings. Verify actual requirements prior to ordering fixtures.

1.06 SUBSTITUTIONS

- A. Substitutions will be allowed for fixtures listed on the lighting fixtures schedule as 'or equal', with Engineer approval.
- B. All proposed substitutions must be submitted in writing for approval by the design professional a minimum of 10 working days prior to the bid date and must be made available to all bidders. Proposed substitutes must be accompanied by a review of the specification noting compliance on a line-by-line basis.

- C. Proposed substitutions shall include complete photometric calculations in plan view showing lighting levels based on proposed fixtures. Final determination of equivalence shall be by the Engineer.

1.07 REFERENCES

- A. National Electrical Manufacturer's Association (NEMA).
- B. Underwriters Laboratories, Inc. (UL).
- C. National Electrical Contractors Association (NECA).

1.08 SYSTEM DESCRIPTION

- A. Light fixture schedule series numbers are a design series reference and do not necessarily represent the exact catalog number, size, voltage, wattage, type of lamp, ballast, finish trim, ceiling type, mounting hardware, ceiling trim or special requirements as specified hereinafter or as required by the particular installations. Provide complete fixtures to correspond with the number of lamps, wattage and/or size specified.
- B. If there are discrepancies between fixture illustrations and the written description in the fixture schedule, the written description in the fixture schedule shall take precedence.

1.09 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit the following:
 - 1. For standard catalog items, provide original product sheets, to indicate that the light fixture fully complies with contract documents. Include photometric report by an independent certified testing laboratory when required in fixture schedule. Manufacturer's test report is not acceptable.
 - 2. Submittals shall have fixture types and project name clearly indicated and shall be prepared by the authorized manufacturer's representative serving the project area. A list of manufacturer's representatives (including address, telephone and fax numbers) identifying which light fixture types they represent shall be included with submittals. Submittals or requests for substitutions not meeting these requirements will be rejected.
 - 3. Product Samples, complete with housing, trim, plug, and specified lamp shall be submitted if requested.

1.10 QUALITY ASSURANCE

- A. Fixtures and components shall be new and listed by Underwriters Laboratories (UL) or other testing lab acceptable to local jurisdiction.
- B. WARRANTY
 - 1. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCT

2.01 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined by NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
- C. Recessed Fixtures: Comply with NEMA LE 4.
- D. CRI of minimum 80. CCT of 4000K.
- E. Rated lamp life of 50,000 hours.
- F. Internal driver.
- G. Nominal Operating Voltage: Multi-Volt including 120, 240, or 277 Volt AC. Single voltage if indicated on drawings.
- H. All exterior fixtures shall include lenses that are resistant to the intrusion of water, dirt and bugs.

2.02 MANUFACTURERS

- A. Provide all fixtures as specified herein or as shown on the drawing fixture schedules.
- B. Subject to compliance with requirements, provide product as indicated in fixture schedule on drawings, or Engineer approved equal.

2.03 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize cost. Coordinate final colors with Engineer and Architect during equipment submittals.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and wall unless otherwise indicated.
- C. Supports:

1. Sized and rated for luminaire weight.
 2. Able to maintain luminaire position after cleaning and relamping.
 3. Provide support for luminaire without causing deflection of ceiling or wall.
 4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.
- D. Flush-Mounted Luminaire Support:
1. Secured to outlet box.
 2. Attached to ceiling structural members at four point equally spaced around circumference of luminaire.
 3. Trim ring flush with finished surface.
- 3.03 FIELD QUALITY CONTROL
- A. Perform the following tests and inspections:
1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.

END OF SECTION 26 51 19

DIVISION 31 – EARTHWORK

SECTION 31 10 00 – SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the requirements applicable to Contractor for the following:
1. Removing designated grass and trees.
 2. Temporary erosion and sedimentation control measures.
 3. Removing designated paving.

1.2 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of roots, sod, subsoil, clay lumps, gravel, rock, weeds, toxic materials, or other non-soil materials.

1.3 SUBMITTALS

- A. Submit site preparation and clearing plans prior to mobilization on-site.

1.4 MATERIAL OWNERSHIP

- A. Stripped topsoil and other materials required to complete grading identified on the construction drawings shall remain on the property. Cleared organic material and waste material shall become Contractor's property and shall be removed from Project site.

1.5 QUALITY ASSURANCE

- A. Project Conditions:
1. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - a. Do not close or obstruct streets, walks, driveways or other adjacent occupied or used facilities without permission from the District and authorities having jurisdiction.
 2. Do not commence site clearing operations until Temporary Erosion and Sedimentation Control measures are in place.
 3. Conform to applicable code for disposal of debris.
 4. Perform work in accordance WSDOT Standard Specifications for Road, Bridge, and Municipal Construction (latest edition).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 013000 – Administrative requirements: Verification of existing conditions before starting work.
- B. Verify existing plant life designated to remain is tagged or identified.
- C. Identify waste area for placing removed materials.

3.2 PREPARATION

- A. Call local utility locate service not less than 3-working days before performing Work.
 - 1. Request underground utilities to be located and marked within the surrounding construction areas.

3.3 PROTECTION

- A. Protect utilities indicated to remain, from damage.
- B. Protect trees, plant growth, and features designated to remain, as final landscaping.
- C. Protect and maintain benchmarks and survey control points from disturbance during construction.
- D. Verify that existing utilities, structures, and other items designated to remain are tagged or identified.
- E. Protect existing site conditions from damage during construction. If damage occurs, restore damaged improvements to their original condition, as acceptable to the District.

3.4 TEMPORARY EROSION AND SEDIMENTATION CONTROL (TESC)

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties per the Contract Documents and Section 312500.

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction according to section 2-01 of the Washington State Department of Transportation Standard Specifications.
- B. Remove all material (not designated to remain) within the Work area. Remove and dispose of all material in excess or unsuitable for reuse on the Project.
- C. Clear areas required for access to site and execution of Work.
- D. Fill depressions caused by clearing and grubbing operations with Satisfactory soil material unless further excavation or earthwork is indicated.
- E. Place fill material in horizontal layers not exceeding a loose depth of 8-inches, and compact each layer to a density equal to adjacent original ground.

3.6 REMOVAL

- A. Dig out and completely remove all boulders and other materials not suitable for bearing new Work As Directed by the District.
- B. Partially remove paving as indicated on the Drawings. Neatly saw cut edges at right angles to surface.
- C. Remove abandoned utilities. Indicate removal termination point for underground utilities on Record Documents.
- D. Remove paving, and aggregate base as indicated.

3.7 EXCAVATION

- A. Excavate As Required for construction of the site structures.
- B. Stockpile materials to be reused in area (to be designated) on site to depth not exceeding 8 feet. Protect from erosion. Remove excess material not being reused from Project and stockpile near the Project site at a location acceptable to the Owner.

3.8 SITE IMPROVEMENTS

- A. Remove existing above and below-grade improvements as indicated and as necessary to facilitate new construction.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
 - 2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

3.9 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, sidewalks, curbing, asphalt pavement, and waste materials including trash and debris, and legally dispose of them.
- B. Disposal of refuse and debris and any accidental loss or damage attendant thereto shall be the Contractor's responsibility.

END OF SECTION 31 10 00

DIVISION 31 – EARTHWORK

SECTION 31 20 00 – EARTHWORK

PART 1 – GENERAL

1.1 DESCRIPTION

Work specified in this Section includes all work associated with import and native earth materials including: excavation, removal, disposal, hauling, importing, reusing, preparing, conditioning, placing and compacting.

1.2 REFERENCES

- A. Washington State Department of Transportation (WSDOT) – Standard Specifications for Road, Bridge, and Municipal Construction (latest edition)
- B. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18 inch Drop
- C. ASTM D2487 - Classification of Soils for Engineering Purposes
- D. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- E. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures

1.3 DEFINITIONS

- A. Trench/Structure Fill: Soil or gravel material used to fill an excavation for trenched utilities, structures, or appurtenances to the limits shown in the Contract Drawings.
- B. Native Fill: Soils found within the project site designated for re-use conforming to Part 2 of this Section - Products for the various fill materials specified therein.
- C. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
- D. Rock Excavation, Removal and Backfill: Rock excavation as defined herein is not expected to be required in this Contract. In the event rock excavation as defined herein is encountered, the Contractor shall stop work immediately and notify the Project Manager for assessment. Failure to do so shall waive any claim by the Contractor for rock excavation compensation as a changed condition. The Project Manager must pre-approve any work for rock excavation.
 - 1. Rock excavation, if required, shall be defined as the removal, waste haul, and import foundation gravel backfill compacted/measured in place of any rock that requires systematic drilling and blasting, or other special

measures, to facilitate removal from the excavation. This definition shall include any rock materials greater than 2.5 cubic yards in size that must be removed to construct the new facilities.

2. For the purpose of this Contract, rock excavation for payment shall be defined as mineral matter in place and of such hardness and texture that, when it is encountered, cannot be loosened by three (3) passes of a ripper tooth mounted on a Caterpillar 225 (or equivalent). Rocks occurring as boulders that are 2.5 cubic yards or less in size shall be considered incidental to the excavation. If rock excavation is encountered it will be considered a changed condition and paid in accordance with provisions of GC-40 Changes in the Work – Field Work Order/Change Orders.
- E. Subgrade: Surface or elevation remaining after completing site clearing and grubbing, and authorized excavation.
- F. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.
- G. Relative Compaction:
1. Ratio, in percent, of as-compacted field dry density to laboratory maximum dry density as determined in accordance with ASTM D1557.
 2. Apply corrections for oversize material to either as-compacted field dry density or maximum dry density, as determined by the Project Manager.
- H. Optimum Moisture Content:
1. Determined in accordance with ASTM Standard specified to determine maximum dry density for relative compaction.
 2. Determine field moisture content on basis of fraction passing $\frac{3}{4}$ -inch sieve.
- I. Relative Density: Calculated in accordance with ASTM D4254 based on maximum index density determined in accordance with ASTM D4253 and minimum index density determined in accordance with ASTM D4254.
- J. Prepared Ground Surface: Ground surface after completion of required demolition, clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and subgrade preparation.
- K. Completed Course: A course or layer that is ready for next layer or next phase of Work.
- L. Lift: Loose (uncompacted) layer of material.
1. Well-Graded. A mixture of particle sized with no specific concentration or lack thereof of one or more sizes.
 2. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.

3. Used to define material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.
- M. Influence Area: Area within planes sloped downward and outward at 2H:1V slope measured from one (1) foot outside outermost edge at base of foundations or slabs.
- N. Borrow Material: Material from required excavations or from designated borrow areas on or near site.
- O. Selected Backfill Material: Materials available onsite that Engineer determines to be suitable for specific use.
- P. Imported Material: Materials obtained from sources offsite, suitable for specified use.
- Q. Structural Fill: Fill materials As Required under structures, pavements, and other facilities.
- R. Embankment Material: Fill materials required to raise existing grade in areas other than under structures.
- S. Intact Native Soil: Undisturbed earth material native to the Project site as determined by the Engineer.

1.4 SUBMITTALS

- A. Test Reports: Submit test results, signed and sealed by a registered Professional Engineer, to the Project Manager for review within 30 or more days prior to use on-site.
 1. For compacted soils and subgrades, perform Optimum Moisture Density Relationship ASTM D698. One test for each soil type encountered.
 2. Field density ASTM D6938 test reports. Certified test lab report of the sieve analysis of the following:
 - a. Imported fill and subgrade material
 - b. Base aggregate
 - c. Pipe bedding

B. Samples

No less than 30 days prior to Work on-site submit samples of the following in gallon size sealable bags labeled with material name, size, and supplier: all import materials, specifically: pipe bedding, crushed surfacing base course, and topsoil.

1.5 JOB CONDITIONS

- A. Geotechnical Report: Site geology including soil conditions are provided in Exhibit U– Additional Information.
- B. Existing Utilities

1. Do not interrupt domestic water service until main is exposed and preparation for taps, fittings, valves and appurtenances are complete.
 2. Notify the Project Manager more than three (3) business days in advance of proposed utility interruptions.
 3. Proceed with utility interruptions after receiving Project Manager's written permission.
 4. Contact utility-locator service for area where Project is located before excavating.
- C. Excavation: Where subgrade is encountered that is not in conformance with the moisture and density requirements contained herein, it must be removed. Over excavation, below subgrade depths, shall only be completed with the approval of the Project Manager. When authorized, over excavation shall be completed in 0.50-foot vertical increments. Upon approval of the Project Manager, over excavation shall be replaced using approved backfill material. Replacement of over excavations shall be completed in accordance with this Specification.

1.6 QUALITY CONTROL

- A. The Contractor is responsible to check quality of work and shall perform compaction, and density tests on request of the District to check compliance with these Specifications. The Contractor shall employ, at its expense, a testing lab acceptable to Project Manager to perform soil tests specified herein.
- B. All test results must indicate conformance to this Specification before proceeding with related Work. Placed material that does not conform to the quality, gradation, moisture and density specified shall be removed and replaced at the Contractor's expense. The Project Manager shall have the authority to accept or reject any or all testing agencies, testing methods, or locations selected by the Contractor. The Contractor shall provide three (3) days advance notice to the Project Manager when tests are required to be performed.
- C. Tests and analysis of soil material will be performed in accordance with ANSI/ASTM D1557.
- D. If tests indicate materials do not meet specified requirements, change material and retest at no cost to Owner.

1.7 FIELD QUALITY CONTROL

- A. Contractor supplied testing:
 1. All testing specified in this Specification shall be paid for by the Contractor.
 2. Compaction testing shall be performed in accordance with ANSI/ASTM D1557.

3. Testing Agency: A qualified independent geotechnical engineering testing agency shall perform field quality-control testing.
4. All soil sampling and testing, including in-place density testing, will be conducted and paid for by the Contractor. Retesting and re-inspection by the same testing laboratory required because of defective Work and testing performed for the convenience of the Contractor shall also be paid for by the Contractor.
5. The Contractor shall cooperate with laboratory personnel employed to conduct the density testing, sampling of material(s), and special inspections. The Contractor shall further provide safe access within the Work site for laboratory personnel such that density testing and visual inspection can be performed. Testing requirements shall not be cause for claims of delay by the Contractor and all expenses accruing therefrom shall be deemed incidental to the performance of the Contract.
6. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed Work comply with requirements.
7. When testing agency reports that subgrade, foundation gravel (if used), pipe zone bedding, trench backfill, or crushed rock surfacing have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace material to depth required. Re-compact and retest until specified compaction is obtained. Failure to achieve compaction requirements and subsequent rework shall be at no cost to the District.
8. If tests indicate Work does not meet specified requirements, remove Work, replace and retest. Frequency of tests will be determined by the Project Manager during construction and will be as needed until site compactions meet Specifications.
9. The Project Manager may elect to conduct, for quality assurance, separate in-place density tests. Under such provisions the Contractor shall cooperate in a like manner as if it was conducting the tests. The District will pay for quality assurance tests, if required. In the event quality assurance tests indicate in-place material does not meet compaction requirements, the Contractor shall cooperate fully to bring the material into conformance and pay for any subsequent quality assurance testing.

PART 2 – PRODUCT

2.1 MATERIALS

- A. Trench Backfill: Import or on-site native material conforming to WSDOT Standard Specification 9-03.14(2) - Select Borrow.
- B. Pipe zone bedding for all PVC and HDPE pipe shall conform to WSDOT Standard Specification 9-03.1S(3) – Gravel Backfill for Pipe Zone Bedding.



- C. Foundation Gravel for Trench Bottoms: Shall conform to WSDOT Standard Specification 9-03.17 Class B. For use only where conditions necessitate as determined by the District.
- D. Drain rock for drainfield beds shall be clean, naturally occurring water sounded gravel material and conform to the following gradation:

Sieve Size	Percent Passing (by weight)
2"	65-100
1"	50-80
No. 4	5 Max
No. 100	0-2

- E. Aggregate base for Asphalt and Concrete: Shall conform to WSDOT Standard Specification 9-03.9(4) – Crushed Surfacing Base Course.

PART 3 – EXECUTION

3.1 PROTECTION OF EXISTING FACILITIES

- A. Utilities: The Contractor shall protect from damage private and public utilities. Verify the locations of underground utilities; call Dial-a-Dig: 1 (800) 424-5555 a minimum of 48 hours prior to excavation.
- B. Pavement: The Contractor shall protect from damage all pavement or paved areas including curbs intended to remain. Contractor shall be responsible for replacement if damage occurs to pavement or curbs.
- C. Access Streets and Roadways: Provide wheel cleaning stations to clean wheels and undercarriage of trucks before leaving site, as necessary to prevent dirt from being carried onto easement drive and public streets. If streets are fouled, they must be cleaned immediately in conformance with WSDOT Standard Specifications.
- D. Repair and/or replacement of damaged facilities will be accomplished at the Contractor's expense.
- E. Preparation of subgrade for earthwork operations, including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface, is specified in Exhibit S, Section 311000 - Site Clearing.
- F. Protect and maintain erosion and sedimentation controls during earthwork operations.
- G. Protect existing trees designated to remain in accordance with Exhibit S, Section 311000 - Site Clearing.

3.2 EXCAVATION

- A. General: Removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Project Manager is not authorized.

- Unauthorized excavation, as well as remedial work directed by Project Manager, shall be at the Contractor's expense.
- B. All grades shown on Contract Drawings are finish grades. Over excavation to subgrade levels may be necessary to backfill with earthen, rock or soil materials shown on Contract Drawings.
 - C. Stability of excavations: Slope sides of excavations shall comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides of slopes of excavations in safe condition until completion of back filling. Contractor shall be prepared to maintain bank stability if indications of instability are observed by Contractor's personnel or District.
 - D. Dewatering: Prevent surface and subsurface water from flowing into upland excavations and from flooding project site. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. If required, line ditches and sumps with coarse-grained material that acts as a filter. Do not use trench excavations as temporary drainage ditches. Methods of dewatering marsh areas must be Approved by Project Manager.
 - E. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
 - F. Dispose of excess soil material and waste materials as herein specified.
 - G. Remove completely any existing "natural" obstructions in areas to be occupied by construction elements or other new work.
 - H. Remove surficial plant material on construction slope areas.
 - I. Layout: Layout of all Work shall be surveyed and staked as required.
 - J. Maintain all bench marks, control monuments and stakes, whether newly established or previously existing. Protect from damage and dislocation. If necessary to disturb existing bench marks, re-establish in a safe place. Notify District a minimum of 3-days prior to excavation of Work areas. District shall inspect staking and layout of Work.
 - K. Excavation for Paths: Cut surface under pavement to comply with cross section, profile, elevations and grades as indicated. Depth of base material, if any, shall be taken into consideration.
 - L. Excavation for Trenches and Structures, See sub-sections 3.3, 3.4 and 3.5 of this Specification.

3.3 PAVEMENT SUBGRADE

- A. All existing surfaces such as asphalt, concrete and grass shall be removed to expose firm subgrade.
- B. If the subgrade appears to be loose, the subgrade should be compacted to a non-yielding condition.
- C. The subgrade shall be proof rolled using a loaded dump truck to identify any potential soft or loose areas. Unsuitable subgrade material shall be removed and replaced with aggregate base for asphalt and compacted to non-yielding condition.
- D. Once a stable subgrade is achieved, new pavement can be placed.

3.4 SHORING

- A. Machine slope banks to angle of repose or less, unless shored.
- B. When shoring is used, the Contractor shall provide all materials, labor, and equipment necessary to shore excavations to protect the Work, existing property, utilities, pavement, etc., and to provide safe working conditions. The Contractor may elect to use any combination of shoring and overbreak, sliding trench shield, or other method of accomplishing the Work consistent with the applicable local, state, or federal safety codes.
- C. If workers enter excavation 4 feet or more in depth that does not meet open pit requirements, it shall be shored. The Contractor alone shall be responsible for worker safety, and the Engineer assumes no responsibility.
- D. Upon completing the Work, the Contractor shall remove all shoring unless the Contract Drawings or the Engineer direct otherwise.
- E. Damages resulting from improper shoring or failure to shore shall be the sole responsibility of the Contractor.
- F. The Contractor may perform extra excavation without shoring if worker safety is ensured As Required by law.
- G. If a slide occurs in an over-excavated trench, the Contractor shall remove the slide material. The Contractor shall pay all costs related to removing slide material and restoring the slide area.

3.5 EXCAVATION FOR TRENCHES AND STRUCTURES

- A. Excavate subsoil As Required for structure foundations. Allow additional space for foundation formwork and other construction operations.
- B. Do not interfere with 45 degree bearing splay of existing or new foundations.
- C. Excavate subsoil As Required for installation of manholes and catch basins.
- D. Excavate trenches to indicated grades, lines, and widths per Contract Drawings.
 - 1. Potable water pipe 12-inches in diameter and larger shall be buried a minimum of 36-inches to the crown, and pipe less than 12-inches in diameter

- shall be buried 4-feet deep to the pipe invert unless otherwise indicated on Contract Drawings.
2. Smooth and proof compact bottom of site water lines trench. Remove all sharp rocks or rocks in excess of 1 inch in diameter.
 3. Grade top perimeter of excavation to prevent surface water from draining into excavation.
 4. Hand trim excavation. Remove loose matter.
 5. Remove lumped subsoil, boulders, and rock. Larger rock may need to be removed with expansive tools or explosives.
- E. All surplus or waste material shall be disposed of by the Contractor.
- F. Notify District of unexpected subsurface conditions and discontinue affected Work in area until notified to resume Work.
- G. Correct areas over-excavated in accordance with Specifications herein.
- H. Stockpile suitable excavated material in area designated on site and remove unsuitable material not being reused from site.
- I. When quantities of suitable materials obtained from specified excavations are insufficient to construct specified fills, the additional materials shall meet Specification requirements.
- J. All borrow (gravel) pits (if used) shall be left in a final condition with stable side slopes, removal of hazards, and other unsightly conditions.

3.6 EXCAVATION PROTECTION

- A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

3.7 BACKFILL AND FILL

- A. Tolerances
1. Top Surface of Backfilling Under Paved Areas: Plus or minus 1-inch from required elevations.
 2. Top Surface of General Backfilling: Plus or minus 1-inch for required elevations.
- B. General
1. Remove all materials and trash from excavation before placing any backfill.
 2. Materials determined by the Project Manager to be unsuitable for backfill at the time of excavation shall be removed and replaced with imported backfill material.

3. Moisten material As Required to aid compaction. Maintain optimum moisture content of backfill materials to attain required compaction density.
4. Place material in horizontal lifts in a manner which avoids segregation.
5. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
6. Employ a placement method that does not disturb or damage other Work.
7. Remove excess and unsuitable surplus backfill materials from site

C. Trenches

Work required to backfill utility trenches:

1. Foundation Gravel
 - a. Use of foundation gravel is required when subgrade is bedrock or when groundwater conditions exist.
 - b. Place foundation gravel on compacted subgrade free of mud, frost, snow, or ice.
 - c. Compact foundation gravel at optimum moisture content to required grades, lines, cross sections, and thickness.

D. Pipe Zone Bedding

1. Place pipe zone bedding on compacted subgrade free of mud, frost, snow, or ice.
2. Place and compact pipe zone bedding on trench bottoms around pipe haunches and over pipe to the dimensions identified in the Contract Drawings. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes, and for joints, fittings, and bodies of conduits. Use hand tools to compact material under haunches and around fittings and valves. Carefully compact initial backfill under pipe haunches evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit.
3. Compact pipe zone bedding at optimum moisture content to required grades, lines, cross sections, and thickness.

E. Trench Backfill

1. Place trench backfill on compacted pipe zone bedding free of mud, frost, snow, or ice.
2. Compact trench backfill at optimum moisture content to required grades, lines, cross sections, and thickness.

F. Crushed Rock Surfacing for Pavement Base Course

1. Prepare native surface for crushed rock surfacing by any mud, frost, snow, or ice and compact native surface to an unyielding condition.

2. Place crushed rock surfacing as follows:
 - a. Shape crushed rock surfacing course to required crown elevations and cross-slope grades.
 - b. Place crushed rock surfacing course in compacted thickness identified in Contract Drawings. Layers shall be compacted in 6-inch maximum lift thickness.
 - c. Compact crushed rock surfacing course at optimum moisture content to required grades, lines, cross sections, and thickness.
 - d. Compaction Requirements: Backfill shall conform with 7-09.3(9-11) of Washington State DOT Standard Specifications, except where indicated otherwise in the Specifications herein.

G. Structures and Pavements

1. Backfill around concrete structures only after the concrete has attained the specified compressive strength indicated in Section 03 30 00 Cast-In-Place Concrete. Obtain Engineer's acceptance of concrete work and attained strength prior to backfilling.
2. Place fill as previously specified in previously excavated areas and area behind structure walls as shown on the Contract Drawings. Do not exceed loose lifts as specified.

H. Planting Areas

1. Slope grade away from structures and pavements, unless noted otherwise.
2. Backfill areas to contours and elevations with unfrozen materials. Make gradual grade changes. Blend slope into level areas.
3. Work shall be built to the required elevations, slope and grade, and finished surfaces shall be even and present a neat appearance. Placed material not meeting these limits shall be removed or reworked as directed by the Project Manager. The Project Manager will approve subgrade and make minor grade changes as necessary prior to placement of paving materials.

3.8 WET WEATHER EARTHWORK

- A. The ground surface in and surrounding the construction area shall be sloped to promote runoff of precipitation away from work areas, and to prevent ponding of water.
- B. Cover work areas or slopes with plastic; execute sloping, ditching, sumps, dewatering, and other as necessary to permit proper completion of the Work. Stockpiles of soil shall be covered with plastic sheeting, properly weighted down.

- C. Earthwork shall be accomplished in small sections to minimize exposure to wet conditions. Each section shall be small enough so the removal of unsuitable soils and placement and compaction of clean structural fill can be accomplished on the same day.
- D. No soil should be left uncompacted and exposed to moisture. A smooth-drum vibratory roller, or equivalent, shall roll the surface to seal out as much water as possible.
- E. In-place soils or fill soils that are or become wet and unstable, and/or too wet to suitably compact, shall be removed and replaced with clean, granular soil.
- F. Grading and earthwork shall not be accomplished during periods of heavy, continuous rainfall.

3.9 COMPACTION

- A. General: Control soil compaction during construction, providing minimum percentage of density specified for area classification.
- B. The Contractor shall determine the most cost effective means and methods for attaining compaction requirements as stated herein. Equipment or hand tools selected for use shall produce consistent results.
- C. Contractor, as part of its quality control program, shall test compaction according to the Modified Proctor ASTM D 1557 to the following percentages and minimum frequency levels:

Material	Percent Compaction	Testing Frequency
Pipe Zone Bedding	90%	Top of bedding material once per every 500 feet of utility type installed
Trench Backfill	90% in landscaped areas, 95% below pavement or concrete	In top one foot of trench once per every 500 feet of utility type trench installed and twice under areas receiving pavement or concrete
Aggregate Base	95%	Below all structures (i.e. Foundations) once before concrete or structure placement
Pre-Cast Concrete Tank Backfill	95%	Once for each tank during fill placement and compaction
Crushed Rock Surfacing	95%	Once per area

3.10 CRUSHED ROCK SURFACING

- A. Excavation and embankment shall be accomplished to meet the lines and grades shown on the Contract Drawings and designated on the ground.

- B. Compact subgrade using mechanical roller or compactor. Remove loose material from compacted subbase surface. Proof roll prepared subgrade to check for unstable areas and need for additional compaction. Do not begin path installation until unstable conditions have been corrected.
- C. Before placing crushed rock, all organic soil, duff and litter shall, unless otherwise shown on the Contract Drawings, be removed from within pathway limits.
- D. Compact crushed rock to required density.
- E. Keep path clean and free of stains, discolorations, dirt and other foreign material throughout contract period and rake clean just prior to final inspection.

3.11 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded and rutted areas to specified tolerances.
- B. Reconditioned Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

3.12 DISPOSAL OF EXCESS AND WASTE MATERIALS

Remove from Owner's property all waste materials, trash and debris, and dispose of it off site in a legal manner.

3.13 PROTECTION OF FINISHED WORK

- A. Protect finished Work.
- B. Reshape and re-compact fills subjected to vehicular/equipment traffic.

END OF SECTION 31 20 00

DIVISION 31 - EARTHWORK

SECTION 31 25 00 – EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SCOPE

- A. The Work specified in this section shall consist of stabilization of soil to prevent erosion during and after construction and land disturbing activities, as well as stormwater pollution prevention. Contractor shall furnish all labor, materials, tools, and equipment to perform the Work and services necessary as specified herein and as indicated in the Contract Documents. This includes installation, maintenance, and final removal as necessary, of all temporary and permanent control measures.
- B. The areas anticipated as requiring soil erosion and sediment control measures are indicated on the Contract Drawings. Contractor shall employ these and additional measures, as necessary, to prevent soil erosion and protect water quality. The District reserves the right to modify the use, location, and quantities of soil erosion and sediment control measures based on the activities of the Contractor.

1.2 QUALIFICATIONS

All erosion control Work shall be done under the supervision of the Contractor.

1.3 GENERAL REQUIREMENTS

- A. Unless otherwise specified herein, all erosion control and stormwater management activities shall conform to the Washington State Department of Ecology Stormwater Management Manual for Eastern Washington.

1.4 SUBMITTALS

- A. Product data
 - 1. Submit manufacturer’s product data for the silt fence 30 or more days prior to Work on-site:

PART 2 - PRODUCTS

- 2.0 SILT FENCE** Provide and install silt fences in accordance the Department of Ecology, Stormwater Management Manual for Eastern Washington, latest edition with the details shown on the Contract Drawings and, and the fabric shall conform to the following properties:

PROPERTY	UNIT	TEST METHOD	RESULT
Weight	oz/sy	ASTM D3776	2.5 min.
Thickness	Mils	ASTM D1776	15 min.
Grab Strength	LB	ASTM D4632	100 min.
UV Resistance	%	ASTM D4355	70 min.
Retention Efficiency	%	Virginia DOT VTM-51	75 min.
Equivalent Size Opening	U.S. Std. Sieve	ASTM D4751	30

- B. When backup support is used, steel wire shall have a minimum mesh spacing of 2 inches by 4 inches, and the plastic mesh shall be as resistant to ultraviolet radiation as the geotextile it supports. The geotextile shall be attached to the posts and support system using staples, wire, or in accordance with the manufacturer's recommendations. The geotextile shall be sewn together at the point of manufacture or at a location Approved by the District, to form geotextile lengths As Required. All sewn seams and overlaps shall be located at a support post.
- C. Posts shall be either wood or steel. Wood posts shall have minimum dimensions of 1-1/4 inches by 1-1/4 inches by the minimum length shown on the plans. Steel posts shall consist of U, T, L, or C shape posts with a minimum weight of 0.90 lbs/ft, or other steel posts having equivalent strength and bending resistance to the posts listed.
- D. When sediment deposits reach approximately one-third the height of the silt fence, the deposits shall be removed and stabilized.

PART 3 - EXECUTION

3.0 TEMPORARY EROSION AND SEDIMENT CONTROL (TESC) General Construction Requirements

- 1. The Contractor shall provide protection to adjoining property from excavation and fill activities and from sediment due to runoff by compliance with the Erosion Control Plan
- 2. The implementation of the TESC and the construction, maintenance, replacement, and upgrading of these TESC facilities is the responsibility of the Contractor until all construction is completed and approved and vegetation/landscaping is established.
- 3. The boundaries of the clearing limits shown on the plan shall be clearly flagged or fenced in the field prior to construction. During the construction period, no disturbance beyond the flagged or fenced clearing limits shall be permitted. The flagging and/or fencing shall be maintained by the Contractor for the duration of the construction project
- 4. The TESC facilities shown on the plan must be constructed prior to all other clearing and grading activities, and in such a manner as to ensure that sediment-laden water does not enter the drainage system, leave the site, or violate applicable water quality standards.
- 5. The TESC facilities shall be inspected daily by the Contractor and maintained as necessary to ensure their continued functioning and operation.
- 6. The TESC facilities on inactive sites shall be inspected and maintained a minimum of once a week and within 24 hours following a storm discharge event.
- 7. At no time shall more than one foot of sediment be allowed to accumulate within a trapped catch basin. All catch basins and conveyance lines shall be cleaned prior to paving. The cleaning operation shall not flush sediment-laden water into the downstream system.

8. Stabilized construction entrances and wash pads (as required) shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures may be required to insure that all paved areas are kept clean for the duration of the project.
 9. The TESC facilities shown on this plan are the minimum requirements for anticipated site condition. During the construction period, these TESC facilities shall be upgraded and added to (e.g. additional sumps, relocation of ditches and silt fences, etc.) as needed for unexpected storm events and to reflect changed conditions as the District requires.
 10. Any area stripped of vegetation, including roadway embankments, where no further work is anticipated for a period of fifteen days during the wet season (October 1 – April 30) and 30 days during the dry season (July 1 – September 30), shall be immediately stabilized with approved TESC methods such as seeding, mulching, netting, erosion blankets, plastic covering, etc. to prevent erosion. Grass seeding alone will be acceptable only between April 1 and October 31.
 11. Any area needing TESC measures, but not requiring immediate attention during the wet season (October 1 – April 30), shall be addressed within 15 days.
 12. Erosion control measures identified are the minimum required. Contractor shall provide additional TESC measures as necessary to control erosion and sediment from his construction operations at no additional cost to the District.
 13. Where possible, natural vegetation shall be maintained for silt control and to minimize erosion.
 14. All temporary stockpiles and any area which has been stripped of vegetation shall be stabilized with seed, fertilizer and mulch or other approved measure.
 15. Siltation control areas shall be returned to original ground conditions or brought to finish grade at the project's completion. Any permanent storm drainage facilities used for erosion control shall be cleaned prior to final project acceptance.
- B. Revegetation
- Revegetation of all disturbed areas shall be performed per the Planting plan and approved by the District.
- C. Dust Abatement and Water Management Plan
1. Dust is likely to occur in disturbed areas, cuts, fills, and stockpiles.
 2. Control of dust on the site shall be the sole responsibility of the Contractor.
 3. Water for dust control shall be available on site at all times from the start of construction until the completion of the punch list items to the approval of the District.
 4. Contractor shall provide the District with the name and telephone number of the contact person responsible for dust abatement 24 hours per day, 7 days a week.
 5. A temporary irrigation system shall be installed if necessary for dust control.

3.1 SILT FENCES

- A. Silt fences shall be constructed to control erosion and migration of soils disturbed during construction. The fences shall provide temporary protection and shall be removed only upon approval of the District.
- B. The silt fence filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum 6-inch overlap, and both ends securely fastened to the post.
- C. The filter fabric fence shall be installed to follow the contours where feasible. The fence posts shall be spaced a maximum of 6 feet apart and driven securely into the ground a minimum of 12-inches.
- D. A trench shall be excavated roughly 8-inches wide by 12 inches deep, upslope and adjacent to the wood post to allow the filter fabric to be buried.
- E. The standard strength filter fabric shall be stapled or wired to the fence, and 12-inches of the fabric shall be extended into the trench. The fabric shall not extend more than 30-inches above the original ground surface. Filter fabric shall not be stapled to existing trees.
- F. Sediment fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.
- G. Sediment fences shall be inspected by contractor immediately after each rainfall event and at least daily during prolonged rainfall. Any required repairs shall be made immediately.
- H. At no time shall more than one foot depth of sediment be allowed to accumulate behind a sediment fence. Sediment should be removed or regarded into slopes and the sediment fences repaired and reestablished.
- I. All areas or drainage ways downstream of the construction site shall have TESC devices installed prior to the beginning of any clearing activities. Runoff from cleared or disturbed area shall be directed through the TESC devices.
- J. Disturbed ground shall be stabilized at the end of each work day.
- K. Permanent soil stabilization and erosion and sedimentation control shall be implemented upon reaching finish grade.
- L. Slope protection shall be immediately implemented upon any soils showing signs of erosion. This shall be done in a manner Approved by the District.
- M. All erosion control devices shall be inspected, maintained and kept in a condition sufficient to provide effective erosion and sedimentation control at all times.
- N. The site shall be inspected to ensure the devices are properly located, constructed and operating as designed during the first storm. Any necessary adjustments or repairs shall be made immediately and be approved by the District. These devices shall be inspected thereafter on a weekly basis and after all large storm events.

- O. All TESC devices shall be removed no sooner than 30 consecutive calendar days after final site stabilization has been achieved as determined by the District. Devices such as silt fences and supports and plastic coverings shall be removed and properly disposed of offsite by the Contractor. Areas disturbed by removal of these devices shall be immediately stabilized in a manner Approved by the District.

END OF SECTION 31 25 00

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 12 16 – ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the requirements applicable to Contractor for the following:
 - 1. Hot-mix asphalt pavement.

1.2 DEFINITIONS

- A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D8 for definitions of terms.
- B. WSDOT: Washington State Department of Transportation.

1.3 SUBMITTALS

- A. Submit the following 30 days prior to Work on-site:
 - 1. Product Data: For each type of product indicated, include technical data and tested physical and performance properties.
 - 2. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
 - 3. Job-Mix Designs: For each job mix proposed for the Work.
 - 4. Material Test Reports: For each paving material.
 - 5. Material Certificates: For each paving material, signed by manufacturers.

1.4 REFERENCES

WSDOT – Standard Specifications for Road, Bridge, and Municipal Construction (latest edition).

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer.
 - 1. Manufacturer shall be a paving-mix manufacturer registered with and Approved by Washington State DOT.
 - B. Regulatory Requirements: Provide all asphalt paving work in accordance with DOT Standard Specifications for materials, workmanship, and other applicable requirements.
 - 1. In addition to the Standard Specifications, comply with all other pertinent codes and regulations.
 - C. Mixing Plant: Asphalt Mixing Plant shall be certified by the Washington State Department of Transportation and Approved by the District.
- 2. Soil treatment applicator shall guarantee that the treated areas under asphalt paving or crushed rock surfacing shall be free of any evidence of weed or vegetation growth for a period of 1 year.

1.6 PROJECT CONDITIONS

Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

- A. Tack Coat: Minimum surface temperature of 60 degrees F (15.6 degrees C).
- B. Hot-Mix Asphalt: Minimum surface temperature of 45 degrees F (15.6 degrees C) and rising at time of placement.

PART 2 - PRODUCTS

2.1 HOT MIX ASPHALT CEMENT

- A. Asphalt Cement: ASTM D946; In accordance with “Standard Specification for Road, Bridge, and Municipal Construction”, latest edition as published by the Washington State Department of Transportation.
 - 1. Hot Mix Asphalt shall be Class ½ inch PG according to Washington State DOT Standard Specifications.
- B. Mineral Filler: Finely ground mineral particles, free of foreign matter.
- C. Soil Sterilant: Use monoborchorate, or Approved, soil sterilant.
- D. Tack Coat (Bonding Oil): Washington State DOT Approved CSS-1 oil.
- E. Bonding Agent: “Duraweld”, or Approved conforming to ASTM C494.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify gradients and elevations of sub-grade.
- B. Apply sterilant to all areas to receive asphalt paving or crushed rock surfacing at a minimum rate of 20 lb. per 1,000 s.f. of surface, mixed with water or as recommended by specific Approved manufacturer, applied with power spray after grading is completed.
- C. Applicator shall be responsible for any run-off, contamination or damage caused by soil treatment product. Cost of damage to property or any neighboring property shall be the responsibility of the applicator.
- D. Verify compacted granular base is dry and ready to support paving and imposed loads by proof rolling with loaded truck.
- E. Verify gradients and elevations of sub-grade.

3.2 SUBGRADE

- A. Ensure that sub-grade is prepared in accordance with Section 31 20 00 Earthwork.
- B. Maintain optimum moisture content of fill materials to attain required compaction density.

3.3 HOT-MIX ASPHALT PAVEMENT

- A. Furnish and place hot mix asphalt in accordance with section 5-04 of Washington State DOT Standard Specifications.
 - 1. Do not place asphalt when ambient or base surface temperature is less than 45 degrees F or base surface is wet or frozen.
 - 2. Saw cut perimeter of patch and excavate existing pavement section to sound base. Minimum width of pavement repair shall be 3 feet, unless otherwise indicated in Contract Drawings. Cut excavation faces vertically. Remove excavated material. Re-compact existing unbound aggregate base course to form new subgrade.
 - 3. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.
 - 4. Tack Coat: Apply tack coat in accordance with Washington State DOT Approved CSS-1 oil. Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m). Allow tack coat to cure undisturbed before applying hot-mix asphalt paving. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
 - 5. Fill excavated pavements with hot-mix asphalt and, while still hot, compact flush with adjacent surface. Place surface course to required grade, cross section, and thickness when compacted.
 - 6. Promptly correct surface irregularities. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix. Use suitable hand tools to smooth surface.
- B. Joints
 - 1. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
 - 2. Clean contact surfaces and apply tack coat to joints.
 - 3. Offset longitudinal joints, in successive courses, a minimum of 6-inches (150 mm).
 - 4. Offset transverse joints, in successive courses, a minimum of 24-inches (600 mm).
- C. Compaction
 - 1. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot,

hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

2. Complete compaction before mix temperature cools to 185 deg F (85 deg C).
3. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
4. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 5. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.
 6. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
 7. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
 8. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
 9. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.4 TOLERANCES

- A. Flatness: Maximum variation of 1/8 inch measured with 10 foot straight edge.
- B. Compacted Scheduled Thickness: Within 1/8 inch of design thickness.
- C. Variation from Shown (or Set) Elevation: Within 1/2 inch.
- D. All surfaces shall be free of wrinkles and depressions and shall uniformly slope to form natural drainage as shown on Contract Drawings.
- E. Repair and/or replace any paving which does not comply with the above or which, due to uneven settlement occurring during the Contract Warranty period, does not drain properly.
- F. In the event of damage to paving materials or incorrect installation, immediately make all repairs and replacements necessary at no additional cost to the Owner.

3.5 CLEAN-UP

- A. Clean all surfaces of buildings, walks, etc., soiled by the Work under this section.
- B. Use all means necessary to protect the installed Work and materials of other trades; take special care in Work adjacent to buildings. Should any defacement or damage occur, repair or replace As Directed at no additional cost to the Owner.

END OF SECTION 32 12 16

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 92 00 – IRRIGATED TURF

PART 1 - GENERAL

1.1 DESCRIPTION

This Section includes Work related to furnishing and installing irrigated turf seed as noted on Contract Drawings; also includes the repair of irrigated turf where damage may occur during construction.

1.2 QUALITY ASSURANCE

All seeds shall conform to the requirements of Washington State Seed Law, and when applicable, the Federal Seed Act and shall be “Certified” grade or better.

1.3 SUBMITTALS

A. Submit the following 30 days prior to Work on-site:

1. Product Data:

- i. Grass Seed Certification: Submit seed vendor’s certification for required grass seed mixture, indicating percentage by weight and percentages of purity, germination and weed seed for each grass species.
- ii. Fertilizer
- iii. Organic Amendment

2. Samples: Provide 1 lb sample of the following:

- i. 936 Organic Amendment

1.4 DELIVERY, STORAGE AND HANDLING

Deliver seed and fertilizer materials in original unopened containers showing weight, analysis, and name of manufacturer. Store in a manner to prevent wetting and deterioration.

1.5 PROJECT CONDITIONS

Restrict traffic from irrigated turf areas until grass is established. Erect signs and barriers As Required.

1.6 QUALITY CONTROL

Provide a uniform stand of grass. Re-seed areas which fail to provide a uniform stand of grass with specified materials until all affected areas are accepted by the Engineer.

PART 2 - PRODUCT

2.1 IRRIGATED TURF SEED

- A. Seed mix shall be 98% pure with a pretested germination rate of 80%.
- B. Seed mix shall be composed of 50% Perennial Ryegrass, 20% Bluegrass and 30% Fescue.
- C. Approved Varieties:
 - 1. Turf-type perennial rye grasses; a minimum of two varieties will be selected from the following list:

Barry	Derby	Loretta	Palmer
Blazer	Diplomat	Manhattan II	Prelude
Citation	Elka	Omega	Regal
Citation II	Gator	Omega II	Yorktown II

- 2. Kentucky Bluegrass: a minimum of two varieties will be selected from the following list:

A-34	Cheri	Merit	Touchdown
Adelphi	Columbia	Parade	
Baron	Fylking	Shasta	
Bonnie Blue	Majestic	Sydsport	

2.2 FERTILIZERS

- A. Brands meeting requirements of applicable Washington State fertilizer laws. Uniform in composition, dry and free flowing.
- B. Deliver to the site in original unopened containers, each bearing manufacturer’s guaranteed analysis.
- C. Seed Fertilizer: Commercial mix formula, 10-20-20 with 50-percent of slow release nitrogen and ammonium nitrate 33-0-0.

Description: Fertilizer shall meet the following specifications:

Description	Percentage
Total Nitrogen (N) 6.2% Ammoniacal Nitrogen 1.3% Urea Nitrogen 3.0 Slow Release Urea Nitrogen 2.0 Slowly Available Water Soluble Nitrogen 1.5% Water Insoluble Nitrogen	14.0%
Available Phosphoric Acid (P ₂ O ₅)	18.0%
Soluble Potash (K)	12.0%
Calcium (Ca)	2.0%
Sulfur (S)	6.0%
Boron (B)	0.03%
Iron (Fe)	0.40%
Manganese (Mn)	0.07%
Molybdenum (Mo)	0.001%
Zinc (Zn)	0.07%

D. Acceptable Sources:

1. Lilly Miller - Pro Ornamental II
2. Other Approved equal

2.3 ORGANIC AMENDMENT

A. Organic Amendment: Shall consist of composted yard debris or organic waste material composted for a minimum of 12 months.

1. Compost shall consist of 100% recycled content. In addition, the organic material shall have the following physical characteristics:
2. Shall be screened using a sieve no finer than 5/16 inch and no greater than 7/16 inch.
3. Shall pass a standard cress test for seed germination (90% ination compared to standard).
4. Shall have a pH from 5.5 to 7.5.
5. Shall have a maximum electrical conductivity of 3.0 ohms/cm.
6. Shall have a maximum carbon to nitrogen ratio of 40:1.

7. Shall be certified by the Process to Further Reduce Pathogens FR guidelines for hot composting as established by the United States Environmental Protection Agency.
- B. Hydroseed Components:
1. Wood Fiber Mulch shall be Conwed Hydro Mulch 1000 Or Equal.
 2. Tackifier shall be Earthbound 2000 Soil Stabilizer and Tackifier.
 3. Moisture Retention Agent: Stay-Moist Or Equal.
 4. Supplier: ACF West, Contact: Aaron Schmidt, phone: (425) 415-6115.

PART 3 - EXECUTION

3.1 HYDROSEEDED IRRIGATED TURF

- A. Preparation: Loosen existing, rough graded, ground surface to depth of 4-inches, remove stones over 2-inches, sticks, roots, rubbish, and extraneous matter. Spread 6-inch blend of topsoil and organic amendments (2 inches organic amendment and 4 inches of topsoil). Apply fertilizer at a rate of 300 lbs. of actual nitrogen per acre. Apply fertilizer evenly with drop type distributor. Blend topsoil, organic amendment and fertilizer thoroughly and evenly. Final grade irrigated turf areas to a smooth even surface. Roll, rake, remove ridges, and fill depressions As Required to drain.
- B. Conditions: Perform seeding operations when the soil is dry and when winds do not exceed 5 miles per hour velocity.
- C. Method: Apply seed using a commercial hydraulic hydroseeder. Broadcasting and drill seeding application methods are not approved methods.
- D. Application: Seed and mulch shall be applied in one stage.
- E. Coverage: Sow grass seed at a rate of 5.0 lbs. per 1000 sq. ft.
- F. Finish: Roll with light irrigated turf roller.
- G. Schedule: Seed only after sprinkler irrigation system and plantings are completely installed and accepted by the Engineer. All seeding shall be completed prior to Substantial Completion.

3.2 MAINTENANCE

Maintain seeded irrigated turf through Final Completion. Protect and maintain by watering (provide constant moisture to a depth of eight inches), mow if required, reseed, weed and repair As Required to establish thick, weed free, uniform stand of grass. Coordinate with Washington State Parks regarding sprinkler run times. Provide 3 lbs. of extra seed mix to Washington State Parks (operator) for additional seeding as necessary.

END OF SECTION 32 92 00

DIVISION 33 - UTILITIES

SECTION 33 11 00 – DISINFECTING OF WATER DISTRIBUTION SYSTEMS

PART 1 - GENERAL

1.1 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Water Works Association (AWWA):
 - a. B300, Hypochlorites.
 - b. B301, Liquid Chlorine.
 - c. B302, Ammonium Sulfate
 - d. B303, Sodium Chlorite.
 - e. C651, Disinfecting Water Mains.
 - f. C652, Disinfection of Water Storage Facilities.
 - g. C653, Disinfection of Water Treatment Plants.
 - h. C654, Disinfection of Wells.
 - 2. Standard Methods for the Examination of Water and Wastewater, as published by American Public Health Association, American Water Works Association, and the Water Environment Federation.

1.2 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit the following:
 - 1. Procedures and plans for disinfection and testing.
 - 2. Proposed locations within system where samples will be taken.
 - 3. Type of disinfecting solution and method of preparation.
 - 4. Method of disposal for highly chlorinated disinfecting water.

PART 2 - PRODUCTS

2.1 WATER DISINFECTION AND TESTING

- A. Clean, uncontaminated, and potable.

2.2 DISINFECTANT

- A. Calcium Hypochlorite Granules in accordance with AWWA B300, Hypochlorites.

2.3 CONTRACTOR'S EQUIPMENT

- A. Furnish chemicals and equipment, such as pumps and hoses, to accomplish disinfection.
- B. Provide protection against cross connections As Required by AWWA C651, when applicable.

PART 3 - EXECUTION

3.1 GENERAL

- A. Conform to AWWA C651-05 for pipes and pipelines, except as modified in these Specifications.

3.2 SEQUENCING AND SCHEDULING

- A. Install dry disinfectant during main and service installation per AWWA C651-05 as follows:

PIPE DIAMETER		CALCIUM HYPOCHLORITE GRANULES	
inch	millimeter	ounce	gram
4	100	1.7	14
6	150	3.8	28
8	200	6.7	57
10	250	10.5	113
12	300	15.1	430
14 or larger	350 or larger	D ² X 15.1	D ² X 428

Note: These measurements of calcium hypochlorite are to be placed at every 500-ft interval of pipe and at every hydrant, hydrant branch and appurtenance.

- B. Warning: This procedure must not be used on solvent-welded plastic or on screwed-joint steel pipe because of danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.
- C. The District will provide a Health/Pressure Test Assembly in a vault as shown on the Contract Drawings, including but not limited to a control valve, reduced pressure double-check valve assembly, and injection port. Health/Pressure Test Assembly shall be used to supply potable water for pressure testing and main flushing and sampling.
- D. Fill new main from District provided Health/Pressure Test Assembly. This water must remain in the pipe for at least 24-hours, or at least 48-hours when the water temperature is below 40°F. Chlorinated water must be flushed out of the new main within 72 hours of filling.
- E. After the specified chlorinated water detention time, the Contractor shall flush the heavily chlorinated water out of the main until the chlorine residual is less than 0.5 ppm.
- F. The chlorinated flushing water must be collected and disposed of properly. If there is any possibility that the chlorinated water can cause environmental damage, then the Contractor will be required to either store and dispose of flushing water in an applicable location or neutralize on-site prior to discharge to storm or sewer drain. The local, state, federal or provincial regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water. If neutralization is required use the following guidelines from AWWA C651-05 Appendix C:

Chlorine Residual	Sulfur Dioxide SO ₂		Sodium Bisulfite NaHSO ₃		Sodium Sulfite NA ₂ SO ₃		Sodium Thiosulfate Na ₂ S ₂ O ₃ * 5H ₂ O		Ascorbic Acid C ₆ O ₈ H ₆	
	(mg/L)	(lb)	(kg)	(lb)	(kg)	(lb)	(kg)	(lb)	(kg)	(lb)
1.0	0.8	0.36	1.2	0.54	1.4	0.64	1.2	0.54	2.1	0.95
2.0	1.7	0.77	2.5	1.13	2.9	1.32	2.4	1.09	4.2	1.9
10.0	8.3	3.76	12.5	5.67	14.6	6.62	12.0	5.44	20.9	9.47
50.0	41.7	18.91	62.6	28.39	73.0	33.11	60.0	27.22	104.0	47.11

Note: The amounts of neutralizing chemicals are for each 100,000 gallons of water.

- G. Contractor shall be responsible to manage water discharge from the hydrant to mitigate any resulting property damage.
- H. The District will collect and analyze bacteriological samples from District determined locations in the main testing section.
- I. Repeat disinfection, flushing and testing until results are Satisfactory.
- J. Upon Satisfactory test results, the next sequential section of main can be tested.

3.3 TESTING

- A. Collection of Samples:
 - 1. Coordinate activities with the District to allow samples to be taken in accordance with this Specification.
 - 2. Provide valves at sampling points, when applicable.
 - 3. Provide access to sampling points.
- B. Chlorine Concentration Sampling and Analysis:
 - 1. Sampling Frequency for Disinfecting Solution: One sample per pipeline, and up to one additional sample for each hydrant in pipeline section to be tested.
 - 2. Free Chlorine Residual Samples: One sample per pipeline, and up to one additional sample for each hydrant in pipeline section to be tested.
 - 3. Dechlorinated Disinfecting Wastewater Residual Samples: One sample per pipeline, and up to one additional sample for each hydrant in pipeline section to be tested.
 - 4. Sampling Locations: District determined locations within the main testing section.
- C. After pipelines have been disinfected, cleaned, and refilled with potable water, the District will take water samples and have them analyzed for conformance to bacterial limitations for public drinking water supplies.
 - 1. Samples shall be collected by the District in accordance with applicable AWWA Standard.
 - 2. Samples shall be analyzed by the District for coliform concentrations in accordance with latest edition of Standard Methods for the Examination of Water and Wastewater.

3. If samples required above are bacterially positive, disinfecting procedures and bacteriological testing shall be repeated until bacterial limits are met.

END OF SECTION 33 11 00

DIVISION 33 - UTILITIES

SECTION 33 11 16 – SITE WATER UTILITY DISTRIBUTION

PART 1 - GENERAL

The Work shall consist of furnishing and installing new waterlines, fittings, valves, and other hardware and appurtenances as shown on the Contract Documents.

1.1 SECTION INCLUDES

- A. Materials: HDPE Pipe, PVC Pipe and fittings, Stainless Steel fittings, Brass fittings, Galvanized Steel Pipe, for domestic water line and irrigation water line.
- B. Gate valves and valve boxes.

1.2 REFERENCES

- A. ANSI/ASTM D2466 – Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- B. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- C. ANSI/AWWA C111 – Rubber-Gasket Joints for Ductile Iron and Grey-Iron Pressure Pipe and Fittings.
- D. ASTM D1785 – Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- E. ASTM D2855 – Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
- F. ASTM D3035 – Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.

1.3 SUBMITTALS

- A. No less than 30 days prior to Work on-site submit the following:
 - 1. Accurately record actual locations of piping, valves, connections, and invert elevations.
 - 2. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

1.4 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of piping mains, valves, connections, and invert elevations.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the Contract Documents and in accordance with manufacturer's written Specifications and installation requirements.
- B. Manufacturer: Company specializing in performing the work of this section with minimum 10 years documented experience.

- C. Valves: Manufacturer's name and pressure rating marked on valve body.

1.6 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on Contract Documents.

PART 2 - PRODUCTS

2.1 PIPE

- A. Galvanized Steel Pipe and Fittings: Shall be general service, carbon steel pipe conforming to ASTM A53, Grade A, Type E. Pipe shall be Schedule 40 with threaded and coupled fittings. All pipe and fittings shall be hot-dipped galvanized unless otherwise indicated on the Plans.
- B. Polyethylene Pipe:
 - 1. Pipe: AWWA C901/ASTM D3035, SDR-9 pipe.
 - 2. Fittings: AWWA C901, fabricated Ford Meter Box Co. fittings or approved equal.
 - 3. Joints: Compression.
 - 4. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Water Service" in large letters.
- C. PVC Pipe and Fittings:
 - 1. ASTM D1785, Schedule 40 and 80 for pressure applications.
 - 2. Fittings: ASTM D2466, PVC.
 - 3. Joints: ASTM D3139, solvent weld.
 - 4. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Irrigation Service" in large letters.

2.2 GATE VALVES

- A. Manufactured in the USA.
- B. Gate valves 2 ½ -inches and smaller shall be brass or bronze body, non-rising stem, inside screw, single wedge or disc. Valves shall be designed for a minimum water operating pressure of 200 pounds per square inch, 16-feet per second maximum flow velocity. Each valve shall be "O"-ring type, provided with a standard AWWA 2-inch operating nut, and shall open by turning counter clockwise (left).
- C. Valves: M&H, Kennedy, Clow or Approved equal.

2.3 ADAPTERS AND DIELECTRIC FITTINGS

- A. Manufactured in the USA.
- B. Provide adapters between dissimilar types of pipes (e.g. brass-steel). Provide dielectric fittings at joints between dissimilar metals.

2.4 BALL VALVES – UP TO 2 INCHES

- A. Manufactured in the USA.
- B. Brass body, Teflon coated brass ball, rubber seats and stem seals, Tee stem pre-drilled for control rod, with control rod, extension box and valve key.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to construction.

3.2 PREPARATION

- A. Ream pipe and tube ends and remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

3.3 BEDDING

- A. Excavate pipe trench in accordance with Section 31 12 00 Earthwork for Work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.
- B. Place bedding material around pipe in accordance with the Contract Documents.
- C. Backfill with native fill, tamped in place and compacted unless otherwise directed in the Contract Documents.
- D. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION – PIPE

- A. The Contractor shall perform all clearing necessary for the proper installation of the piping and appurtenances in the locations shown on the Contract Documents.
- B. The Contractor shall notify the District of their intent to excavate and shall verify the location of any and all utilities including existing water lines. It will be the Contractor's responsibility to repair any damages done to existing and proposed utilities during the excavation and installation operation.
- C. Where the pipe is to be trenched and installed below grade, the trench should be dug to the required alignment and depth as shown on the Contract Documents, or as directed by the District, and only so far in advance of pipe laying as he/she permits.
- D. Trench excavation shall comply with all applicable laws and regulations.
- E. Where dewatering is necessary, water should be removed until the pipe has been installed and the backfill has been placed to a sufficient height to prevent flotation of the pipeline.
- F. Pipe shall be laid to lines and grades shown on the Contract Documents, with bedding and backfill as specified. The pipe shall be uniformly and continuously supported over its entire length with firm, stable bedding material.

- G. It shall be the Contractor's responsibility to prepare the trench foundation for proper placement of the pipe.
 - 1. The trench bottom shall be firm, relatively smooth and free from rocks.
 - 2. The trench bottom shall provide a uniform, stable support for the pipe.
 - 3. The soil surface at the bottom of the trench shall be free of any irregularities that could cause point loads on the pipe or bell.
 - 4. Where rock subgrade or stones larger than 1.5 inches are encountered, a minimum of 3-inches and a maximum of 12 inches of bedding shall be placed under the pipe above the rock as directed by the District.
 - 5. Blocking shall not be used to change pipe grade, or to intermittently support pipe across an excavated section.
- H. Unless otherwise noted, the pipe shall be installed in accordance with the manufacturer's recommendations and as shown on the Contract and Shop Drawings. The pipe shall be laid with bells or the outside laps of circumferential joints pointing upstream. Pipe deflection shall be 3° max. per joint to achieve vertical and horizontal alignment unless manufacturers requirements are more stringent, in which case the more stringent requirements will be adhered to.
- I. Pipe joints shall conform to the details prescribed by the manufacturer and shown on the Contract and Shop Drawings. Pipe joints shall be sound and watertight at the pressure specified on the Contract and Shop Drawings and the material Specification for the type of pipe specified. The joints shall be made in a manner so that the inside of the pipe is free from obstructions.
- J. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- K. Establish elevations of buried piping to ensure not less than 18 inches of cover.
- L. Install trace wire continuous over top of pipe.
- M. Install warning tape continuous 12" over top of pipe.

3.5 INSTALLATION – VALVES, FITTINGS.

- A. Install fittings in accordance with the manufacturer's instructions. Wipe the gaskets clean before they are installed. If necessary, lubricate with gasket lubricant for installation at the pipe ends.
- B. All fittings shall be carefully inspected and cleaned before being lowered into the trench. Well compacted (90 percent standard Proctor Density or greater) crushed stone or gravel shall be applied in 6 inch layers (extending to the trench walls) at all elbows, tees, wyes, and other fittings so that the fittings are encased in stable backfill. The compacted material shall extend a minimum distance of three pipe diameters beyond the ends of the fitting.
- C. Valves, fittings, meters, and other appurtenances shall be installed according to the manufacturer's recommendations. Valves, fittings, meters, and other appurtenances shall have no leakage at the maximum operating pressure. Align the valve or meter to the adjoining pipe to prevent damage to the threads or flanges during installation. All sealing materials or gaskets shall be installed in accordance with the manufacturer's recommendations.

- D. Care shall be taken to prevent damage to factory coatings during storage, handling and/or installation.
- E. Tighten bolts and flanges progressively, drawing up bolts on opposite sides a little at a time until all bolts have a uniform tightness. Tighten bolts with torque-limiting wrenches.
- F. Set valves on solid bearing.
- G. Center and plumb valve box over valve. Set box cover flush with finished grade.
- H. off unless threads are re-cleaned and new sealing compound applied.

3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Flush and disinfect system in accordance with District Standards and Section 331100.

END OF SECTION 33 11 16

DIVISION 33 - UTILITIES

SECTION 33 36 00 – SEPTIC SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

The Work under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing gravity sewer pipe, pressure sewer pipe, fittings, valves, distribution box, concrete tanks, complete pumping system, rail assemblies, level controls, electrical panel, and appurtenances related to the septic system.

1.2 SUBMITTALS

A. No less than 30 days prior to Work on-site submit the following:

1. Provide submittals of this section in accordance with section 013000 – Administrative Requirements.
2. Product Data: Provide Technical Data Sheets on all septic system components including but not limited to pipe materials, pipe fittings and accessories, concrete tanks, pumping system, and appurtenances.
 - a. Include catalog data for concrete tanks, cover, access, slide rail assembly, discharge piping, valves, junction box, level controls, and control panel.
 - b. Include pump catalog data, performance curve, breakaway fittings data, and access frame data.
 - c. Include control panel data and panel wiring schematic.
3. Test Reports: Submit written report certifying factory pump inspections and tests have been successfully performed.
4. Manufacturer's installation instructions: Submit manufacturers published installation instructions. Submit manufacturers published instructions for basin, pump, and panel systems procedures.
5. Shop Drawings:
 - a. Septic and dosing tanks (include specific modifications for this project).
 - b. Pump discharge and float assemblies. Provide sketch indicating confirmation of elevations and measurements of various components in relation to the dosing tank.
6. Project Record Documents: Accurately record actual locations and inverts of buried pipe, components and connections.

1.3 DESIGN REQUIREMENTS

- A. Design conditions for septic system shall conform to conditions shown on Contract Drawings.

1.4 PERFORMANCE REQUIREMENTS

- A. Effluent Pump: Capable of pumping effluent at discharge flow rate equal to 56.6 gpm and a total dynamic head of 49.2 feet.
- B. Operation: Locate three floats consisting of “timer on”, “redundant off”, and “high water alarm level” in dosing tank. Start timer automatically when “timer on” float is activated. Pump cycle must be set for 18 doses per day. Set the pump run time at 3 minutes 13 seconds. Pump off cycle must be set for 1 hour 16 minutes and 47 seconds. Verify the pump volume for a single cycle is 183 gallons. Set squirt height in all beds at 2’ using gate valves located at the distribution valve. Stop pump automatically when “redundant off ” float is activated. Signal alarm condition automatically when “high water alarm level and redundant off” floats are activated. Set float elevations in accordance with Contract Drawings.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - 1. Contract Drawings and specifications
 - 2. Chelan-Douglas Health District regulations
 - 3. Manufacturers written specifications and installation requirements.
- B. In the event of conflicting provisions the most stringent condition shall apply unless otherwise indicated by the Project Manager.

PART 2 - PRODUCTS

2.1 GRAVITY SEWER PIPING

- A. PVC Gravity Sewer Pipe and fittings shall have an SDR of 35, and conform to ASTM D3034.
- B. The Pipe shall have integral wall bell and spigot joints conforming to ASTM D3212. The bell shall consist of an integral wall section with a solid cross-section elastomeric ring, factory assembled, securely locked in place to prevent displacement.

2.2 PRESSURE SEWER PIPING

- A. PVC pressure sewer pipe and fittings shall be solvent welded schedule 40 belled end suitable for pressure applications, and conform to ASTM D1785 and ASTM D2665.

2.3 SEPTIC AND DOSING TANK

- A. Basis of design manufacturer: H2-Precast Inc.
- B. Reinforced precast concrete construction, watertight joints with preformed joint sealers, 4000 psi 28-day minimum strength, concrete partitioned chambers, concrete lid with lifting rings, vent, inlet inspection hole, inlet

turned down minimum of 12-inches below effluent level, 24-inch manway tank access and watertight riser, watertight pre-cored 4-inch pipe inlet and outlet (except no outlet on dosing tank, see Contract Drawings).

C. Septic Tank General Requirements :

1. If Septic Tank does not have a center wall baffle drawing from the clear zone, then a double baffle assembly must be used at the top of the center wall.
2. All pipe penetrations shall be sealed and watertight with rubber boot style gaskets or linkseal or approved equal for cored penetrations.
3. All components must be intrinsically safe and explosion proof.
4. The septic tank shall be included on Washington State Department of Health “List of Registered Sewage Tanks” as established by WAC 246-272C.

2.4 VALVES

- A. Distribution/Indexing Valve: Orenco Systems, Inc. Automatic Distributing Valve model V6606A Or Equal.
- B. Gate Valves (No ball valves shall be used) - 2-inch and smaller: Brass body, Teflon-coated brass ball, rubber seats and stem seals, tee stem pre-drilled for control rod.

2.5 CONNECTING PIPE MATERIALS

- A. PVC Pipe ASTM D3034: Bell and spigot style rubber ring sealed gasket joint.
 1. Fittings: PVC.
 2. Joints: ASTM F477, elastomeric gaskets.
- B. PVC Pipe Schedule 40: Bell and spigot solvent sealed joints.
- C. All pipes and fittings must be rated for high head applications.

2.6 SEWAGE SYSTEM COMPONENTS

- A. Manufacturer: Orenco Systems, Inc.; see Contract Drawings for model numbers. Contractor shall verify model numbers and quantities to ensure a complete and operable system prior to submittal review.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. The Contractor shall comply with the following inspections and requests by the local health officer:

1. Contractor shall excavate two or more potholes prior to construction for soil analysis confirmation by the local health officer. The holes shall be at least 8 feet deep and shaped for safe human entry and exit.
2. Visit the On-Site Sewage (OSS) system site at any time during construction;
3. Inspect the installation of the OSS before cover as coordinated by the contractor;
4. Contractor shall provide As-Built Drawings to the District for submission to the health officer;
5. Assure the OSS meets the approved design;
6. Direct the person responsible for final cover of the system to place a permanent marker at finished grade where needed to identify the location of the septic tanks first manhole.

3.2 PREPARATION

- A. Ream pipe ends and remove burrs.
- B. Remove scale and dirt from components before assembly.
- C. Establish invert elevations for each component in system.
- D. Hand trim excavation to suit septic tank, distribution box and field tile arrangement. Remove stones, roots or other obstructions.

3.3 TANK AND TANK BEDDING

- A. Excavate in accordance with Contract Documents for Work of this section.
- B. Place bedding material level in one continuous layer not exceeding 8-inches compacted depth, compact to 95% MDD.
- C. Backfill around sides of tank tamped in place and compacted to 95% MDD. Special care must be taken during backfill process not to damage or crack tanks.
- D. Maintain optimum moisture content of bedding material to attain required compaction density.
- E. Install tanks and distribution box and related components in bedding.

3.4 CONNECTION PIPING

- A. Install all piping in accordance with manufacturer's requirements and the Contract Documents.
- B. Place pipe and fittings on clean excavated subgrade or sand.
- C. Slope piping to each successive component, minimum of ¼-inch per foot unless noted otherwise.

- D. Cover pipe material as specified in Contract Documents. Geotextile fabric required between bedding material and native within sand bed trenches prior to backfill.

3.5 INSTALLATION

- A. Install components in accordance with the Contract Documents and approved industry standards.
- B. Install pipe, fittings, and accessories in accordance with ASTM 2321. Seal joints watertight.
- C. Lay pipe to slope gradients noted on drawings.
- D. Install bedding at sides and over top of pipe to minimum compacted thickness of 12-inches.
- E. Refer to section 312000 Earthwork for backfilling and compacting requirements. Do not damage or displace pipe when compacting.
- F. Install warning tape and trace wire continuous 6-inches above top of pipe.
- G. Coordinate connection of sanitary sewage system with comfort station plumbing Subcontractor.
- H. Distributing valve shall be installed per manufacturer's recommendations.
- I. Gate valves shall be placed on the zone transport lines near the distributing valve.

3.6 FIELD QUALITY CONTROL

- A. Request inspection by District prior to placing aggregate cover over piping.
- B. Coordinate required inspections with Chelan Douglas Health District.
- C. Compaction testing in accordance with ASTM D1557.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

3.7 PROTECTION OF FINISHED WORK

- A. Do not permit vehicular traffic over drainfield or vault lids.

END OF SECTION 33 36 00

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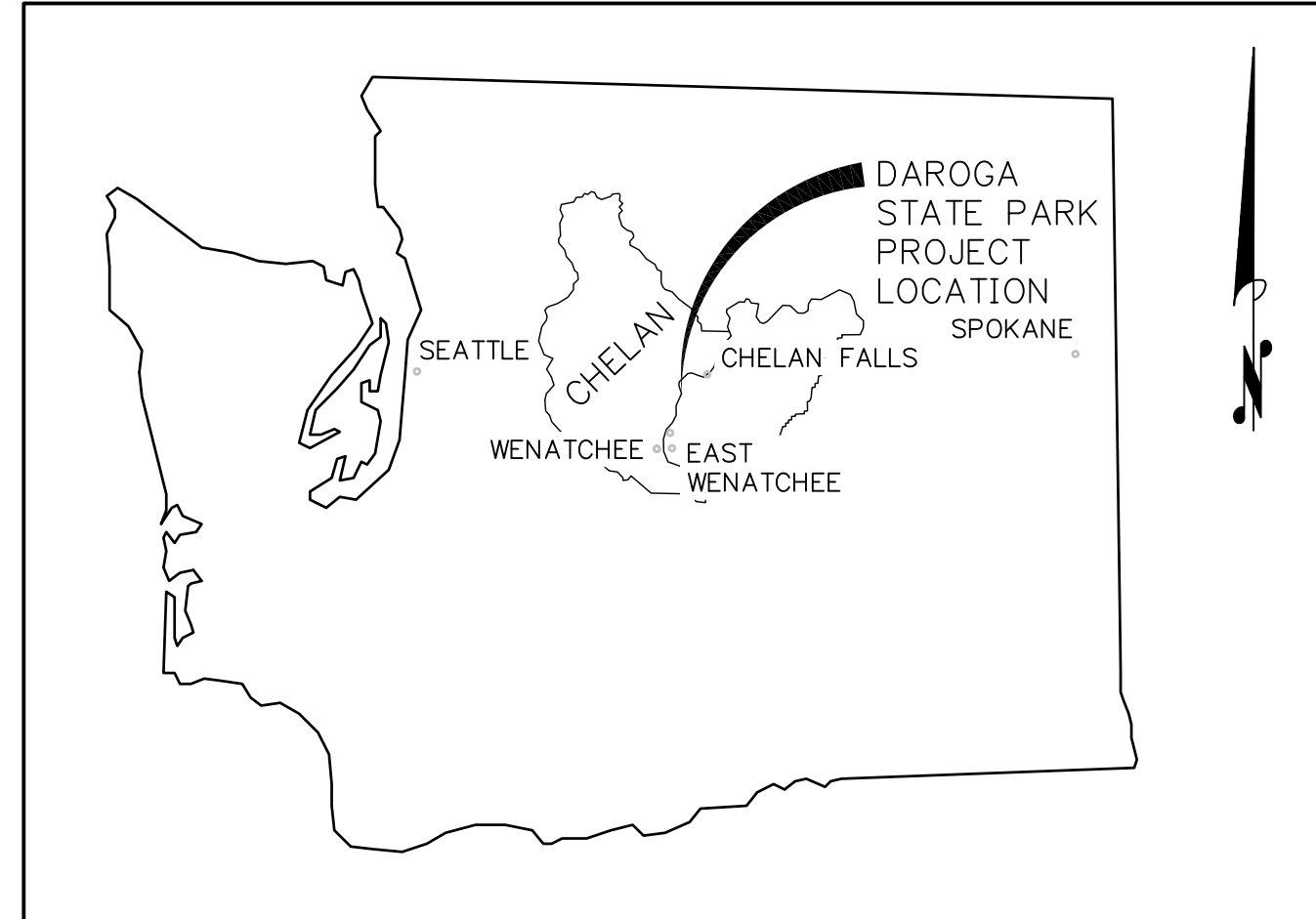
DAROGA STATE PARK

GROUP CAMP IMPROVEMENTS

BID 15-04

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LOCATION MAP



PROJECT MAP



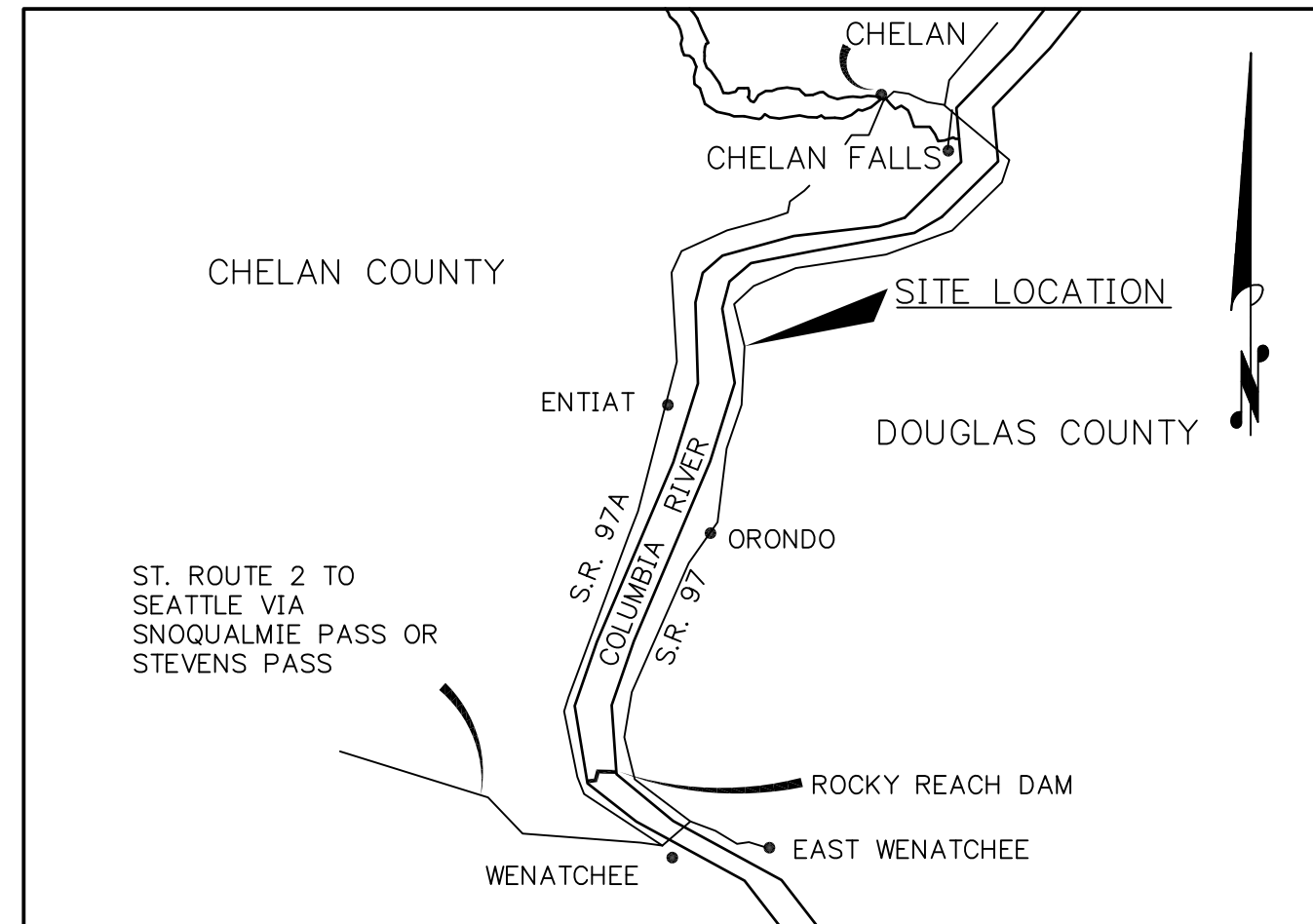
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E2	0908-50EL-0014	ELECTRICAL SITE PLAN
E3	0908-50EL-0015	COMFORT STATION POWER & RECEPTACLE PLAN
E4	0908-50EL-0016	COMFORT STATION LIGHTING PLAN
E5	0908-50EL-0017	COMFORT STATION HVAC POWER PLAN
E6	0908-50EL-0018	ELECTRICAL PANEL SCHEDULES
E7	0908-50EL-0019	ELECTRICAL DETAILS & SCHEDULES

VICINITY MAP



NOT TO SCALE

CHELAN PUD NO.1		SCALE SEE DWG	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
PRIM. ENG.					
2ND ENG.	0	4/10/2015	BID SET	CRH	MPS
PROJ. MGR. COURT HILL	REV	DATE	REVISION	REQ. BY	DRFT

**PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY**
WENATCHEE, WASHINGTON



Daroga State Park
GROUP CAMP IMPROVEMENTS
COVER SHEET
BID NO. 15-04

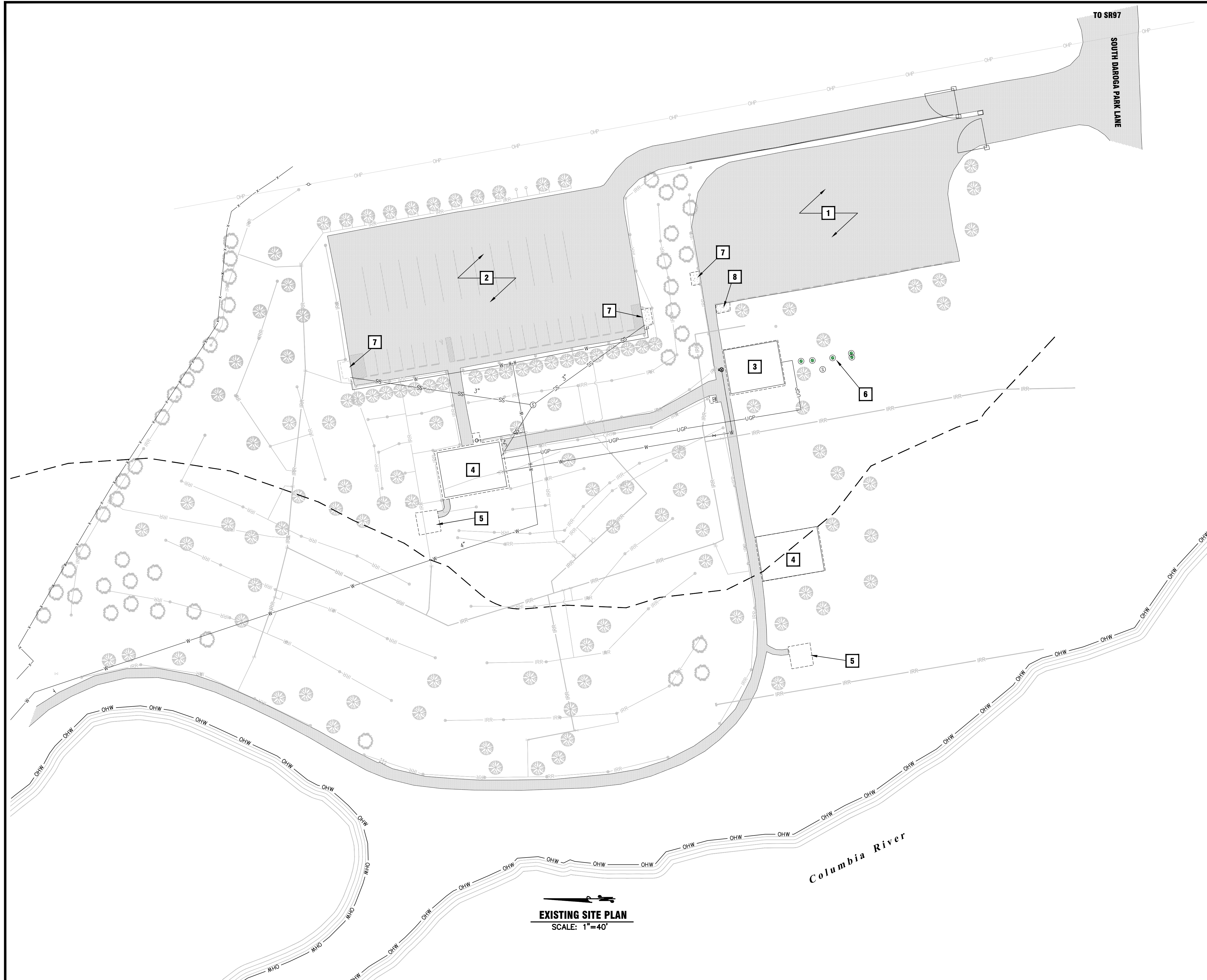
SHEET G1 OF G3
REVISION 0
DATE 4/10/2015
DWG. 0908-50GA-0014

DOCUMENT CLASS:

ID:

ORIGINAL DWG. #: -

ORIG. DATE 12/24/2014 ORIG. DRAWN MPS



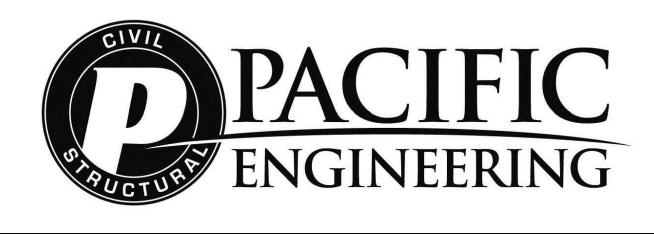
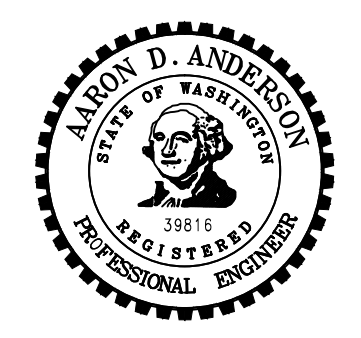
KEYED NOTES	
1	SOUTH PARKING LOT (GROUP A)
2	NORTH PARKING LOT (GROUP B)
3	COMFORT STATION
4	PICNIC SHELTER
5	FIRE PIT
6	ONSITE SEWER SYSTEM
7	TRASH DUMPSTER ENCLOSURE
8	KIOSK

LEGEND	
	EXISTING ASPHALT
	EXISTING WATER LINE
	EXISTING SANITARY SEWER
	EXISTING UNDERGROUND POWER
	EXISTING IRRIGATION LINE
	EXISTING OVERHEAD POWER
	EXISTING ELECTRICAL CONDUIT
	EXISTING POWER POLE
	EXISTING SANITARY SEWER MANHOLE
	EXISTING IRRIGATION VALVE
	EXISTING WATER VALVE
	EXISTING FENCE
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	EXISTING DECIDUOUS TREE
	EXISTING CONIFEROUS TREE
	ORDINARY HIGH WATER
	200 FT OFFSET FROM OHW

NOTES

UTILITIES SHOWN ARE COMPILED FROM VARIOUS DRAWINGS AND ARE SHOWN IN APPROXIMATE LOCATIONS ONLY. VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION

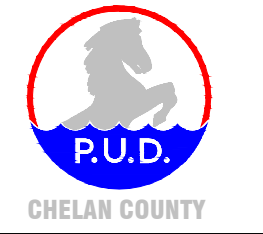
EXISTING SITE PLAN
SCALE: 1"=40'



CONSULTANT	PRIM. ENG. AARON ANDERSON	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG. COURT HILL
	DESIGNER	2ND ENG.
	APPROVAL	PROJ. MGR.

SCALE	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
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			DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON



DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
EXISTING SITE PLAN
SDFSD
BID NO. 15-04

SHEET G2 OF G3
REVISION 0
DATE 4/10/2015
DWG. 0908-50GA-0015

ORIG. DRAWN PED

LEGEND	
	EXISTING STORM DRAIN
	EXISTING SANITARY SEWER
	EXISTING FORCE MAIN
	EXISTING WATER LINE
	EXISTING OVERHEAD POWER
	EXISTING UNDERGROUND POWER
	EXISTING ELECTRICAL CONDUIT
	EXISTING TELEPHONE
	EXISTING FIBER OPTIC LINE
	EXISTING IRRIGATION LINE
	EXISTING GAS LINE
	EXISTING POWER POLE
	EXISTING POWER TRANSFORMER
	EXISTING TELEPHONE VAULT OR RISER
	EXISTING DRYWELL OR STORM DRAIN MANHOLE
	EXISTING CATCH BASIN
	EXISTING SANITARY SEWER MANHOLE
	EXISTING FIRE HYDRANT
	EXISTING WATER VALVE
	EXISTING IRRIGATION VALVE
	EXISTING WATER METER
	EXISTING WATER WELL
	EXISTING SIGN
	EXISTING EDGE OF PAVEMENT
	EXISTING FENCE
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	EXISTING RIGHT-OF-WAY
	EASEMENT LINE
	EXISTING DECIDUOUS TREE
	EXISTING CONIFEROUS TREE
	PROPOSED STORM DRAIN
	PROPOSED FLOW LINE
	PROPOSED WATER LINE
	PROPOSED SANITARY SEWER
	PROPOSED WATER SERVICE LINE
	PROPOSED IRRIGATION LINE
	PROPOSED SERVICE CONDUIT
	PROPOSED SECONDARY CONDUIT
	PROPOSED SINGLE PHASE PRIMARY CONDUIT
	PROPOSED TWO SINGLE PHASE PRIMARY CONDUITS
	PROPOSED SECONDARY HANDHOLE
	PROPOSED POWER VAULT
	PROPOSED PAD MOUNTED POWER TRANSFORMER
	PROPOSED CATCH BASIN
	PROPOSED STORM DRAIN MANHOLE
	PROPOSED SANITARY SEWER MANHOLE
	PROPOSED SANITARY SEWER CLEANOUT
	PROPOSED WATER OR IRRIGATION VALVE
	PROPOSED FIRE HYDRANT
	PROPOSED DOUBLE WATER METER
	PROPOSED SINGLE WATER METER
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	PROPOSED HOT MIX ASPHALT PAVING
	PROPOSED CONCRETE
	PROPOSED GRAVEL SURFACE

STANDARD ABBREVIATIONS			
ABBREVIATION	DEFINITION	ABBREVIATION	DEFINITION
AC	ACRE	NE	NORTHEAST
ACP	ASPHALT CONCRETE PAVEMENT	NIC	NOT IN CONTRACT
APPROX	APPROXIMATE(LY)	NO	NUMBER
APWA	AMERICAN PUBLIC WORKS ASSOCIATION	NTS	NOT TO SCALE
ASSY	ASSEMBLY	NW	NORTHWEST
AUX	AUXILIARY	OD	OUTSIDE DIAMETER, OUTSIDE DIMENSION
AVE	AVENUE	OHP	OVERHEAD POWER LINE
AWWA	AMERICAN WATER WORKS ASSOCIATION	OHP&T	OVERHEAD POWER & TELEPHONE
BLDG	BUILDING	PC	POINT OF CURVATURE
BLVD	BOULEVARD	PCC	PORTLAND CONCRETE CEMENT
BMP	BEST MANAGEMENT PRACTICE	PE	PLAIN END
BST	BITUMINOUS SURFACE TREATMENT	PERF	PERFORATED
CB	CATCH BASIN	P.I.	POINT OF INTERSECTION
CESCL	CERTIFIED EROSION & SEDIMENT CONTROL LEAD	P/L	PROPERTY LINE
CF	CUBIC FEET	PP	POWER POLE
CFM	CUBIC FEET PER MINUTE	PROP	PROPOSED
CFS	CUBIC FEET PER SECOND	PRV	PRESSURE REGULATING VALVE
CI	CAST IRON	PT	POINT, POINT OF TANGENCY
CIP	CAST IRON PIPE	PUD	PUBLIC UTILITY DISTRICT
CJ	CONSTRUCTION JOINT	PVC	POLYVINYL CHLORIDE
C/L	CENTERLINE	PVI	POINT OF VERTICAL INTERSECTION
CMP	CORRUGATED METAL PIPE	PVMT	PAVEMENT
CMU	CONCRETE MASONRY UNIT	PWR	POWER
CO	CLEANOUT	QTY	QUANTITY
CONC	CONCRETE	R	RADIUS, RANGE, RIGHT
CONT	CONTINUOUS	RCP	REINFORCED CONCRETE PIPE
CSBC	CRUSHED SURFACING BASE COURSE	RD	ROAD
CSTC	CRUSHED SURFACING TOP COURSE	REF	REFERENCE
CTR	CENTER	REINF	REINFORCED
CULV	CULVERT	REQD	REQUIRED
DCSD	DOUGLAS COUNTY SEWER DISTRICT	RJ	RESTRAINED JOINT
D.I.	DUCTILE IRON	RP	RADIUS POINT
DIA	DIAMETER	RR	RAILROAD
DIM	DIMENSION	ROW	RIGHT OF WAY
DIST	DISTRICT	S	SOUTH, SLOPE
DNR	DEPARTMENT OF NATURAL RESOURCES	SCH	SCHEDULE
DWG(S)	DRAWING(S)	SD	STORM DRAIN
E	EAST	SE	SOUTH EAST
EA	EACH	SEC	SECOND
EL	ELEVATION	SECT	SECTION
EOP	EDGE OF PAVEMENT	SF	SQUARE FEET
EQUIP	EQUIPMENT	SHT	SHEET
ESMT	EASEMENT	SMMEW	STORMWATER MANAGEMENT MANUAL FOR EASTERN WASHINGTON
EWWD	EAST WENATCHEE WATER DISTRICT	SPEC	SPECIFICATIONS
EXIST	EXISTING	SQ	SQUARE
FF	FINISH FLOOR	SS	SANITARY SEWER
FH	FIRE HYDRANT	ST	STREET
FL	FLANGE, FLOW LINE	STA	STATION
FM	FORCE MAIN	STD	STANDARD
FO	FIBER OPTIC	STD PLN	WSDOT STANDARD PLAN
FT	FOOT, FEET	STL	STEEL
G	GAS	SW	SOUTH WEST
GAL	GALLON	SWPPP	STORM WATER POLLUTION PREVENTION PLAN
GALV	GALVANIZED	SY	SQUARE YARD
GPD	GALLONS PER DAY	TAN	TANGENT
GPM	GALLONS PER MINUTE	TBM	TEMPORARY BENCH MARK
GV	GATE VALVE	TC	TOP OF CURB
H	HORIZONTAL	TEMP	TEMPORARY
HDPE	HIGH DENSITY POLYETHYLENE	TESC	TEMPORARY EROSION AND SEDIMENT CONTROL
HOR	HORIZONTAL	THRU	THROUGH
HP	HIGH PRESSURE	TOC	TOP OF CONCRETE
HT	HEIGHT	TYP	TYPICAL
HWY	HIGHWAY	TWP	TOWNSHIP
HYD	HYDRANT	UG	UNDERGROUND
IBC	INTERNATIONAL BUILDING CODE	UGP	UNDERGROUND POWER
ID	INSIDE DIAMETER	U/P	UTILITY POLE
I.E.	INVERT ELEVATION	USGS	UNITED STATES GEOLOGICAL SURVEY
INV	INVERT	UTIL	UTILITY
LT	LEFT	V	VERTICAL
LF	LINEAL FOOT, FEET	VAR	VARIES
LS	LUMP SUM	VC	VERTICAL CURVE
MAINT	MAINTENANCE	VFY	VERIFY
MAX	MAXIMUM	W	WEST
MB	MAILBOX	WA	WATER
MDD	MAXIMUM DRY DENSITY	W/	WITH
MH	MANHOLE	W/O	WITHOUT
MIC	MONUMENT IN CASE	WM	WATER MAIN, WATER METER, WIRE MESH
MIN	MINIMUM	WS	WATER SERVICE
MISC	MISCELLANEOUS	WSDOT	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
MJ	MECHANICAL JOINT	YD	YARD
MON	MONUMENT	YR	YEAR
MPH	MILES PER HOUR	#	NUMBER, POUNDS
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES	&	AND
N	NORTH	@	AT
N/A	NOT APPLICABLE	ø	DIAMETER, PHASE



CONSULTANT	PRIM. ENG. MIKE ROLFS	CHELAN PUD NO.1
	2ND ENG. COURT HILL	
DESIGNER	2ND ENG.	
APPROVAL	PROJ. MGR.	

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REV	DATE
0	4/10/2015

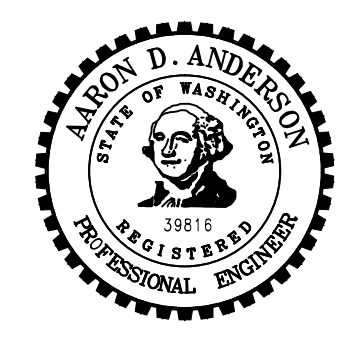
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PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

DAROGA STATE PARK
 GROUP CAMP IMPROVEMENTS
 LEGEND AND ABBREVIATIONS

BID NO. 15-04

SHEET G3 OF G3
REVISION 0
DATE 4/10/2015
DWG. 0908-50GA-0016



ORIG. DRAWN PED



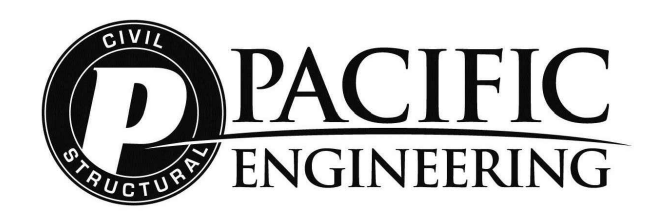
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1	SOUTH PARKING LOT
2	NORTH PARKING LOT
3	COMFORT STATION
4	PICNIC SHELTER
5	FIRE PIT
6	ONSITE SEWER SYSTEM
7	TRASH RECEPTACLE
8	KIOSK

KEYED NOTES - PROPOSED	
1	COMFORT STATION (SEE ARCH)
2	(2) SEPTIC TANKS
3	(1) DOSING TANK
4	AUTOMATIC DISTRIBUTION VALVE
5	(6) 10' X 72' DRAINFIELD BEDS
6	6,120 SQ FT RESERVE AREA
7	RELOCATED TRASH RECEPTACLE (NO WATER OR SEWER) (SEE 11/0908-50CI-0022)
8	RV POWER AND WATER PEDESTALS (SEE 6/0908-50CI-0022)
9	ASPHALT SIDEWALK (SEE 7/0908-50CI-0022)
10	TRANSFORMER LOCATION (SEE ELECTRICAL)

LEGEND	
	EXISTING ASPHALT
	NEW CONCRETE
	EXISTING WATER LINE
	EXISTING OVERHEAD POWER
	EXISTING ELECTRICAL CONDUIT
	EXISTING POWER POLE
	EXISTING SANITARY SEWER MANHOLE
	EXISTING FENCE
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	EXISTING DECIDUOUS TREE
	EXISTING CONIFEROUS TREE
	ORDINARY HIGH WATER
	200 FT OFFSET FROM OHW
	ONSITE TEST PIT LOCATION

NOTES
1. UNDERGROUND UTILITIES NOT SHOWN FOR CLARITY
2. SEE 0908-50CI-0018 FOR SEPTIC DESIGN
3. SEE 0908-50CI-0024 FOR POINTS TABLE

CIVIL SITE PLAN
SCALE: 1"=30'



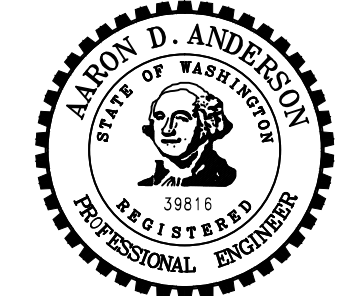
CONSULTANT	PRIM. ENG. AARON ANDERSON	CHELAN PUD NO.1
	2ND ENG. COURT HILL	
DESIGNER	2ND ENG.	
APPROVAL	PROJ. MGR.	

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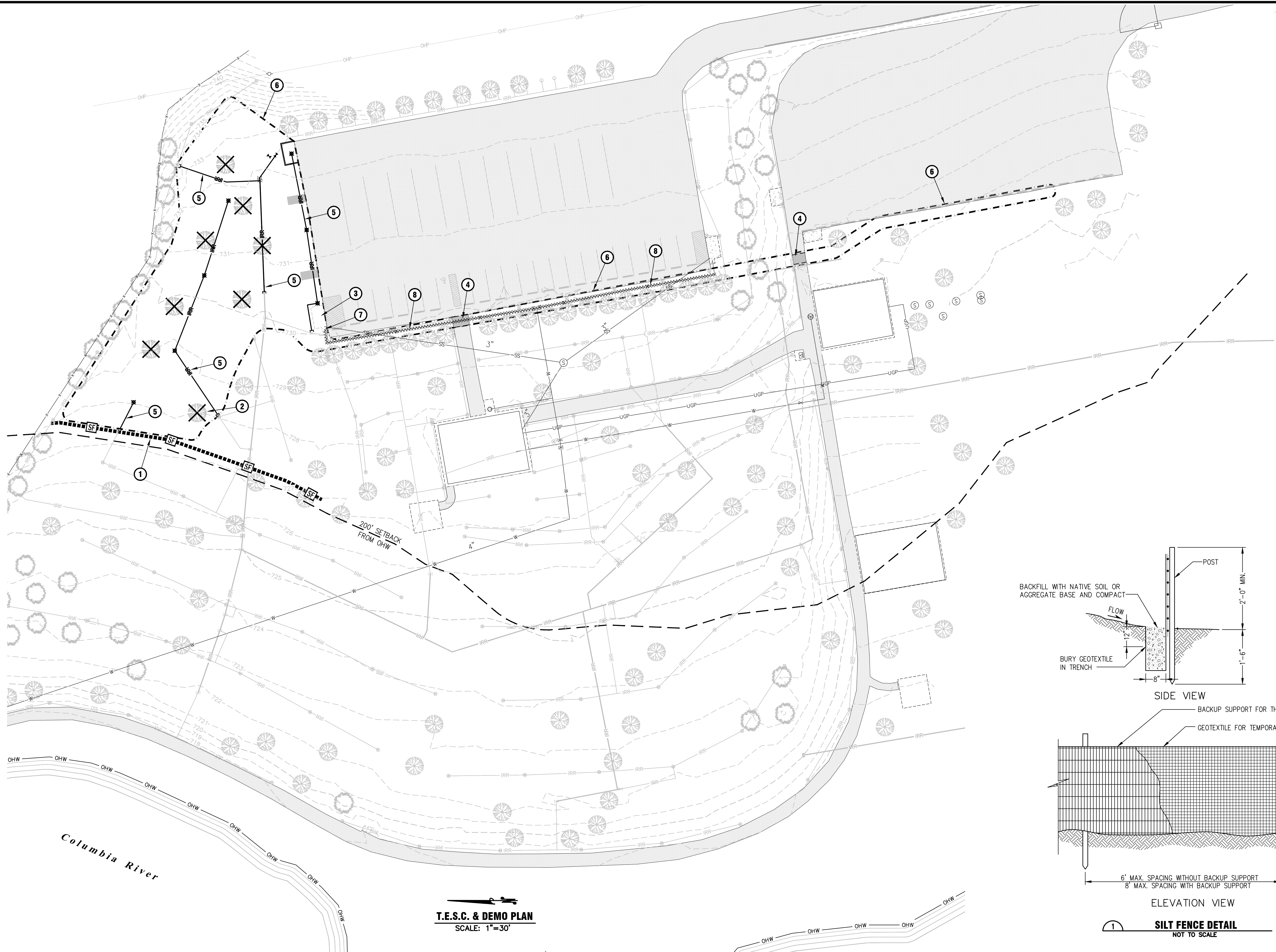
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
CIVIL SITE PLAN
-
BID NO. 15-04

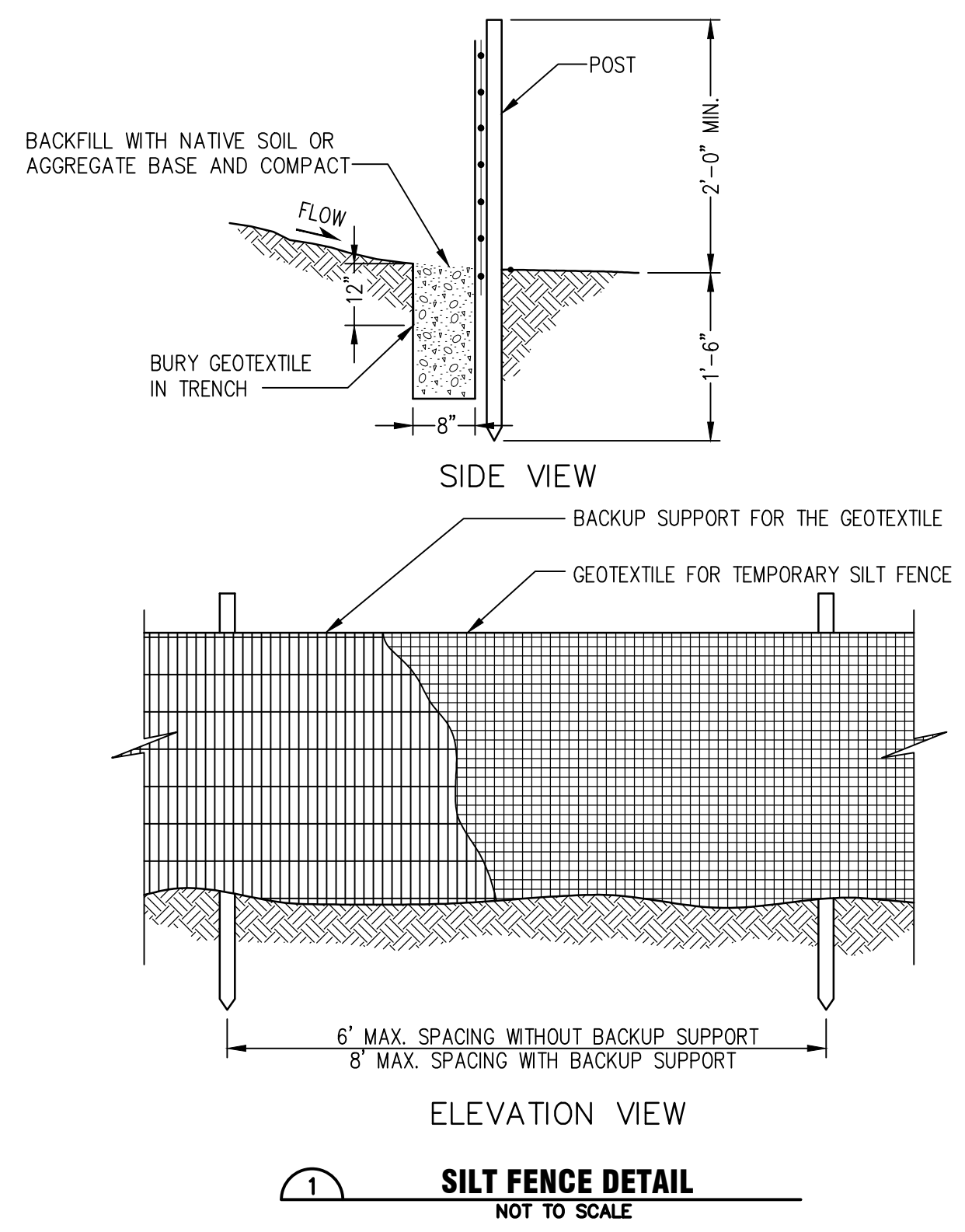
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REVISION 0
DATE 4/10/2015
DWG. 0908-50CI-0015



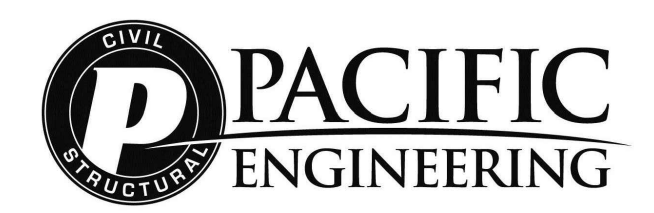
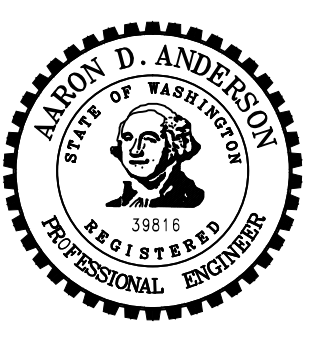
ORIG. DRAWN PED



- KEYED NOTES**
- ① SILT FENCE. SEE 1/-
 - ② REMOVE EXISTING TREE (TYP)
 - ③ REMOVE TRASH PAD, CAP SEWER
 - ④ TRENCH AREA
 - ⑤ IRRIGATION TO BE DEMO'D. (SEE 0908-50CI-0023)
 - ⑥ GRASS REMOVAL EXTENTS AND RESTORATION AREA (SEE 0908-50CI-0023)
 - ⑦ REMOVE DRINKING FOUNTAIN AND BOLLARD
 - ⑧ REMOVE EXISTING 1" DOMESTIC WATERLINE



T.E.S.C. & DEMO PLAN
SCALE: 1"=30'



CONSULTANT	PRIM. ENG. AARON ANDERSON	CHELAN PUD NO.1
	2ND ENG. PRIM. ENG. COURT HILL	
	DESIGNER 2ND ENG.	
	APPROVAL PROJ. MGR.	

SCALE	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
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PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
T.E.S.C. AND DEMO PLAN
-
BID NO. 15-04

SHEET C2 OF C10
REVISION 0
DATE 4/10/2015
DWG. 0908-50CI-0016

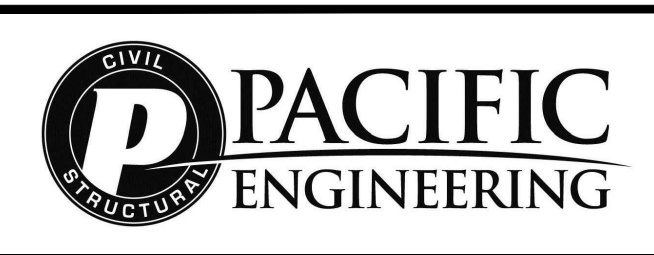
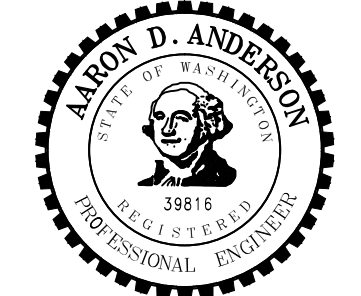
ORIG. DRAWN PED



LEGEND	
	EXISTING ASPHALT
	EXISTING WATER LINE
	EXISTING SANITARY SEWER
	EXISTING UNDERGROUND POWER
	EXISTING IRRIGATION LINE
	EXISTING OVERHEAD POWER
	EXISTING ELECTRICAL CONDUIT
	EXISTING POWER POLE
	EXISTING SANITARY SEWER MANHOLE
	EXISTING IRRIGATION VALVE
	EXISTING WATER VALVE
	EXISTING FENCE
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	EXISTING DECIDUOUS TREE
	EXISTING CONIFEROUS TREE
	ORDINARY HIGH WATER
	200 FT OFFSET FROM OHW
	PROPOSED STORM DRAIN
	PROPOSED FLOW LINE
	PROPOSED WATER LINE
	PROPOSED SANITARY SEWER
	PROPOSED WATER SERVICE LINE
	PROPOSED IRRIGATION LINE
	PROPOSED SERVICE CONDUIT
	PROPOSED SECONDARY CONDUIT
	PROPOSED SINGLE PHASE PRIMARY CONDUIT
	PROPOSED TWO SINGLE PHASE PRIMARY CONDUITS
	PROPOSED SECONDARY HANDHOLE
	PROPOSED POWER VAULT
	PROPOSED PAD MOUNTED POWER TRANSFORMER
	PROPOSED CATCH BASIN
	PROPOSED STORM DRAIN MANHOLE
	PROPOSED SANITARY SEWER MANHOLE
	PROPOSED SANITARY SEWER CLEANOUT
	PROPOSED WATER OR IRRIGATION VALVE
	PROPOSED FIRE HYDRANT
	PROPOSED DOUBLE WATER METER
	PROPOSED SINGLE WATER METER
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR

KEYED NOTES - PROPOSED	
①	LIMITS OF DISTURBANCE AND RESTORATION
②	LIMITS OF GRADING AROUND COMFORT STATION
③	DRAINFIELD AREA (SEE 0908-05CI-0018)
④	NEW TRASH RECEPTACLE PAD (POINT ELEVATIONS SHOWN ARE SLAB ELEVATION)
⑤	CURB CUT, IE=732.15 (SEE 10/0908-05CI-0022)
⑥	ASPHALT PATH (SEE 7/0908-05CI-0022)

GRADING AND DRAINAGE PLAN
SCALE: 1"=10'



CONSULTANT	PRIM. ENG. AARON ANDERSON	CHELAN PUD NO.1
	2ND ENG. PRIM. ENG. COURT HILL	
DESIGNER	2ND ENG.	
APPROVAL	PROJ. MGR.	

SCALE	0 1" = 10'	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
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PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
GRADING AND DRAINAGE PLAN

BID NO. 15-04

SHEET C3 OF C10
REVISION 0
DATE 4/10/2015
DWG. 0908-50CI-0017

ORIG. DRAWN PED



ONSITE SANITARY SEWER PLAN
SCALE: 1"=20'

- KEYED NOTES**
- ① 44 LF-4" 3034 PVC W/CLEANOUT SEE 4,5/0908-50CI-0019
 - ② (2) 5,000 GALLON SEPTIC TANKS. SEE 1/0908-50CI-0020
 - ③ 6 LF-4" 3034 PVC SEE 5/0908-50CI-0019
 - ④ 4" 3034 PVC AS REQUIRED SEE 5/0908-50CI-0019
 - ⑤ 6,700 GALLON DOSING TANK. SEE 2/0908-50CI-0020
 - ⑥ 15 LF-2.5" SCHEDULE 40 PVC SEE 5/0908-50CI-0019
 - ⑦ OSI MODEL 6606A INDEXING/DISTRIBUTION VALVE SEE 5/0908-50CI-0020
 - ⑧ TRANSPORT LINE TRENCH SECTION SEE 6/0908-50CI-0019 SEE TABLE FOR LENGTH
 - ⑨ (6) TYPICAL DRAINFIELD BED SECTION SEE 3/0908-50CI-0020
 - ⑩ 7.5 LF-2.5" SCHEDULE 40 PVC MANIFOLD (TYP)
 - ⑪ 6,120 S.F. OF RESERVE DRAINFIELD AREA

- NOTES TO OWNER**
- 1. DO NOT PLANT TREES WITHIN 50 FEET OF THE DRAINFIELD AREA
 - 2. ONSITE SEPTIC SYSTEM IS DESIGNED FOR 3,300 GALLONS PER DAY PEAK USE

TRANSPORT LINE LENGTH TABLE
(BENDS AS REQUIRED)

BED NO.	PIPE LENGTH
B1	105 LF-2.5" SCHEDULE 40 PVC
B2	100 LF-2.5" SCHEDULE 40 PVC
B3	138 LF-2.5" SCHEDULE 40 PVC
B4	133 LF-2.5" SCHEDULE 40 PVC
B5	170 LF-2.5" SCHEDULE 40 PVC
B6	165 LF-2.5" SCHEDULE 40 PVC

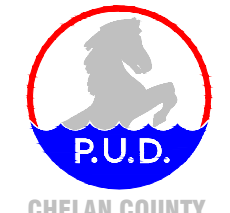


CONSULTANT
 PRIM. ENG. MIKE ROLFS
 2ND ENG.
 DESIGNER
 APPROVAL

CHELAN PUD NO.1
 PRIM. ENG. COURT HILL
 2ND ENG.
 PROJ. MGR.

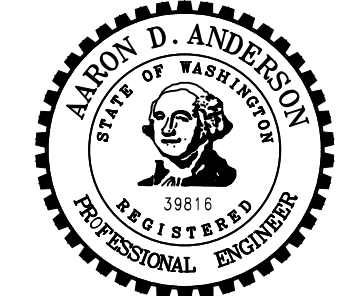
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REV	DATE	REVISION	REQ. BY	DRFT	

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

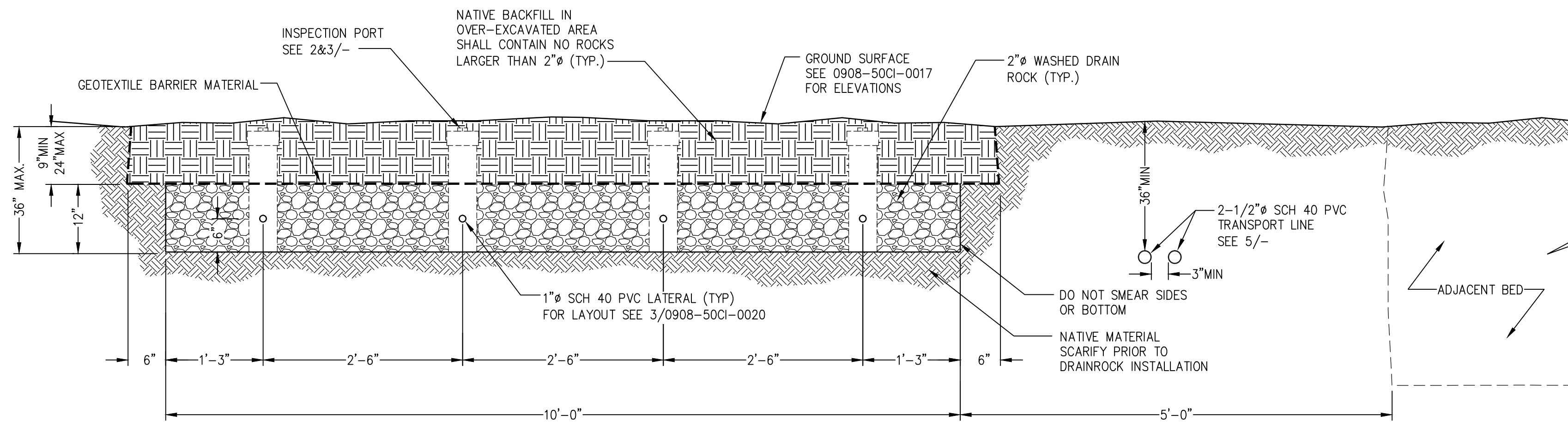


DAROGA STATE PARK
 GROUP CAMP IMPROVEMENTS
 ONSITE SANITARY SEWER PLAN
 BID NO. 15-04

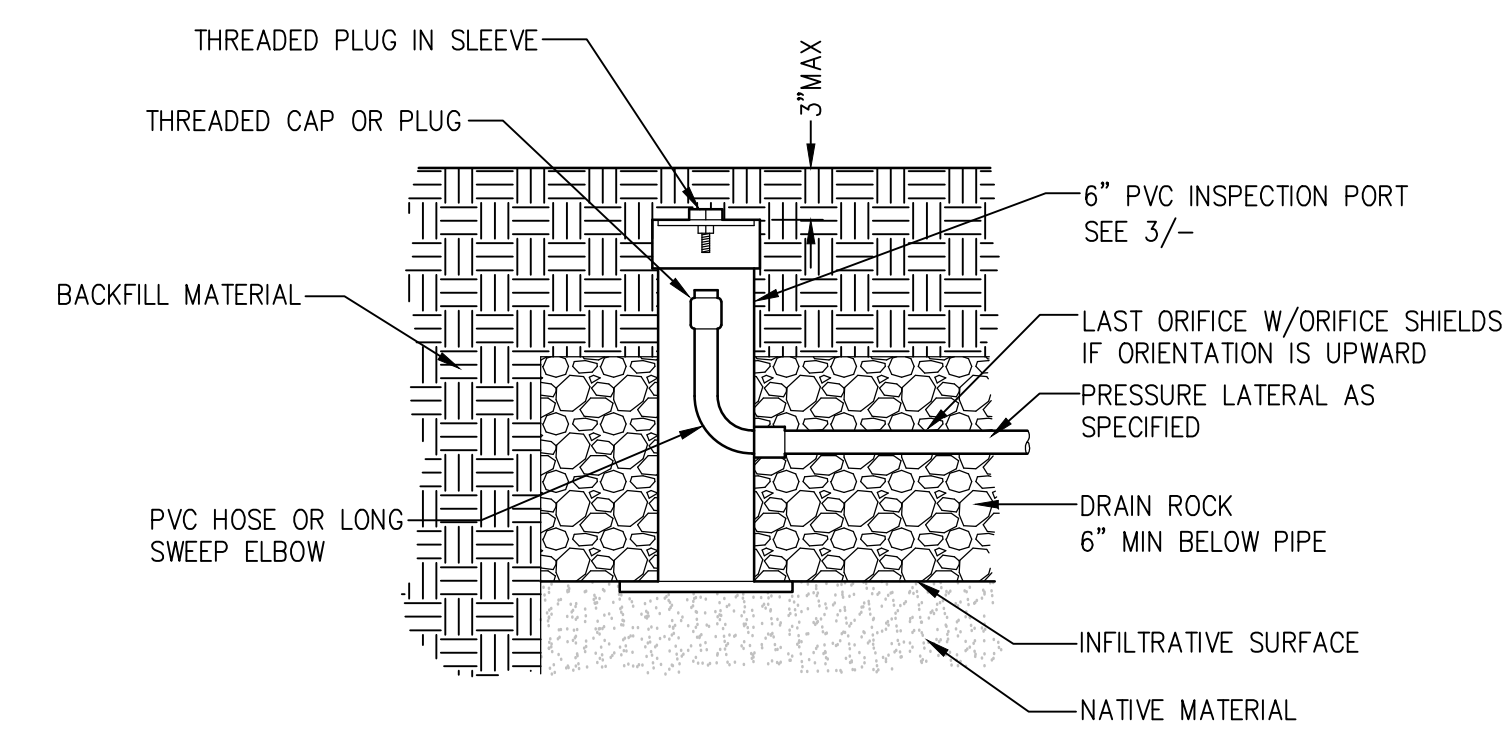
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DATE 4/10/2015
DWG. 0908-50CI-0018



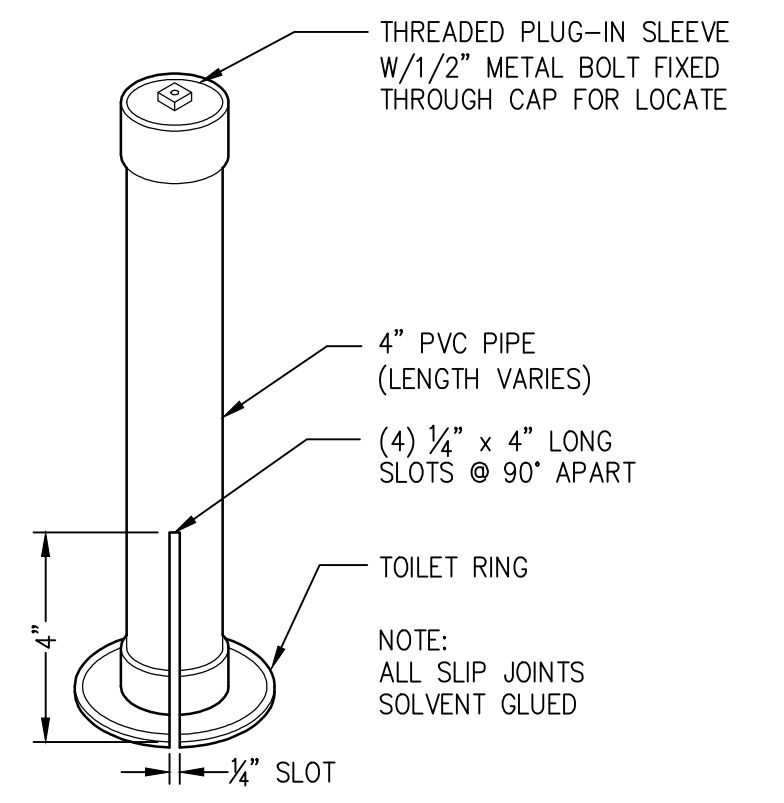
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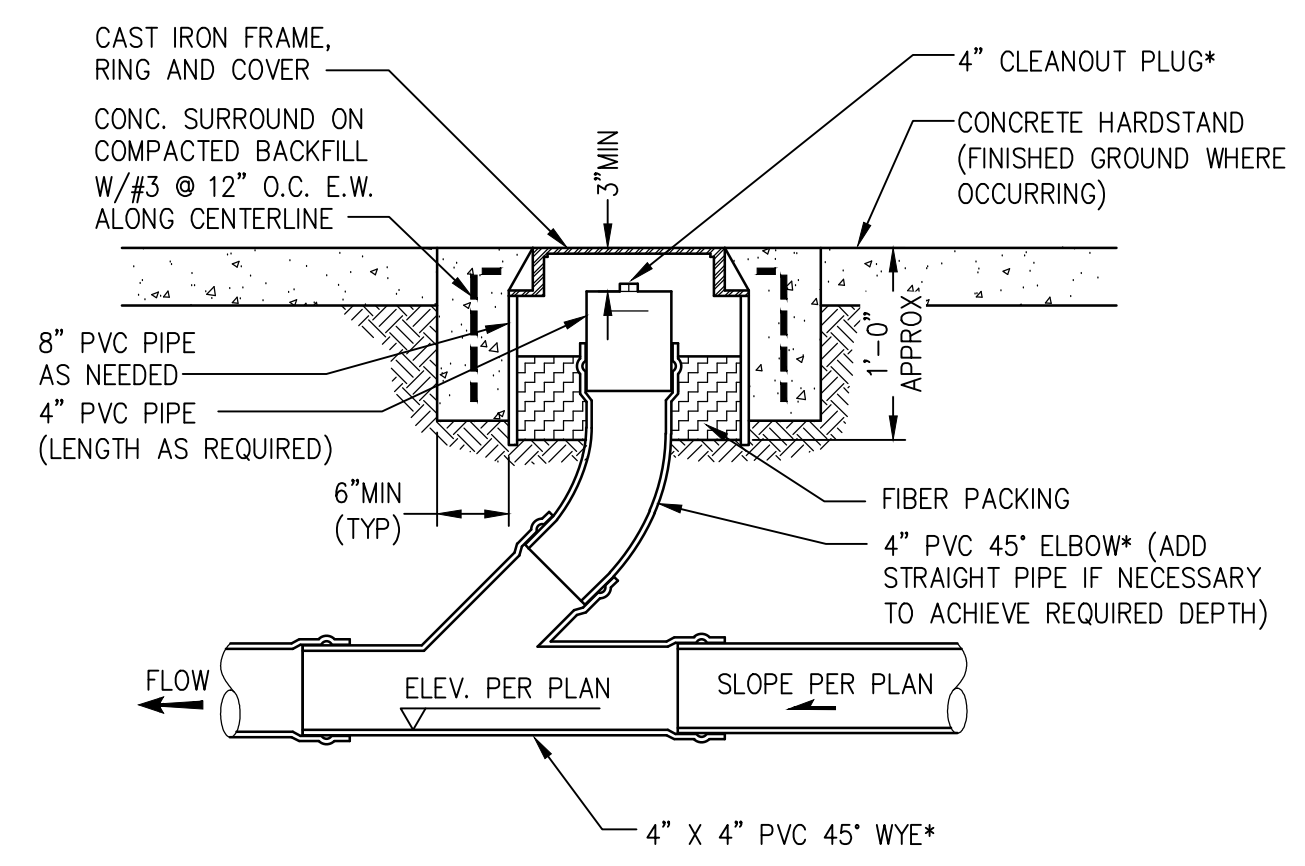
1 TYPICAL SAND BED DETAIL
0908-50CI-0018 NOT TO SCALE



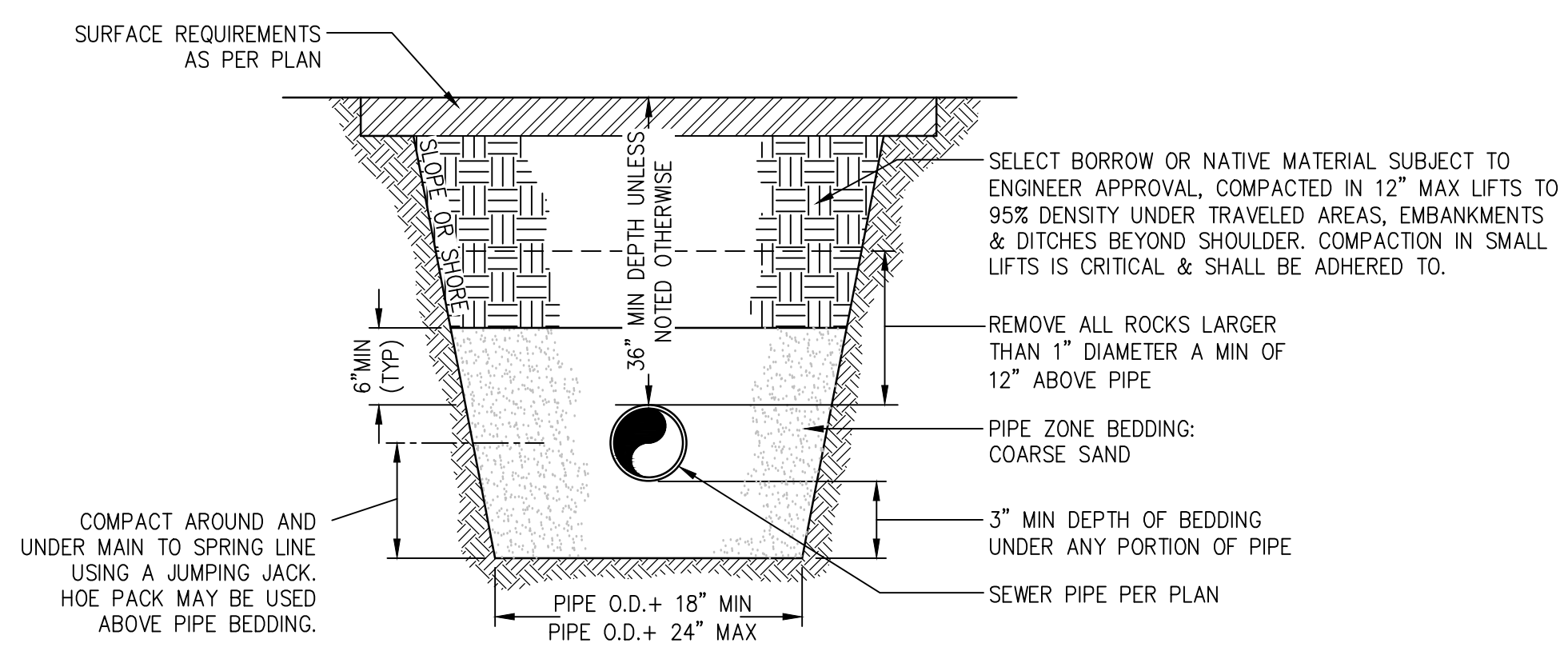
2 TYPICAL INSPECTION/CLEANOUT PORT DETAIL
0908-50CI-0020 NOT TO SCALE



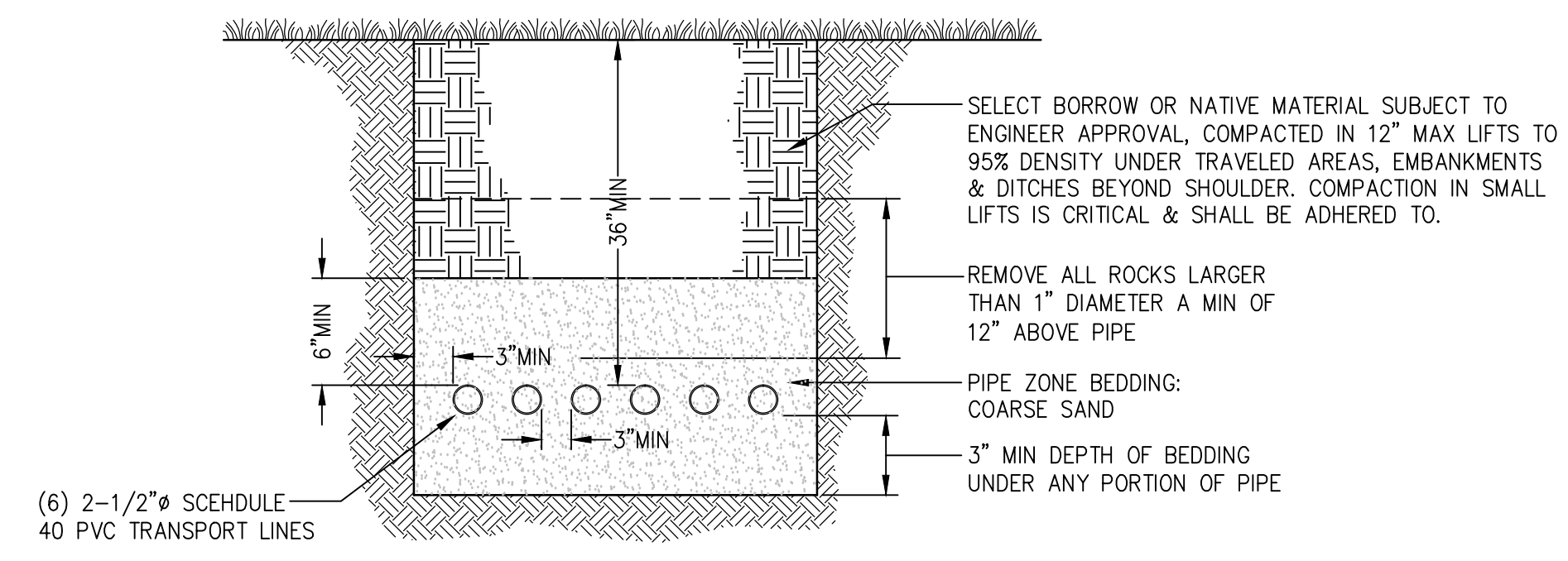
3 TYPICAL INSPECTION PORT DETAIL
NOT TO SCALE



4 CLEANOUT
0908-50CI-0018
0908-50CI-0020 NOT TO SCALE



5 TYPICAL SEWER TRENCH SECTION
0908-50CI-0018 NOT TO SCALE



6 TRANSPORT LINE TRENCH SECTION
0908-50CI-0018 NOT TO SCALE

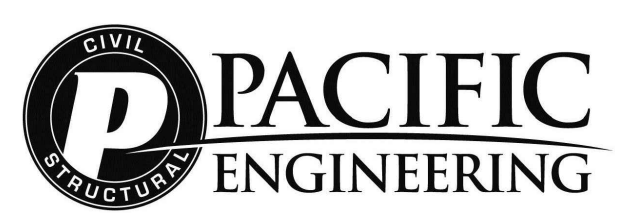
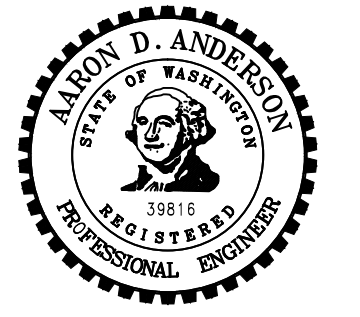
ONSITE SEWAGE SYSTEM GENERAL NOTES

- DRAINFIELD COMPONENTS AND SQUIRT HEIGHT MUST BE INSPECTED AND APPROVED BY THE ENGINEER OR HEALTH DEPARTMENT REPRESENTATIVE PRIOR TO BACKFILL.
 - THE GATE VALVES LOCATED NEAR THE BED INDEXING/DISTRIBUTING VALVE MUST BE USED FOR SQUIRT HEIGHT ADJUSTMENTS.
 - REMOVE HANDLES AFTER FINAL ADJUSTMENTS. BALL VALVES ARE NOT ACCEPTABLE FOR SQUIRT HEIGHT ADJUSTMENTS.
 - ALARM MUST BE ON SEPARATE CIRCUIT FROM PUMP.
 - CONTRACTOR MUST SET PUMP RUNTIME AND SQUIRT HEIGHT AS SPECIFIED ON THE PLANS.
 - INSTALL THE LATERALS AS LEVEL ELEVATIONS PARALLEL WITH SITE TOPO LINES.
 - INSTALL CLEANOUT AND MONITORING PORTS (SEE 1/- AT THE DISTAL ENDS OF EACH LATERAL).
 - THE DRAINFIELD AND RESERVE AREAS MUST BE FLAGGED AND TAPED OR OTHERWISE MARKED PRIOR TO ANY CONSTRUCTION INSIDE THE PROJECT BOUNDARY TO PROTECT THEM FROM COMPACTION AND DISTURBANCE AS A RESULT OF VEHICULAR TRAFFIC, PARKING, AND MATERIAL STORAGE.
 - THE PUMP CONTROLS MUST BE PERMANENTLY MOUNTED WITHIN SIGHT OF THE DRAINFIELD. SEE ELECTRICAL FOR LOCATION.
 - ALL COMPONENTS SHALL MEET CLASS 1, DIVISIONS 1 AND 2 CLASSIFICATIONS.
- SEPTIC TANKS:**
- THE SEPTIC TANK MUST BE FROM THE STATE APPROVED LIST AND APPROPRIATE SIZE.
 - DEEPLY BURIED SEPTIC TANKS MUST HAVE RISERS ON ALL MANHOLES TO WITHIN 12" OF THE GROUND SURFACE.
 - VERIFY PIPE PENETRATIONS "IN" AND "OUT" ARE SEALED AT THEIR UNION WITH THE TANK.
 - REQUIRED SEPARATION DISTANCES MUST BE OBSERVED.
- DRAINFIELD:**
- THE BOTTOM OF THE DRAINFIELD TRENCHES MUST BE VIRTUALLY FLAT (SLOPE NOT TO EXCEED 2" FALL PER 100 FEET (.16%).)
 - CHELAN/DOUGLAS COUNTY HEALTH DISTRICT REQUIRED SEPARATION DISTANCES MUST BE OBSERVED.
 - VEHICULAR TRAFFIC OVER DRAINFIELD IS PROHIBITED.
 - DRAINFIELD TRENCHES ARE NOT TO BE INSTALLED IN UNAPPROVED FILL. NOTIFY ENGINEER IF UNSUITABLE SOIL CONDITIONS ARE ENCOUNTERED.

ONSITE SEWAGE SYSTEM TABLE OF MATERIALS

ITEM	QUANTITY	MANUFACTURER	MODEL
EFFLUENT FILTER	2	ORENCO SYSTEMS, INC	FT-1554-36
EFFLUENT PUMP	1	ORENCO SYSTEMS, INC	PF501012-20
DISCHARGE ASSEMBLY	1	ORENCO SYSTEMS, INC	HV200BCOAS
DISCHARGE ASSEMBLY KIT	1	ORENCO SYSTEMS, INC	HVCW200-KIT
FLOAT SWITCH ASSEMBLY	1	ORENCO SYSTEMS, INC	MF3A-Y,G,W-83VC-20(44",78",81")
INDEXING/DISTRIBUTING VALVE	1	ORENCO SYSTEMS, INC	V6606A
PUMP CONTROL PANEL	1	ORENCO SYSTEMS, INC	MVP-S21RDM
24" ULTRA-RIB RISER	6	ORENCO SYSTEMS, INC	RR24XX+XX ²
24" LID ADAPTERS	6	ORENCO SYSTEMS, INC	PRTA24BDKIT WITH MA320
PUMP VAULT	1	ORENCO SYSTEMS, INC	PVU 114-2425-L
30" DISTRIBUTING VALVE RISER	1	ORENCO SYSTEMS, INC	RR30XX+20 ²
30" LID	1	ORENCO SYSTEMS, INC	FLD30G14
24" LID	6	ORENCO SYSTEMS, INC	FLD24G14
SPLICE BOX FOR FLOATS	1	ORENCO SYSTEMS, INC	SB3
SPLICE BOX FOR PUMP	1	ORENCO SYSTEMS, INC	SBX-S

- CONTRACTOR TO VERIFY MODEL NUMBERS AND QUANTITIES TO ENSURE A COMPLETE AND OPERABLE SYSTEM PRIOR TO SUBMITTAL REVIEW.
- CONTRACTOR TO FIELD FIT RISER HEIGHT DIMENSIONS TO CONFORM WITH FINISHED GROUND SURFACE ELEVATIONS. CONTRACTOR TO FIELD INSTALL GROMMETS AS SUPPLIED BY ORENCO SYSTEMS, INC FOR PIPE AND SPLICE BOX PENETRATIONS.



CONSULTANT	PRIM. ENG. AARON ANDERSON	CHELAN PUD NO.1
	2ND ENG. COURT HILL	
DESIGNER	2ND ENG.	
APPROVAL	PROJ. MGR.	

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REV	DATE	REVISION	REQ. BY DRFT
0	4/10/2015	BID SET	- VK

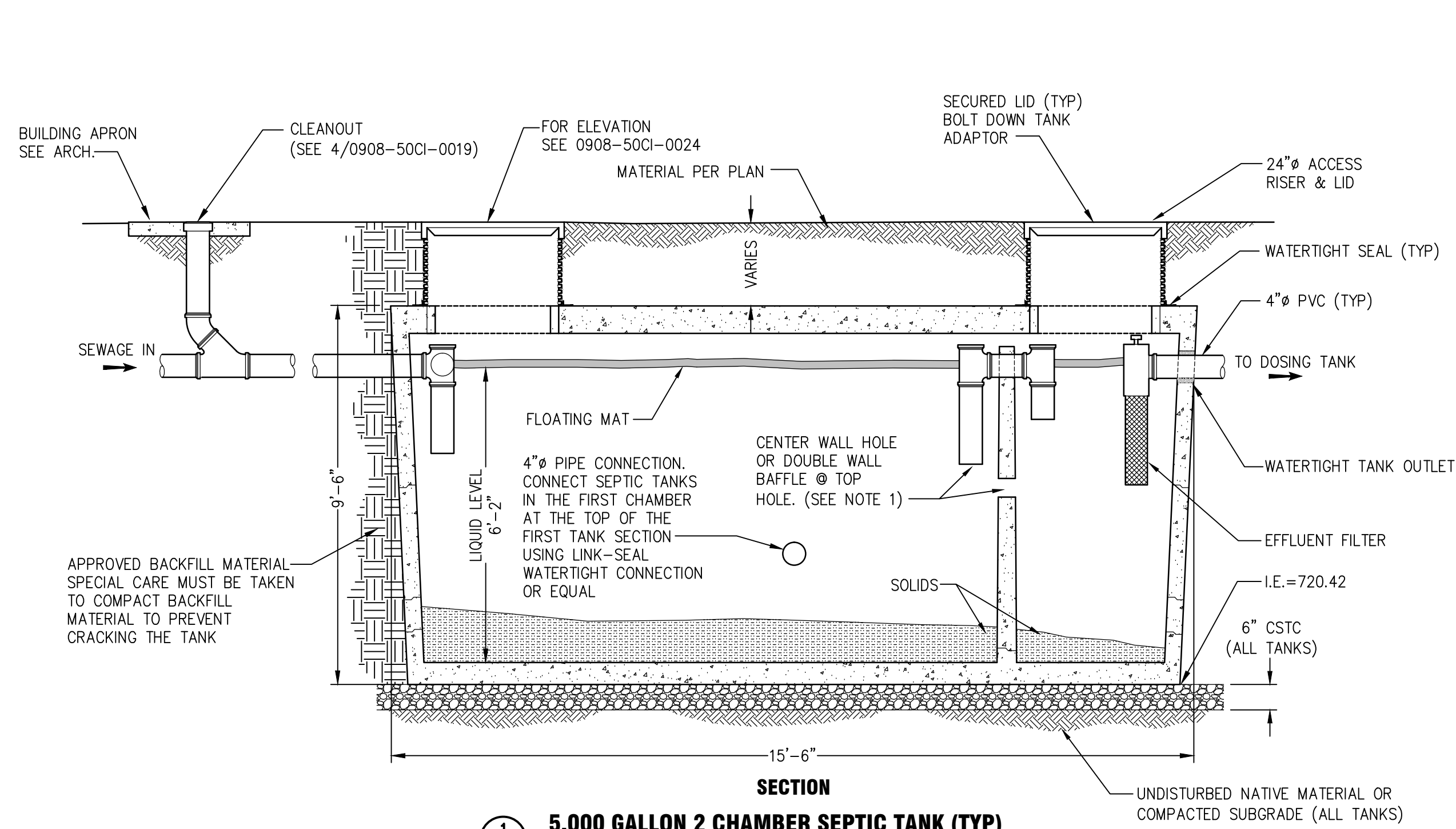
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REV	DATE	REVISION
0	4/10/2015	BID SET

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

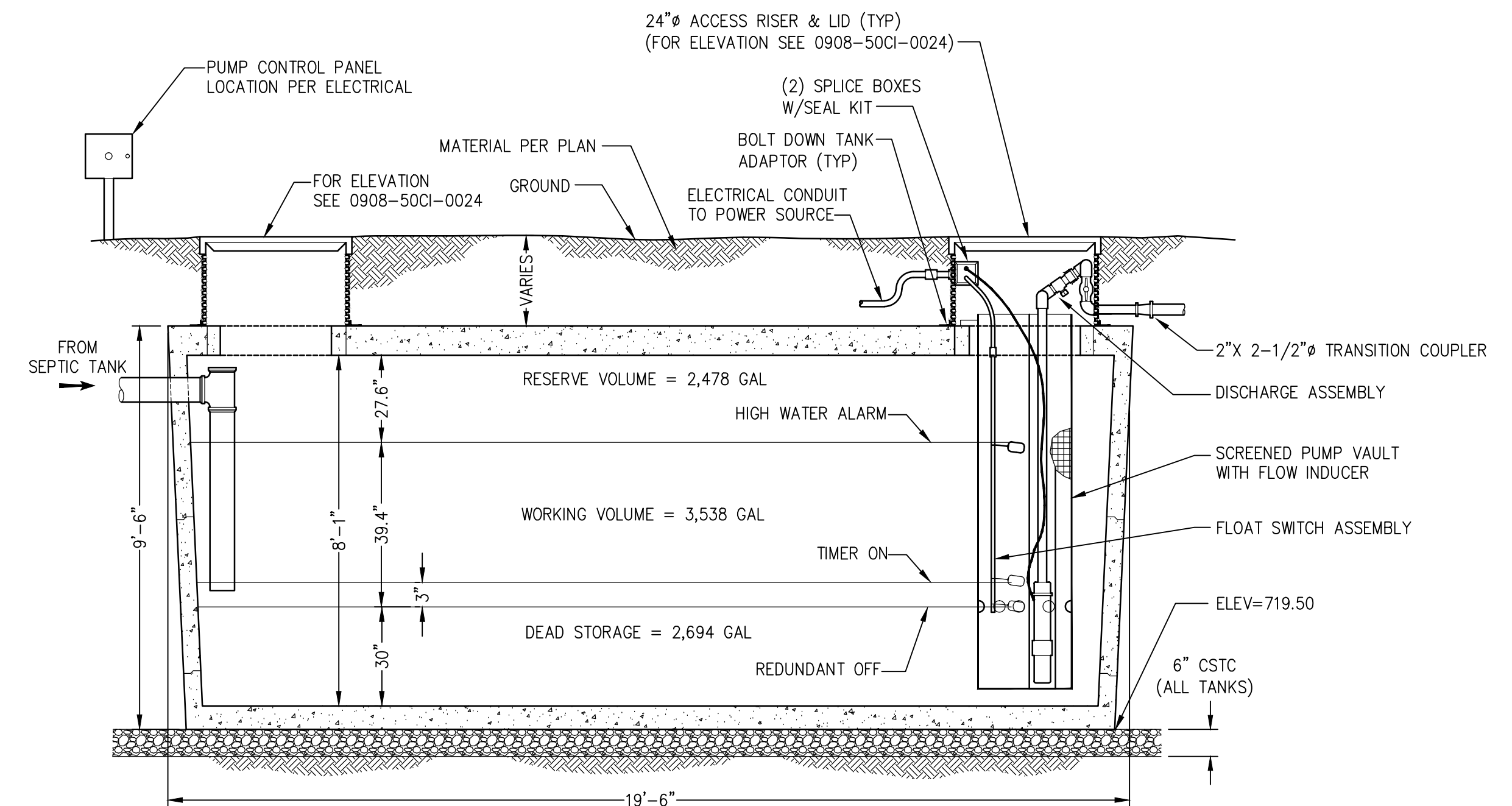
DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
SANITARY SEWER DETAILS 1
BID NO. 15-04

SHEET C5 OF C10
REVISION 0
DATE 4/10/2015
DWG. 0908-50CI-0019

ORIG. DRAWN PED
ORIG. DATE



SECTION 1
5,000 GALLON 2 CHAMBER SEPTIC TANK (TYP)
 0908-50CI-0018 NOT TO SCALE

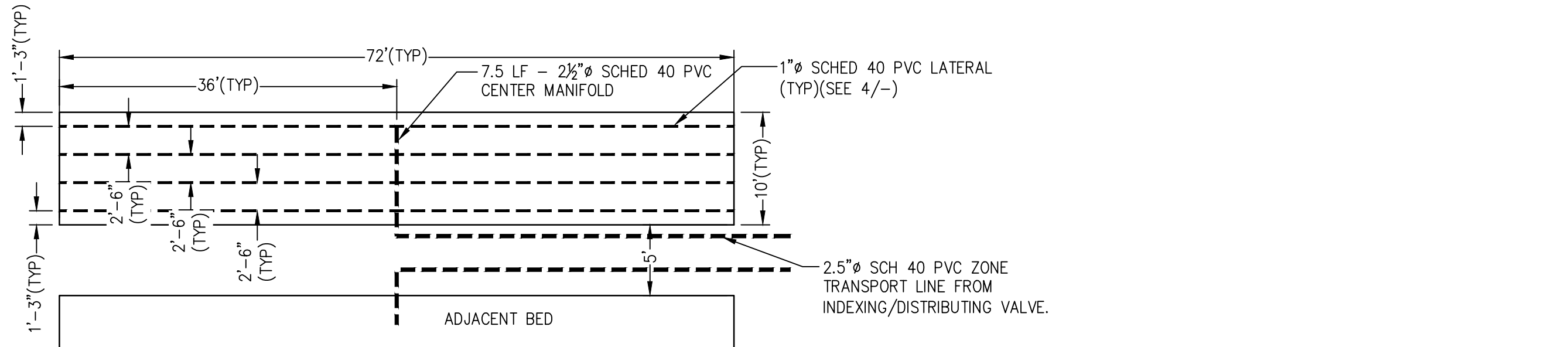


SECTION 2
6,700 GALLON DOSING TANK SECTION
 0908-50CI-0018 NOT TO SCALE

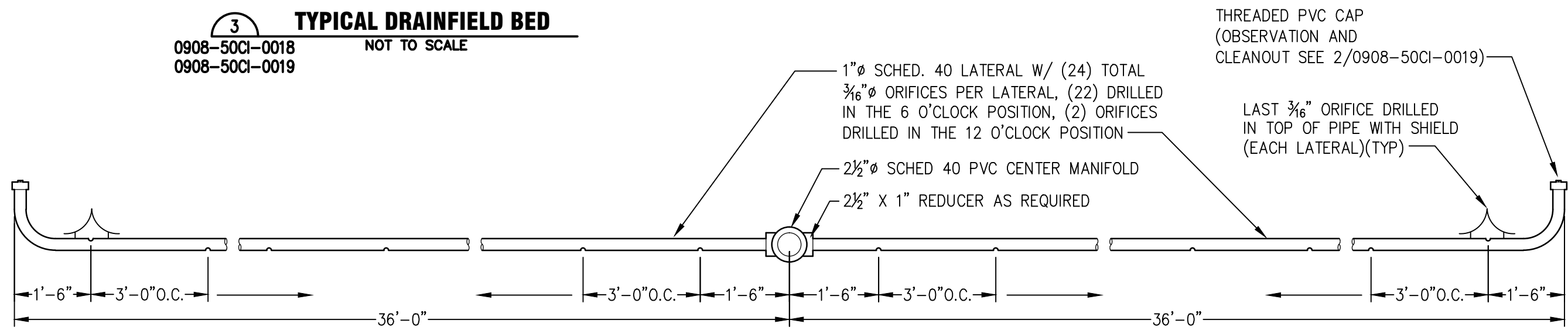
SEPTIC TANK AND DOSING NOTES:

- IF SEPTIC TANK DOES NOT HAVE A CENTER WALL BAFFLE DRAWING FROM THE CLEAR ZONE, THEN A DOUBLE BAFFLE ASSEMBLY MUST BE USED AT THE TOP OF THE CENTER WALL.
- ALL PIPE PENETRATIONS SHALL BE SEALED AND WATERTIGHT WITH RUBBER BOOT STYLE GASKETS OR LINKSEAL OR EQUAL FOR CORED PENETRATIONS.
- BACKFILL MATERIAL AROUND TANK MUST BE COMPACTED TO 95% MDD TO PREVENT SETTLEMENT. SPECIAL CARE MUST BE TAKEN DURING BACKFILL PROCESS NOT TO DAMAGE OR CRACK TANKS.
- ALL PIPES AND FITTINGS MUST BE RATED FOR HIGH HEAD APPLICATIONS.
- ALL COMPONENTS MUST BE INTRINSICALLY SAFE AND EXPLOSION PROOF.
- DISTRIBUTING VALVE MUST BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
- GATE VALVES SHALL BE PLACED ON THE ZONE TRANSPORT LINES NEAR THE INDEXING/DISTRIBUTING VALVE.
- SEE ADDITIONAL NOTES ON 0908-50CI-0019.
- BASIS OF DESIGN: H2 PRECAST 5,000 GALLON DOSING TANK.

SYSTEM REQUIREMENTS	
EFFLUENT PUMP REQUIREMENTS	56.6 GPM @ 49.2 FEET TDH
SQUIRT HEIGHT ADJUSTMENT	= 2 FT
DOSE FREQUENCY SET	TO 18 DOSES PER DAY
CONSISTING OF	183 GALLONS PER DOSE
TIME DOSING REQUIRED	
ESTIMATED TIMED CYCLE	
PUMP ON:	0 HR 03 MIN 13 SEC
PUMP OFF:	1 HR 16 MIN 47 SEC

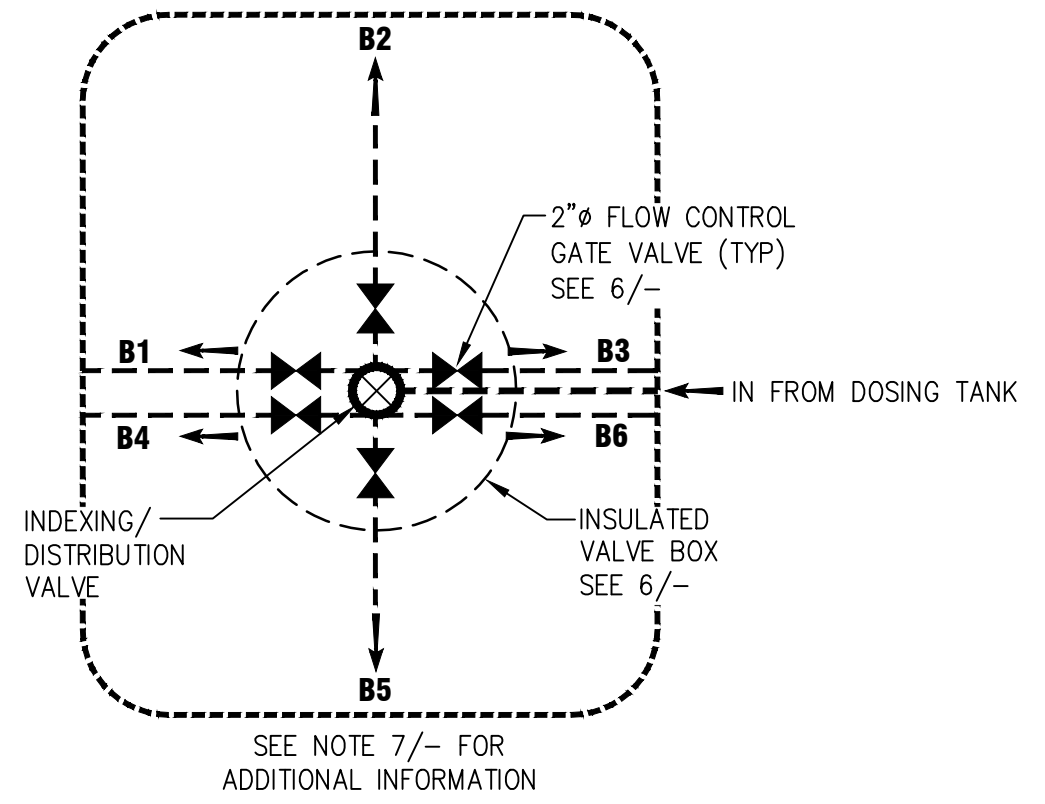


SECTION 3
TYPICAL DRAINFIELD BED
 0908-50CI-0018
 0908-50CI-0019 NOT TO SCALE



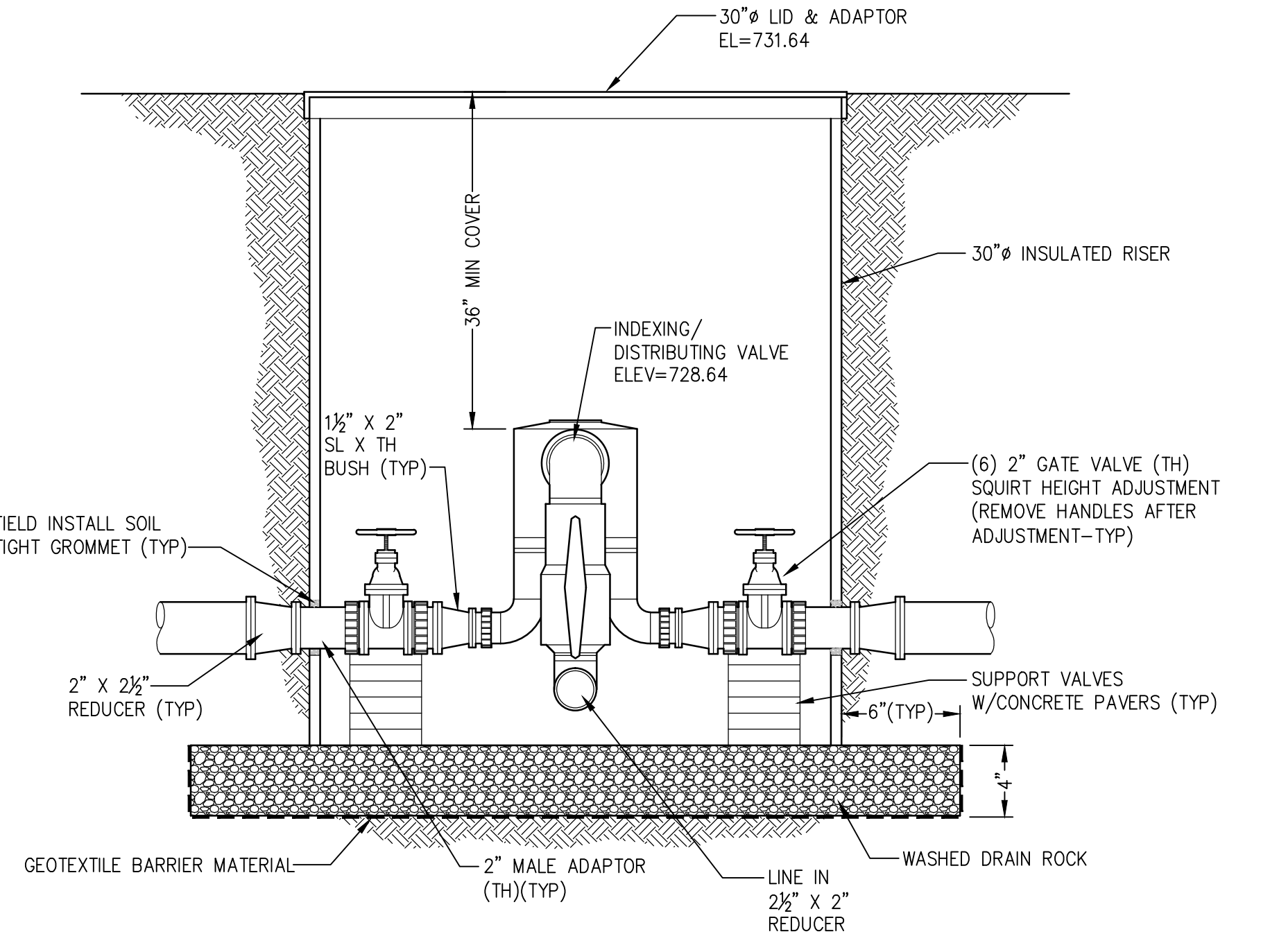
ORIFICE SQUIRT HEIGHT MUST BE ADJUSTED TO 2' USING THE GATE VALVE LOCATED NEAR THE INDEXING VALVE AND HANDLE REMOVED AFTER ADJUSTMENTS.

SECTION 4
TYPICAL MANIFOLD AND LATERAL DETAIL
 NOT TO SCALE

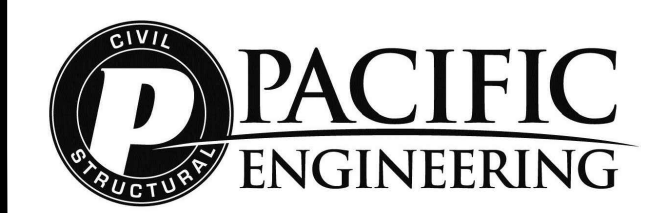


- SPECIAL CARE MUST BE TAKEN DURING INSTALLATION OF THE INDEXING VALVES. MANUFACTURER'S RECOMMENDATIONS MUST BE STRICTLY FOLLOWED TO ENSURE PROPER OPERATION.
- BALL VALVES WILL NOT BE PERMITTED FOR USE FOR LATERAL FLOW CONTROL AND SQUIRT HEIGHT ADJUSTMENT.
- SQUIRT HEIGHT ADJUSTMENT=2 FT

SECTION 5
INDEXING/DISTRIBUTING VALVE SCHEMATIC
 0908-50CI-0018 NOT TO SCALE



SECTION 6
INDEXING/DISTRIBUTING VALVE ASSEMBLY
 NOT TO SCALE



CONSULTANT	PRIM. ENG. AARON ANDERSON	CHELAN PUD NO.1
	2ND ENG. COURT HILL	
	DESIGNER	2ND ENG.
	APPROVAL	PROJ. MGR.

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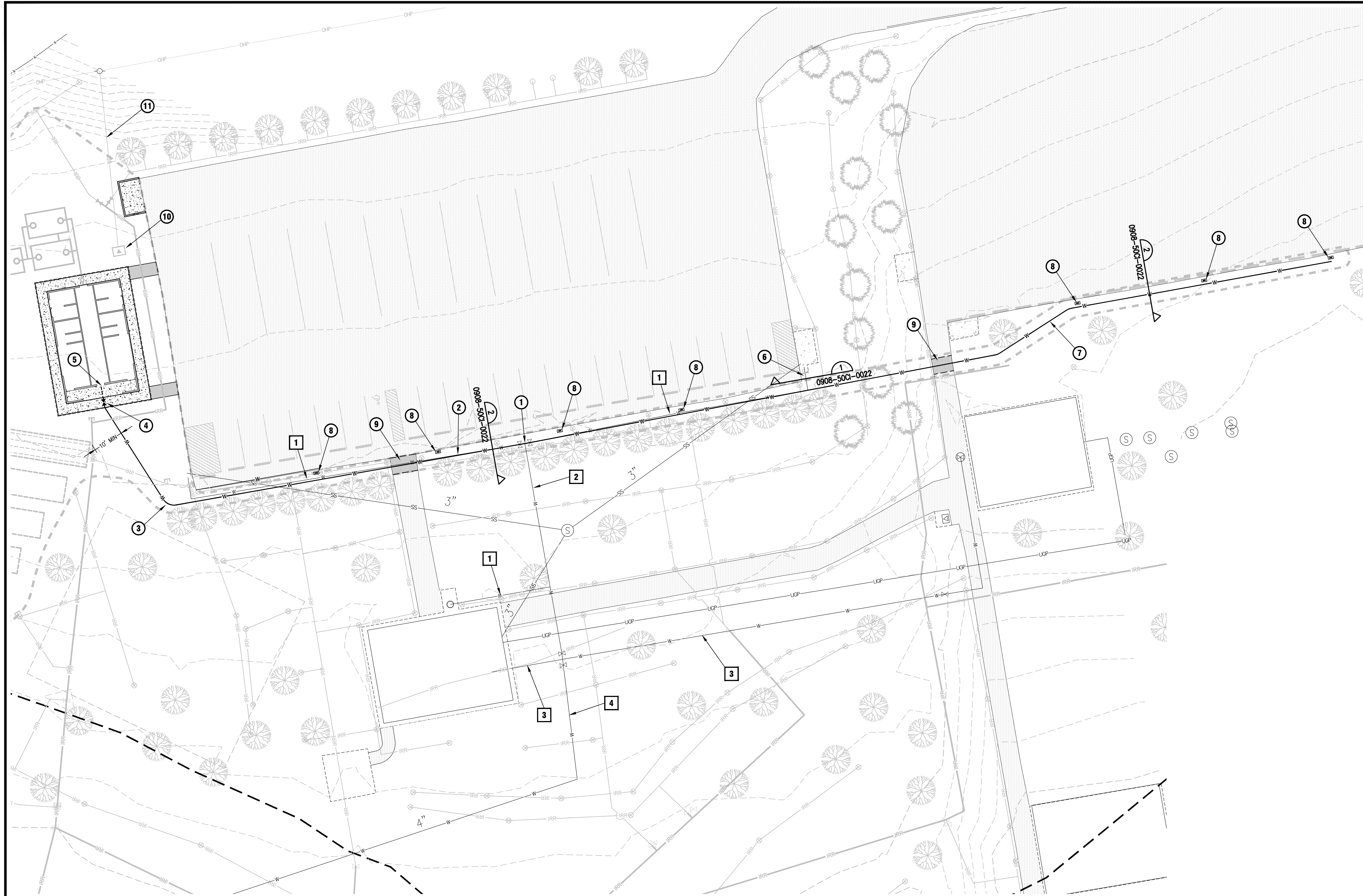
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

DAROGA STATE PARK
 GROUP CAMP IMPROVEMENTS
 SANITARY SEWER DETAILS 2
 BID NO. 15-04

SHEET C6 OF C10
REVISION 0
DATE 4/10/2015
DWG. 0908-50CI-0020



ORIG. DRAWN PED
 ORIG. DATE

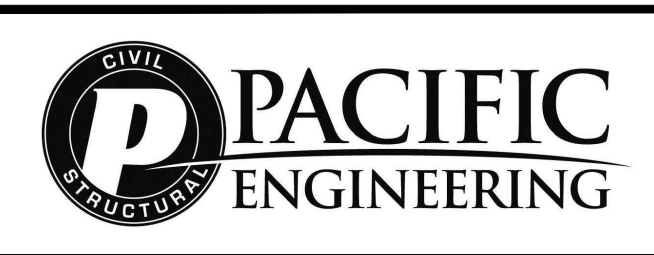
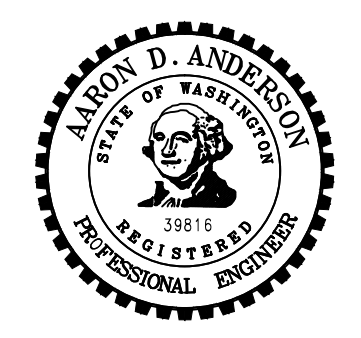


KEYED NOTES - EXISTING	
1	1" WATER LINE
2	2" WATER LINE
3	3" WATER LINE
4	4" WATER LINE

KEYED NOTES - PROPOSED	
1	CONNECTION POINT (SEE 5/0908-50CI-0022)
2	190 LF 2" SDR9 HDPE WATER LINE
3	5' RADIUS BEND (MIN)
4	2" BALL VALVE IN CASING (SEE 4/0908-50CI-0022)
5	BUILDING CONNECTION (SEE MECHANICAL)
6	RECONNECT EXIST WATER SERVICE WITH FITTINGS AS REQUIRED
7	325 LF 2" SDR9 HDPE WATER LINE
8	RV POWER/WATER PEDESTAL (SEE 6/0908-50CI-0022)
9	SAWCUT OR GROUND PENETRATE UNDER SIDEWALK (IF SAWCUT SEE 9/0908-50CI-0022)
10	TRANSFORMER PAD (SEE ELECTRICAL)
11	PRIMARY CONDUIT (SEE ELECTRICAL)

LEGEND	
	EXISTING ASPHALT
	EXISTING WATER LINE
	EXISTING SANITARY SEWER
	EXISTING UNDERGROUND POWER
	EXISTING IRRIGATION LINE
	EXISTING OVERHEAD POWER
	EXISTING ELECTRICAL CONDUIT
	EXISTING POWER POLE
	EXISTING SANITARY SEWER MANHOLE
	EXISTING IRRIGATION VALVE
	EXISTING WATER VALVE
	EXISTING FENCE
	EXISTING DECIDUOUS TREE
	EXISTING CONIFEROUS TREE
	ORDINARY HIGH WATER
	200 FT OFFSET FROM OHW
	PROPOSED WATER LINE
	PROPOSED SANITARY SEWER
	PROPOSED WATER SERVICE LINE
	PROPOSED IRRIGATION LINE
	PROPOSED SANITARY SEWER MANHOLE
	PROPOSED SANITARY SEWER CLEANOUT
	PROPOSED WATER OR IRRIGATION VALVE

DOMESTIC WATER PLAN
SCALE: 1"=20'



CONSULTANT	PRIM. ENG. AARON ANDERSON	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG. COURT HILL
	DESIGNER	2ND ENG.
	APPROVAL	PROJ. MGR.

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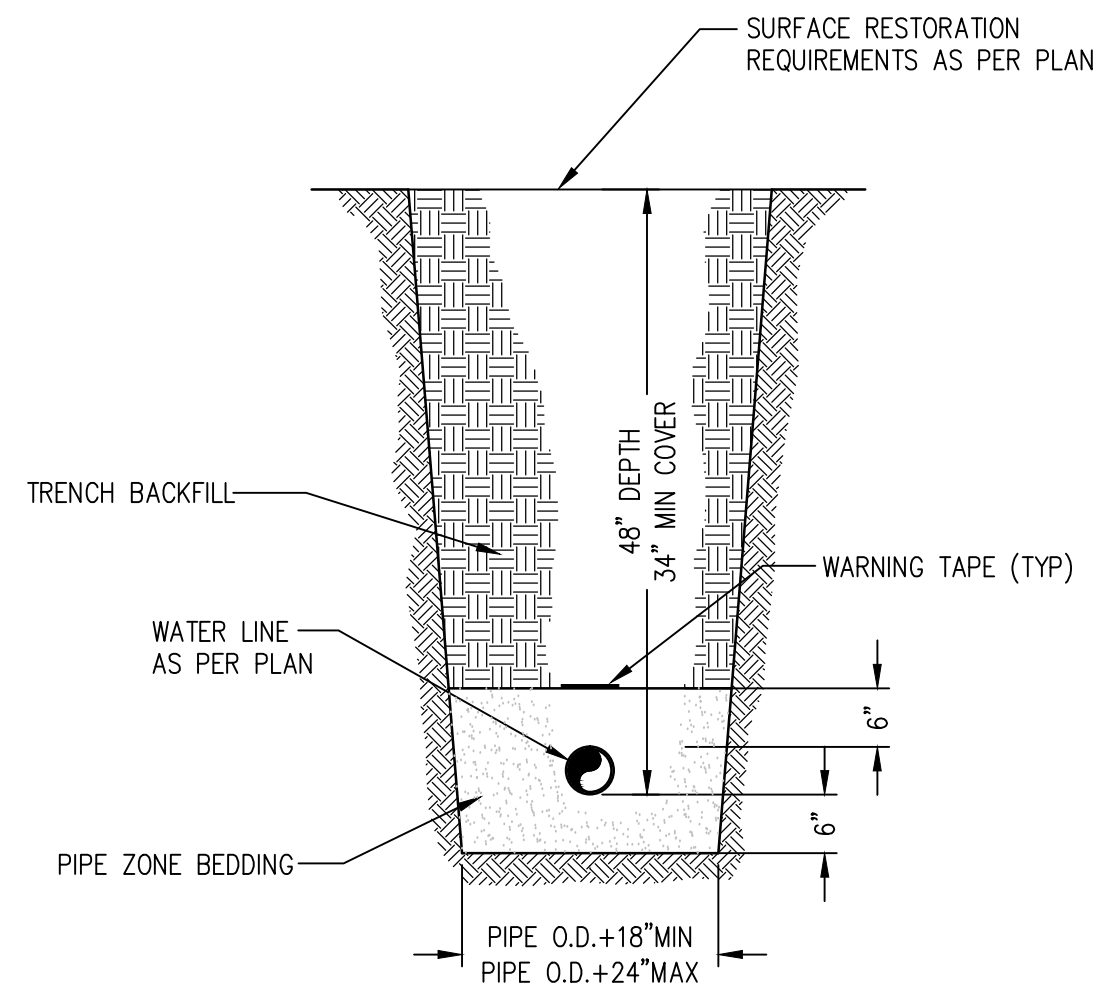
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
DOMESTIC WATER PLAN

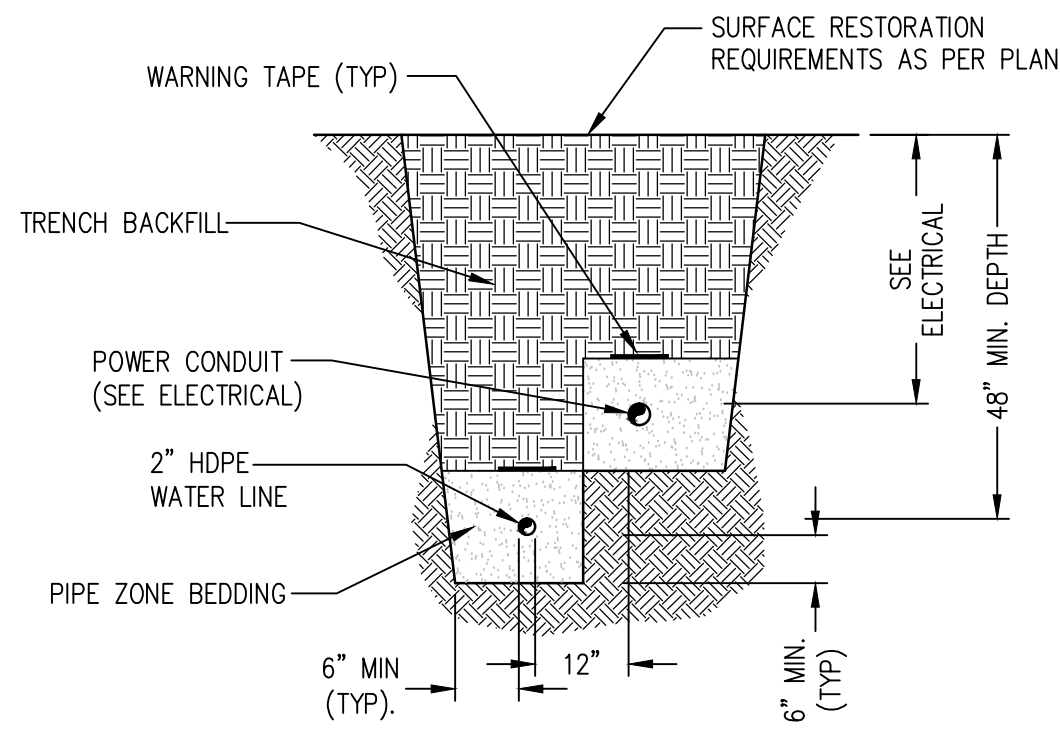
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BID NO. 15-04

SHEET C7 OF C10
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DATE 4/10/2015
DWG. 0908-50CI-0021

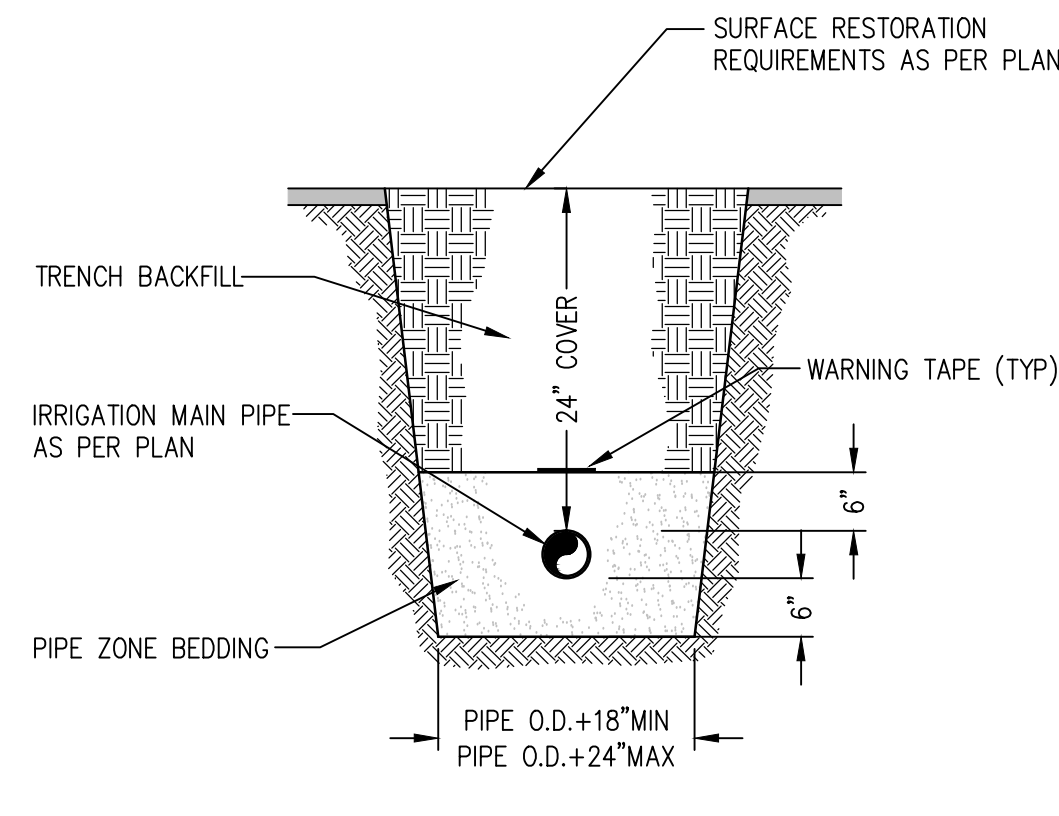
ORIG. DRAWN PED



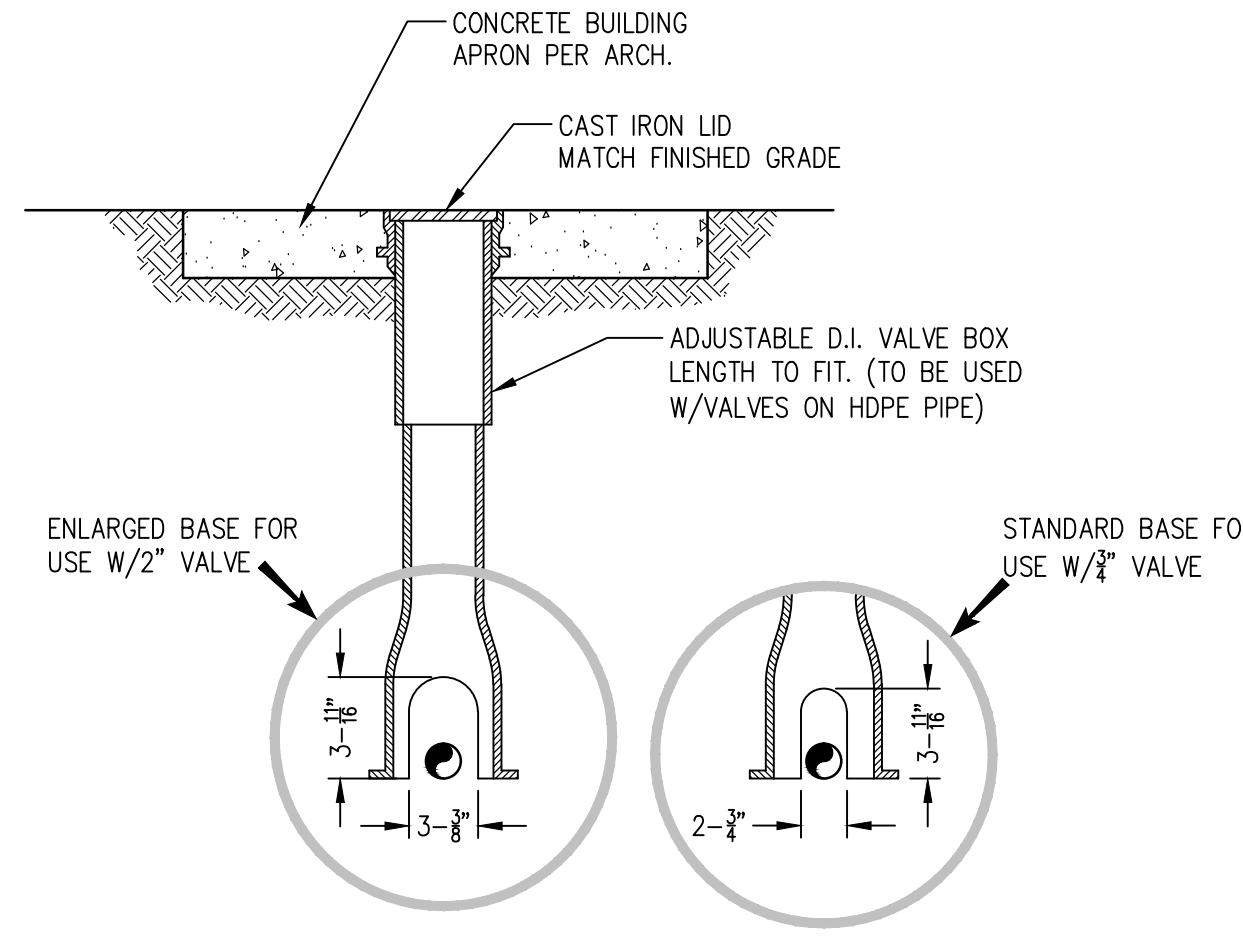
1 WATER TRENCH SECTION
0908-50CI-0021 NOT TO SCALE



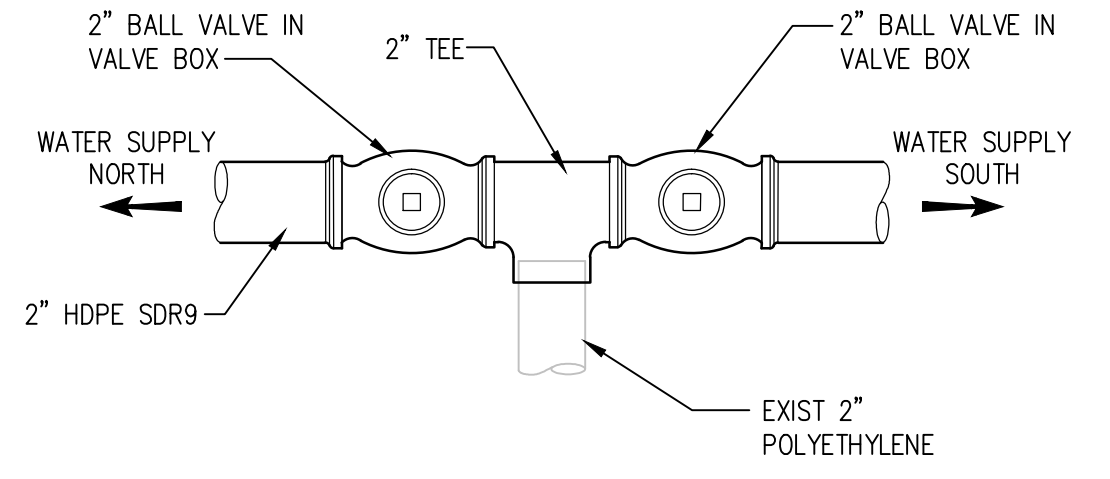
2 WATER & POWER COMMON TRENCH SECTION
0908-50CI-0021 NOT TO SCALE



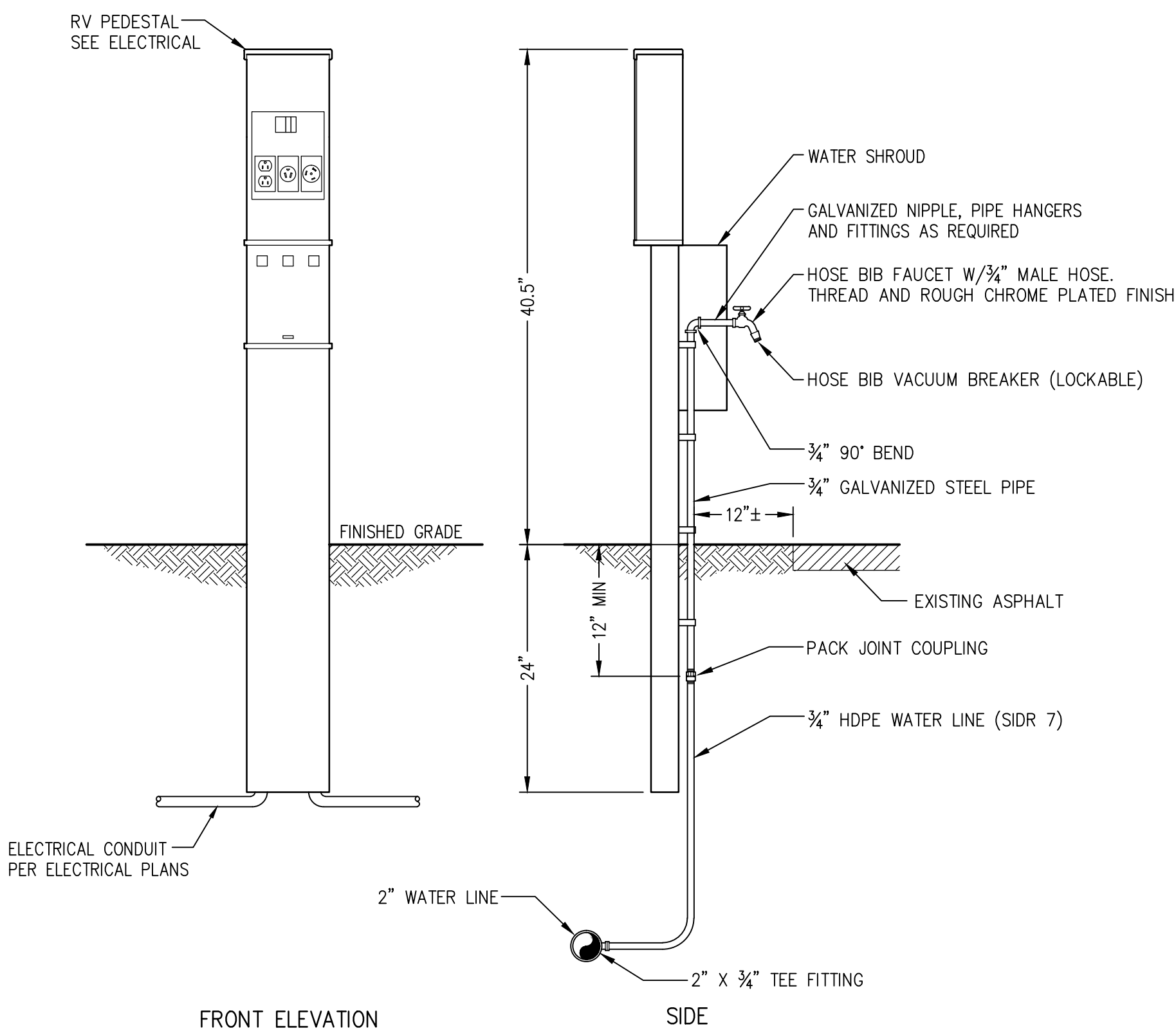
3 IRRIGATION TRENCH SECTION
0908-50CI-0023 NOT TO SCALE



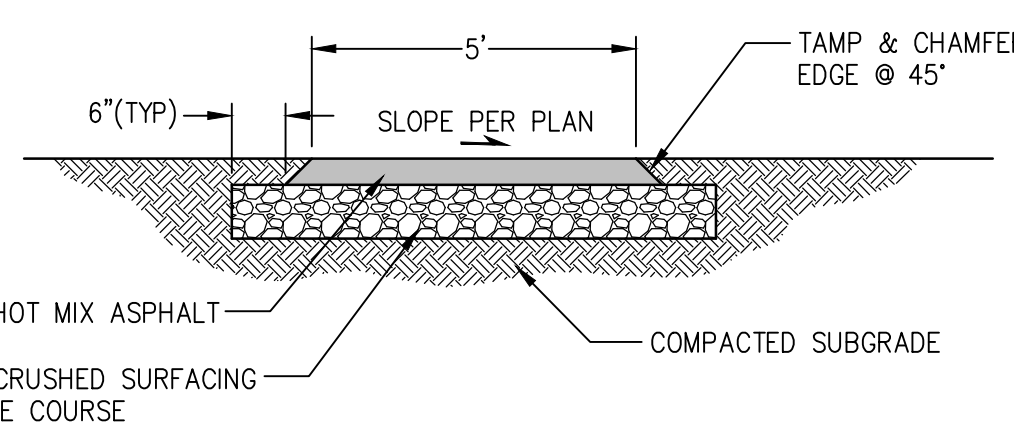
4 VALVE BOX DETAILS
0908-50CI-0021 NOT TO SCALE



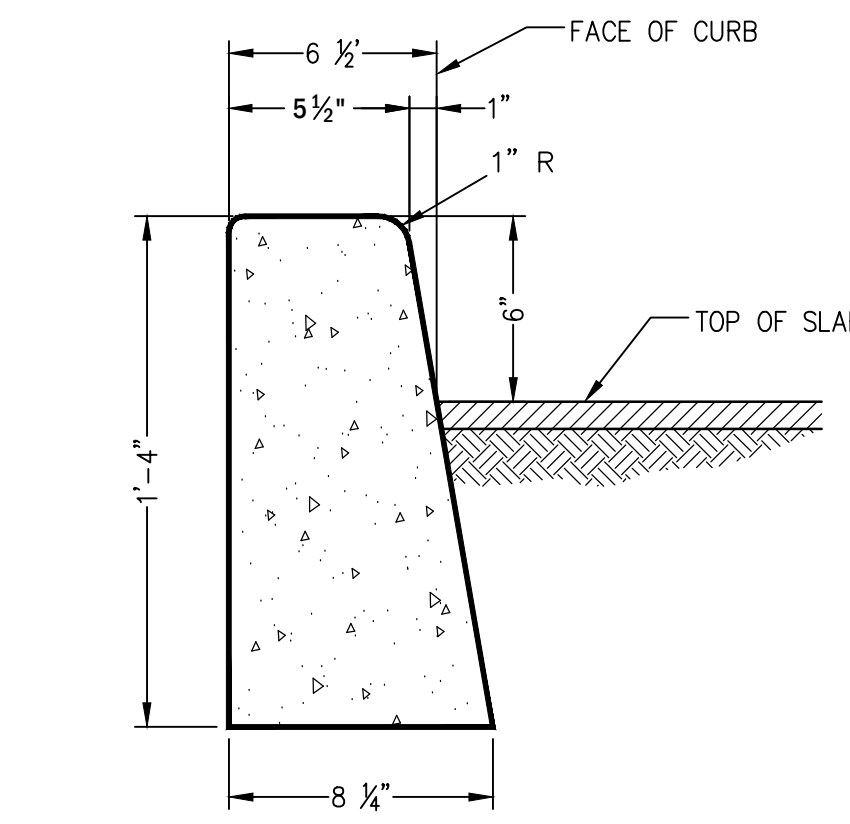
5 DOMESTIC WATER LINE CONNECTION DETAIL
0908-50CI-0021 NOT TO SCALE



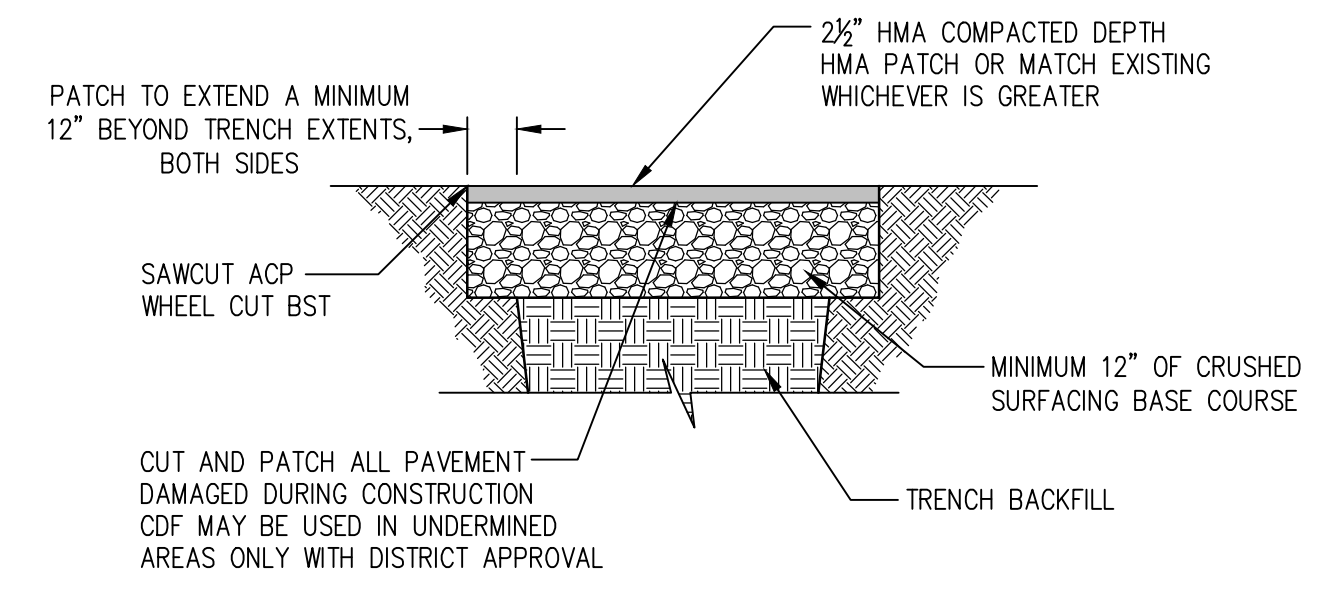
6 R.V. POWER/WATER PEDESTAL DETAIL
0908-50CI-0015
0908-50CI-0021 NOT TO SCALE



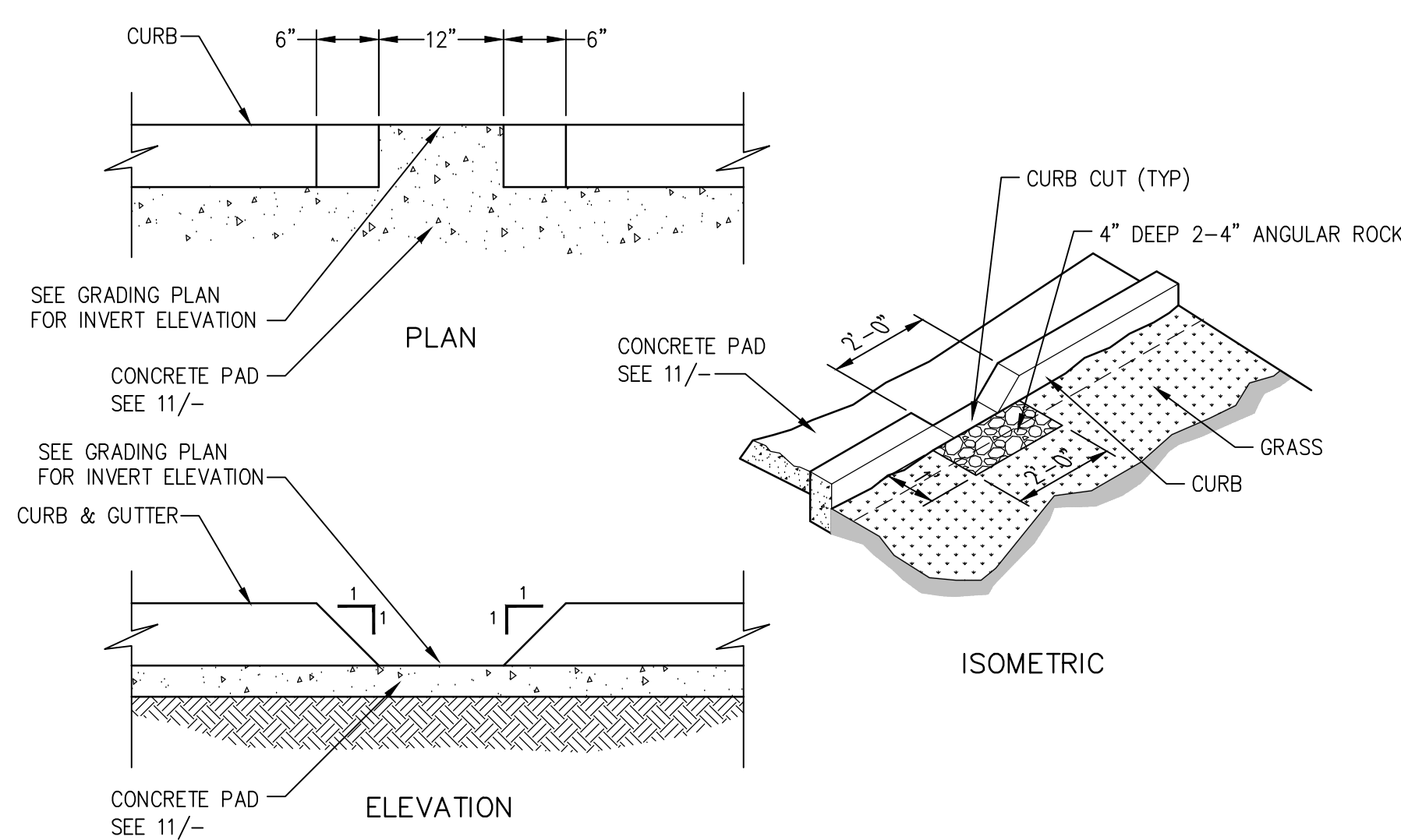
7 ASPHALT WALK SECTION
0908-50CI-0017
0908-50CI-0015
0908-50CI-0024 NOT TO SCALE



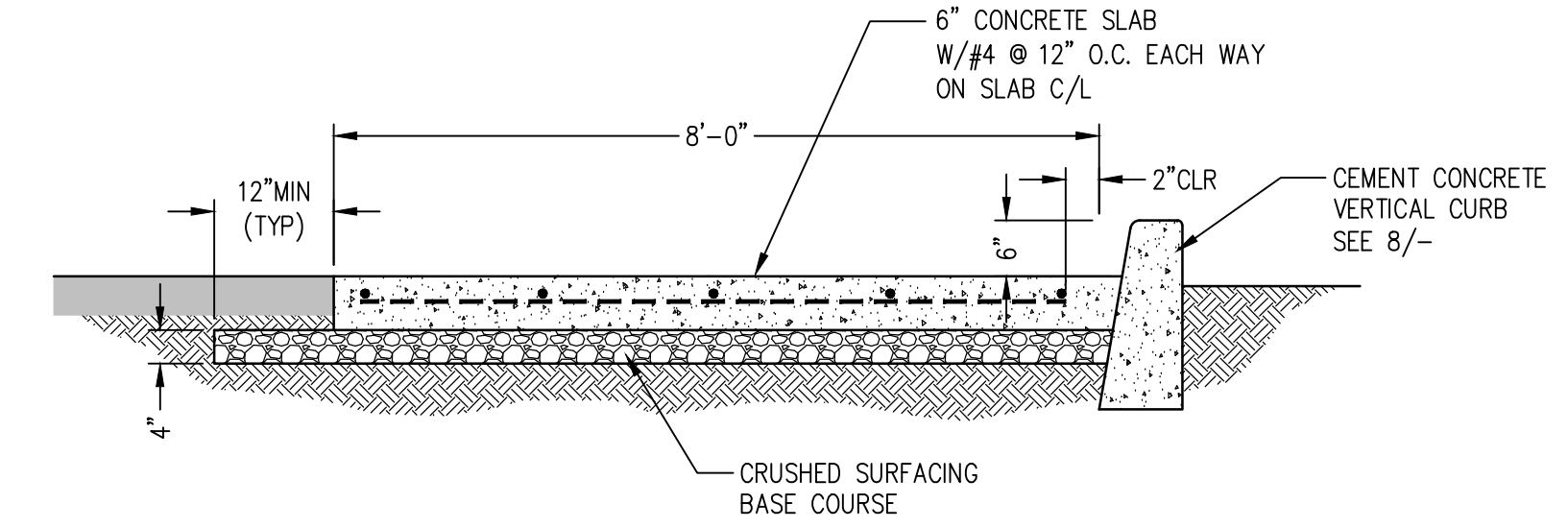
8 CEMENT CONCRETE VERTICAL CURB
NOT TO SCALE



9 ASPHALT PATCH DETAIL
0908-50CI-0017
0908-50CI-0021 NOT TO SCALE



10 CURB CUT DETAIL
0908-50CI-0017 NOT TO SCALE



11 8' X 13' TRASH RECEPTACLE PAD
0908-50CI-0015
0908-50CI-0017 NOT TO SCALE



CONSULTANT	PRIM. ENG. MIKE ROLFS	CHELAN PUD NO.1
DESIGNER	2ND ENG. COURT HILL	
APPROVAL	2ND ENG.	
	PROJ. MGR.	

SCALE	0 1"
REV	DATE
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	BID SET

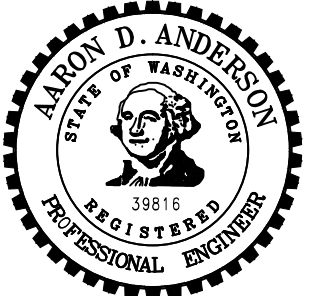
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PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

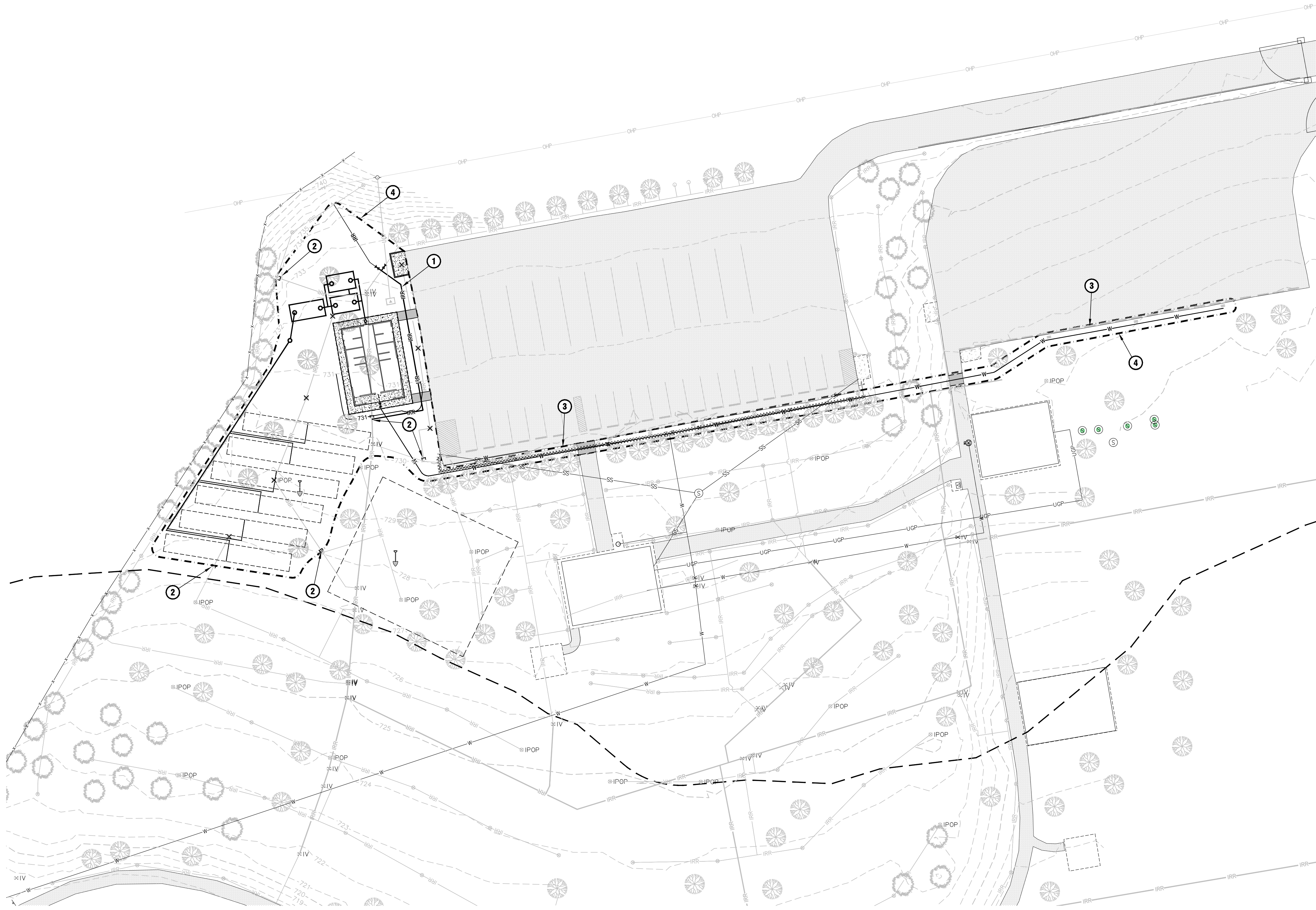


DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
CIVIL DETAILS
BID NO. 15-04

SHEET C8 OF C10
REVISION 0
DATE 4/10/2015
DWG. 0908-50CI-0022



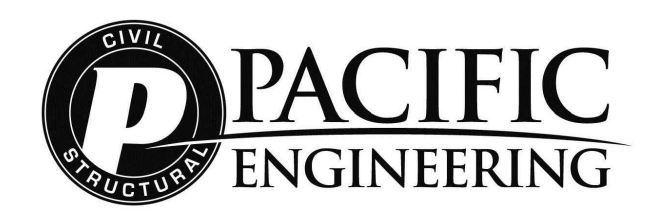
ORIG. DRAWN PED



IRRIGATION PLAN
SCALE: 1"=30'

- KEYED NOTES**
- ① RE-ROUTE IRRIGATION WITH SIMILAR PIPE SIZE AND MATERIAL. TRENCHING PER 3/0908-50CI-0022
 - ② CUT AND CAP FOR CONSTRUCTION. CONTRACTOR TO PROVIDE IRRIGATION PLAN TO RECONNECT CAPPED PIPES UTILIZING EXISTING ZONES.
 - ③ REPAIR IRRIGATION LINES CUT DURING TRENCHING FOR WATER AND POWER.
 - ④ GRASS SOD/SEED RESTORATION LIMITS

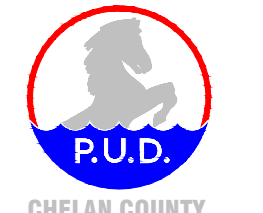
- NOTES**
- 1. THE MAINTENANCE OF EXISTING SOD/GRASS NOT DESIGNATED TO BE REMOVED SHALL BE COORDINATED WITH STATE PARKS INCLUDING THE OPERATION OF THE EXISTING SPRINKLER IRRIGATION SYSTEM.
 - 2. CONTRACTOR SHALL MODIFY THE EXISTING SPRINKLER SYSTEM TO FIT THE PLACEMENT OF THE NEW COMFORT STATION. MODIFICATIONS WILL INVOLVE RELOCATING OR ADJUSTING EXISTING HEADS. MODIFICATIONS WILL ALSO REQUIRE INSTALLING NEW HEADS. CONTRACTOR SHALL PROVIDE SCHEMATIC DRAWING FOR LAYOUT OF NEW SPRINKLER HEAD LOCATIONS PRIOR TO MAKING MODIFICATIONS. NEW HEADS SHALL MATCH TYPE/BRAND OF EXISTING SPRINKLER HEADS.
 - 3. SPRINKLER HEADS SHALL NOT BE PLACED DIRECTLY OVER DRAINFIELDS. RELOCATE HEADS AND PIPING OUTSIDE DRAINFIELD BEDS.



CONSULTANT	PRIM. ENG. AARON ANDERSON	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG. COURT HILL
	DESIGNER	2ND ENG.
	APPROVAL	PROJ. MGR.

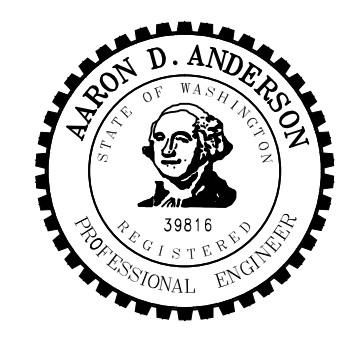
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PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
WENATCHEE, WASHINGTON

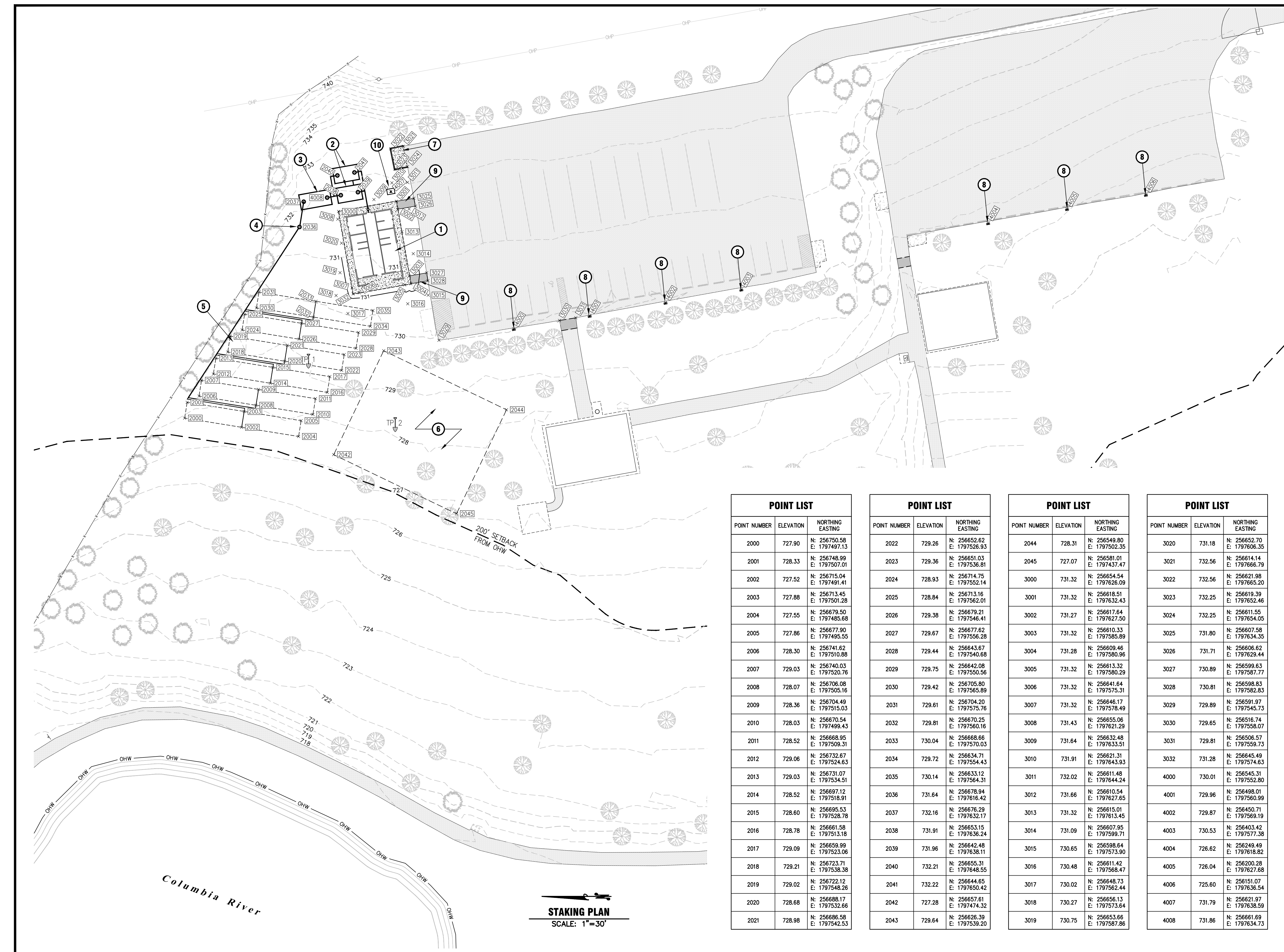


DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
IRRIGATION SCHEMATIC SITE PLAN
-
BID NO. 15-04

SHEET C9 OF C10
REVISION 0
DATE 4/10/2015
DWG. 0908-50CI-0023



ORIG. DRAWN 9
ORIG. DATE



- KEYED NOTES - PROPOSED**
- ① COMFORT STATION
 - ② (2) SEPTIC TANKS
 - ③ (1) DOSING TANK
 - ④ AUTOMATIC DISTRIBUTION VALVE
 - ⑤ (6) 10' X 72' DRAINFIELD BEDS
 - ⑥ 6,120 SQ FT RESERVE AREA
 - ⑦ RELOCATED TRASH RECEPTACLE (NO WATER OR SEWER)
 - ⑧ RV POWER AND WATER PEDESTALS
 - ⑨ ASPHALT SIDEWALK (SEE 7/0908-50CI-0022)
 - ⑩ TRANSFORMER (SEE ELECTRICAL)

- LEGEND**
- EXISTING ASPHALT
 - NEW CONCRETE
 - EXISTING WATER LINE
 - EXISTING OVERHEAD POWER
 - EXISTING ELECTRICAL CONDUIT
 - EXISTING POWER POLE
 - EXISTING SANITARY SEWER MANHOLE
 - EXISTING FENCE
 - EXISTING MAJOR CONTOUR
 - EXISTING MINOR CONTOUR
 - EXISTING DECIDUOUS TREE
 - EXISTING CONIFEROUS TREE
 - ORDINARY HIGH WATER
 - 200 FT OFFSET FROM OHW
 - ONSITE TEST PIT LOCATION

NOTES

- UNDERGROUND UTILITIES NOT SHOWN FOR CLARITY

POINT LIST

POINT NUMBER	ELEVATION	NORTHING EASTING
2000	727.90	N: 256750.58 E: 1797497.13
2001	728.33	N: 256748.99 E: 1797507.01
2002	727.52	N: 256715.04 E: 1797501.28
2003	727.88	N: 256713.45 E: 1797501.28
2004	727.55	N: 256679.50 E: 1797485.68
2005	727.86	N: 256677.90 E: 1797495.55
2006	728.30	N: 256741.62 E: 1797510.88
2007	729.03	N: 256740.03 E: 1797520.78
2008	728.07	N: 256706.08 E: 1797505.16
2009	728.36	N: 256704.49 E: 1797515.03
2010	728.03	N: 256670.54 E: 1797499.43
2011	728.52	N: 256668.95 E: 1797509.31
2012	729.06	N: 256732.67 E: 1797524.63
2013	729.03	N: 256731.07 E: 1797534.51
2014	728.52	N: 256697.12 E: 1797518.91
2015	728.60	N: 256695.53 E: 1797528.78
2016	728.78	N: 256661.58 E: 1797513.18
2017	729.09	N: 256659.99 E: 1797523.06
2018	729.21	N: 256723.71 E: 1797538.38
2019	729.02	N: 256722.12 E: 1797548.26
2020	728.68	N: 256688.17 E: 1797532.66
2021	728.98	N: 256686.58 E: 1797542.53

POINT LIST

POINT NUMBER	ELEVATION	NORTHING EASTING
2022	729.26	N: 256652.62 E: 1797526.93
2023	729.36	N: 256651.03 E: 1797536.81
2024	728.93	N: 256714.75 E: 1797552.14
2025	728.84	N: 256713.16 E: 1797562.01
2026	729.38	N: 256679.21 E: 1797546.41
2027	729.67	N: 256677.62 E: 1797556.28
2028	729.44	N: 256643.67 E: 1797540.68
2029	729.75	N: 256642.08 E: 1797550.56
2030	729.42	N: 256705.80 E: 1797565.89
2031	729.61	N: 256704.20 E: 1797575.76
2032	729.81	N: 256670.25 E: 1797560.16
2033	730.04	N: 256668.66 E: 1797570.03
2034	729.72	N: 256634.71 E: 1797554.43
2035	730.14	N: 256633.12 E: 1797564.31
2036	731.64	N: 256678.94 E: 1797616.42
2037	732.16	N: 256676.29 E: 1797632.17
2038	731.91	N: 256653.15 E: 1797636.24
2039	731.96	N: 256642.48 E: 1797638.11
2040	732.21	N: 256655.31 E: 1797648.55
2041	732.22	N: 256644.65 E: 1797650.42
2042	727.28	N: 256657.61 E: 1797474.32
2043	729.64	N: 256626.39 E: 1797539.20

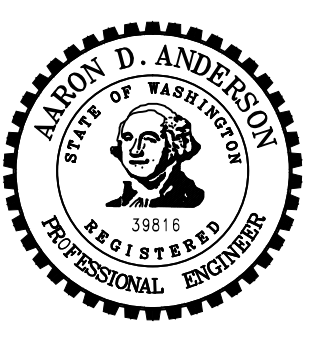
POINT LIST

POINT NUMBER	ELEVATION	NORTHING EASTING
2044	728.31	N: 256549.80 E: 1797502.35
2045	727.07	N: 256581.01 E: 1797437.47
3000	731.32	N: 256654.54 E: 1797632.43
3001	731.32	N: 256618.51 E: 1797632.43
3002	731.27	N: 256617.64 E: 1797627.50
3003	731.32	N: 256610.33 E: 1797585.89
3004	731.28	N: 256609.46 E: 1797580.96
3005	731.32	N: 256613.32 E: 1797580.29
3006	731.32	N: 256646.17 E: 1797575.31
3007	731.32	N: 256646.17 E: 1797578.49
3008	731.43	N: 256655.06 E: 1797621.29
3009	731.64	N: 256632.48 E: 1797633.51
3010	731.91	N: 256621.31 E: 1797643.93
3011	732.02	N: 256611.48 E: 1797644.24
3012	731.66	N: 256610.54 E: 1797627.65
3013	731.32	N: 256615.01 E: 1797613.45
3014	731.09	N: 256607.95 E: 1797599.71
3015	730.65	N: 256598.64 E: 1797573.90
3016	730.48	N: 256611.42 E: 1797568.47
3017	730.02	N: 256648.73 E: 1797562.44
3018	730.27	N: 256656.13 E: 1797573.64
3019	730.75	N: 256653.66 E: 1797587.86

POINT LIST

POINT NUMBER	ELEVATION	NORTHING EASTING
3020	731.18	N: 256652.70 E: 1797606.35
3021	732.56	N: 256614.14 E: 1797666.79
3022	732.56	N: 256621.98 E: 1797665.20
3023	732.25	N: 256619.39 E: 1797652.46
3024	732.25	N: 256611.55 E: 1797654.05
3025	731.80	N: 256607.58 E: 1797634.35
3026	731.71	N: 256606.62 E: 1797629.44
3027	730.89	N: 256599.63 E: 1797587.77
3028	730.81	N: 256598.83 E: 1797582.83
3029	729.89	N: 256591.97 E: 1797545.73
3030	729.65	N: 256516.74 E: 1797558.07
3031	729.81	N: 256506.57 E: 1797559.73
3032	731.28	N: 256645.49 E: 1797574.63
4000	730.01	N: 256545.31 E: 1797552.80
4001	729.96	N: 256498.01 E: 1797560.99
4002	729.87	N: 256450.71 E: 1797569.19
4003	730.53	N: 256403.42 E: 1797577.38
4004	728.62	N: 256249.49 E: 1797618.82
4005	728.04	N: 256200.28 E: 1797627.68
4006	725.60	N: 256151.07 E: 1797636.54
4007	731.79	N: 256621.97 E: 1797638.59
4008	731.86	N: 256661.69 E: 1797634.73

STAKING PLAN
SCALE: 1"=30'



CONSULTANT	PRIM. ENG. AARON ANDERSON	CHELAN PUD NO. 1	SCALE	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
	2ND ENG. PRIM. ENG. COURT HILL		0	4/10/2015	BID SET	- VK
	DESIGNER 2ND ENG.		REV	DATE	REVISION	REQ. RY DRFT
	APPROVAL PROJ. MGR.					

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

DOROQA STATE PARK
GROUP CAMP IMPROVEMENTS
STAKING PLAN
BID NO. 15-04

SHEET C10 OF C10
REVISION 0
DATE 4/10/2015
DWG. 0908-50CI-0024

ORIG. DRAWN PED

ABBREVIATIONS

<	Angle	LAM.	Laminate
⊕	Centerline	LAV.	Lavatory
∅	Diameter or Round	LT.	Light
⊕	Square Existing	MAS.	Masonry
⊕	Property Line	MATL.	Material
A.B.	Anchor Bolt	MAX.	Maximum
A.C.P.	Asphaltic Conc. Paving	MECH.	Mechanical
A.D.	Area Drain	MFR.	Manufacturer
ADJ.	Adjustable	MH.	Manhole
AL.	Aluminum	MIN.	Minimum
ALT.	Alternate	MISC.	Miscellaneous
APPROX.	Approximate	M.O.	Mas. Opening
ARCH.	Architectural	M.R.	Mirror
A.T.	Acoustical Tile	MTD.	Mounted
A.W.P.	Acoustical Wall Panel	MTL.	Metal
BD.	Board	N.	North
BLDG.	Building	N.I.C.	Not in Contract
BLKG.	Blocking	NOM.	Nominal
B.M.	Bench Mark	N.T.S.	Not to Scale
C.A.B.	Cement Asbestos Board	O.C.	On Center
C.B.	Catch Basin	O.D.	Outside Dia.
C.H.	Coat Hook	OFCI	Owner Furn. Contr. Install
C.I.P.	Cast in Place	OFOI	Owner Furn. Owner Install
C.J.	Control Joint	OPNG.	Opening
CLG.	Ceiling	OPP.	Opposite
CLR.	Clear	P.B.	Particle Board
CMU	Conc. Masonry Unit	PC.	Precast
C.O.	Clean out	PIP.	Poured in Place
COL.	Column	PL.	Plate
CONC.	Concrete	P. LAM.	Plastic Laminate
CONN.	Connection	PLAS.	Plaster
CONST.	Construct(ion)	PLYWD.	Plywood
CONT.	Continuous	PR.	Pair
DBL.	Double	P.T.	Pressure Treated
D.F.	Drinking Fountain	P.T.D.	Paper Towel Disp.
DIA.	Diameter	R.D.	Roof Drain
DIM.	Dimension	REF.	Reference
DISP.	Dispenser	REINF.	Reinforced
DN.	Down	REQ'D.	Required
DR.	Door	RESIL.	Resilient
D.S.	Down spout	RH.	Robe Hook
DTL.	Detail	RM.	Room
DW.	Drywell	R.O.	Rough Opening
DWG.	Drawing	R.W.L.	Rain Water Leader
DWR.	Drawer	S.	South
E.	East	S.C.	Solid Core
E.A.	Each	SCHED.	Schedule
E.J.	Expansion Joint	S.D.	Soap Dispenser
ELECT.	Electrical	SECT.	Section
ELEV.	Elevator	SHT.	Sheet
EQ.	Equal	S.J.	Slab Joint
EQUIP.	Equipment	SIM.	Similar
EXIST.	Existing	S.N.D.	Sanitary Napkin Dispenser
EXP.	Expansion	S.N.R.	Sanitary Napkin Receptacle
EXT.	Exterior	SPEC.	Specification
F.A.	Fire Alarm	SQ.	Square
F.D.	Floor Drain	STD.	Standard
F.E.	Fire Extinguisher	STL.	Steel
F.E.C.	Fire Exting.Cab	STOR.	Storage
FIN.	Finish	STRCT.	Structural
FLASH.	Flashing	SUSP.	Suspended
FLR.	Floor	SYM.	Symmetrical
FRP.	Fiberglass Reinf. Panel	S.S.	Sanitary Sewer
FLUOR.	Fluorescent	T.B.	Towel Bar
FND.	Foundation	T.C.	Top of Curb
F.O.C.	Face of Conc.	TEL.	Telephone
F.O.S.	Face of Studs	T.O.C.	Top of Concrete
FT.	Foot or Feet	T.P.D.	Toilet Paper Dispenser
FTG.	Footing	TSC	Toilet Seat Cover Disp.
GA.	Gauge	TYP.	Typical
GALV.	Galvanized	U	Urinal
G.B.	Grab Bar	U.O.N.	Unless Otherwise Noted
GND.	Ground	V.	Vent
G.W.B.	Gypsum Wallboard	V.B.	Vapor Barrier
HB.	Hose Bibb	VERT.	Vertical
HCP.	Handicapped	VTR	Vent Through Roof
H.C.	Hollow Core	W.	Waste Vent
HDW.	Hardware	W/	With
HGT.	Height	W.C.	Water Closet
H.M.	Hollow Metal	W.H.	Water Heater
HORIZ.	Horizontal	W/O	Without
I.D.	Inside Diameter	W.W.F.	Welded Wire Fabric
INSUL.	Insulation		
INT.	Interior		

ARCHITECTURAL SYMBOLS

	PROPERTY LINE / CORNER
$+ (12.50)$	EXISTING POINT ELEVATION (To Remain)
$+ 12.50$	FINISH POINT ELEVATION
UTILITY LINES:	
	NATURAL GAS
	WATER
	UNDERGROUND ELECTRICAL
	OVERHEAD ELECTRICAL/COMMUNICATIONS
	SANITARY SEWER
	STORM DRAIN
	UNDERGROUND TELEPHONE/COMMUNICATIONS
	FENCE
	N. North
	INVISIBLE LINE ABOVE
	INVISIBLE LINE BELOW
	LINE to be REMOVED
	CENTER LINE
	FINISH FLOOR, BEARING, or Building Line
	GRID LINE
	DOOR NUMBER
	WINDOW NUMBER KEY (on Plan)
	INTERIOR ELEVATION NUMBER
	DETAIL KEY
0908-05AR-XXXX	Detail No. Where Found if on Different Sheet or Dash if found on Same Sheet
	DETAIL SCALE
	BUILDING SECTION KEY
0908-05AR-XXXX	Detail No. Where Found if on Different Sheet or Dash if found on Same Sheet
	WALL SECTION KEY
0908-05AR-XXXX	Detail No. Where Found if on Different Sheet or Dash if found on Same Sheet
	EQUIP
0908-05AR-XXXX	Room Number (Elev. Number) (Name on Tail with Number)
	NOTE KEY
	PARTITION KEY
	CABINET KEY
	ASPHALTIC CONCRETE PAVEMENT (As Noted)
	CONCRETE WALK OR SURFACE (As Noted)
	MASONRY SURFACE (As Noted)
	CONCRETE WALL (PLAN)
	BRICK MASONRY WALL (PLAN)
	CONCRETE MASONRY UNIT WALL
	FRAME WALL (PLAN)
	MAIN BEARING POINT in WALL (Member as Indicated)
	1 HOUR WALL
IN DETAIL-SECTION:	
	WOOD FRAMING MEMBER (Nominal Size Noted)
	WOOD BLOCKING MEMBER (Nominal Size Noted)
	WOOD FINISH MEMBER (Net Size Noted)
	PLYWOOD
	PARTICLE BOARD
	INSULATION, RIGID
	SPRAY FOAM INSULATION
	METAL
	GYPSUM BD / PLASTER / CEMENT BOARD
	INSULATION, BATT AND/OR LOOSE FILL
	TILE
	ASPHALTIC PAVEMENT
	CONCRETE
	EARTH (SECTION)

VICINITY MAP



GENERAL NOTES

- ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES, THE MORE STRINGENT IS TO GOVERN; DISCREPANCIES BETWEEN CONTRACT DOCUMENTS AND CODES SHALL BE BROUGHT TO THE DISTRICT'S ATTENTION PROMPTLY AND A RESOLUTION OBTAINED BEFORE PROCEEDING.
- DRAWINGS ARE NOT TO BE SCALED. DIMENSIONAL DATA SHALL BE OBTAINED FROM WRITTEN INFORMATION ONLY. VERIFY ALL DIMENSIONS BEFORE PROCEEDING. ANY DIMENSIONAL DEVIATION FROM THAT SHOWN ON THE DRAWINGS OR AS EXISTING, WHICH MAY EFFECT THE INTENT OF THE DESIGN OR PROPER INCORPORATION OF ELEMENTS, SHALL BE BROUGHT TO THE DISTRICT'S ATTENTION PROMPTLY AND A RESOLUTION OBTAINED BEFORE PROCEEDING.
- THE DISTRICT SHALL BE INFORMED IMMEDIATELY OF ANY DISCREPANCY BETWEEN THE CONTRACT DOCUMENTS AND THE EXISTING SITE CONDITIONS.
- THE TERM "FINISHED FLOOR" (FIN. FLR.) REFERS TO THE TOP OF THE TOP OF CONC. SLAB.
- EXTERIOR DIMENSIONS ARE TO THE FACE OF MASONRY OR FACE OF CONCRETE UNLESS OTHERWISE NOTED. INTERIOR DIMENSIONS ARE TO THE FACE OF FRAMING, UNLESS INDICATED AS A CENTERLINE OR SPECIFICALLY NOTED OTHERWISE. CLEAR DIMENSIONS SHALL BE FROM FINISH TO FINISH.
- NOTATIONS OR DETAILS KEYED TO VARIOUS DRAWING SYMBOLS, PATTERNS, ETC. SHALL APPLY TYPICALLY TO ALL SIMILARLY INDICATED ITEMS, LOCATIONS, OR CONDITIONS NOT OTHERWISE KEYED.
- PRESERVE AND PROTECT EXISTING UTILITIES AND LANDSCAPING THAT MAY BE PRESENT ARE NOT SUBJECT OR SCHEDULED TO BE CHANGED

PROJECT INFORMATION

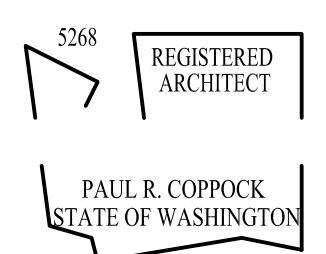
JOB ADDRESS — Daroga STATE PARK
 1 South Daroga Park Road
 Orondo, WA 98843

OWNER:
 P.U.D. No.1 OF CHELAN COUNTY
 327 N. WENATCHEE AVE.
 WENATCHEE, WA 98801

ASSESSOR'S PARCEL NO.
 26213310001

SHEET INDEX

0908-50AR-0001	LEGEND, ABBREVIATIONS & NOTES
0908-50AR-0002	FLOOR PLAN
0908-50AR-0003	EXTERIOR ELEVATIONS
0908-50AR-0004	BUILDING SECTIONS
0908-50AR-0005	WALL SECTIONS
0908-50AR-0006	INTERIOR ELEVATIONS
0908-50AR-0007	ARCHITECTURAL DETAILS 1
0908-50AR-0008	ARCHITECTURAL DETAILS 2



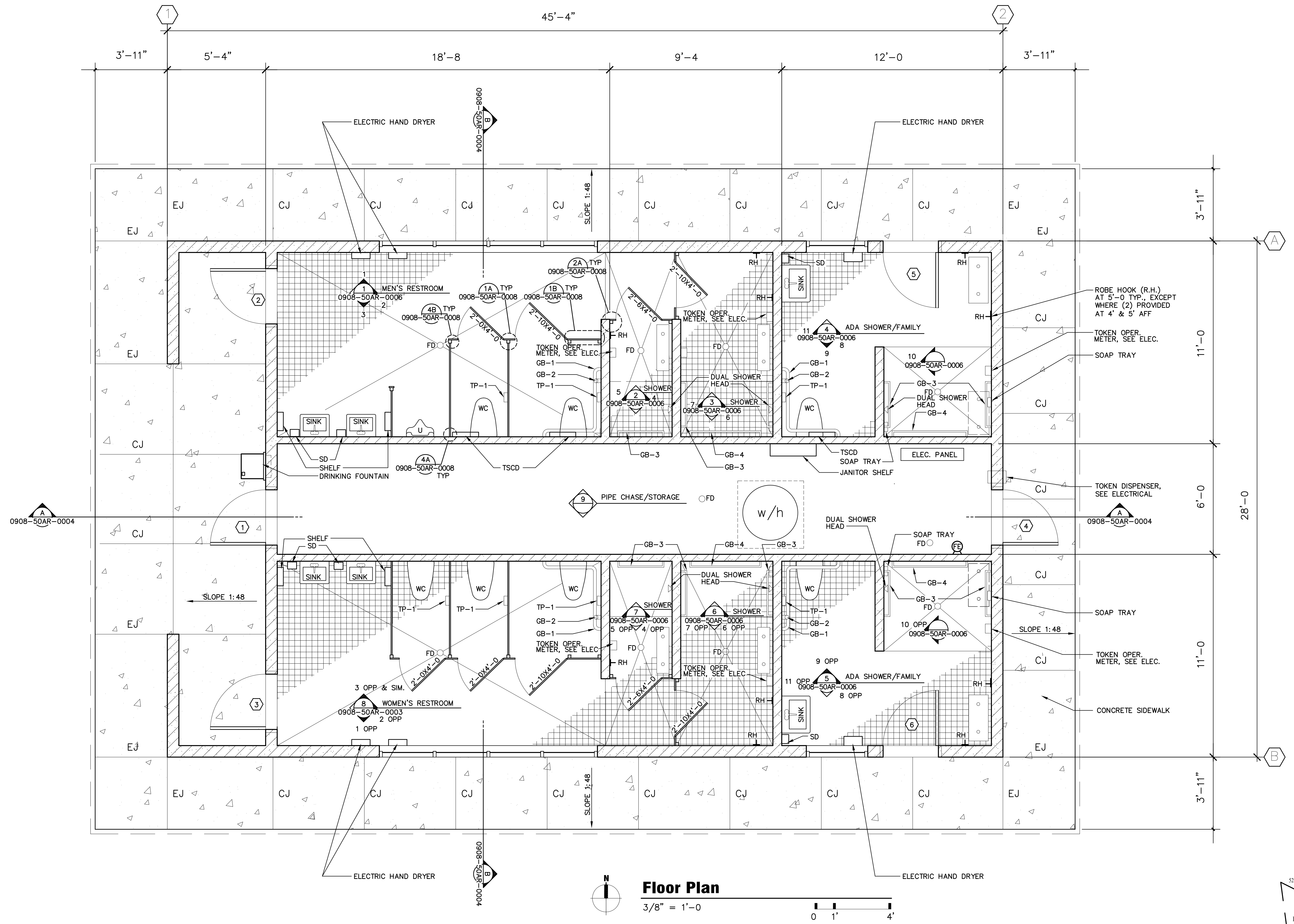
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APPROVAL	PROJ. MGR. COURT HILL	BID SET	
		REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY		WENATCHEE, WASHINGTON	
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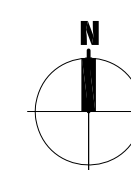
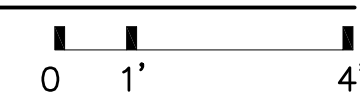
Daroga State Park GROUP CAMP IMPROVEMENTS	
LEGEND, ABBREVIATIONS & NOTES	
BID NO. 15-04	

SHEET A1 OF A8
REVISION 0
DATE 4/10/15
DWG. 0908-50AR-0001



Floor Plan

3/8" = 1'-0"



5268 REGISTERED ARCHITECT
PAUL R. COPPOCK
STATE OF WASHINGTON



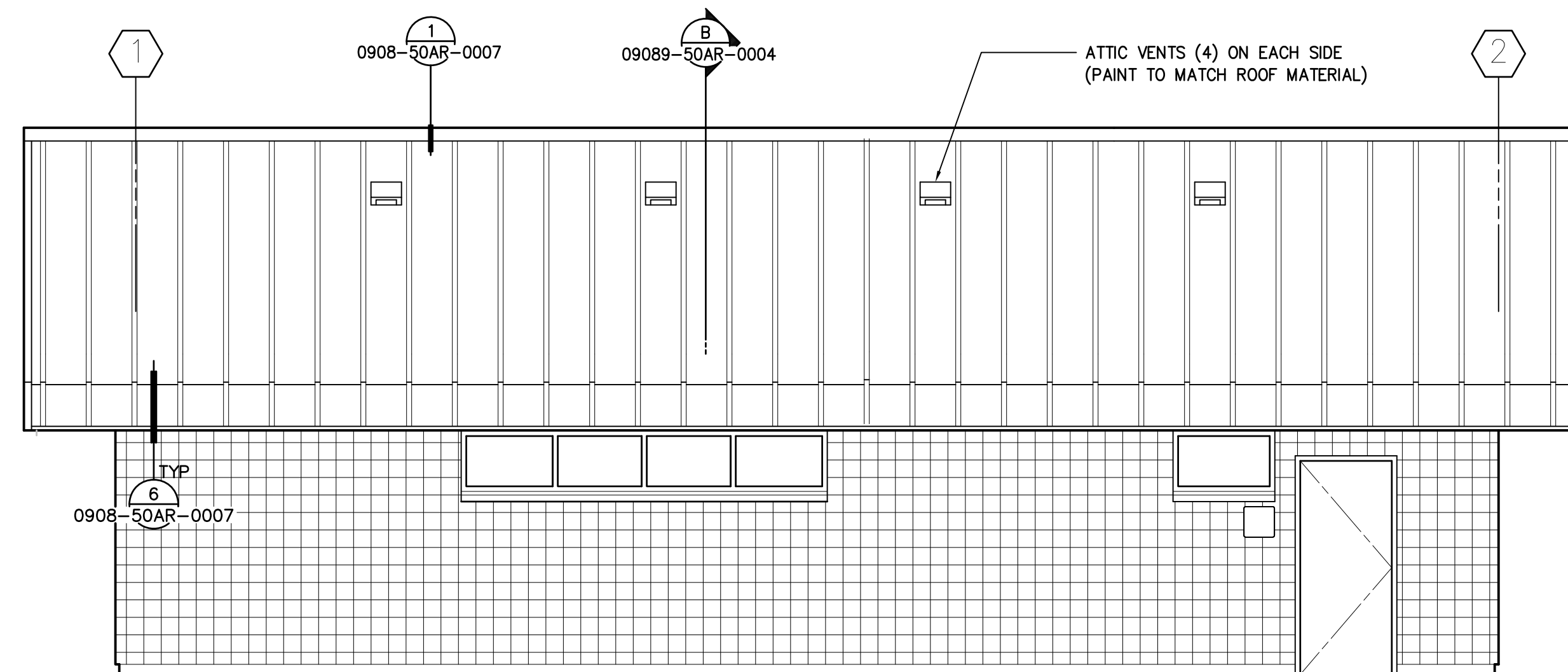
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	DESIGNER	2ND ENG.
	APPROVAL	PROJ. MGR. COURT HILL

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REV	DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

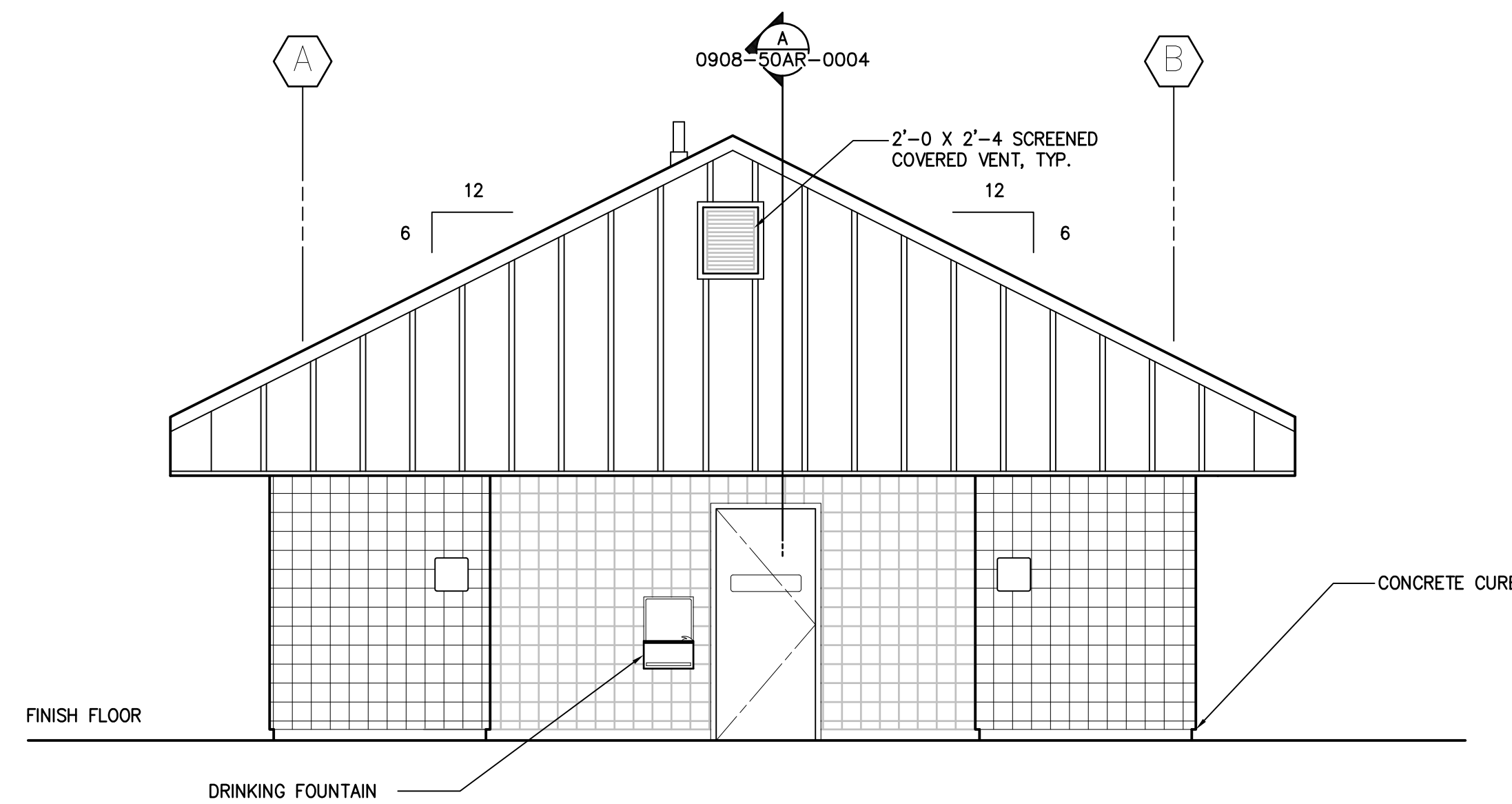
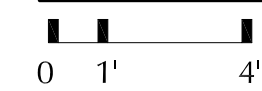
Daroga State Park
GROUP CAMP IMPROVEMENTS
FLOOR PLAN
BID NO. 15-04

SHEET A2 OF A8
REVISION 0
DATE 4/10/15
DWG. 0908-50AR-0002

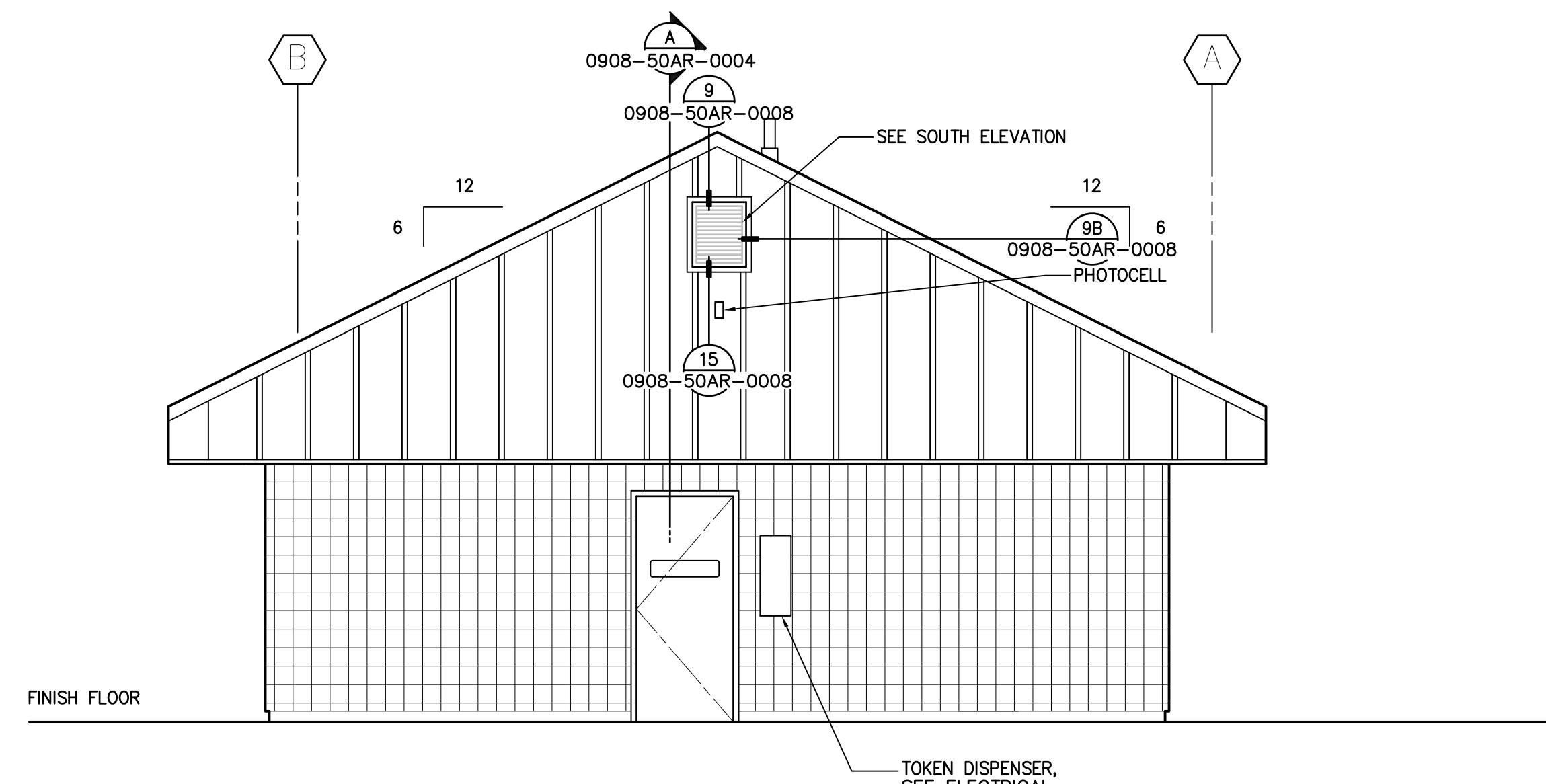
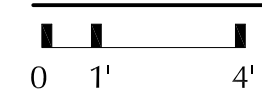


FINISH FLOOR

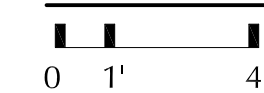
South Elevation (North Elevation Opp)



West Elevation



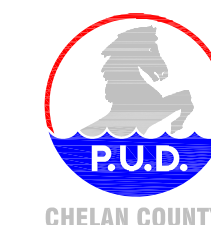
East Elevation



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	2ND ENG.	PRIM. ENG.
	DESIGNER	2ND ENG.
	APPROVAL	PROJ. MGR. COURT HILL

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0	1'	0	1"	
REV	DATE	REVISION	REQ. BY	DRFT
	4/10/15	BID SET		

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON



Daroga State Park
GROUP CAMP IMPROVEMENTS
EXTERIOR ELEVATIONS
BID NO. 15-04

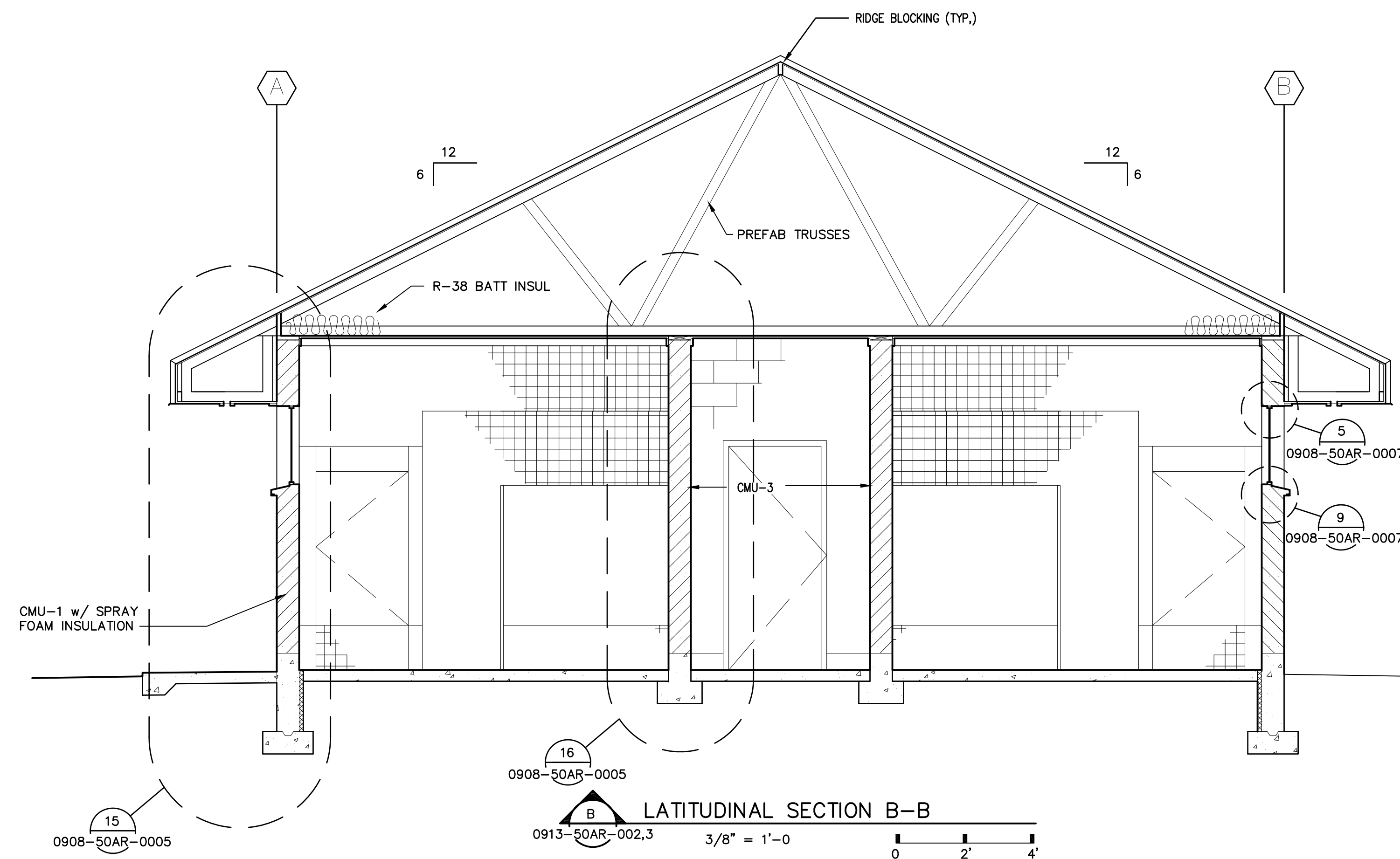
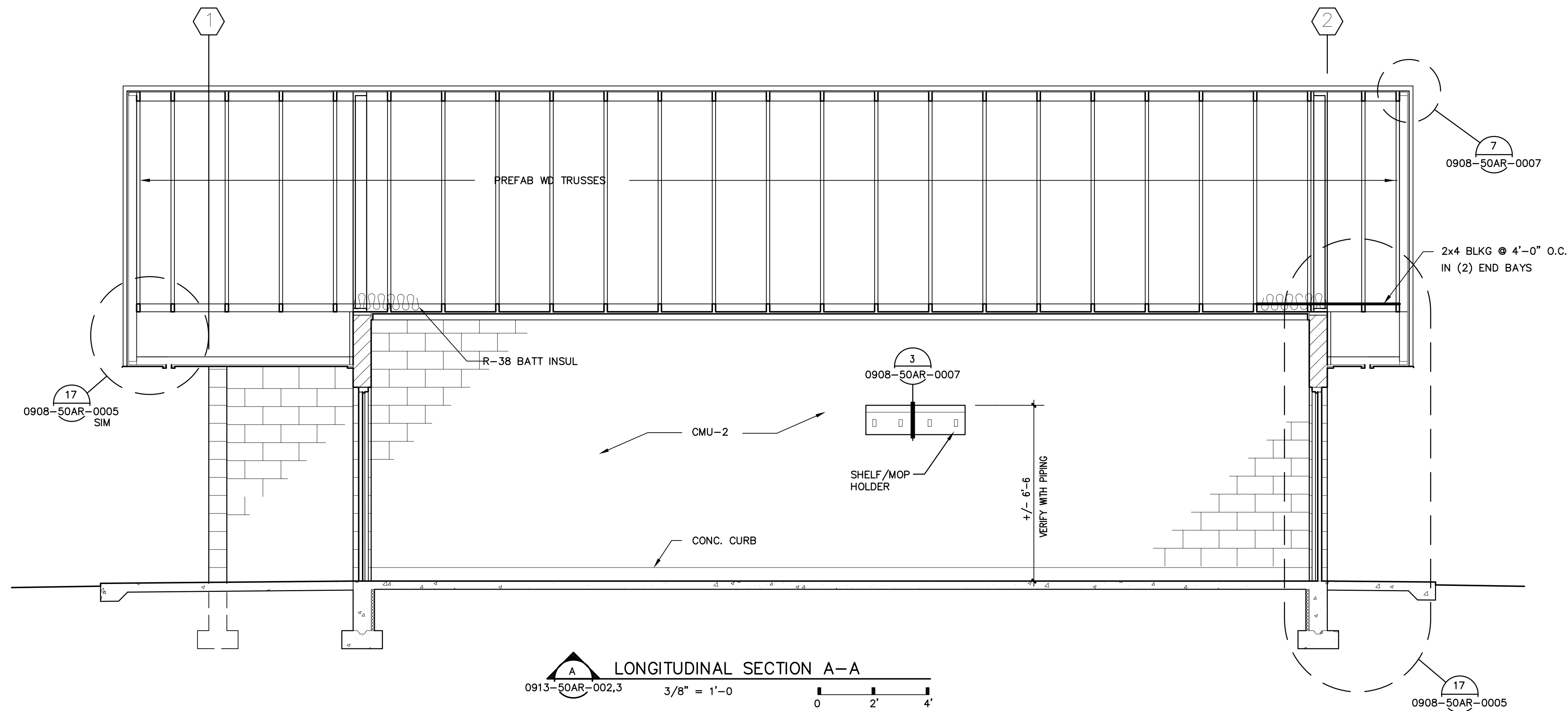
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DWG. 0908-50AR-0003

DOCUMENT CLASS:

ID:

ORIGINAL DWG. #:

ORIG. DATE
ORIG. DRAWN



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DESIGNER DOH	2ND ENG.	
APPROVAL	PROJ. MGR.	COURT HILL

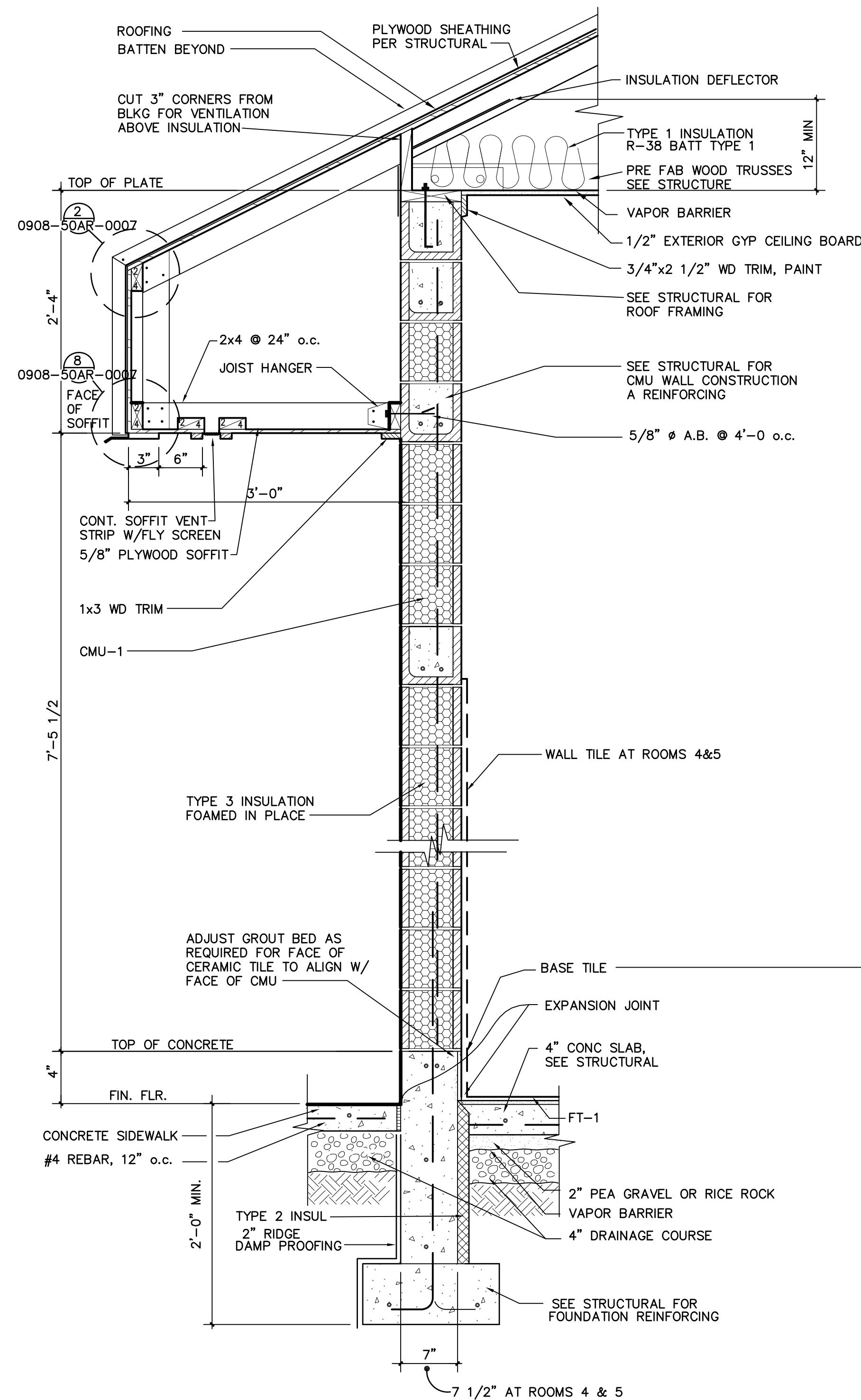
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PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

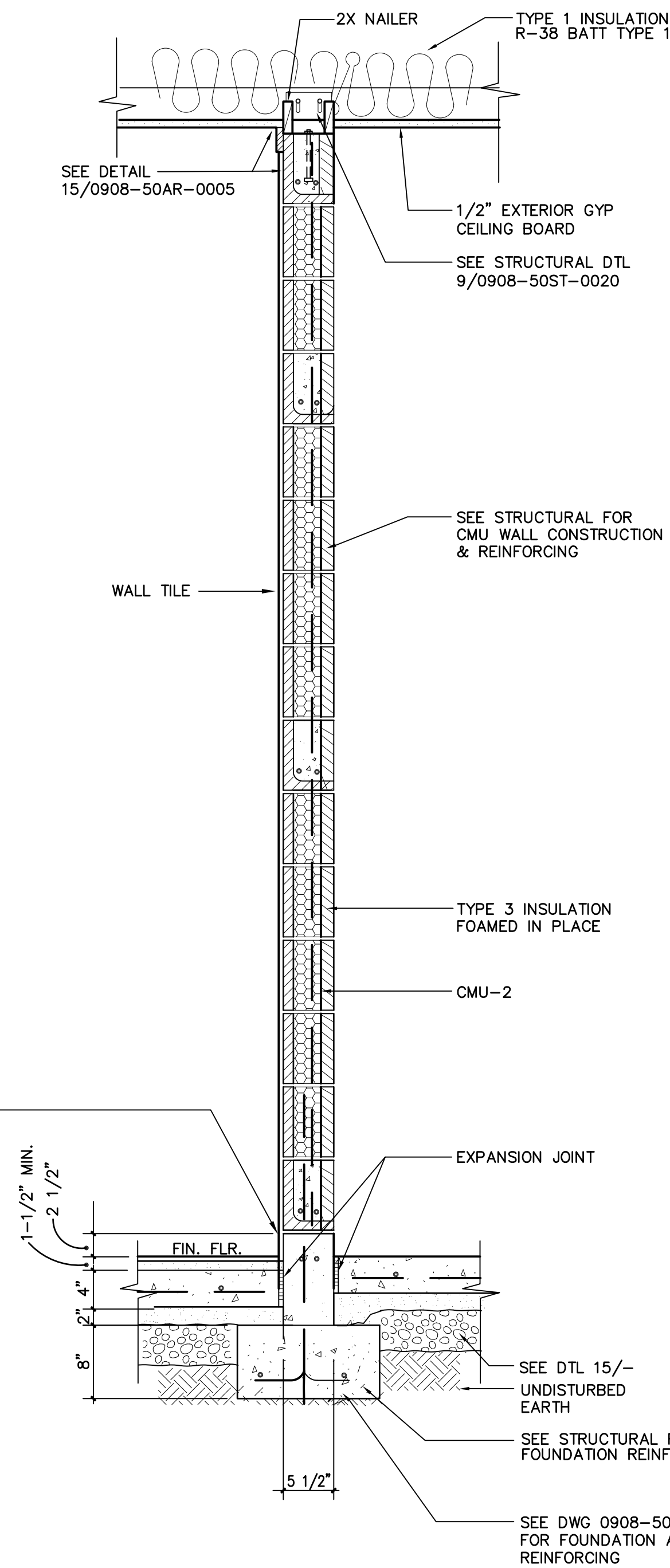
Daroga State Park
 GROUP CAMP IMPROVEMENTS
 BUILDING SECTIONS
 BID NO. 15-04

SHEET A4 OF A8
REVISION 0
DATE 4/10/15
DWG. 0908-50AR-0004

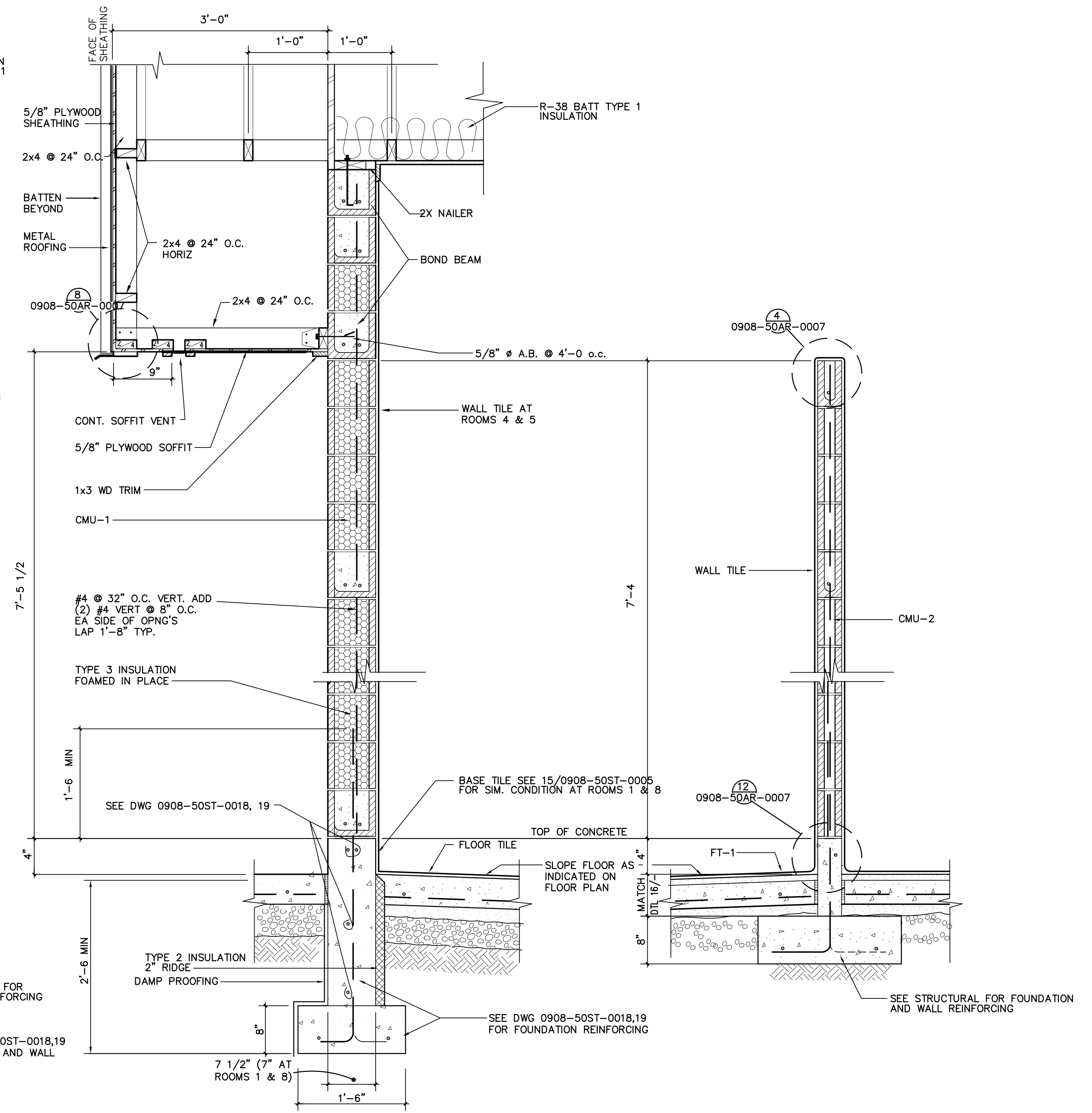
5268 REGISTERED ARCHITECT
 PAUL R. COPPOCK
 STATE OF WASHINGTON



(15) WALL SECTION
0908-50AR-0004 SCALE: 1" = 1'-0"
TYP. EXTERIOR
0 3" 6" 1'

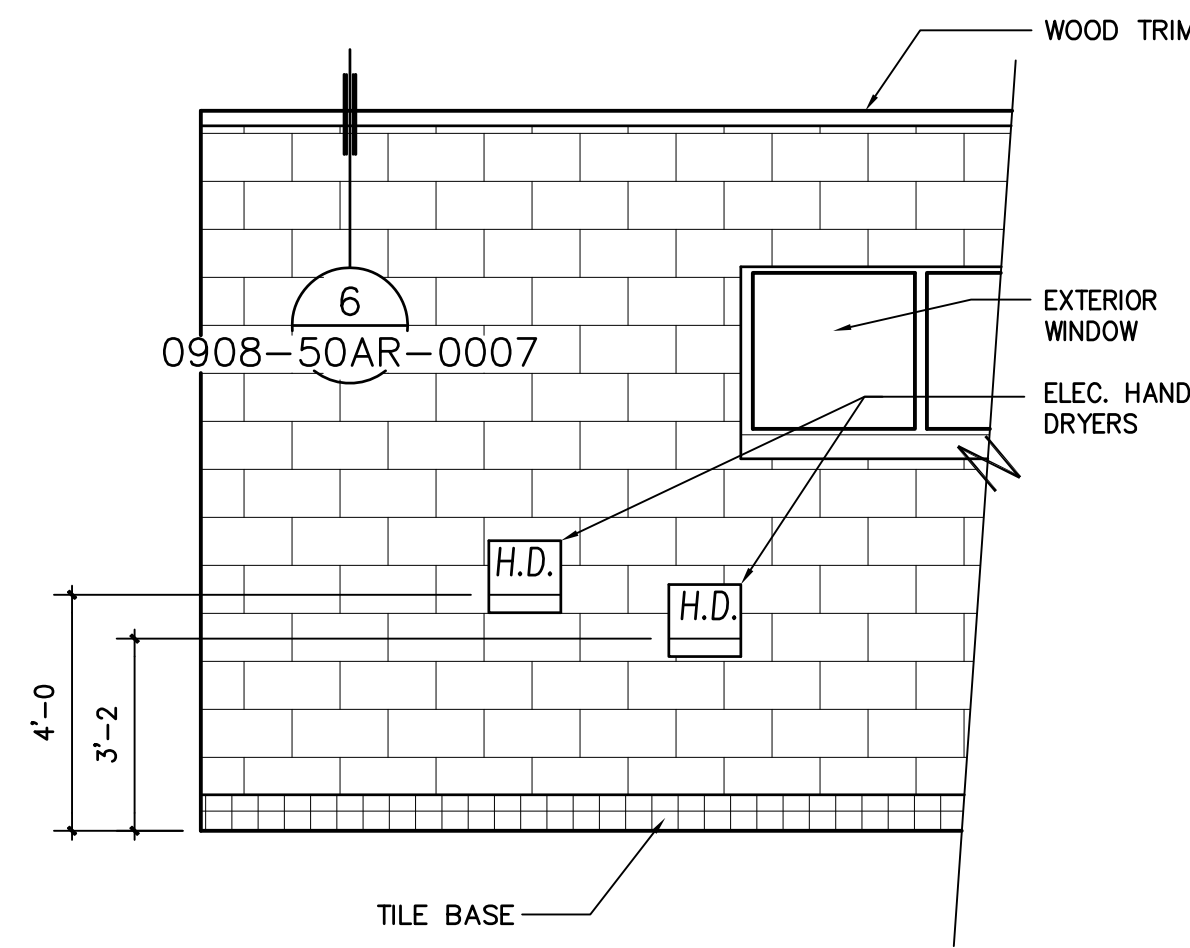


(16) INTERIOR WALL
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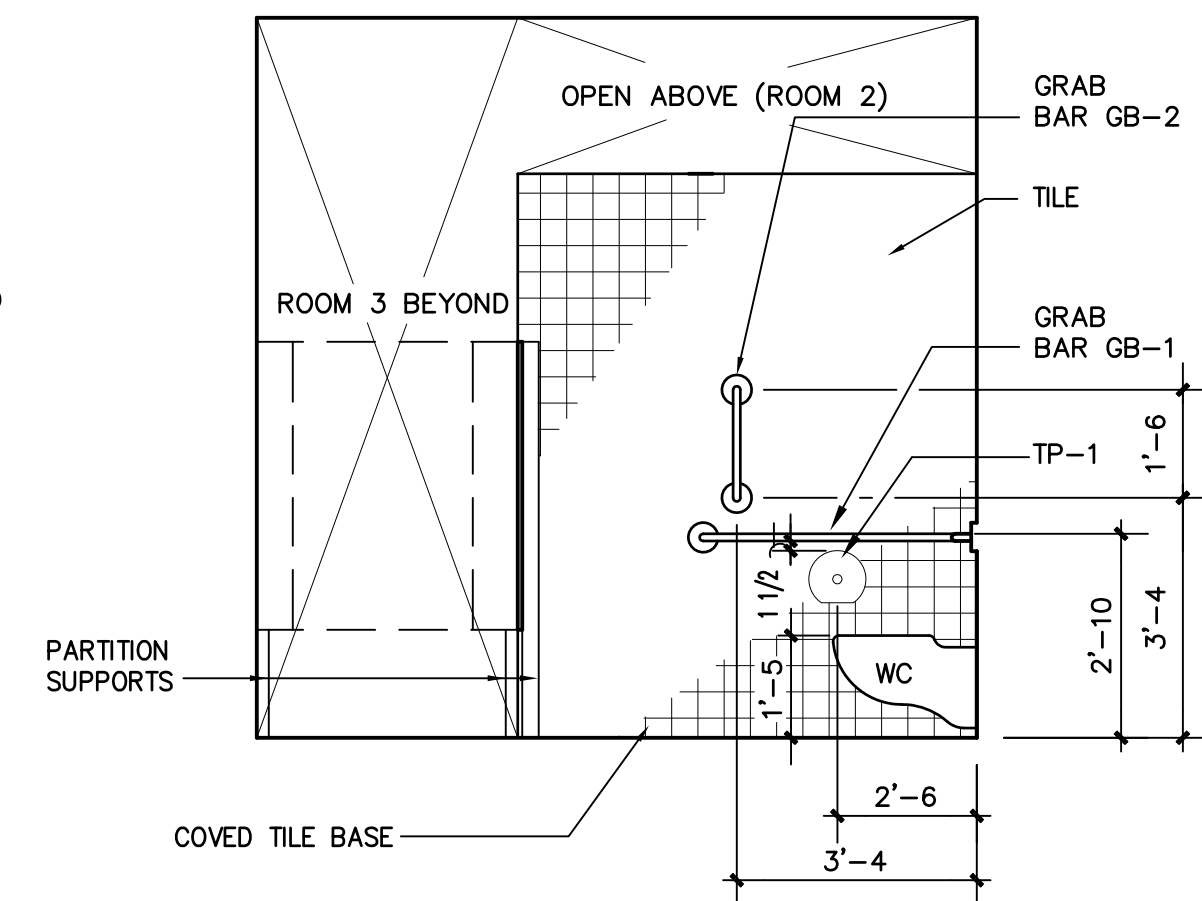


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TYP. EXTERIOR
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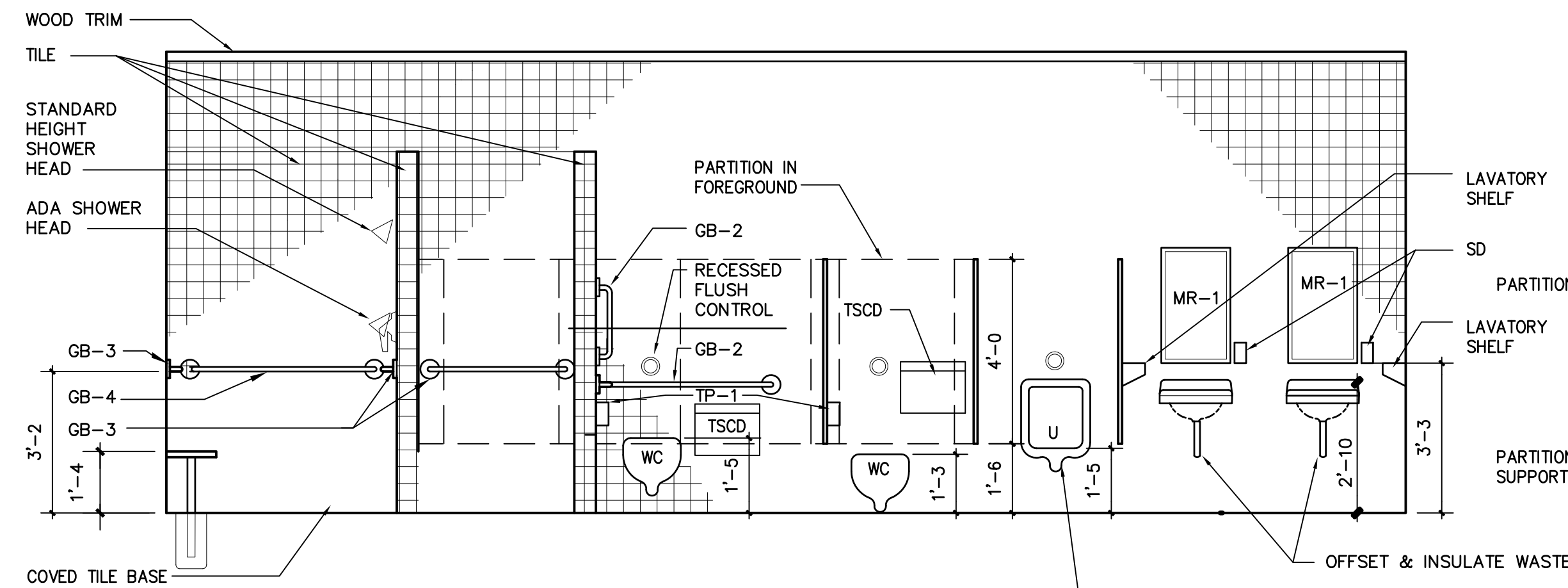
(18) SHOWER WALL
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0 3" 6" 1'



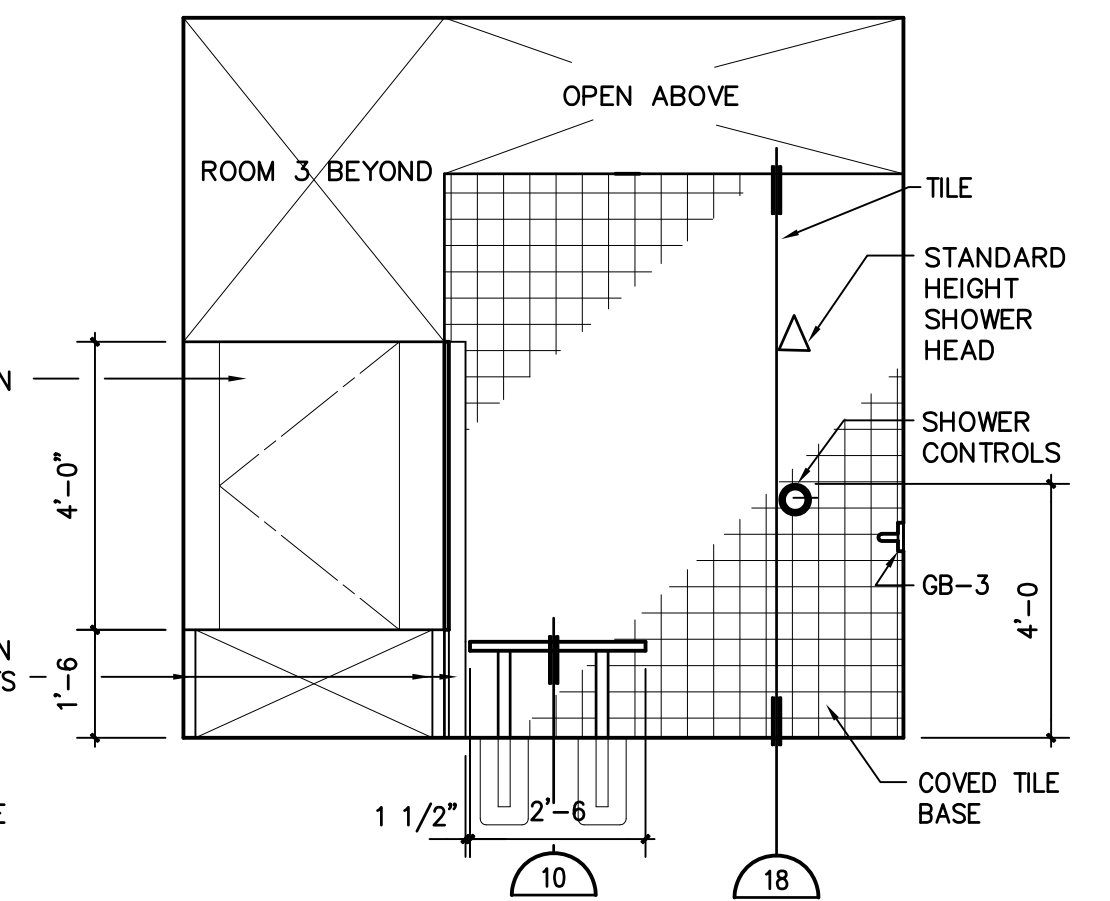
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3/8" = 1'-0"
0 2' 4' 8'



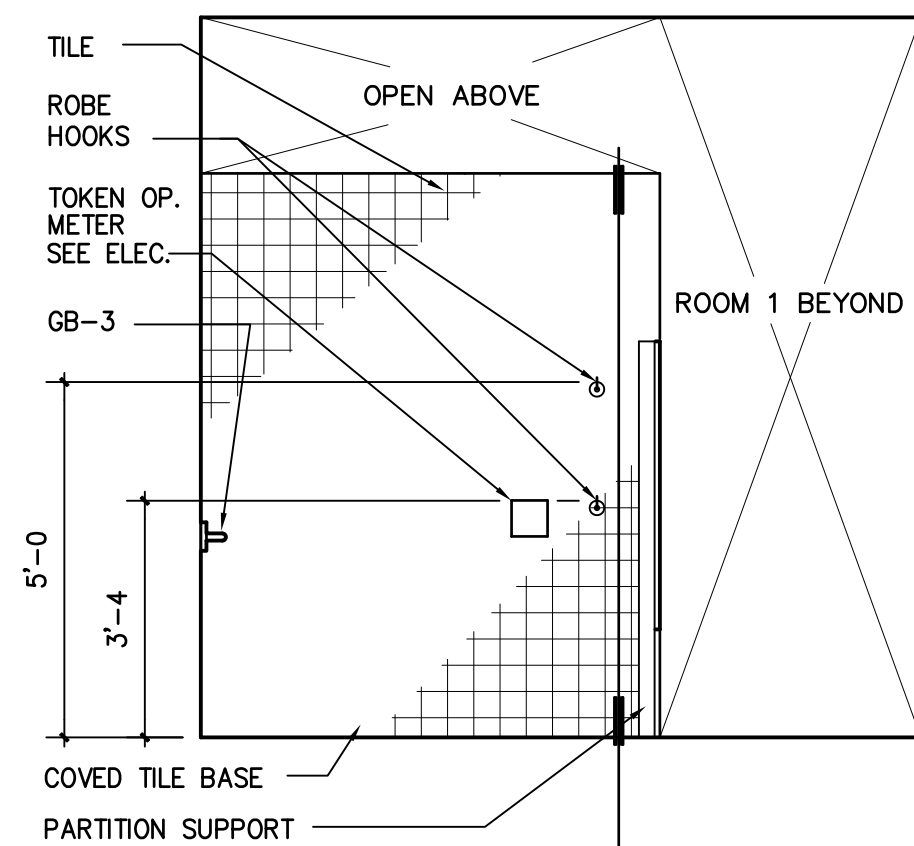
Men's RR 1 - East Elevation
3/8" = 1'-0"
0 2' 4' 8'



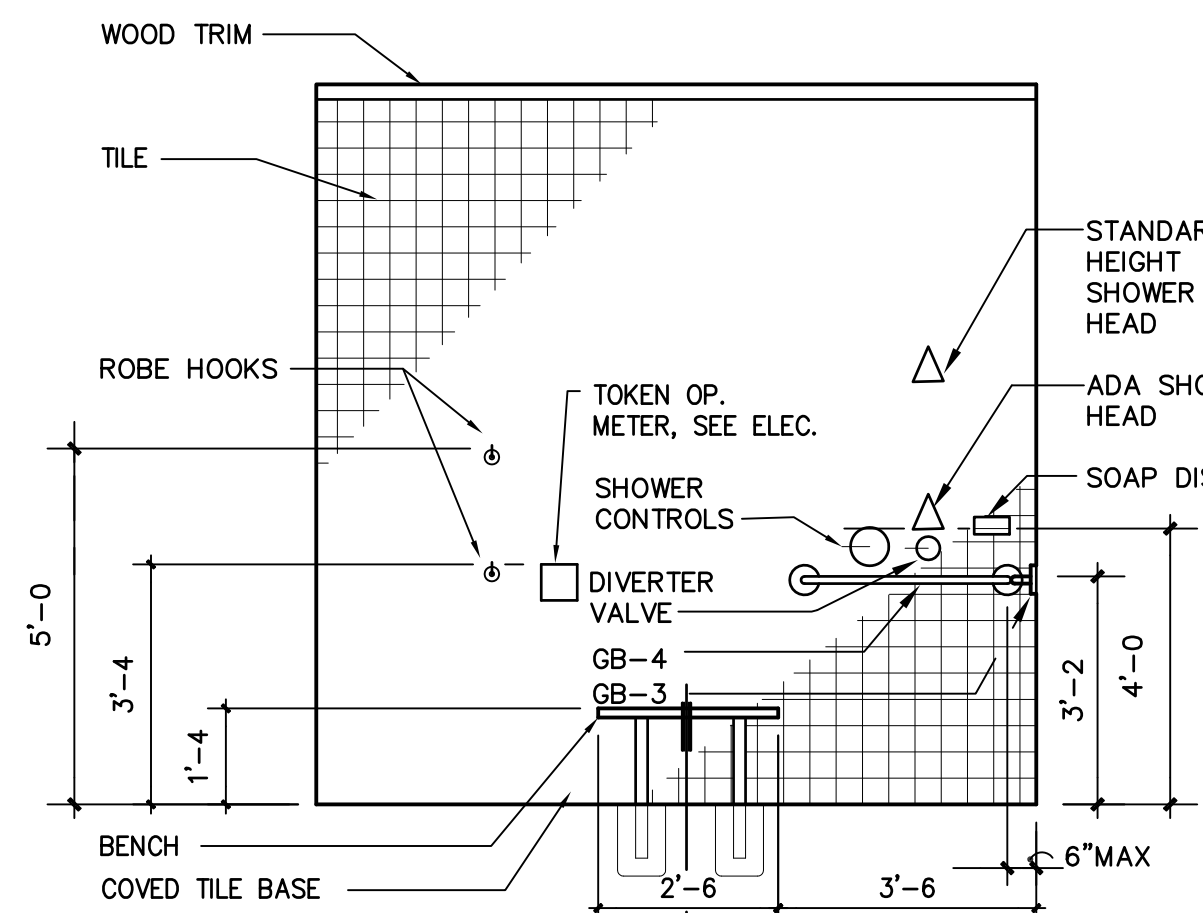
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0 2' 4' 8'



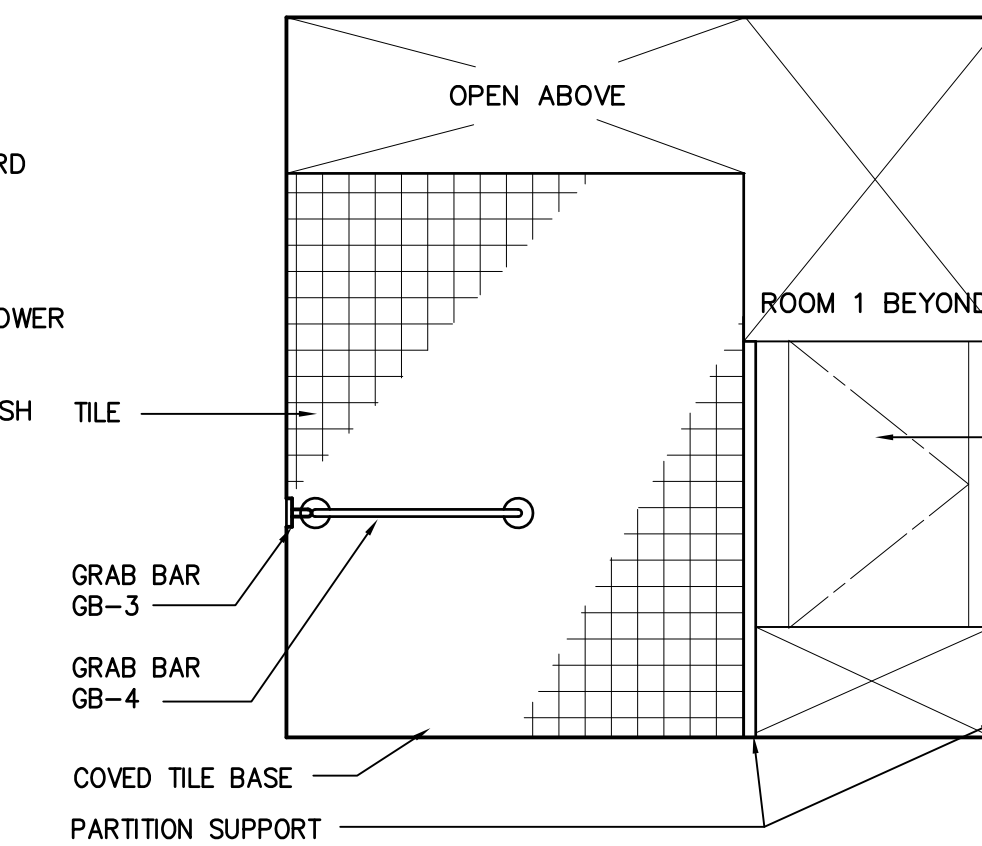
Men's Shower 2 - East Elevation
3/8" = 1'-0"
0 2' 4' 8'



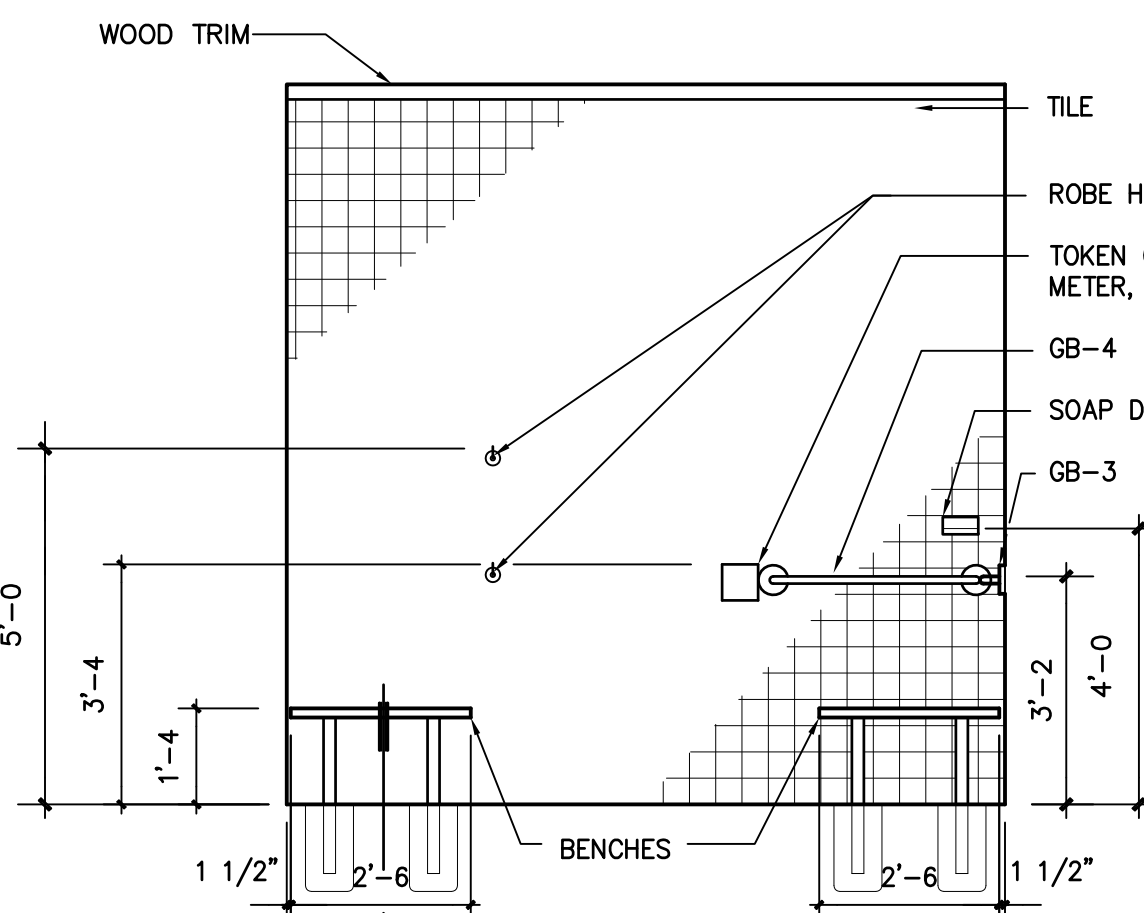
Men's Shower 2 - West Elevation
3/8" = 1'-0"
0 2' 4' 8'



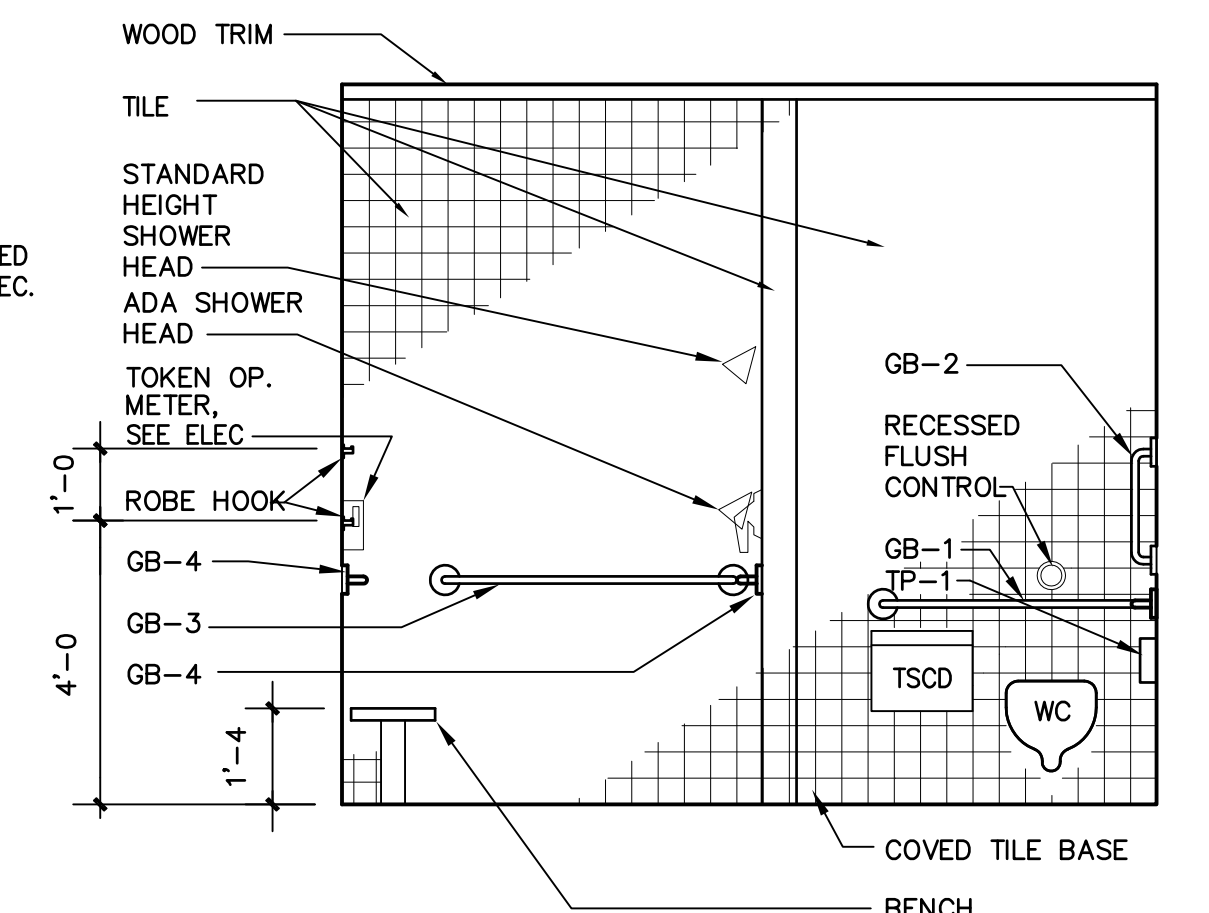
Men's Shower 3 - East Elevation
3/8" = 1'-0"
0 2' 4' 8'



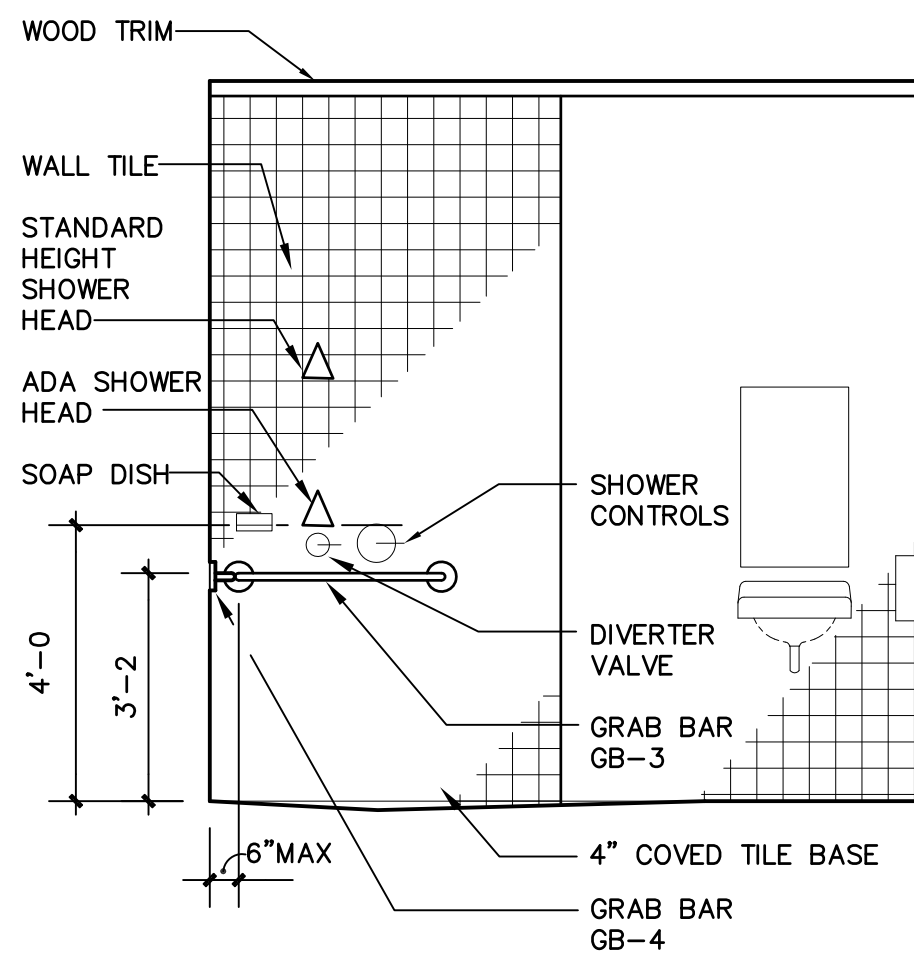
Men's RR 3 - West Elevation
3/8" = 1'-0"
0 2' 4' 8'



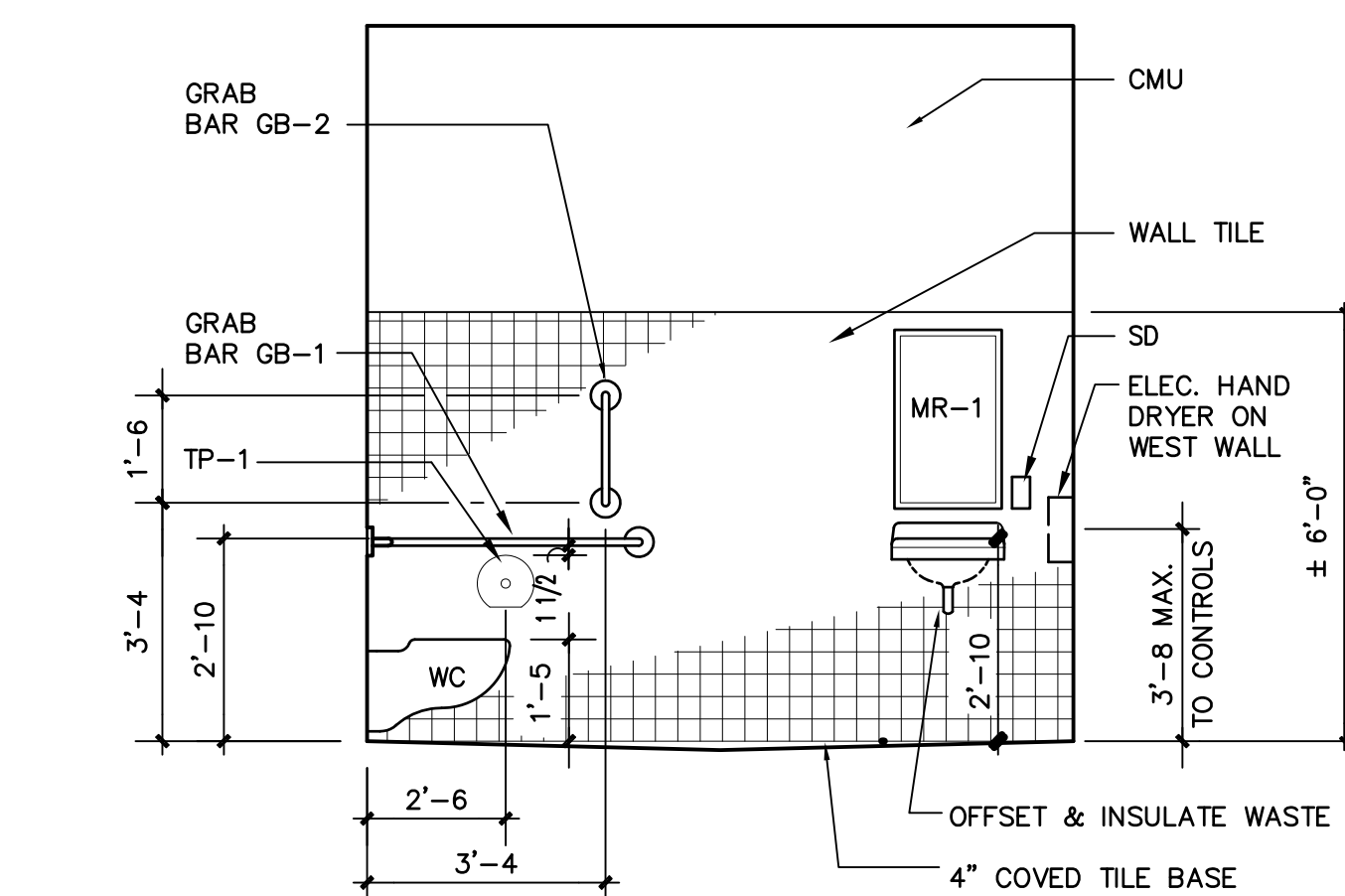
ADA Shower 4 - East Elevation
3/8" = 1'-0"
0 2' 4' 8'



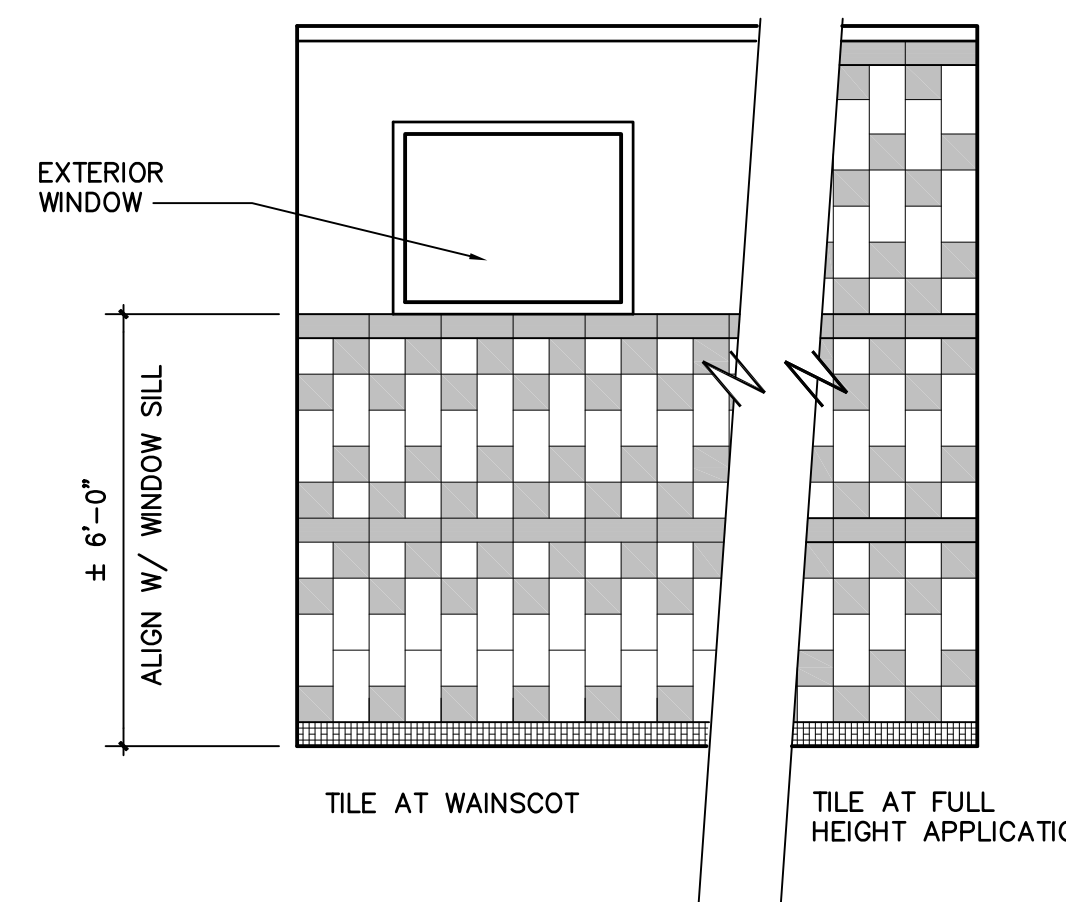
ADA Shower 4 - South Elevation
3/8" = 1'-0"
0 2' 4' 8'



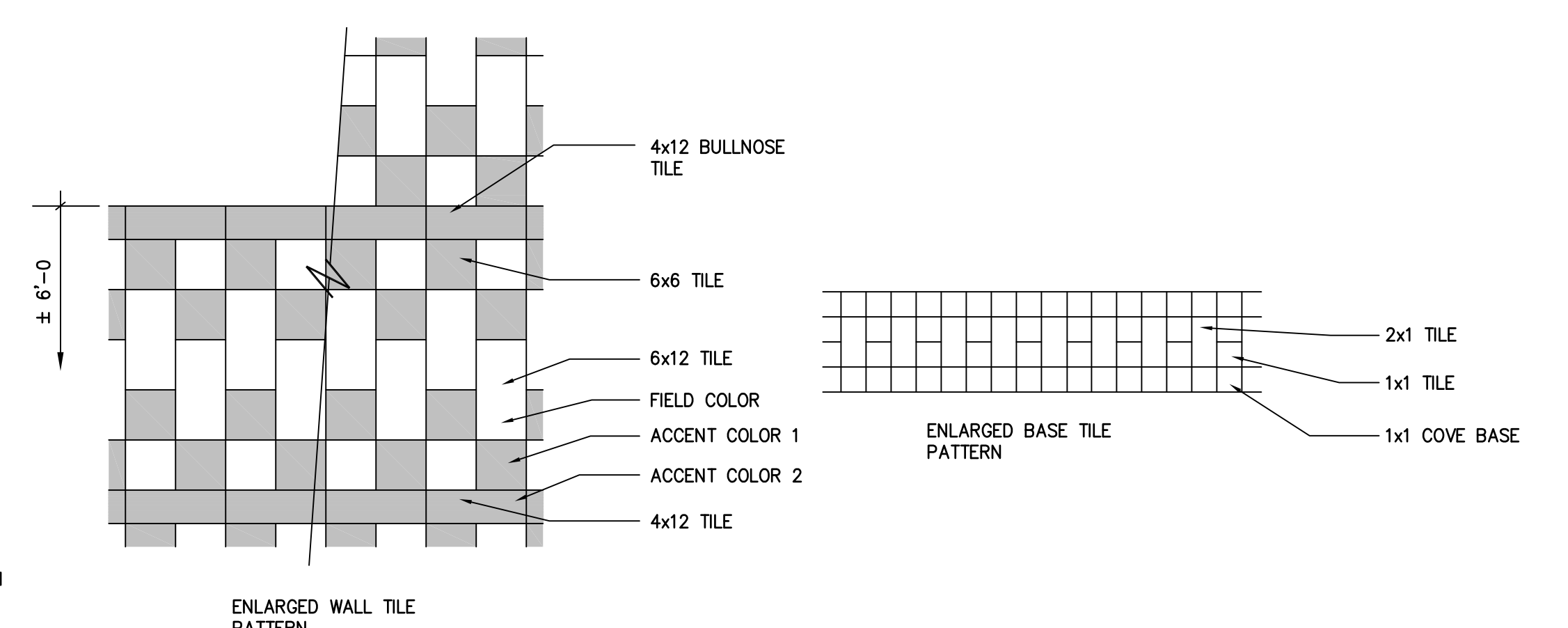
ADA Shower 4 - West Elevation A
3/8" = 1'-0"
0 2' 4' 8'



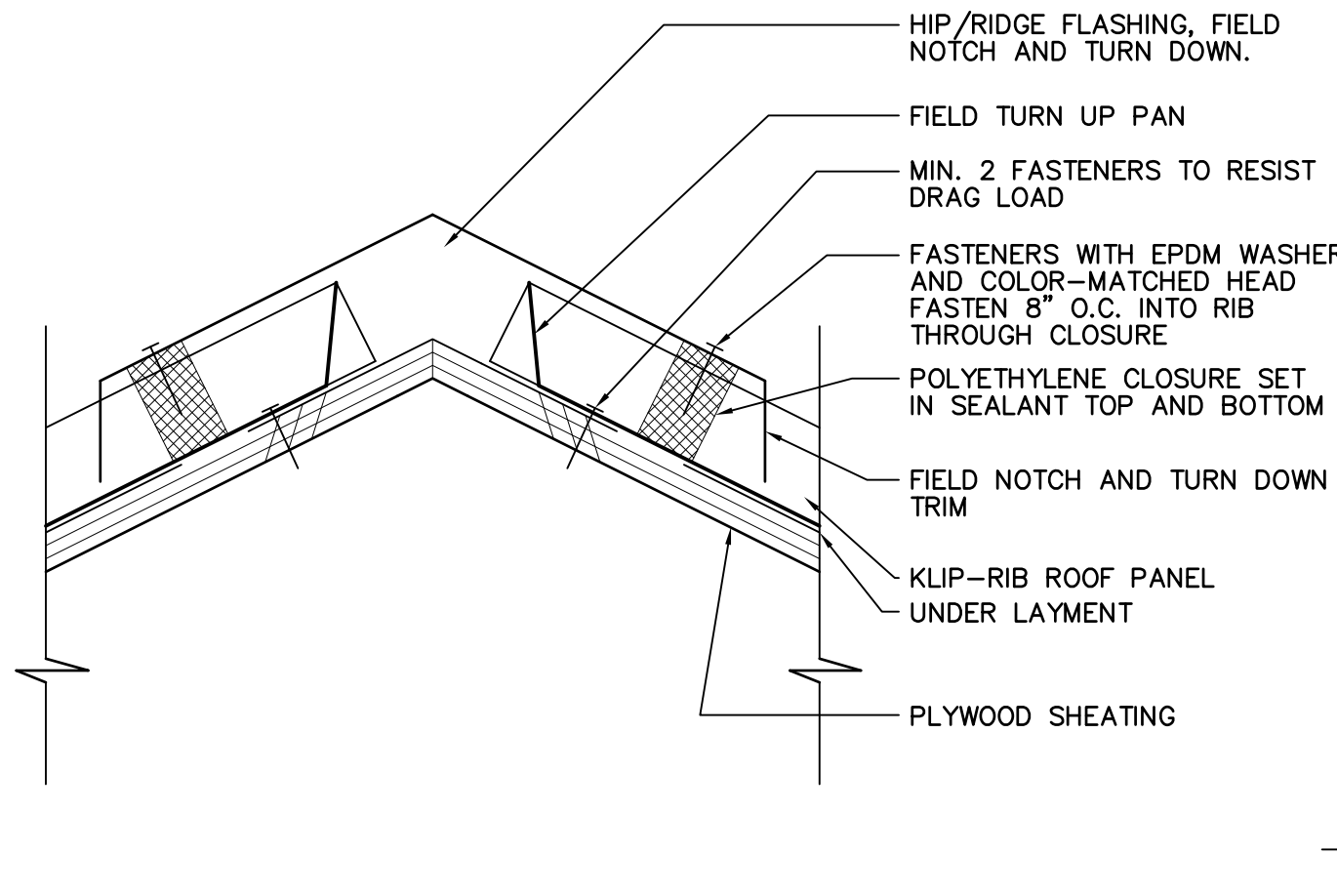
ADA Shower 4 - West Elevation B
3/8" = 1'-0"
0 2' 4' 8'



Tile Pattern
3/8" = 1'-0"
0 2' 4' 8'

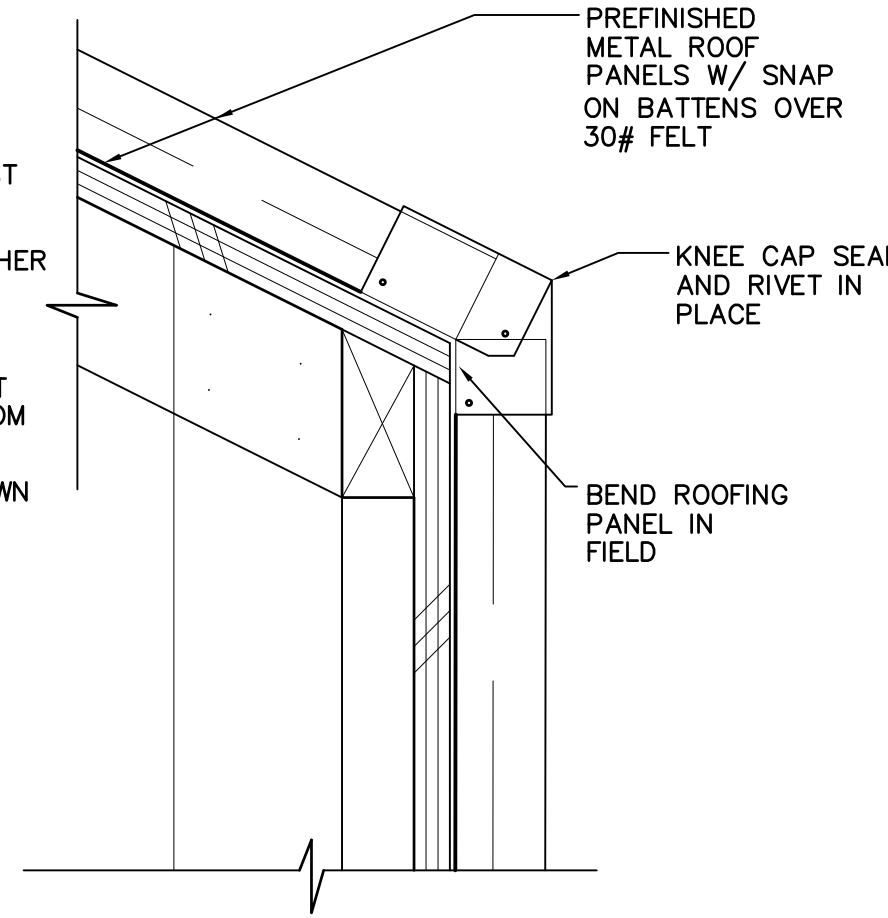


Enlarged Wall Tile Pattern



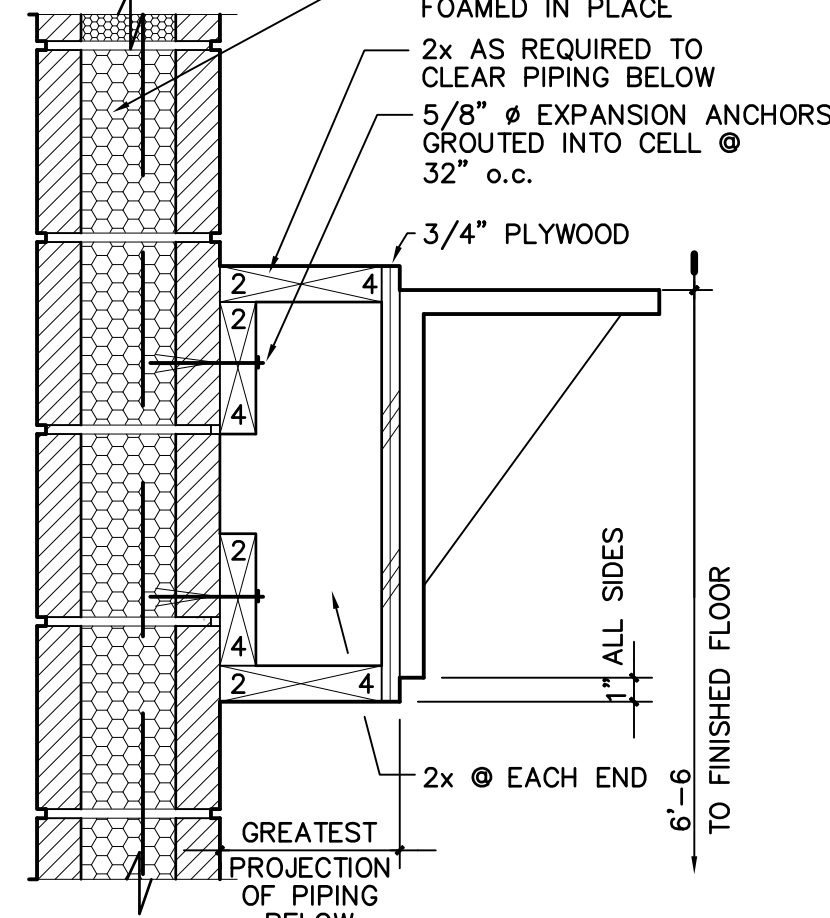
1 ROOF RIDGE

0908-50AR-0004 SCALE: 3" = 1'-0" 0 1" 6" 1'-0"



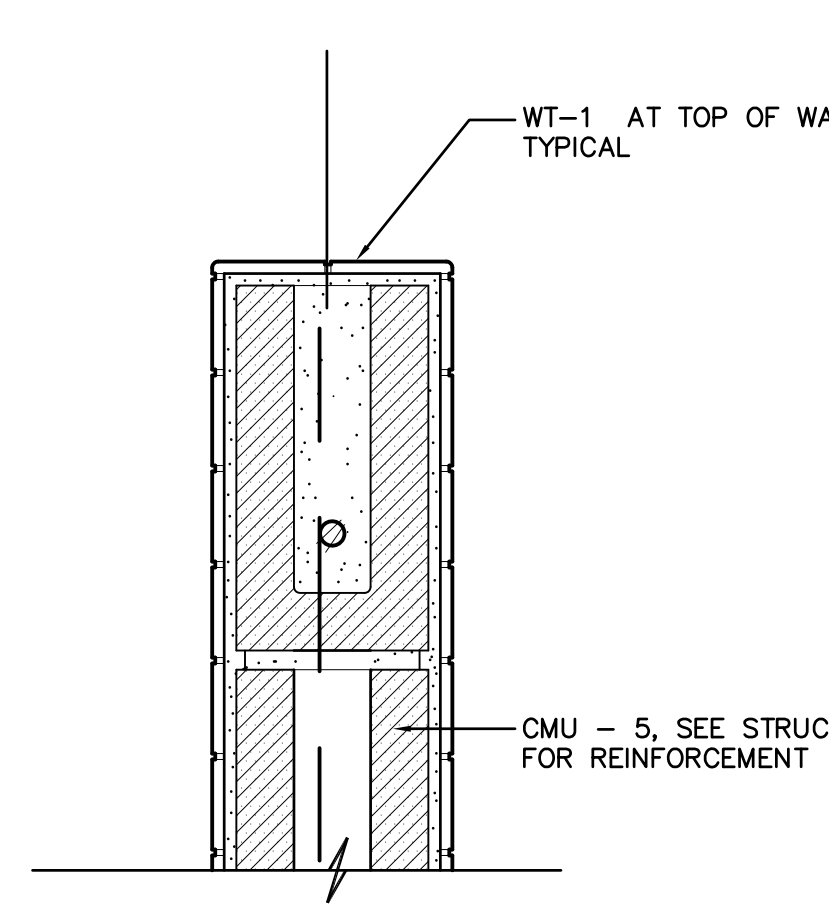
2 SEAM AND BATTEN AT EAVE

0908-50AR-0005 SCALE: 3" = 1'-0" 0 1" 6" 1'-0"



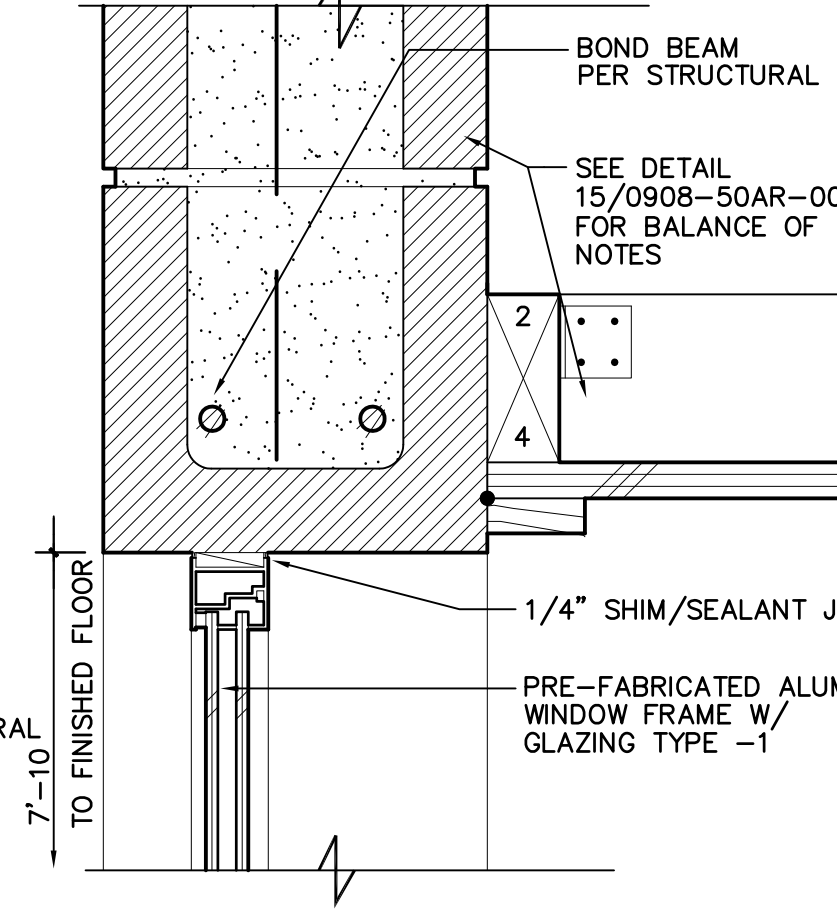
3 SHELF/MOP HOLDER

0908-50AR-0004 SCALE: 1 1/2" = 1'-0" 0 3" 6" 1'



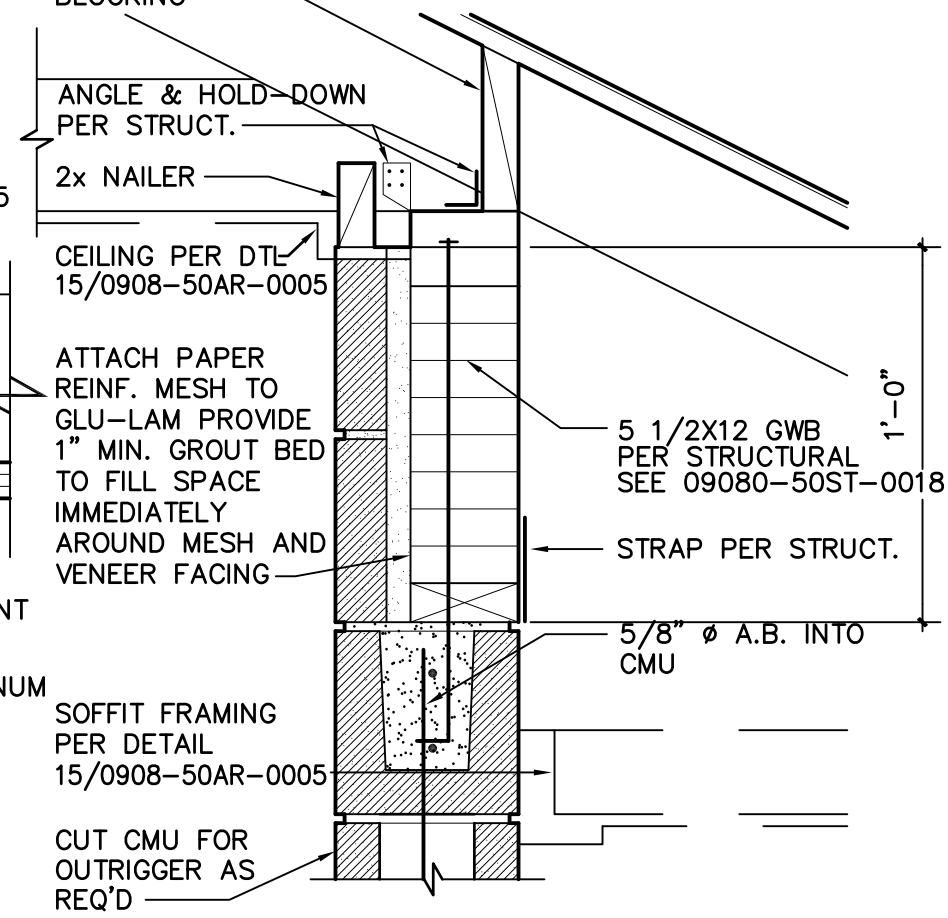
4 SHOWER PARTITION - TOP

0908-50AR-0005 SCALE: 3" = 1'-0" 0 1" 6" 1'-0"



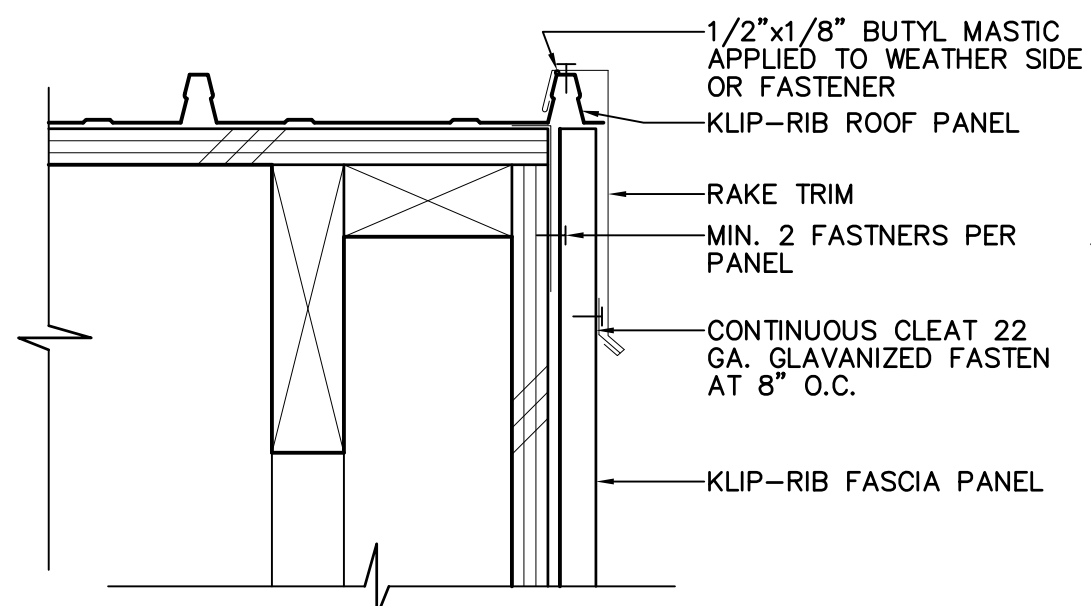
5 WINDOW HEAD (JAMB SIM)

0908-50AR-0004 SCALE: 3" = 1'-0" 0 1" 6" 1'-0"



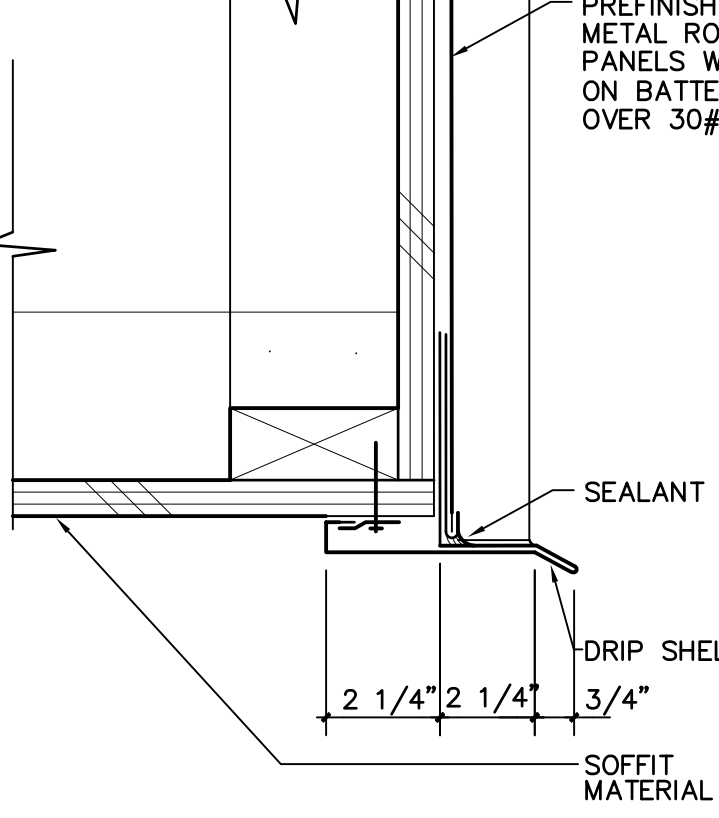
6 OUTRIGGER BEAM

0908-50AR-0003 SCALE: 1 1/2" = 1'-0" 0 3" 6" 1'



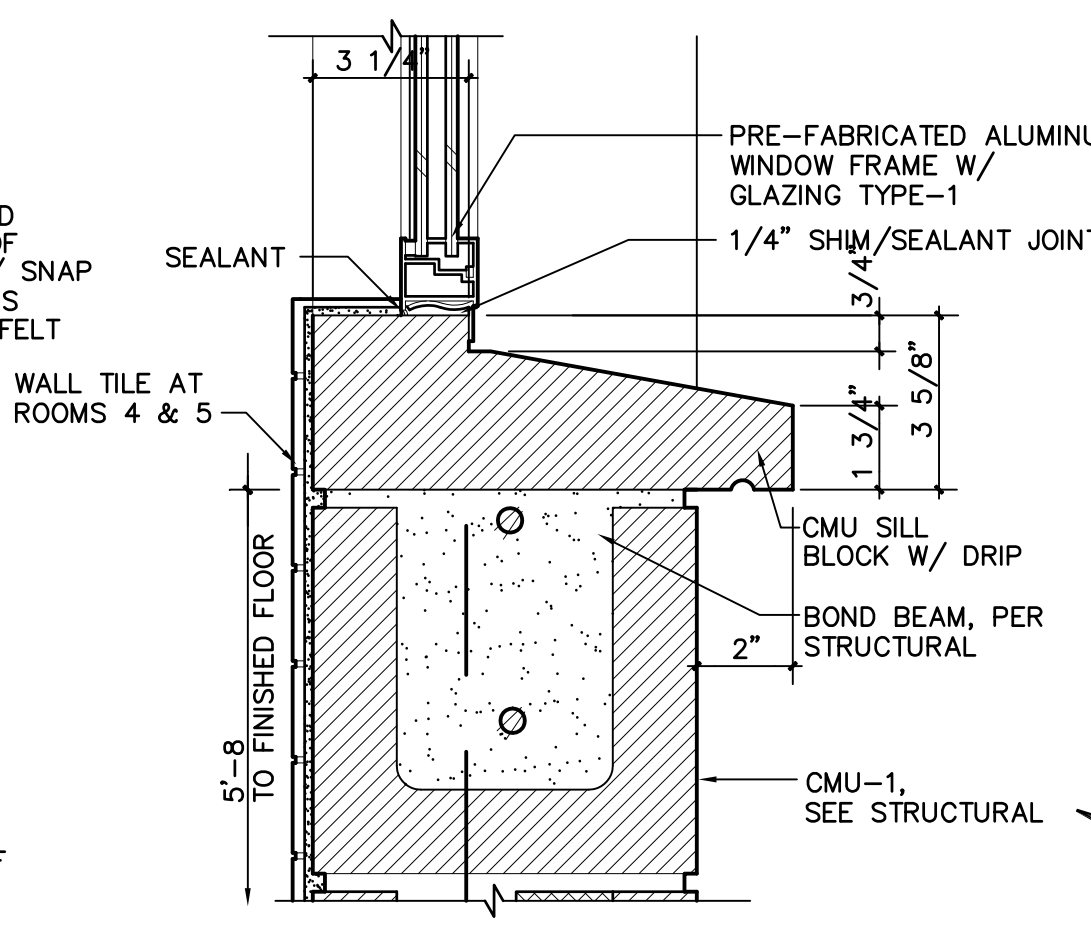
7 RAKE

0908-50AR-0005 SCALE: 3" = 1'-0" 0 1" 6" 1'-0"



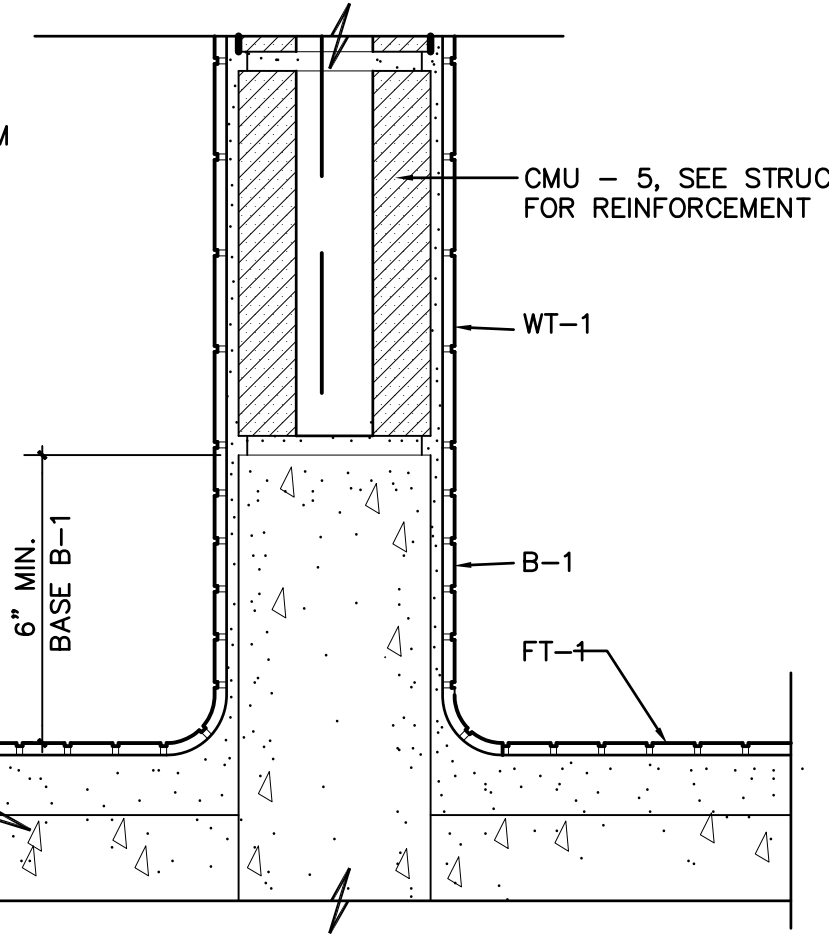
8 EAVE

0908-50AR-0005 SCALE: 3" = 1'-0" 0 1" 6" 1'-0"



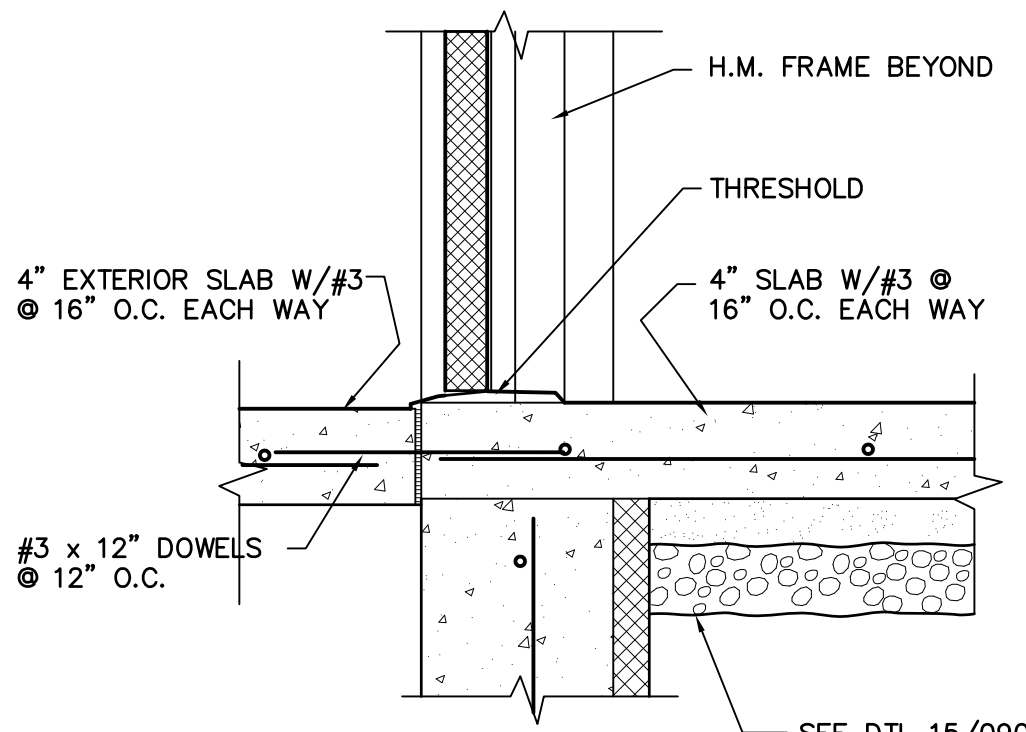
9 WINDOW SILL

0908-50AR-0004 SCALE: 3" = 1'-0" 0 1" 6" 1'-0"



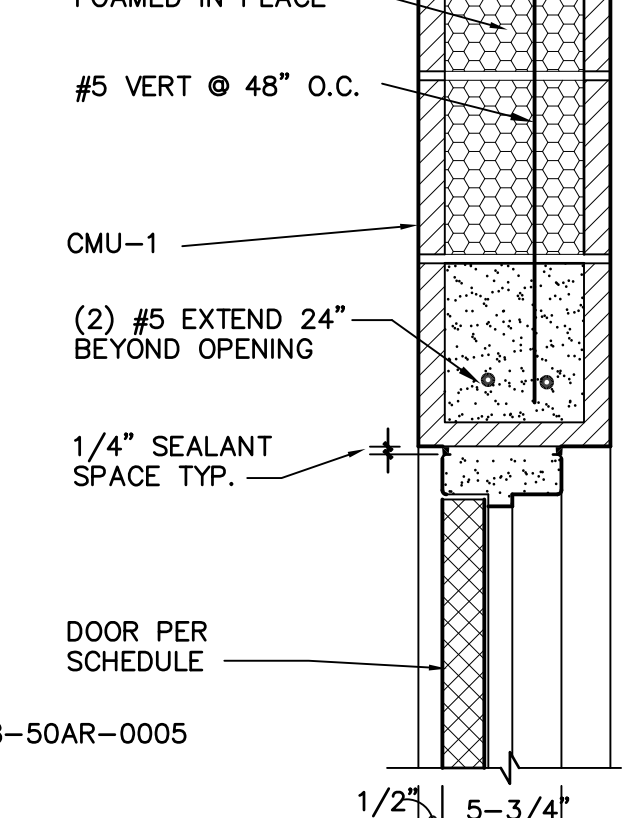
10 SHOWER PARTITION - FLOOR

0908-50AR-0005 SCALE: 3" = 1'-0" 0 1" 6" 1'-0"



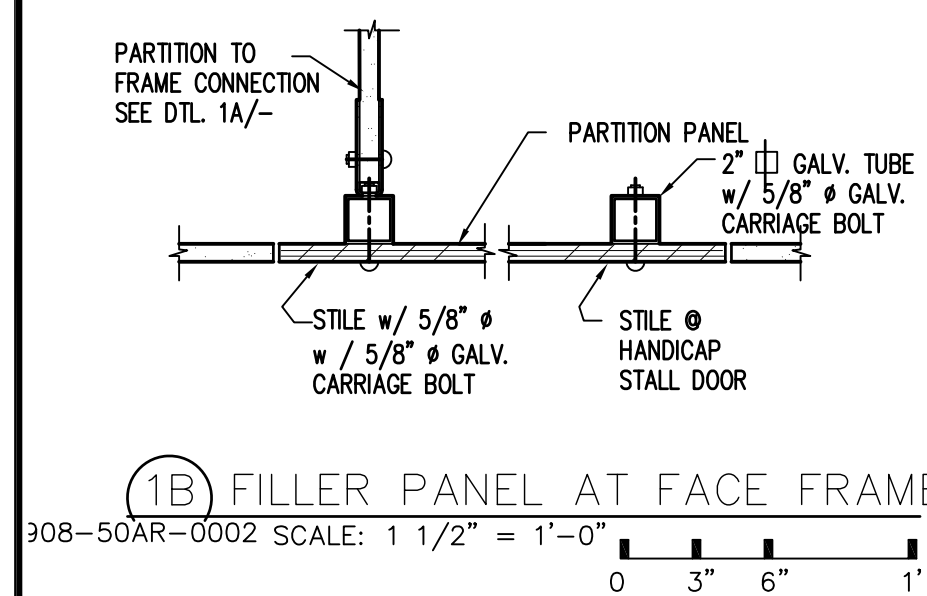
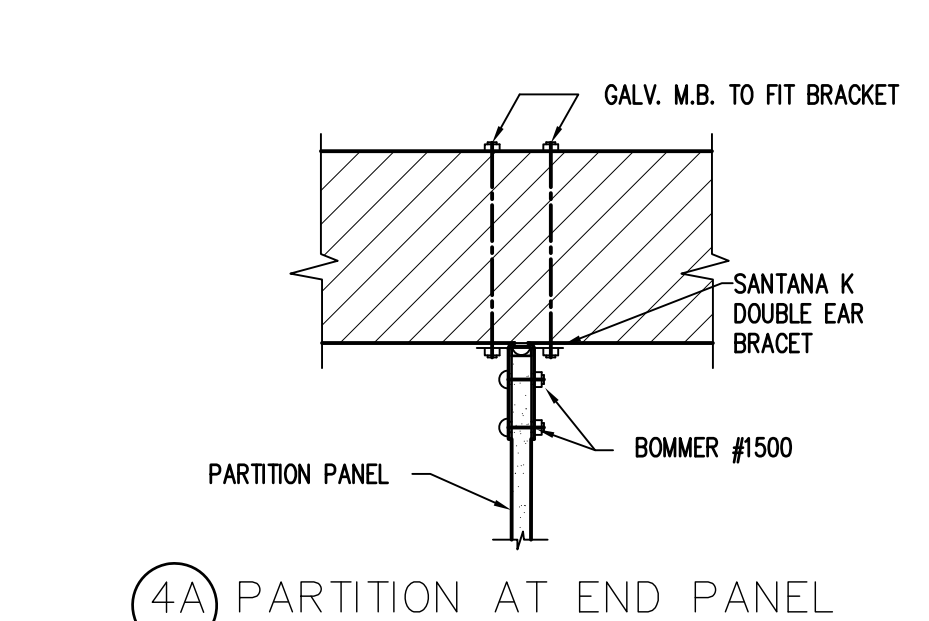
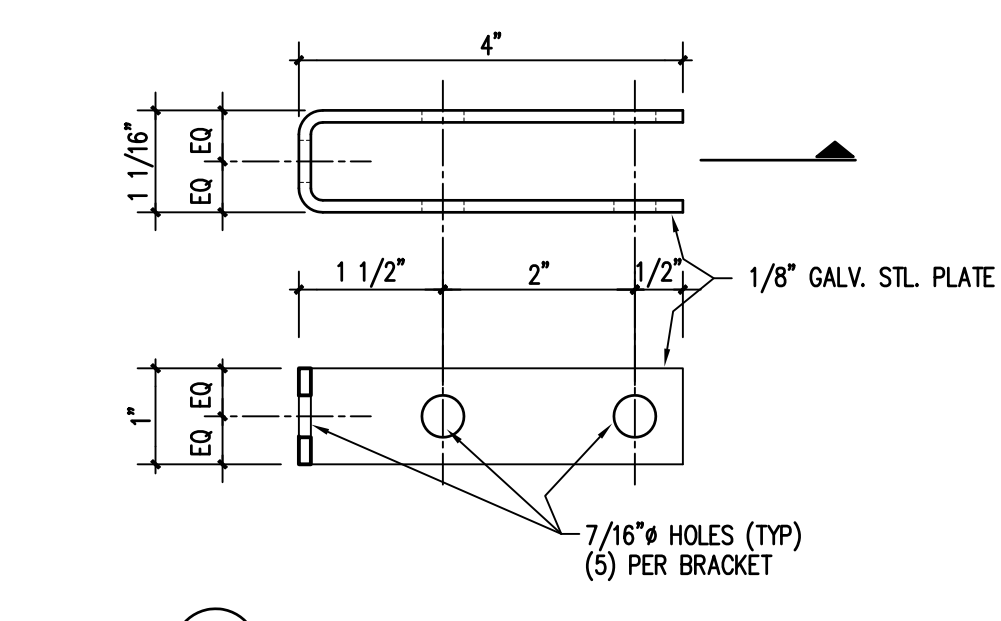
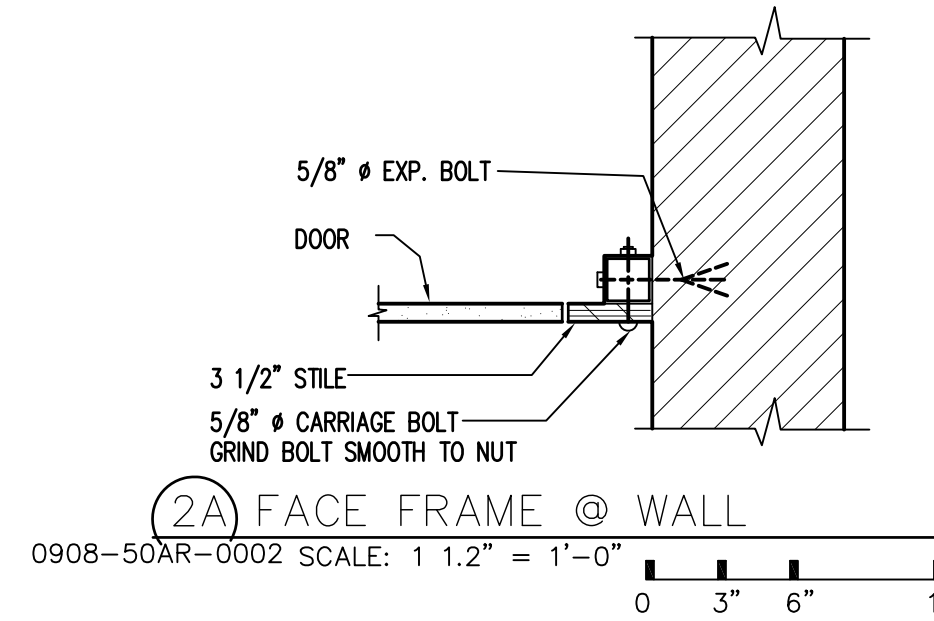
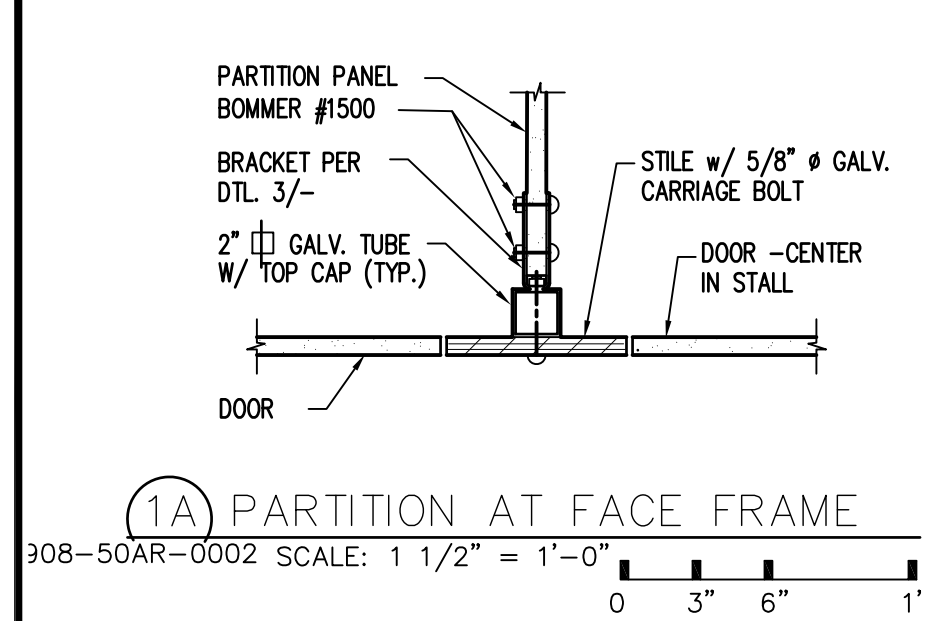
11 DOOR THRESHOLD

0908-50AR-0008 SCALE: 1 1/2" = 1'-0" 0 3" 6" 1'

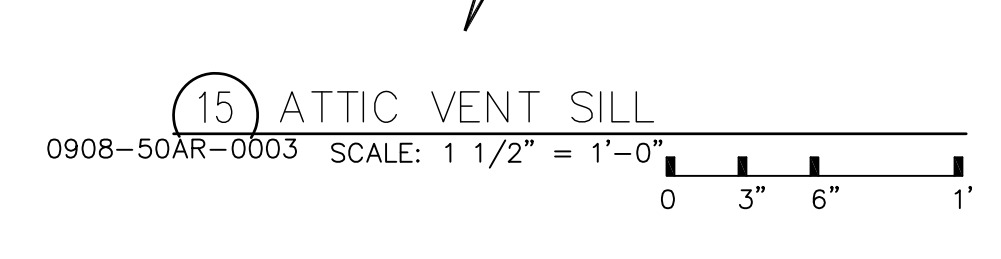
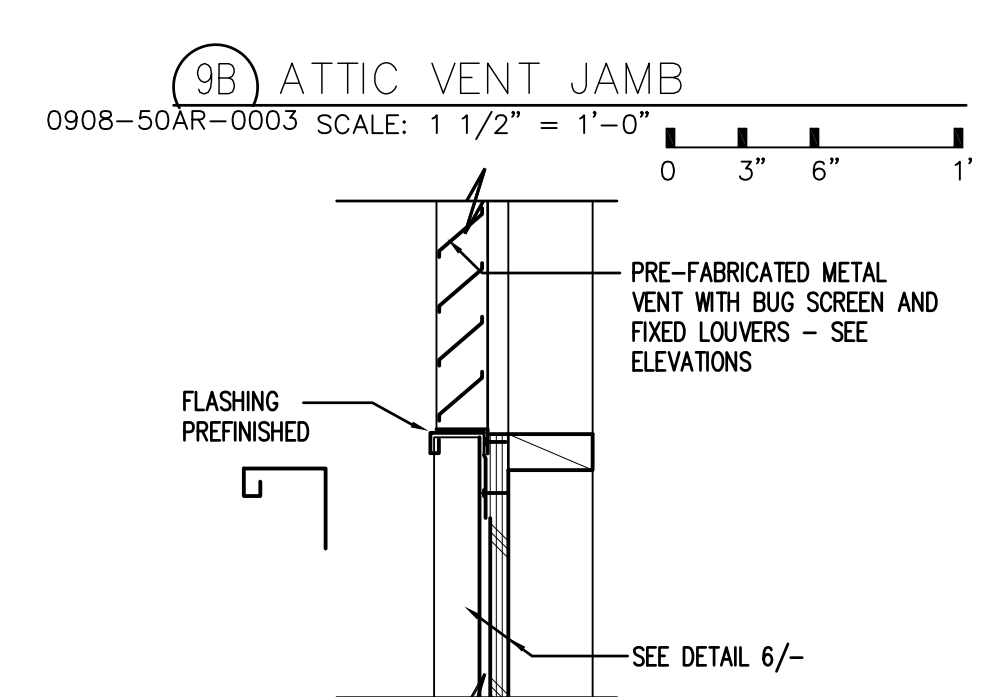
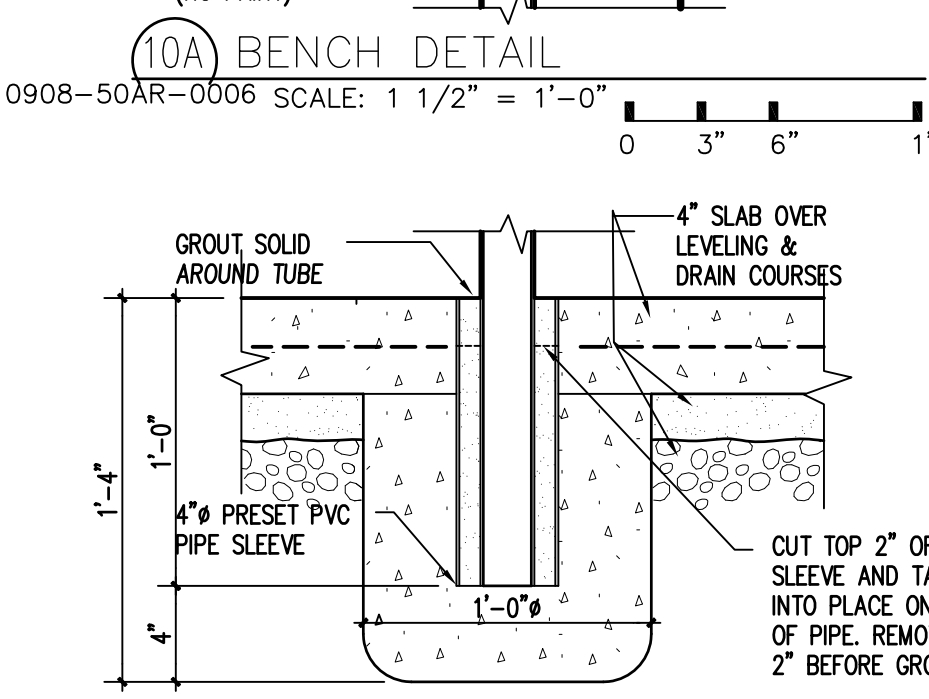
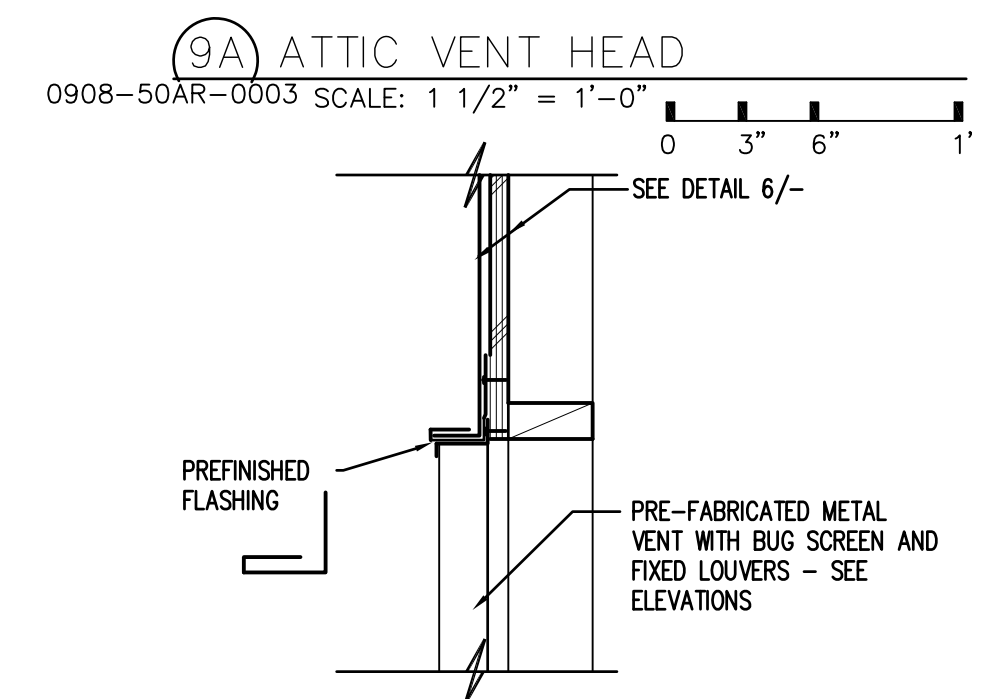
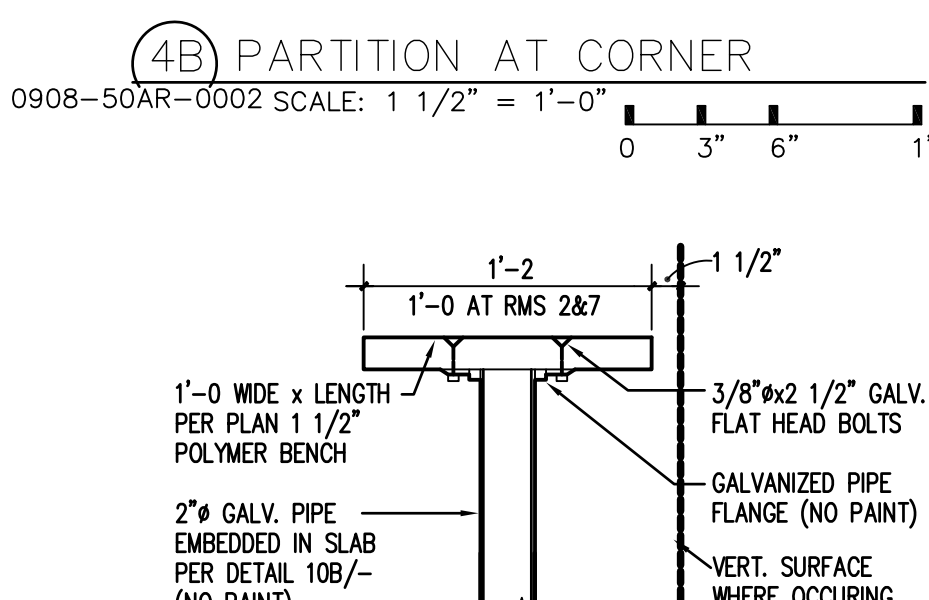
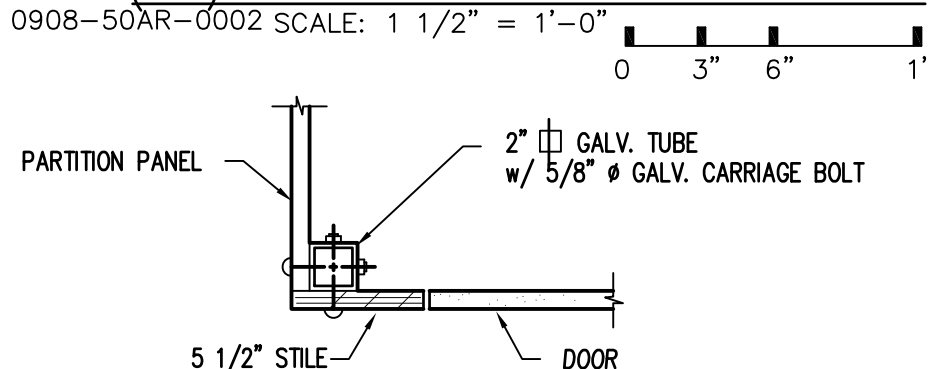
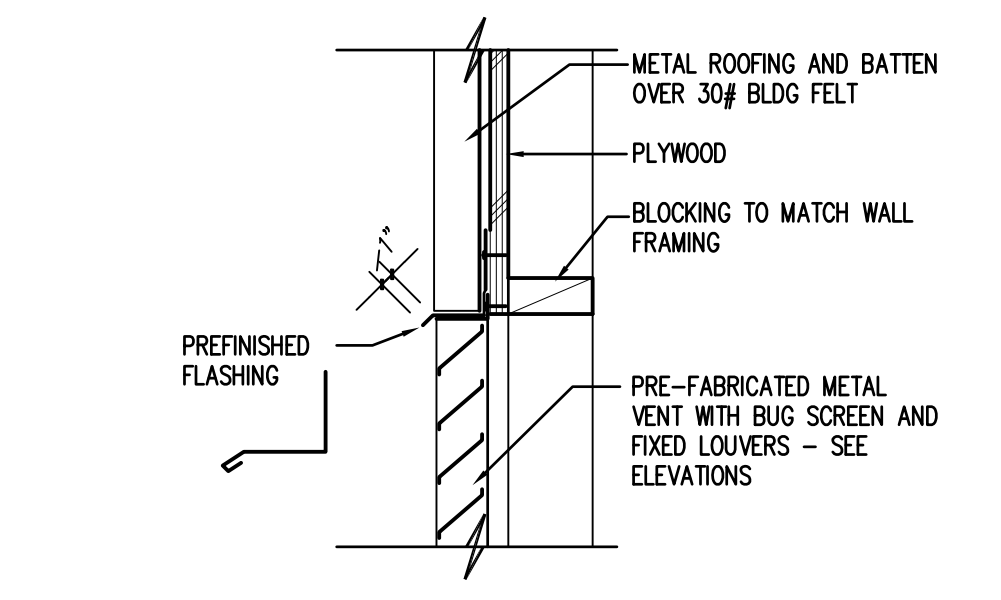


12 DOOR HEAD (JAMB SIM)

0908-50AR-0008 SCALE: 1 1/2" = 1'-0" 0 3" 6" 1'



GENERAL NOTES:
 ALL 2" GALV. TUBES TO HAVE WELDED TOP CAP.
 BOLTS SHALL NOT EXTEND BEYOND NUTS.



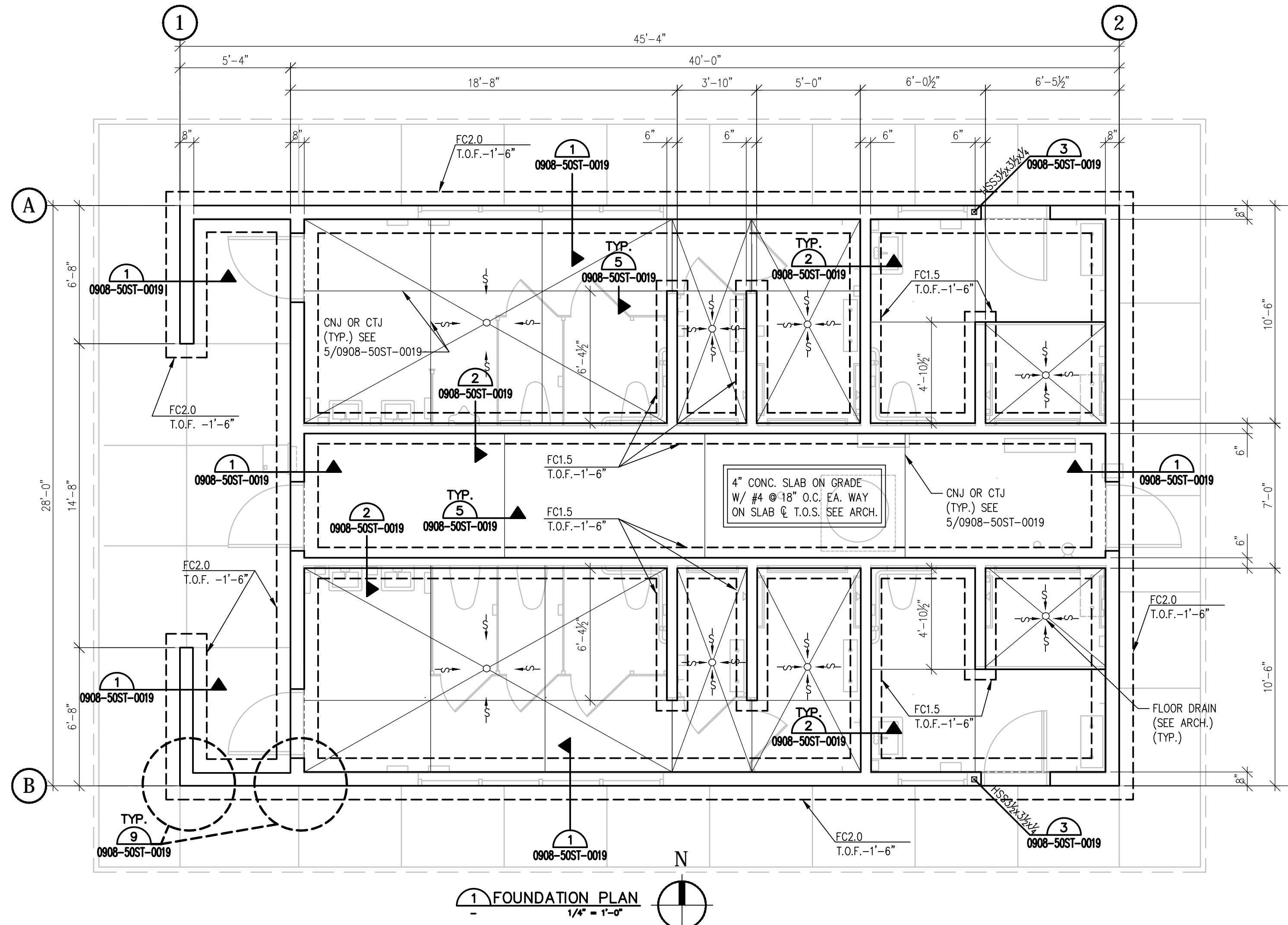
ROOM FINISH SCHEDULE																
ROOM NO.	FLOOR	FINISH	BASE	FINISH	NORTH WALL	FINISH	EAST WALL	FINISH	SOUTH WALL	FINISH	WEST WALL	FINISH	CEILING	FINISH	WINDOW TRTMT.	REMARKS
1	TILE	FACTORY	TILE	FACTORY	CMU	PAINT	TILE	FACTORY	TILE	FACTORY	CMU	PAINT	GWB	PAINT	---	
2	TILE	FACTORY	TILE	FACTORY	CMU	PAINT	TILE	FACTORY	TILE	FACTORY	CMU	PAINT	GWB	PAINT	---	
3	TILE	FACTORY	TILE	FACTORY	CMU	PAINT	TILE	FACTORY	TILE	FACTORY	CMU	PAINT	GWB	PAINT	---	
4	TILE	FACTORY	TILE	FACTORY	TILE TO 6'	FACTORY/PAIN	TILE	FACTORY	TILE TO 6'	FACTORY/PAIN	CMU	PAINT	GWB	PAINT	---	
5	TILE	FACTORY	TILE	FACTORY	TILE	FACTORY	TILE	FACTORY	TILE TO 6'	FACTORY/PAIN	CMU	PAINT	GWB	PAINT	---	
6	TILE	FACTORY	TILE	FACTORY	TILE	FACTORY	TILE	FACTORY	TILE TO 6'	FACTORY/PAIN	CMU	PAINT	GWB	PAINT	---	
7	TILE	FACTORY	TILE	FACTORY	TILE	FACTORY	TILE	FACTORY	TILE TO 6'	FACTORY/PAIN	CMU	PAINT	GWB	PAINT	---	
8	TILE	FACTORY	TILE	FACTORY	TILE	FACTORY	TILE	FACTORY	TILE TO 6'	FACTORY/PAIN	CMU	PAINT	GWB	PAINT	---	
9	CONC.	SEAL	CONC.	PAINT	CMU	PAINT	CMU	PAINT	CMU	PAINT	CMU	PAINT	GWB	PAINT	---	

NOTE: SEE DWG. 0913-05AR-0020 FOR ROOM ASSIGNMENTS

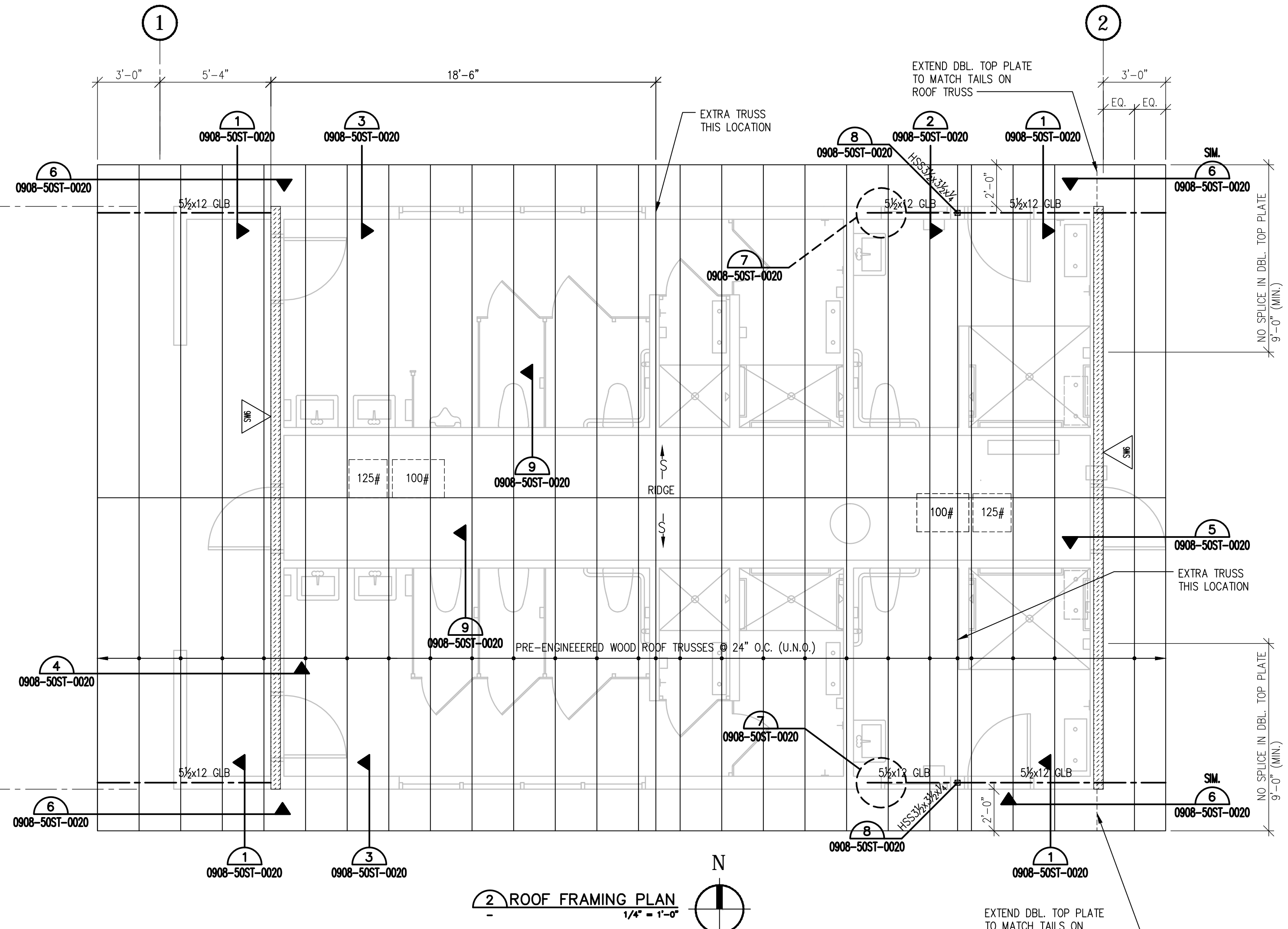
DOOR SCHEDULE											
DOOR MARK	OPENING SIZE	THICKNESS	ELEVATION	DOOR TYPE as spec'd	GLASS as spec'd	RATING	DOOR FINISH	FRAME FINISH	FRAME DETAIL	LOUVRE/UNDERCUT	HARDWARE GROUP
1	3'-0 x 7'-0	1 3/4"	A	1	---	---	P	P	11&12/0908-50AR-0007	---	3
2	3'-0 x 7'-0	1 3/4"	A	1	---	---	P	P	11&12/0908-50AR-0007	---	1
3	3'-0 x 7'-0	1 3/4"	A	1	---	---	P	P	11&12/0908-50AR-0007	---	1
4	3'-0 x 7'-0	1 3/4"	A	1	---	---	P	P	11&12/0908-50AR-0007	---	3
5	3'-0 x 7'-0	1 3/4"	A	1	---	---	P	P	11&12/0908-50AR-0007	---	2
6	3'-0 x 7'-0	1 3/4"	A	1	---	---	P	P	11&12/0908-50AR-0007	---	2

DOOR ELEVATIONS:

DOOR SCHEDULE NOTES:
 * indicates tempered (or laminated) safety glass
 RATING: 1/3, 3/4, 1, 1-1/2, ETC. indicates hour of fire rating.
 DOOR/FRAME FINISH:
 P = Painted
 SV = Stain & Varnish or Clear Lacquer
 Apply finishes both sides, regardless of room finish
 All doors and frames listed as Alternate #2 shall be painted under the base bid. Frame and door paint shall be different.
 F = Factory or Pre-Finish
 E = Existing



1 FOUNDATION PLAN
1/4" = 1'-0"



2 ROOF FRAMING PLAN
1/4" = 1'-0"

FOUNDATION PLAN NOTES:

- REFER TO ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS, WALLS, AND OTHER INFORMATION NOT SHOWN OR NOTED.
 - THE CONSTRUCTION DOCUMENTS MAY NOT SHOW SOME OBSTRUCTIONS, EVEN THOUGH NOT SHOWN OR SPECIFICALLY MENTIONED, THE REMOVAL AND REPLACEMENT OF MINOR OBSTRUCTIONS SHOULD BE ANTICIPATED AND ACCOMPLISHED.
 - CONTRACTOR SHALL PROVIDE TEMPORARY BRACING AND/OR SHORING OF THE STRUCTURE AND STRUCTURAL COMPONENTS UNTIL ALL FINAL CONNECTIONS HAVE BEEN COMPLETED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.
 - CONTRACTOR TO EQUAL SPACE CONTROL AND CONSTRUCTION JOINTS PER THE FOUNDATION PLAN.
 - TYPICAL FLOOR CONSTRUCTION TO BE 4" CONCRETE SLAB ON GRADE WITH #4 AT 18" O.C. EACH WAY ON SLAB CENTERLINE.
 - PLATE WASHERS A MINIMUM OF 3" BY 3" BY 0.229" THICK SHALL BE USED ON EACH SILL BOLT AT SHEAR WALLS.
 - DEPRESS TOP OF FOUNDATION WALL AT ALL DOOR LOCATIONS AND POUR SLAB THROUGH. PROVIDE 1" SAND OR OTHER BOND BREAKER BETWEEN BOTTOM OF SLAB AND TOP OF WALL.
 - SEE 6/0908-50ST-0019 WHERE PIPING OCCURS PERPENDICULAR TO FOUNDATION WALL.
 - FOR MASONRY WALL REINFORCING AND GROUTING REQUIREMENTS, SEE MASONRY WALL SCHEDULE (1/0908-50ST-0022) SEE 5/0908-50ST-0022 FOR TYPICAL WALL INTERSECTION REQUIREMENTS.
 - SEE ROOF FRAMING PLANS AND NOTES ON THIS SHEET FOR ADDITIONAL INFORMATION.
 - REINFORCING SHALL BE WITHIN 1/2" TOLERANCE OF CLEAR DISTANCE SHOWN ON CONSTRUCTION DOCUMENTS. WET-SETTING OF REINFORCING STEEL IS NOT ACCEPTABLE.
 - EXTERIOR FOOTINGS SHALL BEAR 2'-0" MINIMUM BELOW NEAREST EXTERIOR FINISH GRADE (U.N.O.). ALL FOOTINGS SHALL BEAR ON FIRM UNDISTURBED EARTH OR ENGINEERED FILL BELOW ORGANIC SURFACE SOILS. ALL BACKFILL SHALL BE THOROUGHLY COMPACTED.
- LEGEND:**
- FC# - DENOTES CONTINUOUS FOOTING. SEE FOOTING SCHEDULE (THIS SHEET) FOR ADDITIONAL INFORMATION.
 - T.O.F. - DENOTES TOP OF FOOTING ELEVATION.
 - T.O.S. - DENOTES TOP OF SLAB ELEVATION
 - CTJ - DENOTES CONTROL JOINT. SEE SECTION 5/0908-50ST-0019 FOR ADDITIONAL INFORMATION.
 - CNJ - DENOTES CONSTRUCTION JOINT. SEE SECTION 5/0908-50ST-0019 FOR ADDITIONAL INFORMATION.
 - M# - DENOTES MASONRY WALL MARK. SEE MASONRY WALL ELEVATIONS (SHEET 0908-50ST-0021) AND MASONRY WALL SCHEDULE (1/0908-50ST-0022) FOR ADDITIONAL INFORMATION.
 - ☒ - DENOTES STEEL COLUMN LOCATIONS. CENTER COLUMN ON CENTERLINE OF MASONRY WALL.

ROOF FRAMING PLAN NOTES:

- PLYWOOD ROOF SHEATHING TO BE 5/8" APA C-D EXPOSURE 1 WITH PANEL SPAN RATING 32/16.
 - ROOF PLYWOOD NAILING TO BE:
10d AT 6" O.C. AT DIAPHRAGM BOUNDARIES;
10d AT 6" O.C. AT ALL SUPPORTED PANEL EDGES;
10d AT 12" O.C. AT INTERMEDIATE SUPPORTS.
SEE PLYWOOD LAYOUT AND NAILING PLAN (DETAIL 12/0908-50ST-0020) FOR NAILING AND TYPICAL PLYWOOD PANEL LAYOUT.
 - SUPPORT SHALL BE SUPPLIED TO ALL PLYWOOD EDGES WITH PLYCLIPS, BLOCKING, TONGUE & GROOVE PLYWOOD JOINTS, OR OTHER APPROVED METHODS PER APA RECOMMENDATION.
 - WOOD TRUSSES SHALL BE PRE-MANUFACTURED TRUSSES, ENGINEERED FOR THE LOADS AS INDICATED UNDER "DESIGN INFORMATION" AND MANUFACTURED IN CONFORMANCE WITH THE INTERNATIONAL BUILDING CODE, SECTION 2303, AND THE LATEST EDITION OF AF & PA NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION AND ANS/TP1 1. ERECTION, ANCHORAGE, AND BRIDGING SHALL BE PER MANUFACTURER'S STANDARD. CHORDS AND WEBS SHALL BE STRESS GRADE LUMBER. WEB MEMBERS SHALL BE CONNECTED TO CHORDS WITH LIGHT GAGE STEEL GUSSET PLATES. COMPLETE TRUSS DESIGNS BEARING THE STAMP OF A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF WASHINGTON SHALL BE SUBMITTED (IF REQUESTED) FOR REVIEW PRIOR TO FABRICATION. TRUSS MANUFACTURER SHALL SPECIFY AND PROVIDE ALL SPECIALTY ITEMS SUCH AS BLOCKING, BRIDGING, TRUSS TO TRUSS CONNECTIONS, TRUSS TO BEAM CONNECTIONS, ETC. REQUIRED FOR A NORMAL AND COMPLETE INSTALLATION OF THE TRUSSES, HANDLING, INSTALLATION, AND BRACING SHALL BE IN ACCORDANCE WITH ABOVE REFERENCED STANDARDS AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
 - CONTRACTOR SHALL PROVIDE TRUSS MANUFACTURER WITH MECHANICAL EQUIPMENT AND PIPING WEIGHTS AND PLACEMENT PLAN. TRUSS MANUFACTURER SHALL PROVIDE SPECIALLY DESIGNED (OR ADDITIONAL) TRUSSES AS REQUIRED TO SUPPORT MECHANICAL EQUIPMENT, PIPING OR OTHER SPECIALTY EQUIPMENT. (SEE 10/0908-50ST-0019)
 - ANCHOR ROOF TRUSSES TO WALL TOP PLATE OR HEADERS WITH SIMPSON "H2.5A" HURRICANE TIES, MINIMUM U.N.O.
 - STAGGER SPLICES ON CONTINUOUS TOP PLATE AND NAIL WITH 12d AT 6" O.C. STAGGERED. MINIMUM OF SIXTEEN (16) NAILS BETWEEN ADJACENT SPLICES.
 - BLOCK ALL JOINTS ON WALLS SHEATHED WITH PLYWOOD. SEE WALL PANEL LAYOUT AND NAILING DETAIL (11/0908-50ST-0020) FOR ADDITIONAL INFORMATION.
 - FASTENERS AND HANGERS FOR PRESERVATIVE-TREATED AND FIRE-RETARDANT-TREATED WOOD SHALL BE OF HOT-DIPPED ZINC-COATED GALVANIZED STEEL, STAINLESS STEEL, SILICON BRONZE OR COPPER.
- LEGEND:**
- ▲ - DENOTES SHEAR WALL BELOW ROOF FRAMING TO CMU WALL. SEE SHEAR WALL SCHEDULE (10/0908-50ST-0020) FOR ADDITIONAL INFORMATION.
 - ↘ - DENOTES ROOF SLOPE DIRECTION.
 - ☒ - DENOTES STEEL COLUMN LOCATION.
 - ☒ - DENOTES APPROXIMATE SIZE AND WEIGHT OF MECHANICAL UNITS (CONTRACTOR TO VERIFY W/ MECHANICAL). FOR MECH. UNIT SUPPORT SEE 10/0908-50ST-0019

DESIGN INFORMATION:

APPLY THE FOLLOWING MINIMUM SPECIFICATIONS UNLESS NOTED OTHERWISE ON THE CONSTRUCTION DOCUMENTS.

REFERENCE CODE:
INTERNATIONAL BUILDING CODE, 2012 - LATEST EDITION REFERS TO CURRENT LOCALLY ADOPTED EDITION OF THE INTERNATIONAL BUILDING CODE.

DESIGN DATA:

ROOF LOADS:
ROOF SNOW LOAD : 35 PSF (PROVIDED BY JURISDICTION)
ROOF DEAD LOAD : 15 PSF
TOTAL : 50 PSF

WIND DESIGN DATA:
WIND DESIGN DATA : MWRS ENVELOPE PROCEDURE
ULTIMATE DESIGN WIND SPEED : VULT = 110 MPH (RISK CATEGORY II BLDG.)
EXPOSURE CATEGORY : C
ENCLOSURE CATEGORY : ENCLOSED

SEISMIC DESIGN DATA:
SEISMIC IMPORTANCE FACTOR, I : 1.0
RISK CATEGORY : II
MAPPED SPECTRAL RESPONSE ACCELERATIONS : S₁ = 0.48
S₂ = 0.20
SITE CLASS : D
SPECTRAL RESPONSE COEFFICIENTS : S_{ps} = 0.45
S_{pt} = 0.26
C : C

SEISMIC DESIGN CATEGORY : INTERMEDIATE REINFORCED MASONRY SHEAR WALLS
BASIC SEISMIC-FORCE - RESISTING SYSTEM : SEISMIC RESPONSE COEFFICIENT(S), C_s : 0.13
RESPONSE MODIFICATION FACTOR(S), R : 3.5
ANALYSIS PROCEDURE USED : EQUIVALENT LATERAL FORCE

ASSUMED SOIL PROPERTIES:
ALLOWABLE SOIL BEARING PRESSURE : 1500 PSF
PASSIVE PRESSURE : 250 PSF/FT
COEFFICIENT OF FRICTION : 0.35

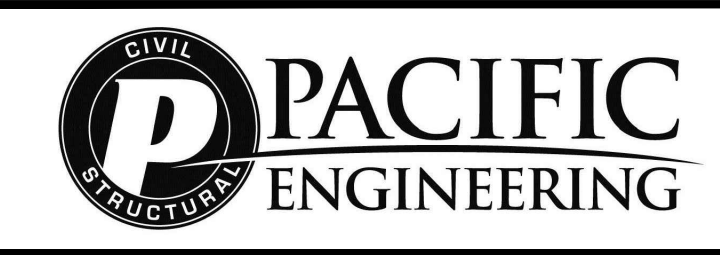
STRUCTURAL STEEL:

STRUCTURAL STEEL SHALL BE GRADE ASTM A36, F_y = 36,000 PSI. SQUARE HSS COLUMNS SHALL BE GRADE ASTM A500, GRADE B, F_y = 46,000 PSI. DESIGN, FABRICATION, AND ERECTION SHALL BE IN ACCORDANCE WITH THE AISC "THIRTEENTH EDITION "STEEL CONSTRUCTION MANUAL" AND "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS", LATEST EDITION.

ALL WELDED SHALL BE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY STANDARD CODE. WELDERS SHALL BE CERTIFIED BY A THIRD PARTY QUALITY CONTROL AGENCY SUCH AS THOSE LICENSED BY WASHINGTON ASSOCIATION OF BUILDING OFFICIALS (WABO). SLAG SHALL BE REMOVED FROM ALL WELDS. WELDING OF DEFORMED BAR ANCHORS TO BASE MATERIAL SHALL BE BY USE OF STUD WELDING GUN AS RECOMMENDED BY STUD MANUFACTURER.

ALL BOLTED CONNECTIONS SHALL BE A307. HOLE SIZE SHALL BE IN ACCORDANCE WITH AISC SPECIFICATION FOR BEARING CONNECTIONS AND BOLTS SHALL BE TIGHTENED TO SNUG-TIGHT CONDITION. ERECTION BOLTS ARE NOT SHOWN AND SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR AT LOCATIONS REQUIRED TO FACILITATE THE CONSTRUCTION PROCESS. ANCHOR BOLTS SHALL BE ASTM F1554 GR. 36 OR A307 (MIN.) HEADED TYPE AND SHALL HAVE A STANDARD BOLT HEAD.

FOOTING SCHEDULE												
ID	WIDTH	LENGTH	DEPTH	REINF. CROSSWISE				REINF. LENGTHWISE				REMARKS
				NO	SIZE	LENGTH	SPACING	NO	SIZE	LENGTH	SPACING	
FC1.5	1'-6"	CONT.	12"	--	#4	1'-2"	18" O.C.	2	#4	--	EQ.	CONT. FTG.
FC2.0	2'-0"	CONT.	12"	--	#4	1'-8"	18" O.C.	3	#4	--	EQ.	CONT. FTG.

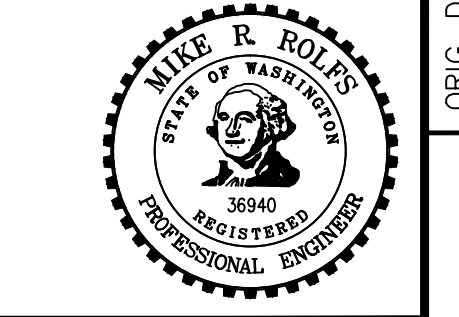


CONSULTANT	CHELAN PUD NO.1
DRAWN BY: RHW	PRIM. ENG. COURT HILL
DESIGNED BY: APJ	2ND ENG. -
APPROVED BY: MRR	PROJ. MGR. -

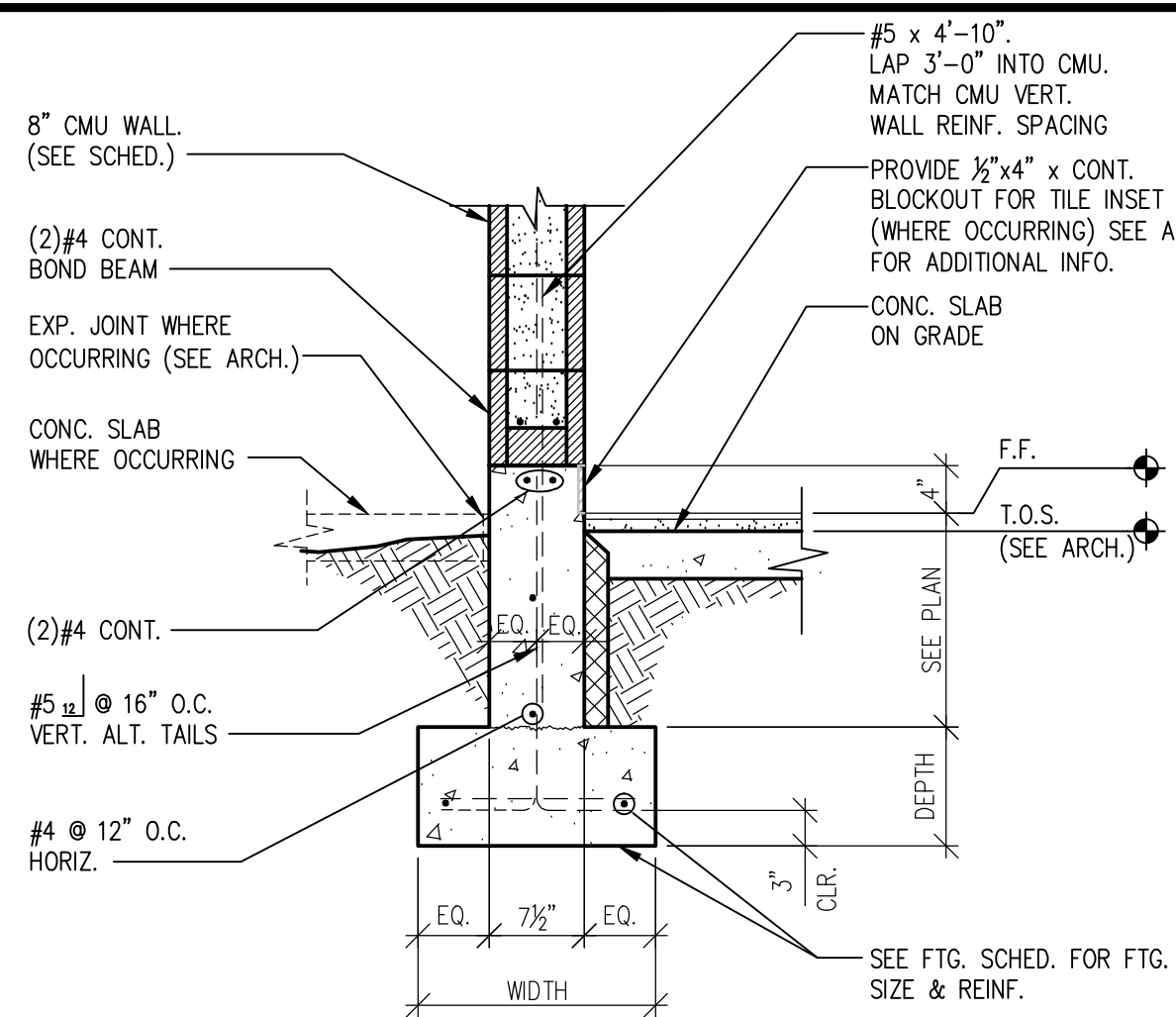
SCALE	VERIFY SCALE
AS NOTED	0 1"
0 4/10/2015	BID SET
REV	DATE
REVISION	REVISION
REQ. BY	DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON
CHELAN COUNTY

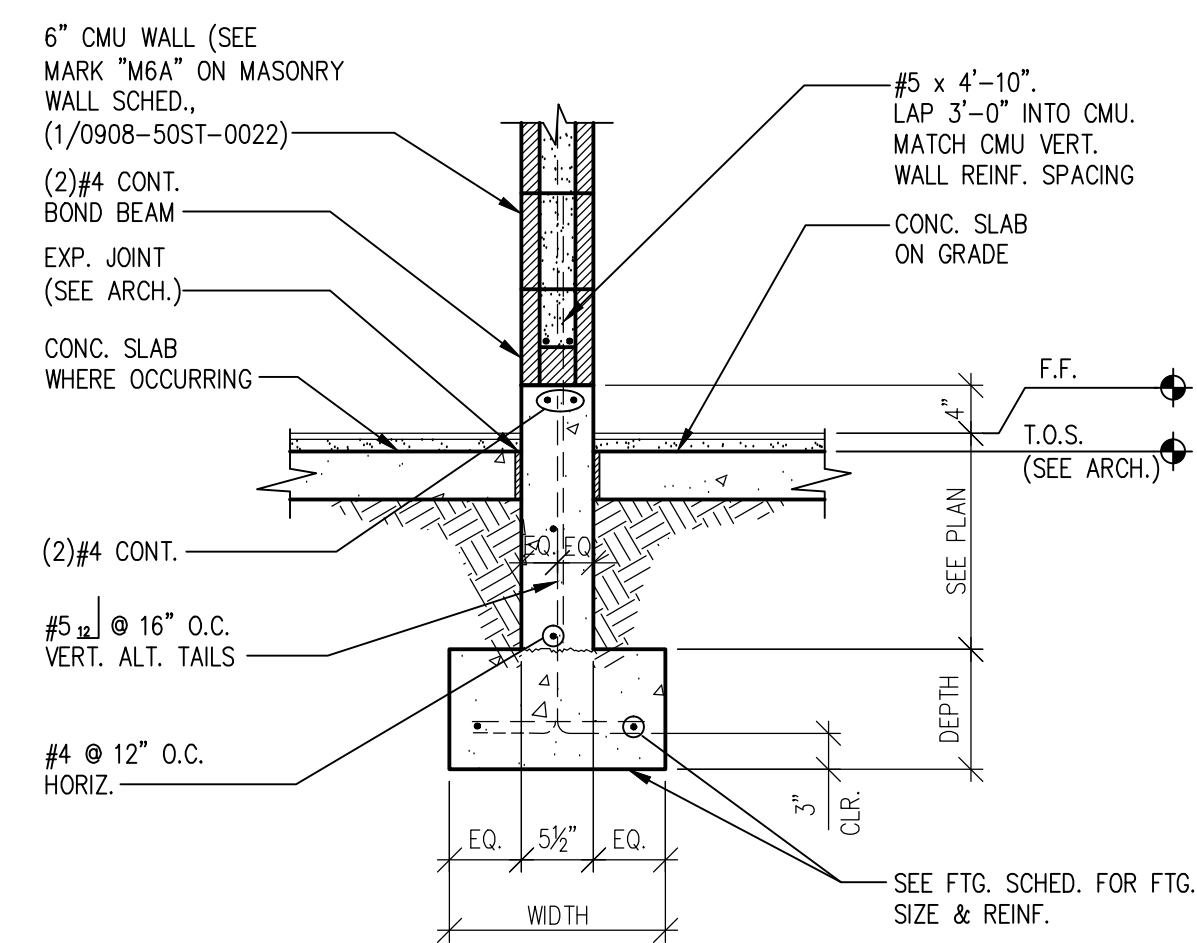
DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
FRAMING & FOUNDATION PLANS & NOTES
BID 15-04



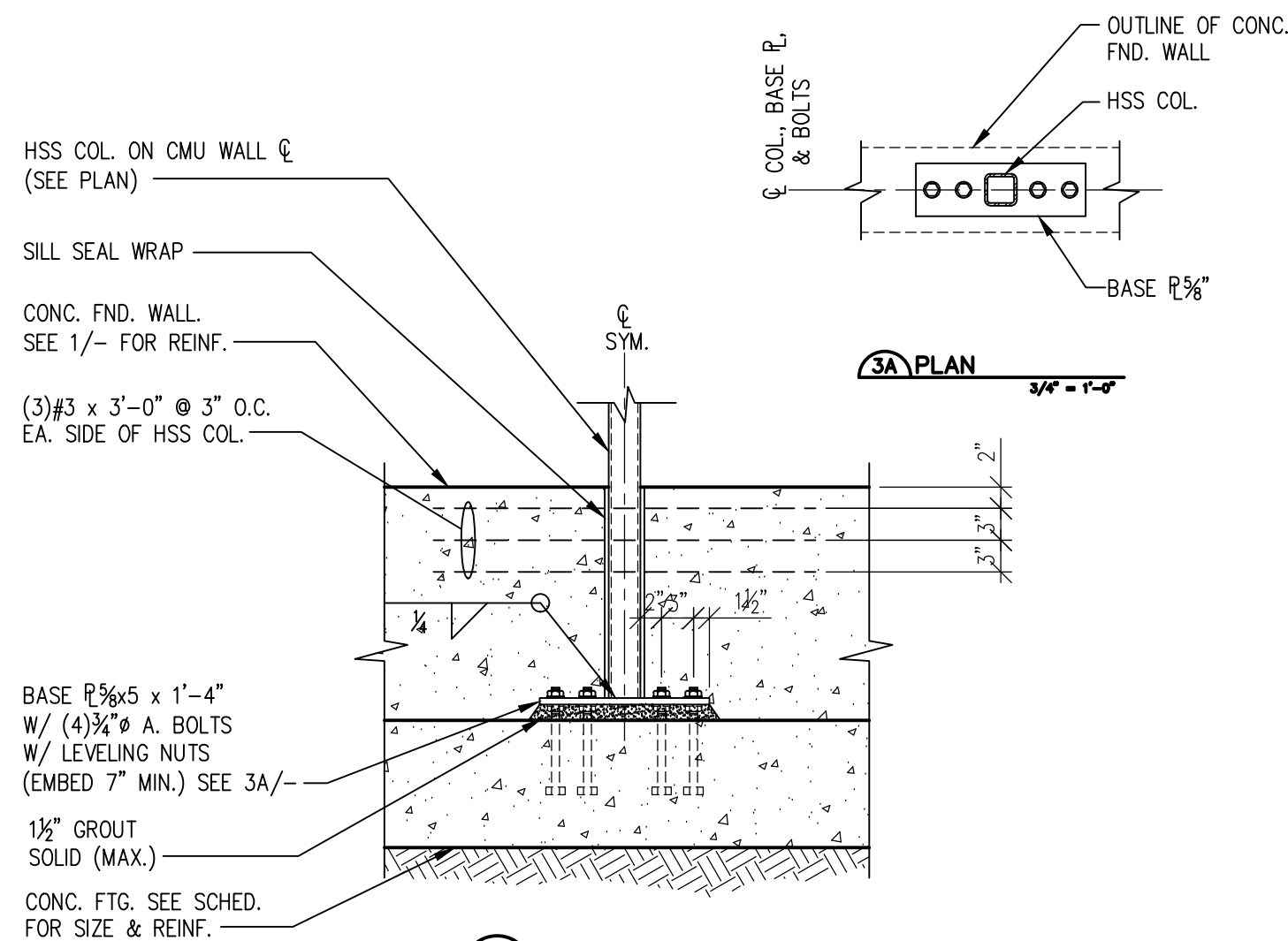
SHEET AS1 OF AS5
REVISION 0
DATE 4/10/2015
DWG. 0908-50ST-0018



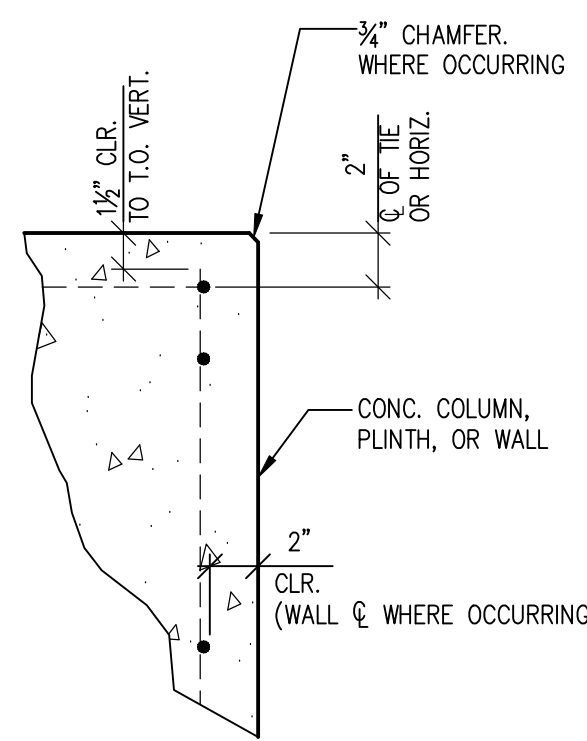
NOTES:
1. SEE 4/- FOR ADDITIONAL INFORMATION.
1 SECTION
0908-50ST-0018 3/4" = 1'-0"



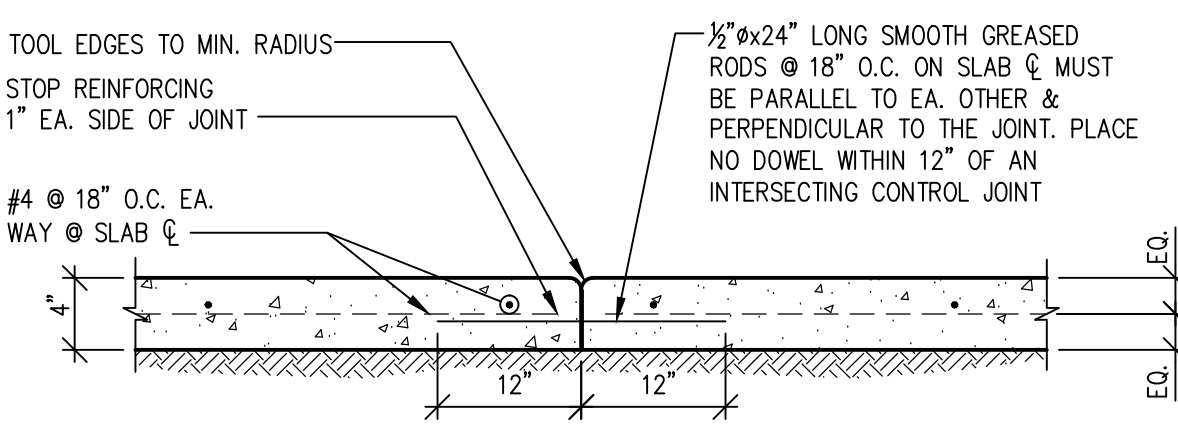
NOTES:
1. SEE 4/- FOR ADDITIONAL INFORMATION.
2 SECTION
0908-50ST-0018 3/4" = 1'-0"



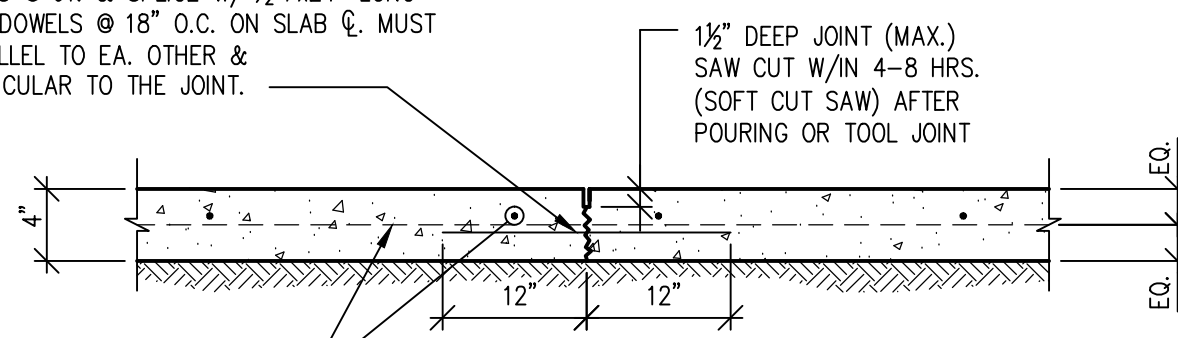
3 SECTION
0908-50ST-0018 3/4" = 1'-0"



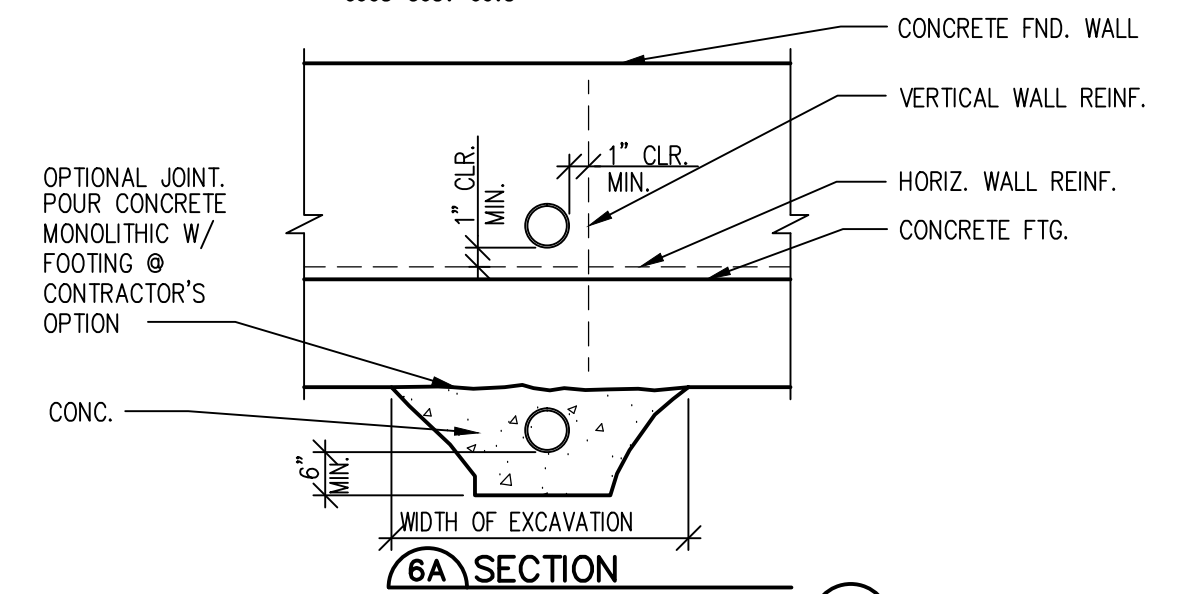
4 DETAIL
1 1/2" = 1'-0"



CONSTRUCTION JOINT

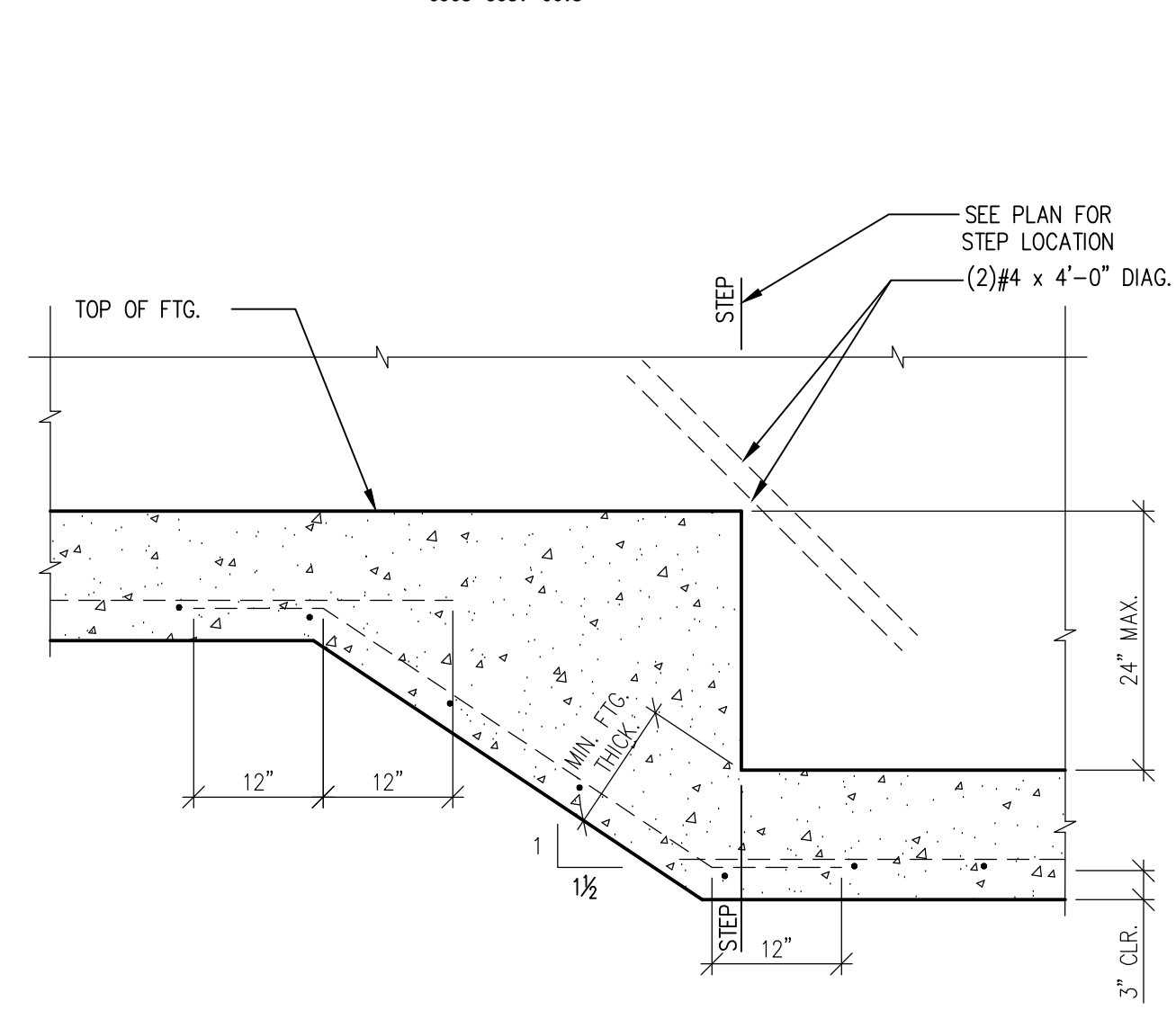


CONTROL JOINT

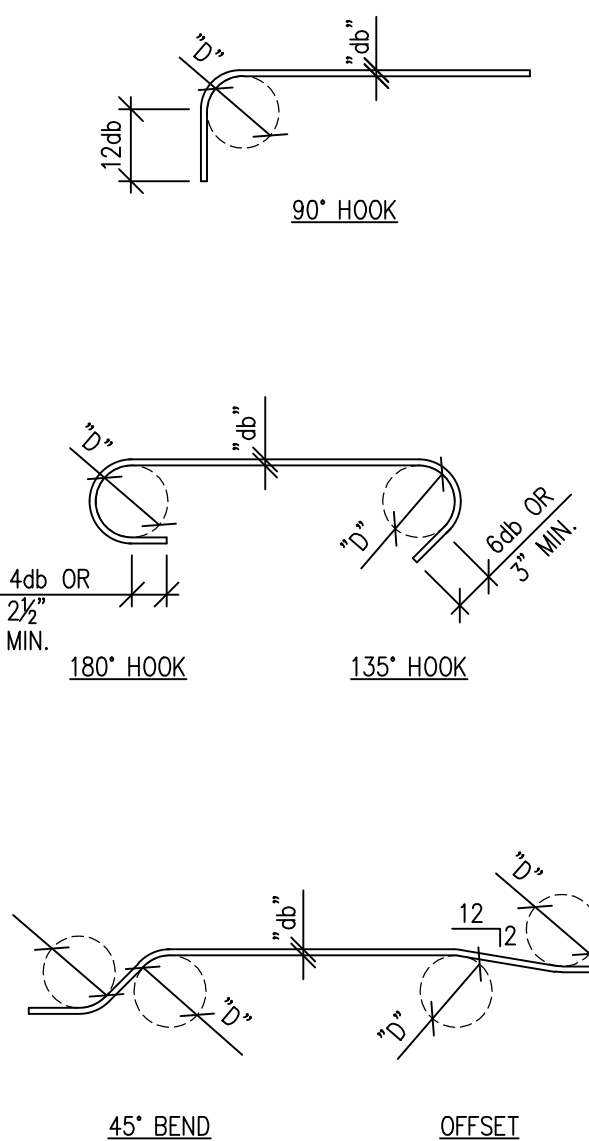


6A SECTION
NO SCALE

- NOTES:
1. THIS DETAIL SHOWS PERMISSIBLE LOCATIONS OF NEW OR EXIST. PIPES, CONDUITS, ETC. THROUGH FND. WALLS.
2. CONC. BACKFILL NOT REQD UNDER NON-BRG. WALL FTG. WHEN MECH. EXCAVATION IS LESS THAN 1'-0" DEEP BY 1'-0" WIDE UNLESS NOTED OTHERWISE.
3. IF PIPING OCCURS AT FTG. LOCATION AND CANNOT BE MOVED OR RE-LOCATED, STEP FTG. AS REQD. SEE 7/- FOR ADDNL. INFO.
4. WALL ABOVE AND ADDITIONAL INFO. NOT SHOWN.
5. CONDUIT OR PIPE SHALL BE PERPENDICULAR TO FOOTING.



7 SECTION
3/4" = 1'-0"

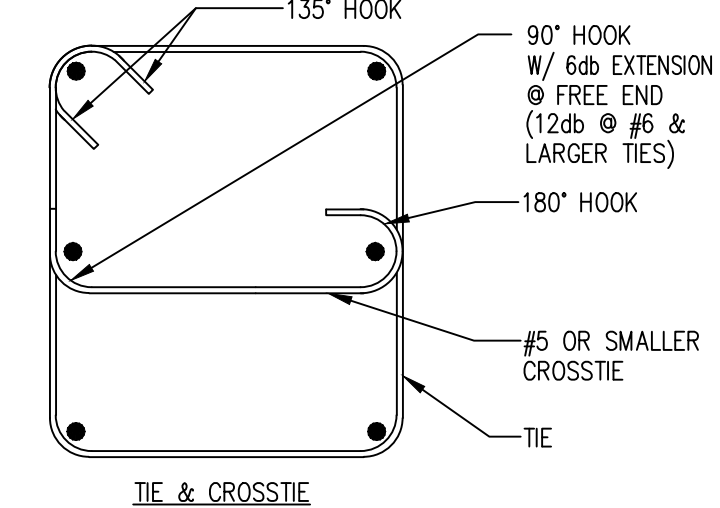


MINIMUM DIAMETER OF BEND PRIMARY REINFORCEMENT	
BAR SIZE "db"	MINIMUM DIAMETER "D"
#3 - #8	6db
#9 - #11	8db
#14 & #18	10db

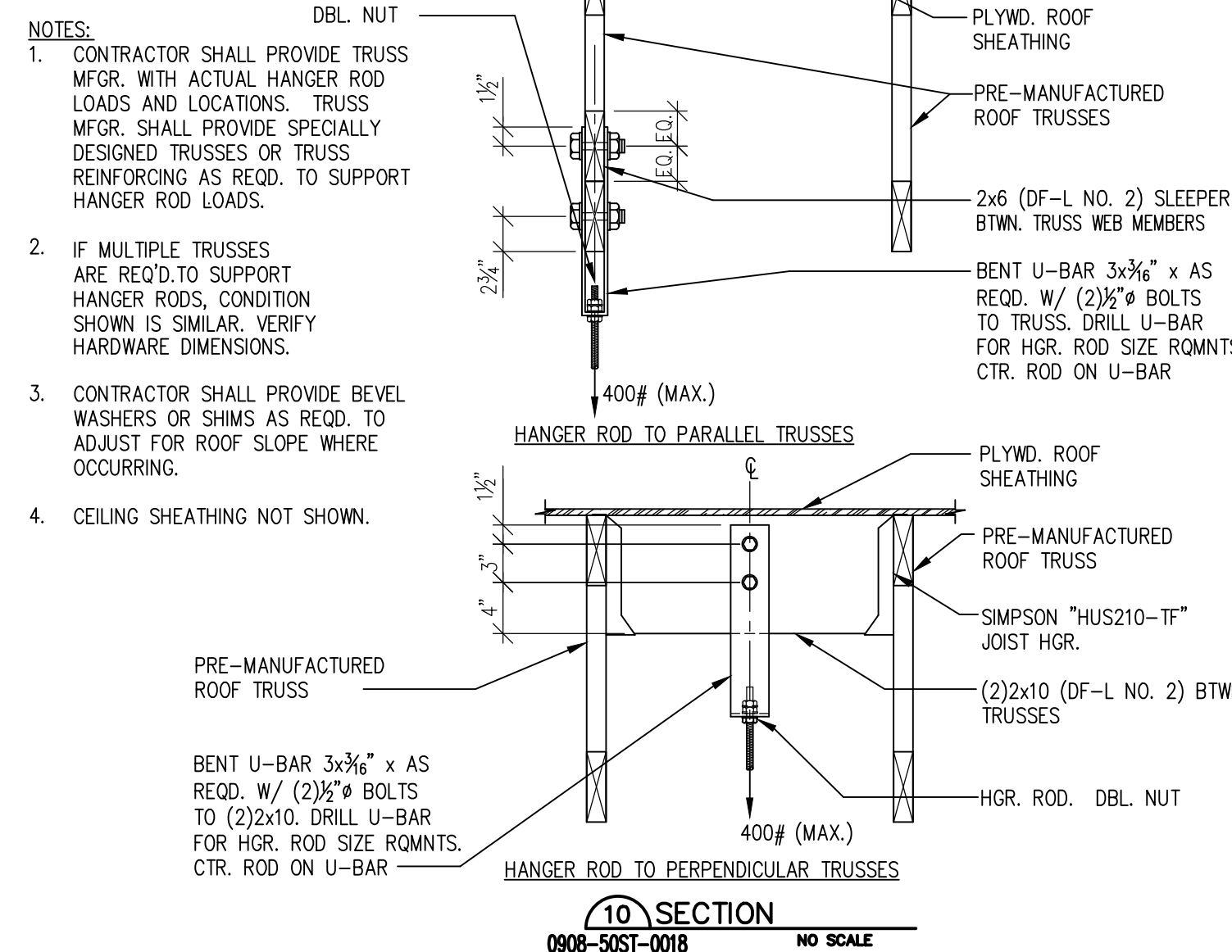
(D) MEASURED ON INSIDE OF BAR

MINIMUM DIAMETER OF BEND TIES AND STIRRUPS	
BAR SIZE "db"	MINIMUM DIAMETER "D"
#3 - #5	4db
#6 - #8	6db

(D) MEASURED ON INSIDE OF BAR

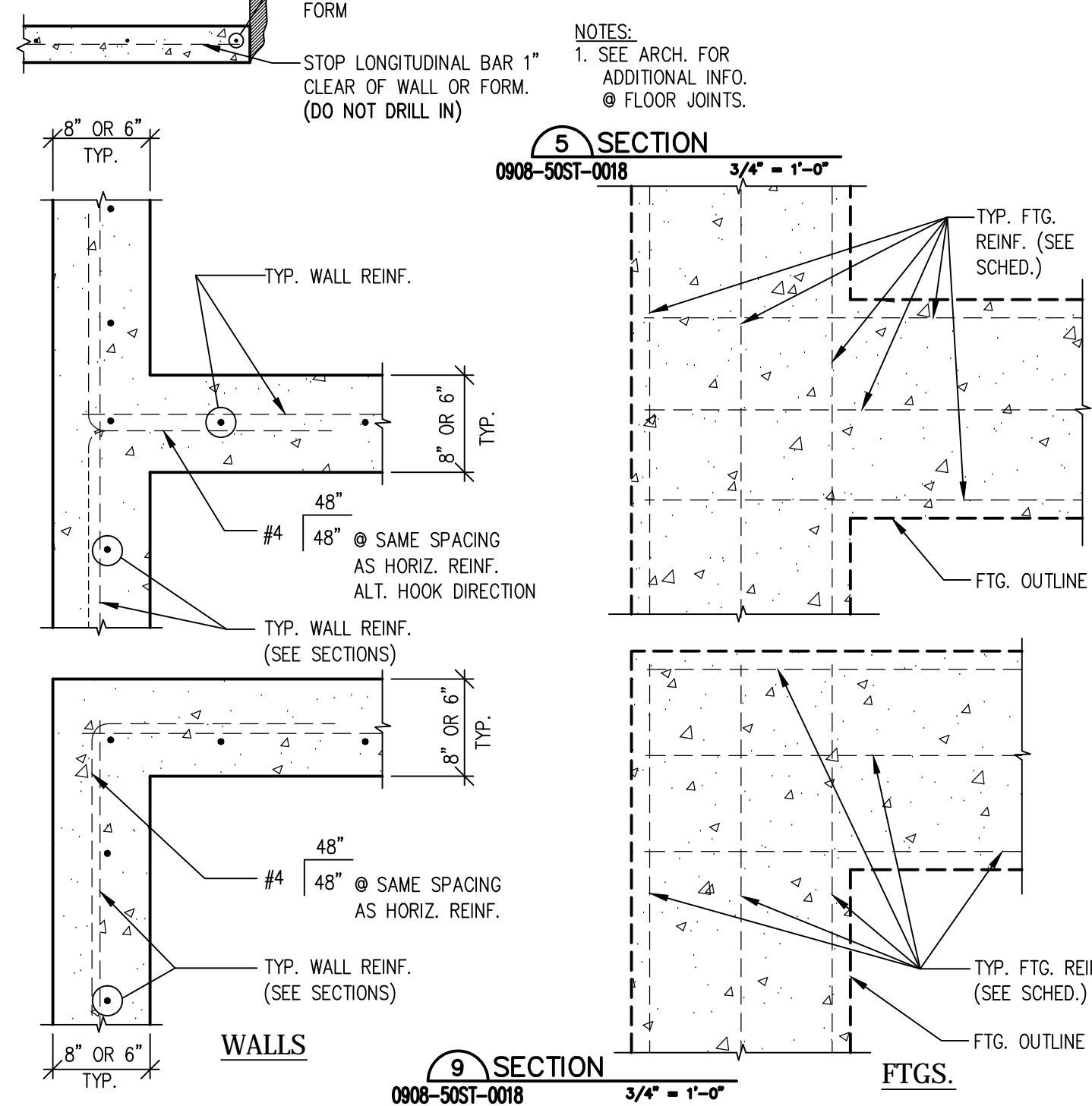


8 ACI MINIMUM BENDS
N.T.S.

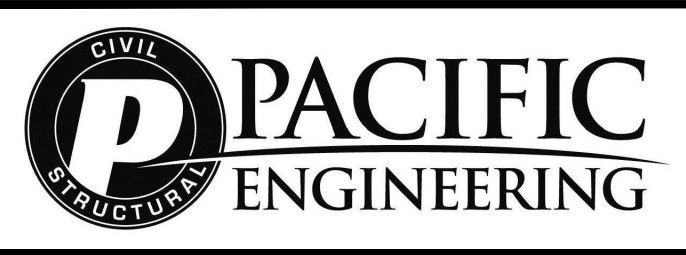


10 SECTION
NO SCALE

- NOTES:
1. CONTRACTOR SHALL PROVIDE TRUSS MFR. WITH ACTUAL HANGER ROD LOADS AND LOCATIONS. TRUSS MFR. SHALL PROVIDE SPECIALLY DESIGNED TRUSSES OR TRUSS REINFORCING AS REQD. TO SUPPORT HANGER ROD LOADS.
2. IF MULTIPLE TRUSSES ARE REQD. TO SUPPORT HANGER RODS, CONDITION SHOWN IS SIMILAR. VERIFY HARDWARE DIMENSIONS.
3. CONTRACTOR SHALL PROVIDE BEVEL WASHERS OR SHIMS AS REQD. TO ADJUST FOR ROOF SLOPE WHERE OCCURRING.
4. CEILING SHEATHING NOT SHOWN.



9 SECTION
0908-50ST-0018 3/4" = 1'-0"



CONSULTANT	CHELAN PUD NO.1
DRAWN BY: RHW	PRIM. ENG. COURT HILL
DESIGNED BY: APJ	2ND ENG. -
APPROVED BY: MRR	PROJ. MGR. -

SCALE	VERIFY SCALE
AS NOTED	0 1"
0 4/10/2015	BID SET
REV	DATE
REVISION	REQ. BY
	DRFT

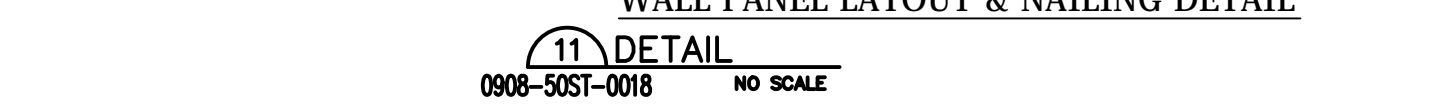
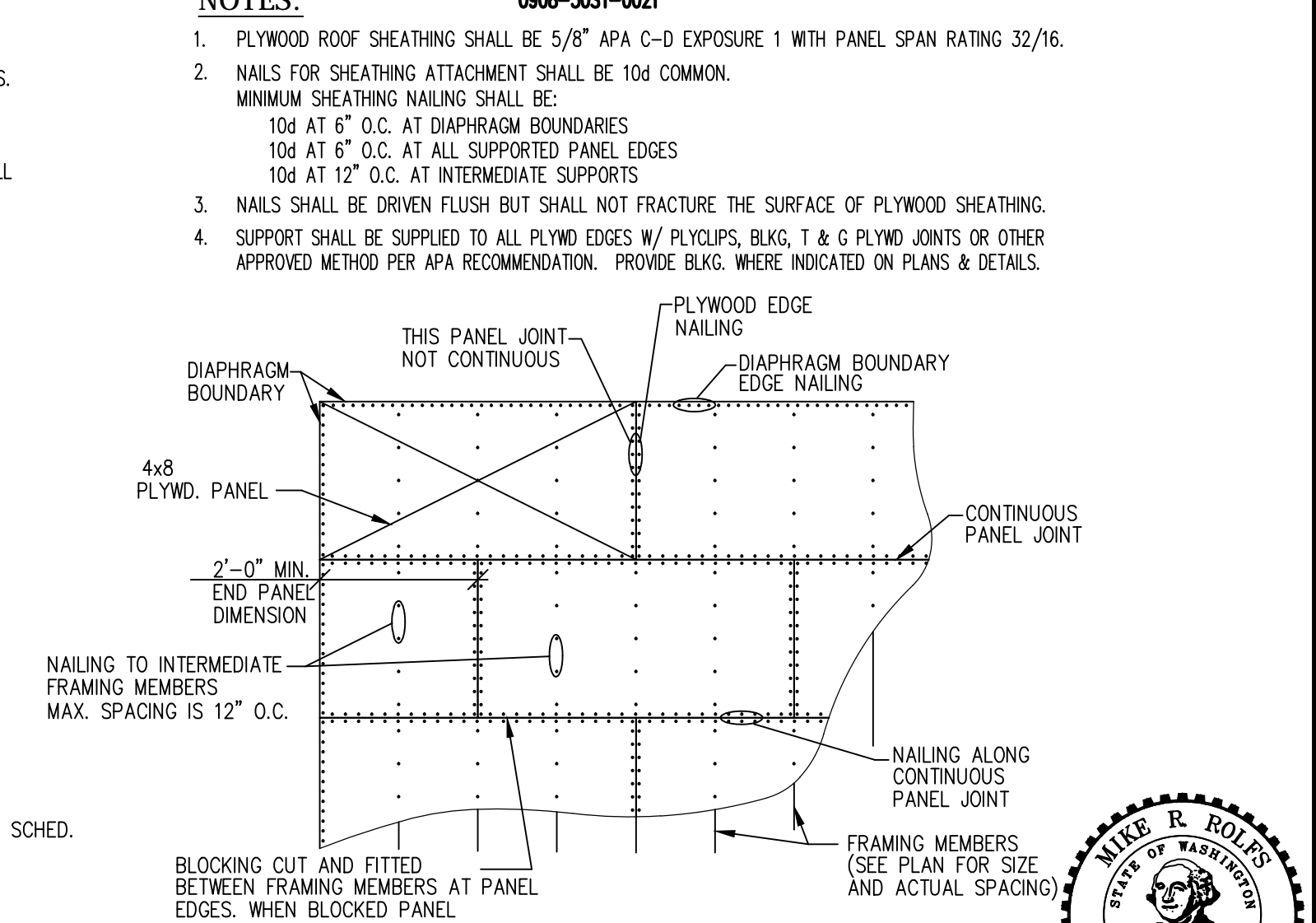
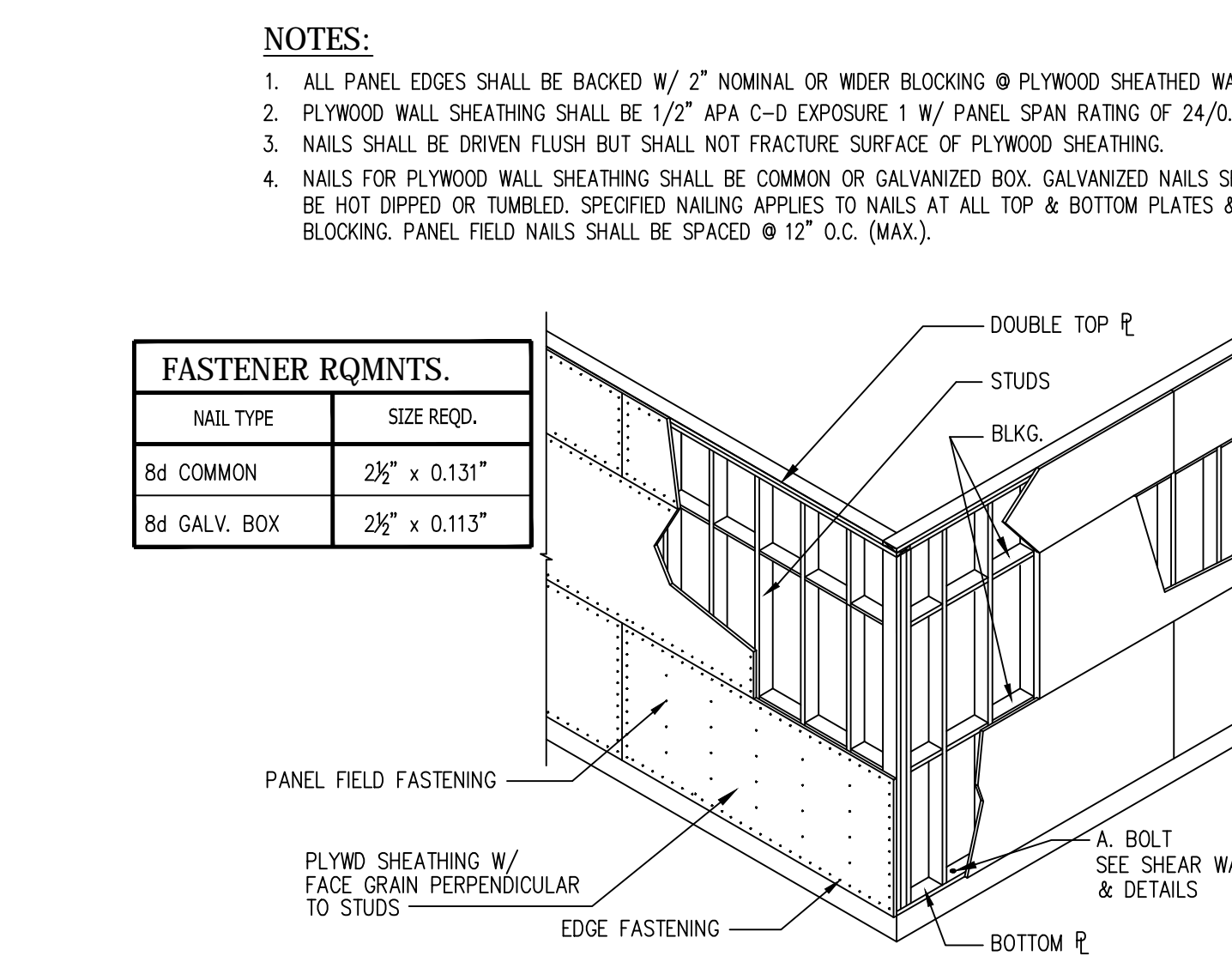
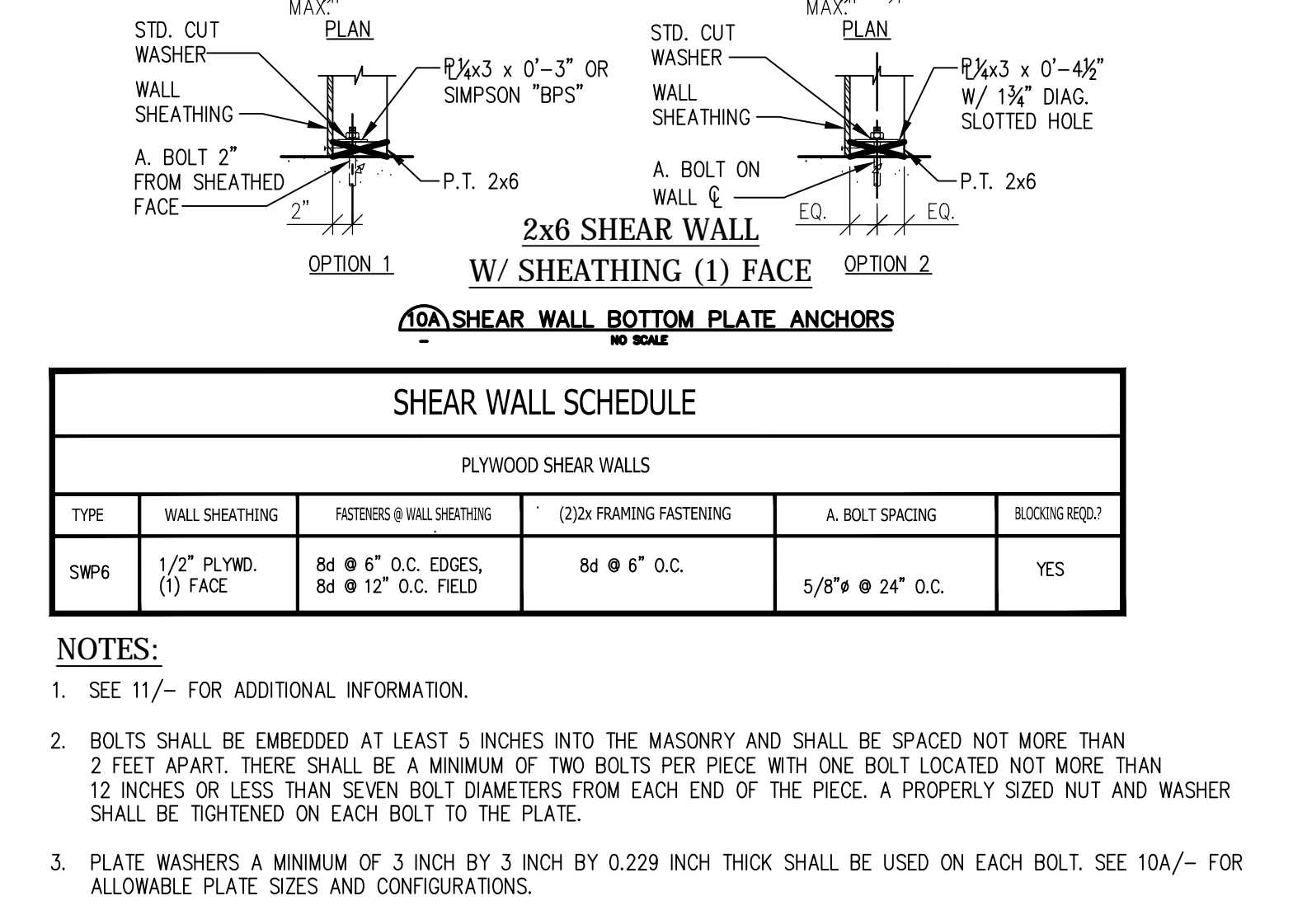
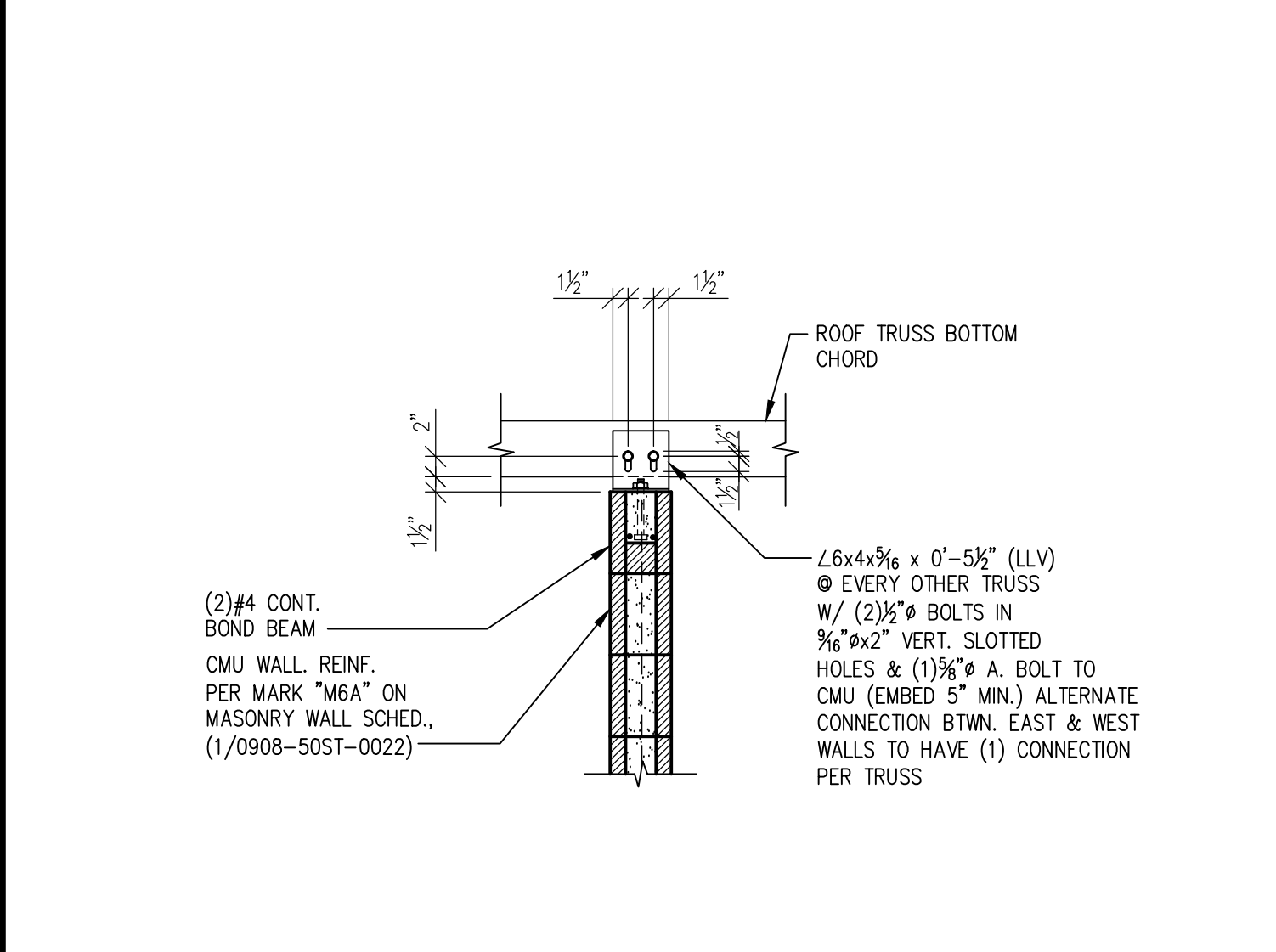
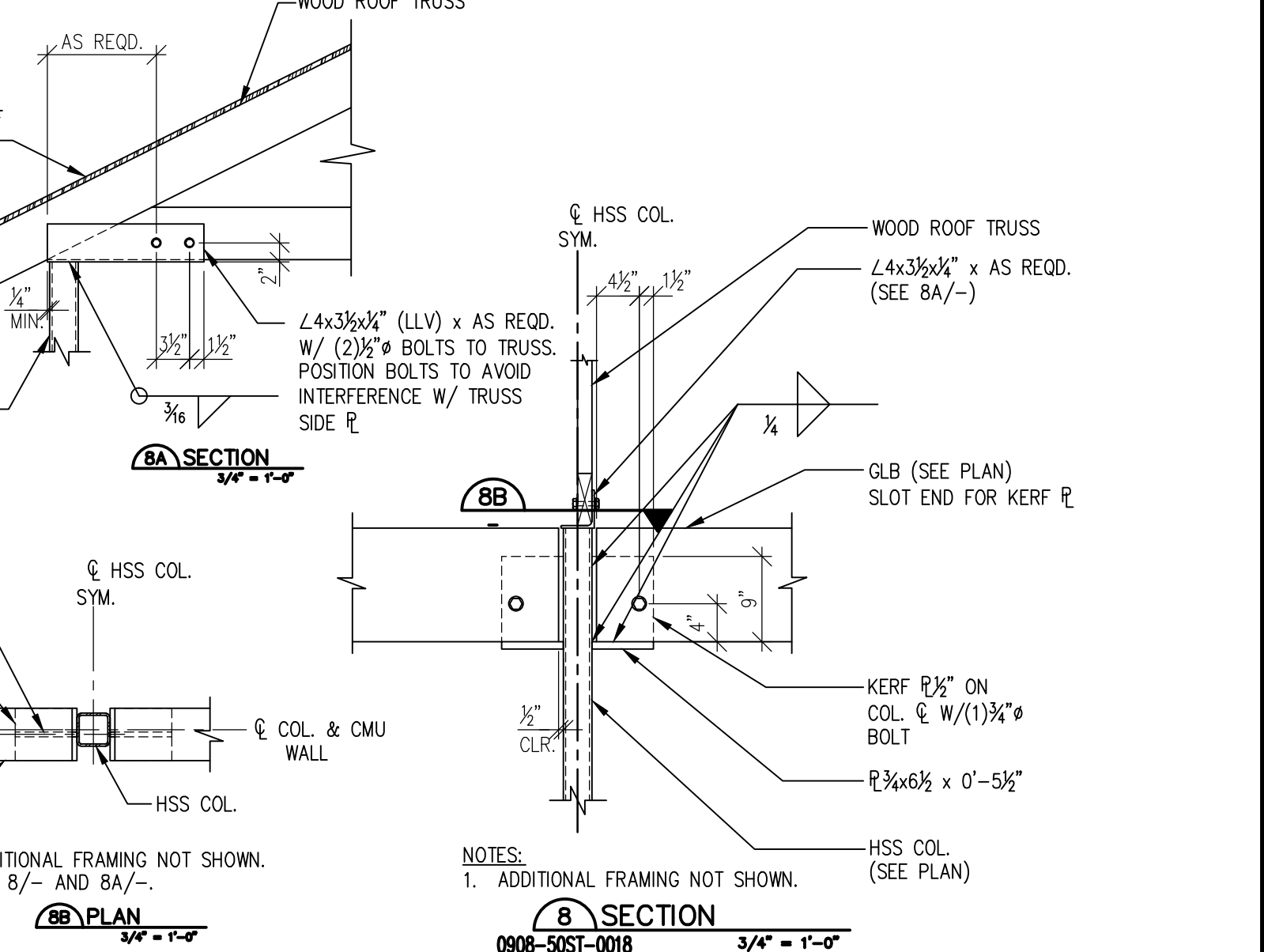
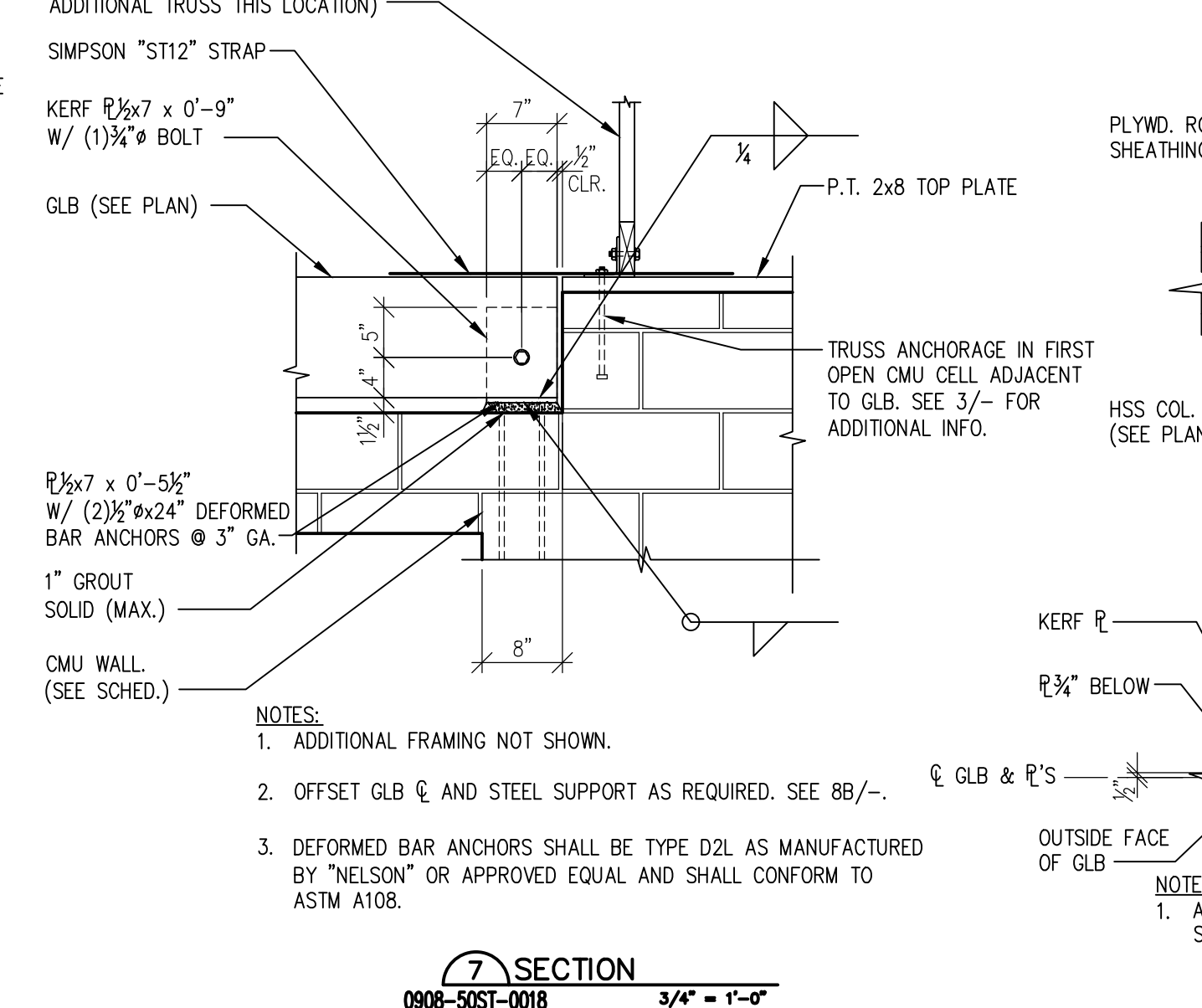
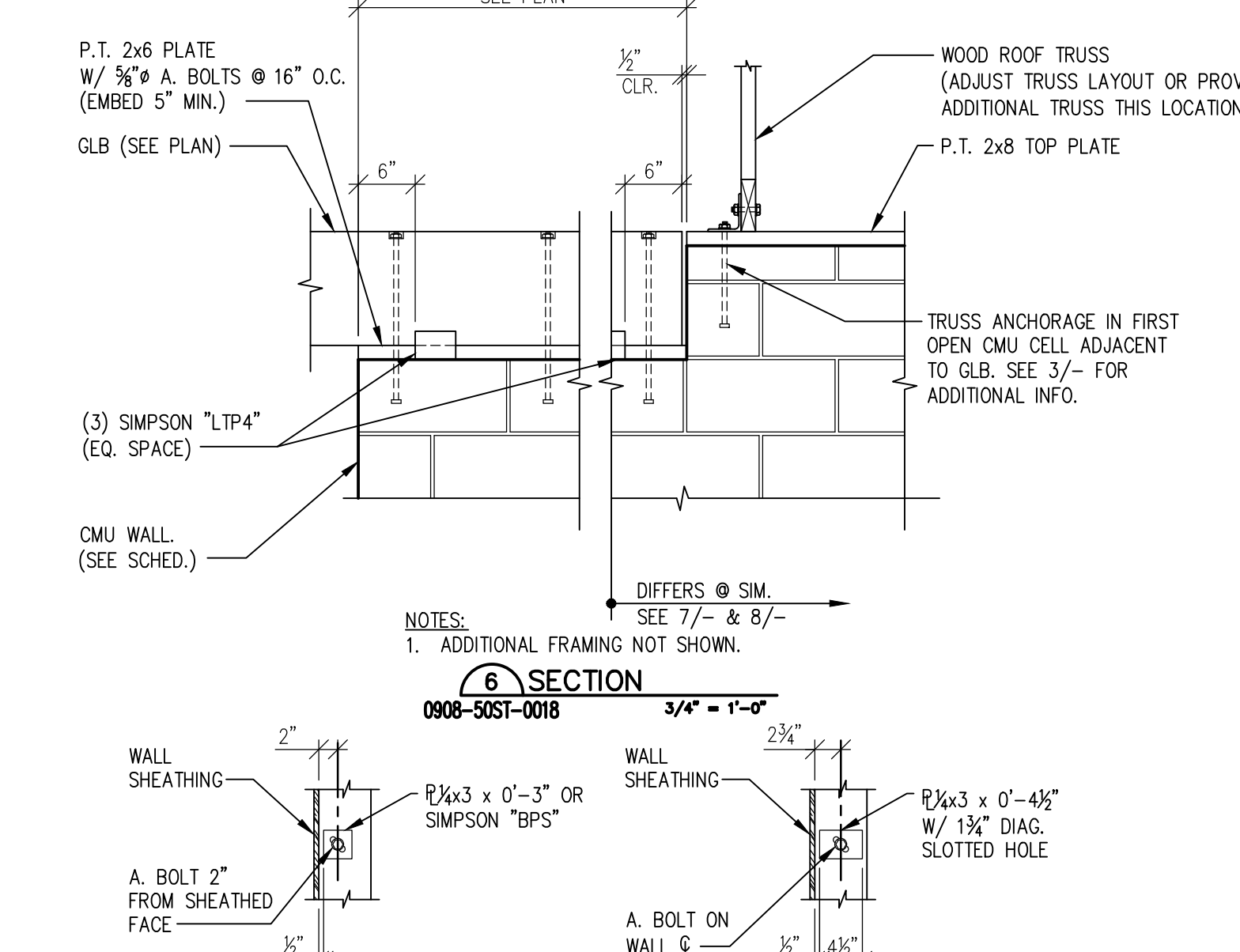
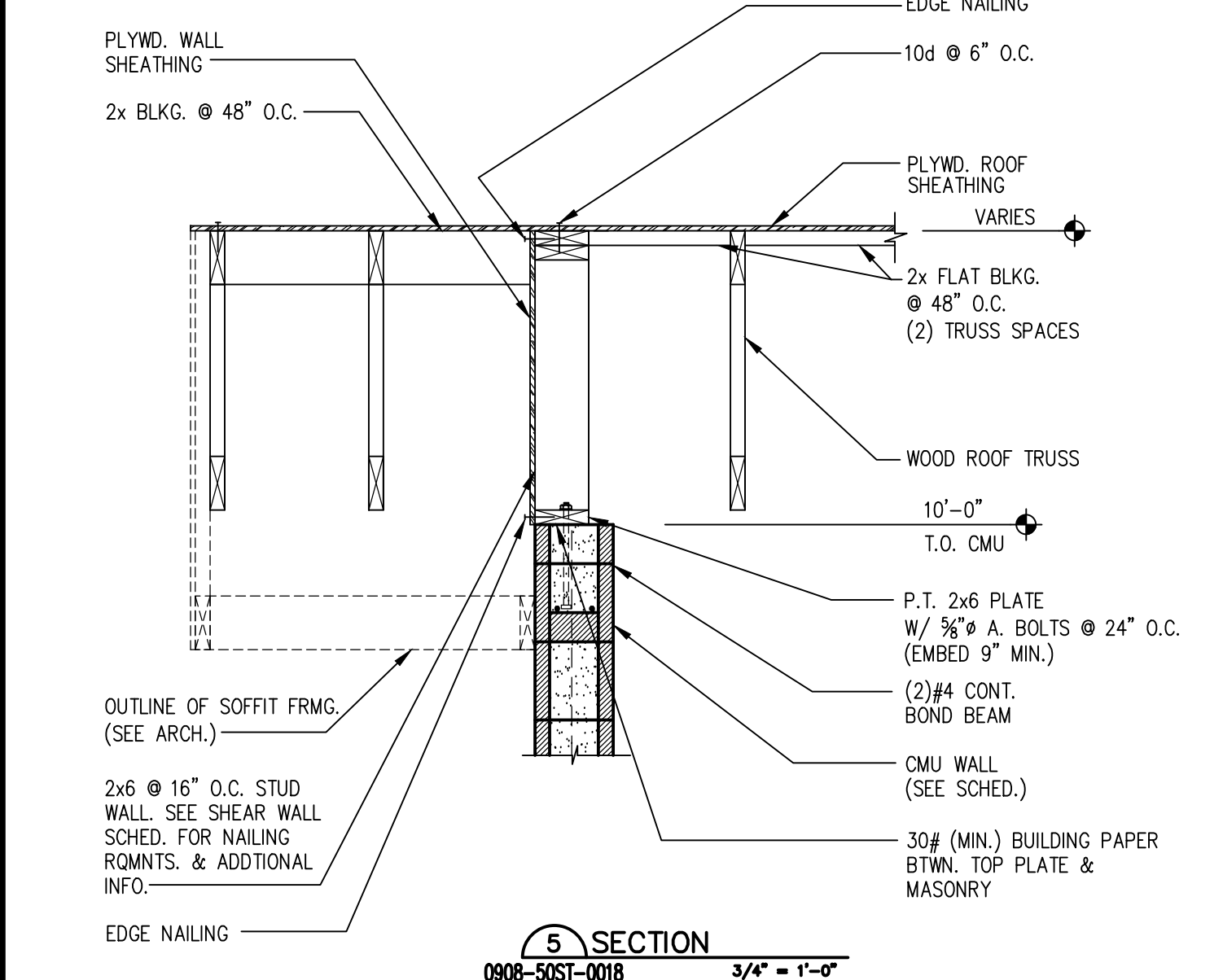
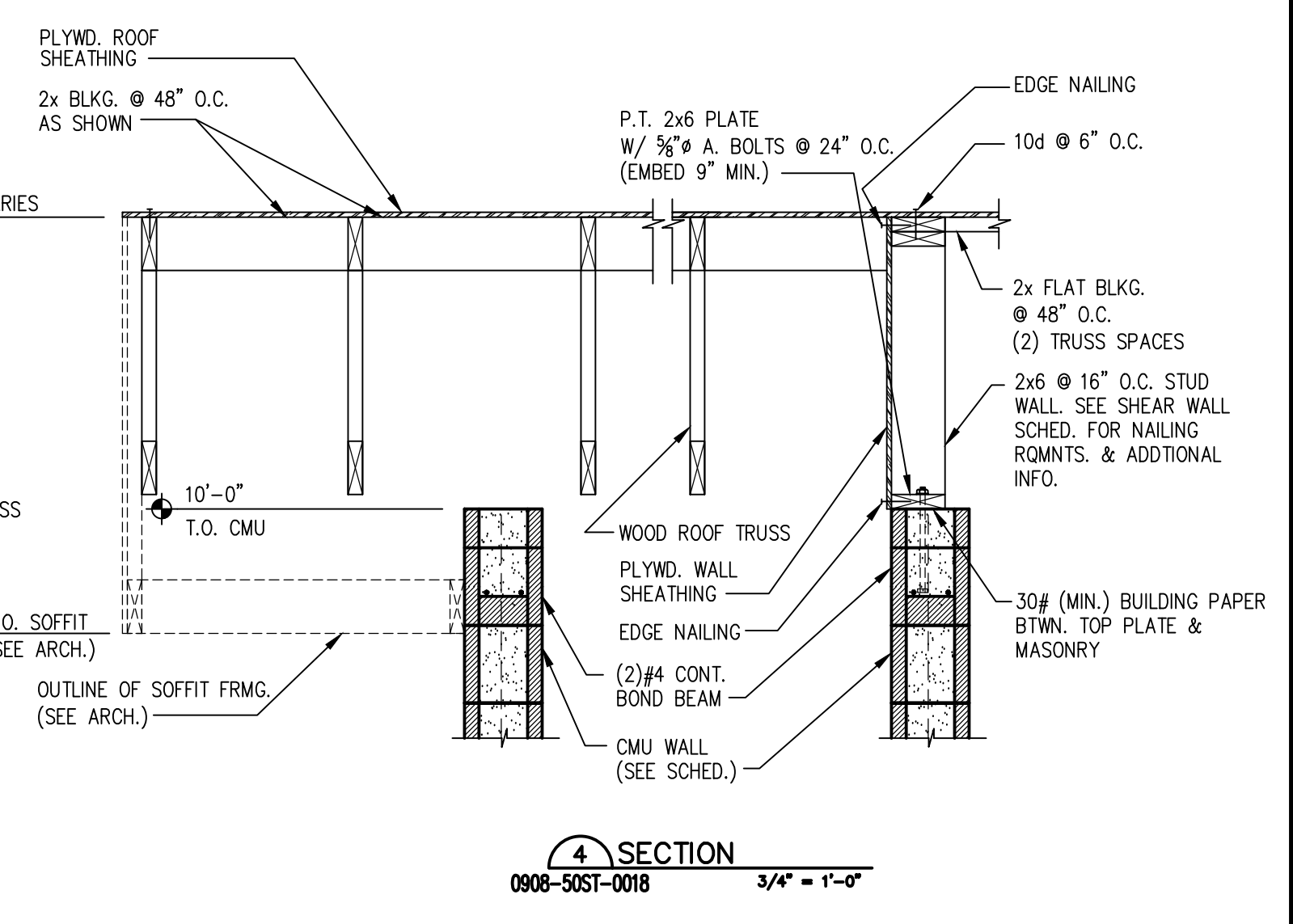
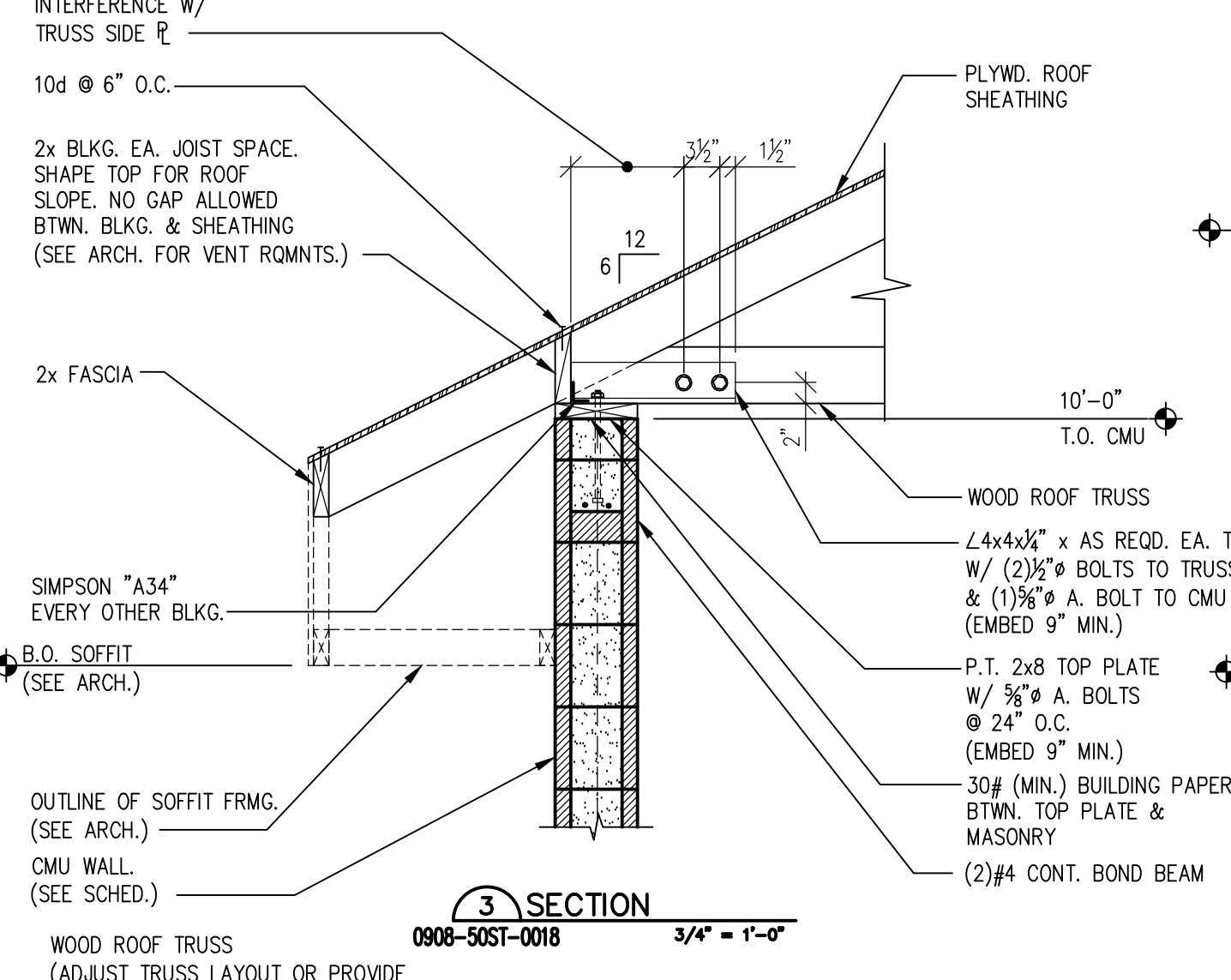
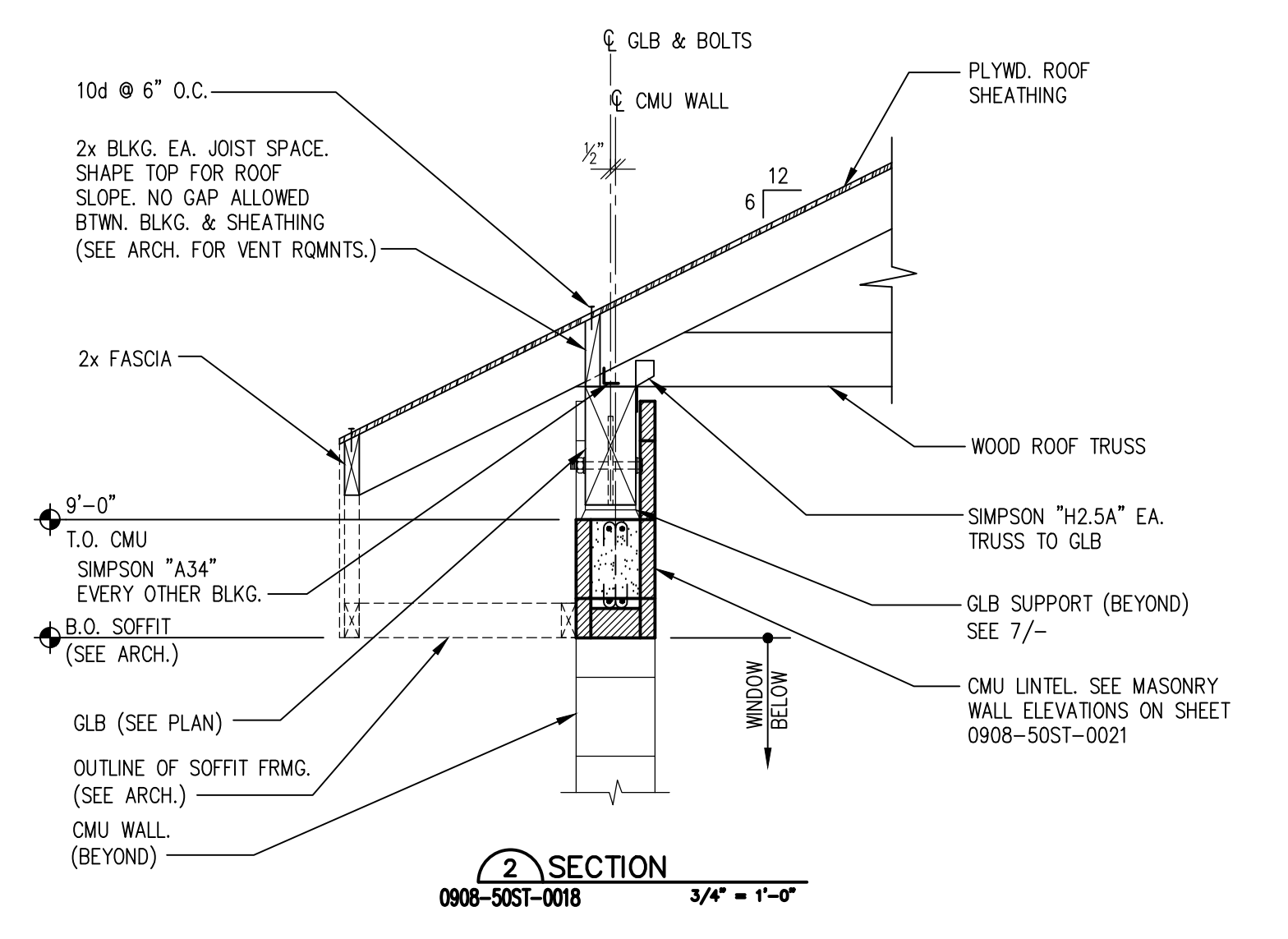
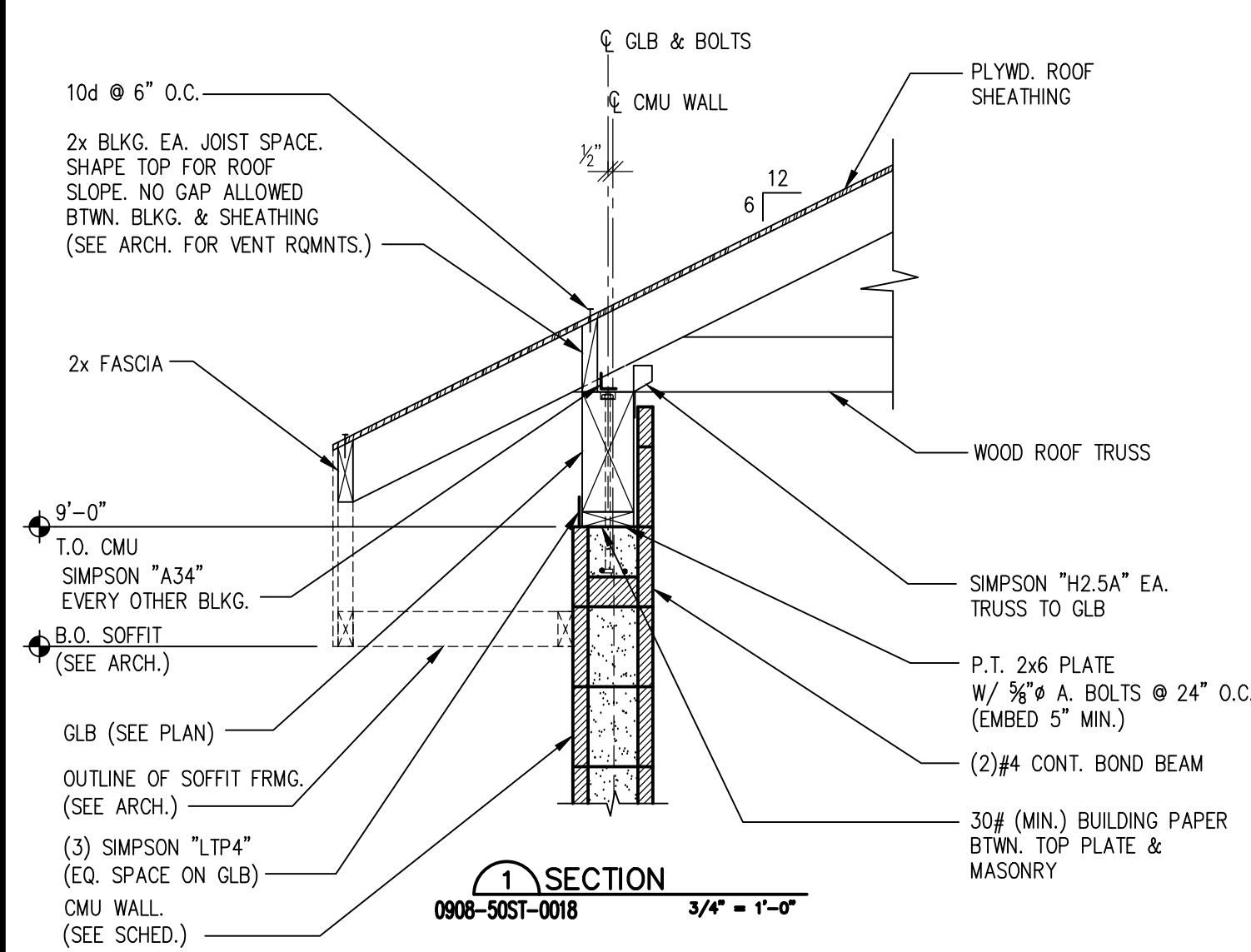
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
FOUNDATION DETAILS
BID 15-04

SHEET AS2 OF AS5
REVISION 0
DATE 4/10/2015
DWG. 0908-50ST-0019



ORIG. DRAWN PED
ORIG. DATE



CONSULTANT	CHELAN PUD NO.1
DRAWN BY: RHW	PRIM. ENG. COURT HILL
DESIGNED BY: APJ	2ND ENG. -
APPROVED BY: MRR	PROJ. MGR. -

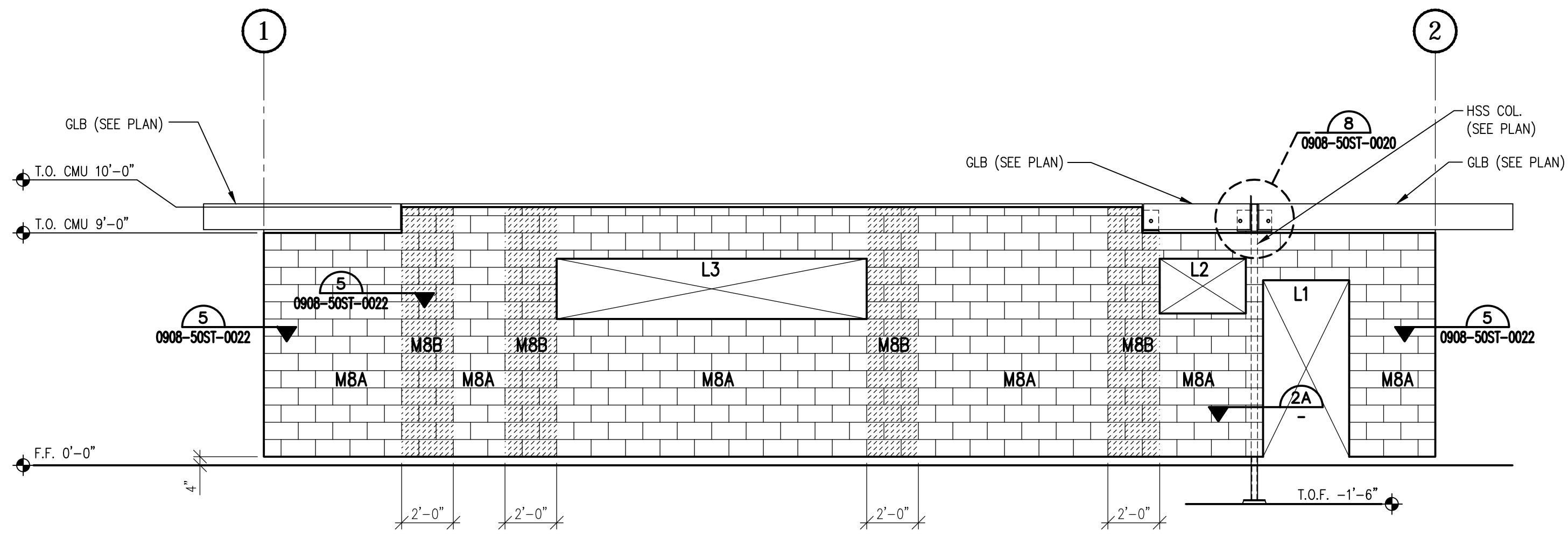
SCALE	AS NOTED
DATE	4/10/2015
REV	BID SET

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

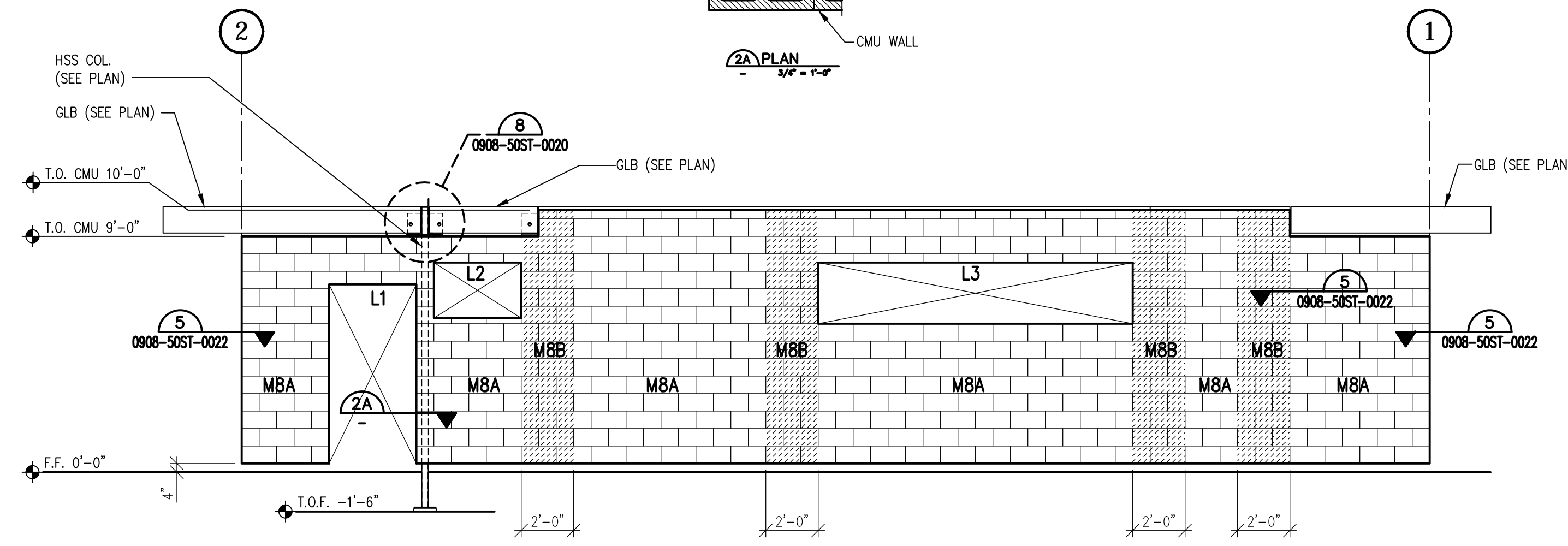
DAROGA STATE PARK GROUP CAMP IMPROVEMENTS
FRAMING DETAILS
BID 15-04

SHEET	AS3 OF AS5
REVISION	0
DATE	4/10/2015
DWG.	0908-50ST-0020

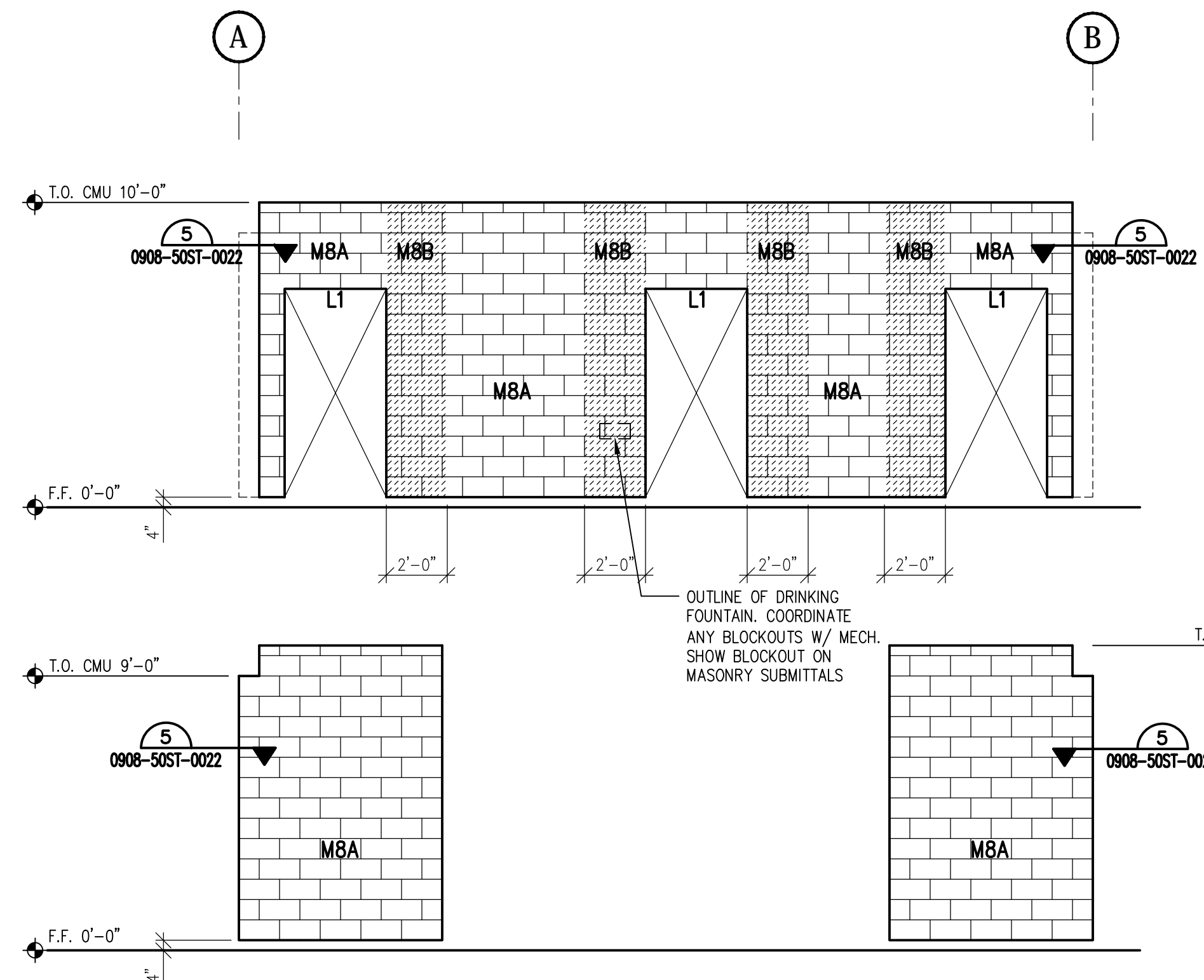
ORIG. DRAWN: PED



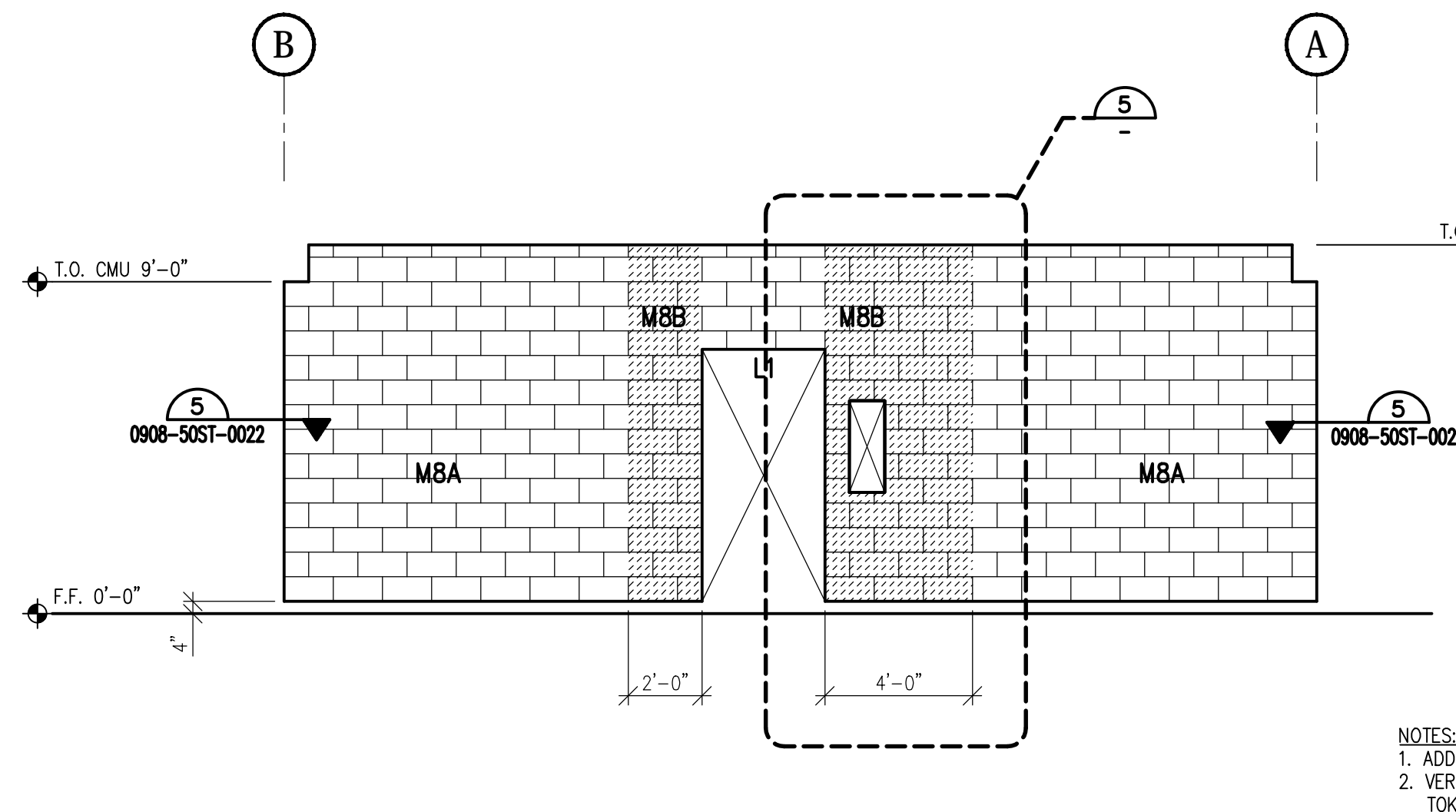
1 SOUTH MASONRY ELEVATION
1/4" = 1'-0"



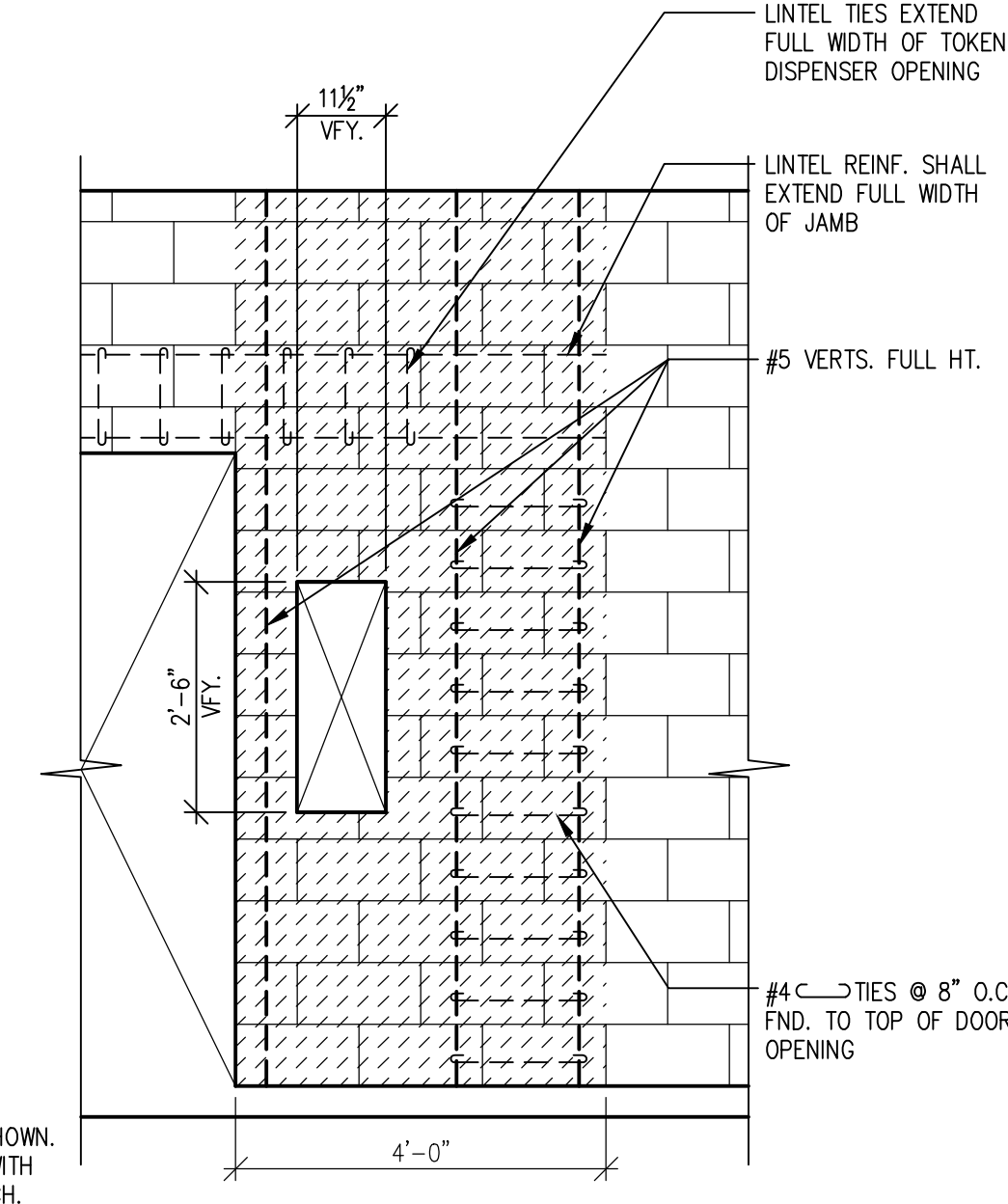
2 NORTH MASONRY ELEVATION
1/4" = 1'-0"



3 WEST MASONRY ELEVATION
1/4" = 1'-0"



4 EAST MASONRY ELEVATION
1/4" = 1'-0"



5 TOKEN DISPENSER BLOCKOUT DETAIL
1/2" = 1'-0"

HOLLOW MASONRY UNIT (CMU):
ALL HOLLOW CONCRETE MASONRY MATERIALS AND PLACEMENT SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE "INTERNATIONAL BUILDING CODE (IBC)" AND ACI 530/ASCE 5/TMS 402. THE MASONRY ASSEMBLY SHALL CONSIST OF THE COMBINATION OF THE MASONRY UNITS, MORTAR, AND GROUT MATERIALS.

ALL CONCRETE MASONRY UNITS SHALL CONFORM TO GRADE N TYPE 1 PER IBC SECTION 2103 AND ASTM C90. THE UNIT STRENGTH SHALL EQUAL OR EXCEED THAT REQUIRED TO OBTAIN THE SPECIFIED MASONRY ASSEMBLY STRENGTH IN ACCORDANCE WITH IBC SECTION 2105 FOR TYPE S MORTAR.

ALL MASONRY MORTAR SHALL CONFORM TO IBC SECTION 2103 AND ASTM C270, TYPE S. THE PROPORTIONS OF SAND, CEMENT, AND LIME SHALL BE CONTROLLED. SHOVEL COUNTS SHALL NOT BE USED. PLASTIC OR MASONRY CEMENT MORTARS SHALL NOT BE USED.

ALL MASONRY GROUT SHALL CONFORM TO IBC SECTION 2103 AND TABLE 2103.12 OR ASTM C476. GROUT SHALL BE PROPORTIONED BY LABORATORY OR FIELD EXPERIENCE TO OBTAIN THE REQUIRED MASONRY ASSEMBLY STRENGTH F'M GIVEN ABOVE. GROUT SHALL HAVE COMPRESSIVE STRENGTH EQUAL TO OR GREATER THAN 2000 PSI OR F'M. THE COMPRESSIVE STRENGTH OF GROUT SHALL BE DETERMINED IN ACCORDANCE WITH ASTM C1019. SUFFICIENT WATER SHALL BE ADDED TO THE GROUT BEFORE PLACEMENT TO ASSURE FILLING OF ALL CELLS TO BE GROUTED.

SPECIFIED MASONRY ASSEMBLY COMPRESSIVE STRENGTH, F'M (Psi)	MINIMUM COMPRESSIVE STRENGTH OF BLOCK UNITS (Psi)	MINIMUM GROUT COMPRESSIVE STRENGTH (Psi)
1500	1900	2000

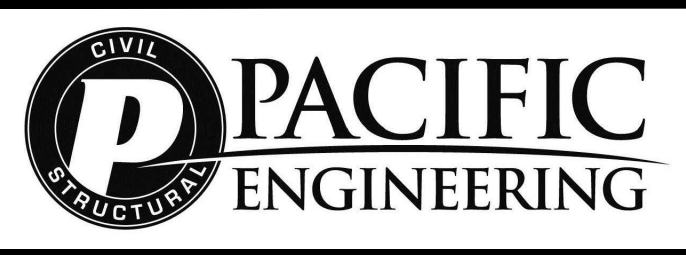
REINFORCING STEEL SHALL BE OF NEW BILLET STOCK ASTM A615, GRADE 60, F_y=60,000 PSI EXCEPT #3 BARS SHALL BE GRADE 40. VERTICAL REINFORCING SHALL BE PLACED ON WALL CENTERLINE. REINFORCING SHALL BE SECURED AGAINST DISPLACEMENT PRIOR TO GROUTING BY WIRE POSITIONERS OR OTHER SUITABLE DEVICES AT INTERVALS NOT EXCEEDING 200 BAR DIAMETERS. GROUT ALL REINFORCED COURSES IN 4'-0" MAXIMUM LIFTS.

IN ADDITION TO VERTICAL REINFORCING SHOWN ON THE ELEVATIONS AND/OR SCHEDULES, PROVIDE (1) VERTICAL BAR OF SAME SIZE AS VERTICAL WALL REINFORCING AT EDGE OF ALL OPENINGS, WALL INTERSECTIONS, ENDS, AND CORNERS UNLESS OTHERWISE NOTED. VERTICAL BARS SHALL EXTEND FROM THE FOUNDATION TO WITHIN 2' OF THE TOP OF THE TOP COURSE. LAP VERTICAL BARS 48 DIAMETERS MINIMUM.

IN ADDITION TO HORIZONTAL REINFORCING (BOND BEAMS) SHOWN ON THE ELEVATIONS AND/OR SCHEDULES, PROVIDE HORIZONTAL REINFORCING AT ELEVATIONS +0'-0", +4'-0", +8'-0", +12'-0", ETC. AND TOP AND BOTTOM OF WALL PROVIDE HORIZONTAL REINFORCING AT ALL JOIST AND BEAM BEARING/LEDGER ELEVATIONS. PROVIDE ADDITIONAL HORIZONTAL REINFORCING BELOW ALL OPENINGS AND EXTEND 40 HORIZONTAL BAR DIAMETERS OR 2'-0" MINIMUM BEYOND OPENING WHICHEVER IS GREATER. HORIZONTAL REINFORCING SHALL BE CONTINUOUS BELOW MULTIPLE OPENINGS EXCEPT WHERE DISTANCE BETWEEN OPENING EXCEEDS 12 TIMES THE UNIT THICKNESS. LAP HORIZONTAL BARS 40 DIAMETERS MINIMUM. LAP ALL BOND BEAM BARS 2'-6" AROUND CORNERS OR PROVIDE SEPARATE 90 DEGREE HOOKED CORNER BARS 4'-0" LONG EACH LEG. AT CONDITIONS WHERE THE UNIT HEIGHT IS LESS THAN 8", OR WHERE MASONRY OR LEDGERS SLOPE, HORIZONTAL BOND BEAM SHALL BE ONE (1) FULL COURSE MINIMUM IN DEPTH.

MASONRY SHALL BE LAID UP IN RUNNING BOND UNLESS SHOWN OR OTHERWISE NOTED. ALL MORTAR JOINTS SHALL BE FULLY COMPACTED BY JOINTING TO ASSURE TIGHT MORTAR JOINTS. ALL HEAD AND BED JOINTS SHALL BE FILLED SOLIDLY WITH MORTAR FOR A DISTANCE NOT LESS THAN THE THICKNESS OF THE SHELL MEASURED FROM THE FACE OF THE UNIT. ALL CELLS, BOND BEAMS, AND LINTELS CONTAINING REINFORCEMENT SHALL BE FILLED SOLID WITH GROUT. GROUT SHALL BE CONSOLIDATED BY MECHANICAL VIBRATION DURING PLACING OF GROUT AND RECONSOLIDATED BY MECHANICAL VIBRATION. HEADED ANCHOR BOLTS SHALL HAVE A STANDARD BOLT HEAD. ANCHOR BOLTS SHALL BE OF AT LEAST A307 QUALITY. ALL ANCHOR BOLTS AND OTHER EMBEDDED ITEMS SHALL BE SET IN SOLID GROUT CORES. PLACEMENT OF ANCHOR BOLTS AND OTHER EMBEDDED ITEMS THROUGH FACE SHELL SHALL BE IN DRILLED HOLES. SAWCUT HOLES ARE NOT ALLOWED.

ALL LINTELS SHALL BE LAID UP USING BOND BEAM BLOCKS WITH BLOCKOUTS REMOVED AT ALL COURSES. ALL LINTELS SHALL BE GROUTED SOLID FULL HEIGHT. HORIZONTAL LINTEL REINFORCING SHALL EXTEND NOT LESS THAN 2'-0" OR 40 BAR DIAMETERS INTO JAMBS. HORIZONTAL LINTEL REINFORCING SHALL BE CONTINUOUS BELOW MULTIPLE OPENINGS EXCEPT WHERE DISTANCE BETWEEN OPENING EXCEEDS 12 TIMES THE UNIT THICKNESS. GROUT JAMBS SOLID FULL LENGTH OF HORIZONTAL LINTEL REINFORCING.



CONSULTANT	CHELAN PUD NO.1	SCALE	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
DRAWN BY: RHW	PRIM. ENG. COURT HILL	AS NOTED		0	1"
DESIGNED BY: APJ	2ND ENG. -	0	4/10/2015	BID SET	
APPROVED BY: MRR	PROJ. MGR. -	REV	DATE	REVISION	REQ. BY DRFT

0	4/10/2015	BID SET			
REV	DATE	REVISION	REQ. BY	DRFT	

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
MASONRY WALL ELEVATIONS
BID 15-04

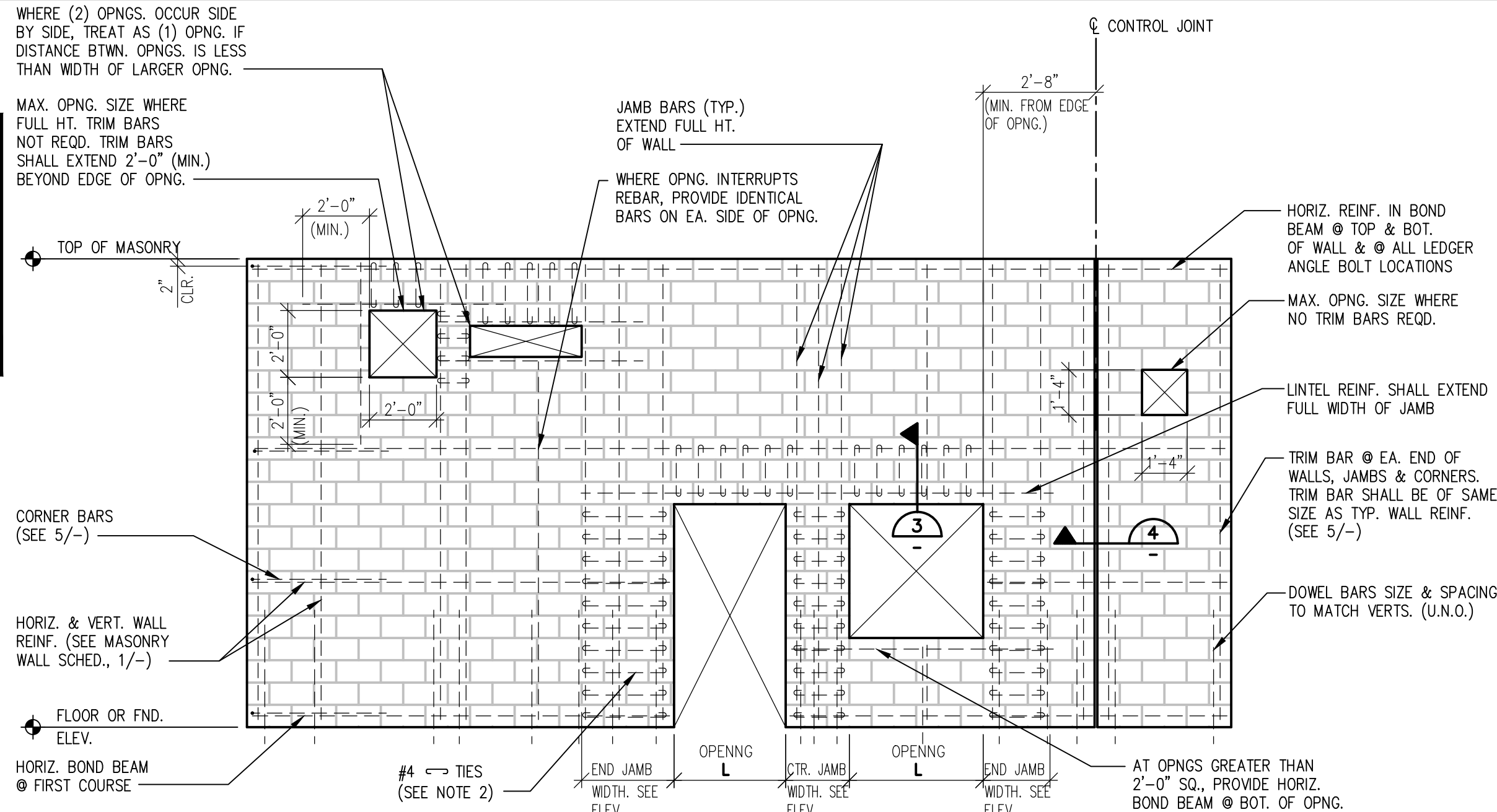
SHEET AS4 OF AS5
REVISION 0
DATE 4/10/2015
DWG. 0908-50ST-0021

ORIG. DRAWN PED
ORIG. DATE

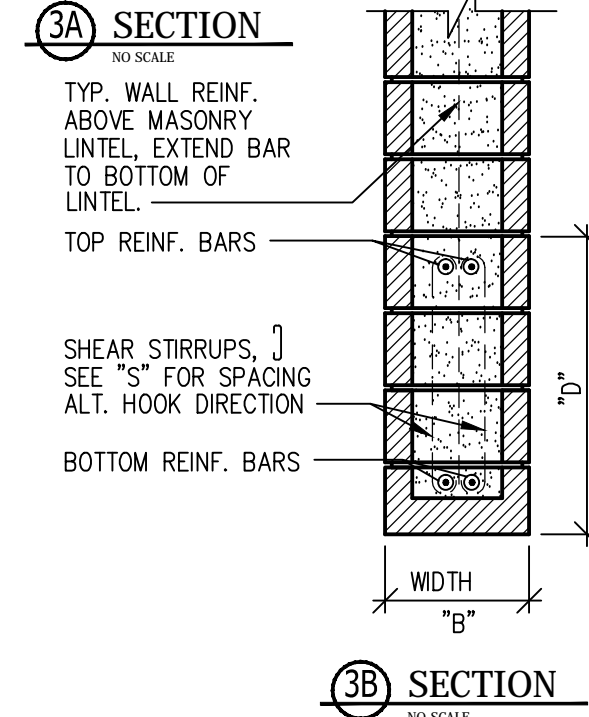
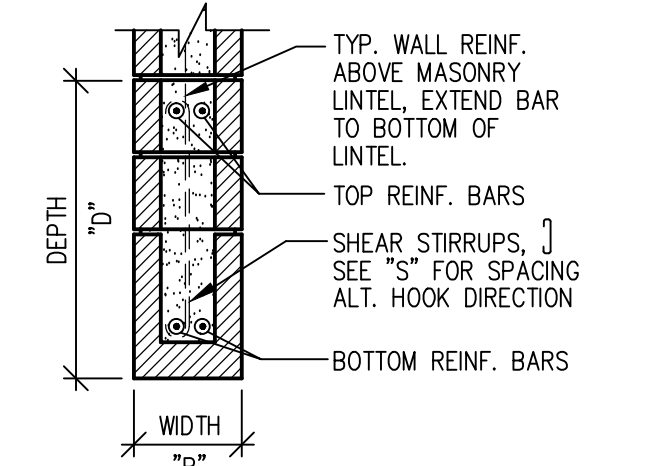


MASONRY WALL SCHEDULE				
MARK	THICKNESS	REINFORCEMENT		REMARKS
		VERTICAL	HORIZONTAL	
M6A	6"	#4 @ 32" O.C. ON WALL @	(2)#4 @ 48" O.C. BOND BEAM	
M8A	8"	#5 @ 32" O.C. ON WALL @	(2)#4 @ 48" O.C. BOND BEAM	
M8B	8"	#5 @ 16" O.C. ON WALL @	#4 @ TIES @ 8" O.C. FND. TO TOP OF OPNG. (2)#4 @ 48" O.C. BOND BEAM ON REMAINDER	SOLID GROUT

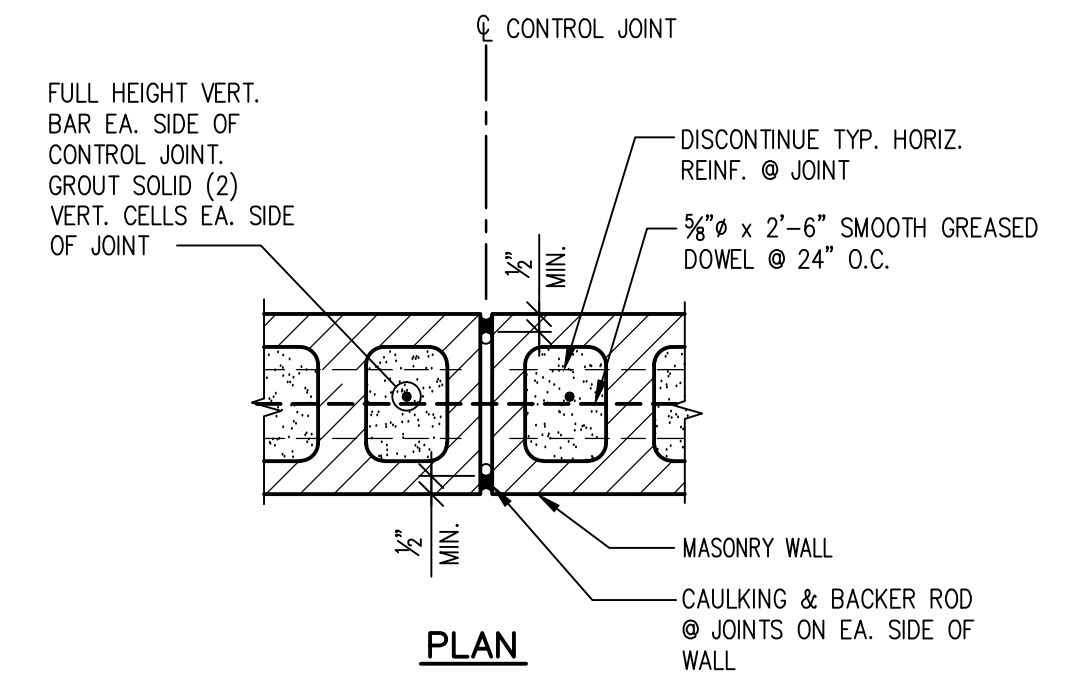
MASONRY ASSEMBLAGE COMPRESSIVE STRENGTH, F'M = 1500 PSI. SPECIAL INSPECTION REQUIRED



MASONRY LINTEL SCHEDULE							
MARK	LENGTH	SIZE		REINFORCING		S	NOTES
		"B"	"D"	BOT.	TOP		
L1	4'-0"	8"	16"	(2)#4	(2)#4	#4	8" O.C.
L2	4'-0"	8"	12"	(2)#4	(2)#4	#4	8" O.C.
L3	12'-0"	8"	24"	(2)#5	(2)#5	#4	8" O.C.



3 MASONRY WALL/LINTEL SECTION
NO SCALE



4 TYP. CMU CONTROL JOINT
NO SCALE

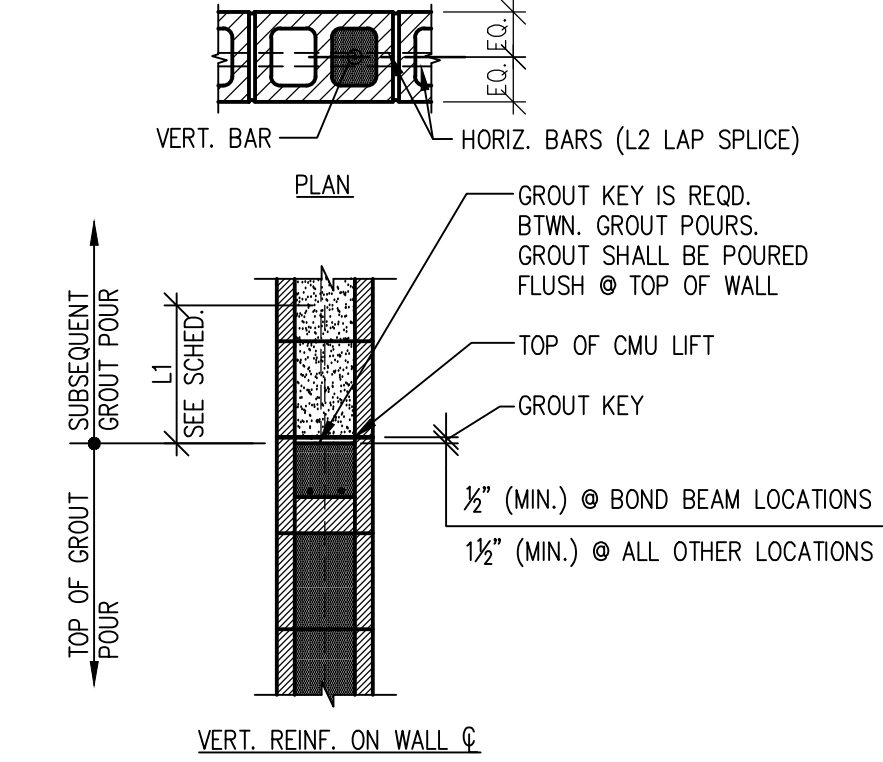
- NOTES:**
- MASONRY WALL SCHEDULE INDICATES MINIMUM REINFORCING UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWINGS. SEE 2/- FOR ADDITIONAL INFORMATION.
 - FILL ALL BLOCK VOIDS CONTAINING REINFORCING STEEL, ANCHOR BOLTS, OR EPOXY ANCHOR BOLTS WITH GROUT. GROUT SHALL BE CONSOLIDATED DURING PLACING OF GROUT AND RECONSOLIDATED BY MECHANICAL VIBRATION.
 - CLEANOUTS ARE REQUIRED FOR MASONRY GROUT POURS IN EXCESS OF FIVE FEET.
 - PLASTIC OR MASONRY CEMENT SHALL NOT BE USED IN MORTAR OR GROUT.
 - FRAME ALL OPENINGS 24" OR LESS IN WIDTH WITH (1)#5 AT 8" WALL. EXTEND HORIZONTALS 24" MINIMUM BEYOND OPENING CORNERS. AT HEAD AND SILL SEE 2/- FOR ADDITIONAL INFORMATION AND FOR MASONRY LINTEL AND JAMB REQUIREMENTS AT LARGER OPENINGS.
 - ALL CORNERS AND JAMBS NOT OTHERWISE NOTED TO BE REINFORCED WITH CONTINUOUS VERTICAL BAR SAME SIZE AS TYPICAL WALL REINFORCING. SEE 5/- FOR ADDITIONAL INFORMATION.
 - SEE 4/- FOR TYPICAL CMU CONTROL JOINT INFORMATION.
 - GROUT KEYS SHALL BE INCLUDED IN EACH SUBSEQUENT GROUT POUR. SEE 6/- FOR ADDITIONAL INFORMATION.
 - MODULE BOND BEAMS TO ALIGN WITH ADJACENT WALL BOND BEAMS.
 - MASONRY WALL CONSTRUCTION SHALL CONFORM TO HOLLOW MASONRY UNIT NOTES (SHEET 0908-50ST-0021).

- NOTES:**
- FOR WALL REINFORCING NOT SHOWN OR NOTED, SEE MASONRY WALL SCHEDULE (1/-).
 - PROVIDE #4 @ 8" O.C. FROM FOUNDATION OR FLOOR TO TOP OF OPENING. PROVIDE TYPICAL BOND BEAM SIZE AND SPACING ABOVE OPENING LINTEL (U.N.O.)
 - BOTTOM OF BOND BEAMS SHALL HAVE METAL LATH OR NYLON SCREEN.
 - BOND BEAM BLOCKS SHALL HAVE KNOCKOUT WEBS. LINTEL BLOCKS TO BE CHANNEL "U" BLOCKS.
 - CORE DRILLING IS NOT ALLOWED. PROVIDE BLOCKOUTS FOR ALL OPENINGS. COORDINATE WITH ALL ARCHITECTURAL, ELECTRICAL, MECHANICAL AND PLUMBING DRAWINGS FOR LOCATIONS AND SIZES OF REQUIRED OPENINGS.

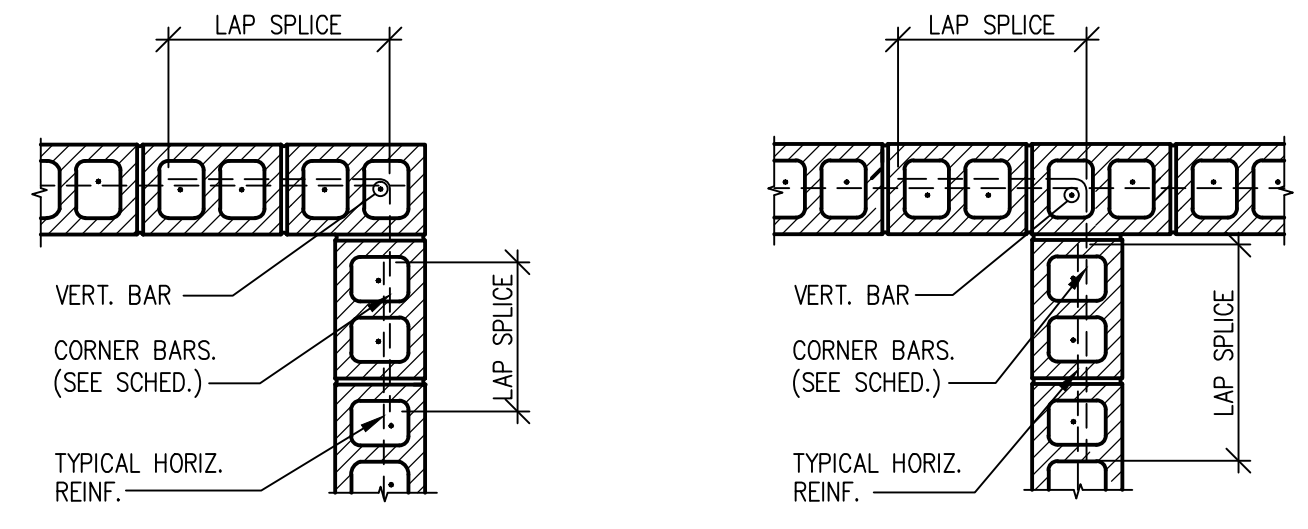
1 MASONRY WALL SCHEDULE
NO SCALE

2 MASONRY WALL/LINTEL ELEVATION
NO SCALE

LAP SPLICE SCHEDULE	
REINF. SIZE	MIN. LAP SPLICE LENGTH, L1 REINF. ON CL
#3	1'-6"
#4	2'-0"
#5	2'-8"



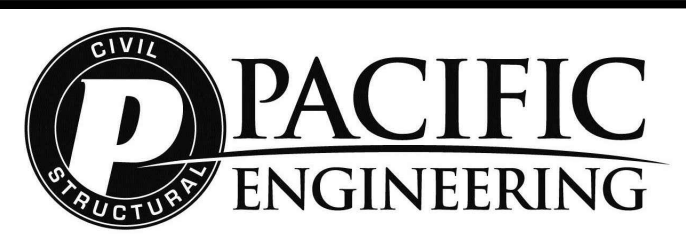
6 REINF. PLACEMENT & SPLICE
NO SCALE



CORNER BAR SCHEDULE	
REINF. SIZE	CORNER BAR
#3	24
#4 & #5	42

- NOTES:**
- CORNER BARS SHALL BE SAME SIZE AS HORIZONTAL REINFORCING.
 - FOR CORNER BARS INTERRUPTED BY OPENING, HOOK AROUND OPENING VERTS., WITH 180° HOOK.
 - HORIZONTAL BARS MUST HOOK AROUND VERTICAL CORNER OR INTERSECTING WALL REINFORCING.
 - CORNER SHALL BE RUNNING BOND. IF STACK BOND, EVERY OTHER FACE SHELL TO BE REMOVED TO ACT AS KEYWAY.

5 WALL CORNERS & INTERSECTIONS
NO SCALE



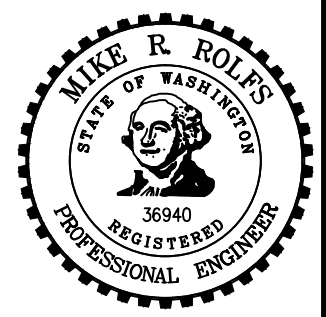
CONSULTANT		CHELAN PUD NO.1	
DRAWN BY: RHW	PRIM. ENG. COURT HILL	SCALE AS NOTED	
DESIGNED BY: APJ	2ND ENG. -	0 4/10/2015	BID SET
APPROVED BY: MRR	PROJ. MGR. -	REV	DATE

VERIFY SCALE			
BAR IS ONE INCH ON ORIGINAL DRAWING.	0	1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
REVISION		REQ. BY	DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
MASONRY DETAILS
BID 15-04

SHEET AS5 OF AS5
REVISION 0
DATE 4/10/2015
DWG. 0908-50ST-0022



ORIG. DRAWN PED

LEGEND

— — — — —	WATER (OUTSIDE BUILDING)		STRAINER	AFF	ABOVE FINISHED FLOOR
— W — — —	WASTE LINE ABOVE GRADE		THREE-WAY CONTROL VALVE	CO	CLEANOUT
— W — — —	WASTE LINE BELOW GRADE		TWO-WAY CONTROL VALVE	COTG	CLEANOUT THRU FLOOR
— V — — —	VENT PIPING		PRESSURE REDUCING VALVE	COTW	CLEANOUT TO GRADE
— — — — —	DOMESTIC COLD WATER		PRESSURE REGULATING VALVE (GAS)	FD	FLOOR DRAIN
— — — — —	DOMESTIC HOT WATER		GAS COCK	HB	HOSE BIBB
— — — — —	DOMESTIC HOT WATER RECIRC.		FLEXIBLE PIPE CONNECTOR	IE	INVERT ELEVATION
— D — — —	DRAIN LINE		PRESSURE GAUGE	RD	ROOF DRAIN
— G — — —	NATURAL GAS		THERMOMETER	TYP	TYPICAL
— GV — — —	GAS VENT		THERMOMETER WELL	VTR	VENT THRU ROOF
— ID — — —	INDIRECT WASTE		GATE VALVE WITH HOSE END CONN.	WH	WALL HYDRANT
	CONTINUATION OF PIPING		SOLENOID VALVE	SF	SUPPLY FAN
	TEE DOWN		SAFETY VALVE	EF	EXHAUST FAN
	TEE UP		ELECTRIC DUCT COIL	EDC	
	ELBOW DOWN				
	ELBOW UP				
	ROUND FLOOR DRAIN				
	SQUARE FLOOR DRAIN				
	PUMP				
	CHECK VALVE (FLOW TO RIGHT)				
	CHECK VALVE (FLOW TO LEFT)				
	GATE VALVE				
	GLOBE VALVE				
	BALL VALVE				
	BUTTERFLY VALVE				
	FLOW FITTING (CIRCUIT SETTER)				
	CIRCUIT SETTER				
	FLOW FITTING (CIRCUIT SENSOR)				
	UNION				
	CLEANOUT				
	CAPPED END				
	WALL HYDRANT				
	TRIPLE DUTY VALVE				
	VACUUM BREAKER				
	THERMOSTAT				
	DDC TEMPERATURE SENSOR				
	OCCUPANCY SENSOR				
	MATCH LINE				
	PLAN NOTE				
	SECTION DESIGNATION DRAWING NO. WHERE FOUND IF ON DIFFERENT SHEET OR DASH IF FOUND ON THE SAME SHEET.				
	DETAIL DESIGNATION OR DETAIL NUMBER DRAWING NO. WHERE FOUND IF ON DIFFERENT SHEET OR DASH IF FOUND ON THE SAME SHEET.				
	D14 325 OR D14-325 DIFFUSER DESIGNATION SUPPLY CFM				
	G16 405 OR G16-405 GRILLE DESIGNATION SUPPLY OR RETURN CFM				
	RC-8 REHEAT COIL DESIGNATION THIS IS ALSO USED FOR OTHER EQUIPMENT DESIGNATIONS, SEE ABBREVIATIONS.				
	F-1 PLUMBING FIXTURE DESIGNATION				
	CONNECTION OF NEW TO EXISTING				

ELECTRIC DUCT HEATER SCHEDULE		
ITEM NO.	EDC-1	EDC-2
LOCATION SERVED	BATHROOM	BATHROOM
CAPACITY (kW)	10	11
VOLTAGE	240	240
PHASE	1	1
DUCT DIMENSIONS (WXH)	16x16	16x16
NUMBER OF HEATING STAGES	3	3
CONTROL TYPE	THERMOSTAT	THERMOSTAT
MANUFACTURER	INDEECO	INDEECO
MODEL	TFXU	TFXU
NOTES	1,2,3	1,2,3

NOTES:
1. PROVIDE WITH DOOR INTERLOCKED DISCONNECT SWITCH
2. PROVIDE WITH AIR PROOFING SWITCH
3. COORDINATE CONTROL REQUIREMENTS WITH CONTROL SEQUENCES LISTED ON SHEET M2.0

SUPPLY FAN SCHEDULE		
ITEM NO.	F-1	F-2
CAPACITY		
CFM	700	800
STATIC PRESSURE (IN WG)	0.5	0.5
RPM	1402	1253
SONES	8.3	7.6
POWER		
HP	0.5	0.5
VOLTS	115	115
PHASE	1	1
MANUFACTURER	COOK	COOK
MODEL	120SQN17DEC	120SQN17DEC
NOTES	1,2,3	1,2,3

NOTES:
1. MOTOR TO BE ECM TYPE
2. PROVIDE WITH FACTORY DISCONNECT SWITCH
3. PROVIDE WITH VARIABLE SPEED CONTROLLER

PLUMBING FIXTURE & EQUIPMENT SCHEDULE						
SYMBOL	DESCRIPTION	CONNECTIONS				
		W	V	OV	CW	HW
F-1	WATER CLOSET: KOHLER #K-4323, WALL HUNG, SIPHON JET, ELONGATED VITREOUS, WHITE FLUSH VALVE: SLOAN #952-1.6, CONCEALED, HYDRAULICALLY OPERATED FLUSHOMETER SEAT: KOHLER #K-4731-C, OPEN FRONT WHITE SEAT CARRIER: J. R. SMITH CARRIER TO SUIT CONSTRUCTION	4"	1-1/2"		1"	
F-2	LAVATORY: KOHLER #K-2032, "GREENWICH," 20"x18", WALL MOUNTED VITREOUS CHINA, WHITE, 4" CENTERS, WITH HANGER, FAUCET: SYMMONS, S-60-G-H-1.25-IPS, "SCOT," WITH GRID STRAINER DRAIN, VANDAL RESISTANT AERATOR, AND 1/2" IPS CONNECTORS TRAP: KOHLER #K-8998, 1-1/4" P-TRAP	1-1/2"	1-1/4"		1/2"	
F-3	SHOWER HEAD: TWO(2) SYMMONS 4-141, BALL JOINT TYP, CHROME FINISH, WITH 2.0 GPM MAX FLOW ONE(1) MOUNTED AT 48" A.F.F., AND ONE (1) MOUNTED AT 6'-6" A.F.F. MIXING VALVE: SYMMONS C-96-1-X-LDH, TEMPTROL PRESSURE-BALANCING MIXING VALVE WITH LEVER HANDLE, INTEGRAL STOPS, AND ADJUSTABLE STOP SCREW, CHROME FINISH, NO SHOWER HEAD WITH MIXING VALVE DIVERTER VALVE: SYMMONS 4-458 DUAL OUTLET DIVERTER, CHROME FINISH FLOOR DRAIN: J.R. SMITH #2005-B06PBU CONTROL VALVE: ASCO 8221 SLOW CLOSING SOLENOID VALVE	2"	1-1/2"		1/2"	1/2"
F-4	URINAL: KOHLER #K-4904-ER, WHITE, VITREOUS CHINA, WASHOUT, 3/4" REAR SPUD, 1.0 GPF ADA COMPLIANT, FLUSH VALVE: SLOAN #995-1, 1.0 GPF, CONCEALED HYDRAULICALLY OPERATED URINAL FLUSHOMETER FOR 3/4" BACK SPUD URINAL	2"	1-1/2"		3/4"	
F-5	SERVICE FAUCET: FIAT 830AA, PROVIDE FIAT 889-CC MOP BRACKET, FIAT 832-AA HOSE AND BRACKET INSTALL. NO SINK BASE TO BE PROVIDED.	3"	2"		3/4"	3/4"
F-6	DRINKING FOUNTAIN: HAWS 1109, BARRIER FREE WALL MOUNT DRINKING FOUNTAIN	1-1/4"	1-1/4"		1/2"	

SCHEDULE KEY NOTES:
1. INSTALL ALL FIXTURES & ASSOCIATED SUPPORT EQUIPMENT/FITTINGS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. SHOULD ANY VARIANCE OCCUR WITH THESE INSTRUCTIONS, THE ARCH. OR MECHANICAL ENGINEER SHOULD BE NOTIFIED SO THAT ANY VARIATIONS IN INSTALLATION CAN BE KNOWN BY ALL PARTIES CONCERNED.

- REFER TO A.D.A. ACCESSIBILITY GUIDELINES FOR COMPLETE INSTALLATION REQUIREMENTS FOR A.D.A. COMPLIANT FIXTURES.
- PROVIDE & INSTALL SAFETY PROTECTIVE PIPE COVERS FOR P-TRAP AND HOT AND COLD WATER PIPES AND STOPS UNDER LAV TO MEET ADA REQUIREMENTS. COLOR: WHITE
- INSTALL SHUT-OFF (BALL VALVE TYPE) VALVES IN EACH (HW&CW) PLUMBING SUPPLY LINE SERVING THE NEW PLUMBING FIXTURES.

EXHAUST FAN SCHEDULE	
ITEM NO.	EF-1
CAPACITY	
CFM	75
ESP. (IN W.G.)	0.25
RPM	1380
SONES / NC LEVEL	2.5
POWER	
HP	0.067
VOLTS	120
PHASE	1
MANUFACTURER	BROAN
MODEL	HD80
NOTES	1,2,3,4,5

NOTES:
1. PROVIDE WITH FACTORY MOTOR SPEED CONTROL
2. PROVIDE WITH 24 VOLT RELAY STARTER AS REQUIRED TO PROVIDE TYPE OF CONTROL SPECIFIED ON SHEET XXXX-XXXX-XXXX
3. PROVIDE WITH FACTORY OR FIELD FUSED DISCONNECT
4. PROVIDE WITH ALUMINUM OR PAINTED WHITE METAL CEILING GRILLE
5. PROVIDE W/FACORY, LOW LEAK BACKDRAFT DAMPER

GRILLE SCHEDULE				
ITEM NO.	G-1	G-2	G-3	G-4
CAPACITY				
CFM	700	100	350	350
NC LEVEL	20	20	20	20
SIZE	20x10	6x6	12x8	10x10
MANUFACTURER	TITUS	TITUS	TITUS	TITUS
MODEL	355FL	272FL	272FL	355FL
NOTES		1	1	1

NOTES:
1. PROVIDE WITH INTEGRAL, OPPOSED BLADE BALANCING DAMPER

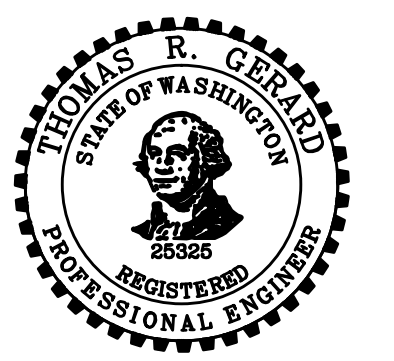
DRAWING INDEX

- M0.1 - COMFORT STATION SCHEDULE AND SHEET INDEX
- M1.0 - COMFORT STATION PLUMBING FOUNDATION PLAN
- M1.1 - COMFORT STATION PLUMBING FLOOR PLAN
- M2.0 - COMFORT STATION HVAC PLAN
- M3.0 - COMFORT STATION DETAILS

HOSE BIBB SCHEDULE				
SYMBOL	CW	HW	NON-FREEZE	REMARKS
HB-1	3/4"	-	NO	HOSE BIBB SHALL BE WALL MOUNTED, MIFAB MFG. COMPANY, MODEL MHY-50, EXPOSED TYPE, SELF DRAINING, NARROW WALL HYDRANT WITH A.S.S.E 1011 APPROVED ANTI SIPHON AND VANDAL RESISTANT INTEGRAL VACUUM BREAKER WITH A 3/4" (19) MALE HOSE CONNECTION. HYDRANT ASSEMBLY COMPLETE WITH NEOPRENE PLUNGER TO CONTROL BOTH THE FLOW AND DRAIN FUNCTIONS, HARDENED BRONZE OPERATING STEM, 360° SWIVEL INLET CONNECTION, HEAVY DUTY CHROME PLATED BRONZE HEAD CASTING, AND POLISHED CHROME PLATED FACE PLATE. UNIVERSAL OPERATING KEY FURNISHED WITH EACH HYDRANT

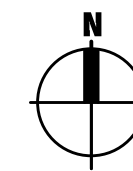
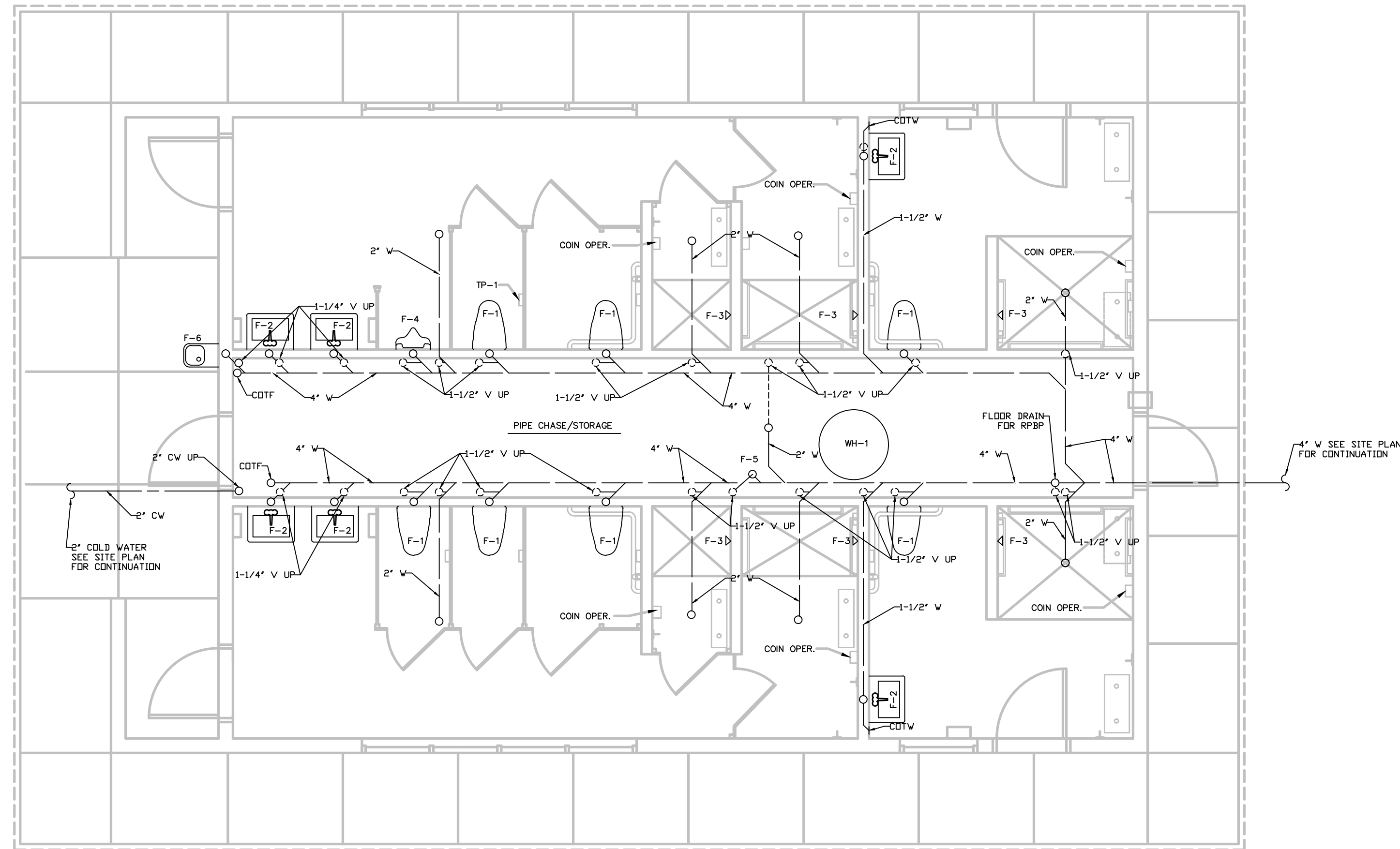
ELECTRIC WATER HEATER SCHEDULE	
ITEM NO.	WH-1
LOCATION	CHASE
CAPACITY	
GALLONS	120
INPUT KW	54
RECOVERY	248
VOLTAGE/PHASE	240/1Ø
MANUFACTURER	BRADFORD WHITE
MODEL	M-II-120A-35F
SHIPPING WEIGHT	485 LBS

NOTES:
1. RECOVERY IS GALLONS PER HOUR AT 90°F RISE.
2. PROVIDE ASME TEMP./PRESS. RELIEF VALVE AND EXPANSION TANK
3. PROVIDE WITH 5-YEAR LIMITED TANK WARRANTY
4. PROVIDE WITH TEMPERATURE CONTROLS HAVING A MINIMUM TEMPERATURE SETTING RANGE OF 90°F-145°F. SET THERMOSTAT TO 110°F
5. INSTALL PER MANUFACTURER'S RECOMMENDATIONS
6. PROVIDE FACTORY OR FIELD INSTALLED HEAT TRAPS ON BOTH THE COLD WATER INLET AND THE HOT WATER DISCHARGE OFF OF WATER HEATER.
7. COORDINATE INSTALLATION OF WATER HEATER WITH DOMESTIC WATER WASTE AND VENT PIPING TO MAINTAIN REQUIRED CLEARANCE



	PRIM. ENG. TRG 2ND ENG. RFG DESIGNER APPROVAL	CHELAN PUD NO.1 PRIM. ENG. COURT HILL 2ND ENG. PROJ. MGR.	SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"	VERIFY SCALE IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		DAROGA STATE PARK GROUP CAMP IMPROVEMENTS INDEX & SCHEDULES	SHEET M1 OF M5 REVISION 0 DATE 4-10-2015 DWG. 0908-05BS-0001
	CHESLANT CONSULTANT	CHELAN PUD NO.1	SCALE 0 4-10-2015 BID SET REV DATE REVISION	REQ. BY DRFT	BID NO. 15-04	DOCUMENT CLASS:	ID:	ORIGINAL DWG. #:

GENERAL NOTES:
1. SEE SCHEDULE FOR PLUMBING FIXTURE WASTE CONNECTION SIZES



Foundation Plan - Plumbing

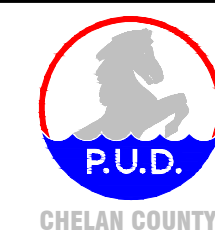
1/4" = 1'-0"



CONSULTANT	PRIM. ENG.	TRG	CHELAN PUD NO.1	
	2ND ENG.	RFG	PRIM. ENG.	COURT HILL
	DESIGNER		2ND ENG.	
	APPROVAL		PROJ. MGR.	

SCALE		BAR IS ONE INCH ON ORIGINAL DRAWING.		VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
0	1"			0	1"		
REV	DATE	BID SET	4-10-2015	REVISION		REQ. BY	DRFT

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
WENATCHEE, WASHINGTON



DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
FOUNDATION PLUMBING PLAN

BID NO. 15-04

SHEET M2 OF M5
REVISION 0
DATE 4-10-2015
DWG. 0908-05BS-0002

DOCUMENT CLASS:

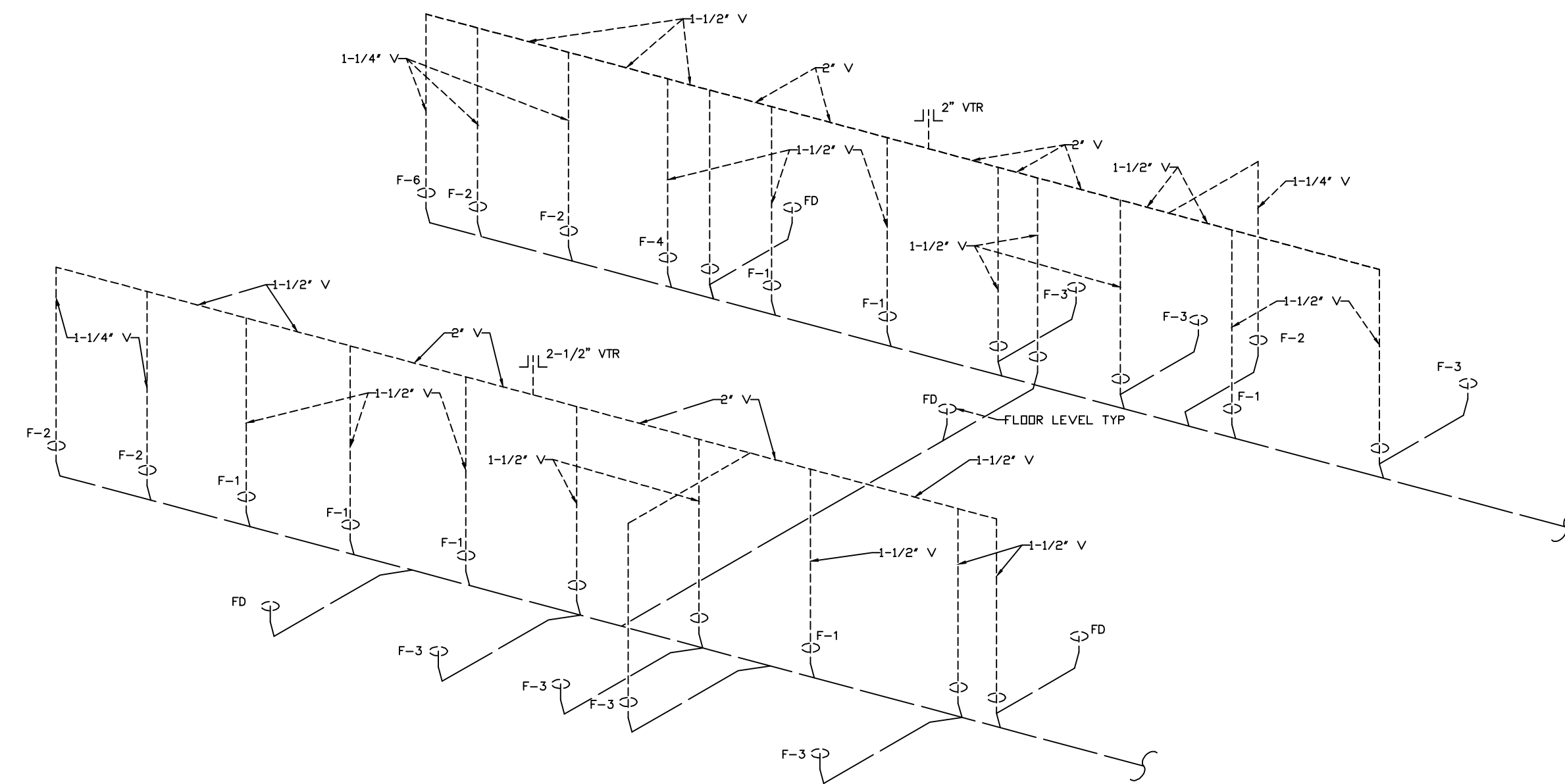
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ORIG. DRAWN

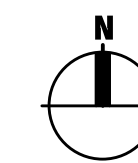
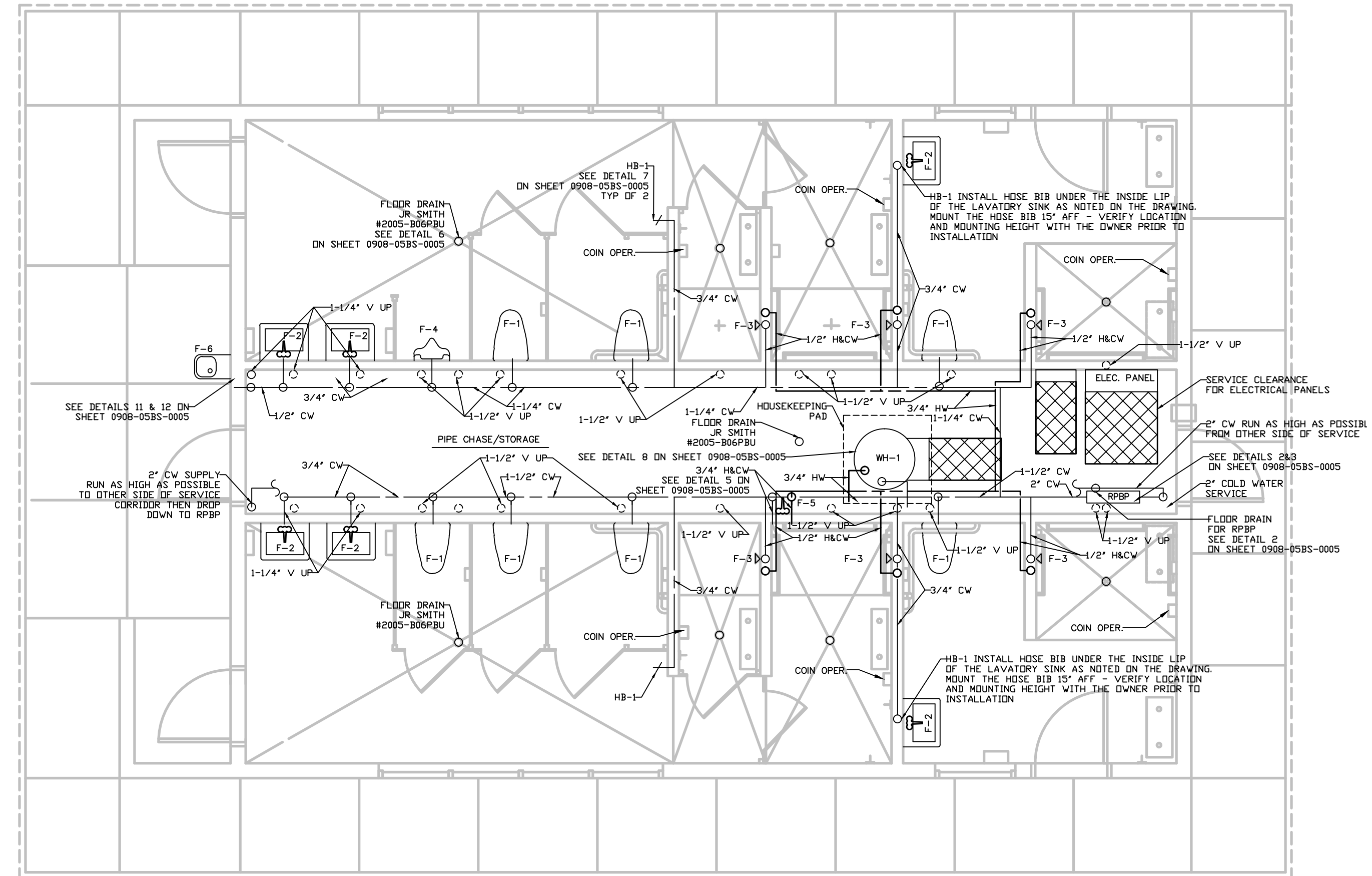
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GENERAL NOTE:
 1. A SHUT-OFF (BALL) VALVE IS TO BE INSTALLED IN THE SERVICE CORRIDOR ON EVERY SUPPLY (HW&CW) LINE SERVING EACH FIXTURE



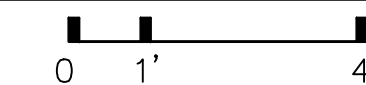
Vent Riser Diagram

NOT TO SCALE



Floor Plan - Plumbing

1/4" = 1'-0"



CONSULTANT	PRIM. ENG.	TRG	CHELAN PUD NO.1		SCALE		BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
	2ND ENG.	RFG	PRIM. ENG.	COURT HILL	0	4-10-2015		
	DESIGNER		2ND ENG.		REV	DATE		
	APPROVAL		PROJ. MGR.		REVISION	REQ. BY		

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

DAROGA STATE PARK
 GROUP CAMP IMPROVEMENTS
 FLOOR PLAN PLUMBING

BID NO. 15-04

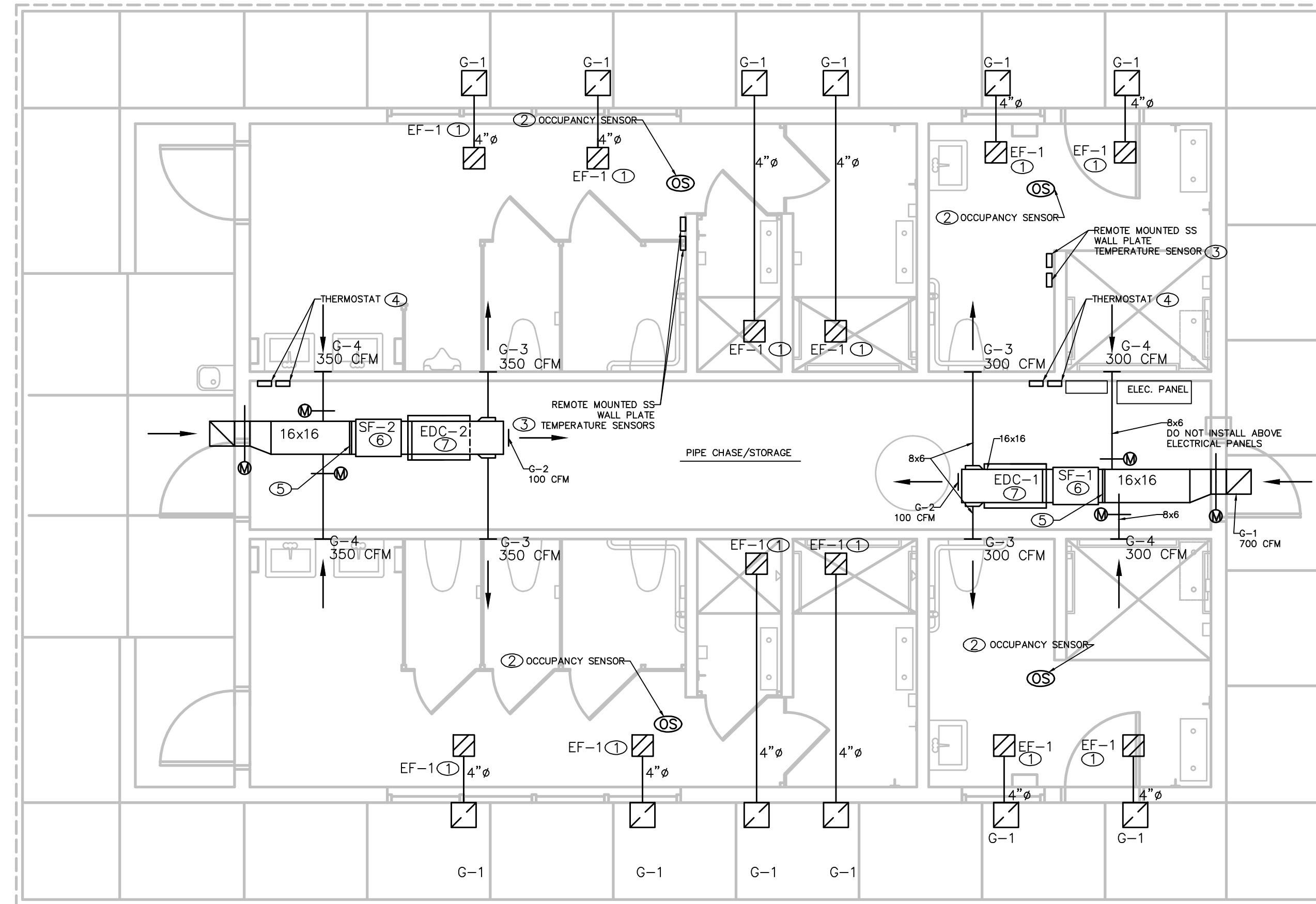
SHEET M3 OF M5
REVISION 0
DATE 4-10-2015
DWG. 0908-05BS-0003

DOCUMENT CLASS:

ID:

ORIGINAL DWG. #:

ORIG. DRAWN
ORIG. DATE



PLAN NOTES

- ① EXHAUST FAN - CONTROL FROM OCCUPANCY SENSOR - SEE CONTROL SEQUENCE ON THIS SHEET.
- ② NEW OCCUPANCY SENSOR PROVIDED AND INSTALLED BY DIVISION 26. SEE ELECTRICAL DRAWINGS FOR EXACT LOCATION OF OCCUPANCY SENSORS
- ③ REMOTE MOUNTED, STAINLESS STEEL, WALL PLATE TEMPERATURE SENSOR (QUANTITY=2 ONE FOR THE OCCUPIED CYCLE, THE SECOND FOR THE OCCUPIED CYCLE. TYPICAL FOR BOTH THE GENERAL RESTROOM AND THE FAMILY REST ROOMS)
- ④ SINGLE SETPOINT HEATING ONLY THERMOSTAT SHALL BE CAPABLE UTILIZING REMOTE TEMPERATURE SENSORS AND BE CAPABLE OF CONTROLLING 3-STAGES OF ELECTRIC HEAT. (QUANTITY=2 ONE FOR THE OCCUPIED CYCLE, THE SECOND FOR THE UN-OCCUPIED CYCLE. TYPICAL FOR BOTH THE GENERAL RESTROOM AND THE FAMILY REST ROOMS) LABEL EACH THERMOSTAT MOUNTED IN THE SERVICE CORRIDOR SHALL BE LABELED OCCUPIED OR UNOCCUPIED AND GENERAL RESTROOM OR FAMILY RESTROOM.
- ⑤ 1" FIELD FABRICATED FILTER RACK WITH BOTTOM ACCESS. PROVIDE TWO(2) SETS OF DISPOSABLE 1" THICK, EXTENDED COVERAGE, PLEATED FILTERS.
- ⑥ SEE DETAIL NO. 9 ON DWG. M3.0 - MOUNTING DETAIL
- ⑦ MOUNT ELECTRIC DUCT COIL CONTROL PANEL ON BOTTOM OF DUCT. MAINTAIN 36" CLEARANCE IN FRONT OF ELECTRICAL DUCT COIL ON BOTTOM OF DUCT

GENERAL RESTROOM CONTROL SEQUENCE

- OCCUPIED CYCLE**
 WHEN EITHER OCCUPANCY SENSOR DETECTS OCCUPANCY
 1. LIGHTS COME ON & ALL EXHAUST FANS IN BOTH RESTROOMS WILL START.
 2. DEFAULT CONTROL THERMOSTAT IS THE UNOCCUPIED THERMOSTAT. WHEN OCCUPANCY IS DETECTED, THE OCCUPIED THERMOSTAT BECOMES THE CONTROLLING THERMOSTAT
 3. BOTH RETURN DAMPERS ON FAN COIL WILL CLOSE, OUTSIDE AIR DAMPER WILL OPEN, AND FAN COIL WILL START AND RUN CONTINUOUSLY
 4. THERMOSTAT WILL MODULATE THE HEATING COIL ON THE FAN COIL UNIT TO MAINTAIN THE SETPOINT. (70° OCCUPIED OR 50° F UNOCCUPIED OR AS SET)
 5. ALL SYSTEMS WILL CONTINUE TO OPERATE FOR 10 MINUTES (OR AS SET) AFTER THE LAST DETECTION OF OCCUPANCY.

- UNOCCUPIED CYCLE**
 WHEN NEITHER OCCUPANCY SENSOR DETECTS OCCUPANCY
 1. LIGHTS AND EXHAUST FANS WILL BE OFF
 2. RETURN DAMPERS ON FAN COIL WILL BE OPEN, OUTSIDE AIR DAMPER WILL BE CLOSED, AND FAN COIL UNIT WILL CYCLE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE SETPOINT.
 3. THE UNOCCUPIED THERMOSTAT WILL MODULATE THE HEATING COIL ON THE FAN COIL UNIT TO MAINTAIN THE SETPOINT. (50° F OR AS SET)

FAMILY RESTROOM CONTROL SEQUENCE

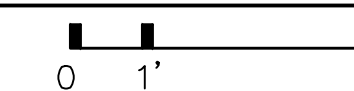
- OCCUPIED CYCLE**
 WHEN EITHER OCCUPANCY SENSOR DETECTS OCCUPANCY
 1. LIGHTS COME ON & ALL EXHAUST FANS IN BOTH RESTROOMS WILL START.
 2. DEFAULT CONTROL THERMOSTAT IS THE UNOCCUPIED THERMOSTAT. WHEN OCCUPANCY IS DETECTED, THE OCCUPIED THERMOSTAT BECOMES THE CONTROLLING THERMOSTAT
 3. BOTH RETURN DAMPERS ON FAN COIL WILL CLOSE, OUTSIDE AIR DAMPER WILL OPEN, AND FAN COIL WILL START AND RUN CONTINUOUSLY
 4. THERMOSTAT WILL MODULATE THE HEATING COIL ON THE FAN COIL UNIT TO MAINTAIN THE SETPOINT. (70° OCCUPIED OR 50° F UNOCCUPIED OR AS SET)
 5. ALL SYSTEMS WILL CONTINUE TO OPERATE FOR 10 MINUTES (OR AS SET) AFTER THE LAST DETECTION OF OCCUPANCY.

- UNOCCUPIED CYCLE**
 WHEN NEITHER OCCUPANCY SENSOR DETECTS OCCUPANCY
 1. LIGHTS AND EXHAUST FANS WILL BE OFF
 2. RETURN DAMPERS ON FAN COIL WILL BE OPEN, OUTSIDE AIR DAMPER WILL BE CLOSED, AND FAN COIL UNIT WILL CYCLE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE SETPOINT.
 3. THE UNOCCUPIED THERMOSTAT WILL MODULATE THE HEATING COIL ON THE FAN COIL UNIT TO MAINTAIN THE SETPOINT. (50° F OR AS SET)



Floor Plan - HVAC

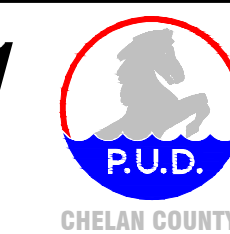
1/4" = 1'-0"



CONSULTANT	PRIM. ENG.	TRG	CHELAN PUD NO.1	
	2ND ENG.	RFG	PRIM. ENG.	COURT HILL
	DESIGNER		2ND ENG.	
	APPROVAL		PROJ. MGR.	

SCALE	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0	1"		
REV	DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON



DAROGA STATE PARK
 GROUP CAMP IMPROVEMENTS
 FLOOR PLAN HVAC

BID NO. 15-04

SHEET M4 OF M5
REVISION 0
DATE 4-10-2015
DWG. 0908-05BS-0004

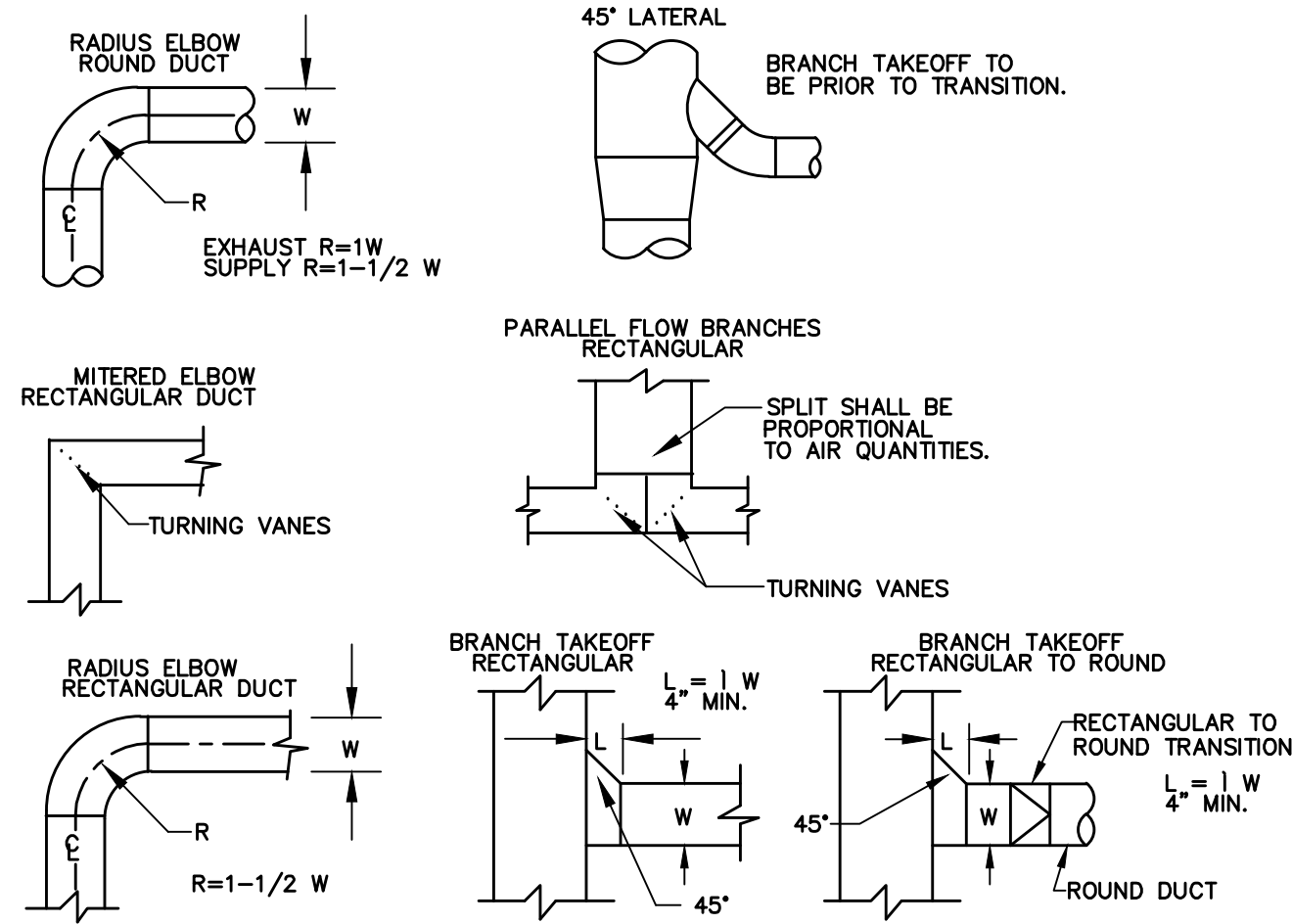
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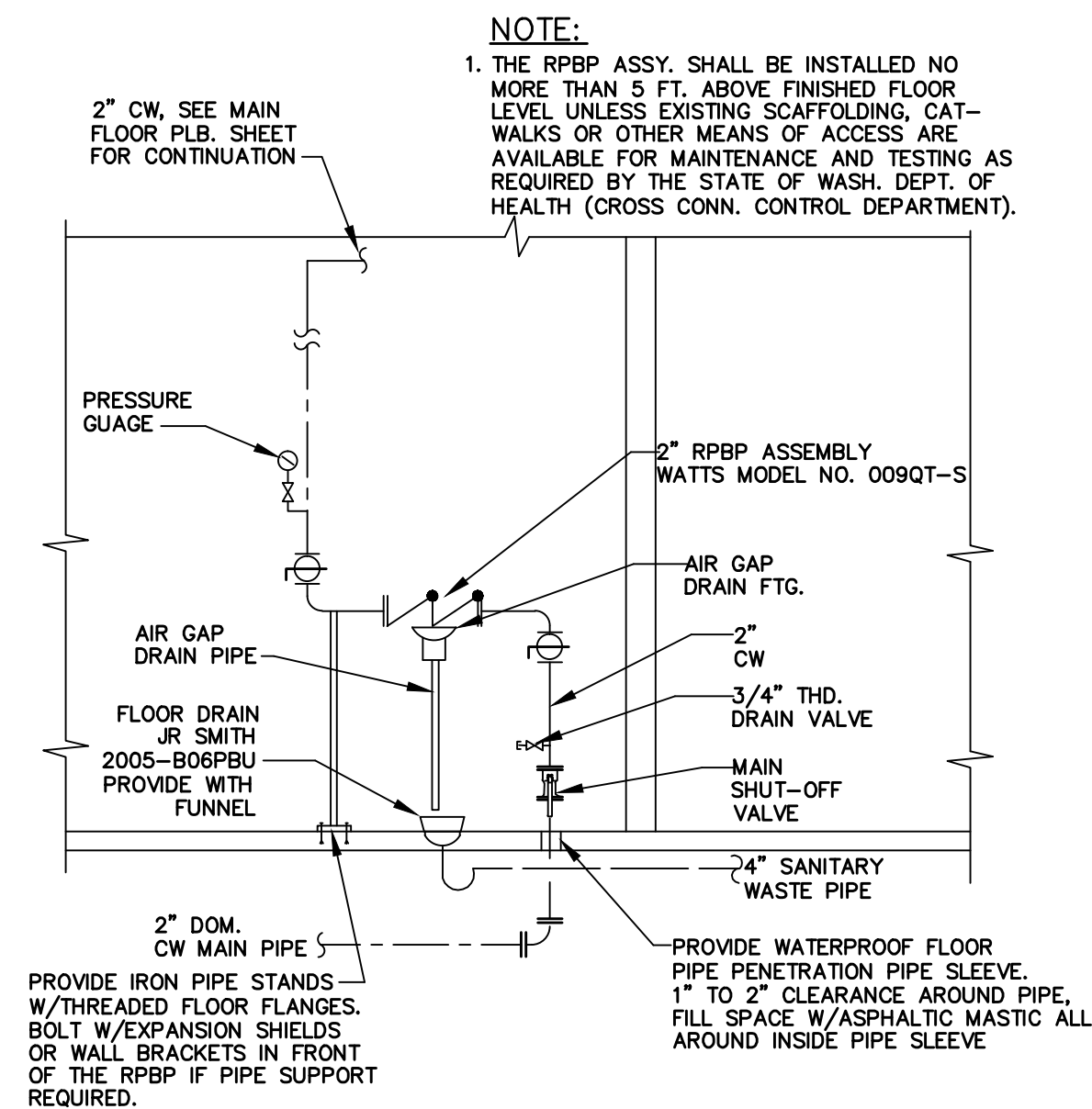
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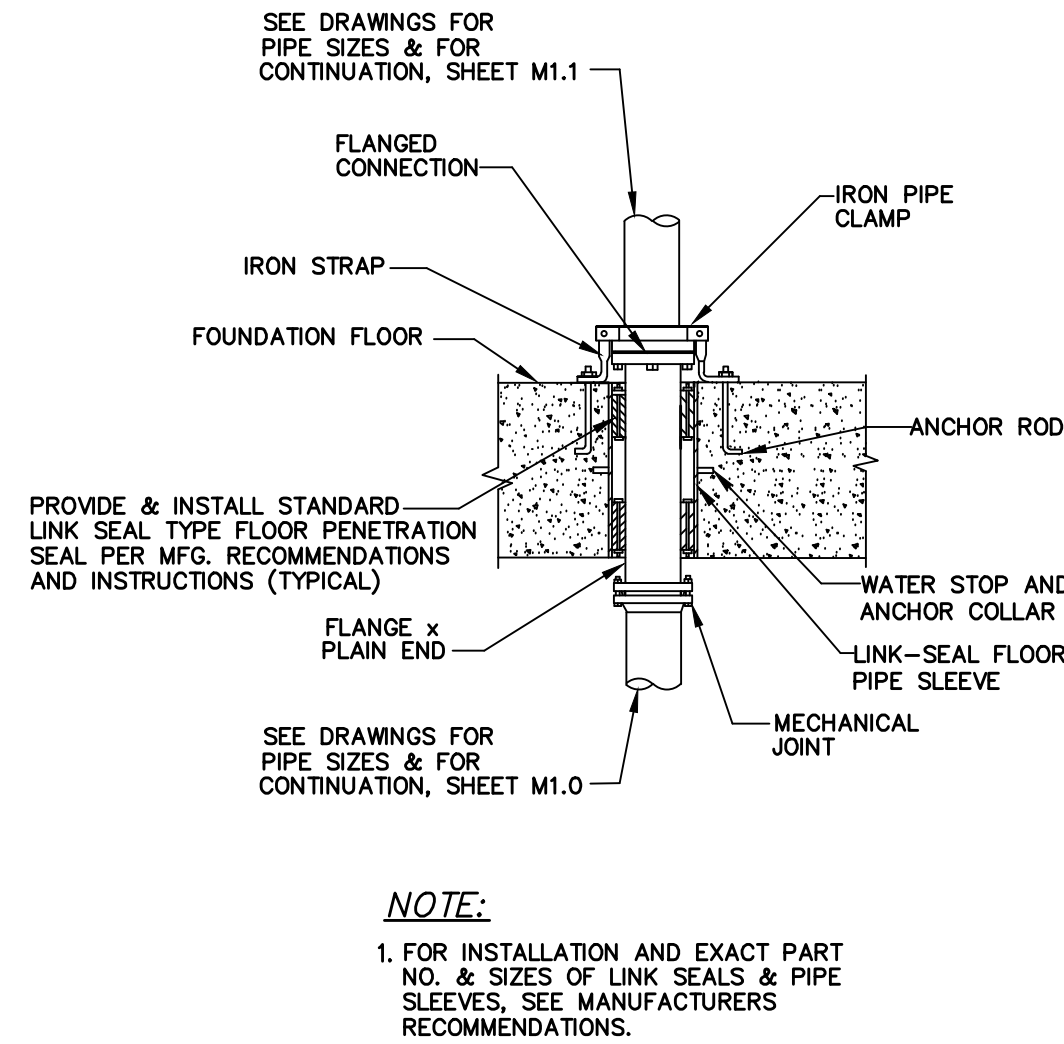
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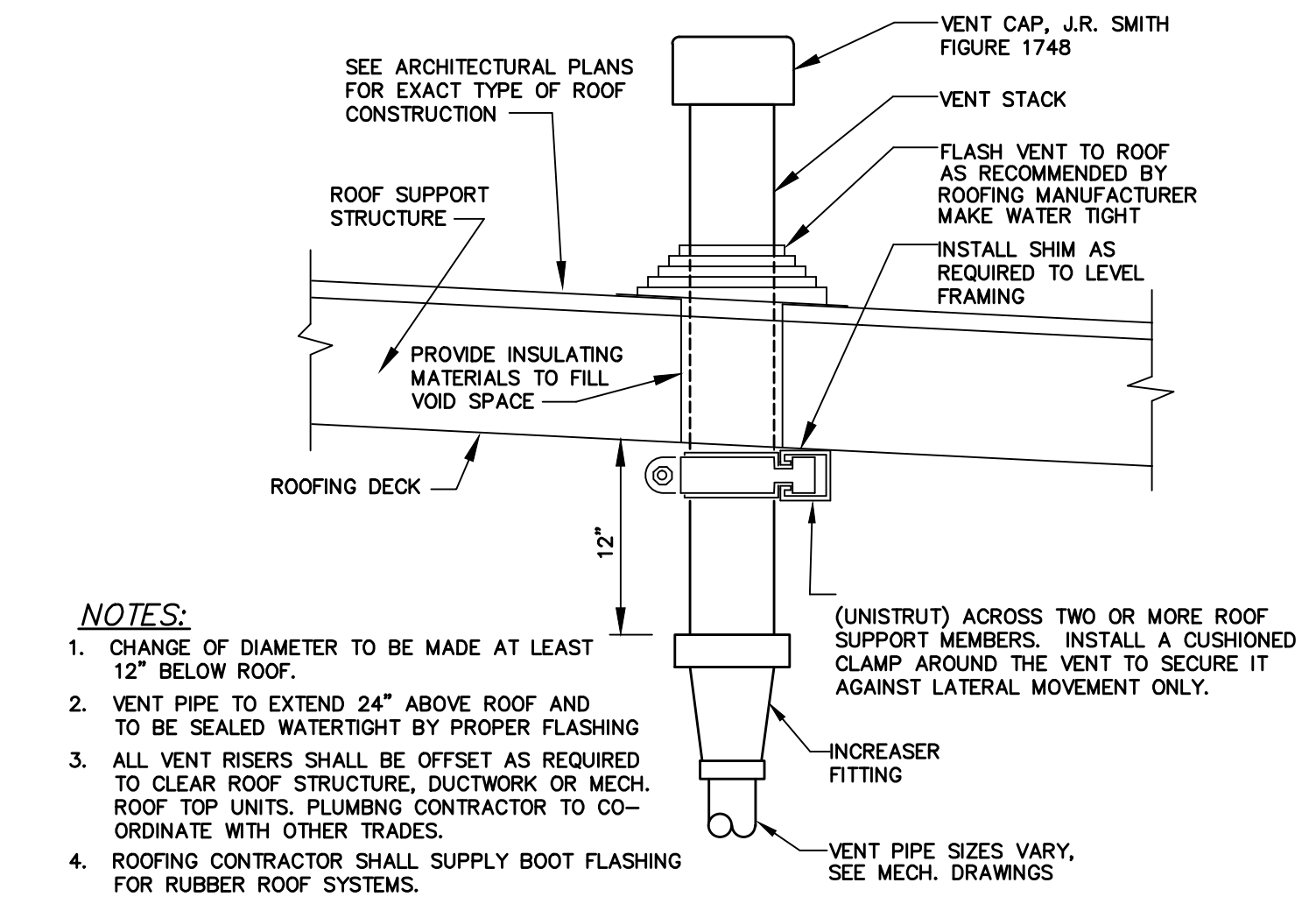
1 TYPICAL DUCT FITTINGS
NOT TO SCALE



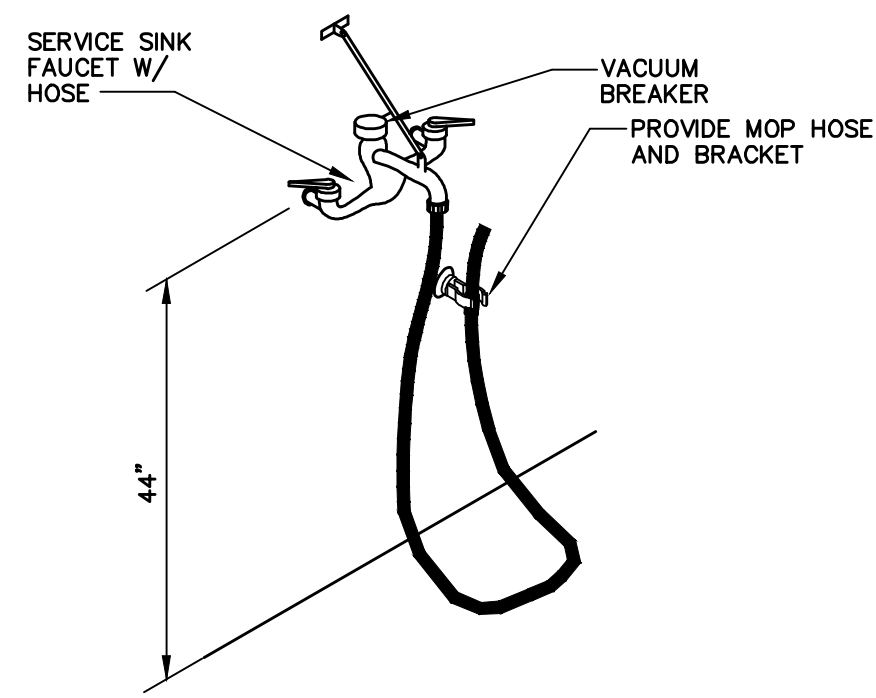
2 BACKFLOW PREVENTER DETAIL
NOT TO SCALE



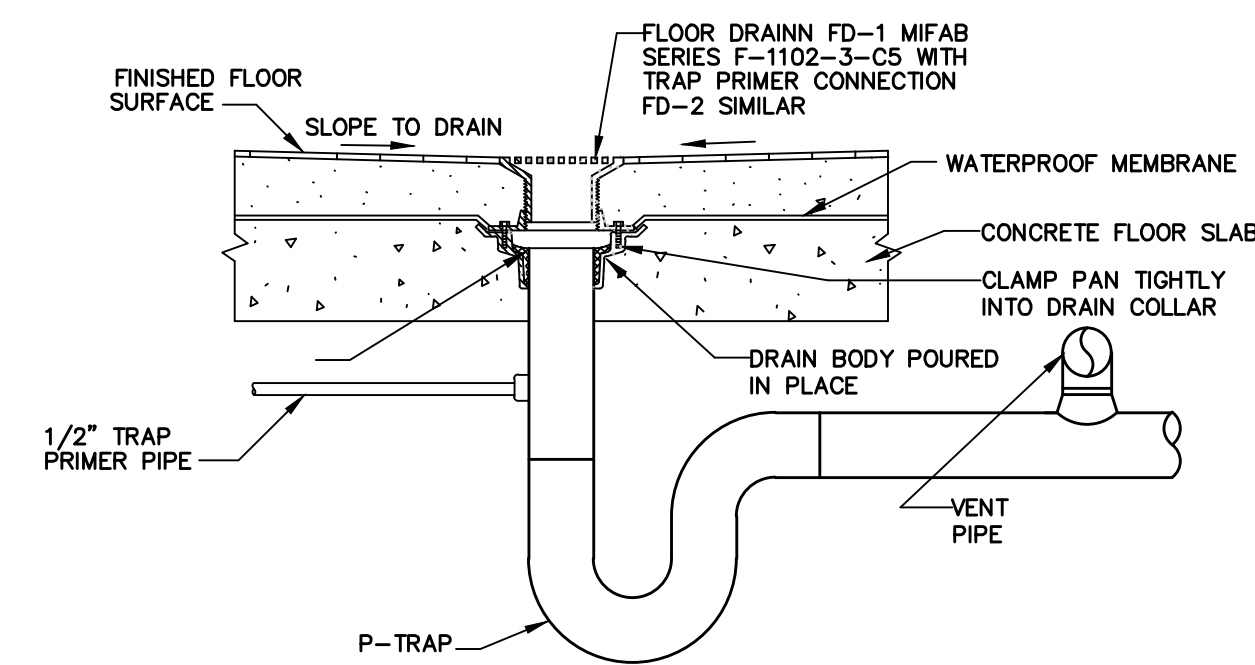
3 ANCHOR FOR COLD WATER MAIN SERVICE
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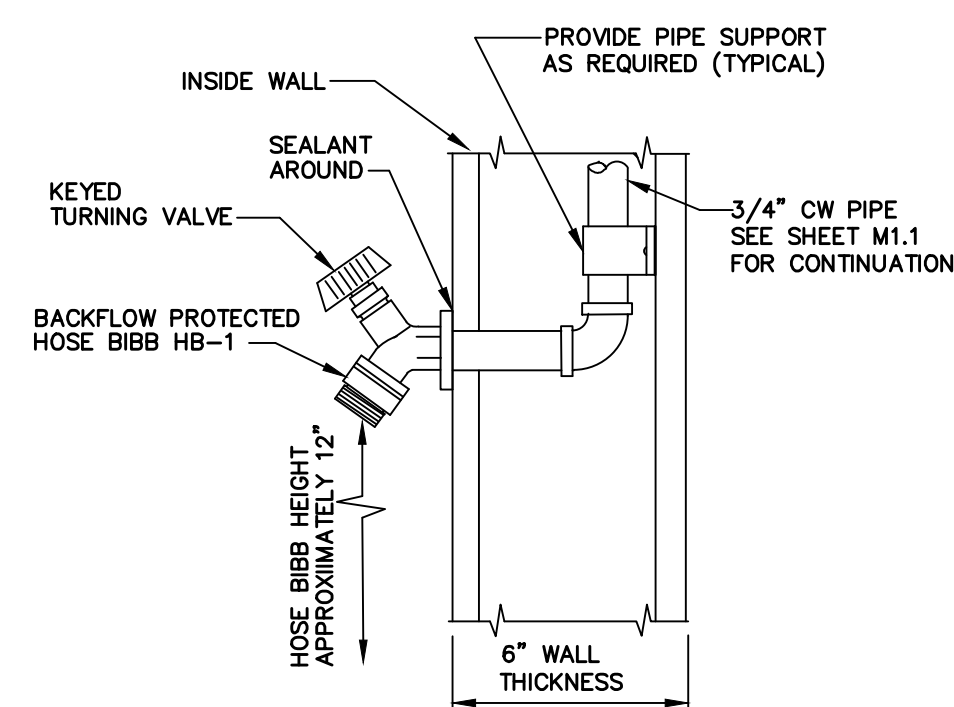
4 VENT THROUGH ROOF
NOT TO SCALE



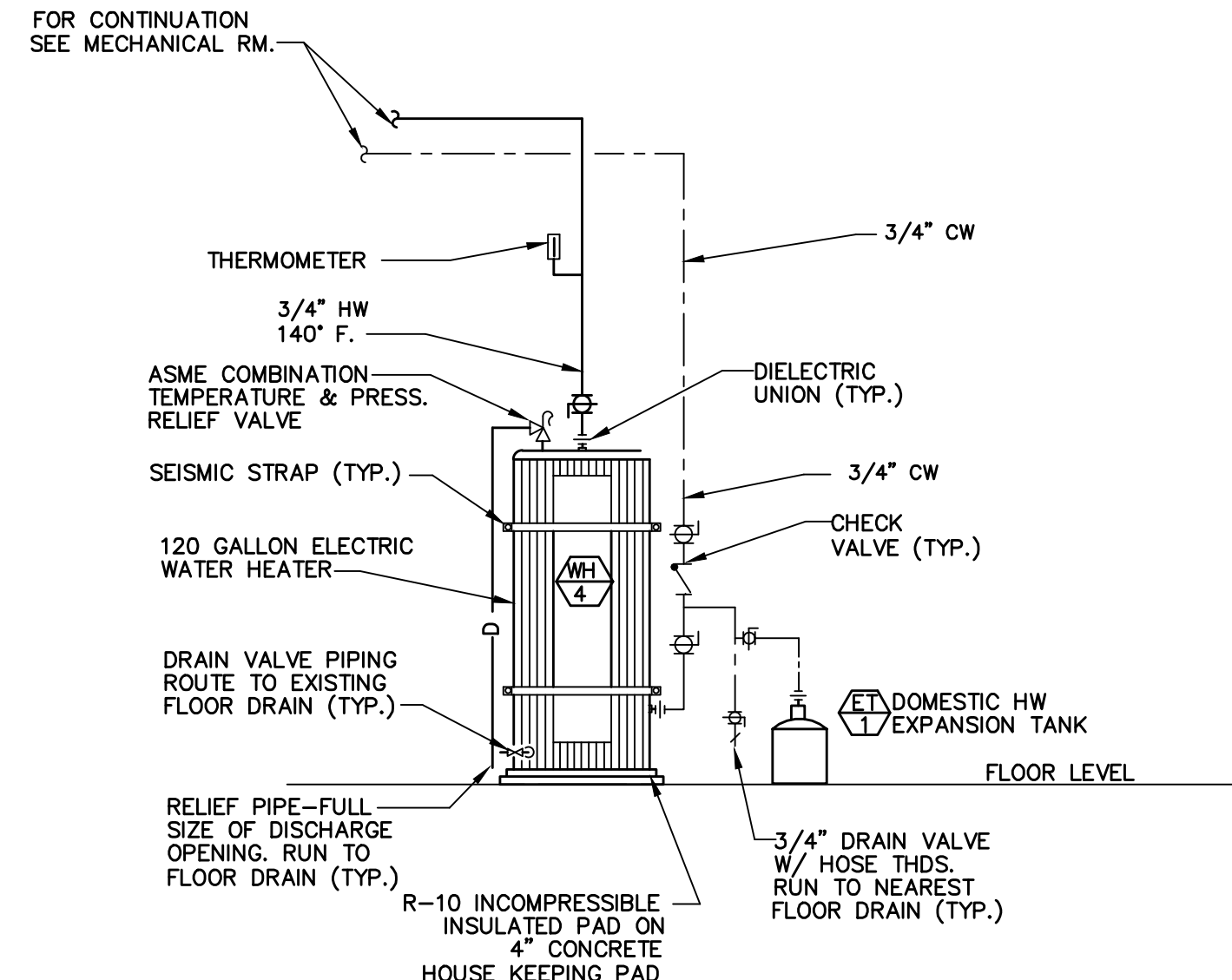
5 SERVICE FAUCET
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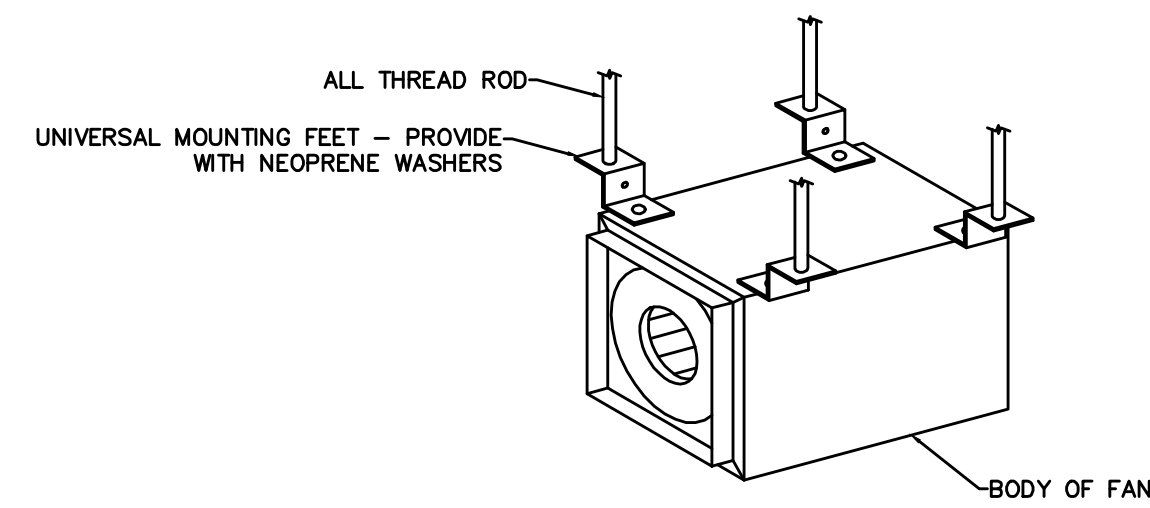
6 FLOOR DRAIN
NOT TO SCALE



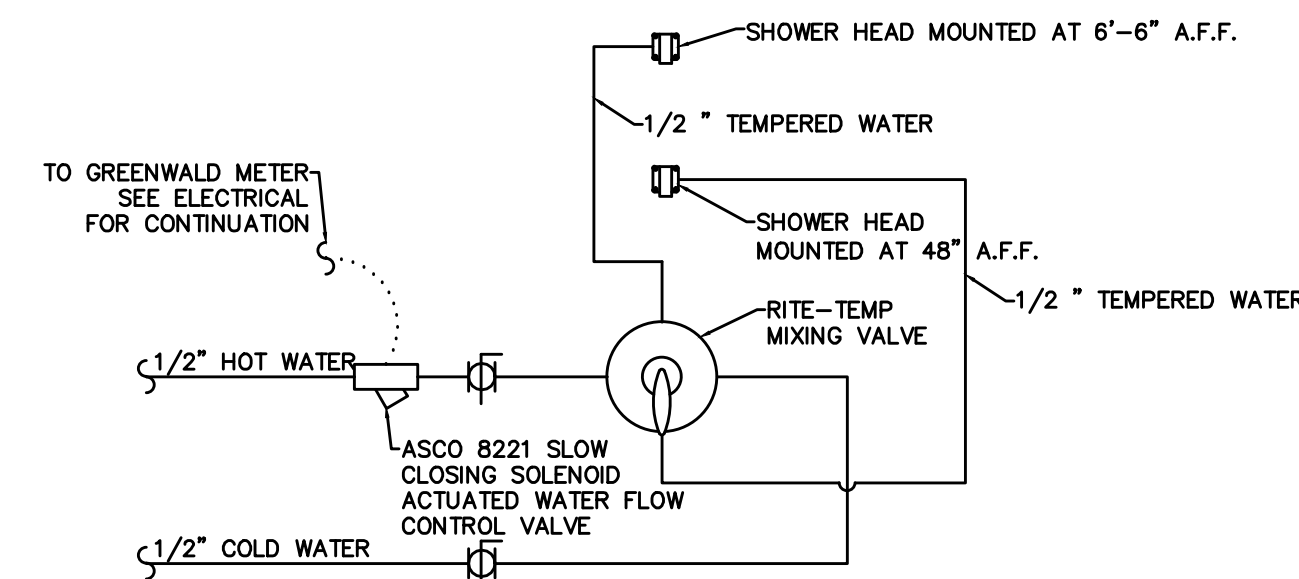
7 HOSE BIBB
NOT TO SCALE



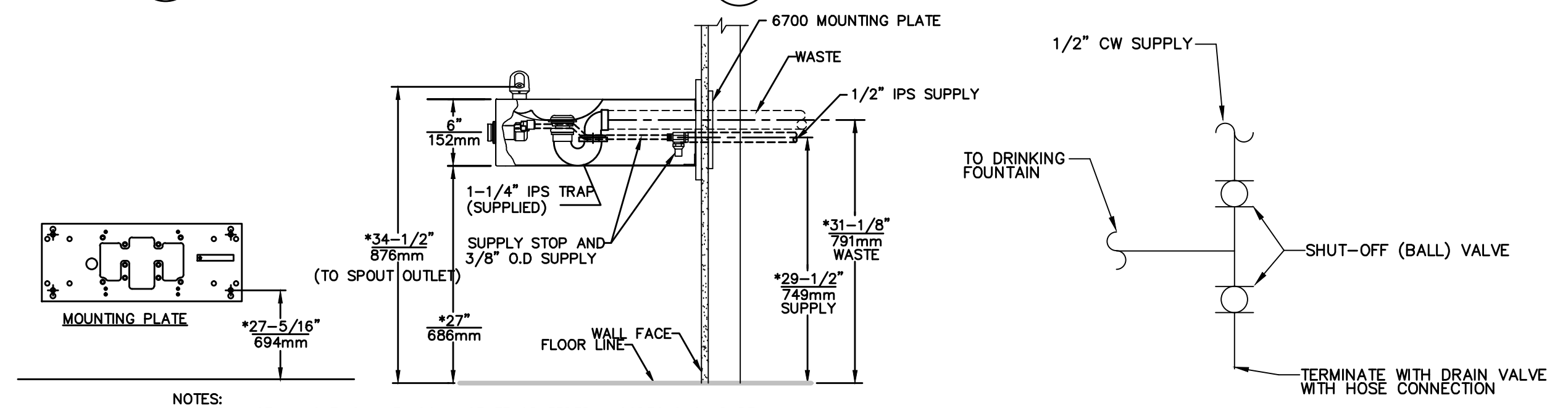
8 120 GALLON ELECTRIC WATER HEATER
NOT TO SCALE



9 SUPPLY FAN MOUNTING DETAIL
NOT TO SCALE



10 SHOWER PIPING DETAIL
NOT TO SCALE



11 DRINKING FOUNTAIN DETAIL
NOT TO SCALE

12 DRINKING FOUNTAIN CW SUPPLY LINE
NOT TO SCALE



CONSULTANT	PRIM. ENG. TRG	CHELAN PUD NO.1	SCALE	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
	2ND ENG. RFG	PRIM. ENG. COURT HILL	0	4-10-2015	BID SET	
	DESIGNER	2ND ENG.	REV	DATE	REVISION	REQ. BY DRFT
	APPROVAL	PROJ. MGR.				

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY		WENATCHEE, WASHINGTON	
DAROGA STATE PARK GROUP CAMP IMPROVEMENTS DETAILS		BID NO. 15-04	

SHEET M5 OF M5	REVISION 0	DATE 4-10-2015	DWG. 0908-05BS-0005
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DOCUMENT CLASS:	ORIGINAL DWG. #:
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ORIG. DRAWN
ORIG. DATE

RACEWAYS AND CONDUCTORS		CALLOUTS AND DESIGNATIONS		CONTROLS AND INSTRUMENTATION		STANDARD ABBREVIATIONS		PROJECT GENERAL NOTES:	
<p>MANUFACTURERS CORD/CABLE HEAT TAPE ON PIPING FLEXIBLE CONDUIT TWISTED SHIELDED PAIR SEWER LINE OVERHEAD ELECTRICAL EXISTING CONDUIT UNDERGROUND CONDUIT EXPOSED CONDUIT BELOW GRADE OR CONCEALED CONDUIT CAPPED CONDUIT BENT UP OR TOWARD CONDUIT BENT DOWN OR AWAY GROUNDING CAD WELD CONNECTION CONDUCTORS NOT CONNECTED CONDUCTORS CONNECTED CONDUIT SEALS CLASS 1, DIV. 1 EXPLOSION PROOF NEW EQUIPMENT (STANDARD LINEWEIGHT) EXISTING EQUIPMENT (E) (LIGHT LINEWEIGHT) EQUIPMENT TO BE REMOVED</p>		<p>CONDUIT CALLOUT TRENCH CALLOUT EQUIPMENT CALLOUT LIGHTING FIXTURE CALLOUT: SEE SCHEDULE DRAWING KEY NOTE CALLOUT DETAIL NUMBER DETAIL IDENTIFIER REFERENCE DRAWING NUMBER PANEL AND CIRCUIT (EXAMPLE: PANEL LPA, CIRCUITS 1 AND 3) HOMERUN/CONDUIT GROUND CONDUCTOR NEUTRAL CONDUCTOR</p>		<p>NORMALLY CLOSED NORMALLY OPEN</p> <p>TEMPERATURE SWITCH - TS LEVEL SWITCH - LS PRESSURE SWITCH - PS LIMIT SWITCH - LS CONTACT - CR = CONTROL RELAY, MS-MOTOR STARTER, OR AS INDICATED SWITCH - SW FLOW SWITCH - FS PUSHBUTTON - PB TIME DELAY - TD</p> <p>SELECTOR SWITCH. HAND-OFF-AUTO SHOWN. X'S INDICATE CONTACT SWITCHING CONVENTION.</p> <p>AM AMMETER VM VOLTMETER GEN GENERATOR MS MOTOR STARTER PFR PHASE FAIL RELAY ETM ELAPSED TIME METER SCT STARTS COUNTER CR CONTROL RELAY TDR TIME DELAY RELAY SV-SOLENOID VALVE INSTRUMENT (L=LEVEL, F=FLOW P=PRESSURE) INDICATING LIGHT, LETTER INDICATES: R-RED, G-GREEN, A-AMBER, W-WHITE, B-BLUE D.C. TERMINAL A.C. TERMINAL FIELD INSTRUMENT HORN SPEED POTENTIOMETER</p>		<p>A, AMP AC AIR COMPRESSOR AFF ABOVE FINISHED FLOOR AI ANALOG INPUT POINT (PLC) AIC AMPERES INTERRUPTING CAPACITY AL ALARM ALT ALTERNATOR AO ANALOG OUTPUT POINT (PLC) ATS AUTOMATIC TRANSFER SWITCH BAT BATTERY BC BATTERY CHARGER BH BLOCK HEATER BP BYPASS CONTACTOR C CONDUIT (RGS) CAP CAPACITOR CB CIRCUIT BREAKER CKT CIRCUIT CNT COUNTER CP CONTROL PANEL CPT CONTROL POWER TRANSFORMER CR CONTROL RELAY CT CURRENT TRANSFORMER CV CHECK VALVE DEM DEMAND DI DIGITAL INPUT POINT (PLC) DO DIGITAL OUTPUT POINT (PLC) DWG DRAWING E OR (E) EXISTING DEVICE EF EXHAUST FAN E.O.D.O. ELECTRICAL OPERATED DRAW OUT FE FLOW ELEMENT FS FLOW SWITCH FT FLOW TRANSMITTER FU FUSED FVNR FULL VOLTAGE NON-REVERSING G, GND GROUND GEN GENERATOR GFCI/GFI GROUND FAULT CIRCUIT INTERRUPTER H HOT, HIGH HH HAND HOLE HID HIGH INTENSITY DISCHARGE HOA HAND-OFF-AUTO HTR HEATER IC ISOLATION CONTACTOR ISR INTRINSICALLY SAFE RELAY KW KILOWATT KWH KILOWATT HOUR KWD KILOWATT DEMAND LC LIGHTING CONTACTOR LCP LOCAL CONTROL PANEL LE LEVEL ELEMENT LS LIMIT SWITCH LT LEVEL TRANSMITTER LTM LIGHTING M METER MCC MOTOR CONTROL CENTER MCP MAIN CONTROL PANEL MFR MANUFACTURER MOV MOTOR OPERATED VALVE OR METAL OXIDE VARISTOR MS MOTOR STARTER MTS MANUAL TRANSFER SWITCH N NEUTRAL NC NORMALLY CLOSED NO NORMALLY OPEN OI OPERATOR INTERFACE OIT OPERATOR IN TROUBLE OL OVERLOAD RELAY OT OVER TEMP P POWER PB PUSH BUTTON PE PHOTO ELECTRIC RELAY PFR PHASE FAILURE RELAY PLC PROGRAMMABLE LOGIC CONTROLLER PNL PANEL POT POTENTIOMETER PS PRESSURE SWITCH PT POTENTIAL TRANSFORMER PVC POLY VINYL CHLORIDE (CONDUIT) RGS RIGID GALVANIZED STEEL (CONDUIT) RTM RUN TIME METER RV REDUCED VOLTAGE S SIGNAL SA SURGE ARRESTOR SE SERVICE ENTRANCE SHT SHEET SS STAINLESS STEEL SSS SOLID STATE STARTER SV SOLENOID VALVE T THERMOSTAT TC TIME CLOCK TDR TIME DELAY TST TWISTED SHIELDED THREE CONDUCTOR (TRIAD) TYP TYPICAL UH UNIT HEATER UPS UNINTERRUPTABLE POWER SUPPLY VS VIBRATION SWITCH VT VIBRATION TRANSMITTER VFD VARIABLE FREQUENCY DRIVE VSD VARIABLE SPEED DRIVE W WATT WHM WATT HOUR METER WP WEATHER PROOF XFMR TRANSFORMER XP EXPLOSION PROOF XMTR TRANSMITTER</p>		<p>PROJECT GENERAL NOTES:</p> <ol style="list-style-type: none"> THE ELECTRICAL DRAWINGS AND SCHEDULES ARE FUNCTIONAL IN NATURE AND DO NOT SPECIFY EXACT LOCATIONS OF EQUIPMENT OR EQUIPMENT TERMINATIONS. ALL CONDUIT ROUTING IS NOT SHOWN. ELECTRICAL CONTRACTOR SHALL DETERMINE THE BEST ROUTING PATH AND CIRCUIT COMBINATIONS BASED ON FIELD CONDITIONS AND ELECTRICAL CODES. CONDUCTOR AND CONDUIT SIZING SHALL BE AS REQUIRED BY NEC. EQUIPMENT LOCATIONS AND ARRANGEMENT ARE SCHEMATIC. CONTRACTOR SHALL COORDINATE WITH EQUIPMENT MANUFACTURER FOR DETAILED CONNECTION REQUIREMENTS AND PROVIDE MATERIALS AND INSTALLATION FOR A COMPLETE AND OPERATIONAL SYSTEM. THESE WIRING DIAGRAMS SHOW ONLY FUNCTIONAL REQUIREMENTS OF THE VARIABLE FREQUENCY DRIVE CONTROL SYSTEM. CONTRACTOR SHALL PROVIDE DETAILED PANEL LAYOUTS, WIRING DIAGRAMS AND SIZE EQUIPMENT AND ENCLOSURES AS REQUIRED FOR A COMPLETE AND OPERATIONAL SYSTEM. COORDINATE WITH OWNER FOR DETAILED EQUIPMENT CONNECTION REQUIREMENTS. GENERAL POWER DISTRIBUTION AND CIRCUIT DESIGNATIONS ARE SHOWN ON THE DRAWINGS. ALL MATERIALS SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE ARTICLE 110-14C. WIRING AND CIRCUIT BREAKERS ON THIS PROJECT ARE DESIGNED FOR 75 DEG C OPERATION ABOVE 100 AMPERES; 60 DEG C FOR 100 AMPERES AND BELOW. ALL PRODUCTS FURNISHED ON THIS PROJECT SHALL HAVE ELECTRICAL TERMINATIONS RATED FOR 60 DEG C FOR AMPACITIES OF 100 AMPERES AND BELOW, AND RATED FOR 75 DEG C FOR AMPACITIES ABOVE 100 AMPERES. ALL CONDUCTORS SHALL BE COPPER. SEE DETAIL 6 ON DWG. 0908-50ST-0019 FOR ALL CONDUIT PENETRATIONS ABOVE, BELOW OR THROUGH FOUNDATIONS. 	
LIGHTING AND RECEPTACLES		ELECTRICAL AND POWER DISTRIBUTION						ELECTRICAL SHEET INDEX	
<p>LIGHTING FIXTURE. FIXTURE IDENTIFIER AND SWITCHED CIRCUIT INDICATED. REFER TO LIGHTING SCHEDULE FOR FIXTURE AND LAMP TYPE. LIGHTING FIXTURE WITH EMERGENCY BATTERY PACK LIGHTING FIXTURE, EMERGENCY DUAL HEAD WITH INTEGRAL BATTERY PACK. EXIT SIGN WHERE INDICATED. LED EXIT SIGN LIGHTING FIXTURE, CEILING MOUNTED PHOTOELECTRIC CONTROL UNIT. WALL MOUNTED LIGHTING FIXTURE, POLE MOUNT LIGHTING FIXTURE, WALL MOUNT DUPLEX RECEPTACLE, NUMBER INDICATES CIRCUIT. GFCI WHERE INDICATED FOURPLEX RECEPTACLE, NUMBER INDICATES CIRCUIT. DUPLEX RECEPTACLE FLOOR MOUNTED, NUMBER INDICATES CIRCUIT. SPECIAL PURPOSE RECEPTACLE OR DEDICATED EQUIPMENT CONNECTION, AS NOTED. TELEPHONE OUTLET DATA OUTLET SPLIT TELEPHONE DATA OUTLET INTERCOM SWITCH, NUMBERS REFER TO SWITCH TYPE AND SWITCHED CIRCUIT. JUNCTION BOX JUNCTION BOX, EXPLOSION PROOF THERMOSTAT HUMIDISTAT</p>		<p>PANELBOARD 208Y/120V OR 120/240V PANELBOARD 480Y/277V UTILITY METER MOTOR CONNECTION NUMBER INDICATES HORSEPOWER THERMAL OVERLOAD RELAY FULL VOLTAGE NON REVERSING MOTOR STARTER NUMBER INDICATES NEMA SIZE REDUCED VOLTAGE SOLID STATE STARTER VARIABLE FREQUENCY DRIVE LINE REACTOR BUS CONNECTION (N=NEUTRAL, G=GROUND) HEATER, NUMBER INDICATES KW DISCONNECT SWITCH - HP RATED, AS INDICATED DISCONNECT SWITCH (FUSED) TRANSFORMER CARTRIDGE FUSE AND FUSEHOLDER ATS - AUTOMATIC TRANSFER SWITCH MTS - MANUAL TRANSFER SWITCH THERMAL MAG CIRCUIT BREAKER, RATING/NO. POLES MOTOR CIRCUIT PROTECTOR, RATING/NO. POLES GROUND ROD AND WELL GROUNDING ELECTRODE PULL OUT PLUG-RECEPTACLE/MCC CONNECTION BATTERY SIDEWALK SNOWMELT</p>						<p>0908-50EL-0013 ELECTRICAL SYMBOLS & ABBREVIATIONS 0908-50EL-0014 ELECTRICAL SITE PLAN 0908-50EL-0015 COMFORT STATION POWER & RECEPTACLE PLAN 0908-50EL-0016 COMFORT STATION LIGHTING PLAN 0908-50EL-0017 COMFORT STATION HVAC POWER PLAN 0908-50EL-0018 ELECTRICAL PANEL SCHEDULES 0908-50EL-0019 ELECTRICAL DETAILS & SCHEDULES</p>	



CONSULTANT

PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO. 1
2ND ENG. PRIM. ENG.	
DESIGNER GREG HENN	2ND ENG.
APPROVAL BRIAN ZIESMER	PROJ. MGR. COURT HILL

SCALE AS NOTED	0 4/10/2015
REV	DATE

BID SET	BZ	AB
REVISION	REQ. BY	DRFT

VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0 1"	

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
WENATCHEE, WASHINGTON

DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
ELECTRICAL
SYMBOLS & ABBREVIATIONS
BID NO. 15-04

SHEET E1 OF E7
REVISION 0
DATE 4/10/2015
DWG. 0908-50EL-0013

ORIG. DRAWING



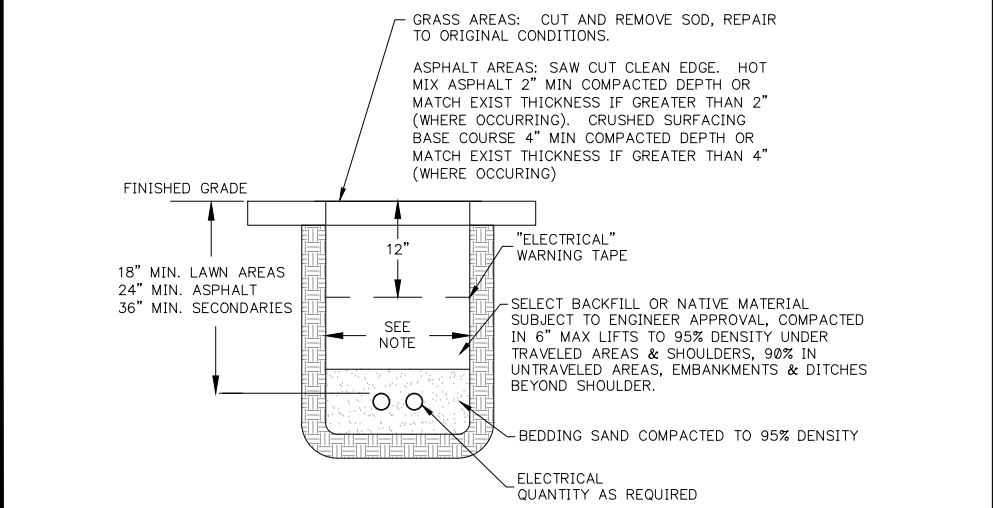
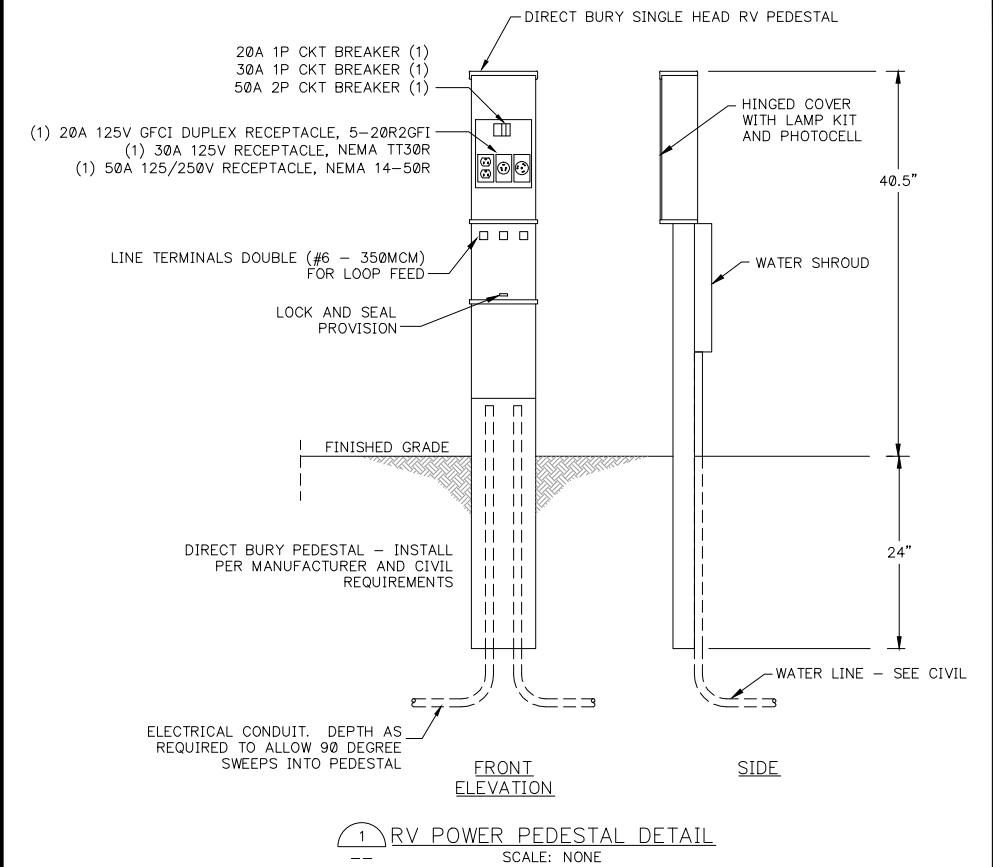
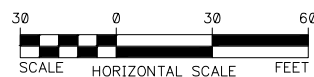
KEY NOTES:

- 1 COORDINATE WITH DOUGLAS COUNTY PUD FOR COMPLETE NEW 120/240V 800 AMP ELECTRICAL SERVICE FROM NEW SERVICE POLE TO COMFORT STATION. CONTRACTOR SHALL PROVIDE ALL TRENCHING AND EXCAVATION FOR ELECTRICAL UTILITIES. SEE SECTION 262700 FOR SEPARATION OF UTILITY AND CONTRACTOR RESPONSIBILITIES.
- 2 PROVIDE POWER AND CONTROL FROM PUMP CONTROL PANEL TO PUMP STATION PER MANUFACTURER REQUIREMENTS.



ELECTRICAL SITE PLAN

SCALE: 1" = 30'



Z-engineers
Z Engineers, PLLC
One Fifth Street, Ste 150
Wenatchee, WA 98801
Tel: 509.888.9364
Fax: 509.888.9365
www.z-engineers.com

CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO. 1
	2ND ENG. GREG HENN	PRIM. ENG.
	DESIGNER GREG HENN	2ND ENG.
	APPROVAL BRIAN ZIESMER	PROJ. MGR. COURT HILL

SCALE AS NOTED	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0	30	60	1"
REV	DATE	REVISION	REQ. BY DRFT
0	4/10/2015	BID SET	BZ AB

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
ELECTRICAL
SITE PLAN
BID NO. 15-04

SHEET E2 OF E7
REVISION 0
DATE 4/10/2015
DWG. 0908-50EL-0014

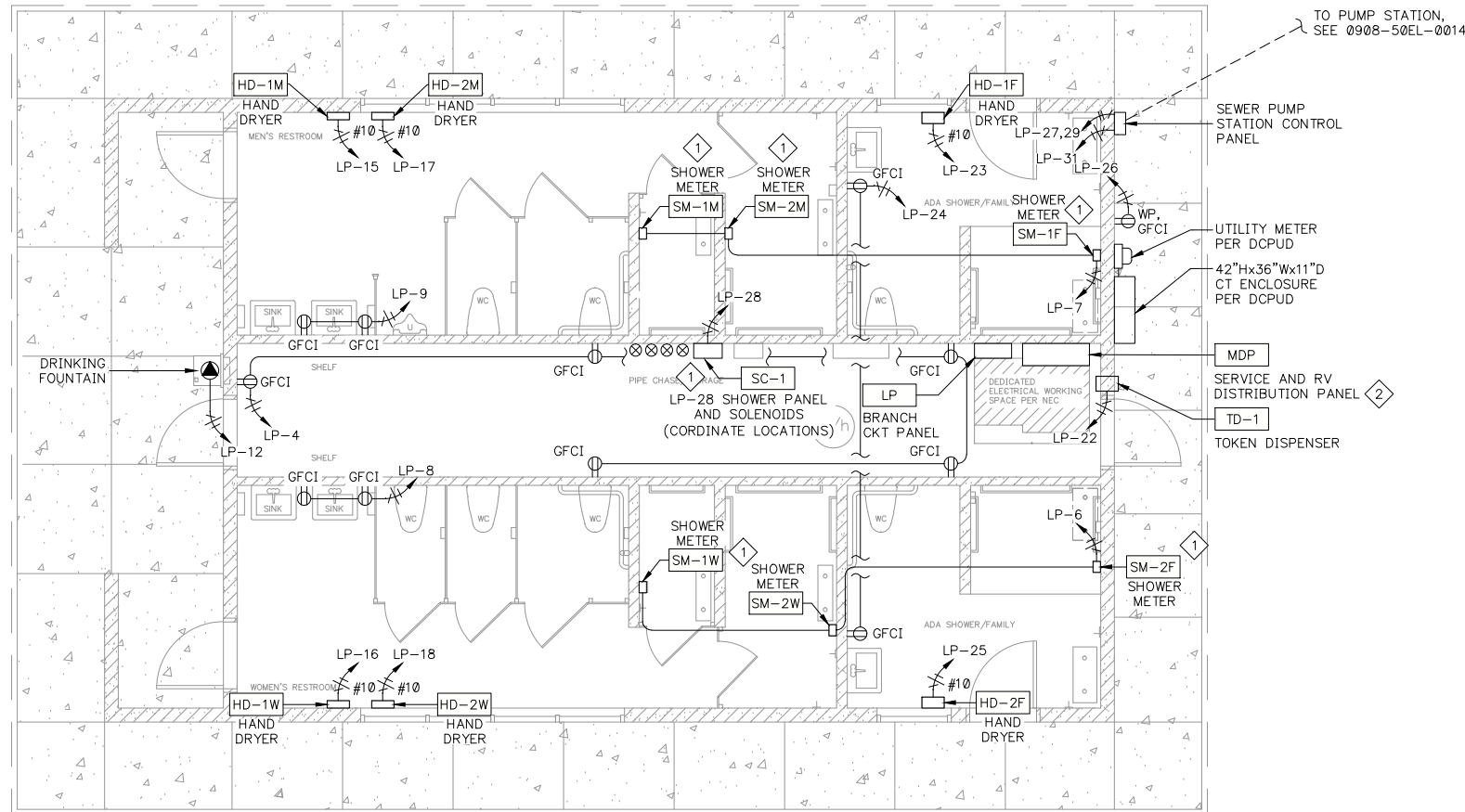


GENERAL NOTES:

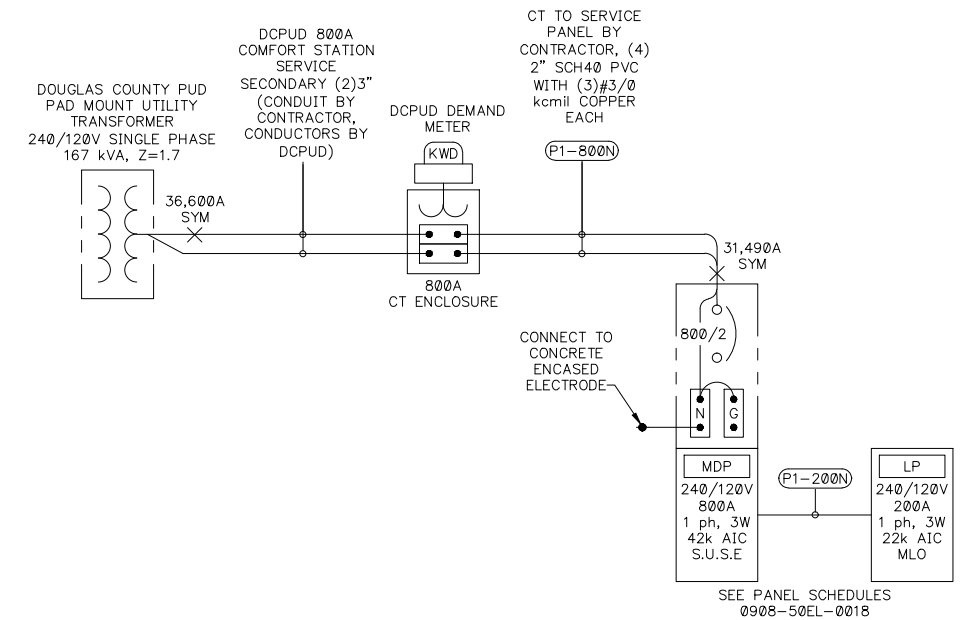
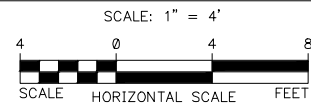
1. CONTRACTOR SHALL COORDINATE BRANCH CIRCUIT RACEWAY ROUTING FROM PANELS MDP AND LP TO FIELD DEVICES BASED ON CIRCUIT DESIGNATIONS SHOWN IN PANEL SCHEDULES.
2. SEE OTHER SHEETS FOR MECHANICAL EQUIPMENT, POWER AND CONTROL REQUIREMENTS.
3. ALL POWER CIRCUITS SHALL BE #12 AWG Cu, OR SIZED PER NEC FOR BREAKER RATING SHOWN IN PANEL SCHEDULES.
4. BRANCH CIRCUIT PROVIDED FOR IRRIGATION CONTROL PANEL. COORDINATE LOCATION DURING CONSTRUCTION.

KEY NOTES:

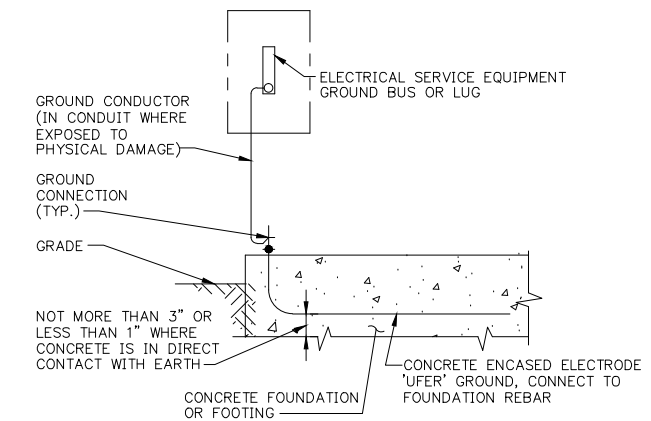
1. COIN OPERATED SHOWER SYSTEM CONTROLLER. CONTROLLER SHALL PROVIDE CONTROL OF HOT WATER SOLENOIDS AND ACCEPT START SIGNALS FROM EACH COIN OP METER. PROVIDE (2)#18 IN 1/2" CONDUIT FROM SHOWER SYSTEM CONTROLLER TO EACH HOT WATER SOLENOID VALVE (4 TOTAL). PROVIDE (2)#18 IN 1/2 CONDUIT FROM SHOWER SYSTEM CONTROLLER TO EACH COIN OP METER (4 TOTAL).
2. CONTRACTOR SHALL COORDINATE RACEWAY ROUTING OUT OF BUILDING FOR SERVICE AND SITE ELECTRICAL BASED ON COORDINATION WITH UTILITY AND OTHER TRADES. PROVIDE HANDHOLES AS REQUIRED BY UTILITY AND TO MEET ELECTRICAL CODE. SEE SITE PLANS.



COMFORT STATION – POWER AND RECEPTACLE PLAN



ONE-LINE DIAGRAM – COMFORT STATION
SCALE: NONE



GENERAL NOTE: CONTRACTOR SHALL PROVIDE ALL REQUIRED GROUNDING AND BONDING TO MEET REQUIREMENTS OF NEC ARTICLE 250.

GROUNDING SYSTEM DETAIL
SCALE: NONE



CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO. 1	SCALE AS NOTED	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
	2ND ENG. GREG HENN	PRIM. ENG. COURT HILL	0	4/10/2015	BID SET	BZ AB
	DESIGNER GREG HENN	2ND ENG. COURT HILL	REV	DATE	REVISION	REQ. BY DRFT
	APPROVAL BRIAN ZIESMER	PROJ. MGR. COURT HILL				

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON



DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
COMFORT STATION
POWER & RECEPTACLE PLAN
BID NO. 15-04

SHEET E3 OF E7
REVISION 0
DATE 4/10/2015
DWG. 0908-50EL-0015

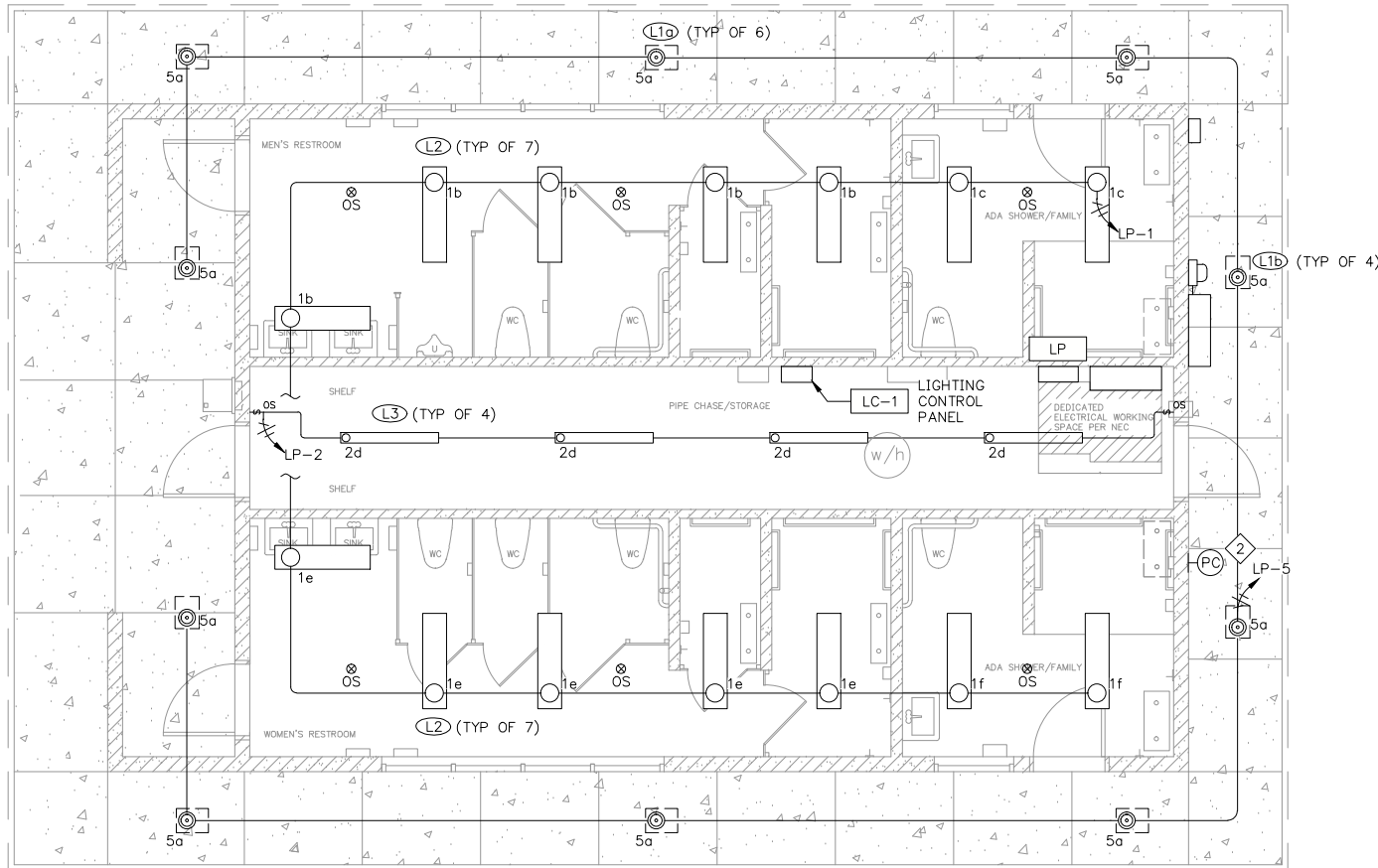


GENERAL LIGHTING NOTES:

- COORDINATE ALL FINAL FIXTURE LOCATIONS WITH ARCHITECTURAL AND MECHANICAL TO AVOID CONFLICTS.
- EXTERIOR SOFFIT LIGHTING SHALL BE CONTROLLED FROM INTEGRAL FIXTURE OR REMOTE MOUNTED PHOTOCELL.
- ALL EXTERIOR LIGHTS SHALL BE WET LOCATION RATED AND INCLUDE SEALED LENSES TO KEEP OUT BUGS AND OTHER FOREIGN MATTER.
- LIGHTING CIRCUITS SHALL BE #12 AWG COPPER. ROUTING SHOWN ON PLANS IS SCHEMATIC. ROUTE ALL LIGHTING CIRCUITS TO LIGHTING PANEL, SEE SCHEDULES. ELECTRICAL CONTRACTOR SHALL DETERMINE THE BEST ROUTING PATH AND CIRCUIT COMBINATIONS BASED ON FIELD CONDITIONS AND ELECTRICAL CODES.
- LIGHTING CONTROLS SHALL BE PROVIDED FOR OCCUPANCY AND DIMMING CONTROL AS INDICATED. PROVIDE QUANTITY OF SENSORS TO CONTROL INDICATED AREA.
- PROVIDE UNSWITCHED POWER CIRCUIT TO ALL EMERGENCY FIXTURES.

KEY NOTES:

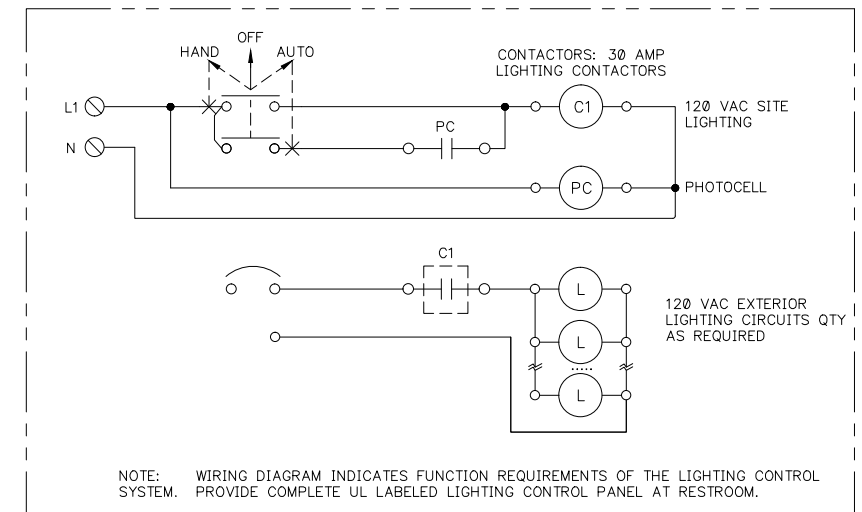
- PROVIDE DUAL RELAY OCCUPANCY SENSOR FOR CONTROL OF LIGHTING AND EXHAUST FANS. SEE MECHANICAL. TIE RESTROOM EXHAUST FAN POWER AND CONTROL INTO LIGHTING CIRCUIT AND DUAL RELAY OCCUPANCY SENSOR.
- ROUTE CONDUCTORS VIA PHOTOCELL CONTROLLED LIGHTING CONTACTOR.



FIXTURE SCHEDULE					
ID	DESCRIPTION	MOUNTING	LAMPS	VA	MANUFACTURER / PART NO.
L1a	RECESSED LED CANOPY FIXTURE	RECESSED IN SOFFIT	LED	26	KENALL HRDL6TCL-26L40K-DV-SCC-FW-CSS-G, OR EQUAL
L1b	RECESSED LED SLOPED MOUNT	RECESSED IN SOFFIT	LED	26	JUNO SUPERSLOPE - 1C928LED964-41K-1, OR EQUAL
L2	SURFACE LED 4' FIXTURE	SURFACE MOUNTED ON CEILING	LED	50	KENALL MLHA12-48-F-MW-CP-1-50L40K-DCC-1-DV, OR EQUAL
L3	PENDANT LED 4' FIXTURE	PENDANT MOUNT	LED	50	KENALL MLHA5-48-F-MW-CP-1-50L40K-DCC-1-DV, OR EQUAL

LIGHTING FIXTURE SCHEDULE

SCALE: NONE

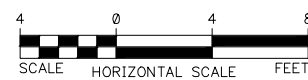


LIGHTING CONTROL PANEL - SCHEMATIC DIAGRAM

SCALE: NONE

COMFORT STATION - LIGHTING PLAN

SCALE: 1" = 4'



CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1	SCALE AS NOTED	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
	2ND ENG. GREG HENN	PRIM. ENG. COURT HILL	0	4/10/2015	BID SET	BZ AB
	DESIGNER GREG HENN	2ND ENG. COURT HILL	REV	DATE	REVISION	REQ. BY DRFT
	APPROVAL BRIAN ZIESMER	PROJ. MGR. COURT HILL				



DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
COMFORT STATION
LIGHTING PLAN
BID NO. 15-04



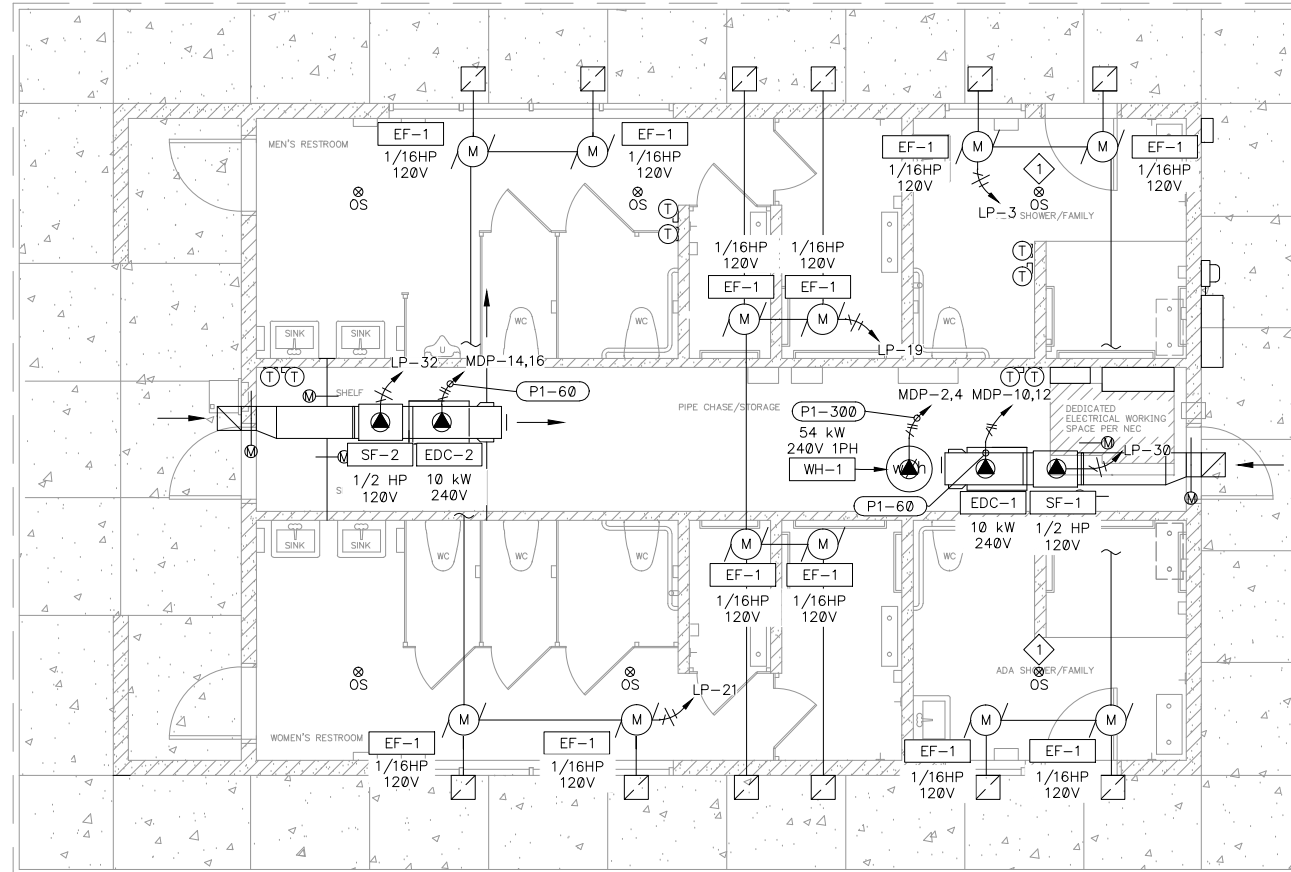
SHEET E4 OF E7
REVISION 0
DATE 4/10/2015
DWG. 0908-50EL-0016

GENERAL NOTES:

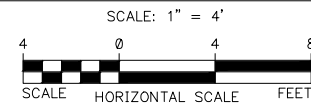
1. CONTRACTOR SHALL COORDINATE BRANCH CIRCUIT RACEWAY ROUTING FROM PANELS TO FIELD DEVICES BASED ON CIRCUIT DESIGNATIONS SHOWN IN PANEL SCHEDULES.
2. ELECTRICAL CONTRACTOR SHALL PROVIDE ELECTRICAL POWER AND LOW VOLTAGE CONTROLS FOR ALL MECHANICAL EQUIPMENT INCLUDING CONTROLS, SENSORS, DISCONNECTS AND THERMOSTATS PER MECHANICAL SCHEDULES AND MECHANICAL SEQUENCE OF OPERATIONS, AND AS REQUIRED TO MEET ELECTRICAL CODES. SEE MECHANICAL DRAWING 0908-05BS-001 FOR ADDITIONAL INFORMATION.

KEY NOTES:

1. PROVIDE (2)#12 CONDUCTORS FROM EXHAUST FAN TO DUAL RELAY OCCUPANCY SENSOR IN EACH FAMILY SHOWER ROOM AND TERMINATE. OCCUPANCY SENSOR SHALL PROVIDE 15 MINUTE TIME DELAY AFTER VACANCY OF SPACE. SEE MECHANICAL DRAWING 0908-05BS-004 FOR ADDITIONAL INFORMATION.



COMFORT STATION – HVAC POWER PLAN



CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1
	2ND ENG. GREG HENN	PRIM. ENG. COURT HILL
	DESIGNER GREG HENN	2ND ENG. COURT HILL
	APPROVAL BRIAN ZIESMER	PROJ. MGR. COURT HILL

SCALE AS NOTED	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0 4/10/2015	BID SET	BZ AB
REV DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY

WENATCHEE, WASHINGTON

DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
COMFORT STATION
HVAC POWER PLAN
BID NO. 15-04

SHEET E5 OF E7
REVISION 0
DATE 4/10/2015
DWG. 0908-50EL-0017

ORIG. DRAWN: CH

PANEL: LP				PANEL SCHEDULE						PROJECT: DAROGA SP -- GROUP CAMP			
120/240V, 1Ph, 3W.				225A Bus			M.L.O.			SURFACE MOUNTED			
CKT NO	DESCRIPTION / LOCATION	LOAD (VA)	LOAD TYPE	C.B. AMP	C.B. POLE	PHASE	C.B. POLE	C.B. AMP	LOAD TYPE	LOAD (VA)	DESCRIPTION / LOCATION	CKT NO	
1	RESTROOM LIGHTS	700	L	20	1	A	1	20	L	250	MECH RM LIGHTS	2	
3	EXHAUST FANS - FAMILY	720	LM	20	1	B	1	20	R	360	MECH RM OUTLETS	4	
5	OUTSIDE LIGHTS	260	L	20	1	A	1	20	G	500	SHOWER METER -- WOMENS	6	
7	SHOWER METER -- MENS	500	R	20	1	B	1	20	R	360	WOMEN'S OUTLETS	8	
9	MEN'S OUTLETS	360	R	20	1	A	1	20	R	500	IRRIGATION CONTROL	10	
11	SPARE		---	20	1	B	1	20	R	500	DRINKING FOUNTAIN	12	
13	SPARE		---	20	1	A	1	20	---		SPARE	14	
15	HD-1M	2,400	H	30	1	B	1	30	H	2,400	HD-1W	16	
17	HD-2M	2,400	H	30	1	A	1	30	H	2,400	HD-2W	18	
19	EF-1 - SHOWER	100	M	20	1	B	1	20	---		SPARE	20	
21	EF-1 - RESTROOM	150	M	20	1	A	1	20	R	500	TOKEN DISPENSER	22	
23	HD - 1F	2,400	H	30	1	B	1	20	R	360	SHOWER RM RECEPTACLES	24	
25	HD - 2F	2,400	H	30	1	A	1	20	R	180	UTILITY RECEPTACLE	26	
27	SEPTIC PUMP STATION	1,920	M	20	2	B	1	20	R	1,200	SHOWER SYSTEM CONTROLLER	28	
29	---	1,920	M	---	---	A	1	20	M	696	SF-1	30	
31	SEPTIC PUMP STATION CONTROLS	500	C	20	1	B	1	20	M	696	SF-2	32	
33	SPACE					A	1	20			SPARE	34	
35	SPACE					B	1	20			SPARE	36	
37	SPACE					A	1	20			SPARE	38	
39	SPACE					B					SPACE	40	
41	SPACE					A					SPACE	42	

TOTAL CONNECTED LOAD: PH A 13,216 VA 110.1 AMPS DATE: April 10, 2015
TOTAL CONNECTED LOAD: PH B 14,416 VA 120.1 AMPS

MAX PHASE CONNECTED LOAD: PH B 14,416 VA PANEL RATING: 22,000 AIC
TOTAL CONNECTED LOAD (2 x MAX): 28.8 kVA 120.1 AMPS TOTAL DEMAND LOAD: 27.9 kVA 116.5 AMPS

	CONNECTED LOADS	SUBFED LOADS [S]	TOTAL LOADS	DEMAND FACTOR	DEMAND LOAD
G GENERAL (RV PEDESTALS)	500 VA	0 VA	500 VA	42%	210 VA
L LIGHTING	1,210 VA	0 VA	1,210 VA	125%	1,513 VA
R RECEPTACLES	4,820 VA	0 VA	4,820 VA	100%	4,820 VA
RECEPTACLES OVER 10 kVA	0 VA	0 VA	0 VA	50%	0 VA
K KITCHEN	0 VA	0 VA	0 VA	100%	0 VA
H HEATING	14,400 VA	0 VA	14,400 VA	100%	14,400 VA
M MOTORS	5,482 VA	0 VA	5,482 VA	100%	5,482 VA
LM LARGEST MOTOR	720 VA	0 VA	720 VA	125%	900 VA
WH WATER HEATER	0 VA	0 VA	0 VA	100%	0 VA
C CONTINUOUS (GENERAL LOAD)	500 VA	0 VA	500 VA	125%	625 VA
N NON-COINCIDENT	0 VA	0 VA	0 VA	0%	0 VA
TOTAL:	27,632 VA	0 VA	27,632 VA		27,950 VA

NOTES:

1. NEMA 1 ENCLOSURE
- 2.
- 3.
- 4.
- 5.
- 6.

PANEL SCHEDULE LP
SCALE: NONE

PANEL: MDP				PANEL SCHEDULE						PROJECT: DAROGA SP -- GROUP CAMP			
120/240V, 1Ph, 3W.				800A Bus			800A M.C.B			SURFACE MOUNTED			
CKT NO	DESCRIPTION / LOCATION	LOAD (VA)	LOAD TYPE	C.B. AMP	C.B. POLE	PHASE	C.B. POLE	C.B. AMP	LOAD TYPE	LOAD (VA)	DESCRIPTION / LOCATION	CKT NO	
1	RV-1	4,800	G	50	2	A	2	300	WH	27,000	WATER HEATER WH-1	2	
3	---	4,800	G	---	---	B	---	---	WH	27,000	---	4	
5	RV-2	4,800	G	50	2	A	2	200	S	13,216	SUB FEED PANEL LP	6	
7	---	4,800	G	---	---	B	---	---	S	14,416	---	8	
9	RV-3	4,800	G	50	2	A	2	60	H	5,000	EDC-1	10	
11	---	4,800	G	---	---	B	---	---	H	5,000	---	12	
13	RV-4	4,800	G	50	2	A	2	60	H	5,000	EDC-2	14	
15	---	4,800	G	---	---	B	---	---	H	5,000	---	16	
17	RV-5	4,800	G	50	2	A					SPACE	18	
19	---	4,800	G	---	---	B					SPACE	20	
21	RV-6	4,800	G	50	2	A					SPACE	22	
23	---	4,800	G	---	---	B					SPACE	24	
25	RV-7	4,800	G	50	2	A					SPACE	26	
27	---	4,800	G	---	---	B					SURGE PROTECTION	28	
29	SPACE					A					---	30	

TOTAL CONNECTED LOAD: PH A 83,816 VA 698.5 AMPS DATE: April 10, 2015
TOTAL CONNECTED LOAD: PH B 85,016 VA 708.5 AMPS

MAX PHASE CONNECTED LOAD: PH B 85,016 VA PANEL RATING: 42,000 AIC
TOTAL CONNECTED LOAD (2 x MAX): 170.0 kVA 708.5 AMPS TOTAL DEMAND LOAD: 139.0 kVA 579.1 AMPS

	CONNECTED LOADS	SUBFED LOADS [S]	TOTAL LOADS	DEMAND FACTOR	DEMAND LOAD
G GENERAL (RV PEDESTALS)	67,200 VA	500 VA	67,700 VA	55%	37,235 VA
L LIGHTING	0 VA	1,210 VA	1,210 VA	125%	1,513 VA
R RECEPTACLES	0 VA	4,820 VA	4,820 VA	100%	4,820 VA
RECEPTACLES OVER 10 kVA	0 VA	0 VA	0 VA	50%	0 VA
K KITCHEN	0 VA	0 VA	0 VA	100%	0 VA
H HEATING	20,000 VA	14,400 VA	34,400 VA	100%	34,400 VA
M MOTORS	0 VA	5,482 VA	5,482 VA	100%	5,482 VA
LM LARGEST MOTOR	0 VA	720 VA	720 VA	125%	900 VA
WH WATER HEATER	54,000 VA	0 VA	54,000 VA	100%	54,000 VA
C CONTINUOUS (GENERAL LOAD)	0 VA	500 VA	500 VA	125%	625 VA
N NON-COINCIDENT	0 VA	0 VA	0 VA	0%	0 VA
TOTAL:	141,200 VA	27,632 VA	168,832 VA		138,975 VA

NOTES:

1. PROVIDE SURGE PROTECTIVE DEVICE FOR SERVICE PANEL
2. RV DEMAND FACTOR PER NEC TABLE 551.73
3. NEMA 1 ENCLOSURE
4. SERVICE RATED
- 5.
- 6.

PANEL SCHEDULE MDP
SCALE: NONE



CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO. 1	SCALE AS NOTED	BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
	2ND ENG.	PRIM. ENG.				
	DESIGNER GREG HENN	2ND ENG.	0 4/10/2015	BID SET	BZ	AB
	APPROVAL BRIAN ZIESMER	PROJ. MGR. COURT HILL	REV	DATE	REVISION	REQ. BY

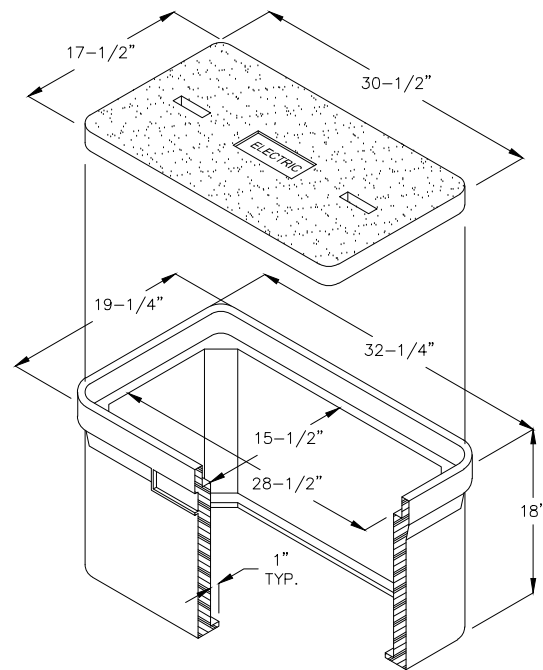
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON



DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
ELECTRICAL
PANEL SCHEDULES
BID NO. 15-04



SHEET E6 OF E7
REVISION 0
DATE 4/10/2015
DWG. 0908-50EL-0018



1 ELECTRICAL HAND HOLE DETAIL
SCALE: NONE

NOTES

- HAND HOLE FOR USE IN SIDEWALKS, ROADWAY MEDIANS AND BEHIND CURB LOCATIONS WHERE NO DELIBERATE VEHICULAR TRAFFIC IS PLANNED. SIZE AS REQUIRED TO MEET NEC ARTICLE 314.30.
- DIMENSIONS ARE APPROXIMATE MINIMUM DIMENSIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL SELECTION TO MEET LOCAL CODES AND INSTALLATION REQUIREMENTS.
- OLDCASTLE #1730-18, OR EQUAL.

SINGLE PHASE RACEWAY & CONDUCTORS						
FEEDER ID	AMPERAGE	# OF SETS	CONDUIT INDOOR	CONDUIT OUTDOOR	CONDUCTORS EACH CONDUIT	GROUND EACH CONDUIT
P1-20	20A	(1)	3/4"	1"	(2) #12	(1) #12
P1-25	25A	(1)	3/4"	1"	(2) #12	(1) #12
P1-30	30A	(1)	3/4"	1"	(2) #10	(1) #10
P1-35	35A	(1)	3/4"	1"	(2) #8	(1) #10
P1-40	40A	(1)	3/4"	1"	(2) #8	(1) #10
P1-45	45A	(1)	3/4"	1"	(2) #6	(1) #10
P1-50	50A	(1)	3/4"	1" (2"RV)	(2) #6	(1) #10
P1-60	60A	(1)	1"	1"	(2) #4	(1) #10
P1-70	70A	(1)	1"	1" (2"RV)	(2) #4	(1) #8
P1-80	80A	(1)	1-1/4"	1-1/4"	(2) #3	(1) #8
P1-90	90A	(1)	1-1/4"	1" (2"RV)	(2) #2	(1) #8
P1-100	100A	(1)	1-1/4"	1-1/4"	(2) #1	(1) #8
P1-125	125A	(1)	1-1/4"	1-1/4"	(2) #1	(1) #6
P1-150	150A	(1)	1-1/2"	1-1/2"	(2) #1/0	(1) #6
P1-175	175A	(1)	2"	2"	(2) #2/0	(1) #6
P1-200	200A	(1)	2"	2"	(2) #3/0	(1) #6
P1-225	225A	(1)	2"	2"	(2) #4/0	(1) #4
P1-250	250A	(1)	2-1/2"	2-1/2"	(2) #250	(1) #4
P1-300	300A	(1)	2-1/2"	2-1/2"	(2) #350	(1) #4
P1-400	400A	(2)	2"	2"	(2) #3/0	(1) #3
P1-800	800A	(4)	2"	2"	(2) #3/0	(1) #1/0

NOTES:

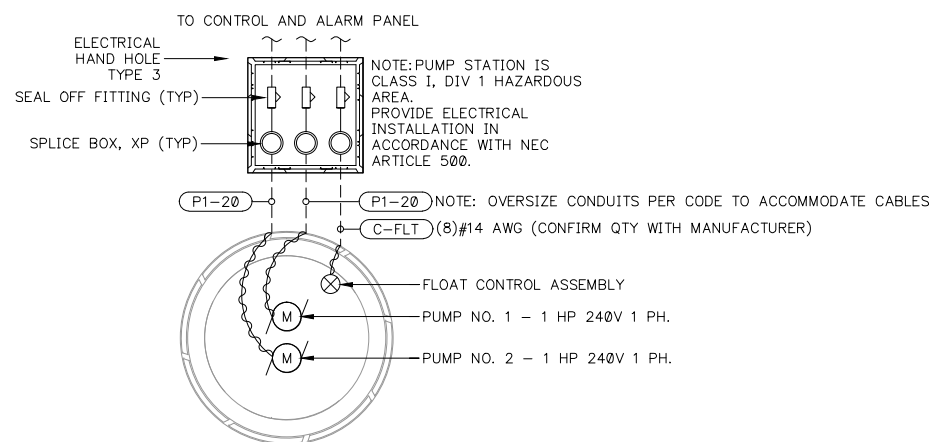
- FEEDER ID FOLLOWED BY THE SUFFIX "N" INDICATES NEUTRAL CONDUCTOR. PROVIDE ADDITIONAL NEUTRAL CONDUCTOR SIZED TO MATCH PHASE CONDUCTORS.
- CONDUCTOR AMPACITY BASED ON NEC TABLE 310.16.
- CONDUIT FILL BASED ON NEC ANNEX C, TABLE C.1 FOR THHN/THWN TYPE CONDUCTORS. CONTRACTOR SHALL PROVIDE ADJUSTMENTS AS NECESSARY FOR OTHER CONDUCTOR AND RACEWAY TYPES.
- CONTRACTOR MAY COMBINE BRANCH CIRCUITS IN COMMON RACEWAY UP TO SIX CURRENT CARRYING CONDUCTORS. ADJUSTMENT FACTORS SHALL BE APPLIED PER NEC TABLE 310.15(B)(2)(a).
- MINIMUM CONDUIT SIZE FOR UNDERGROUND RACEWAY IS 1 INCH, RV FEEDERS 2"

RACEWAY AND CONDUCTOR SCHEDULE
SCALE: NONE

RV PEDESTAL VOLTAGE DROP CALCULATIONS (240V, 1Ph.)												
Description	Load	Segment	Multiplier	Ckt Brkr	Segment	Copper	Segment	Cumulative	Drop (V)	Drop (%)	Drop (%)	Cumul.
ID	Ckt Amps	Amperes	Distance	Copper	Amp	Wire	Voltage	Segment	Drop (V)	Drop (%)	Drop (%)	Cumul.
1 Phase	9600 VA ea	551.73 Demand	Feet	1 Phase	Rating	number	Mils	Size	Drop (V)	Drop (%)	Drop (%)	Cumul.
DAROGA STATE PARK - CABIN LOOP - RV PEDESTALS												
RV-1	40	0.55	22	95	25.8	50	1	26240	6	2.05	0.86	0.86
RV-2	40	0.55	22	145	25.8	50	1	26240	6	3.14	1.31	1.31
RV-3	40	0.55	22	195	25.8	50	1	26240	6	4.22	1.76	1.76
RV-4	40	0.55	22	245	25.8	50	1	26240	6	5.30	2.21	2.21
RV-5	40	0.55	22	405	25.8	50	1	41740	4	5.51	2.29	2.29
RV-6	40	0.55	22	455	25.8	50	1	41740	4	6.19	2.58	2.58
RV-7	40	0.55	22	505	25.8	50	1	41740	4	6.87	2.86	2.86

GENERAL NOTE: SEGMENT DISTANCES FOR CALCULATION PURPOSES ONLY, NOT TO BE USED BY CONTRACTOR FOR COST ESTIMATING.

VOLTAGE DROP SCHEDULE
SCALE: NONE



2 SEWER PUMP STATION DETAIL
SCALE: NONE



CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO. 1	SCALE AS NOTED	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
	2ND ENG. GREG HENN	PRIM. ENG. GREG HENN	0	4/10/2015	BID SET	BZ AB
	APPROVAL BRIAN ZIESMER	PROJ. MGR. COURT HILL	REV	DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
WENATCHEE, WASHINGTON



DAROGA STATE PARK
GROUP CAMP IMPROVEMENTS
ELECTRICAL
DETAILS & SCHEDULES
BID NO. 15-04

SHEET E7 OF E7
REVISION 0
DATE 4/10/2015
DWG. 0908-50EL-0019