



PUBLIC UTILITY DISTRICT NO. 1 of CHELAN COUNTY

P.O. Box 1231, Wenatchee, WA 98807-1231 • 327 N. Wenatchee Ave., Wenatchee, WA 98801
(509) 663-8121 • Toll free 1-888-663-8121 • www.chelanpud.org

December 19, 2014

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 Lincoln Rock State Park Cabin Loop and 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 Lincoln Rock 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)
- Volume I: Contract Documents, Exhibit U - Addition Information, and Exhibit V - Permits
- Volume II: Exhibit S - Technical Specifications
- Volume III: Exhibit T - Contract Drawings

Trash clean up during construction is the responsibility of the Contractor as described in Volume I: General Conditions (GC) 61 - 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 from width and grade of trails to designated disabled campsites, universal picnic tables, fire rings, comfort station and cabins built to American Disabilities Act standards, designated disabled parking, as is evidenced on the construction drawings. In addition, there will be appropriate signage identifying the designated disabled parking stalls. These features are illustrated in Volume III: Contract Drawings.

As part of the planning process, Chelan PUD consulted with, and received the necessary permits from Douglas County, Washington (see Volume 1, Exhibit V).

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 proposed to begin March 2015 through December 2015.

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

Sincerely,



Michelle Smith *for*
Licensing & Compliance Manager
(509) 661-4180
michelle.smith@chelanpud.org

Enclosure: Electronic files for the QCIP, ESCP, and contract plans and specifications
(Volumes 1-3)

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

Lincoln Rock State Park Cabin Loop & Group Camp

Rocky Reach Hydroelectric
Project
FERC Project No. 2145

December 2014

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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 Lincoln Rock State Park. This park is located on the Rocky Reach reservoir, just upstream of 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 Lincoln Rock State Park, specifically for a new cabin camping loop and a group camp. Chelan PUD proposes to construct these improvements beginning March 2015 and complete by December 2015.

The project was designed using a team of external consultants and Chelan PUD staff. 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 new camping loop in an undeveloped area of the park consisting of eight (8) deluxe cabins and three (3) RV sites with full hook-ups (ie. power, water and sanitary sewer), and an interpretive trail which includes two interpretive sites and improvements to an existing parking area.

1. Site improvements in the cabin loop will consist of concrete demolition, clearing, grubbing, earthwork, installation of new utilities, asphalt road widening and construction of new asphalt roads, parking, RV sites and landscaping.
2. Deluxe cabin information:
 - Architectural design
 - Construction: On-site, stick framed
 - Size: 400 square feet not including a 96 square foot front porch
 - Trades include: concrete, electrical, plumbing, HVAC, glazing, metal roofing, painting and carpentry

Construction of a new group camp in an existing developed area of the park consists of three (3) RV sites with hook-ups and expansion of an existing comfort station. Comfort station expansion includes the addition of two new family/ADA bathrooms and a roof replacement.

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 December 2015.

B. Anticipated construction sequence

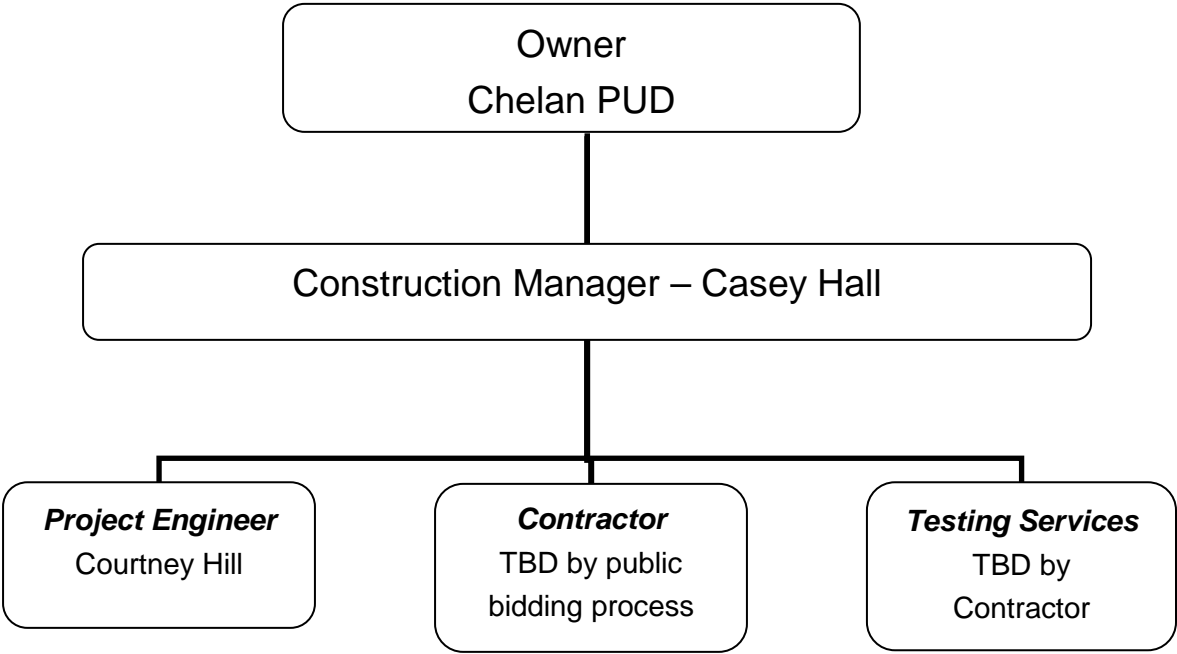
The construction sequence will generally begin with installation of site earthwork and utilities, then will progress to building construction and landscaping improvements.

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
Lincoln Rock 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, 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
- Lincoln Rock & 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		

LINCOLN ROCK 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 Lincoln Rock State Park. This park is located on the Rocky Reach reservoir, just upstream of 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 Lincoln Rock State Park, specifically construction of a new cabin camping loop and group camp. Chelan PUD proposes to begin construction March 2015 and complete by December 2015.

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 new camping loop in an undeveloped area of the park consisting of eight (8) deluxe cabins and three (3) RV sites with full hook-ups (ie. power, water and sanitary sewer), and an interpretive trail which includes two interpretive sites and improvements to an existing parking area.

1. Site improvements in the cabin loop will consist of concrete demolition, clearing, grubbing, earthwork, installation of new utilities, asphalt road widening and construction of new asphalt roads, parking, RV sites and landscaping.
2. Deluxe cabin information:
 - Architectural design
 - Construction: On-site, stick framed
 - Size: 400 square feet not including a 96 square foot front porch
 - Trades include: concrete, electrical, plumbing, HVAC, glazing, metal roofing, painting and carpentry

Construction of a new group camp in an existing developed area of the park consists of three (3) RV sites with hook-ups and expansion of an existing comfort station. Comfort station expansion includes the addition of two new family/ADA bathrooms and a roof replacement.

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 (312500) dedicated to erosion and sediment control. The specification requires the contractor to develop, submit and implement a Storm Water Pollution Prevention Plan (SWPPP) in accordance with Washington State Department of Ecology standards. This specification section should be considered a primary component of this ESCP.

3.0 CONCLUSION

Construction of the Lincoln Rock State Park cabin loop and group camp 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. 14-31

**Lincoln Rock State Park
Cabin Loop and Group Camp**

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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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 Cathy Davis, 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. 14-31 for Lincoln Rock State Park Cabin Loop and Group Camp. Bids will be publicly opened and read aloud at 2:30 PM, Pacific Time, January 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.
- Acknowledgment of receipt of Addenda to Contract Documents on Bid Form.
- Bid Bond, or certified or cashier's check.



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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 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 unless otherwise specified in Specific Requirements. The Performance and Payment Bond shall extend for one year from the date of final acceptance of the Project 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 contains 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



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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

Pursuant to RCW 39.30.060, Bidder shall submit on the List of Subcontractors form, as part of the bid or within one hour after the published bid submittal time, the names of the Subcontractors with whom the Bidder, if awarded the Contract, will subcontract for the performance of work of HVAC (heating, ventilation, and air conditioning); Plumbing (as described in Chapter 18.106 RCW); and electrical as described in Chapter 19.28 RCW, or to name itself for the Work. Bidder shall not list more than one Subcontractor for each category of work unless Subcontractors will vary with bid alternates, in which case Bidder must indicate (on the List of Subcontractors form) which Subcontractor will be used for which alternate. Failure of Bidder to comply with these requirements shall render the Bidder's bid nonresponsive and, therefore, void. Additionally, 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 and possesses an electrical contractor license, if required by RCW 19.28, or an elevator contractor license, if required by RCW 70.87.

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 on projects of similar scope and complexity. 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 five 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 this Project, showing a minimum of five 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. Provide experience information as specified in 3 above for proposed Subcontractors Bidder identifies in Exhibit C – List of Subcontractors.

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.



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- 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.
- In accordance with RCW 43.19.1911, which authorizes consideration of bids with the lowest life cycle cost in evaluating bids for the purchase, manufacture or lease of materials, equipment or other goods, the District may consider and apply the "life cycle costing" technique where it will result in the lowest total cost to the District.
- 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.

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.



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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
<hr/>	
Alaska nonresident Contractor Bid Amount	\$100,000.00
Alaska CPD Total	\$ 5,000.00
Nonresident Disadvantage Total	\$105,000.00*

*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



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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.

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



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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 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 PROJECT MANAGER – The principal or authorized person designated by the Contractor to be responsible for the performance of the Work, and authorized to negotiate changes to the Work on behalf of the Contractor.

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 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.

REFERENCE DRAWINGS – "Reference Drawings" means drawings that are provided by the District to show additional information about existing site features, structures, equipment, or other information about existing conditions that may be of interest to the Contractor. Reference Drawings are for informational purposes only and do not show extent or details of the Work to be furnished as specified in the Contract Documents.

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



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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 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" 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
- . AWSC 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.**



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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 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.



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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 stated in 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



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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 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 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.



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- 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.
- 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 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 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 below.

The District has obtained the following approvals and permits, and has paid the fees associated with the application and procurement of such approvals and permits. The Contractor shall comply with all conditions of each approval/permit as if the conditions were detailed herein.

- Douglas County Shoreline Substantial Development Permit and Conditional Use Permit (see Exhibit V)
- Douglas County Building Permits

All costs in connection with obtaining and/or complying with the necessary remaining permits shall be considered incidental to the Project and shall be merged into the various Bid Items in the Bid Proposal.



GC-29 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-30 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.



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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-31 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-32 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



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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-33 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. Property Insurance. The Contractor shall, at its own expense, carry and maintain "All Risk" form of "Builder's Risk", installation floater, or equivalent property insurance insuring the District, Contractor and all Subcontractors from and against all risks of physical loss or damage to the Project (including permanent and temporary buildings and contents), materials, equipment and supplies in an amount not less than \$750,000.00 while in transit to the job site, while there awaiting installation, during installation and all forms of testing, and until Completion and final acceptance by the District of Contractor's Work hereunder. Upon written request by the Contractor to the District, the District may, at its sole discretion, accept Subcontractor's property insurance in substitution for Contractor's property insurance, in whole or in part, to cover the District's, Contractor's, and Subcontractor's interest in the Project. The District's acceptance of Subcontractor's property insurance does not relieve the Contractor from the ultimate responsibility to comply with and maintain insurance coverage in accordance with the provisions of this Property Insurance section. The District shall be named as loss payee as respects this coverage for the Project.
4. 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



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separate coverage requirement may be met by a cross liability clause, a severability of interest clause or an acceptable definition of the term "insured".

5. 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 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.
6. 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.
7. 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.
8. 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.



9. Delivery of Certificate. The completed Insurance Certificate with all necessary attachments shall be delivered to the District's Procurement & Contract Services Department.
10. 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.
11. 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-34 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-35 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-36 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-37 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-38 WORK SCHEDULE

Within five (5) 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-39 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



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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.

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-40 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



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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-41 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-42 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-43 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



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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 January 22, 2015 for this Project, the applicable Effective Date for prevailing wages for this Project is January 22, 2015. In the event the Project is not awarded within six (6) months of the bid submittal deadline of January 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-44 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



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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 the following items:

- a detailed Contractor's Application and Certificate for Payment,
- Contractor's invoice for the value of the Work completed during the previous month, and
- an updated Project Schedule, which shows all milestones.

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]). Each month, a draft of the Application and Certificate for Payment, Invoice and Project Schedule update shall be submitted to the District's Project Manager. Following the Project Manager's review and revisions by the Contractor, if necessary, the Contractor's Application and Certificate for Payment form and invoice 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 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-45 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-46 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-47 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-48 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-49 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.



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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 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-50 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-51 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-52 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-53 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-54 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-55 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-56 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-57 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-58 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.



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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-59 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 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.

Contractors are required to comply with WAC 296-155-Part L regarding Operator Certification and Crane Certification and Rigger and Signal Person qualifications. A current operator's certificate and a current crane certificate are to be submitted to the District Project Manager 10 days prior to mobilizing any cranes, derricks, or boom trucks to the Project site.

GC-60 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-61 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-62 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-63 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-64 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-65 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-66 SAFETY DATA SHEETS

Five (5) days prior to performing Work on 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-67 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-68 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 R, 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-69 ENVIRONMENTAL PROTECTION

Submittals. Contractor shall submit to District for review and approval a site specific Work Plan and Safety & Health Plan 30 days before beginning any on-site activities.



These Plans must also include the following:

1. Spill/discharge prevention and reporting.

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 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-70 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
- Permits (see Exhibit V)
- 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 perform the Work outlined below, as shown on the Contract Drawings, and as specified in the Contract Documents for Bid 14-31 Lincoln Rock State Park Cabin Loop and Group Camp, located at Lincoln Rock State Park, 13251 SR97, East Wenatchee, Washington.

SR-2 COMPLETION SCHEDULE/CONTRACT TIME

The Contractor shall commence Work under this Contract 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; 5) receipt of Notice to Proceed from the District.

The Contractor shall complete such Work in a diligent and workmanlike manner. Substantial Completion is required by November 24, 2015. All Work is required to be completed by December 18, 2015.

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.

The Contractor shall submit a project schedule in accordance with Exhibit S – Specifications Section 013000 Administrative Requirements. The schedule shall clearly identify the following 2015 milestone completion dates:

- March 2: Groundbreaking
- April 24: Cabin foundations and concrete slabs
- May 15: All earthwork & utilities (sewer, water, power)
- May 22: Cabin rough framing



- May 29: Comfort station men and women's restrooms Substantially Complete
- July 3: Cabin exterior finishes, including roofs
- June 26: All RV tent sites and picnic table concrete pads
- July 10: All paving for roads, trails and RV sites
- July 17: All signage and kiosks
- July 31: Comfort station family restrooms complete
- July 31: All sprinkler irrigation
- September 18: All shrubs, trees and hydroseed
- November 24: Cabin interior finishes and Substantial Completion of Work
- December 18: Final Completion of Work

If the Contractor (including all tiers of Subcontractors) fails to meet any one of the above milestone dates, it shall immediately submit a written plan and updated schedule indicating how it intends to expedite work to meet future milestones. The District may seek compensation from Contractor for the inspection of Work, if allowed to occur outside of the regular work week defined above.

SR-3 LIQUIDATED DAMAGES

For each and every day that Substantial Completion has not been achieved after expiration of the Contract Time, the Contractor shall pay the District, not as a penalty but as Liquidated Damages, the amount of \$360 per day or part of a day, including weekends and holidays.

Because of the difficulty in computing the actual damages which will result, the amount of Liquidated Damages as set forth above is hereby estimated, agreed upon and determined in advance by the parties hereto as a reasonable forecast of the actual damages which the District will suffer by the failure of the Contractor to complete the Work within the Contract Time. Such damages shall include the cost of all office and field engineering and inspection incurred after the time fixed for Completion in the Contract Documents.

The District may retain from any monies due the Contractor after the time fixed in the Contract Documents for Completion of the Work such amount as may be necessary to pay said Liquidated Damages. Should such amounts due to the Contractor not be sufficient to pay such damages, the Contractor shall immediately pay the deficiency to the District.

The execution of the Contract for the Work herein contemplated shall constitute acknowledgement by the Contractor that it understands, has estimated and ascertained and agrees that the District will actually suffer damages in the amount herein fixed for each and every day during which the Completion of the Work is delayed beyond the expiration of the Contract Time, including weekends and holidays.



SR-4 LIMITATION ON LIQUIDATED DAMAGES

The District shall not assess liquidated damages under this Contract in an amount in excess of 5% of the Contract Price.

SR-5 STORAGE OF MATERIALS AND EQUIPMENT

If any materials or equipment are stored, they shall be stored so as to ensure the preservation of their quality and fitness. Materials and equipment shall be placed on platforms or other hard, clean surfaces, and not on the ground, and shall be placed under cover and heated adequately to prevent condensation, oxidation or freezing. Stored materials and equipment shall be located so as to facilitate observation. The Contractor shall be responsible for all damage or loss that occurs as a result of its fault or negligence in connection with the care and protection of all materials and equipment until acceptance by the District.

SR-6 EXPERIENCE MODIFICATION RATE (EMR)

The Contractor's Experience Modification Rate (EMR) is requested to be submitted with the bid; however, if not submitted with the bid, it will be required for District review prior to award. 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-7 INSPECTION ELEMENTS - SUMMARY MATRIX

The Engineer has prepared an Inspection Elements-Summary Matrix (Matrix) 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 are identified in the Matrix (see Exhibit P). 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 require inspection and written authorization by the District prior to continuing Work on the inspected item or activity.

SR-8 DRAFTING STANDARDS AND SPECIFICATIONS

Drawings prepared by the Contractor shall be in compliance with the following:

A. EXISTING DRAWINGS

Any existing drawing (electronic or manual) requested by the Contractor will be scanned and sent via email, FTP site or CD via mail.

The Contractor shall make all changes to these drawings in this format:

- Color **Red (AutoCAD color 242)** Any additions
- Color **Green (AutoCAD color 82)** Any deletions
- Color **Blue (AutoCAD color 160)** General notes to explain change.

(Note: These will not be added to the final drawing.)

Approved District Format: Electronic file format shall be Autodesk® AutoCAD® DWG (*.dwg) 2010, Autodesk® DWF Viewer DWF (*.dwf). The District's preference is to receive .DWG (*.dwg) files, but .DXF (*.dxf) or .TIF (*.tif) files may be accepted with the District's **prior** approval.

Revision tracking shall be done in capital alpha character, after the initial numeric revision provided (i.e., revisions to 'Rev 4.0" would be 'Rev 4.0A', 'Rev 4.0B', etc.).

The Contractor shall provide a softcopy in approved format (see "Approved District Format" above) of **all** drawings on CD (with all image reference files included) and a full size hardcopy.

B. NEW DRAWINGS

Approved District Format: Electronic file format shall be as described above. The District's preference is to receive .DWG files (*.dwg), but .DXF (*.dxf) or .TIF (*.tif) files may be accepted with the District's **prior** approval.



CONTRACT DOCUMENTS 14-31

The Contractor shall comply with the latest revision of the National CAD Standard in these areas:

- CAD Layering Guidelines
- Tri-Services Plotting Guidelines (plot file will be provided by the District.)
- Drafting Conventions
- Terms & Abbreviations
- Symbols

Exceptions to the National CAD Standard shall be as follows:

- All CAD files shall be drawn at full scale (1:1) in Model Space.
- Acceptable hard copy size shall be as defined in ANSI Y14.1: B-size 11" x 17", C-size 18" x 24", D-size 22" x 34", or F-size 30" x 42". Preferred size will be at the **District's** discretion.
- Font shall be **simplex.shx** (provided by District).
- At delivery of final drawings, any use of cross-references ("X-REF") shall be bound within each drawing.
- The District's title block, border, and numbering system shall be used and will be provided by the District. (DO NOT MODIFY TITLE BLOCK. *Other than populating existing attribute.*)
- At delivery of final drawings, all CAD files shall be individually named and numbered per sheet with a distinct drawing number per sheet.
- EXAMPLE: Drawing file name: 0505-61WD-0001.dwg Drawing Number: 0505-61WD-0001. Only one (1) drawing per file will be accepted.
- All sections, views and details shall be referenced to and from each appropriate sheet using the District's drawing number.

The Contractor shall provide a softcopy of all drawings on CD (with all reference files included) and a hardcopy.

The Contractor shall be responsible to make sure **all** Subcontractors conform to these same standards.

If drawings pertain to a District bid or small works project, the correct bid or small works number shall appear in "Title Line 4" on each drawing. This will be provided by the Project Engineer.

END OF SPECIFIC REQUIREMENTS



EXHIBITS

EXHIBIT A BID FORM

TO: PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 327 NORTH WENATCHEE AVENUE
 P.O. BOX 1231
 WENATCHEE, WASHINGTON 98807

Having carefully examined the Contract Documents, including Specifications and Contractor’s Drawings entitled Lincoln Rock State Park Cabin Loop and Group Camp, 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 following prices:

Chelan County PUD No. 1 BID PRICE SCHEDULE					
Item	Description	Unit	Estimated Quantity	Unit Price	Total Price
1.	Cabin Loop	LS			= \$_____
2.	Cabin Type A (ADA)	EA	1	x \$_____	= \$_____
3.	Cabin Type B	EA	7	x \$_____	= \$_____
4.	Interpretive Trail & Parking Area	LS			= \$_____
5.	Group Camp	LS			= \$_____
6.	Comfort Station Addition	LS			= \$_____
7.	Topsoil Blend for Hydroseed Applications	CY	1,650*	x \$_____	= \$_____
8.	Trench Excavation Safety Systems	LS			= \$_____
TOTAL BID PRICE (not to include WSST)					\$_____

*Note: The quantity indicated for Item 7 above is an estimate for evaluation purposes only. The District will pay Contractor based on the actual quantity consumed as part of the Work.



CONTRACT DOCUMENTS 14-31

We, the undersigned, agree that the price(s) as quoted in the Bid Form 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 on or before a date to be specified in a written Notice to Proceed from the District and to strictly comply with the Contract Time schedule as specified in Specific Requirements, Completion Schedule, of these Contract Documents.

The Work shall be completed in its entirety by December 18, 2015.

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.

Attached hereto is a certified, cashier's check or Bid Bond drawn in favor of Public Utility District No. 1 of Chelan County, Washington, this amount being not less than the amount stated in the bid documents. If submitting a certified or cashier's check, please 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).



CONTRACT DOCUMENTS 14-31

Dated: _____ E-Mail: _____

(Complete, Registered Company Name)

Submitted by: _____

(Name of Bidder – typewritten or printed)

Per: _____

(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 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 _____, 20_____.

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

Bid 14-31 Lincoln Rock State Park Cabin Loop and Group Camp

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, Subcontracts, and RCW 39.30.060, 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 or within 1 hour of the scheduled bid opening time. Failure of a Bidder to name such Subcontractors shall 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 (see ITB-15 Bidder's Data).

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



OTHER SUBCONTRACTORS:

_____	CIVIL EARTH SUBCONTRACTOR
_____	CIVIL UTILITY SUBCONTRACTOR
_____	LANDSCAPE SUBCONTRACTOR
_____	PAVING SUBCONTRACTOR
_____	CARPENTRY SUBCONTRACTOR
_____	CONCRETE SUBCONTRACTOR
_____	ROOFING SUBCONTRACTOR
_____	TILE SUBCONTRACTOR
_____	_____
_____	_____
_____	_____

(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:		Contract No.:	14-31
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).



CONTRACT DOCUMENTS 14-31

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. _____ ENTERED INTO THE _____ DAY OF _____, 20____
BETWEEN THE DISTRICT AND THE CONTRACTOR of _____
(City, State)

FOR THE _____
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



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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 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).		
All Risk form of Builder's Risk Coverage to the value stated in the Contract.		
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

Five (5) days prior to performing Work on site, 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 ÖYES
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
Project Number, Project Name

The District has considered the Bid Proposal submitted by you for the above described Project in response to its Advertisement for Bid No. _____ 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. _____ 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:
_____ under Bid Number
_____.

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



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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.

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. _____ 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. _____, 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 _____

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. _____, 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



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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. _____ 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

Printed Name of Principal _____

Mailing Address _____

Street Address _____

Signature of Principal _____

SURETY

Printed Name of Surety _____

Mailing Address _____

Street Address _____

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. _____ 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 _____.

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. _____
 Insert Bid Title

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



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under 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



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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: _____
Printed Name:

By: _____
Printed Name:

TITLE _____

TITLE: _____

SAMPLE
FORM



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.

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.

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



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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 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 INSPECTION ELEMENTS – SUMMARY MATRIX

Name of Project:	14-31 Lincoln Rock State Park Cabin Loop & Group Camp	Notes: 1) Indicate specification reference with criteria. 2) Results and Inspector's name can be placed in last two columns.
Responsible party:		

DESCRIPTION: 14-31 LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP

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 02 - EXISTING CONDITIONS

SECTION 024116 – STRUCTURAL DEMOLITION

1.	Pre demolition inspection		Field	Existing conditions	Section 024116	Visual	Before Demolition		Hold		
2.	Protection of preserved structure		Field	Protection measures for portions of the building to remain	Section 024116	Visual	Before Demolition		Hold		



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DESCRIPTION: 14-31 LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP											
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
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		
3.	Vapor Retarder		Field	Placed in location and limits indicated on Contract 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		



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DESCRIPTION: 14-31 LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP											
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
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, ASTM C143/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		
DIVISION 05 - METALS											
SECTION 055000 – METAL FABRICATIONS											
1.	Metal Gate Material		Field, Submittals	Verify gate manufactured to Specifications and approved Shop Drawings, galvanizing condition, welds	Section 055000/ Approved submittals, ASTM A36, AASHTO M232	Visual	Before Installation		Hold		
2.	Metal Entrance Gate Installation		Field	Gate post hole as detailed, top 6" formed, post plumb and braced before concrete placement	Section 055000/ Approved submittals, ASTM A36, AASHTO M232	Visual	At Installation		Witness		



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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
3.	Bollards		Field, Submittals	Verify gate manufactured to Specifications and approved Shop Drawings, galvanizing condition, welds	Section 055000/ Approved submittals, ASTM A500, Grade B	Visual	Before Installation		Hold		
4.	Bollards Installation		Field	Bollard hole as detailed, top 6" formed, post plumb and braced before concrete placement	Section 055000/ Approved submittals	Visual	At Installation		Witness		
5.	Structural Steel Members		Field	Sizes and shapes of steel members match approved Shop Drawings,	Contract Drawings	Visual	Periodic		Witness		
6.	Structural Steel Fasteners, Connectors, and Anchors		Field	Meet requirements of Specifications, and Approved submittals	Contract Drawings	Visual	Periodic		Witness		
7.	Grout		Field	Meet requirement of Specifications and Approved submittals, Apply per manufacturers' recommendations	Contract Drawings	Visual	Periodic		Witness		
8.	Steel Shop Coat		Field	Steel shop coat applied, touch up after erection	Contract Drawings	Visual	Periodic		Witness		



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9.	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		
10.	Weld Inspection		Field	Certified welders, visually inspect all welds, field test as required in the Specifications	Contract Drawings, AWS D1.1	Visual / Testing Reports	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		
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 Specifications	Section 061000, Contract Drawings	Visual	Periodic		Witness		
4.	Sill Sealer, Flexible Flashing		Field/Submittal	Meets material requirements detailed in Specifications	Section 061000, Contract Drawings	Visual	Periodic		Witness		



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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
5.	Framing		Field	Level, plumb, no member splicing between supports, securely attached with fastening indicated on Contract Drawings, see Section 061000	Section 061000, Contract Drawings	Visual	Periodic		Witness		
SECTION 061600 - SHEATHING											
1.	Sheathing Materials		Field	Meets grade specified, fastener type	Section 061600 Contract Drawings	Visual	Periodic		Witness		
2.	Sheathing Installation		Field	Attachment pattern meets building codes and structural notes	Section 061600, Contract Drawings	Visual	Periodic		Witness		
SECTION 062000 – FINISH CARPENTRY											
1.	Material Storage		Field	Meets grades specified on Contract Drawings and Approved submittal	Section 062000, Contract Drawings	Visual	Periodic		Witness		
2.	Standing and Running Trim		Field	Meets grades specified on Contract Drawings and Approved submittal	Section 062000, Contract Drawings	Visual	Periodic		Witness		
3.	Lumber Siding		Field	Meets grades specified on Contract Drawings and Approved submittal	Section 062000, Contract Drawings	Visual	Periodic		Witness		



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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
4.	Installation		Field	Level, plumb, true, and aligned with adjacent materials.	Section 062000, Contract Drawings	Visual	Periodic		Witness		
5.	Furring Strips		Field	Installed and attached as shown in the Contract Drawings	Section 062000, Contract Drawings	Visual	Periodic		Witness		
SECTION 064023– INTERIOR ARCHITECTURAL WOODWORK											
1.	Architectural Wood Materials		Field	Meets grade specified, fastener type	Section 064023 Contract Drawings	Visual/Submittal	Periodic		Witness		
2.	Architectural Wood Installation		Field	Attachment pattern meets building codes and structural notes	Section 060423 Contract Drawings	Visual	Periodic		Witness		
SECTION 065300 – PLASTIC LUMBER											
1.	Plastic Lumber		Field	Material meets Specification, installed at locations specified per Contract Drawing details	Section 065300, 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		



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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 072100 – THERMAL 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 072100	Section 072100	Visual	Periodic		Witness		
SECTION 072500 – WEATHER BARRIERS											
1.	Weather Barriers Materials		Field	Building Wrap and Ice Shield meets Specification,	Section 072500 Contract Drawings	Visual/Submittal	Periodic		Witness		
2.	Weather Barriers Installation		Field	Attachment pattern meets building codes, Specifications, and Contract Drawings	Section 072500 Contract Drawings	Visual	Periodic		Witness		
SECTION 072600 – PLASTIC VAPOR BARRIERS											
1.	Vapor Barrier Installation correct type at locations		Field/Submittal	Meets specification requirements 6 Mil at slabs, 4 mil under roof insulation, 4 mil at exterior insulated walls	Section 072600	Visual	Periodic		Witness		



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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 074113 – PREFORMED METAL ROOFING											
1.	Metal Roof Panel material		Field/Submittal	Meets Specification requirements and Approved submittals	Section 074113	Visual	Periodic		Witness		
2.	Panel Sealant Material, Panel Fasteners, Snow Guards, Roof Curbs, Sheet metal Accessories		Field	Meets Specification requirements and Approved submittals	Section 074113	Visual	Periodic		Witness		
3.	Metal Roof Installation		Field	Underlayment, metal roof panel Installation,	Section 074113	Visual	Periodic		Witness		
SECTION 076200 – MISCELLANEOUS FLASHING AND SHEET METAL											
1.	Flashing Materials		Field/Submittal	Meets Specification requirements and Approved submittals	Section 076200	Visual	Periodic		Witness		
2.	Flashing Installation		Field	Flashing dimensions and angles, color match to Approved submittal, attachment, See Section 076200	Section 076200	Visual	Periodic		Witness		
SECTION 079200 JOINT SEALANTS											
1.	Sealant Materials		Field/Submittal	Sealants meet Specification requirements and Approved submittals	Section 079200	Visual	Periodic		Witness		



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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
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		



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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
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 081416 – FLUSH WOOD DOORS											
1.	Doors and Frames Delivery and Storage		Field	Crated or cardboard wrapped, store under cover	Section 081416	Visual	Periodic		Witness		
2.	Wood Doors and Frames		Field	Wood flush doors meet requirements of Specifications and Approved submittals	Section 081416	Visual	At installation		Hold		
3.	Door Finish		Field	Meets Specification	Section 081416	Visual	At Installation		Hold		
4.	Frames		Field	Plumb, aligned, braced, and anchored as specified, See Section 081100	Section 081416	Visual	At Installation		Witness		
SECTION 085313 - VINYL WINDOWS											
1.	Vinyl Windows		Field	Vinyl windows meets requirements of Specifications and Approved submittals	Section 085313, Submittals	Visual	Periodic		Witness		



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2.	Window Hardware		Field	Window hardware meets requirements of Specifications and Approved submittals	Section 085313, Submittals	Visual	Periodic		Witness		
3.	Window Installation		Field	Level, plumb, square, sill members set with gasket or sealant. Comply with manufacturers' written recommendations	Section 085313	Visual	During Installation		Witness		
SECTION 087100 – DOOR HARDWARE											
1.	Door Hardware Materials		Field	Hardware meets requirements of Specifications and Approved submittals.	Section 087100	Visual	At Delivery		Witness		
2.	Door Hardware Installation		Field	Follow manufacturers' written instructions per Contract Specifications	Section 087100	Visual	Periodic		Witness		
SECTION 088000 - 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		



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2.	Glazing Installation		Field	Per manufacturers' requirements and Project Specifications	Section 088000	Visual / Submittal	During Installation		Witness		
SECTION 088300 - MIRRORS											
1.	Mirror Materials		Field	Mirrors meet Specifications and Approved submittals.	Section 088300	Visual	At Delivery		Witness		
2.	Mirror Installation		Field	Follow manufacturers' written instructions per Contract Specifications	Section 088300	Visual	Periodic		Witness		
DIVISION 09 - FINISHES											
SECTION 092900 – GYPSUM BOARD											
1.	Gypsum Wall Board and Products		Field	Material meets requirements of Specifications and Approved submittal information	Section 092900	Visual / Submittal	During Installation		Witness		
2.	Gypsum Wall Board Installation		Field	Installation and finish as required in the Contract Specifications	Section 092900	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		



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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
2.	Tile Installation		Field	Waterproof membranes installed, temperature of Work area is controlled, installation follows schedules.	Section 093000, TCA's Handbook for Ceramic Tile Installation, ANSI A108.1A	Visual	Periodic		Witness		
SECTION 096513 – RESILIENT BASE AND ACCESSORIES											
1.	Resilient Base Products		Field	Material meets requirements of Specifications and Approved submittal information	Section 096153	Visual / Submittal	During Installation		Witness		
2.	Resilient Base Installation		Field	Installation and finish as required in the Contract Specifications	Section 096153	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		



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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 099100	Section 099100 Master Painters Institute	Visual	Continuous		Witness		
DIVISION 10 - SPECIALTIES											
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 PARTITIONS											
1	Toilet, Urinal, Shower Compartment Materials		Field	Verify products provided meet requirements of Specifications and Approved submittals	Section 102100	Visual / Submittal	At Delivery		Hold		



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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		
SECTION 101453 – SITE SIGNAGE											
1.	Sign Materials		Field/Submittal	Verify products provided meet requirements of Specifications and Approved submittals	Section 101453, Submittals	Visual	At Delivery		Hold		
2.	Sign Installations		Field	Sign locations staked, post plumb, concrete anchor top crowned at finish grade, attachment, sign back painted to match post. Location, plumb, mounting, sign surface not distorted	Section 101453	Visual	Periodic		Witness		
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		



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2.	Toilet Accessory Installation		Field	Verify blocking in place for accessory installation. Mounting heights and locations match Contract Drawings, straight and plumb	Section 102800	Visual	Periodic		Witness		
SECTION 104413 – FIRE EXTINGUISHER CABINETS											
1.	Fire Extinguisher Cabinet Materials		Field/Submittal	Verify products provided meet requirements of Specifications and Approved submittals	Section 104413, Submittals	Visual	At Delivery		Hold		
2.	Fire Extinguisher Cabinet Installation		Field	Verify blocking in place for installation. Mounting heights and locations match Contract Drawings, straight and plumb	Section 104413	Visual	Periodic		Witness		
SECTION 104416 – FIRE EXTINGUISHERS											
1.	Fire Extinguisher Materials		Field/Submittal	Verify products provided meet requirements of Specifications and Approved submittals	Section 104416, Submittals	Visual	At Delivery		Hold		



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DIVISION 12 - FURNISHINGS											
SECTION 129300 – SITE FURNISHINGS											
1.	Benches		Field/Submittal	Material meets Specifications and Approved submittals, anchored, finish	Section 129300	Visual	Periodic		Witness		
2.	Trash Receptacles		Field/Submittal	Material meets Specifications and Approved submittals, anchored, finish	Section 129300	Visual	Periodic		Witness		
3.	Fire Rings		Field/Submittal	Material meets Specifications and Approved submittals, anchored, finish	Section 129300	Visual	Periodic		Witness		
DIVISION 22 – PLUMBING											
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		



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2.	Piping Insulation, Jackets and Accessories Installation		Field	Install in accordance with manufacturers' recommendations, pipe tested before installation	Section 220700	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. 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		



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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											
2.	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		



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2.	Plumbing Fixture Installation		Field	Install per Contract Specifications and manufacturers' recommendations	Section 224000	Visual	Periodic		Witness		
DIVISION 23 – HEATING VENTILATION AND AIR CONDITIONING											
SECTION 230500.2 – COMMON WORK RESULTS FOR HVAC											
1.	HVAC		Field/Submittal	Verify products provided meet requirements of Specifications and Approved submittals	Section 230500.2, Submittals	Visual/Submittal	Installation		Hold		
2.	HVAC Installation		Field/Submittal	Installation, Per Specifications	Section 230500.2	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 230529 – HANGERS AND SUPPORTS HVAC PIPING AND EQUIPMENT											
1.	HVAC Hangers Materials		Field/Submittal	Verify products provided meet requirements of Specifications and Approved submittals	Section 230529, Submittals	Visual	At Delivery		Hold		
2.	HVAC Hangers Installation		Field	Verify installation meets Specification	Section 230529	Visual	Installation		Witness		



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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 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 230700, 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		



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DESCRIPTION: 14-31 LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP											
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 233100 – HVAC DUCTS AND CASING											
1.	Duct Material		Field/Submittal	Verify products provided meet requirement of Specifications and Approved submittals	Section 233100	Visual	Periodic		Witness		
2.	Ductwork Installation		Field	Hangers spaced as specified, duct size, provide temporary closures for ducts during construction	Section 233100	Visual	Periodic		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		



CONTRACT DOCUMENTS 14-31

DESCRIPTION: 14-31 LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP											
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
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		
SECTION 238126– SPLIT-SYSTEM AIR-CONDITIONERS AND HEAT PUMP											
1.	HVAC Split System Material		Field/Submittal	Meets Specification, provided	Section 238126	Visual/Submittal	Product arrive		Hold		
2.	HVAC Split System Installation		Field	Meets Specification	Section 238126	Visual	Installation		Witness		
SECTION 238239 – UNIT HEATERS											
1.	HVAC Unit Heater materials		Field/Submittal	Meets Specification, provided	Section 238239	Visual/Submittal	Product arrive		Hold		
2.	HVAC Unit Heaters installation		Field	Meets Specification	Section 238239	Visual	Installation		Witness		
DIVISION 26 - ELECTRICAL											
SECTION 260500 – ELECTRICAL GENERAL											
1.	Electrical Device Nameplates		Field/Submittal	Meets Specification, provided at all electrical devices	Section 260500	Visual	At Completion		Hold		



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DESCRIPTION: 14-31 LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP											
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
2.	Functional Tests		Field	Testing of all electrical equipment as specified. Submit functional test procedure.	Section 260800	Visual / Report	At Completion		Hold		
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 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		



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DESCRIPTION: 14-31 LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP											
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
3.	Ground testing		Field	Ground testing OHM Values meet Specification	Section 260526, 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 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 013000.	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		



CONTRACT DOCUMENTS 14-31

DESCRIPTION: 14-31 LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP											
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
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 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, grounded, 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		



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DESCRIPTION: 14-31 LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP											
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 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											
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		



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DESCRIPTION: 14-31 LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP											
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
3.	Existing Concrete Removal		Field	Concrete removed to limits shown on the Contract Drawings and Specifications	Section 311000	Visual	Periodic		Witness		
4.	Clearing and Grubbing		Field	Clear and grub to depth indicated/ to limits on Contract Drawings	Section 311000	Visual	Periodic		Witness		
5.	Tree Removal		Field	Remove trees and stumps as indicated in the Specifications and noted on Contract Drawings	Section 311000	Visual	Periodic		Witness		
6.	Erosion Control		Field/Submittal	Erosion Control Measures Installed as shown on approved Erosion Control Plan, material installed conforms to Approved submittal.	Section 312500, Approved SWPP	Visual	Periodic		Witness		
7.	Excavation		Field	Lines and Grades indicated on the Contract Drawings	Section 312000	Visual	Periodic		Witness		
8.	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		
9.	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		



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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
10.	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		
11.	Berm Planting /Planting Bed Subgrade Material		Field/Submittal	Meets Specifications, tested at frequency indicated in Specifications. Placement depth	Section 312000	Visual	Periodic		Witness		
12.	Base Aggregate for Concrete Footings		Field/Submittal	Meets Specifications, tested at frequency indicated in Specifications. Placement depth	Section 312000	Visual	Periodic		Witness		
13	Cobbles		Field/Submittal	Meets Specifications	Section 312000, Submittal	Visual	Periodic				
14.	Trench Excavation		Field	Trench width and depth. Trench alignment	Section 312000, Contract Drawings	Visual	Continuous		Witness		
15.	Trench Backfill		Field/Submittal	Lift thickness and specified backfill used. Density testing completed at intervals described in Specifications.	Section 312000, In Field Density Tests ASTM D1557, WSDOT 7-09.3(9-11) 95%	Visual / Tests	Periodic		Witness		



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DESCRIPTION: 14-31 LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP											
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
16.	Backfill at Structures and Pavements		Field/Submittal	Lift Thickness and specified backfill used, density testing completed at intervals described in Specifications.	Section 312000, In Field Density Tests ASTM D1557, WSDOT 2.03.3(14)D 95%	Visual / Tests	Periodic		Witness		
17.	Backfill at Planting Areas		Field/Submittal	Lift thickness and specified backfill used, density testing completed at intervals described in Specifications.	Section 312000, In Field Density Tests ASTM D1557, 70%	Visual / Tests	Periodic		Witness		
18.	Crushed Rock Surfacing		Field/Submittal	Lift thickness and specified backfill used, density testing completed at intervals described in Specifications.	Section 312000, In Field Density Tests ASTM D1557, 95%	Visual / Tests	Periodic		Witness		
19.	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		
20.	Construction Entrance		Field/Submittal	Material meet Specifications, Fabric placed, quarry spalls to depth and width required, length adequate	Section 312500	Visual	Before Work Begins/Periodic		Witness		



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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
21.	Straw Bale Barrier		Field/Submittal	Meets Specification, installed at locations needed	Section 312500, DOE Standards Manual Eastern Washington Edition	Visual	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		
SECTION 321723 – ASPHALT PAVEMENT STRIPING											
1.	Asphalt Striping		Field/Submittal	Correct atmospheric temperature, application surface dry and free of debris, alignment, square parallel	Section 321723, WSDOT Standard Specifications	Visual	Periodic		Witness		
SECTION 328400 – SITE IRRIGATION											
1.	Pipe Fittings, Sprinklers, Controllers, Valves and Other Materials		Field	Verify material meets Specifications and Approved submittals	Section 328400	Visual	Periodic		Witness		



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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
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.	Section 328400	Visual	Periodic		Witness		
3.	Pipe Joints		Field	Pipe completely set in bell, PVC solvent weld	Section 328400	Visual	Periodic		Witness		
4.	Irrigation System Layout		Field	Survey staking of zones and mainline before installation	Section 328400	Visual	At Staking		Hold		
5.	Irrigation System Installation		Field	Backfill; required backfill material, backfill lifts, water in pipe at 25psi during backfill process	Section 328400	Visual	Periodic		Witness		
6.	Valve Boxes		Field	Set to finish grades, backfill around valve box	Section 328400	Visual	Periodic		Witness		
7.	Control Wiring		Field	Installed as detailed in specifications	Section 328400	Visual	Periodic		Witness		
8.	Irrigation Controller		Field	Installed per Specification	Section 328400	Visual	Periodic		Witness		
9.	System Flushing		Field	System and zones flushed before head placement	Section 328400	Visual	At Flush		Hold		



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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
10.	Pressure Testing		Field	Verify gauge calibrated and certified, pressure test per Specifications	Section 328400	Visual / Test Report	At Test		Hold		
SECTION 329200 – IRRIGATED TURF											
1.	Seed Mix		Field	Meets Specification and approved submittal, application rate	Section 329000	Visual	Before Installation		Hold		
2.	Fertilizer		Field	Meets Specification and Approved submittal, application rate	Section 329000	Visual	Before Installation		Hold		
3.	Organic Amendment		Field	Meets Specification and Approved submittal, application rate	Section 329000	Visual	Before Installation		Hold		
4.	Lawn Area Prep		Field	Procedures in Specification are followed.	Section 329000	Visual	Periodic		Witness		
SECTION 329300 – LANDSCAPING											
1.	Plant Material		Field	Per Specifications	Section 329300, ANSI Z60.1-2004	Visual	Periodic		Witness		
2.	Mulch		Field	Depth per Specifications and Approved submittals	Section 329300	Visual	Periodic		Witness		
3.	Planting Pit Topsoil		Field	Per Specifications and Approved submittals, depth in pit,	Section 329300	Visual	Periodic		Witness		



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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
4.	Organic Soil Amendments		Field	Per Specifications and Approved submittals, placed at rate specified	Section 329300	Visual	Periodic		Witness		
5.	Plant Placement		Field	Pits size specified in Contract Drawings, staked as specified, Layout of beds and trees, crown set at finish grade	Section 329300	Visual	Periodic		Witness		
6.	Seed Placement		Field	Place to limits indicated on the Contract Drawings, coverage,	Section 329300	Visual	Periodic		Witness		
7.	Boulders		Field	Size, placement	Section 329300	Visual	Periodic		Witness		
DIVISION 33 - UTILITIES											
SECTION 330513 MANHOLES AND COVERS											
1.	Manholes and Catch Basins		Field	Material meets Specifications and Submittals. Manhole alignment. Plumb.	ASTM C478, ASTM C923, WSDOT Standard Specifications, Section 330513	Visual	Periodic		Witness		
SECTION 331100 – WATER UTILITY DISTRIBUTION PIPING											
1.	Pipe Preparation		Field	Verify pipe ends are removed of burrs, no dirt or scale in pipe before assembly	Section 331100	Visual	Periodic		Witness		



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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
2.	Pipe Installation		Field	Alignment of pipe in trench, pipe installed to line and grade indicated on Contract 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.	Fire Hydrants		Field	Installed per Contract Drawings, alignment, location joints bolts and fittings are clear of hydrant thrust block concrete	Section 331100	Visual	Periodic		Witness		
6.	Disinfection and Testing		Field/Submittal	Disinfection follows approved procedures and plans submitted by the Contractor	Section 331100	Visual	Continuous		Hold		



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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
7.	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 333000 – SANITARY SEWERAGE PIPING											
1.	Pipe and Fittings		Field	Materials used meet Specifications and Approved submittals, check for defects in material	Section 333000, Approved Submittals	Visual	Periodic		Witness		
2.	Grinder Pump Station		Field/Submittal	Pump meets Specifications and Approved submittals	Section 333000, 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 333000	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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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
5.	Grinder Pump Station Installation		Field	Height of station at finish grades. Round aggregate base placed below station, anti-floatation collar installed	Section 333000, ASTM 2321	Visual	Continuous		Witness		
6.	Grinder Pump Station Field Test and Factory Tests		Field	Per Contract Specifications	Section 333000	Visual / Manufacturer test report	Continuous		Hold		

END OF EXHIBIT P



EXHIBIT Q NOT USED



EXHIBIT R 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 _____

EXHIBIT U – ADDITIONAL INFORMATION

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Lincoln Rock Cabin Loop Geotech Report

Reference Drawings

**GEOTECHNICAL EVALUATION
SERVICES
CABIN LOOP DEVELOPMENT
LINCOLN ROCK STATE PARK
DOUGLAS COUNTY, WASHINGTON**

**PREPARED FOR
PUD NO 1 OF CHELAN COUNTY**



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ASSOCIATES, INC.**
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October 17, 2013

Mr. Court Hill
Public Utility District No. 1 of Chelan County
P. O. Box 1231
Wenatchee, Washington 98807

Geotechnical Evaluation Services
Cabin Loop Development
Lincoln Rock State Park
Douglas County, Washington
NGA Project No. 883813
[SA-TA No 13-171 – Task 1]

Dear Mr. Hill:

We are pleased to submit the attached report titled “Geotechnical Evaluation Services – Cabin Loop Development – Lincoln Rock State Park – Douglas County, Washington.” This report summarizes our explorations of the surface and subsurface conditions within the site, and provides general recommendations for the proposed site development. Our services were completed in general accordance with the Task Authorization SA-TA No. 13-171 – Task 1, and approved by Public Utilities District No. 1 of Chelan County.

The project site is located on gentle to moderate west-facing slopes, becoming steep slopes just to the west above the Columbia River, and is covered with semi-arid grass and sagebrush. The site appears to have been modified through past grading, including fills up to eight feet deep where explored. Even deeper fills may occur to the west. It is our understanding that the proposed Cabin Loop development includes construction of a new paved access roadway and parking, and eight new cabin structures. In addition, stormwater infiltration is anticipated for the new development.

We explored the site subsurface soil and groundwater conditions on September 26th, 2013 with ten trackhoe-excavated test pits. In general, our test pits exposed a variably thick sequence of surficial fill, varying from a few inches to at least eight feet deep, overlying native brown to gray silty fine-coarse sand with gravel and occasional boulders and/or gray silt with fine sand, gravel and cobbles, often angular in shape and interbedded. These deposits are believed to be glacial age outwash flood deposits. Our explorations did not encounter groundwater seepage.

It is our opinion, from a geotechnical standpoint, that the site is compatible with the planned development, provided that our recommendations are incorporated into project plans. One area of concern for the project is the undocumented fill that exists surficially and thickens toward the west, and the fine-grained nature of the silt/sand/gravel interbeds for use in infiltration. All of these issues are addressed in the attached report.

This report generally includes an assessment of potential geologic hazards, and our opinions and recommendations for site development. More specifically, we provide preliminary recommendations for site grading, structural fill, temporary and permanent slope inclinations, foundation preparation and placement, pavement support, site drainage, and erosion control.

We appreciate the opportunity to provide service to you on this project. Please contact us if you have any questions regarding this report or require further information.

Sincerely,

NELSON GEOTECHNICAL ASSOCIATES, INC.

A handwritten signature in black ink, appearing to read 'D. Nelson', written in a cursive style.

David L. Nelson, PG
President

Three Copies Submitted

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Figures 8 through 11 – Test Pit Logs

Figures 12 through 13 – Grain-Size Sieves Analysis

Geotechnical Evaluation Services
Cabin Loop Development
Lincoln Rock State Park
Douglas County, Washington

INTRODUCTION

This report presents the results of our geotechnical engineering investigation and evaluation of the planned Cabin Loop development located on the south side of Lincoln Rock State Park, in the Baker Flats area of Douglas County, Washington, as shown on the Vicinity Map in Figure 1. The purpose of this study is to explore and characterize the site's surface and subsurface conditions, and to provide geotechnical recommendations for the proposed site development. To aid in our evaluation of this site, we have been provided with an electronic site plan showing the subject property and planned site development.

The project site is located on gentle to moderate west-facing slopes above steep west-facing slopes above the Columbia River. The site is covered with semi-arid grass, weeds and sagebrush. The site appears to have been graded, reworked and filled with undocumented fill material found to be a few inches to at least eight feet deep along the western portion, which then appears to thicken to the west along the steep slopes.

As shown on Figure 2, it is our understanding that the proposed Cabin Loop development will consist of eight single-story cabins located within the western portion of the site, connected by an access roadway with off-street parking near the cabins. The new two-way access roadway will enter the area from the northeast, loop down toward the west, and exit parking off site toward the southeast. Development of the access roadway will require significant cuts from the upper terrace to the lower terrace area. We also understand that the site is proposed for storm water detention/infiltration, and associated utilities.

SCOPE

Based on our understanding of the planned development and site conditions, the services to be provided by NGA were to:

1. Review available soil and geologic maps of the area.
2. Monitor test pit explorations to evaluate subsurface soils and groundwater conditions. The excavation equipment was provided by the client.

3. Conduct laboratory gradation analyses on selected soil samples for soil classification and infiltration/gradation.
4. Provide a design storm water infiltration rate for the subsurface soils.
5. Provide geotechnical analyses for loop and parking area subgrade preparation.
6. Provide geotechnical parameters and recommendations for pavement design.
7. Provide recommendations for foundations and maximum allowable soil bearing pressures for structures.
8. Provide recommendations for earthwork, including cuts and structural fills.
9. Provide recommendations for drainage and erosion control.
10. Document our geotechnical engineering findings, opinions, and recommendations in a written geotechnical evaluation report.

SITE CONDITIONS

Surface Conditions

A dirt access road leads from Lincoln Rock State Park southwest to the development site. The general area consists of two terraces; an upper terrace and a lower terrace, above steep slopes off-site toward the west. The upper terrace is planned to be used for the loop access roadway development into the planned cabin structure development on the lower terrace. The terraces slope gently down to the west, with moderate slopes separating the terraces, and steep slopes off-site toward the west and the Columbia River below. The site area apparently has been reworked with past grading and fills to create the western portion of the lower terrace, including the area of the proposed cabin structures. The reworking of this site may indicate that it was once used as a gravel quarry or similar useage. A dirt access road lies between the lower portion of the fill and above the steep slopes down to the shoreline of the Columbia River. The area toward the north and west, and partly within, the area of the planned cabins is strewn with various sized boulders, some up to 5 feet in diameter. This area and these boulders, appear to have been placed as fill of unknown depth. Ground cover consists of semi-arid grass, weeds and sagebrush.

Subsurface Conditions

Geology: The geologic units for this area are shown on the Geologic Map of the Chelan 30-Minute by 60-Minute Quadrangle, Washington by R.W. Tabor, et al. (U.S.G.S., 1987). The site is mapped as Deposits of Catastrophic Floods in the Columbia Valley – Flood Gravels [Pleistocene] (Qfg). These deposits are described as moderately sorted cobble to pebble gravel, with large boulders..

Explorations: The subsurface conditions within the site were explored on September 26, 2013 by excavating 10 test pits to depths ranging from 6.0 to 14.0 feet below the existing surface using a trackhoe. The approximate locations of our explorations are shown on the Site Plan in Figure 2. An engineer from Nelson Geotechnical Associates, Inc. (NGA) was present during the explorations, examined the soils and geologic conditions encountered, obtained samples of the different soil types, and maintained logs of the test pits.

The soils were visually classified in general accordance with the Unified Soil Classification System, presented in Figure 3. The test pit logs are presented in Figures 8 through 11. We present a brief summary of the subsurface conditions in the following paragraph. For a detailed description of the subsurface conditions, the test pit logs should be reviewed.

In general, our test pits exposed a surface/near surface layer of about a few inches to up to eight feet of brown, loose to medium dense, silty fine to coarse sand with gravel and varying cobbles and boulders, determined to be undocumented fill. As previously discussed, large boulder fills lie just to the west and north of the planned cabin structure development location. Underlying the surficial fill, we encountered materials generally consisting of light brown to gray-brown, silty fine to coarse sand with gravel cobbles and some boulders, interbedded with brown medium dense to dense gravel with cobbles, silt and some boulders. Within TP-1, TP-3 TP-6 and TP-10, we also encountered an interbedded deposit of gray brown to gray, very stiff to dense silt, with fine to medium sand and gravel. We interpret these interbedded strata as being portions of the Catastrophic Floods of various times, where either coarse-grained gravels to boulders are deposited, and then separately fine-grained silts, with sand and gravels are deposited at a separate time. These types of interbedded deposits are common within the Catastrophic Flood deposits, as shown on the Cross Sections Figures 3 through 6.

Hydrogeologic Conditions

We did not encounter groundwater seepage in our explorations. However, during prolonged periods of wet weather, a perched water condition may develop on this site. Perched water occurs when surface water infiltrates through less dense or more permeable soils such as the surficial fill and sand/gravels, and accumulates on top of lower dense silt soils such as the silt interbeds or bedrock. Perched water does not

represent a regional groundwater "table" within the upper soil horizons or within this site. Perched water tends to vary spatially and is dependent upon the amount of precipitation. We would expect the amount of any surface water or groundwater to decrease during drier times of the year and increase during wetter periods.

LABORATORY TESTING AND INFILTRATION ANALYSIS

Laboratory analyses were completed on selected soil samples obtained from the explorations. These analyses included two grain-size analyses within the fine-grained deposits encountered on site. The results of the sieve analyses are presented as Figures 12 and 13.

For preliminary estimates of storm water infiltration rates, we referred to the Stormwater Management Manual for Eastern Washington (WA Department of Ecology, September 2004). The 2004 Eastern Washington storm water manual refers to the Stormwater Management Manual for Western Washington (WA DOE, February 2005) for estimating storm water infiltration rates based on soil gradation. Table 3.8 titled "Alternative Recommended Infiltration Rates Based on ASTM Gradation Testing," was used to determine the estimated long-term (design) infiltration rates.

We performed two grain-size analyses on selected fine-grained soil samples from the site. Based on the laboratory results, we have concluded that the fine-grained soils strata encountered in Test Pit 1 at 6.5 feet deep and TP-10 at 3.5 feet deep are not suitable for infiltration. In addition, areas of undocumented fill as shown within the test pit logs are also not recommended for infiltration.

Those native granular deposits as encountered on site were found to be at the maximum allowable for infiltration due to their coarse nature, and should be designed using a maximum of 10 minutes per inch.

GEOLOGIC HAZARD EVALUATION

Seismic Hazard

We reviewed the 2009 International Building Code (IBC) for seismic site classification for this project. Since medium-dense to dense native soils were encountered underlying the site, the site conditions best fit the description for Site Class D.

Hazards associated with seismic activity include liquefaction potential and amplification of ground motion by soft deposits. Liquefaction is caused by a rise in pore pressures in a loose, fine sand deposit beneath the groundwater table. It is our opinion that the granular soils interpreted to underlie the site should have a low potential for liquefaction or amplification of ground motion.

Landslide Hazard

The criteria used for the evaluation of landslide hazards include soil type, slope gradient, and groundwater conditions. Due to the moderately sloping nature of the site slopes and the competent soils that make up the core of the sloping areas, it is our opinion that the risk of deep-seated landslides on this site is low. A risk of landsliding should be anticipated within slopes created through placement of undocumented fill. The areas just west of the planned cabin development should be considered at a moderate risk of surficial sliding, due to the presence of the fill. This risk will be elevated during extended periods of wet weather or as a result of seismic activity.

Erosion Hazard

The criteria used to determine erosion hazard include soil type, slope gradient, vegetation cover, and groundwater conditions. The erosion sensitivity is related to the vegetative cover and the specific surface soil types, which are related to the underlying geologic soil units. The Soil Survey of Douglas County, Washington, by the Soil Conservation Service (SCS) was reviewed to determine the erosion hazard of the on-site soils. The site surface soils were classified using the SCS classification system as Malaga gravelly fine sandy loam, 0 to 8 percent slopes and Beverly cobbly fine sandy loam, 0 to 8 percent slopes. Permeability of both these deposits is moderately rapid to rapid. In addition, for both soil types the hazard of surface runoff is slow and the water erosion hazard is slight.

Flood Hazard

We did not observe evidence of an active alluvial fan or recent flood deposits within this site. Therefore, the risk of catastrophic flooding, inundation, or debris flows appears to be low for this site.

Snow Avalanche Hazard

No evidence or history of the risk of snow avalanches was observed within or nearby this site area during the time of our visits.

CONCLUSIONS AND RECOMMENDATIONS

General

It is our opinion, from a geotechnical standpoint, that the site is compatible with the proposed development, provided that the geotechnical recommendations presented in this report are incorporated into project plans and followed during construction.

The site appears generally stable with respect to geologic hazards. The future potential for geotechnical issues due to settlement of the existing fill, surficial sliding off existing fill slopes, and local erosion conditions will depend on how the site is graded and how surface water is controlled. In particular, we recommend that grading and site drainage plans be subject to geotechnical engineering review prior to construction.

Grading within the site is anticipated to achieve relatively level to slightly sloping ground for site development. Accordingly, some of the planned access roadway grades will require significant cuts to achieve desired grades, creating adjacent cut slopes. Maintaining long-term slope stability conditions within the cut slopes through the placement of rockeries, gabions, or other types of retainage structures is recommended.

Planned cabin structure development will require foundation soils stabilization, due to the presence of the undocumented fill. In general, we anticipate that the existing fill will need to be improved through either complete removal/replacement, or partial removal/replacement, and compacting the re-worked soils to a firm unyielding state that will minimize potential post-construction total and differential settlements.

Reinforced soil walls may be the most cost-effective method for achieving stable fill areas at this site, if required. The face of the reinforced soil walls could include rockeries, keystones, or rock-filled wire mesh. Structural fill and reinforced walls should be constructed on stable level benches.

Stormwater management plans were not available at the time this report was written. Water from impervious surfaces should not be allowed to pond or flow over sloping ground. Detention systems and solid drain pipes placed over sloping ground should be considered in order to reduce the potential for erosion and slope instability. Based on our site explorations, it is our opinion that stormwater infiltration

from impervious surfaces will be at the maximum allowable infiltration rate of 10 inches per hour within the native, gravelly, cobbly soils. Infiltration is not recommended within areas of undocumented fill. In addition, infiltration is not considered feasible in the areas underlain by the interbedded silt with sand and gravel deposits. NGA is available upon request for additional geotechnical consultation regarding stormwater management at this site, once the preliminary infiltration/detention facility locations are determined.

The underlying native soils are granular, and medium dense to dense, but are interbedded within silt strata which are fine grained, and are considered moisture sensitive. We recommend that construction take place during the drier months, if possible. If construction takes place during the wet season, additional expenses and delays could occur due to the wet conditions.

Erosion Control

The erosion hazard for the on-site soils varies from low to moderate for exposed soils, but actual erosion potential will be dependent on how the site is graded and how water is allowed to concentrate. Best Management Practices (BMPs) should be used to control erosion. In particular, we recommend using plastic sheets to cover all excavations during periods of wet weather. Sump pumps could be utilized to pump water out of the excavation and to an appropriate discharge location during construction. Water from the planned construction area should not be allowed to flow over sloping ground. Protection of the planned excavation areas should be performed as required by Douglas County.

Site Preparation and Grading

After vegetation and unsuitable surficial fill have been removed, the next step of site preparation should be to strip any topsoil or loose material to expose medium dense or better native soils in foundation, pavement, and slab areas. If the ground surface, after stripping the unsuitable material and excavating down to planned subgrade elevations appears to be loose, it should be compacted to a non-yielding condition and then proof-rolled with a heavy rubber-tired piece of equipment. Areas observed to pump or weave during the proof-roll test should be reworked to structural fill specifications or over-excavated and replaced with properly compacted structural fill or rock spalls. We anticipate that the majority of the site has a few inches to several feet of undocumented fill, and as such may be suitable for re-working into structural fill if properly performed. Within the areas of the existing deeper fills, the fill areas should

anticipate partial removal/replacement, to achieve desired subgrade conditions. Generally we recommend that the two feet below planned subgrades consist of compact native soils, or improved soils through removal/replacement, and compaction to engineering standards.

Temporary and Permanent Slopes

Temporary cut slope stability is a function of many factors, including the type and consistency of soils, depth of the cut, surcharge loads adjacent to the excavation, length of time a cut remains open and the presence of surface or groundwater. It is exceedingly difficult under these variable conditions to estimate a stable, temporary, cut slope angle. Therefore, it should be the responsibility of the contractor to maintain safe slope configurations since he is continuously at the job site, able to observe the nature and condition of the cut slopes, and able to monitor the subsurface materials and groundwater conditions encountered.

The following information is provided solely for the benefit of the owner and other design consultants and should not be construed to imply that Nelson Geotechnical Associates, Inc. assumes responsibility for job site safety. Job site safety is the sole responsibility of the project contractor.

For planning purposes, we recommend that temporary cuts in the on-site soils be no steeper than 1.5H:1V, and permanent slopes be no steeper than 2H:1V. If looser soil strata are encountered, we would expect that flatter inclinations would be necessary. These temporary cut inclinations are preliminary. We should be retained to specifically review proposed geometry for significant cuts planned on this site. We recommend that cut slopes be protected from erosion. Measures taken may include covering cut slopes with plastic sheeting and diverting surface water runoff away from the top of cut slopes. We do not recommend vertical slopes for cuts deeper than four feet, if worker access is necessary. We recommend that cut slope heights and inclinations conform to appropriate OSHA/WISHA regulations.

Foundations

From a general geotechnical standpoint, conventional shallow spread foundations should be placed on undisturbed medium dense or better native soils, or structural fill extending to native soils. Medium dense soils should generally be encountered about two to feet below ground surface based on our explorations, except within the areas of the deeper undocumented fill found in TP-7, TP-8 and TP-9,

where bearing soil was encountered from three to eight feet below the surface. Where undocumented fill or less dense soils are encountered at depths below planned footing elevation, the subgrade should be over-excavated to expose suitable bearing soil, replaced with engineered structural fill, or improved through partial removal/replacement and compaction. The over-excavation may be filled with structural fill, compacted to a uniform non-yielding state, or the footing may be extended down to the native bearing soils. If footings are supported on structural fill, the fill zone should extend outside the edges of the footing a distance equal to one-half of the depth of the over-excavation below the bottom of the footing.

Footings, including interior footings, should generally extend at least 24 inches below the lowest adjacent finished ground surface for frost protection and bearing capacity considerations. Foundations should be designed in accordance with the 2006 IBC. Footing widths should be based on the anticipated loads and allowable soil bearing pressure. Water should not be allowed to accumulate in footing trenches. All loose or disturbed soils should be removed from the foundation excavation prior to placing concrete.

For foundations constructed as outlined above, we preliminarily recommend an allowable design bearing pressure of not more than 1,500 pounds per square foot (psf) be used for the design of footings founded on the medium dense or better native soils, structural fill, or the improved/removed and replaced fill areas. The foundation bearing soil should be evaluated and verified by a representative of NGA. We should be consulted if higher bearing pressures are needed. Current IBC guidelines should be used when considering increased allowable bearing pressure for short-term transitory wind or seismic loads.

Lateral loads may be resisted by friction on the base of the footing and passive resistance against the subsurface portions of the foundation. From a preliminary standpoint, a coefficient of friction of 0.33 may be used to calculate the base friction and should be applied to the vertical dead load only. Passive resistance may be calculated as a triangular equivalent fluid pressure distribution. An equivalent fluid density of 150 pounds per cubic foot (pcf) should be used for passive resistance design for a level ground surface adjacent to the footing. This level surface should extend a distance equal to at least three times the footing depth. These recommended values incorporate safety factors of 1.5 and 2.0 applied to the estimated ultimate values for frictional and passive resistance, respectively. To achieve this value of passive resistance, the foundations should be poured “neat” against the native medium dense soils or compacted fill should be placed against the footing. We recommend that the upper one-foot of soil be neglected when calculating the passive resistance.

Slabs-on-Grade

In general, slabs-on-grade should be supported on subgrade soils prepared as described in the **Site Preparation and Grading** and **Structural Fill** subsections of this report. Where moisture control is important, we recommend that all floor slabs be underlain by at least six inches of free-draining sand or gravel for use as a capillary break. A suitable vapor barrier, such as heavy plastic sheeting (6-mil minimum), should be placed over the capillary break material. An additional 2-inch-thick sand blanket may be used to cover the vapor barrier. This sand blanket is to protect the vapor barrier membrane and to aid in curing the concrete.

Retaining Walls

Fill areas for the probable grading within this site will likely include the use of retaining walls. Concrete walls or reinforced soil walls faced with rockeries, keystones, or rock-filled steel-meshes could be utilized. Reinforced soil walls will likely be the most cost-effective for this site; however, their use will be limited to areas of fill. The walls should be keyed into the slope and be engineered to support traffic surcharge loads. The overall stability of the proposed geometry will have to be evaluated as part of the planning for retaining walls and final grading plans. Stormwater should not be allowed flow over the top of retaining walls or allowed to pond nearby. NGA is available upon request to provide detailed recommendations and designs for retaining walls.

Structural Fill

General: Fill placed beneath foundations, pavement, or other settlement-sensitive structures should be placed as structural fill. Structural fill, by definition, is placed in accordance with prescribed methods and standards, and is monitored by an experienced geotechnical professional or soils technician. Field monitoring procedures would include the performance of a representative number of in-place density tests to document the attainment of the desired degree of relative compaction. The area to receive the fill should be suitably prepared as described in the **Site Preparation and Grading** subsection prior to beginning fill placement. Sloping areas to receive fill should be benched prior to fill placement. The benches should be level and have minimum widths of eight feet.

Materials: Structural fill should consist of a good quality, granular soil, free of organics and other deleterious material and be well graded to a maximum size of about three inches. All-weather fill should

contain no more than five-percent fines (soil finer than U.S. No. 200 sieve, based on that fraction passing the U.S. 3/4-inch sieve). The use of some of the on-site soils as structural fill may be feasible, but will be highly dependent on the types of material and moisture contents at the time construction takes place. A further and more specific evaluation of the on-site soils for use as structural fill is recommended prior to finalizing construction plans and budgets. We should be retained to evaluate proposed structural fill material prior to construction to provide recommendations regarding how to place and compact the fill.

Fill Placement: Following subgrade preparation, placement of structural fill may proceed. All filling should be accomplished in uniform lifts up to eight inches thick. Each lift should be spread evenly and be thoroughly compacted prior to placement of subsequent lifts. All structural fill underlying building areas and pavement subgrade should be compacted to a minimum of 95 percent of its maximum dry density. Maximum dry density, in this report, refers to that density as determined by the ASTM D-1557 Compaction Test procedure. The moisture content of the soils to be compacted should be within about two percent of optimum so that a readily compactable condition exists. It may be necessary to over-excavate and remove wet soils in cases where drying to a compactable condition is not feasible. All compaction should be accomplished by equipment of a type and size sufficient to attain the desired degree of compaction.

Pavements

Pavement subgrade preparation, and structural filling where required, should be completed as recommended in the **Site Preparation and Grading** and **Structural Fill** subsections of this report. The pavement subgrade should be proof-rolled with a heavy, rubber-tired piece of equipment to identify soft or yielding areas that require repair. We should be retained to observe the proof rolling and recommend repairs prior to placement of the asphalt or hard surfaces.

For pavements above prepared subgrades we recommend that a minimum of six inches of gravel base be placed and compacted to design standards. A pavement section consisting of two 1.5-inch asphalt surfacing layers should be performed for the access roadways and parking areas within this site.

Site Drainage

Surface Drainage: The finished ground surface should be graded such that stormwater is directed to an appropriate stormwater collection system. Water should not be allowed to stand in any area where footings or slabs are to be constructed. Final site grades should allow for drainage away from the structures. Surface water should be collected by permanent catch basins and drain lines, and be discharged into an appropriate discharge system. Under no circumstances should water be allowed to flow uncontrolled over planned cuts or fills, or the steep slopes to the west.

Subsurface Drainage: As mentioned earlier, we do not anticipate that groundwater will impact development on this site based on the planned grading and groundwater conditions encountered in our explorations. If groundwater is encountered during construction, we recommend that the contractor slope the bottom of the excavations and collect water into ditches and small sump pits where the water can be pumped out of the excavations and routed into a permanent storm drain.

USE OF THIS REPORT

NGA has prepared this report for Mr. Court Hill with Public Utility District No. 1 of Chelan County, and his agents, for use in the planning of the development planned on this site only. The scope of our work does not include services related to construction safety precautions and our recommendations are not intended to direct the contractors' methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design. There are possible variations in subsurface conditions between the explorations and also with time. Our report, conclusions, and interpretations should not be construed as a warranty of subsurface conditions. A contingency for unanticipated conditions should be included in the budget and schedule.

We recommend that NGA be retained to provide specific evaluations and design-level recommendations for the planned site earthwork and grading, foundation design, slabs-on-grade and retaining walls. We should also be retained to review final project plans and provide consultation regarding structure placement, setback distances, and foundation support. We also recommend that NGA be retained to provide monitoring and consultation services during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to

evaluate whether or not earthwork and foundation installation activities comply with contract plans and specifications. We should be contacted a minimum of one week prior to construction activities and could attend pre-construction meetings if requested.

Within the limitations of scope, schedule, and budget, our services have been performed in accordance with generally accepted geotechnical engineering practices in effect in this area at the time this report was prepared. No other warranty, expressed or implied, is made. Our observations, findings, and opinions are a means to identify and reduce the inherent risks to the owner.

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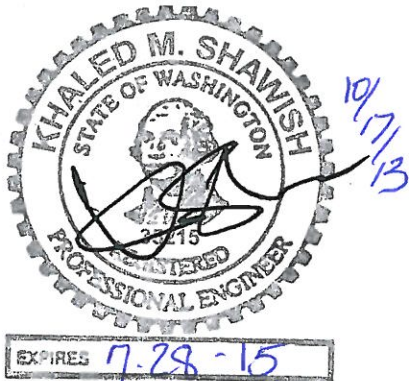
We appreciate the opportunity to provide service to you on this project. If you have any questions or require further information, please call.

Sincerely,

NELSON GEOTECHNICAL ASSOCIATES, INC.



David L. Nelson, PG
Professional Engineering Geologist



Khaled M. Shawish, PE
Principal Engineer

Three copies submitted

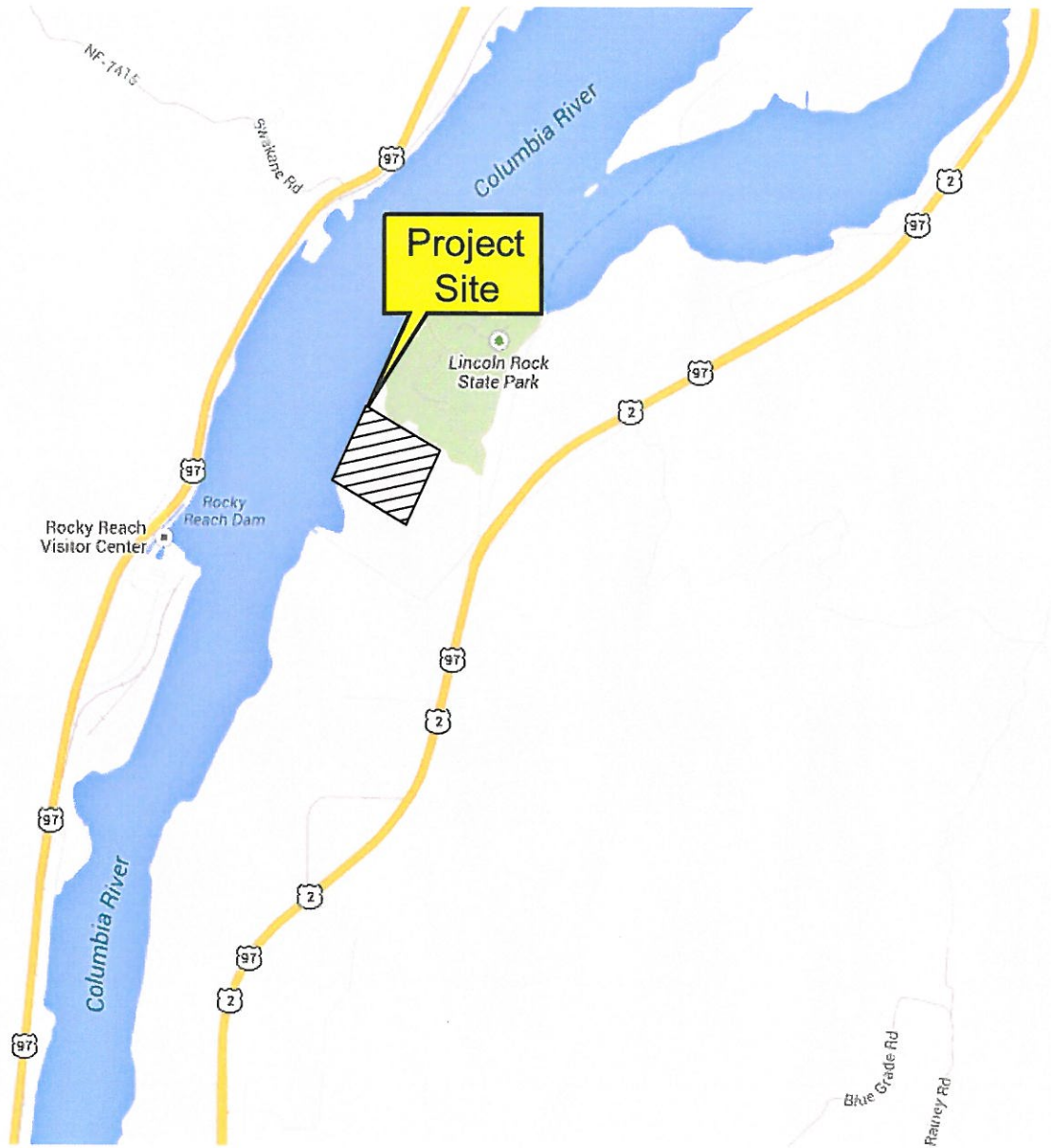
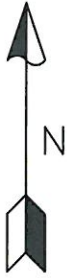
Thirteen Figures attached

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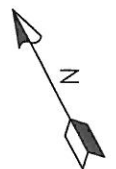
VICINITY MAP

Not to Scale

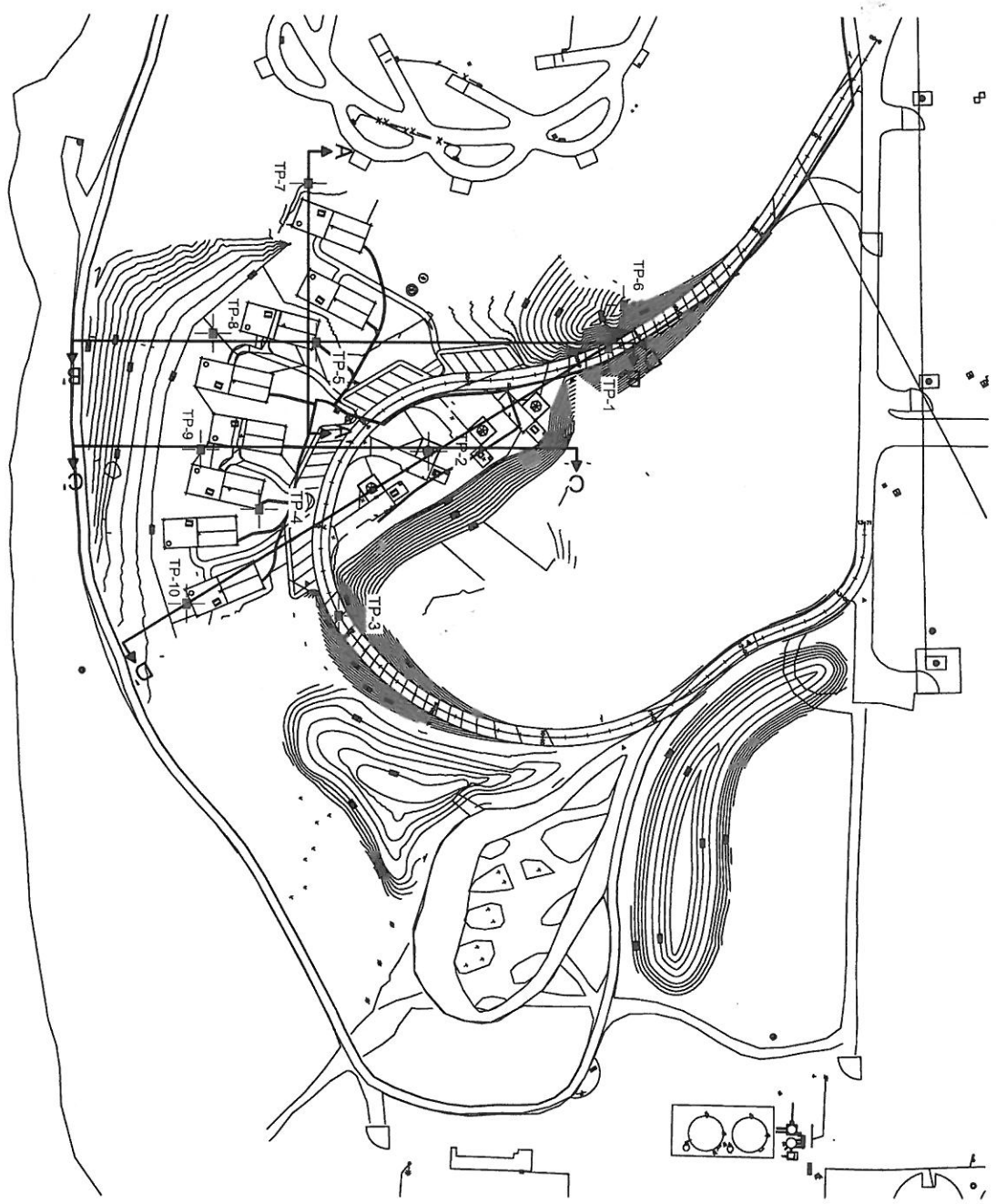


East Wenatchee, WA

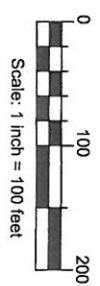
Project Number 883813	Lincoln Rock State Park Cabin Loop Vicinity Map	 <p>NELSON GEOTECHNICAL ASSOCIATES, INC. GEOTECHNICAL ENGINEERS & GEOLOGISTS 17311-135th Ave. NE, A-500 Woodinville, WA 98072 (425) 486-1669 / Fax 481-2510</p> <p>Snohomish County (425) 339-1669 Wenatchee/Chelan (509) 665-7666 www.nelsongeotech.com</p>	No.	Date	Revision	By	CK
Figure 1			1	10/14/13	Original	DPN	DLN



- LEGEND**
- TP-1 Number and approximate location of test pit
 - A-A' Approximate location of cross-section



Reference: Site Plan based on a plan dated June 19, 2013, titled "Cabin Loop - Lower Loop Conceptual Site Plan," prepared by Public Utility District No. 1 of Chelan County.



Project Number	883813
Figure	2

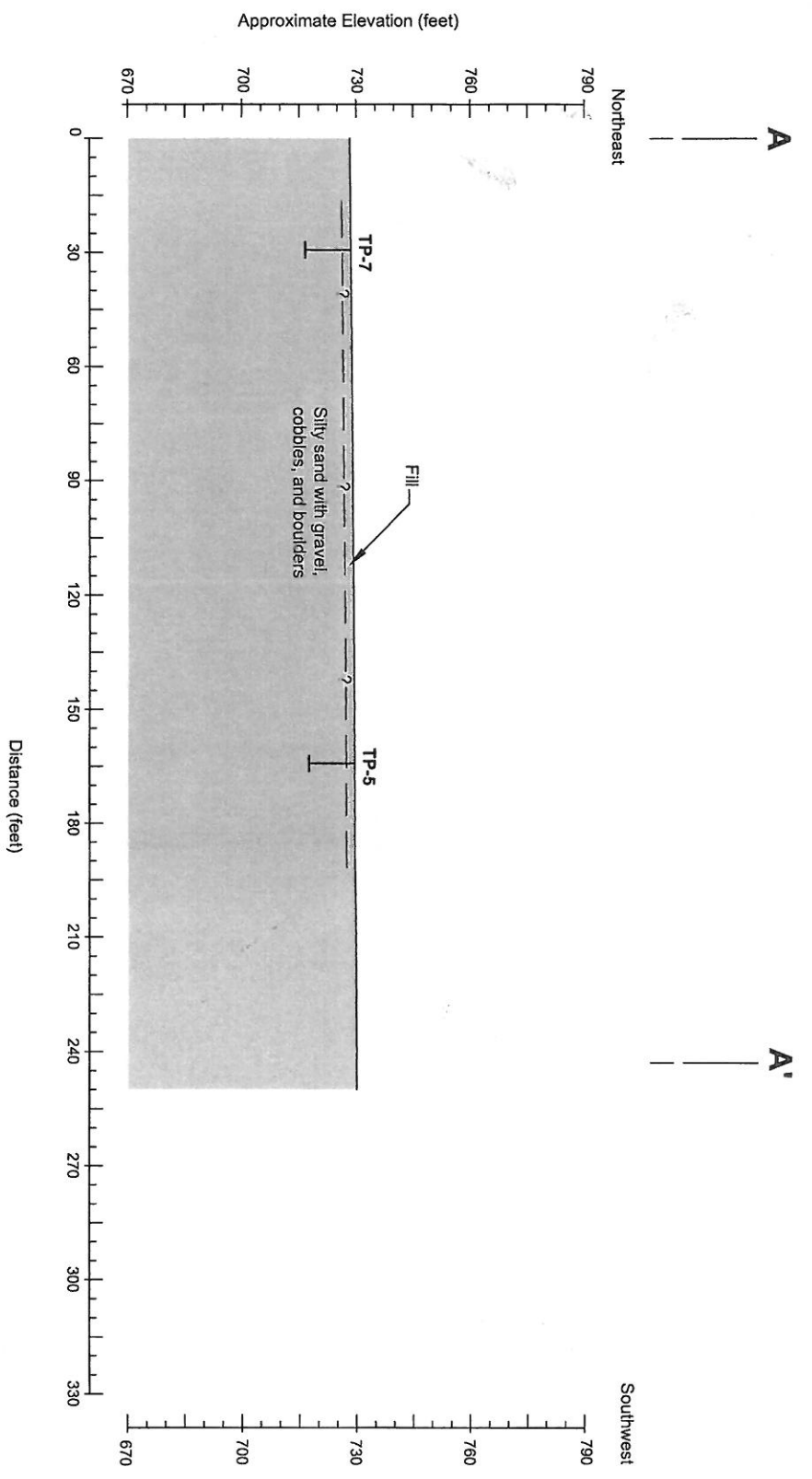
Lincoln Rock State Park
Cabin Loop
Site Plan

NGA NELSON GEOTECHNICAL ASSOCIATES, INC.
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No.	Date	Revision	By	CK
1	10/14/13	Original	DPN	DLN



Exploration

Test Pit Designation → TP-1
 Groundwater Level → ▽
 During Exploration
 Geologic Contact → ?-?-?
 (approximate)

- NOTES:**
- 1) Stratigraphic conditions are interpolated between the explorations. Actual conditions may vary.
 - 2) Elevations are approximate.

Reference: Cross Section is based on a plan dated June 19, 2013, titled "Cabin Loop - Lower Loop Conceptual Site Plan," prepared by Public Utility District No. 1 of Chelan County.


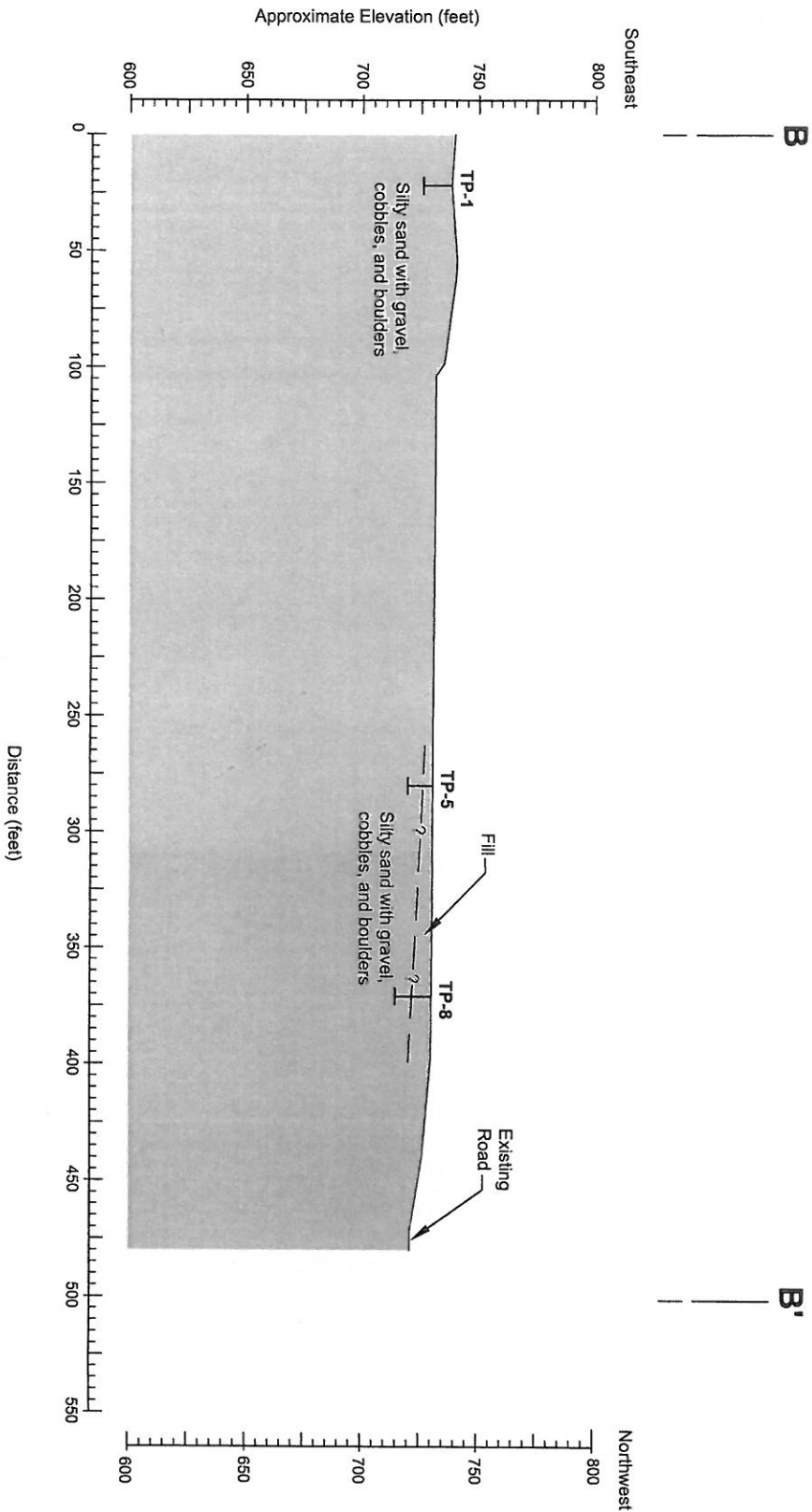
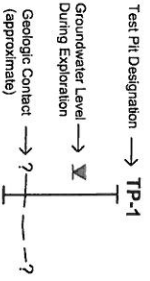
Project Number 883613	Lincoln Rock State Park Cabin Loop Cross-Section A-A'	 NELSON GEOTECHNICAL ASSOCIATES, INC. GEOTECHNICAL ENGINEERS & GEOLOGISTS 17311-135th Ave. NE, A-500 Woodinville, WA 98072 (425) 496-1669 / Fax 481-2510	Snohomish County (425) 339-1669 Wenatchee/Chelan (509) 665-7696 www.nelsongetech.com	No.	Date	Revision	By	CK
				1	10/15/13	Original	DPN	KMS

Figure 3



Exploration



- NOTES:
- 1) Stratigraphic conditions are interpolated between the explorations. Actual conditions may vary.
 - 2) Elevations are approximate.

Reference: Cross Section is based on a plan dated June 19, 2013, titled "Cabin Loop - Lower Loop Conceptual Site Plan," prepared by Public Utility District No. 1 of Chelan County.

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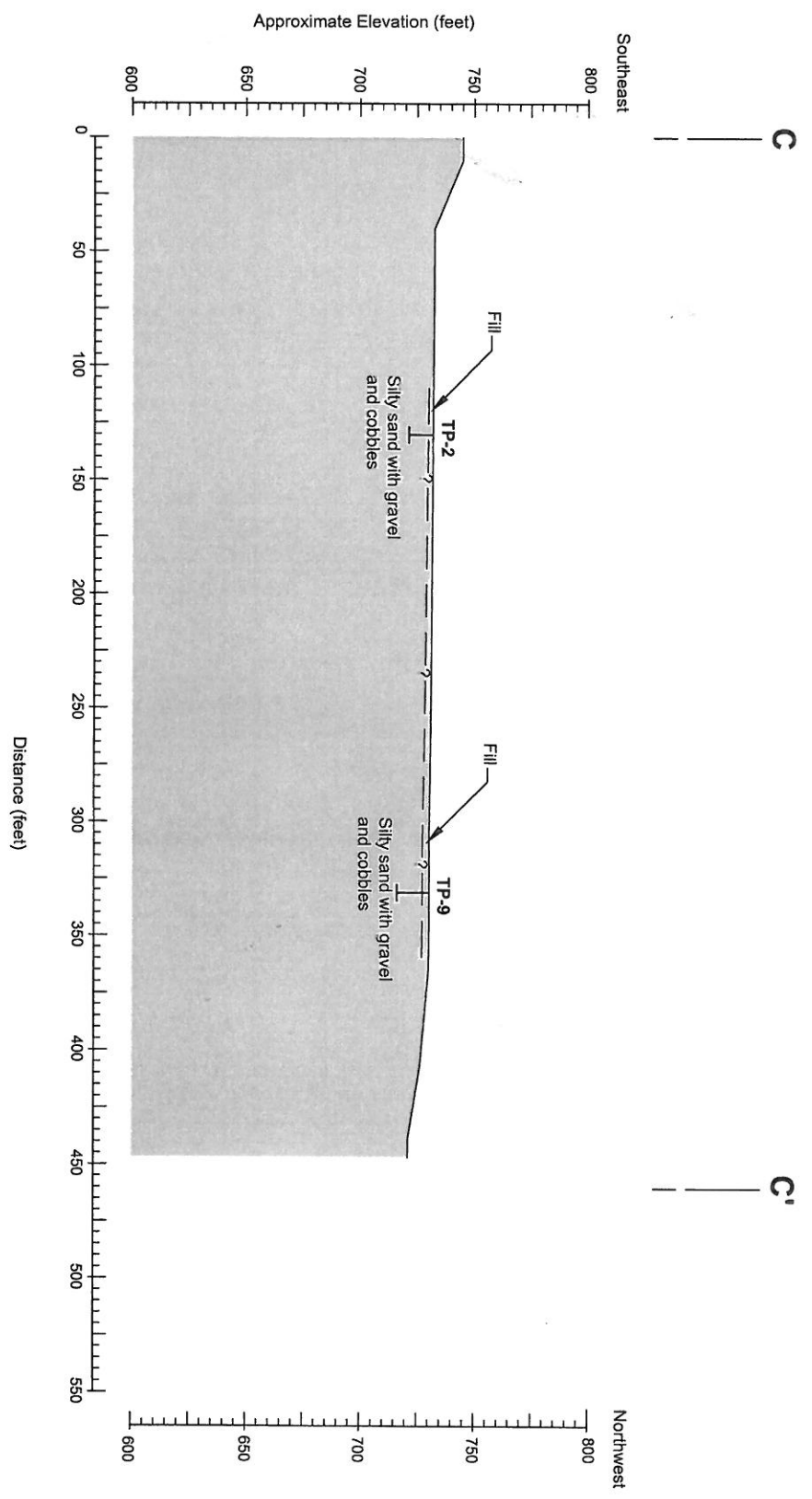
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Lincoln Rock State Park
 Cabin Loop
 Cross-Section B-B'

Project Number
883813

Figure 4



Exploration

Test Pit Designation → TP-1

Groundwater Level During Exploration → ▽

Geologic Contact (approximate) → ?-?-?

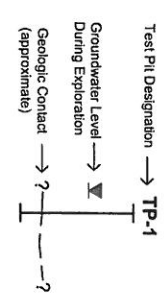
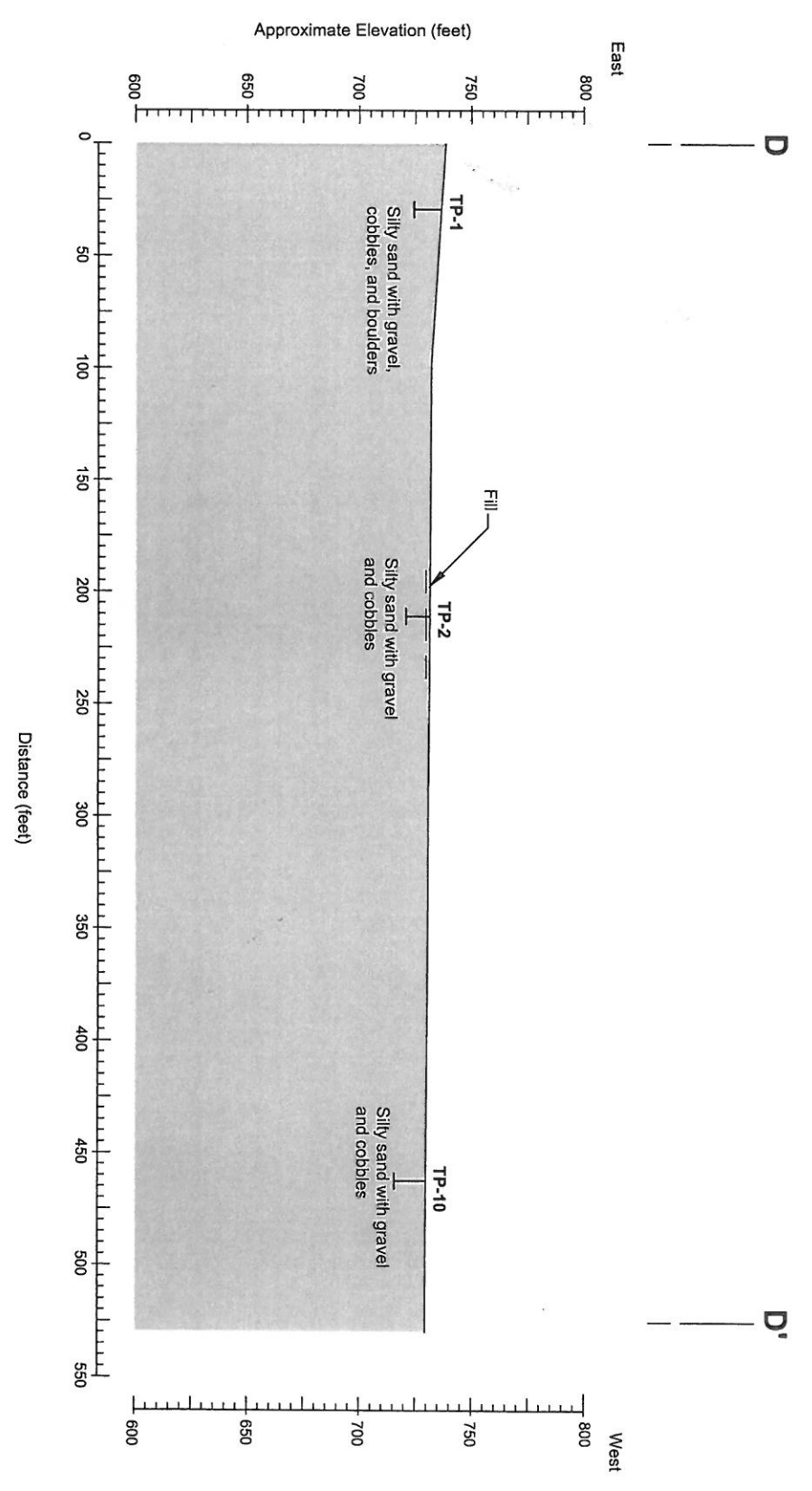
NOTES:

1) Stratigraphic conditions are interpolated between the explorations. Actual conditions may vary.

2) Elevations are approximate.

Reference: Cross Section is based on a plan dated June 19, 2013, titled "Cabin Loop - Lower Loop Conceptual Site Plan," prepared by Public Utility District No. 1 of Chelan County.

Project Number 883813	Lincoln Rock State Park Cabin Loop Cross-Section C-C'	NELSON GEOTECHNICAL ASSOCIATES, INC. GEOTECHNICAL ENGINEERS & GEOLOGISTS		No.	Date	Revision	By	CK
		1	10/15/13	Original	DPN	KMS		
Figure 5		17311-135th Ave. NE, A-500 Woodinville, WA 98072 (425) 486-1669 / Fax 481-2510		Snohomish County (425) 339-1669 Wenatchee/Chelan (509) 665-7696 www.nelsongeotech.com				



- NOTES:**
- 1) Stratigraphic conditions are interpolated between the explorations. Actual conditions may vary.
 - 2) Elevations are approximate.

Reference: Cross Section is based on a plan dated June 19, 2013, titled "Cabin Loop - Lower Loop Conceptual Site Plan," prepared by Public Utility District No. 1 of Chelan County.

Project Number 883813	Lincoln Rock State Park Cabin Loop Cross-Section D-D'	<p>NELSON GEOTECHNICAL ASSOCIATES, INC. GEOTECHNICAL ENGINEERS & GEOLOGISTS</p> <p>17311-135th Ave. NE, A-500 Woodinville, WA 98072 (425) 486-1669 / Fax 481-2510</p> <p>Snohomish County (425) 338-1669 Wenatchee/Chelan (509) 665-7696 www.nelsongeotech.com</p>	No.	Date	Revision	By	CK
			1	10/15/13	Original	DPN	KMS

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE - GRAINED SOILS MORE THAN 50 % RETAINED ON NO. 200 SIEVE	GRAVEL MORE THAN 50 % OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVEL	GW	WELL-GRADED, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND MORE THAN 50 % OF COARSE FRACTION PASSES NO. 4 SIEVE	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE - GRAINED SOILS MORE THAN 50 % PASSES NO. 200 SIEVE	SILT AND CLAY LIQUID LIMIT LESS THAN 50 %	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY LIQUID LIMIT 50 % OR MORE	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FLAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

- 1) Field classification is based on visual examination of soil in general accordance with ASTM D 2488-93.
- 2) Soil classification using laboratory tests is based on ASTM D 2488-93.
- 3) Descriptions of soil density or consistency are based on interpretation of blowcount data, visual appearance of soils, and/or test data.

SOIL MOISTURE MODIFIERS:

Dry - Absence of moisture, dusty, dry to the touch

Moist - Damp, but no visible water.

Wet - Visible free water or saturated, usually soil is obtained from below water table

Project Number 883813	Lincoln Rock State Park Cabin Loop Soil Classification Chart	NELSON GEOTECHNICAL ASSOCIATES, INC. GEOTECHNICAL ENGINEERS & GEOLOGISTS <small>17311-135th Ave, NE, A-500 Woodville, WA 98072 (425) 486-1669 / Fax 481-2510</small>	No.	Date	Revision	By	CK
Figure 7			1	10/15/13	Original	DPN	KMS

LOG OF EXPLORATION

DEPTH (FEET)	USC	SOIL DESCRIPTION
TEST PIT ONE		
0.0 – 0.2		GRASS/ BRUSH
0.2 – 2.5	SW/GW	BROWN SILTY FINE TO COARSE SAND WITH GRAVEL, COBBLES AND TRACE ORGAINCS (ROOTS) (LOOSE TO MEDIUM DENSE, DRY)
2.5 – 6.0	SW/GW	BROWN SILTY FINE TO COARSE SAND WITH GRAVEL AND COBBLES (MEDIUM DENSE, DRY)
6.0 – 11.0	ML/SM	GRAY-BROWN SILT WITH FINE SAND, GRAVEL AND COBBLES (ANGULAR) (MEDIUM DENSE TO DENSE, DRY)
11.0 – 12.0	SM/GM	RED-BROWN SILTY FINE TO MEDIUM SAND WITH GRAVEL AND COBBLES (ANGULAR) (DENSE TO VERY DENSE, DRY)
		SAMPLE WAS COLLECTED AT 6.5 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED SLIGHT TO MODERATE TEST PIT CAVING WAS ENCOUNTERED FROM 0.2 TO 6.0 FEET TEST PIT WAS COMPLETED AT 12.0 FEET ON 9/26/13
TEST PIT TWO		
0.0 – 0.2		GRASS/ BRUSH
0.2 – 2.0		GRAY SILTY FINE TO COARSE SAND WITH GRAVEL, COBBLES AND BOULDERS (FILL) (MEDIUM DENSE, DRY)
2.0 – 8.0	SW/GW	BROWN SILTY FINE TO COARSE SAND WITH GRAVEL AND COBBLES (MEDIUM DENSE, DRY)
8.0 – 10.0	SW/GW	LIGHT BROWN SILTY FINE TO COARSE SAND WITH GRAVEL AND COBBLES (MEDIUM DENSE TO DENSE, DRY)
		SAMPLES WERE COLLECTED AT 4.0 AND 9.0 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED SLIGHT TO MODERATE TEST PIT CAVING WAS ENCOUNTERED FROM 0.2 TO 10.0 FEET TEST PIT WAS COMPLETED AT 10.0 FEET ON 9/26/13
TEST PIT THREE		
0.0 – 0.2		GRASS/ BRUSH
0.2 – 2.5		BROWN SILTY FINE TO COARSE SAND WITH GRAVELS, COBBLES AND METAL DEBRIS (FILL) (LOOSE TO MEDIUM DENSE, DRY)
2.5 – 4.0	ML/SM	GRAY SILT WITH FINE TO MEDIUM SAND AND GRAVEL (MEDIUM DENSE TO DENSE, DRY)
4.0 – 13.5	SW/GW	BROWN SILTY FINE TO COARSE SAND WITH GRAVELS, COBBLES AND BOULDERS (MEDIUM DENSE TO DENSE, DRY)
		SAMPLES WERE COLLECTED AT 3.0 AND 5.0 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED SLIGHT TO MODERATE TEST PIT CAVING WAS ENCOUNTERED FROM 0.2 TO 2.5 FEET TEST PIT WAS COMPLETED AT 13.5 FEET ON 9/26/13

LOG OF EXPLORATION

DEPTH (FEET)	USC	SOIL DESCRIPTION
TEST PIT FOUR		
0.0 – 0.2		GRASS/ BRUSH
0.2 – 2.0		GRAY SILTY FINE TO MEDIUM SAND WITH GRAVEL (FILL) (LOOSE TO MEDIUM DENSE, DRY)
2.0 – 7.5	SW/GW	LIGHT BROWN SILTY FINE TO COARSE SAND WITH GRAVEL AND COBBLES (MEDIUM DENSE, DRY)
7.5 – 12.0	SW/GW	LIGHT BROWN SILTY FINE TO COARSE SAND WITH GRAVEL, COBBLES AND BOULDERS (MEDIUM DENSE, DRY)
		SAMPLE WAS COLLECTED AT 4.0 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED SLIGHT TO MODERATE TEST PIT CAVING WAS ENCOUNTERED FROM 0.2 TO 12.0 FEET TEST PIT WAS COMPLETED AT 12.0 FEET ON 9/26/13
TEST PIT FIVE		
0.0 – 0.2		GRASS/ BRUSH
0.2 – 2.5		BROWN SILTY FINE TO COARSE SAND WITH GRAVEL, COBBLES, AND ASPHALT DEBRIS (FILL) (LOOSE TO MEDIUM DENSE, DRY)
2.5 – 4.0	GW/SW	GRAY GRAVEL WITH FINE TO COARSE SAND, COBBLES AND BOULDERS (MEDIUM DENSE TO DENSE, DRY)
4.0 – 11.0	SW/GW	LIGHT BROWN SILTY FINE TO COARSE SAND WITH GRAVEL, COBBLES, AND BOULDERS (MEDIUM DENSE TO DENSE, DRY)
		SAMPLES WERE COLLECTED AT 3.0 AND 9.0 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED SLIGHT TO MODERATE TEST PIT CAVING WAS ENCOUNTERED FROM 2.5 TO 11.0 FEET TEST PIT WAS COMPLETED AT 11.0 FEET ON 9/26/13
TEST PIT SIX		
0.0 – 0.2		GRASS/ BRUSH
0.2 – 2.5	SW/GW	BROWN SILTY FINE TO COARSE SAND WITH GRAVEL AND TRACE COBBLES (LOOSE TO MEDIUM DENSE, DRY)
2.5 – 6.0	ML/SM	GRAY SILT WITH FINE SAND, GRAVEL AND COBBLES (ANGULAR) (MEDIUM DENSE, DRY)
		SAMPLES WERE COLLECTED AT 2.0 AND 4.0 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED SEVER TEST PIT CAVING WAS ENCOUNTERED FROM 0.2 TO 6.0 FEET TEST PIT WAS COMPLETED AT 6.0 FEET ON 9/26/13

LOG OF EXPLORATION

DEPTH (FEET)	USC	SOIL DESCRIPTION
TEST PIT SEVEN		
0.0 – 0.2		GRASS/ BRUSH
0.2 – 3.0		GRAY SILTY FINE TO COARSE SAND WITH GRAVEL AND TRACE COBBLES (FILL) (MEDIUM DENSE, DRY)
3.0 – 11.5	SW/GW	LIGHT BROWN SILTY FINE TO COARSE SAND WITH GRAVEL, COBBLES AND BOULDERS (MEDIUM DENSE TO DENSE, DRY) SAMPLE WAS COLLECTED AT 11.0 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED SLIGHT TO MODERATE TEST PIT CAVING WAS ENCOUNTERED FROM 0.2 TO 11.5 FEET TEST PIT WAS COMPLETED AT 10.0 FEET ON 9/26/13
TEST PIT EIGHT		
0.0 – 0.2		GRASS/ BRUSH
0.2 – 3.5		BROWN SILTY FINE TO COARSE SAND WITH GRAVEL AND TRACE COBBLES (FILL) (LOOSE TO MEDIUM DENSE, DRY)
3.5 – 8.0		GRAY SILTY FINE TO MEDIUM SAND WITH GRAVEL, COBBLES, CONCRETE AND PLASTIC DEBRIS (FILL) (LOOSE TO MEDIUM DENSE, DRY)
8.0 – 16.0	SW/GW	LIGHT BROWN SILTY FINE TO MEDIUM SAND WITH GRAVEL, COBBLES AND BOULDERS (MEDIUM DENSE TO DENSE, DRY) SAMPLES WERE NOT COLLECTED GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED SLIGHT TO MODERATE TEST PIT CAVING WAS ENCOUNTERED FROM 0.2 TO 16.0 FEET TEST PIT WAS COMPLETED AT 16.0 FEET ON 9/26/13
TEST PIT NINE		
0.0 – 0.2		GRASS/ BRUSH
0.2 – 5.0		GRAY SILTY FINE TO COARSE SAND WITH GRAVEL, COBBLES, BOULDERS, TIRES AND METAL DEBRIS (FILL) (LOOSE TO MEDIUM DENSE, DRY)
5.0 – 12.0	SW/GW	LIGHT BROWN FINE TO COARSE SAND WITH GRAVEL, COBBLES AND BOULDERS (MEDIUM DENSE TO DENSE, DRY) SAMPLE WAS COLLECTED AT 6.0 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED SLIGHT TO MODERATE TEST PIT CAVING WAS ENCOUNTERED FROM 2.0 TO 12.0 FEET TEST PIT WAS COMPLETED AT 12.0 FEET ON 9/26/13

LOG OF EXPLORATION

DEPTH (FEET)	USC	SOIL DESCRIPTION
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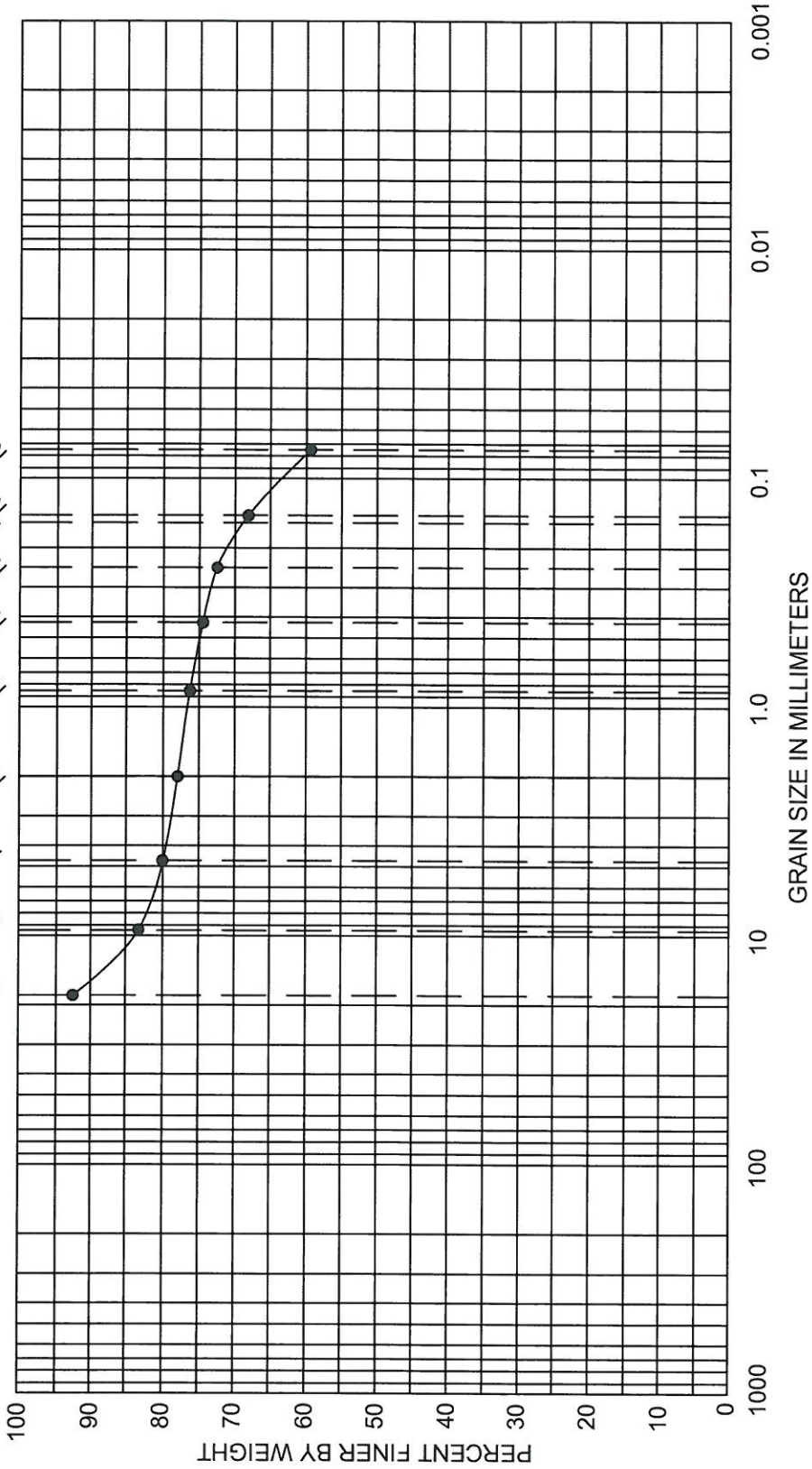
TEST PIT TEN

0.0 – 0.2		GRASS/ BRUSH
0.2 – 1.0	SM/SW	BROWN SILTY FINE TO MEDIUM SAND WITH GRAVELS (LOOSE TO MEDIUM DENSE, DRY)
1.0 – 4.5	ML/SM	GRAY- BROWN SILT WITH FINE TO MEDIUM SAND, GRAVEL AND COBBLES (ANGULAR) (MEDIUM DENSE TO DENSE, DRY)
4.5 – 14.0	ML/SM	GRAY-BROWN SILT WITH FINE SAND, GRAVEL AND COBBLES (ROUNDED TO ANGULAR) (DENSE, DRY)

SAMPLES WERE COLLECTED AT 3.5, 5.0 AND 13 FEET
GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED
SLIGHT TEST PIT CAVING WAS ENCOUNTERED FROM 0.2 TO 1.0 FEET
TEST PIT WAS COMPLETED AT 14.0 FEET ON 9/26/13

U.S. STANDARD SIEVE SIZE

3/4 IN.
3/8 IN.
NO. 4
NO. 10
NO. 20
NO. 40
NO. 60
NO. 80
NO. 100
NO. 200



GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

U.S.C. SYMBOL	EXPLORATION NUMBER	SAMPLE DEPTH	SOIL DESCRIPTION	SOIL DISTRIBUTION
● ML	TP-1	6.5 feet	Gray-brown silt with fine to medium sand, gravel, and cobbles	Gravel = 20% Sand = 21% Silt/Clay = 59%

Project Number
883813

Figure 12

Lincoln Rock State Park
Cabin Loop
Sieve Analysis

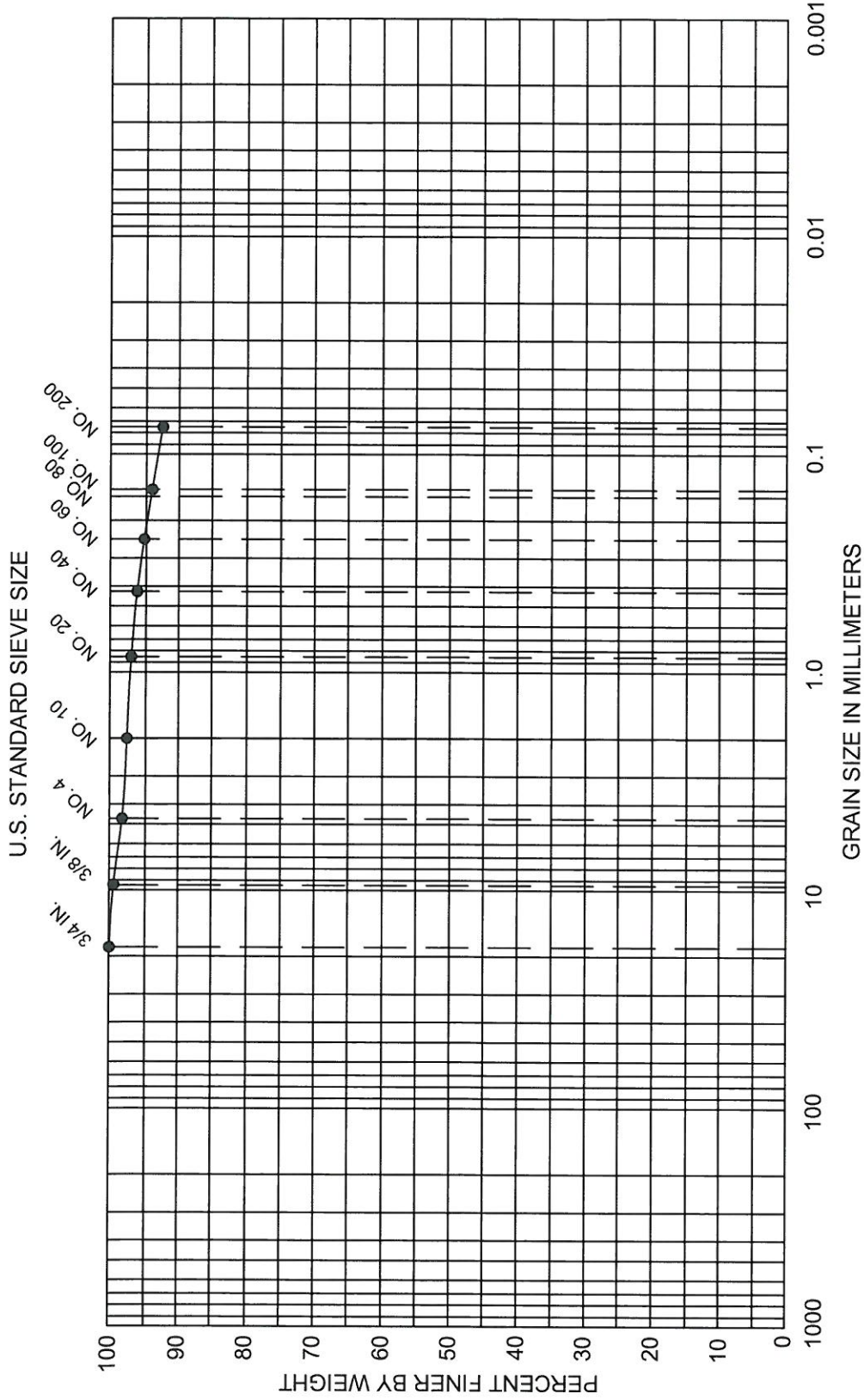


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COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S.C. SYMBOL	EXPLORATION NUMBER	SAMPLE DEPTH	SOIL DESCRIPTION			SOIL DISTRIBUTION
●ML	TP-10	3.5 feet	Gray-brown silt with fine to medium sand and trace gravel			Gravel = 2% Sand = 6% Silt/Clay = 92%

Project Number
883813

Figure 13

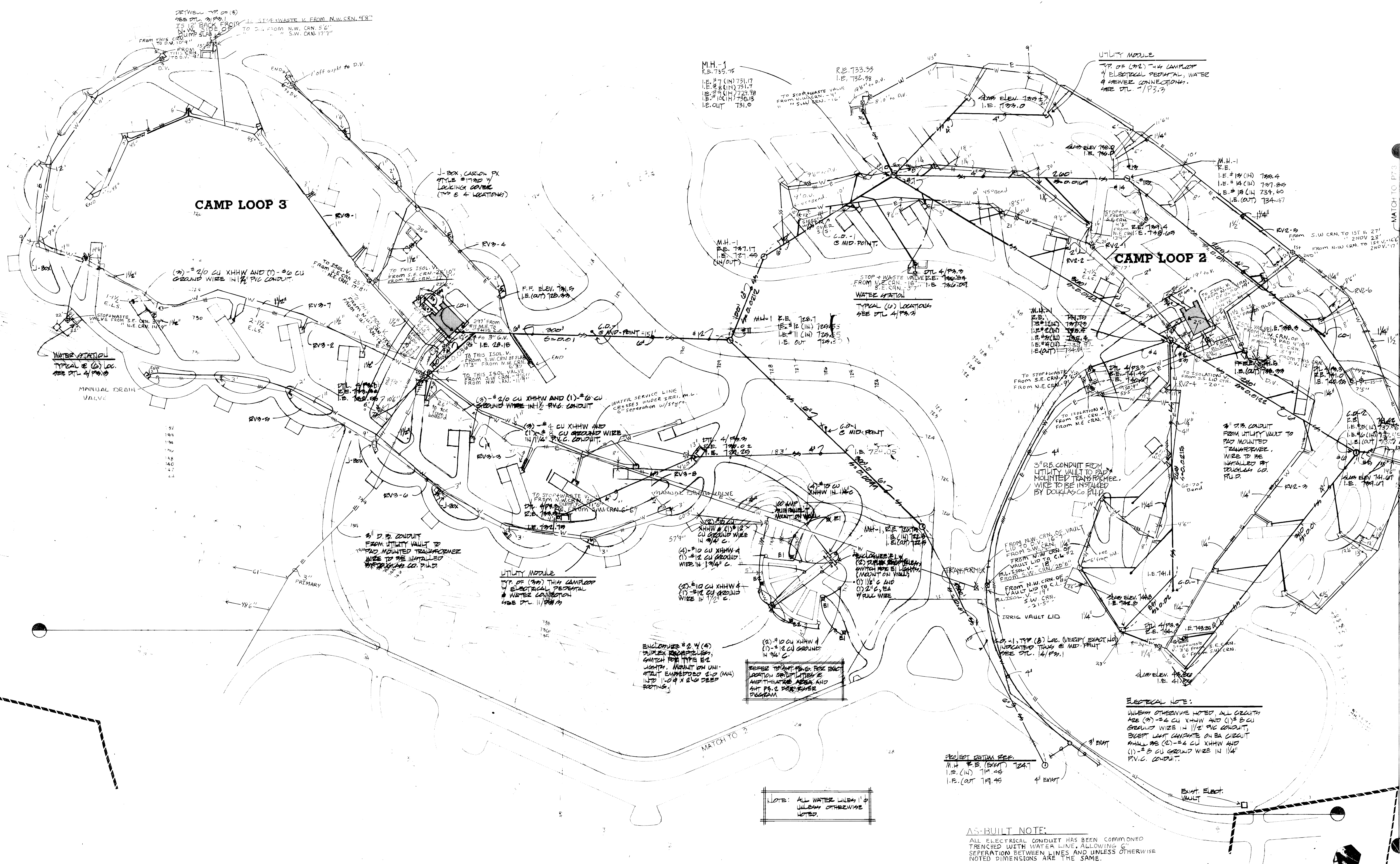
Lincoln Rock State Park
Cabin Loop
Sieve Analysis

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No.	Date	Revision	By	CK
1	10/15/13	Original	DPN	KMS



CAMP LOOP 3

CAMP LOOP 2

WATER STATION
TYPICAL (C) LOC.
SEE DTL 4/P3.3

STOP-WASTE VALVE
TYPICAL (C) LOCATIONS
SEE DTL 4/P3.3

UTILITY MODULE
TYP. OF (99) THIS CAMPLOT
ELECTRICAL, PERSONAL
& WATER CONNECTIONS.
SEE DTL 1/P3.3

UTILITY MODULE
TYP. OF (99) THIS CAMPLOT
ELECTRICAL, PERSONAL
& WATER CONNECTIONS.
SEE DTL 1/P3.3

ELECTRICAL NOTE:
UNLESS OTHERWISE NOTED, ALL CIRCUITS
ARE (9) - 2 CU XHHW AND (1) - 2 CU
GROUND WIRE IN 1/2" PVC CONDUIT,
EXCEPT LIGHT CIRCUITS ON EA CIRCUIT
SHALL BE (2) - 2 CU XHHW AND
(1) - 2 CU GROUND WIRE IN 1/4"
PVC CONDUIT.

PROJECT DATA REF.
M.H. # E. (BY) 724.7
I.E. (IN) 719.45
I.E. (OUT) 719.45

NOTE: ALL WATER LINES 1" O
UNLESS OTHERWISE
NOTED.

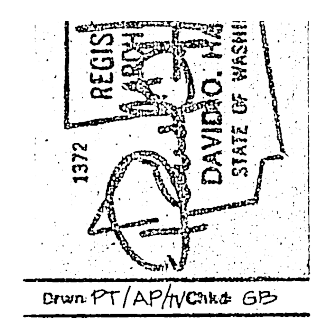
AS-BUILT NOTE:
ALL ELECTRICAL CONDUIT HAS BEEN COMMONED
TRENCHED WITH WATER LINE, ALLOWING 6"
SEPARATION BETWEEN LINES AND UNLESS OTHERWISE
NOTED DIMENSIONS ARE THE SAME.

SITE UTILITIES Section 4
1" = 20'-0" DRAWINGS REVISED TO AS-BUILT MAY 21, 87 BY ALLEN PRATT

53.4
3.4

CAMP LOOP 3

CAMP LOOP 2



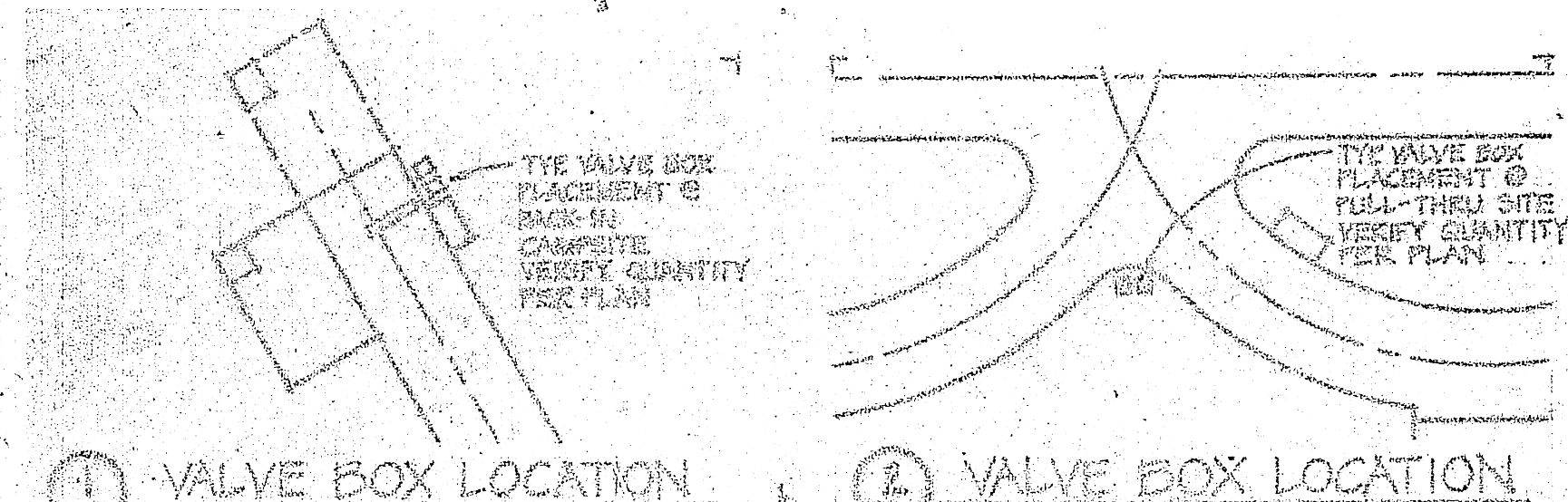
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MATCH TO P7.3

MATCH TO 2

NOTE: SEE SHEET P4.5 SECTION 4 IRRIGATION MAINS.

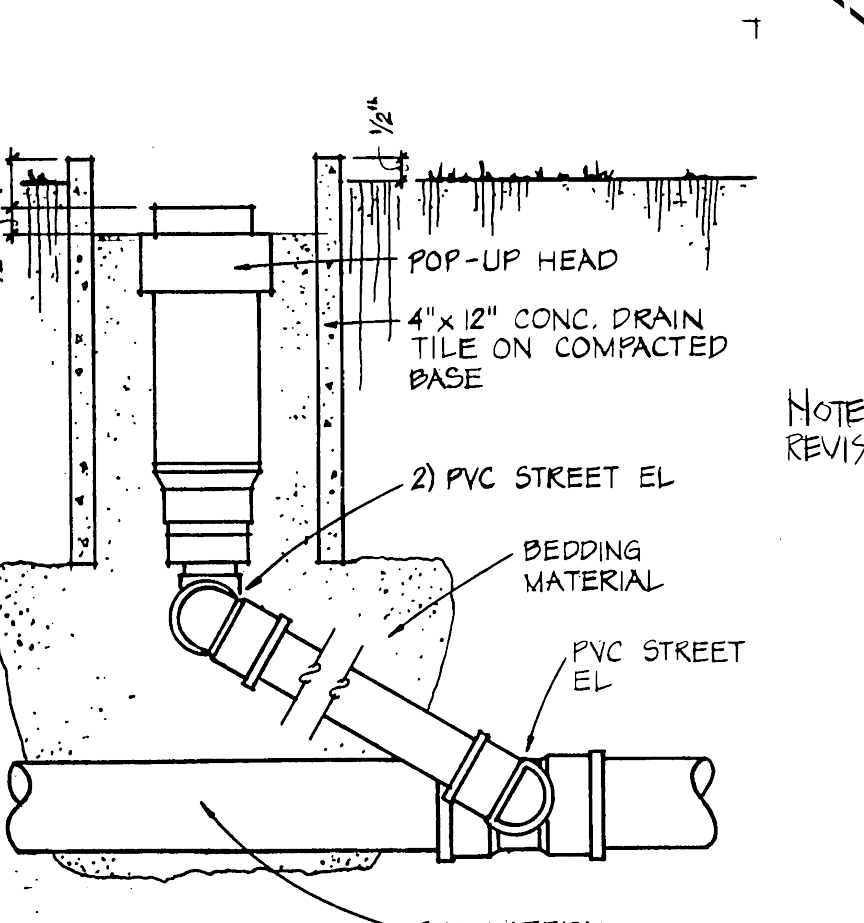
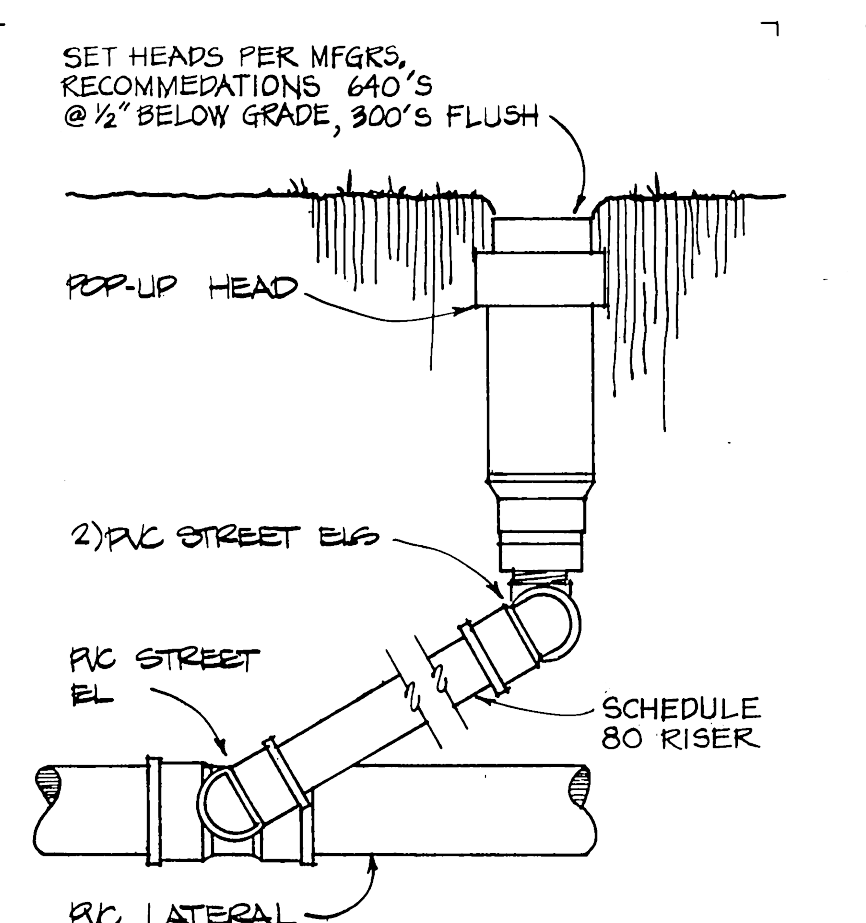
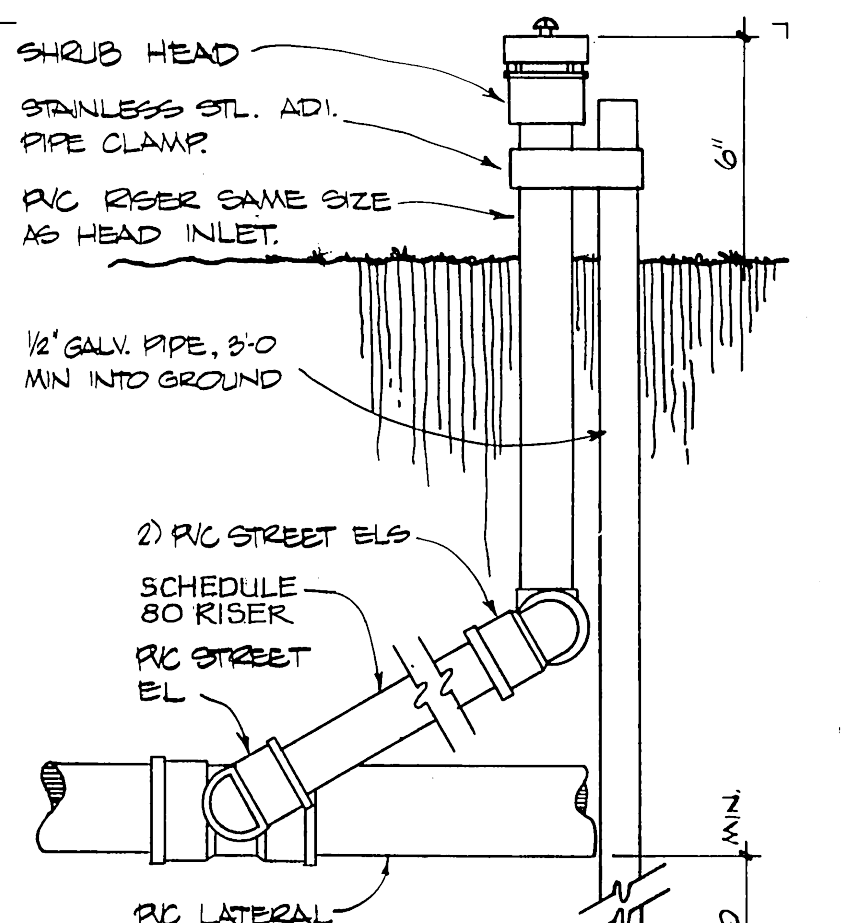
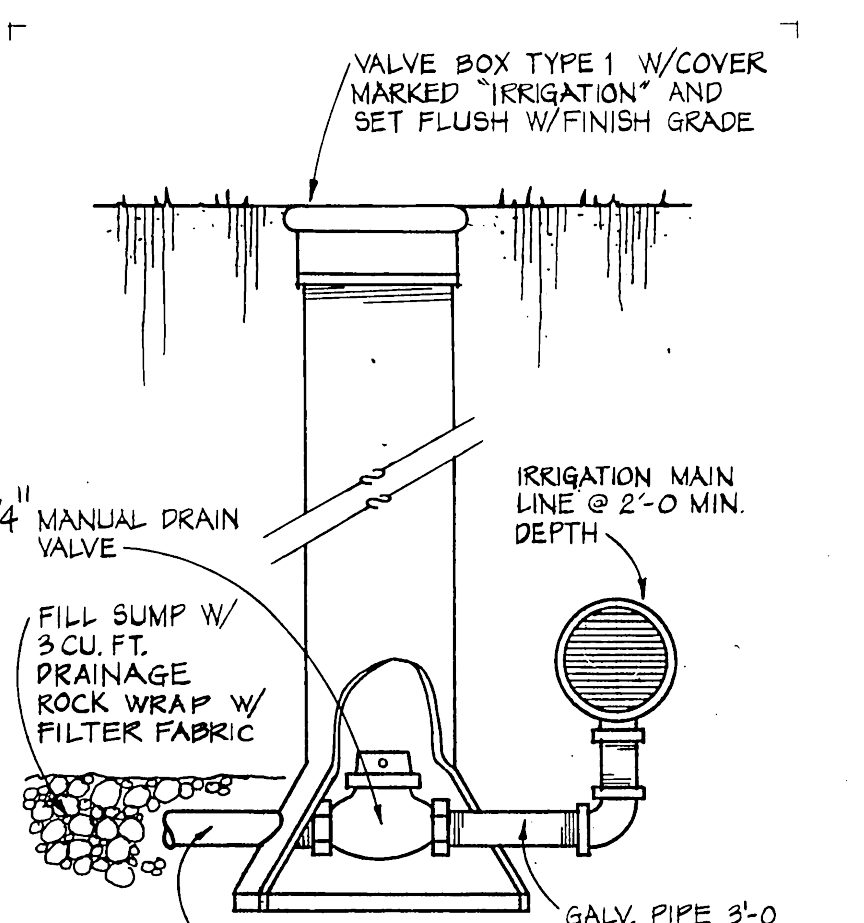
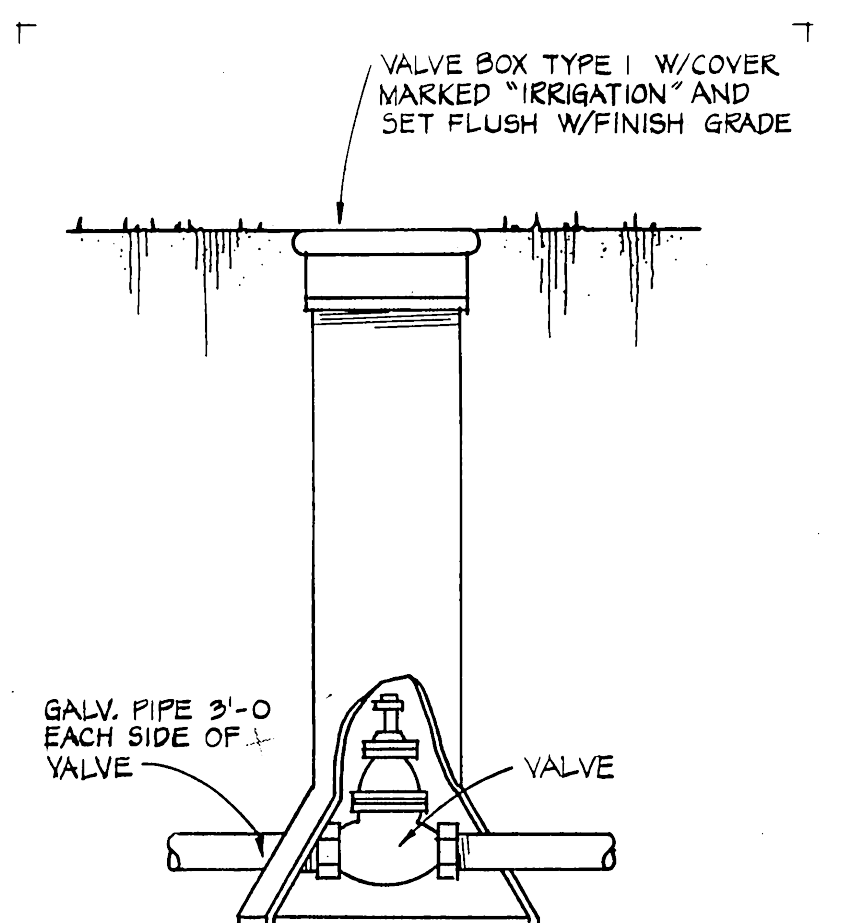
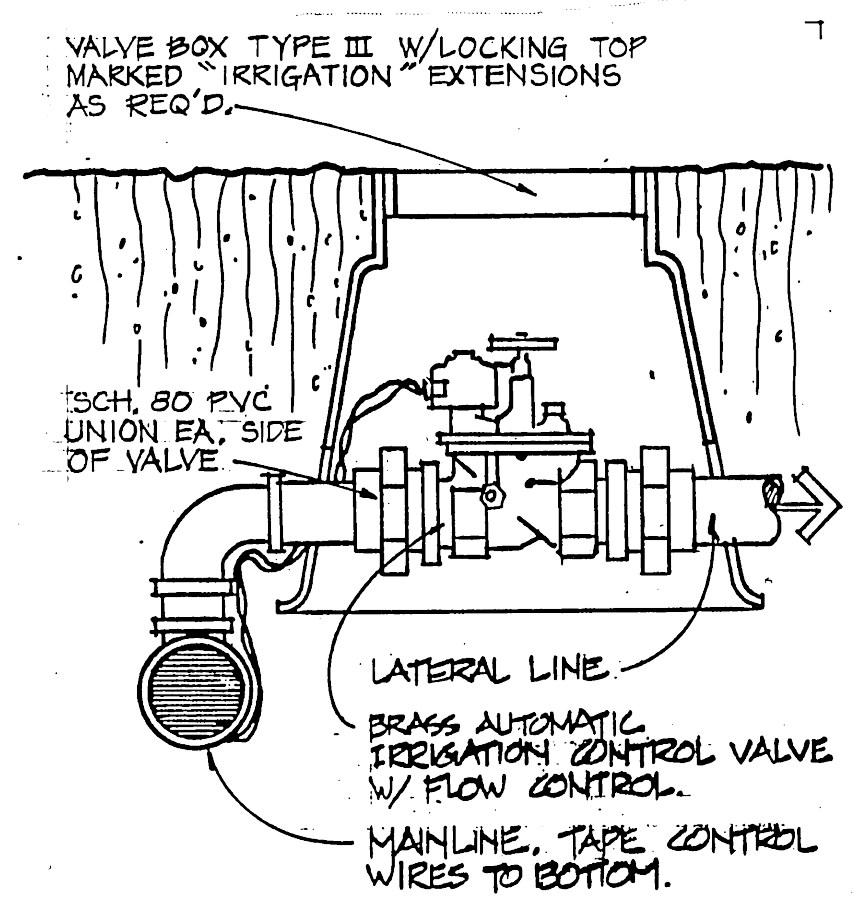
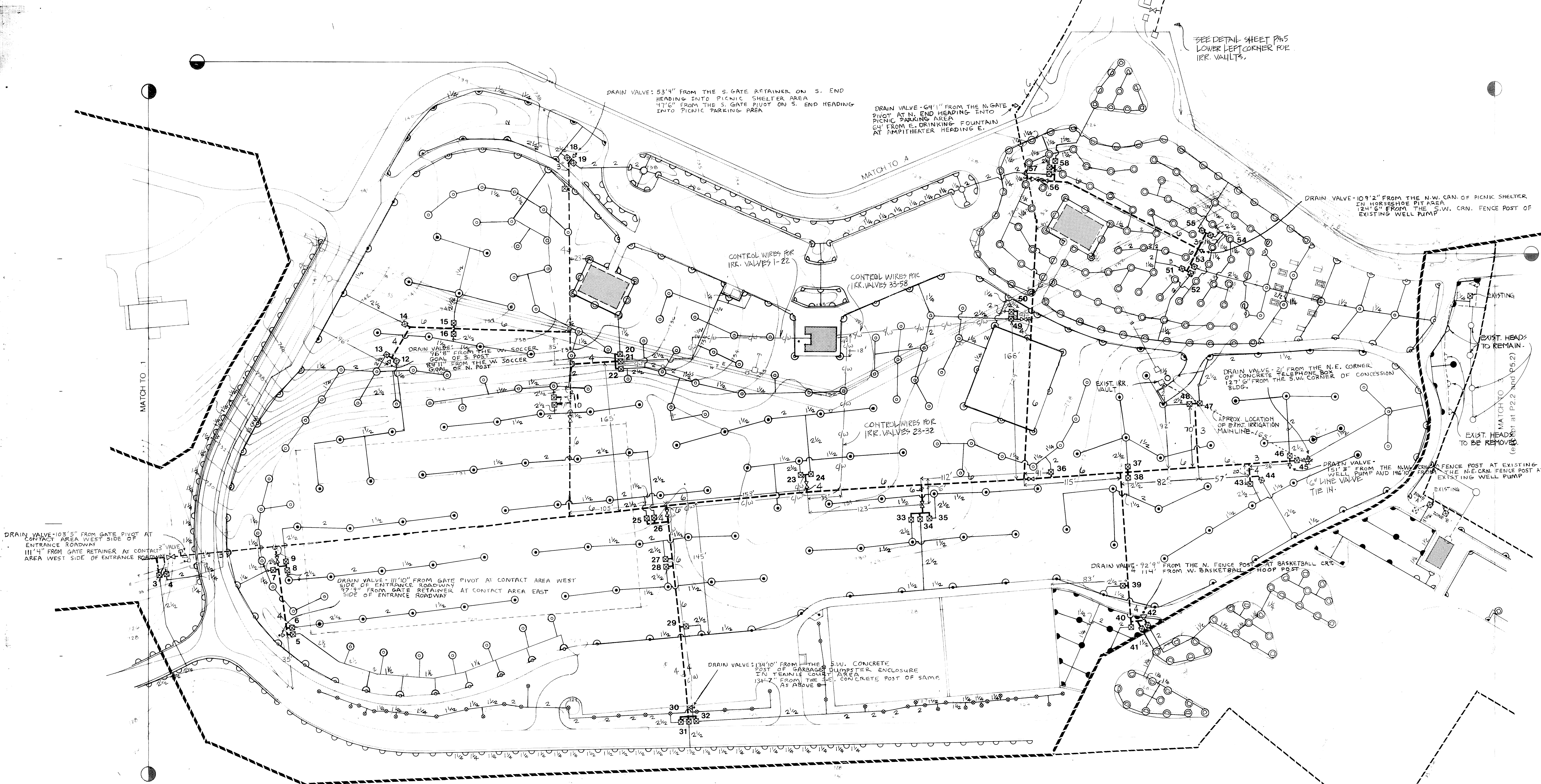


1 VALVE BOX LOCATION

2 VALVE BOX LOCATION

The Doh Associates
Architects and Planners

A Professional Services Corporation
500 Duneson Building, Wenatchee, Washington 98801 (509) 662-4761



NOTE: SEE SHEET P4.1, *NOTE FOR IRRIGATION REVISIONS.

1 AUTO. ZONE VALVE
N.T.S.

2 MANUAL VALVE
N.T.S.

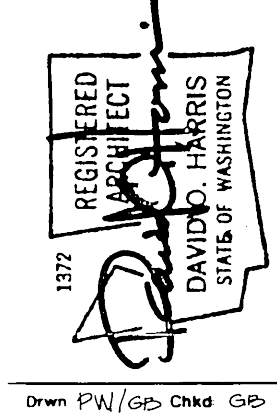
3 MANUAL DRAIN VALVE
N.T.S.

4 RISER SWING JOINT
N.T.S.

5 POP-UP HEAD SWING JOINT
N.T.S.

6 IRRIGATION HEAD
N.T.S.

IRRIGATION PLAN
Section 2
1"=50'-0" DRAWINGS REVISED TO AS-BUILT MAY 23, 87 BY ALLEN PRATT



CONTROLLER SCHEDULE #7

STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C38	1/2	32
2.	C39	1/2	32
3.	C30	1/2	30
4.	C31	1/2	47
5.	C32	1/2	43
6.	C33	1/2	32
7.	C1	2	24
8.	C2	1	22

Remarks: LOCATE IN RESTROOM @ CAMP LOOP 2 (TYPICAL CONTROLLERS 7 THRU 11)

CONTROLLER SCHEDULE #8

STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C34	1/2	44
2.	C35	1/2	39
3.	C36	1/2	42
4.	C37	1/2	37
5.	C38	1/2	35
6.	C39	1/2	33
7.	C3	2	37
8.	C4	2	79

Remarks:

CONTROLLER SCHEDULE #9

STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C40	1/2	59
2.	C41	1/2	32
3.	C42	1/2	47
4.	C43	1/2	41
5.	C44	1/2	40
6.	C45	1/2	32
7.	C5	1/2	53
8.	C6	1/2	32

Remarks:

CONTROLLER SCHEDULE #12

STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C9	1/2	62
2.			
3.			
4.			
5.			
6.			
7.			
8.			

Remarks:

CONTROLLER SCHEDULE #10

STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C46	1/2	43
2.	C47	1/2	32
3.	C48	1/2	37
4.	C49	1/2	30
5.	C50	1/2	32
6.	C51	1/2	51
7.	C52	1/2	33
8.	C7	1/2	32

Remarks:

CONTROLLER SCHEDULE #11

STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C53	1/2	37
2.	C54	1/2	31
3.	C55	1/2	60
4.	C56	1/2	37
5.	C57	1/2	52
6.	C58	1/2	50
7.	C59	1/2	44
8.	C8	2	42

Remarks:

CONTROLLER SCHEDULE #13

STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C60	1/2	50
2.	C61	1/2	40
3.	C62	1	20
4.	C63	1/2	35
5.	C64	1/2	54
6.	C10	1/2	42
7.	C11	1/2	64
8.			

Remarks: LOCATE IN RESTROOM @ CAMP LOOP 3 (TYPICAL CONTROLLERS 13 THRU 19)

CONTROLLER SCHEDULE #14

STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C65	1	22
2.	C66	1/2	49
3.	C67	1/2	50
4.	C68	1/2	45
5.	C69	1/2	53
6.	C12	1/2	65
7.	C13	1/2	50

Remarks:

CONTROLLER SCHEDULE #15

STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C70	1/2	43
2.	C71	1/2	32
3.	C72	1/2	40
4.	C73	1/2	46
5.	C74	1/2	45
6.	C75	1/2	53
7.	C76	1/2	47
8.	C16	1/2	62

Remarks:

CONTROLLER SCHEDULE #16

STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C76	1/2	32
2.	C77	1/2	32
3.	C78	1/2	30
4.	C79	1	22
5.	C80	1/2	53
6.	C81	1/2	31
7.	C17	1/2	62
8.	C18	2	27

Remarks:

CONTROLLER SCHEDULE #17

STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C82	1/2	22
2.	C83	1/2	42
3.	C84	1	21
4.	C85	1/2	32
5.	C86	1	23
6.	C87	1/2	40
7.	C19	2	75
8.	C10	1	29

Remarks:

CONTROLLER SCHEDULE #18

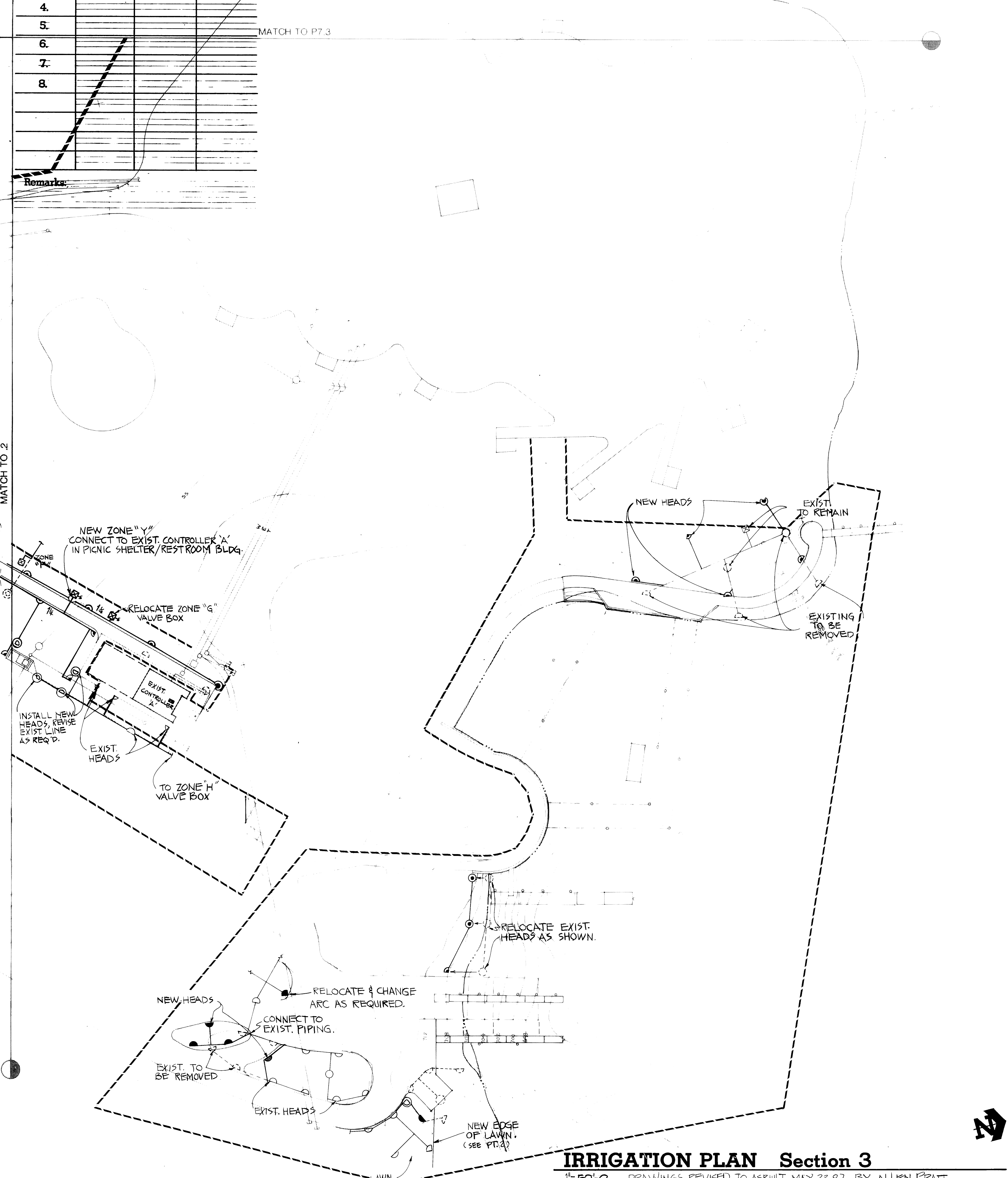
STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C88	1/2	37
2.	C89	1/2	32
3.	C90	1	29
4.	C91	1	30
5.	C92	1/2	50
6.	C93	1/2	32
7.	C21	1	22
8.	C22	2	74

Remarks:

CONTROLLER SCHEDULE #19

STATION NUMBER	VALVE NUMBER	SIZE	GPM.
1.	C94	1/4	32
2.			
3.			
4.	23	2	27
5.	24	1/2	50
6.	25	1/2	51
7.	26	1/2	50
8.	27	1/2	32

Remarks:



IRRIGATION PLAN Section 3
 1"=50'-0" DRAWINGS REVISED TO ASBUILT MAY 23, 87 BY ALLEN PRATT

4.3
7.3

EXHIBIT V – PERMITS

Shoreline Management Permit

Conditional Use and/or Variance Permit

SHORELINE MANAGEMENT PERMIT

ACTION SHEET

Application #: SP 14-06
CUP 86-01C

Administering Agency Douglas County Department of Community Development

Type of Permits: Shoreline Substantial Development Permit
 Conditional Use Permit

Action: Approved Denied

Date of Action: October 22, 2014

Date Mailed to DOE/AG

Pursuant to Chapter 90.58 RCW and the Shoreline Master Program of Douglas County, the following permit is hereby granted to:

**Public Utility District No. 1 of Chelan County
PO Box 1231
Wenatchee, WA 98807**

To undertake the following development: An application for a shoreline substantial development permit and amendment to a conditional use permit for the installation of 8 deluxe cabins, 3 full hook-up RV sites, parking stalls, a group camp, new access road, and 2,136 feet of new trails.

Upon the following property:

Within 200 feet of the Columbia River and/or its associated wetlands.

The project will be within a shoreline of statewide significance (RCW 90.58.030). The project will be located within a Rural Conservancy shoreline environment designation.

The following Shoreline Master Program provisions are applicable to this development: Sections 7, 9, 11, 16, 21, 27 and 29.

All conditions imposed herein shall be binding on the "Applicant," which terms shall include the owner or owners of the property, heirs, assigns and successors.

CONDITIONS OF APPROVAL

1. The project shall proceed in substantial conformance with the plans and application materials of file submitted on August 8, 2014 except as amended by the conditions herein.
2. The applicant shall comply with all applicable local, state and federal regulations.
3. A copy of this permit and attached conditions shall be kept on-site and provided to the contractor and all others working within the shoreline area at all times. The applicant, contractor, machinery operators and all others working within the shoreline area shall have read this permit and attached conditions and shall follow its conditions at all times.
4. Erosion and Sediment Control Plan received with application shall be included in the commercial building permit.
5. The project application shall proceed consistent with the Fish & Wildlife Habitat Management and Mitigation Plan prepared by Grette & Associates, dated August, 2014.
6. Where necessary, a permanent means of irrigation shall be installed for the mitigation plantings that are designed by a landscape architect or equivalent professional. Said design shall meet the specific needs of riparian and shrub steppe vegetation.
7. Mitigation planting as shown on the mitigation planting plan sheets P1 – P6, dated 7/30/2014 shall be planted upon completion of the project structures and interpretive trail construction.
8. The mitigation site shall be maintained to ensure the management and mitigation plan objectives are successful. Maintenance shall ensure 80% survival during the 5 year monitoring period and shall include corrective actions to rectify problems, include rigorous, as-needed elimination of undesirable plants; protection of shrubs and small trees from competition by grasses and herbaceous plants, and repair and replacement of any dead plants.
9. A five year monitoring period shall commence upon placement of the planting materials and irrigation system.
10. Onsite monitoring and monitoring reports shall be submitted to Douglas County Transportation and Land Services 1 year after mitigation installation; 3 years after mitigation installation; and 5 years after mitigation installation. Monitoring reports shall be submitted by a qualified biologist, as defined by Douglas County Code. The biologist must verify that the conditions of approval and provisions in the fish & wildlife habitat management and mitigation plan submitted by Grette & Associates, dated August, 2014 have been satisfied.
11. Where a condition imposed herein may be found inconsistent with the requirements of the Washington State Department of Fish and Wildlife, HPA Permit, or permitting issued by the United States Army Corps of Engineers, the Douglas County Land Services Director shall have discretion to allow for project redesign consistent with the approvals granted by said agencies; if the redesign can be found consistent with the Douglas County Code, the Shoreline Master Program, and the Shoreline Management Act.
12. Construction of the project for which this permit has been granted must be commenced within two (2) years of the effective date of this permit. Authorization to conduct development activities granted by the permit shall terminate five (5) years from the filing date of the permit.

Additional Conditions of Approval for Conditional Use Permit, CUP#86-01C:

13. The project shall proceed in substantial conformance with the plans and application materials of file submitted on August 8, 2014 except as amended by the conditions herein.
14. The applicant shall comply with all applicable local, state and federal regulations.
15. Prior to building permit issuance, the applicant shall obtain all necessary permits from agencies with jurisdiction.
16. A copy of this permit and attached conditions shall be kept on-site and provided to the contractor and all others working within the shoreline area at all times. The applicant, contractor, machinery operators and all others working within the shoreline area shall have read this permit and attached conditions and shall follow its conditions at all times.
17. Erosion and Sediment Control Plan received with application shall be included in the commercial building permit.
18. The project application shall proceed consistent with the Fish & Wildlife Habitat Management and Mitigation Plan prepared by Grette & Associates, dated August, 2014.
19. In the event that human remains, burials, funerary items, sacred objects, or objects of cultural patrimony are found during project implementation, the proponent or authorized agent shall cease work immediately within 200 ft. of the find and take steps to protect the find from further damage or disruption. Then they shall contact the THPO at (509) 634-2695 to report the find. No further work shall be allowed on the project until an approved plan for managing or preserving the remains or items is in place.
20. In the event that prehistoric artifacts (i.e., arrowheads, spear points, mortars, pestles, other ground stone tools, knives, scrapers, or flakes from the manufacture of tools, fire pits, peeled trees, etc.) or historic-period artifacts or features (i.e., fragments of old plates or ceramic vessels, weathered glass, dumps old cans, cabins, root cellars, etc.) are found during project implementation, the proponent or authorized agent shall cease work immediately within 200 ft. of the find. Then they shall contact the THPO at (509) 634-2695. No further work shall be allowed on the project until an approved plan for managing or preserving the artifacts or features is in place.
21. Activities that have the potential to disturb cultural resources outside the specified project area should not proceed prior to a cultural resources review of potential adverse effects in the new area.
22. The applicant is responsible for compliance with applicable state regulations including but not limited to acquisition of the Department of Ecology, Construction Stormwater Permit, and registration of UIC facilities, prior to construction.

FINDINGS OF FACT

1. The applicant is Public Utility District No. 1 of Chelan County (Chelan PUD), PO Box 1231, Wenatchee, WA 98807

2. General Description: An application for a shoreline substantial development permit and amendment to a conditional use permit for the installation of 8 deluxe cabins, 3 full hook-up RV sites, parking stalls, a group camp, new access road, and 2,136 feet of new trails.
3. Cabin Loop & Interpretive Trail will serve Lincoln Rock State Park. The subject property is described as being located at 13253 Lincoln Rock State Park Rd, East Wenatchee. The subject property is further described as being located within the East Half of Section 35, Township 24 N, Range 20 EWM, Douglas County, Washington.
4. The Douglas County Assessor's parcel numbers is: 24203510001.
5. The Comprehensive Plan Designation is Rural Essential Public Facilities.
6. The subject property is located in the R-EPF district.
7. The Columbia River Shoreline section of the subject property is designated as Rural Conservancy by the Douglas County Shoreline Master Program.
8. DCC 18.80 "Conditional Uses" establishes minimum review criteria for recreational vehicle parks and campgrounds.
9. The proposed project is a permitted conditional use within the R-EPF district pursuant to DCC 18.80.230.
10. WAC 173-27-150 establishes minimum review criteria for Shoreline Management Substantial Development Permits. This criteria states that a substantial development permit shall be granted only when the development proposed is consistent with the policies and procedures of the Act; the provisions of this regulation; and the applicable master program adopted or approved for the area.
11. An erosion and sediment control plan was performed for the project.
12. A traffic impact analysis indicated that the project will add 8 additional vehicular trips per day during the camping season. The additional vehicular trips per day is minimal and will have no impact on existing transportation facilities.
13. A Fish and Wildlife Habitat Management and Mitigation Plan dated August 2014 was prepared for the project by Grette & Associates.
14. The Fish and Wildlife Habitat Management and Mitigation Plan utilizes a 100 foot riparian buffer as determined by the Riparian Buffer Assessment completed by Grette Associates, date August 2014.
15. The development of the cabins, RV sites, and interpretive trail will impact the riparian environment. A Fish and Wildlife Habitat Management and Mitigation Plan has determined that approximately 2,329 sq. ft. of impact to the riparian buffer. The application proposes 2,640 sq. ft. of mitigation. A planting plan is proposed in Attachment B, Sheet P1 - P6 in the Fish & Wildlife Habitat Management and Mitigation Plan Sheets.
16. The mitigation proposed in the Fish and Wildlife Management and Mitigation Plan meets the requirements of the Douglas County Regional Shoreline Master Program.

17. A cultural resource survey was completed by Archaeological Investigations Northwest. The survey was submitted to the Washington Department of Archaeology & Historic Preservation and the Confederated Tribes of the Colville Reservation. The survey resulted in no evidence of archaeological or potential cultural resources.
18. Comments from reviewing agencies have been considered and addressed where appropriate.
19. Chelan County PUD issued a Determination of Non-significance, as the lead agency, on August 20, 2014 in accordance with WAC 197-11-340(2).
20. Surrounding property owners were given the opportunity to comment on the proposals, can request a copy of the decision, and can appeal the decision subject to the requirements outlined in DCC Title 14.
21. Proper legal requirements were met and surrounding property owners were given the opportunity to comment on the proposal at a public hearing.
22. WAC 173-27-090 requires that construction of projects receiving shoreline substantial development permits must be commenced within 2 years of the effective date of the shoreline permit and that authorization for construction shall terminate 5 years after the effective date of the shoreline permit.
23. As conditioned, the development will not adversely affect the general public, health, safety and general welfare.
24. An open record public hearing after legal notice was provided was held on October 16, 2014.
25. The File of Record, Douglas County Department of Community Development Staff Report, and exhibits were received, admitted into the record and considered by the Hearing Examiner.
26. Appearing and testifying on behalf of the applicant was Waikele Frantz. Ms. Frantz testified that she was an agent authorized to appear and speak on behalf of the applicant. Ms. Frantz indicated that the applicant concurred with the staff report findings and conclusions. The applicant had no objection to any of the proposed conditions of approval.
27. No member of the public testified at the hearing.
28. The Chelan County Hearing Examiner considered all evidence within the record in rendering this decision.
29. Any Conclusion of Law that is more correctly a Finding of Fact is incorporated herein as such by this reference.

CONCLUSIONS

1. The Hearing Examiner has authority to render this Decision.
2. Referral agency comments were received and considered in the review of this proposal.

3. As conditioned, the development meets the goals, policies and implementation recommendations as set forth in the Douglas County Countywide Comprehensive Plan and the Douglas County Shoreline Master Program.
4. As conditioned, this proposal is consistent with applicable federal and state laws and regulations.
5. As proposed, revised, and conditioned, potential impacts of the project can be mitigated.
6. Public interests will be served by approval of this proposal.
7. As conditioned, the proposal is consistent with Title 18 "Zoning" and Title 19 "Environment" of the Douglas County Code.

This permit is granted pursuant to the Shoreline Master Program of Douglas County, as amended, and nothing in this permit shall excuse the applicant from compliance with any other federal, state, or local statutes, ordinances, or regulations applicable to this project, but not inconsistent with the Shoreline Management Act of 1971 (Chapter 90.58 RCW).

This permit may be rescinded pursuant to RCW 90.58.140(7) in the event the permittee fails to comply with the terms and conditions hereof.

CONSTRUCTION PURSUANT TO THIS PERMIT SHALL NOT BEGIN NOR IS AUTHORIZED UNTIL TWENTY-ONE (21) DAYS FROM THE DATE OF FILING AS DEFINED IN RCW 90.58.140(6) AND WAC 173-14-090, OR UNTIL ALL REVIEW PROCEEDINGS INITIATED WITHIN TWENTY-ONE (21) DAYS FROM THE DATE OF SUCH FILING HAVE TERMINATED; EXCEPT AS PROVIDED IN RCW 90.58.140(5)(a)(b)(c).

Substantial progress toward construction of the project for which this permit has been granted must be accomplished within two (2) years of the filing date of this permit. Authorization to conduct development activities granted by this permit shall terminate five (5) years from the filing date of this permit.

Approved this 22nd day of October, 2014.

DOUGLAS COUNTY HEARING EXAMINER



Andrew L. Kottkamp

Anyone aggrieved by this decision has twenty-one (21) days from the "date of filing" as defined in WAC 461-08-305 and RCW 90.58.140(6) to file a petition for review with the Shorelines Hearings Board as provided for in RCW 90.58.180 and Chapter 461-08 WAC, the rules of practice and procedure of the Shorelines Hearings Board.

**THIS SECTION FOR DEPARTMENT OF ECOLOGY USE ONLY IN REGARD TO A
CONDITIONAL USE AND/OR VARIANCE PERMIT**

Date received by the Department _____

Approved _____

Denied _____

This conditional use/variance permit is approved / denied by the Department pursuant to Chapter 90.58 RCW.

Development shall be undertaken pursuant to the following additional terms and conditions:

END OF EXHIBIT V

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DIVISION 01 – GENERAL REQUIREMENTS

SECTION 011000 – SUMMARY OF WORK

PART 1 – GENERAL

1.1 BACKGROUND

The District is the Owner of Lincoln Rock State Park (Park), including all properties on which it resides. Washington State Parks & Recreation Commission is the District's contract operator for Lincoln Rock 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 Lincoln Rock State Park Cabin Loop and Group Camp Project, which includes but is not limited to the following description:

- A. Construction of a new camping loop in an undeveloped area of the Park consisting of eight (8) deluxe cabins, one (1) of which meets Americans with Disabilities Act (ADA) requirements, and three (3) RV sites with full hook-ups (i.e. power, water and sanitary sewer). Associated with the cabin loop is also development of an interpretive trail including two interpretive sites and improvements to an existing parking area.
 1. Site improvements in the cabin loop will consist of concrete demolition, clearing, grubbing, earthwork, installation of new utilities, asphalt road widening and construction of new asphalt roads, parking, RV sites and landscaping.
 2. Deluxe cabin information:
 - Architectural based design
 - Construction: On-site, stick framed
 - Size: 400 square feet not including a 96 square foot front porch
 - Trades include: concrete, electrical, plumbing, HVAC, glazing, metal roofing, painting and carpentry
- B. Construction of a new group camp in a developed area of the Park consisting of three RV sites with hook-ups and expansion of an existing comfort station. Comfort station expansion includes the addition of two new family/ADA bathrooms and a roof replacement.

1.3 PROJECT LOCATION

- A. General Location: The project is located 5 miles north of East Wenatchee, WA in Douglas County, WA along SR 97.

B. Lincoln Rock State Park Physical Address:

Lincoln Rock State Park
13251 SR97
East Wenatchee, WA 98802

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:

- Lincoln Rock State Park, 509-884-8702
- 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. Lincoln Rock State Park will be open during the 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 011000

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 011100 – 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 have a written Accident Prevention Program 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 011100-1). 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 011100-2) 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 (011100-2) 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



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 012200 – MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.1 SCOPE

- A. 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.
- B. The District reserves the right to make changes should unforeseen conditions necessitate such changes. Where the Work is on a Unit Price basis, the actual quantities required by such changes shall govern the compensation.

1.2 MEASUREMENT

Measurement for all items shall be as indicated in these Specifications for unit price and lump sum Bid Price items, and 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 Unit Price or lump sum Bid Price as indicated in the Bid Price Schedule, payment of which shall constitute full compensation, for a complete installation.

1.4 SCHEDULE OF VALUES

Within ten (10) days following Notice of Award, the Contractor shall submit a written Schedule of Values for each lump sum price fixed in the Contract. The Schedule of Values shall provide information used by the Bidder to develop the lump sum price. This information may be used by the District to determine the amount of progress payments, to determine the value of changes in the Work, and to evaluate potential or actual claims. The Schedule of Values shall be sufficiently detailed and complete to support those uses. At a minimum the Schedule of Values shall include groups of items for the following: demolition and clearing, grading and erosion control, auto and pedestrian circulation (pavement work), utilities by type (i.e. waste, storm, irrigation, domestic, electric, etc.), camping facilities by type (RV and cabin), cabin phases (foundation, framing, roofing, plumbing, electrical, etc.), miscellaneous site improvements, signage, comfort station expansion by phase, and plantings and other

landscaping improvements. Additional items will be required for mobilization, demobilization, general administration, O&M manuals, As-Built Drawings, etc.

1.5 INDIVIDUAL BID ITEMS

A. Item 1 – Cabin Loop

Measurement: Lump sum

Payment: Costs for all Work described in Exhibits S and T, excepting all other bid items as identified as separate bid items in this Specification.

B. Item 2 – Cabin Type A (ADA)

Measurement: Each

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to construct a Type A (ADA) cabin.

C. Item 3 – Cabin Type B

Measurement: Each

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to construct a Type B cabin.

D. Item 4 – Interpretive Trail and Parking Area

Measurement: Lump sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to construct the interpretive trail and parking area. See Contract Drawings 0913-50CI-0036, 38 and 0913-50YP-0006.

E. Item 5 - Group Camp

Measurement: Lump sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to construct the group camp. Includes paved trails illustrated in Contract Drawings 0913-50CI-0039 and 40.

F. Item 6 – Comfort Station Addition

Measurement: Lump sum

Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to make all improvements to the existing comfort station as described in Exhibits S and T.

G. Item 7 – Topsoil Blend for Hydroseed Applications

Measurement: Cubic Yard (placed)



Payment: Costs for furnishing all supervision, labor, equipment, tools, and materials necessary to furnish and install topsoil blend. See Exhibit S Section 329200 Irrigated Turf for additional information.

H. Item 8 – 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.

1.6 PROJECT MATERIALS ON HAND

The Contractor will not be paid for materials on hand.

END OF SECTION 012200

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: 1431-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	1431-XXXX–L0001-0
Speedy Memos	1431-XXXX–M0001-0
Submittals	1431-XXXX–S-001-0
Example: 1431-HHI-L0001-0	
1431:	(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 14-31 Lincoln Rock State Park Cabin Loop & Group Camp

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 14-31 Lincoln Rock State Park Cabin Loop & Group Camp

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. Ownership

All documents (i.e., Shop Drawings, data, manuals, calculations, schedules, digital photographs, etc.), as well as plans and procedures for installation or testing) shall become the property of the District. The District shall have full rights to reproduce and submit to others any document for bids on future Projects, notwithstanding any indication otherwise on the Contract Drawing or elsewhere.

G. 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.

H. 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® Viewer™ DWF	DWF (*.dwf)	Shop Drawings

I. 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.

J. 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.

K. 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.

- L. 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.
- M. 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.
- N. 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.
- O. Documents shall be made available at all times for observation by the District and the Engineer.
- P. 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.

- Q. 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.

- R. 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 013000

Appendix 013000-1, 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
011100	Site Specific Accident Prevention Program including Emergency Notification Procedure	Within 20 days after Notice of Award
013000	Overall Project Schedule	5 days following Notice of Award
013000	Schedule Updates	As stated in Section 01300
013000	Project Record Drawings	At Substantial Completion
017823	Operation & Maintenance Manuals	Prior to Substantial Completion
014000	Contractor Quality Control (CQC) Plan	Within 20 days of Notice to Award
015000	Temporary Construction Facilities Access Plans	Within 20 days after Notice of Award
055000	Product data and shop drawings	No less than 30 days prior to Work on-site
033000	Product data, design mixtures and Shop Drawings	No less than 30 days prior to Work on-site
061000	ICC-ES evaluation reports	No less than 30 days prior to Work on
061600	ICC-ES evaluation reports	No less than 30 days prior to Work on
062000	Samples and manufacturer's installation instructions	No less than 30 days prior to Work on
064023	Samples and Shop Drawings	No less than 30 days prior to Work on
071100	Pre-Application Requirements, Manufacturer's Data and Samples	No less than 30 days prior to Work on-site
072100	Pre-Application Requirements, Manufacturer's Data and Samples	No less than 30 days prior to Work on-site
072500	Manufacturer's installation instructions, ICC-ES evaluation reports	No less than 30 days prior to Work on-site
074113	List of Materials, Spec. Conformance, Product Data, Color Samples and Shop Drawings	No less than 30 days prior to Work on-site

Appendix 013000-1, Required Submittals

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

076200	Product data and Shop Drawings	No less than 30 days prior to Work on-site
079200	Product data and color samples	No less than 30 days prior to Work on-site
081100	Shop Drawings and Manufacturer's Technical Data	No less than 30 days prior to Work on-site
081416	Samples	No less than 30 days prior to Work on-site
084300	Shop Drawings and Samples	Within 30 days of Notice of Award
085313	Product Data, Shop Drawings and Color Samples, AAMA or WDMA certification	Within 30 days of Notice of Award
087100	Hardware & Keying Schedule, keys	No less than 30 days prior to Work on-site
088000	Product data and 12-inch square samples	Within 30 days of Notice of Award
088300	Product data	No less than 30 days prior to Work on-site
092813	Samples and Material Data	Within 30 days of Notice of Award
092900	Product data	No less than 30 days prior to Work on-site
093000	Samples of tile and grout	Within 30 days of Notice of Award
096513	Product data and samples	No less than 30 days prior to Work on-site
099100.1	Paint and Wood Stain Finishes Product data and color samples, Mockups	No less than 30 days prior to Work on-site
099100.2	Product data and color samples	No less than 30 days prior to Work on-site
101400	Shop Drawings and product data	Within 45 days of Notice of Award

Appendix 013000-1, Required Submittals

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

101453	Product data, Shop Drawings, Samples, Graphic Proofs and Installer Qualifications	Within 45 days of Notice of Award
102100	Shop Drawings, Samples and O&M Instructions	Within 30 days of Notice of Award
102800.1	Product data	Within 30 days of Notice of Award
102800.2	Product data	Within 30 days of Notice of Award
104413	Product data	No less than 30 days prior to Work on-site
104416	Product data	No less than 30 days prior to Work on-site
129300	Product data, shop drawings and owner's manual	No less than 30 days prior to Work on-site
220519	Product data	No less than 30 days prior to Work on-site
220523	Product data	No less than 30 days prior to Work on-site
220529	Product data	No less than 30 days prior to Work on-site
220553	Product data	No less than 30 days prior to Work on-site
220700.1	Product data	No less than 30 days prior to Work on-site
220700.2	Product data	No less than 30 days prior to Work on-site
221000	Product data	No less than 30 days prior to Work on-site
221116.1	Product data and Shop Drawings	No less than 30 days prior to Work on-site
221116.2	Product data	No less than 30 days prior to Work on-site

Appendix 013000-1, Required Submittals

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

221119	Product data	No less than 30 days prior to Work on-site
221316	Product data	No less than 30 days prior to Work on-site
221319	Product data	No less than 30 days prior to Work on-site
223300	Product data	No less than 30 days prior to Work on-site
224000	Product data	No less than 30 days prior to Work on-site
224200	Product data	No less than 30 days prior to Work on-site
230513	Product data	No less than 30 days prior to Work on-site
230529	Product data	No less than 30 days prior to Work on-site
230553	Product data	No less than 30 days prior to Work on-site
230593.1	Preliminary Data, Balancing Report, Commissioning Report	30 days after Notice of Award, Prior to TAB Work and prior to Final Completion
230593.2	Qualification data and Examination Report	Within 30 days following Notice to Proceed
230593.2	Strategies and Procedures Plan	Within 60 days following Notice to Proceed
230593.2	Certified TAB reports and instrumentation calibration reports	Prior to Final Completion
230700.1	Product data	No less than 30 days prior to Work on-site
230700.2	Product data	No less than 30 days prior to Work on-site
233100	Product data and Shop Drawings	No less than 30 days prior to Work on-site

Appendix 013000-1, Required Submittals

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

233113	Product data and shop drawings	No less than 30 days prior to Work on-site
233300	Product data	No less than 30 days prior to Work on-site
233400	Product data	No less than 30 days prior to Work on-site
233423	Product data	No less than 30 days prior to Work on-site
238126	Product data	No less than 30 days prior to Work on-site
238239	Product data	No less than 30 days prior to Work on-site
260519	Catalog data	No less than 30 days prior to Work on-site
260526	Product data	No less than 30 days prior to Work on-site
260529	Catalog data	No less than 30 days prior to Work on-site
260533	Catalog data	No less than 30 days prior to Work on-site
260800	Test Results	No less than 5 days after testing Work on-site
262416	Catalog data	No less than 30 days prior to Work on-site
262700	Catalog data	No less than 30 days prior to Work on-site
262816	Catalog data	No less than 30 days prior to Work on-site
264710	Catalog data	No less than 30 days prior to Work on-site
265119	Catalog data	No less than 30 days prior to Work on-site

Appendix 013000-1, Required Submittals

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

311000	Site Preparation, Demolition, Clearing & Grubbing Plans	Prior to Mobilization on-site
312000	Test Reports and samples	Within 30 or more days prior to use on-site
312500	Product Data and samples	Preconstruction Conference
312500	SWPP and Contractor's CESCL	Prior to Mobilization on-site
321723	Product data, mix designs, test reports and certificates	30 days prior to Work on-site
321723	Product Data	10 days prior to Work on-site
330513	Product data and Shop Drawings	No less than 30 days prior to Work on-site
331100	Product data	No less than 30 days prior to Work on-site
331100	Procedures, methods and plans for pressure testing and disinfection	No less than 30 days prior to Work on-site
334000	Product data	No less than 30 days prior to Work on-site
333000	Product data	No less than 30 days prior to Work on-site
328400	Product data	No less than 30 days prior to Installation
329200	Product data and samples	No less than 30 days prior to Work on-site
329300	Plant and Seed Material Sources, Samples, Photos, Inspection Certificates, Product Data, Test Reports, Shipping Tickets	Within 30 days after Notice of Award

END OF APPENDIX

Appendix 013000-2, Contract Submittal & District Submittal Reply

CONTRACTOR SUBMITTAL & DISTRICT SUBMITTAL REPLY			
Submittal No.: Appendix 013000-2 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 013000-3; 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 013000-4, Sample Record of Conversation Form

RECORD OF CONVERSATION			
Check one:		<input type="checkbox"/> Phone Call	<input type="checkbox"/> Personal Contact
Date:		Time:	ROC No. 1431-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 013000-5, How To Properly Identify Embedded Documents, Catalog Cut Sheets, Etc.

DSD 2210 A, S, M

M22 x1

Module 1

Q+

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 no.	Connections	Housing thread	Weight (g)	Operating I (A)	Notes
DSD 2210.01 81V	3142-03762	Cable 5 m	M20x1	565	25 -185	Standard
DSD 2210.01 81V	3142-03762	Cable 2 m	M20x1	226	25 -115	Standard
DSD 2210.01 41V	3142-04170	Connector	M20x1	130	25 -185	Standard
DSD 2210.01 41V	3142-04171	Connector	M20x1	130	42 -115	Standard
DSD 2210.01 MFV	3142-04148	Protective hose 5 m	M20x1	1000	25 -185	Standard
DSD 2210.06 81V	3142-04120	Cable 5 m	M20x1	290	25 -185	Standard

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Differential Ferrosstat Sensor

Type DSD 2210
Version A, S, M

Technical data

Supply
Power supply: Supply voltage 8...30 V D.C. max. superimposed A.C. voltage 25 V r.m.s.; reverse polarity protection; Current consumption: max. 15 mA (not load).

Input
Frequency range: 0 Hz...20 kHz
Noise immunity: Cable shield connected to the supply negative pole. Noise generator between housing and electronics.
1.5 kV/1 s max./max. 1 Hz (source resistance 500 Ω).
2.0 kV/100 ns max./max. 10 ns (standards with IEC 60140).
2.3 kV/1 MHz damped resonance (stand I) in accordance with IEC 295-4).

Pole wheel
Ferromagnetic toothed wheel, i.e. U407-2, involute gear form preferred. Module ≥ 1 mm, tooth width 6 mm, side clear with rail, tooth space < 0.2 mm, eccentricity < 0.2 mm.
Dish wheel sensor (also with):
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-pull stage, D.C. coupled to the supply (negative pole = reference voltage), max. load 20 mA.
Output voltage (U_o): = supply voltage - 2.5 V at I = 20 mA.
Output voltage (U_o): = 1.5 V at I = 20 mA.
Short circuit proof with reverse polarity protection.

Connections

Shield to be connected with 0 V of power supply.

Mechanical
Protection class: IP65 (power), IP67 (cable connector), IP69 (back 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/1 min).
Housing: Stainless steel, front side hermetically sealed, electronic components potted in a chemical- and high-stress synthetic resin.
Dimensions according to model overview and dimensional drawing.
Weight: Acc. to model overview.
Operating instructions: 314E-63870, version with integral case; 314E-63850, version with integral connector.

Versions

Version ST (S1): PVC cable, Part no. 824L-01081, 3mm, 5 x 0.75 mm², stranded wire (Metal not isolated from housing), white. Outer Ø = max. 7.4 mm, bending radius = min. 110 mm, weight 80 g/m. Standard length for version ST: 5 m.

Version ST (S2): PVC cable, Part no. 824L-35663, 3mm, 3 x 0.22 mm² (AWG 24), stranded wire (ferromagnetic screening with conductivity conductor, insulation from housing), grey. Outer Ø = max. 4.3 mm, bending radius = min. 60 mm, weight 25 g/m. Standard length for version ST: 3 m.

Version SH: Tubing cable, Part no. 824L-30253, 4mm, 4 x 0.24 mm² (AWG 24), stranded wire (Metal not measured from housing), white. Outer Ø = max. 4.0 mm, bending radius = min. 60 mm, weight 22 g/m. Standard length for version SH: 2.8 m.

Version MT: Protection hose over PVC cable, Tube 825G-26124 made of profile milled steel plate with PVC cover, grey. Weather and water-tight, conditionally oil 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: Connector type, Part no. 805A-30771, Connector plug, Part no. 805A-30752.

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End of Appendices

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 014100 – INSPECTIONS AND TESTS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. The Contractor shall be responsible for quality control of the Work. The District will inspect the Work to verify compliance with the requirements of the Contract Documents. Some components of the Work also require inspection by Douglas County (County) or Washington State Department of Labor and Industries (L&I). Inspection is intended to be performed for quality assurance of the Work.
- B. All materials, products and components manufactured, procured or fabricated by Contractor as part of the Work shall be subjected to such tests and inspections as may be necessary to verify compliance with the requirements of the Contract Documents.
- C. Approval of assemblies, tests and test procedures, etc., and acceptance of pertinent test certificates, inspection or waiving of inspections and tests shall in no way relieve Contractor of its contractual obligations for furnishing the Work in accordance with the provisions of these Contract Documents.

1.2 SUBMITTALS

- A. The Contractor shall submit all test results in accordance with Section 01300 Administrative Requirements and each individual specification for which testing is required.

1.3 REFERENCES, SPECIFICATIONS, CODES AND STANDARDS

- A. Code of Federal Regulations (CFR)
- B. National Institute of Standards and Technology (NIST)
- C. American National Standards Institute (ANSI)
- D. International Building Code (IBC)

1.4 TESTS

- A. Contractor shall perform tests as specified or required to verify that the control measures are adequate and the Work meets the requirements of the Contract and applicable standards and codes. All expenses for the tests (e.g. soils, concrete testing, etc.) shall be fully borne by Contractor. Contractor shall

prepare and supply all labor, material and equipment necessary for performing specified or required tests.

- B. The District shall be notified of all tests no less than 24 hours prior to test being conducted. Failure to notify may result in delay of testing. Any costs attributed to delays for inadequate notification to the District shall be borne by the Contractor.

C. Testing Procedure:

The Contractor shall perform tests specified or required to verify that control measures are adequate to Provide a product which conforms to Contract requirements. Testing includes operation and/or acceptance tests when specified.. The Contractor shall perform the following activities and record and provide the following data:

1. Verify that testing procedures comply with Contract requirements.
2. Verify that facilities and testing equipment are available and comply with testing standards.
3. Check test instrument calibration data against certified standards.
4. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
5. Results of all tests taken, both passing and failing tests, shall be recorded and submitted to the District. An information copy of tests performed by an off-site or commercial test facility shall be provided directly to the Project Manager.

D. Contractor shall perform checks and tests in accordance with the following:

1. Field Inspections and Tests as specified in these Specifications
2. Manufacturer's and/or Contractor's standard practices and recommendations
3. Reference and applicable testing standards
4. Mutual agreement of Contractor and Engineer based upon conditions or circumstances that may arise in the shop or in the field

- E. Contractor shall evaluate test results and advise Engineer immediately of any discrepancy between test results and test limits or the failure of any item to meet the test criteria.

- F. Contractor, at its expense, shall furnish, set up and operate test equipment and facilities in Contractor's shops or on site. If facilities for conducting required tests are unavailable, Contractor may conduct tests elsewhere or have them performed by an independent agency subject to approval by Engineer.
- G. Contractor shall protect all material and equipment during and after testing and checking to provide that subsequent testing of other equipment or systems does not disturb, damage, or otherwise interfere with functional capability of material and equipment.
- H. In the event that test results do not fulfill the requirements specified in these Specifications or that any defects attributable to Contractor are found in test results, Contractor shall repair, adjust or correct and retest at its own expense to the satisfaction of Engineer. Repairs shall be subject to the approval of Engineer. Even in such an event, Contractor shall be responsible for maintaining the Project schedule and milestone completion dates.

1.5 INSPECTION

- A. Inspection will be completed by the District for quality assurance. Inspection will be performed by the County for compliance with applicable sections of the building codes. L&I inspections are also required for approval of electrical Work. Contractor shall not rely upon inspection as a means to satisfy their quality control program. Inspections shall only be called for when the Contractor has determined they have adequately complied with the Contract Documents and applicable regulatory codes.
- B. Contractor shall give full cooperation to District's or County's inspection at the site during installation and testing. During assembly and installation, Contractor shall request District's observation of those in-progress tests, which are impossible to be checked if the installation works are advanced or completed.
- C. The District will perform inspections as identified in 014000 Inspection Matrix. The Contractor shall notify the District's Inspector a minimum of 24 hours prior to any hold or witness inspection required. Failure to notify may result in delay of inspection. Any costs attributed to delays for inadequate notification to the District shall be borne by the Contractor.
- D. The District will call for and coordinate all required County inspections. A minimum of 24 hours is required for all County inspections. The Contractor is required to comply with all County inspections in the same manner as if performed by the District.
- E. Contractor shall not build upon or conceal non-conforming Work.



- F. Work deemed non-conforming by the District, County or L&I shall be repaired, adjusted or corrected and retested at Contractor's expense to the satisfaction of District and/or County.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 014100

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 015000 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 – GENERAL

1.1 DESCRIPTION

Work and requirements of this section include, but are not limited to, the following:

- A. Furnish, install, maintain, and protect temporary signs, facilities, and utilities. Remove or relocate field offices and signs upon completion of Work.
- B. Installations are required to be safe, non-hazardous, and sanitary. They are to be protective of persons and property, and be free of deleterious effects.
- C. The Park will be open and in use during construction. Temporary controls shall be used to safe guard the general public.

1.2 DEFINITIONS

- A. Contractor's Field Office – An on-site trailer facility provided by the Contractor to support Contractor's field work compliant with the requirements of this section.
- B. District's Field Office – An on-site trailer facility provided by the District to support the District's construction observation team.
- C. Temporary Controls - Construction signage provided by the Contractor for public information and safety as well as for directing construction traffic into and within the Park.

1.3 SUBMITTALS

- A. Access plans including identification of routes and entrances for construction traffic.
- B. Construction worker parking area plans.
- C. Contractor's field office, storage yard, and storage building plans. Location as proposed by the contractor shall be within the park boundaries as shown on the Contract Drawings.
- D. Fencing and protective barrier locations and details.
- E. Stockpile and staging area locations plan.
- F. Temporary utilities plan for electricity, water and sanitation.
- G. Plan for site security as needed.

H. Temporary construction signs – submit 8.5 x 11 paper size scaled drawing of sign with Content as specified herein and as deemed necessary by the District at time of submittal. Include with submittal site plans illustrating proposed location of signs.

- 1) Entrance signs
- 2) Construction traffic signs

PART 2 – PRODUCTS

2.1 TEMPORARY SERVICES – GENERAL

- A. Use of existing Park facilities outside the defined limits of Work is prohibited and will not be available to the Contractor.
- B. Arrange, set up and coordinate for the use of utilities on a temporary nature through the duration of the on-site Work.

2.2 CAMPING ACCOMODATIONS

Contractor may elect to camp at Lincoln Rock State Park; however camping reservations, if made, shall be done through Washington State Parks and not directly with Lincoln Rock State Park staff (see: <https://washington.goingtocamp.com/> or call: 1-888-226-7688). The District does not guarantee the availability of campsites during the contract period. Costs for camping accommodations, if secured, are the sole responsibility of the Contractor. Any requests for discounts or other special arrangements should be made directly to Washington State Parks.

2.3 TEMPORARY ELECTRICAL AND LIGHTING

The monthly use of temporary electrical power where existing or proposed in the Park will be paid for by Washington State Parks. Provide temporary electrical power source for temporary lighting or other needs where power is not existing or proposed. Provide temporary lighting and electrical power for Contractor's Field Offices. Cost to establish reliable temporary lighting and power supplies shall be paid for by the Contractor.

2.4 TEMPORARY HIGH SPEED INTERNET

Provide temporary high speed internet connections for Contractor's Field Offices from Notice to Proceed to final Completion.

2.5 TEMPORARY WATER

Provide domestic and irrigation water for all construction facilities and construction needs.

2.6 TEMPORARY SANITARY FACILITIES

Provide sanitary facilities for Contractor and District use in compliance with laws and regulations.

- A. Place Contractor's sanitation facilities in a location convenient to but not conflicting with construction operations; maintain in sanitary condition.
- B. Provide such sanitary facilities as necessary in accordance with the provider's recommendation as to capacity based on maintenance schedule.
- C. Service, clean, and maintain sanitary facilities on no less than a weekly basis or more frequent if conditions necessitate.
- D. Pay all costs for installation, maintenance, and removal of temporary sanitary facilities.

2.7 SOLID WASTE

Contractor shall furnish adequate sanitary holding containers, and remove all solid waste from site. Local health department may inspect the site to assure adequate facilities are available for the sanitary holding of garbage and other waste organic materials, to which rodents and insects may have access.

2.8 SIGNAGE

- A. Construction Signs – Provide, erect and maintain two 8-foot wide by 4-foot high signs constructed of 3/4-inch exterior high density overlaid plywood. Lettering shall be blue applied on a white background by an experienced sign painter. Paint shall be exterior type enamel. Construction sign shall be placed at cabin loop and group camp areas as designated by the District in coordination with Washington State Parks. Sign shall read:

CABIN LOOP & GROUP CAMP DEVELOPMENT PROJECT

THIS AREA OF PARK TEMPORARILY CLOSED

TO CAMPING AND DAY USE ACTIVITIES

MARCH 2, 2015 – November 24, 2015

CONTRACTOR: [ENTER NAME OF CONTRACTOR]

OWNER: PUD NO. 1 OF CHELAN COUNTY

OPERATOR: WASHINGTON STATE PARKS

- B. Construction Traffic Signs – Provide, erect and maintain signs of a reasonable size and legibility to direct construction traffic in and through the park. Signs shall also be placed to protect park patrons.

PART 3 – EXECUTION

3.1 GENERAL

Maintain, operate, and service temporary facilities and controls as the Work progress requires. Make accommodations to assure continuous services.

3.2 REMOVAL

- A. Completely remove temporary facilities and controls when no longer required.
- B. Clean and repair damage caused by temporary installations and use of temporary facilities.
- C. Disinfect premises occupied by temporary sanitary facilities.
- D. Restore existing facilities used for temporary services to specified, or to original condition.
- E. In areas compacted due to construction operations, till or harrow to loosen soil, rough grade, re-compact to 70% compaction and fine grade to elevations on plans, and restore existing vegetation unless otherwise indicated to be planted or seeded by Contractor or Owner.

END OF SECTION 015000

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 017823 – 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 and diskette 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. For 3.5 inch diskette media storage, use Fellowes, 3.5" Diskette Binder Sheets, #95371 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 LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP OPERATION AND MAINTENANCE MANUAL VOLUME NUMBER X OF Y CONTRACT NUMBER 14-31 [DATE] [NAME AND ADDRESS OF CONTRACTOR/EQUIPMENT SUPPLIER]</p>
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- 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. Submit one (1) copy 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 two (2) revised Final O&M Manuals incorporating the comments from the Draft O&M Manuals for review by Engineer.
 2. If accepted, submit an additional four (4) copies for a total of five (5) Final O&M Manuals and two (2) copies in electronic format.
 3. If rejected, one (1) copy will be returned to the Contractor with the Engineer's comments for revision and re-submittal.
 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.

END OF SECTION 017823

DIVISION 02 – EXISTING CONDITIONS

SECTION 024116 – STRUCTURAL DEMOLITION

PART 1 – GENERAL

1.1 CONTRACT CONDITIONS

- A. Contract Drawing indications of existing conditions are cursory, and for Contractor's general reference only. Contractor shall carefully examine existing conditions and accept existing construction and adjacent site improvements on an "as is" basis.
- B. Prior to starting demolition, Contractor and District shall make a complete inspection of conditions of adjacent parts of the building and adjacent property, including visible defects close to, or adjoining spaces to be altered. When deemed necessary to facilitate Contractor's work, portions of building, or other improvements, may be removed and replaced in "as-is" condition, at Contractor's expense.
- C. The term "Structural Demolition" as used herein refers to all demolition other than abatement of asbestos, PCBs and other hazardous materials.

1.2 SCOPE OF WORK

- A. Demolish and/or remove all existing construction components, adjacent site improvements, systems, items and equipment so indicated on the Contract Drawings **and as further required to properly implement the new Work of the Contract.**
- B. **Contract Drawings which show demolition activities are schematic and general in nature and do not attempt to show the exact scope or detail of all required demolition.**
- C. Also, at all visible finished areas within the limits of Work, including the building exterior, remove any miscellaneous unused or abandoned items, such as old brackets, bolts, pipes, outdated signs, accessories, etc.

1.3 QUALITY ASSURANCE

- A. Coordination
 - 1. The Contractor shall fully coordinate **ALL** demolition work, as may be executed by various trades, etc., including mechanical and electrical demolition.
- B. Protections
 - 1. All demolition work shall proceed in an orderly and careful manner with due consideration for any existing structures, including any portions of the

surrounding structure, which are to remain. Cover as necessary, allowing no leaks of water (or dust particles), even temporary, in existing building.

2. During demolition activities the building will be closed to the public. Coordinate with State Park staff regarding their operational needs to access the building.
3. Provide protection of persons and property required by Exhibit S, Section 011100, Safety. Provide protection to neighboring property, occupants of said property, customers, visitors, and passers-by, from damage, injury or discomfort caused by dust or any other nuisance. Periodically sprinkle to allay dust as required and/or directed.
4. Avoid any encroachment on adjacent properties unless prior written permission is obtained by District. Repair and make good any damage to adjoining properties or improvements caused by operations under this Contract.

1.4 JOB CONDITIONS

A. Disposition of Removed Material

1. All material removed under this Contract, which is not to be salvaged or reused, shall become the property of the Contractor and be promptly removed from the site. General building materials may be reused on the Work if Project Manager specifically judges them equal to new in all critical respects. Certain items may be scheduled for reuse; (see Contract Drawings for information.) Contractor shall store items to be reused on site as directed or in a bonded warehouse with approval of the District.

1.5 TESTING

Contractor shall provide all testing and documentation required by the local landfill or governing authority to dispose of building materials and debris. If hazardous materials are identified, the Contractor shall proceed as required by the General Conditions of the Contract.

1.6 SALVAGE OF MATERIALS

The District reserves the right to salvage certain construction materials, fixtures, or other existing items of value (as may be encountered). Items selected by the District for salvage under the Contract shall be removed with particular care and delivered to storage on the premises as directed by the District. Materials not claimed by the District for salvage, scheduled to be reused or to remain in the Work, shall become the property of the Contractor, and shall be removed promptly from the site.

PART 2 – PRODUCT (NOT USED)

PART 3 – EXECUTION

3.1 DEMOLITION

- A. Execute all required demolition in an orderly and careful manner.
- B. All debris and rubble (not scheduled to be re-used or delivered to District) shall be removed from the premises promptly and disposed of at Contractor's expense. Use only covered debris boxes to convey demolished materials through the finished spaces of the existing building. Salvage items shall be wiped reasonably clean and delivered into Contract or District's storage, as scheduled, immediately upon removal.
- C. Particular care shall be taken at boundaries of demolition work to provide for smooth and properly finished merging of new work with existing to remain. This shall include the removal of existing items (such as corner beads, j-molds, ceramic tiles, etc.) as required to create a smooth surface or straight corner.
- D. All holes, cracks, voids, broken edges, etc. in existing surfaces or other building components to remain, resulting from demolition work, shall be filled, patched, or refinished as required for proper completion and appearance of the finished Work. Specific patching and finishing procedures for various materials may be further addressed in the various sections of these Specifications.

3.2 STRUCTURAL DEMOLITION

- A. Before removal of structural walls, columns, beams, trusses or other supporting members, provide shoring as required and in a manner suitable to the Work sequences.
- B. Where support of existing portions of the Work to remain is to be transferred to new construction, do not remove any other existing load carrying members until adequate temporary shoring, or new supporting structure, having attained full strength, is in proper place.
- C. Use carborundum saws, or other Approved means, to carefully cut concrete and other structural material to remain in the Work. Contractor shall verify all existing conditions and locations of structural components prior to cutting any members or openings in walls. Said cutting shall not cut existing wood "outlook" beams if indicated to remain.
- D. All new openings through existing walls shall be saw cut unless otherwise approved. Cutting of small round openings in concrete shall be by core drilling, if possible.

3.3 CLEAN UP and PATCHING

A. Repair of Damage

1. Repair or replace entirely, as required by Project Manager, any portion of existing property, building, or other improvements to remain, damaged in the course of demolition, or removed/modified to provide access to new work.

B. Clean Up

1. On completion of demolition work, leave the area of the Work and all adjacent areas clean and in satisfactory condition.

END OF SECTION 024116

DIVISION 03 – CONCRETE

SECTION 033300 – CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 SCOPE

1.2 The Extent of “Architectural” concrete work, excluding incidental patching, is shown on the Contract Drawings.

1.3 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 Slabs"
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"

1.4 SUBMITTALS

A. Submit mix design for approval, substantiated by test results for the various strengths and types of concrete required. Obtain Project Manager's acceptance of mix before delivery of material to job.

1.5 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 Contract 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. 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.

2. Concrete Sampling and Testing: Materials and installed work will require testing by the Contractor's inspection laboratory. All sampling and testing specified in this Specification shall be paid for by the Contractor.
- B. 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 Contractor's testing laboratory/special inspector.
 2. The Testing Laboratory shall:
 - a. Make and cure concrete test specimens for each strength of concrete in accordance with ASTM C31-69. Make one set of three identical compression test specimens from concrete obtained from each one hundred (100) cubic yards or fraction thereof placed each day.
 - b. 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.
 - c. Make air entrainment tests for each batch of each strength of concrete.
 - d. 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 at the project site.
 - e. 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 be 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.
 - f. Assume full responsibility for transportation of test specimens from job site to laboratory. Submit test reports to the District.
- C. 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. Refer to Section 014100.

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.

1.6 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.

1.7 SAMPLES

- A. Sample slabs for Stain Mockup: provide six (6) – 24"x24" concrete sample slabs for stain mockups. Finish slabs same as interior floor slabs (steel trowel finish).

PART 2 – PRODUCT

2.1 MATERIALS

- A. Form Materials: Unless specified or detailed otherwise, construct all formwork with new wood or clean steel forms, to provide continuous straight, smooth, exposed surfaces. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.
- B. Reinforcing Materials:
 1. Reinforcing Bars: ASTM A615 deformed bars. Grade 60 unless otherwise noted. Each bundle shall be accompanied by identification of heat number and grade.
 2. Welded Wire Fabric: Shall conform to requirements of ASTM, A185, furnished in flat sheets. Gauges and dimensions shall be as noted on the Contract Drawings. Provide in all interior slabs where bars are not indicated, and exterior slabs on grade unless noted otherwise.
 3. Dowel Bars: shall be plain steel bars conforming to ASTM A 615, ASTM A 616, or ASTM A 617 and shall be free from burring or other deformation restricting slippage in the concrete. High strength dowel bars shall conform to ASTM A 714, Class 2, Type S, Grade I, II, or III, bare finish. Before delivery to the construction site each dowel bar shall be painted on all surfaces with one coat of paint meeting Federal Specification TT-P.

C. 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. Exposed aggregate size and color shall match existing material used in adjacent exposed aggregate sidewalks.
6. Water shall be clean and free from oil, acid, alkali, vegetable matter, organic matter and other deleterious substances.
7. Water Reducing Agent(s) (Plasticizers): Sika 'Plastiment' or Master Builders' 'Pozzolith'.
8. Air-entraining admixture shall be per ASTM C260.

2.2 CONCRETE FORMWORK

- A. Form for exterior slabs, walks, and steps to finish elevations indicated on Contract 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 REINFORCEMENT INSTALLATION

- A. All reinforcing steel shall be detailed in conformance with ACI "Manual of Standard Practice For Detailing Reinforced Concrete", except as otherwise shown.
1. Bars shall be free from loose, flaky rust, mud, mill scale, oil or other coating that will reduce bond.
- B. Placing: Reinforcement shall be accurately placed in accordance with Contract Drawings, securely tied at intersections with 16-gauge black

annealed wire, and 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.

- C. Laps and Splices: Bars shall lap 40 diameters at splices, unless otherwise indicated. Splices in adjoining horizontal bars shall be staggered at least 6 feet. Horizontal bars shall be hooked around corners not less than 24 diameters, with a minimum of 12", unless otherwise shown on Contract Drawings.

2.4 PROPORTIONING and DESIGN of MIXES

A. 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

B. Interior slabs and covered patio slabs at cabins shall be as follows:

1. 3,500 psi at 28-day
2. 5.5 sack cement/cu. yd. of concrete (minimum)
3. 0.51 water/cement ratio

C. Footings and foundation walls shall be as follows:

1. 3000 psi at 28-day
2. 5.0 sack cement/cu. yd. of concrete (minimum)
3. 0.58 water/cement ratio

D. 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.

E. Air-entrained concrete shall be in strict accordance with agent manufacturer's printed instructions and shall be limited to the following:

F. For concrete slabs (pavement)/walks exposed to weather, use 6.5% of entrained air, by volume, as determined by procedure prescribed in ASTM C231.

2.5 STAIN (SEE DIVISION 09)

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 shall 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 Project Manager or his authorized representative.
- B. Notify District Inspector not less than 48 hours before placing concrete. Failure to notify in advance will result in a delay to concrete placement at no additional cost to the District. Any concrete placed without approval of the Construction Inspector shall be deemed defective and removed at the Contractor's expense.
- 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 312000, Earthwork.
- 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. All construction/expansion joints in (interior) slabs to be covered by finish surfacing material shall be formed with Burke `Screed Rail' system or prior

Approved equivalent. 2" at 4" slabs, 3-1/2" at 6" slabs. Install screed rails in strict accordance with manufacturer's instructions and recommendations. Spray sides of rails with liquid curing compound immediately prior to slab pours.

G. 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 Contract 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 Contract Drawings. Install joint filler strips, as detailed, wherever slabs abut vertical surfaces, and at all construction and control joints in exterior slabs and exposed interior slabs on grade unless detail to have wood divider strips. 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 Contract Drawings. Refer to details on Contract Drawings for finish tooling pattern of joints in exposed exterior slabs.
3. All (interior) slabs shall be poured in alternating (formed) sections. No **sawcutting** of control joints shall be allowed except at Cabins where sawcutting of slab joints is allowed.
4. 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. At exposed aggregate slabs, hand cast exposed aggregate onto top surface and dary in, all to match existing exposed aggregate surfaced walkways.

H. Cold Weather: When the mean daily temperature of the atmosphere is less than 50 degrees F., 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 a 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.

I. 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.

- J. 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. Cure concrete by keeping in a thoroughly moist condition by hot mist, saturated water cure blanket covering or other Approved means, from the time it is placed until it has cured for not less than 7 days for Type I and II cement concrete and 3 days for Type III cement. Cure for longer periods if the District so directs.

Fluid (spray) applied curing compounds are generally not a preferred curing method and, even if allowed, Contractor shall accept all responsibility for any resultant problems of unsatisfactory curing, surface residue, improper adhesion of finished coverings, etc.

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. Exposed aggregate slabs, where called for, shall have a uniform covering of aggregate color as selected to match existing, darbied into surface after bull-floating slab pour. After initial set (approximately 3-1/2 hours), brush aggregate and wash matrix carefully, exposing proper amount of aggregate (to match existing adjacent surfaces). After final curing, clean surfaces with 10% muriatic acid solution; rinse with clean water ready for clear sealer.
- B. Troweled finish for floor surfaces and floors to receive floor coverings, stain, or other thin film-finish coatings. Do not burn steel trowel finish surfaces to receive stain.
- C. Covered patio slabs and picnic pads shall receive light broom finish with the lines perpendicular to the slope.

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. 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. Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of District/Engineer.
- B. 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.
- C. 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.

END OF SECTION 033000

DIVISION 05 – SITE WORK

SECTION 055000 - METAL FABRICATIONS

PART 1 – GENERAL

1.1 DESCRIPTION

This section includes Work related to furnishing and installing structural steel shapes and hardware for entry gates and bollards, including gate padlocks.

1.2 REFERENCES

- A. The publications listed herein form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. The most recent version of the publication and test method shall be applicable in all cases.
- B. American Institute of Steel Construction – Manual of Steel Construction.
- C. American Society for Testing and Materials.
 - 1. ASTM A53/A53M-04a - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
 - 2. ASTM A123/A123M-02 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - 3. ASTM A153/A153M-04 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - 4. ASTM A193/A193M-05 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
 - 5. ASTM A307-04 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
 - 6. ASTM A320/A320M-04 - Standard Specification for Alloy/Steel Bolting Materials for Low-Temperature Service
 - 7. ASTM A325 - Standard specifications for structural bolts, steel, heat treated, 120/105ksi Minimum Tensile Strength
 - 8. ASTM A384/A384M-02 - Standard Practice for Safeguarding against Warpage and Distortion during Hot-Dip Galvanizing of Steel Assemblies

9. ASTM A385-03 - Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
10. ASTM A500-03a - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
11. American Welding Society (AWS) - Structural Welding Code for Steel.

1.3 SUBMITTALS

A. Submit manufacturer's product data for:

1. Padlock
2. Reflective tape

B. Submit Shop Drawings showing dimensions, materials, details, and necessary accessory items for:

1. Single arm gate
2. Double arm gate
3. Steel Pipe Bollard
4. Removable Bollard

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an installer with a minimum of three (3) years of experience constructing and installing similar work

B. Welding shall be done by operators who have been qualified by tests as prescribed by the AWS for the type of work required.

PART 2 – PRODUCTS

2.1 GENERAL

Materials for metal gates and bollards shall be as specified in Table 1.

Table 1 - Steel Material Specifications	
Material Specification	Item
ASTM A36	Steel shapes, plates, bars, clips and similar items
ASTM A53, Type S, Grade B	Steel pipe
ASTM A500, Grade B	Steel tubing
ASTM A320, Type 304	Stainless steel
AASHTO M232	Zinc (Hot- Dip) on Iron and Steel Hardware
AASHTO M111	Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strip

2.2 GALVANIZING

- A. Hot-Dip Galvanizing: Galvanizing by the hot-dip process shall conform to the applicable requirements of ASTM A123, A153, A384 and A385.
- B. Field Repair of Galvanizing: Field repair of galvanizing shall be done using ZRC Products Company Cold Galvanizing Compound.

2.3 BOLTS, NUTS, WASHERS, AND HARDWARE

- A. All bolts, nuts, washers and hardware shall be hot-dipped galvanized.
- B. Bolts shall conform to ASTM A325. Bolts shall physically conform to ASTM A193, Grade B8M. Bolt and nut dimensions shall conform to ANSI B18.2. Washer dimension shall conform to ANSI B18.22.1. Carbon steel bolts, nuts and washers shall be hot-dip galvanized after fabrication.

2.4 STEEL ENTRY GATES

- A. Entry Gate arms shall be constructed of hollow steel sections in sizes per plan, welded at joints as shown on the Contract Drawings.
- B. Entry Gate support posts shall be constructed of 12-inch O.D., schedule 40 pipe, with a round galvanized steel plate weld sealed on top.
- C. Entry Gate hinges shall support 6,500 lbs. The Contractor shall submit Shop Drawings of gate and appurtenances to the District for review of compliance with load requirements.

2.5 STEEL BOLLARDS

Steel bollards shall be constructed of steel schedule 40 pipe.

2.6 FINISHING

- A. All gate and bollard finishes (new and existing) shall be powder coat in accordance with Washington State Department of Transportation (WSDOT) Standard Specification 9-08.2 Powder Coating Materials for Coating Galvanized Surfaces.
- B. Existing Entrance Gate: Strip existing yellow paint down to galvanic coating, powder coat white.
- C. New gates: hot-dip galvanize, powder coat white.
- D. Removable Bollards: hot-dip galvanize, powder coat white.
- E. Steel Pipe Bollards (no galvanic coating required): powder coat white.

2.7 PADLOCK

Provided by Washington State Parks.

2.8 REFLECTIVE TAPE

Reflective, weatherproof, adhesive sheeting meeting ASTM D4956, Scotchlite High Intensity sheeting series 3930, Or Equal.

- A. Manufacturer: 3M St. Paul Minnesota ph 1-877-666-2277
- B. Color: Red

PART 3 – EXECUTION

3.1 GENERAL

- A. Measurements shall be verified at the site. Gate opening span shall be measured on site and coordinated with pavement width.
- B. Holes shall be punched 1.6 mm (1/16-inch) larger than the nominal size of the bolt, unless otherwise specified. No drifting of bolts or enlargement of holes will be allowed to correct misalignment.
- C. Dissimilar metals shall be protected from galvanic corrosion by means of pressure tapes, coatings or isolators.

3.2 FABRICATION

Fabrication and workmanship shall be performed in accordance with the AISC Specification for Design, Fabrication, and Erection of Structural Steel for Buildings. Fabrication, including cutting, drilling, punching, threading, and tapping required for miscellaneous metal or adjacent work, shall be performed prior to hot-dip galvanizing.

- A. Cap all exposed ends of steel tubes and pipes.
- B. Drill one ¼ inch diameter hole in the bottom of each steel member.

3.3 CONNECTIONS

- A. Welded: Weld all members with ¼ inch bead. All welds shall be ground smooth and free of burrs. The quality of welding shall conform to AWS Structural Welding Code.
- B. Bolting: Bolts for structural and miscellaneous steel connections shall extend no further than twice the bolt diameter past the nut. Washers shall be installed at the nut on bolt assemblies. Stacking of nuts or washers on bolts will not be permitted. Bolted connection shall conform to AISC Framed Beam Connections and shall be as shown on the Contract Drawings.

3.4 INSTALLATION

- A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacing indicated. Form top 6-inches of excavation to maintain consistent diameter.
- B. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect above ground portion of posts from concrete splatter.
- C. Install posts in concrete plumb, with post tops at a consistent height above grade. Post tops are to be level where grade is flat, or following a consistent angled line above sloping grade. Hold or brace in position as needed during concrete setting.
- D. Concrete finish: Trowel finish top of footing to shed water away from post and meet adjacent grade.
- E. Install gate rails level.
- F. Verify hinge swing operation and alignment of locking hasps in both open and closed position.

3.5 FINISHING

- A. Damaged areas of galvanizing shall be cleaned with mineral spirits followed by wire brushing. After wire brushing, areas shall be cleaned with ZRC metal conditioner and coated with ZRC Cold Galvanizing Compound, Or Equal, in accordance with the manufacturer's printed instructions and recommendations.
- B. Prepare surfaces, prime and paint in accordance with Exhibit S, Section 099100 - Painting.
- C. Apply reflective sheeting in accordance with manufacturer's recommendation after painting is complete and paint drying time has elapsed.
- D. Install signs on gates where indicated.

3.6 ACCEPTANCE

- A. The Contractor retains all ownership and responsibility for the metalwork until written acceptance by the District.

- B. The District will accept the gates and bollards when:
 - 1. The installation is complete
 - 2. Verification that the quality control requirements of this Specification have been achieved
 - 3. Documentation of installation is complete
 - 4. Verification of the adequacy of testing is complete
 - 5. The required written certification documents have been received by the District.

END OF SECTION 055000

DIVISION 06 – WOOD PLASTICS AND COMPOSITES

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: ICC-ES evaluation reports for wood-preservative treated wood, engineered wood products and metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: Provide dressed lumber, S4S, marked with grade stamp of inspection agency.
- B. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

2.2 TREATED MATERIALS

- A. Preservative-Treated Materials: AWWA C2, except that lumber not in ground contact and not exposed to the weather may be treated according to AWWA C31 with inorganic boron (SBX).
 - 1. Use treatment containing no arsenic or chromium.
 - 2. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
 - 3. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- B. Provide preservative-treated materials for items indicated on Contract Drawings, and the following:
 - 1. Wood members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Concealed members in contact with masonry or concrete.
 - 3. Wood framing members that are less than 18 inches above the ground.
 - 4. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 LUMBER

A. Dimension Lumber:

1. Maximum Moisture Content: 19 percent.
2. Non-Load-Bearing Interior Partitions: Construction or No. 2: Western woods: WCLIB or WWPA.
3. Framing Other Than Non-Load-Bearing Interior Partitions: No. 2: Douglas-fir (north): NLGA;. Finger jointed studs are not allowed.
4. Exposed Framing: Provide material hand-selected for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.
 - a. Species: As specified for framing other than non-load-bearing interior partitions.
 - b. Grade: No. 1.

B. Timbers 5-Inch Nominal Size and Thicker: No. 1: Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south: NLGA, WCLIB, or WWPA; unless more stringent requirements are indicated on the Contract Drawings.

1. Maximum Moisture Content: 19 percent.
- C. Exposed Boards: Douglas-fir, Select Merchantable or No. 1 Common: NLGA, WCLIB, or WWPA; with percent maximum moisture content.
- D. Concealed Boards: Western woods, Standard: WCLIB; or No. 3 Common: WWPA; with 19 percent maximum moisture content.
- E. Miscellaneous Lumber: Construction, or No. 2 grade with 19 percent maximum moisture content of any species. Provide for nailers, blocking, and similar members.
- F. Prefabricated Wood Trusses: Factory manufactured 2 x4 and 2 x 6 members meeting requirements of HUD Handbook 4950.2 “Design Criteria for Trussed Rafters” and loads indicated on Contract Drawings. Provide all accessory items such as blocking, bridging, etc. to match existing and be complete roof framing system.

2.4 MISCELLANEOUS PRODUCTS

- A. Fasteners: Size and type indicated. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.



1. Power-Driven Fasteners: CABO NER-272.
 2. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- B. Metal Framing Anchors: Structural capacity, type, and size indicated.
1. Use anchors made from hot-dip galvanized steel complying with ASTM A 653/A 653M, G60 coating designation for interior locations where stainless steel is not indicated.
 2. Use anchors made from stainless steel complying with ASTM A 666, Type 304 for exterior locations and where indicated.
- C. Sill Sealer: Closed-cell neoprene foam, 1/4 inch thick.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Securely attach rough carpentry to substrates, complying with the following:
1. CABO NER-272 for power-driven fasteners.
 2. Published requirements of metal framing anchor manufacturer.
 3. Attach as required by Structural Notes on the Contract Drawings.

END OF SECTION 061000



DIVISION 06 – WOOD PLASTICS AND COMPOSITES

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: ICC-ES evaluation reports for preservative-treated plywood.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS, GENERAL

- A. Plywood: DOC PS 1.

2.2 TREATED PLYWOOD

- A. Preservative-Treated Plywood: AWPA C9.

1. Use treatment containing no arsenic or chromium.
2. Kiln-dry plywood after treatment to maximum moisture content of 15 percent.

- B. Provide preservative-treated plywood for items indicated on Contract Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.3 WALL SHEATHING

- A. Plywood Wall Sheathing: Exterior, Structural I sheathing.

2.4 MISCELLANEOUS PRODUCTS

- A. Fasteners: Size and type indicated.
 1. For roof sheathing, provide fasteners of Type 304 stainless steel.
 2. Power-Driven Fasteners: CABO NER-272.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Securely attach to substrates, complying with the following:



1. CABO NER-272 for power-driven fasteners.
 2. Attach according to Structural Notes on Contract Drawings.
- B. Fastening Methods:
1. Wall and Roof Sheathing:
 - a. Nail to wood framing.

END OF SECTION 061600

DIVISION 06 – WOOD PLASTICS AND COMPOSITES

SECTION 062000 - FINISH CARPENTRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Samples for all trim and paneling products.
2. Manufacturer's installation instructions for all cement board panels, boards and trim.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and grading rules of inspection agencies certified by American Lumber Standards Committee Board of Review.
- B. Softwood Plywood: DOC PS 1.

2.2 EXTERIOR FINISH CARPENTRY

- A. Exterior Lumber Trim: Saw-textured, cement board trim. Provide full length pieces for trims less than 12'. Where longer runs are required, bevel running splices with no piece less than 6'. Use only manufacturer's designated "trim" stock. Basis of Design: HardieTrim, Rustic finish. Provide with Manufacturer's shop applied color. Color as selected by Project Manager.
- B. Siding: Saw textured cement board panels. Provide 5/16"x4'x9' panels at side walls and 5/16"x4'x10' panels at front and back walls. Basis of Design: HardiePanel, Select Cedarmill. Provide with manufacturer's shop applied color. Color as selected by Project Manager.
- C. Siding-2 (at Comfort Station): 5/8" thick plywood panels to match existing exterior siding.
- D. Wood Trim-2: (at Comfort Station) 1 x 2 exterior wood trim to match existing trims; all other wood trim and batten pieces to match existing trims and battens on adjacent walls for size and species of wood.
- E. Battens: Saw textured cement board battens. Provide 3/4"x2 1/2" battens. Basis of Design: HardieTrim, Rustic finish. Provide with manufacturer's shop applied color. Color as selected by Project Manager.



2.3 INTERIOR STANDING AND RUNNING TRIM

- A. Interior Softwood Lumber Trim: Clear Vertical Grain (CVG), Douglas Fir, fit for clear finish.
 - 1. Maximum Moisture Content: 19 percent.
- B. Wood Moldings: WMMPA WM 4 made to patterns in WMMPA WM 12 from kiln-dried stock.
 - 1. Softwood Moldings for Transparent Finish: Clear Vertical Grain (CVG), Douglas Fir, fit for clear finish.
- C. Bead Board Wainscot: 3/8" x 3 1/4" Clear Vertical Grain (CVG), Douglas Fir, fit for clear finish.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: As recommended by siding manufacturer. Provide fasteners with head color to match siding and trim. Provide color tinted caulk to match siding and trim.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Condition finish carpentry in installation areas for 24 hours before installing.
- B. Prime and backprime lumber for painted finish exposed on the exterior.
- C. Install finish carpentry level, plumb, true, and aligned with adjacent materials. Scribe and cut to fit adjoining work. Refinish and seal cuts.
- D. Install standing and running trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Stagger joints in adjacent and related trim. Cope at returns and miter at corners.
- E. Nail siding at each stud. Nail size, spacing and penetration as recommended by siding manufacturer. Seal joints at inside and outside corners and at trim locations.
- F. Select and arrange paneling for best match of adjacent units. Install with uniform tight joints.

END OF SECTION 062000

DIVISION 06 – WOOD PLASTICS AND COMPOSITES

SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Samples showing the full range of colors, textures, and patterns available for each type of finish.
2. Shop Drawings for Cabinets.

B. Quality Standard: Architectural Woodwork Institute's "Architectural Woodwork Quality Standards."

C. Forest Certification: Provide woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

D. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is completed, and HVAC system is operating.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cabinet Door & End Panels: Softwood Plywood, CVG Fir Plywood, DOC PS 1.
- B. Cabinet Face Frames: CVG Douglas Fir.
- C. Cabinet Drawer Facing: CVG Douglas Fir.

2.2 CABINET HARDWARE AND ACCESSORY MATERIALS

A. Butt Hinges: 2-3/4-inch, 5-knuckle steel hinges made from 0.095-inch thick metal, and as follows:

1. Semiconcealed Hinges for Flush Doors: BHMA A156.9, B01361.
2. Semiconcealed Hinges for Overlay Doors: BHMA A156.9, B01521.

B. Wire Pulls: Back mounted, solid metal, 5 inches long, 2-1/2 inches deep, and 5/16 inch in diameter.

- C. Catches: Ball friction catches, BHMA A156.9, B03013.
- D. Adjustable Shelf Standards and Supports: BHMA A156.9, B04102; with shelf brackets, B04112.
- E. Drawer Slides: BHMA A156.9, B05091.
 - 1. Box Drawer Slides: Grade 1.
 - 2. Trash Bin Slides: Grade 1HD-100.
- F. Drawer Locks: BHMA A156.11, E07041.
- G. Grommets for Cable Passage through Countertops: 1-1/4-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
- H. Exposed Hardware Finishes: Comply with BHMA A156.18 for BHMA code number indicated.
 - 1. Finish: Dark Satin Bronze: BHMA 613.
- I. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to 15 percent moisture content.

2.3 INTERIOR WOODWORK

- A. Complete fabrication to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished Work.
- C. Interior Standing and Running Trim for Transparent Finish: Premium grade, made from CVG Doug Fir.
- D. Wood Cabinets for Transparent Finish: Premium grade, CVG Douglas Fir.
 - 1. AWI Type of Cabinet Construction: Reveal overlay.
 - 2. Wood Species and Cut for Exposed Surfaces: Douglas Fir.
 - 3. Grain Direction: Vertically for drawer fronts, doors, and fixed panels.
 - 4. Matching of Veneer Leaves: Book match.
 - 5. Veneer Matching within Panel Face: Running match.

6. Semiexposed Surfaces Other Than Drawer Bodies: Same species and cut indicated for exposed surfaces.
7. Drawer Sides and Backs: Solid-hardwood lumber.
8. Drawer Bottoms: Hardwood plywood.

2.4 SHOP FINISHING OF INTERIOR ARCHITECTURAL WOODWORK

- A. Finishes: Same grades as items to be finished.
- B. Finish architectural woodwork at the fabrication shop; defer only final touch up until after installation.
 1. Apply one coat of sealer or primer to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces.
 2. Apply a vinyl wash coat to woodwork made from closed-grain wood before staining and finishing.
 3. After staining, if any, apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.
- C. Transparent Finish: AWI finish system conversion varnish.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
- B. Install woodwork to comply with referenced quality standard for grade specified.
- C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.
- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Fasten with countersunk concealed fasteners and blind nailing. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork.
- F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 36 inches long, except where shorter single-

- length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
- G. Anchor paneling to supports with concealed panel-hanger clips and by blind nailing on back-up strips, splined-connection strips, and similar associated trim and framing.
 - H. Cabinets: Install so doors and drawers are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.
 - 1. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips.
 - I. Anchor countertops securely to base units. Seal space between backsplash and wall.

END OF SECTION 064023

DIVISION 06 – WOODS, PLASTICS AND COMPOSITES

SECTION 065300 – PLASTIC LUMBER

PART 1 – GENERAL

1.1 DESCRIPTION

This Section includes furnishing and installing plastic lumber and brackets for tent site borders.

1.2 SUBMITTALS

- A. Prior Product Data: Manufacturer's product data verifying compliance with Specifications.
- B. Color Selection: Submit manufacturer's full range of colors for selection by the District.
- C. Sample: Submit 3-inch by 3-inch sample of recycled plastic lumber labeled with manufacturer and color.

PART 2 – PRODUCTS

2.1 PLASTIC LUMBER

- A. Fiberglass filament reinforced recycled high density polyethylene (HDPE) plastic lumber with ultraviolet stabilizer. Bedford SelectForce plastic lumber Or Equal.
- B. Compressive strength: 4500psi as determined by ASTM D 695
- C. Tensile strength: 3620psi as determined by ASTM D 638
- D. Ultraviolet degradation: Less than 10% when measured by ASTM D4329
- E. Manufacturer: Bedford Technology, 2424 Armour Road, Worthington, MN 56187, phone (800) 721-9037

2.2 BRACKETS

- A. Provide galvanized steel brackets to fasten plastic lumber at all 90 degree corners and at end-to-end connections. Fasten with corrosion resistant steel wood screws.
- B. Manufacturer: Simpson Strong-Tie or Equal.

2.2 DOWELS

Provide ¼ inch diameter steel dowel bars (40 ksi yield strength), twelve inch length for pinning lumber at connections.

2.2 REBAR

Provide #4 Bar (40 ksi yield strength) for staking lumber to ground.

PART 3 – EXECUTION

3.1 GENERAL

- A. Conform to Contract Drawing notes and details.
- B. Conform to all applicable codes.

3.2 INSTALLATION

- A. Grade earth along the alignment of plastic lumber edging to a level grade. Compact sub-grade with plate compactor. Place and compact 4-inch lift of crushed surfacing top/base course to an unyielding condition.
- B. Drill and install dowel bars with epoxy into existing concrete slab at location which will maintain a level transition from slab to lumber edging. Dowel bar shall extend approximately 6 inches into slab and 6 inches into lumber.
- C. Drill lumber at splices and 90 degree connections for dowel pinning.
- D. Drill two holes per 8 foot lumber segment for #4 rebar stakes. Holes shall be drilled at approximately 45 degree angles.
- E. Install lumber, dowel pins, brackets and rebar stakes so that lumber edging is finished in a plumb condition.

END OF SECTION 065300

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 071100 – DAMPPROOFING

PART 1 – GENERAL

1.1 SUMMARY

Work of this Section includes apply dampproofing to all below grade exterior earth faces of concrete footings, foundations, walls, etc., unless specifically indicated not to receive dampproofing.

1.2 SUBMITTALS

A. Pre-application Requirements: Review detail Contract Drawings and enclosed Specifications with waterproofing manufacturer to verify that materials are properly used. Submit a list of materials to be used (before purchase), identifying manufacturers, and any suggested detail revisions to Project Manager. Incorporate any required detail revisions, as approved by the District, at no additional cost to the District.

B. Manufacturer's Data: Submit manufacturer's literature and certificates to the Project Manager. Manufacturer shall submit notarized certification that sheet membrane waterproofing shipped to the job site shall meet the physical properties and performance requirements specified.

C. Samples: Submit 2 samples of membrane, of thickness specified.

1.3 GUARANTEE

A. In addition to basic contractual warranty required per General Conditions of the Contract, applicator shall furnish 2 copies of a written guarantee, countersigned by the Contractor, that sheet dampproofing installation is unconditionally guaranteed to be watertight for a period of 2 years.

1.4 QUALITY ASSURANCE

A. Manufacturer:

B. For the purpose of defining the quality of the work and materials in this Section, Specifications are based on MasterSeal or equal

C. Applicator:

1. Dampproofing membrane shall be applied by properly qualified applicators having a minimum of three (3) years experience in the use of the material and recommended application procedures.

1.5 DELIVERY, HANDLING and STORAGE

- A. Deliver materials to job site in manufacturer's original, unopened packaging, and adequately protect against moisture or damage while temporarily stored at site.
- B. Store materials in covered area where temperatures will not be less than 40 degrees F. or more than 90 degrees F. maximum, and out of the direct rays of the sun.
- C. Use all means necessary to protect the installation of the Work of this Section.

- 1.6 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.

A JOB CONDITIONS

1. Environmental Conditions shall be such that placement and curing of exterior concrete slabs is done in accordance with this specification.
2. Membrane waterproofing shall not be applied when temperature of air or substrate is below 35 degrees F, nor during damp or inclement weather.
3. Protection - Use all means necessary to protect the installed Work of the Section. Protect adjacent Work from damage from Work included in this Section. In the event of damage, immediately make all repairs and replacements to the approval of the District and at no additional cost to the District. Provide barricades, signs, coverings, etc., as may be required to protect the dampproofing membrane from mechanical damage during construction, including backfilling.

PART 2 – MATERIALS

2.1 MANUFACTURER

- A. Approved manufacturer is American Colloid Company. Other manufacturers upon prior District approval only. All the materials designated for a specific application shall be the products of one manufacturer.

2.2 MATERIALS

- A. 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. Condition of Surfaces: Substrate surface shall be clean, dry and free of frost, dew or any foreign matter. Obtain information from manufacturer for cleaning materials, if any must be used to further clean substrate.
1. All materials, comprising complete system application, shall be installed in strict accordance with manufacturer's instructions and recommendations.
 2. Concrete surfaces must have clean, smooth, monolithic finish and shall be free of voids, spalled areas, loose aggregate and sharp protrusions with no coarse aggregate visible.
 3. New concrete shall be fully cured and dry (minimum of seven days).
 4. For spray application minimum two coat application, apply regular coats (after prime coat) at full strength with uniform coverage of at least 1 gal/100 sf.

3.2 CLEANING

- A. Remove all excess materials and debris from site. Leave site and adjacent concrete walks, planters and masonry walls free from droppings, splatters and stains.

END OF SECTION 071100



DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 072100 – THERMAL INSULATION

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide and install all thermal insulation indicated on Contract Drawings or required herein, except insulation for mechanical Work specified in Division 23.

1.2 LABELS

- A. Manufacturer's labels required on each piece or package of insulation. Do not remove labels or open packages until Project Manager inspects and approves. Clearly identify contents, brand name, applicable standard, and R-value.

1.3 SUBMITTALS

- A. Pre-application Requirements: Review detailed Contract Drawings and enclosed Specifications to verify that materials are properly used. Submit a list of materials to be used (before purchase), identifying manufacturers, and any suggested detail revisions to Project Manager. Incorporate any required detail revisions, as approved by the Project Manager, at no additional cost to the District.
- B. Manufacturer's Data: Submit manufacturer's literature and certificates to the Project Manager. Manufacturer shall submit notarized certification that insulation shipped to the job site shall meet the physical properties and performance requirements specified.
- C. Samples: Submit 2 samples of insulation as specified.

1.4 QUALITY ASSURANCE

- A. For the purpose of defining the quality of the work and materials in this Section, Specifications are based on Manufacturer: Manville, Certainteed, or Owens-Corning Or Equal

1.5 DELIVERY, HANDLING and STORAGE

- A. Deliver materials to job site in manufacturer's original, unopened packaging, and adequately protect against moisture or damage while temporarily stored at site.
- B. Store materials in covered area where temperatures will not be less than 40 degrees F. or more than 90 degrees F. maximum, and out of the direct rays of the sun.
- C. Use all means necessary to protect the installation of the work of this Section.

- D. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Project Manager and at no additional cost to the District.

1.5 JOB CONDITIONS

A. Protection

1. Use all means necessary to protect the installed Work of the Section. Protect adjacent work from damage from Work included in this Section. In the event of damage, immediately make all repairs and replacements to the approval of the Project Manager and at no additional cost to the District. Provide barricades, signs, coverings, etc., as may be required to protect the dampproofing membrane from mechanical damage during construction, including backfilling.

PART 2 – MATERIALS

2.1 MATERIALS

- A. Flexible Blanket Insulation (Walls and Roofs): Manville, Certainteed, or Owens-Corning Fiberglass, foil faced, with flame spread rating not over 25, R-21 at walls and R-49 at ceiling with attic space over, R-Values as shown on Contract Drawings. Rockwool or Fiberglass insulation with fire-rated vapor barrier or other manufacturers will be accepted, subject to meeting `R' Values. Where concealed behind gypsum wallboard or gypsum base, unfaced fiberglass batts may be used in conjunction with plastic vapor barrier as specified previously.
- B. Perimeter Insulation (concealed/below grade): Dow Chemical `Styrofoam-SM', 2" thick unless otherwise noted. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, with flame-spread index of 75 or less.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Condition of Surfaces: Substrate surface shall be clean, dry and free of frost, dew or any foreign matter. Obtain information from manufacturer for cleaning materials, if any must be used to further clean substrate.
 1. All materials, comprising complete system application, shall be installed in strict accordance with manufacturer's instructions and recommendations.
 2. Concrete surfaces must have clean, smooth, monolithic finish and shall be free of voids, spalled areas, loose aggregate and sharp protrusions with no coarse aggregate visible.
 3. New concrete shall be fully cured and dry (minimum of seven days).



- B. Install flexible blanket insulation with ends and edges tight, supported by stripping, edge tabs lapped and stapled to face of studs. Install with foil or vapor barrier on room or warm space side.
- C. Perimeter Insulation: At entire perimeter of building, from slab as detailed, to top of footing or to at least 24" below finished grade.
- D. Install insulation to attain maximum R-value possible for finished assembly.

3.2 CLEANING

- A. Remove all excess materials and debris from site. Leave site and adjacent concrete walks, planters and masonry walls free from droppings, splatters and stains.

END OF SECTION 072100



DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Manufacturer's installation instructions
2. ICC-ES evaluation reports for water-resistive barrier.

PART 2 - PRODUCTS

2.1 WATER-RESISTIVE BARRIERS

- A. Building Wrap: ASTM E 1677, Type I air barrier; with water-vapor permeance not less than 10 perms per ASTM E 96, Desiccant Method (Procedure A); flame-spread and smoke-developed indexes not greater than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.
- B. Ice and Water Shield Membrane: Grace Ice and Water Shield.

2.2 ACCESSORIES

- A. Flexible Flashing: Adhesive rubberized-asphalt compound, bonded to plastic film or spunbonded polyolefin, with an overall thickness of 0.030 inch.
- B. Building Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Building Wrap Installation:

1. Apply building wrap immediately after sheathing is installed.
2. Seal seams, edges, fasteners, and penetrations with tape.
3. Extend into jambs of openings and seal corners with tape.

B. Flexible Flashing Installation:

1. Prime substrates as recommended by flashing manufacturer.
2. Lap seams and junctures with other materials at least 3 inches, except that at flashing flanges of other construction, laps need not exceed flange width.
3. Lap flashing over water-resistive barrier at bottom and sides of openings.
4. Lap water-resistive barrier over flashing at heads of openings.
5. After flashing has been applied, roll surfaces with a hard rubber or metal roller.

END OF SECTION 072500

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 072600 – PLASTIC VAPOR BARRIERS

PART 1 – GENERAL

1.1 QUALITY ASSURANCE

- A. Acceptable manufacturers - Arco/Polymers (Durethene); Gering Plastics Company (Ger. Pak); Mobil Oil Company.

1.2 DELIVERY HANDLING and STORAGE

- A. Deliver and store materials in manufacturer's unopened packages. Protect polyethylene sheeting from punctures, cuts, or other damage which would affect its use as a vapor barrier. After installation of vapor barrier, protect from punctures or cuts.

PART 2 – MATERIALS

- A. Polyethylene Sheeting: Conform to sheeting ES LP-378C, Type 1; Clear (unless otherwise noted).
1. 6 mil thickness under interior slabs on grade.
 2. 4 mil thickness under roof insulation.
 3. 4 mil vapor barrier at exterior insulated walls, unless foil faced batts are called for, or wall assembly is noted on Contract Drawings as not requiring vapor barrier.
- B. Tape: Splicing tape as approved by sheeting manufacturer.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Lay in widest practical widths. Where splices are made, overlap 12 inches minimum.
- B. Protect from puncture and other damage. Replace or repair all damaged material before proceeding with subsequent work (e.g., slabs, etc.).

END OF SECTION 072600



DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 074113 – PREFORMED METAL ROOFING

PART 1 – GENERAL

1.1 SUMMARY

- A. Provide all preformed metal roofing including underlayment felts, attachments, spacers, blocking, closure strips, coping, cap flashing, flashing collars, caulking, clips, cants, etc., as required by the manufacturer, as shown on the Contract Drawings, and as specified herein. The preformed metal roofing installation shall be a complete and watertight assembly in all respects.

1.2 SUBMITTALS

- A. Submit the following in accordance with Section 013000.
 - 1. List of materials to be used, identifying manufacturers and any suggested detail revisions. Incorporate any required detail revisions, as Approved by the Project Manager, in the Project at no additional cost to the District.
 - 2. Prior to Application for 100% Completion Payments:
 - a. (2) copies of processed, signed and countersigned guarantee(s) as specified below, and certifications that materials conform to these Specifications.
- B. Submit manufacturer's product data, color samples and Shop Drawings.

1.3 GUARANTEES

- A. The Contractor shall unconditionally guarantee in writing the water tightness 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 guarantee against cracking, peeling and fading (not to exceed 5 N.B.S. units) for metal roofing finish.

1.4 QUALITY ASSURANCE

- A. Standards and Workmanship:
 - 1. All work shall be done by a preformed metal roofing contractor approved by the manufacturer and the Project Manager. 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:

1. 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:

1. Review preformed metal roofing detail Contract Drawings and Specifications with metal roofing manufacturer to verify that materials are properly used.

1.5 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.

1.6 JOB CONDITIONS

A. Construction Traffic:

1. 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.

B. Metal Roofing – Cabins and Comfort Station:

1. Available Products:

- a. AEP Span, Klip-Rib.
- b. Roof Panel Type: standing seam metal roof panels.
- c. Metallic-Coated Steel Roof Panels: Fabricated from galvanized structural-steel sheet, ASTM A653/A 653M, G90, or aluminum-zinc alloy-coated structural-steel sheet, ASTM A 792A 792M, Class AZ50 coating designation, grade 40.

- 1) Nominal Metal Thickness: 24 ga.
 - 2) Finish: Manufacturer's standard two-coat fluoropolymer system with color coat containing not less than 70 percent PVDF resin by weight. Color as selected by Project Manager.
- d. Self Adhered Roofing Underlayment: Grace, Ice and Water Shield.

2. CABIN AND COMFORT STATION ROOFING ACCESSORIES

- 1) Provide components required for a complete roof panel assembly, including trim, fasciae, clips, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 - 2) Flashing and Trim: Formed from 0.025-inch nominal thickness, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet. Provide flashing and trim as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal roof panels.
 - 3) Self-Adhering Sheet Underlayment, High Temperature: Butyl or SBS-modified asphalt; slip-resisting-polyethylene surfaced; with release paper backing; cold applied. Stable after testing at 240 deg F and passes after testing at minus 20 deg F; ASTM D 1970.
 - 4) Felt Underlayment: ASTM D 226, Type II (No. 30), asphalt-saturated organic felts.
 - 5) Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.
 - 6) Thermal Spacer Blocks: Fabricated from extruded polystyrene, 1 inch thick.
 - 7) Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat.
- C. Metal Flashings and Trim: All as detailed on Contract Drawings and as required for weathertight application
- D. Synthetic Sheet Flashings:
1. Gates "Contourflash", "Nervastral", or Approved elastomeric flashing sheet material of specific type and thickness recommended by manufacturer for particular application.

E. Underlayment Felt:

1. 30 lb. asphalt impregnated organic roofing felt; Manville, Certainteed, GAF, or Approved. (Modified Bituminous Membrane)

F. Pre-Fabricated Pipe Flashing Collars:

1. "Oatey", Buildex "Dektite", or Approved, monolithic EPDM elastomeric collar units.

G. Miscellaneous:

1. 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 application as directed.

PART 3 – EXECUTION

3.1 FABRICATION

- A. Shop fabricate all custom shapes and components as required by Contract 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, skylites, 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 shall 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 minimum of one layer of underlayment felt, (applied with waffle pattern up,) lapped horizontally starting at the eave. Lap all edges a minimum of 6". Underlayment shall be installed directly ahead of roofing metal installation to alleviate wind damage and loose fitting portions of underlayment felt.
- D. Roofing Application:
 1. 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 18" o.c. (24" o.c.)

2. 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.
3. 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.

3.4 CABIN AND COMFORT STATION ROOF INSTALLATION

- A. Apply self-adhering sheet underlayment over entire roof area.
- B. Apply slip sheet over underlayment before installing metal roof panels.
- C. Install flashings to cover underlayment to comply with requirements specified in Division 07 Thermal and Moisture Protection.
- D. Rigidly fasten metal roof panels to structure at one and only one location for each panel. Allow remainder of panel to move freely for thermal expansion and contraction. Pre-drill panels for fasteners.
 1. Steel Roof Panels: Use stainless-steel fasteners for surfaces exposed to the exterior and galvanized-steel fasteners for surfaces exposed to the interior.
 2. Aluminum Roof Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior and aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
 3. Provide metal closures at rake edges, rake walls and each side of ridge caps.
 4. Flash and seal metal roof panels with weather closures at eaves, rakes, and perimeter of all openings.
 5. Install ridge caps as metal roof panel work proceeds.
- E. Install gaskets, joint fillers, and sealants where required for weatherproof performance of metal roof panel assemblies. Provide types of gaskets, fillers, and sealants recommended by metal roof panel manufacturer.
- F. Separate dissimilar metals with a bituminous coating or self-adhering sheet underlayment.

END OF SECTION 074113

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 076200 – MISCELLANEOUS FLASHING and SHEET METAL

PART 1 – GENERAL

1.1 SUMMARY

- A. Supply and install all counterflashings and miscellaneous flashings not specified elsewhere and sheet metal work as shown on Contract Drawings and as specified herein.

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 manufacturer's published literature for specified products and accessories as applicable, including manufacturers' specifications, physical characteristics and performance data; instructions and directions for application.
- B. Submit complete Shop Drawings of all flashing and sheet metal proposed to be furnished and installed to the Project Manager for his review. Allow ample time for revision and resubmittal as may be necessary.

1.4 GUARANTEE

- A. Furnish a written guarantee that all sheet metal work is unconditionally guaranteed to be watertight and free of defects for a period of 2 years.

1.5 DELIVERY, HANDLING and STORAGE

- A. Deliver and store materials in dry, protected areas. Keep free of corrosion or other damage. Use all means necessary to protect flashing and sheet metal materials before, during and after installation and to protect the installed work and materials of all other trades.

1.6 JOB CONDITIONS

A. Coordination

1. Coordinate and cooperate with any other trades whose work relates to sheet metal in any way.

B. Measurements

- a. Verify all dimensions shown on Contract Drawings by taking field measurements; proper fit and attachment of all parts is required.

PART 2 – MATERIALS

2.1 PRODUCTS

- A. General: Where sheet metal is required and no material or gauge is indicated on the Contract Drawings, furnish and install the highest quality and gauge commensurate with the referenced standards.
- B. Steel Stiffeners: A7 structural steel, galvanized.
- C. Galvanized Sheet Steel: Conforming to ASTM A90-69 or A446-76, As Required, and shall be "Armco-Zincgrip Paintgrip" as manufactured by Armco Steel Corp., or Approved equal. Where sheet metal gauges are not noted on Contract Drawings or shown in SMACNA details, use #24 gauge. Use #20 gauge minimum for clips.
- D. Lead Collar Flashing: 3#/sf malleable sheet lead.
- E. Pre-Fabricated Pipe Flashing Collars: "Oatey", Buildex "Dektite", or Approved, (composite sheet metal and EPDM type).
- F. Synthetic Elastomeric Sheet Material: Gates "Countourflash", "Nervastral", or Approved, of type and thickness recommended by manufacturer for particular application, and/or as called for on Contract Drawings.
- G. Reglets and Counterflashing: Fry Reglet "MA" - Masonry Springlok flashing system as detailed on Contract Drawings or As Required. Use only factory prefabricated corners.
- H. Nails, Rivets, and Fastenings: Nails shall be hot-dip, galvanized for galvanized steel.
- I. Fastenings: Nails, bolts and nuts, power driven fasteners, screws, washers, etc., must be hot-dip, galvanized or stainless steel.
- J. Anchors: For fastening items to masonry or concrete shall be galvanized machine screws or bolts and "Rawl" plug inserts or Phillips "Red Head" anchors of the size and type noted or required.
- K. Solder: Shall be Grade A, conforming to ASTM B32-76, composed of 50% pig lead and 50% block tin, warranted pure. No remelted or reworked solder shall be used.
- L. Flux: Shall be muriatic acid killed with zinc, or an approved brand of soldering flux, for galvanized steel. Flux shall be thoroughly washed off after soldering is completed.

- M. Cement Bituminous plastic, Fed. Spec. SS-C-153.
- N. Paper Underlayment: 6 pound, rosin-sized.
- O. Building Paper: Waterproof, Fed. Spec. UU-P-147, 15# weight.
- P. Sealants: GE, DAP, Morrison and Company, or Approved, first quality polyurethane, or polyisobutylene including primer, As Required.
- Q. Butyl Sealer: Where impractical to use solder at joints, corners, etc., seal with "DAP Butyl Gutter and Lap Sealer", or "Cushion-Lock CL-50 Butyl Sealer".
- R. Lead and Oil: Red lead primer: Fed. Spec. TT-P-86a, Type II.X

PART 3 – EXECUTION

3.1 INSPECTION

- 3.2 Examine all subsurfaces to receive Work under this Section and verify that they are in proper condition to commence Work of this Section. Do not proceed until improper conditions are corrected.

3.3 FABRICATION

- A. Fabricate sheet metal flashing and other items to shapes and sizes as detailed on Contract Drawings and As Required, allowing sufficient material for up-standing leg. Make surfaces free of waves and buckles, with lines, and angles sharp and true. Form in strict accordance with detailed Contract Drawings. Workmanship shall be equal to best standards of modern sheet metal practices.
- B. Join parts by soldering, or with concealed rivets or sheet metal screws where necessary for strength or stiffness. Place sheets together before drilling. Where lap joints are used, lap sheets at least 4 inches.
- C. Roof Flashings: Specified under Roofing Sections.
- D. Copings (as may be required): Fabricate to detail in approximately 8 ft. lengths of 24-gauge, galvanized steel. Cover wood plate with 30-pound roofing before installing coping. Lock exposed edge over continuous cleats of same material, securely nailed to plate.
- E. Clean All Surfaces Before Soldering: Perform soldering slowly with well heated tools to thoroughly heat the sheet and completely sweat the solder through full width of seam. All lock seam work shall be flat and true to line and be sweated full of solder. All flat lock seams, and lap seams, where soldered, shall be at least 1/2" and made in direction of drainage flow.
 - 1. Thoroughly wash all acid flux work after soldering.

3.4 INSTALLATION

- A. Conform to quality, procedures and methods recommended by National Association of Sheet Metal Contractors. Accurately form, fit snugly, have exposed edges folded under at least 1/2" and no sharp edges or corners left exposed.
1. Properly shield against galvanic action with asphalt base paint or equivalent. Securely fasten and make absolutely watertight.
 2. Provide expansion joints at all junctions and at straight runs at intervals not exceeding 20 feet. Form, fabricate, and install all sheet metal so as to adequately provide for expansion and contraction in the finished work. Select type best suited and least obtrusive for conditions and make watertight with sealant. Shop-form corners, extending not less than 1' each side of corner.
- B. Attach sheet metal (and reglets) to surfaces which are even, smooth, sound, thoroughly dry and clean, free of all defects which might affect application.
1. Use concealed clips, cleats and/or slotted nail hole attachments only, and As Required to allow for expansion and contraction without buckling or loosening. No nails or other attachments shall be exposed to weather, unless specifically approved by Project Manager due to extraordinary circumstances. If exposed attachments are necessary, and Approved, set in elastomeric roofing cement.
 2. Any materials furnished hereunder to be built into work by others shall be in condition for final installation. Do all cutting, fitting, drilling or other operation in sheet metal required to accommodate work of other trades.
 3. Provide any items essential to complete the installation, though not specifically shown or specified, of the same kind, quality and type as similar items utilized elsewhere in the building. Apply all sealant and butyl tape per requirements of Section 07 92 00.
- C. Flashings and counterflashings shall be installed at all points as shown or necessary to make Work watertight. Joints shall be expansion type joints conforming to NRCA recommended detail. Make no joints within 18" of corners.

3.5 CLEANING and FINISHING

- A. Clean all surfaces not concealed after installation, carefully removing grease and oil with solvent or gasoline and wiping with clean rags.
- B. Finish: Visible flashings and counterflashings shall be painted, per Section 099100.

END OF SECTION 076200



DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and color Samples.
- B. Environmental Limitations: Do not proceed with installation of joint sealants when ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions.
- B. Sealant for Use in Building Expansion Joints:
 - 1. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 100/50; for Use NT.
- C. Sealant for General Exterior Use Where Another Type Is Not Specified:
 - 1. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use NT.
- D. Sealant for Exterior Traffic-Bearing Joints, Where Slope Precludes Use of Pourable Sealant:
 - 1. Single-component, nonsag urethane sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use T.
- E. Sealant for Exterior Traffic-Bearing Joints, Where Slope Allows Use of Pourable Sealant:
 - 1. Single-component, pourable urethane sealant, ASTM C 920, Type S; Grade P; Class 25; for Use T.
- F. Sealant for Use in Interior Joints in Ceramic Tile and Other Hard Surfaces in Kitchens and Toilet Rooms and Around Plumbing Fixtures:

1. Single-component, mildew-resistant silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use NT; formulated with fungicide.

G. Sealant for Interior Use at Perimeters of Door and Window Frames:

1. Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

H. Acoustical Sealant:

1. Nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission as demonstrated by testing according to ASTM E 90.

2.2 MISCELLANEOUS MATERIALS

- A. Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.
- D. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with ASTM C 1193.
- B. Install sealant backings to support sealants during application and to produce cross-sectional shapes and depths of installed sealants that allow optimum sealant movement capability.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.



- D. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal perimeters, control joints, openings, and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions. Comply with ASTM C 919.

END OF SECTION 079200

DIVISION 08 – OPENINGS

SECTION 081100 – 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 Project Manager judges them applicable and as modified herein.
- B. 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".
- C. 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. Within 30 days prior to Work on-site, and in accordance with requirements of Section 01 33 00, submit:
 - 1. Shop drawings of all metal doors and frames showing dimensions, cut-outs, reinforcements, joints and welds, to the Project Manager 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 Project Manager 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.

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 prior Approved.

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 087100, Door 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. Furnish all exterior doors, with snap-in vinyl top cap.

H. 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; some with partial glass lites as indicated in Contract Drawings.

2.4 HOLLOW METAL FRAMES

A. Frames shall be preformed of 16 - gauge, cold-rolled steel, 2" faces, in depths as indicated on Contract Drawings and as required to properly fit (the various) wall configurations and as required to match existing frames.

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. Reinforcings for surface closers shall be 12-gauge steel. Adequate reinforcing shall be provided for other hardware as described in Section 087100, Hardware.

H. Grout: Unless otherwise noted on Contract Drawings, installed frames shall be fully grouted with:

1. IBC Type "O" mortar, or "fine" grout per ASTM C270 at all exterior openings.



- I. Finishes: Pre-clean and shop prime each door and frame for finish painting, as specified under Division 09 of these Specifications. Touch up shop prime before starting any finish painting.
- J. 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 Project Manager. 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 081100



DIVISION 08 – OPENINGS
SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Samples for factory-finished doors.

PART 2 - PRODUCTS

2.1 DOOR CONSTRUCTION, GENERAL

- A. Quality Standard: WDMA I.S.1-A.
- B. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
- C. WDMA I.S.1-A Performance Grade:
1. Heavy Duty unless otherwise indicated.

2.2 FLUSH WOOD DOORS

- A. Doors for Transparent Finish:
1. Interior Solid-Core Doors: Custom grade, five-ply, cores.
 - a. Faces: Grade A, CVG Doug Fir.
 - b. Veneer Matching: Book and balance match.
 - c. Panel / Lite configuration as shown.

2.3 FABRICATION AND FINISHING

- A. Factory fit doors to suit frame-opening sizes indicated and to comply with clearances specified.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Submittals: Samples for factory-finished doors.
- C. Quality Standard: WDMA I.S.1-A.
- D. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

- E. WDMA I.S.1-A Performance Grade.
- F. Doors for Transparent Finish.
- G. Factory fit doors to suit frame-opening sizes indicated and to comply with clearances
- H. Cut and trim openings to comply with referenced standards.
 - 1. Trim light openings with moldings indicated.
 - 2. Factory install glazing in doors indicated to be factory finished.
 - 3. Factory install louvers in prepared openings.
- I. Factory finish doors indicated for transparent finish with stain and manufacturer's standard finish complying with WDMA TR-4, conversion varnish for grade specified for doors.
 - 1. Sheen: Satin.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install doors to comply with manufacturer's written instructions and WDMA I.S.1-A, and as indicated.
- B. Align and fit doors in frames with uniform clearances and bevels. Machine doors for hardware. Seal cut surfaces after fitting and machining.
- C. Clearances: As follows unless otherwise indicated:
 - 1. 1/8 inch at heads, jambs, and between pairs of doors.
 - 2. 1/8 inch from bottom of door to top of decorative floor finish or covering.
 - 3. 1/4 inch from bottom of door to top of threshold.
 - 4. Comply with NFPA 80 for fire-rated doors.
- D. Repair, refinish, or replace factory-finished doors damaged during installation, as directed by Project Manager.

END OF SECTION 081416

DIVISION 08 – OPENINGS

SECTION 084300 – ALUMINUM STOREFRONT

PART 1 – GENERAL

1.1 SUBMITTALS

A. Within 30 days of Notice of Award submit the following:

1. Shop Drawings of all specified Work showing sizes, methods of construction, connection to adjacent members and installation.
2. Samples of specified materials and required finishes. Obtain review comments before start of fabrication.

1.2 QUALITY ASSURANCE

A. Guarantee

1. Guarantee all finish metal work for 2 years.

1.3 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 Owner.

1.4 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.

PART 2 – PRODUCT

2.1 MANUFACTURER

1. For purposes of designating type and quality of work of this Section, Contract Drawings and Specifications are based upon products of Kawneer Company, Inc. to match existing profile and dimensions. 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.

2.2 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. 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-M21C22A42, satin aluminum to (match existing), 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.

2.3 WINDOW FRAMING

- A. Select Window Framing system to match existing comfort station windows.
- B. 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.
- C. 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 Latest Edition
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 Contract Drawings.

C. Glazing: As scheduled (on Contract Drawings), and specified in Section 088000.

3.2 INSTALLATION

- A. Items in this Section shall be set in their correct locations as shown in the Contract Drawing 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 aluminum and wood or metal flashing shall be tightly sealed in order to secure a watertight job. All materials shall be carefully screwed in place using backing, 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. Protect aluminum from corrosion or galvanic action which may be caused by adjacent materials. After erection, Contractor shall adequately protect exposed portions of the framing from damage by grinding and polishing machines, 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 Project Manager.
- 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 084300

DIVISION 08 – OPENINGS
SECTION 085313 - VINYL WINDOWS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Awning Windows
- B. Single-Hung Windows

1.2 SECTION REQUIREMENTS

- A. Submittals: Product Data, Shop Drawings and color Samples.
- B. Provide AAMA- or WDMA-certified vinyl windows with an attached label.

1.3 QUALITY ASSURANCE

A. Qualifications

- 1. Installer shall have successfully completed training through JELD-WEN's Product Integrity Group approved installation method course.

B. Mock-ups

- 1. Notify the Project Manager and install 1 Window mock-up to demonstrate the intended methods of flashing, anchoring and sealing for all windows to be installed. Mock-up shall incorporate surrounding construction, including wall assembly fasteners, flashing, and other related accessories installed in accordance with window manufacturer's approved installation methods.
- 2. Mock-up may remain as part of the Work if Approved.

C. Pre-installation Meeting

- 1. Conduct a pre-installation meeting with District's representatives at the time of intended mockup installation.

1.4 WARRANTY

- A. Manufacturer standard warranty indicating that the window unit will be free from material and workmanship defects from the date of Substantial Completion for the time periods indicated below:



1. Window Unit: Limited Lifetime
2. Glazing:
 - a. Insulated Glass: 10 years against seal breakage
 - b. ImpactGard® Glass: 10 years

PART 2 - PRODUCTS

2.1 VINYL WINDOWS

A. Available Products:

1. JELD-WEN Windows and Doors; 3250 Lakeport Blvd. P.O. Box 1329; Klamath Falls, OR 97601-0268, USA; Phone 541.885.7412, fax 541.884.3331; Toll free 800.535. 3936; website www.jeld-wen.com
2. Basis of Design: Windows are based on JELD-WEN® Premium Atlantic Vinyl Windows.

B. Window Types: As indicated on Contract Drawings.

1. Awning.
2. Single hung.

2.2 FINISH

A. Interior Color: Desert Sand

B. Exterior Color: Bronze

C. Glazing

1. As indicated on the Contract Drawings, elsewhere in these Specifications and as required by code.

2.3 WINDOW ACCESSORIES

A. Insect Screens

1. Material: Charcoal fiberglass screen cloth (18 by 16 mesh) set in painted roll formed or extruded aluminum frame.
2. Frame Finish: Color match frame extrusion

2.4 CONSTRUCTION ACCESSORIES

A. Flashing

1. As recommended by manufacturer's installation instructions.

B. Sealants

1. As recommended by manufacturer's installation instructions to maintain watertight conditions.

C. Glaze units with tinted, low-e coated, argon-filled, sealed insulating glass, complying with Division 08, Section 088000-Glazing.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare windows for installation in accordance with manufacturer's recommendations.

3.2 INSTALLATION

- A. Install in full accordance with manufacturer's submitted installation instructions.
- B. Set units level, plumb, and true to line, without warp or rack of frames and panels. Provide proper support and anchor securely in place.
- C. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
- D. Adjust operating panels, screens, and hardware to provide a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- E. Clean glass and vinyl surfaces immediately after installing windows. Remove nonpermanent labels from glass surfaces.

END OF SECTION 085313



DIVISION 08 – OPENINGS

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Hardware & Keying Schedule.
- B. Deliver keys to Project Manager.

PART 2 - PRODUCTS

2.1 HARDWARE

- A. Available Manufacturers:
 - 1. Schlage. (LFIC at the Comfort Station Doors as Approved)
- B. Hinges:
 - 1. Brass/bronze hinges with stainless-steel pins for exterior.
 - 2. Non removable hinge pins for exterior and public interior exposure.
 - 3. Ball-bearing hinges for doors with closers and entry doors.
 - 4. 2 hinges for 1-3/8-inch- thick wood doors.
 - 5. 3 hinges for 1-3/4-inch- thick doors 90 inches or less in height; 4 hinges for doors more than 90 inches in height.
- C. Locksets and Latchsets:
 - 1. BHMA A156.2, Series 4000, Grade 2 for bored locks and latches.
 - 2. BHMA A156.3, Grade 1 for exit devices.
 - 3. BHMA A156.5, Grade 2 for auxiliary locks.
 - 4. BHMA A156.12, Series 5000, Grade 2 for interconnected locks and latches.
 - 5. Provide trim on exit devices matching locksets.



- D. Key locks to District's existing Schlage master-key system.
 - 1. Cylinders with five-pin tumblers and removable cores.
- E. Provide wall stops or floor stops for doors without closers.
- F. Provide hardware finishes as follows:
 - 1. Hinges: Matching finish of lockset/latchset.
 - 2. Locksets, Latchsets, and Exit Devices: Oil-rubbed, oxidized bronze; at toilet rooms and bath rooms, provide split finish with bright chrome-plated finish on inside.
 - 3. Closers: Matching finish of lockset/latchset.
 - 4. Other Hardware: Matching finish of lockset/latchset.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount hardware in locations recommended by the Door and Hardware Institute unless otherwise indicated.

3.2 HARDWARE SCHEDULE FOR 8 EA DELUXE CABINS.

A. Hardware Set No. 1 For Door: 1

- | | |
|--------------------------------|---------------|
| 1. 3ea. BB51 4.5x4.5 US32D NRP | Hinges |
| 2. 1ea. ADA compliant | Lockset |
| 3. 1ea. | Threshold |
| 4. 1ea. | Sweep |
| 5. 1ea. Head & Jamb | Weather Strip |
| 6. 1ea. | Floor Stop |
| 7. 1ea. | Latch Guard |

B. Hardware Set No 2. For Door: 2,

- | | |
|-----------------------|----------|
| 1. 3ea. US26D | Hinges |
| 2. 1ea. ADA compliant | Latchset |



- 3. 1ea. Floor Stop
 - 4. 3ea. SilencersHardware set
- C. Hardware Set No. 3 For Door: 3,
- 1. 3ea. US26D Hinges
 - 2. 1ea. Bath / Privacy ADA compliant Lockset
 - 3. 1ea. Wall Stop
 - 4. 3ea. Silencers

Hardware Sets for Comfort Station Addition (all to match existing hardware at building)

- A. Hardware Set No. 1 for Doors No. 2 and No. 3: (ADA Accessible Compliant)
- 1. 3 ea. US26 D Hinges (NRP)
 - 2. 1 ea. Push/Pull
 - 3. 1 ea. Thumb Turn Dead Bolt
 - 4. 1 ea. Door Bottom Sweep
 - 5. 1 ea. Flat Threshold
 - 6. 1 ea. Closer w/ Stop
 - 7. 1 ea. Set Weatherstripping
 - 8. 3 ea. Silencers
- B. Hardware Set No. 2 for Door No. 1.
- 1. 3 ea. US26D Hinges (NRP)
 - 2. 1 ea, Lockset(Stor. Function)
 - 3. 1 ea, Door Bottom Sweep
 - 4. 1 ea. Flat Threshold
 - 5. 1 ea. Closer
 - 6. 1 ea. Wall Stop w/hold-open on wall as approved



- 7. 1 ea. Set Weatherstripping
- 8. 3 ea. Silencers

END OF SECTION 087100

DIVISION 08 – OPENINGS
SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and 12-inch- square Samples.
- B. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201.
- C. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated.
 - 1. GANA Publications: GANA's "Glazing Manual."
 - 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
 - 3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
 - 4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- D. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- E. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3.
- B. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.

2.2 MONOLITHIC-GLASS TYPES

A. Glass Type: Clear fully tempered float glass.

1. Thickness: 6.0 mm.
2. Provide safety glazing labeling.

2.3 INSULATING-GLASS TYPES

A. Glass Type: Low-e-coated, clear insulating glass. (At Comfort Station – Match existing clarity and finish of existing adjacent glazing.)

1. Overall Unit Thickness: 1 inch.
2. Thickness of Each Glass Lite: 4.0 mm.
3. Outdoor Lite: Fully tempered float glass
4. Interspace Content: Air.
5. Indoor Lite: Fully tempered float glass.
6. Provide safety glazing labeling.

2.4 GLAZING SEALANTS

A. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

B. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are contained in GANA's "Glazing Manual."

B. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

C. Remove nonpermanent labels, and clean surfaces immediately after installation.

END OF SECTION 088000

DIVISION 08 – OPENINGS

SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Glazing Publications: Comply with the following published recommendations:

1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this section or in referenced standards.
2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."

C. Safety Glazing Products: For tempered mirrors, provide products complying with testing requirements in 16 CFR 1201 for Category II materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Glass Mirrors, General: ASTM C 1503; manufactured using copper-free, low-lead mirror coating process.

B. Clear Glass: Mirror Glazing Quality, 4.0-mm nominal thickness.

C. Laminated Mirrors: ASTM C 1172, Kind LM.

1. Clear Glass for Outer Lite: Mirror Glazing Quality, 4.0-mm nominal thickness.
2. Glass for Inner Lite: Annealed float glass; ASTM C 1036, Type I (transparent flat glass), Quality-Q3; Class 1 (clear) 4.0-mm nominal thickness.

D. Mirror Mastic: An adhesive setting compound, asbestos free, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

- E. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.
- F. Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of each mirror in a single piece.
 - 1. Finish: Clear bright anodized.
- H. Frameless Stainless Steel Mirror (Comfort Station): 20-gauge, Type 304 stainless steel polished to a #8 mirror finish with a ¼” return. Provide with ¼” concealed tempered masonite backing and (4) mounting holes. Provide mounting screws (vandal resistant) to fit the wall conditions.

2.2 FABRICATION

- A. Mirror Edge Treatment: Flat polished.
 - 1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
- B. Film-Backed Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint as recommended in writing by film-backing manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide a minimum air space of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- B. Wall-Mounted Mirrors: Install mirrors with mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed so heads do not impose point loads on backs of mirrors.
 - 1. Top and Bottom Aluminum J-Channels: Provide setting blocks 1/8 inch thick by 4 inches long at quarter points.
 - 2. Mirror Clips: Place a felt or plastic pad between mirror and each clip. Locate clips so they are symmetrically placed and evenly spaced.



3. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
- C. Remove nonpermanent labels, and clean surfaces immediately after installation.

END OF SECTION 088300

DIVISION 09 –FINISHES

SECTION 092813 – CEMENT BOARD

PART 1 – GENERAL

1.1 SUMMARY

- A. Work herein requires coordination with trades whose Work connects with, is concealed by, or is affected by, cement board. 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 cement board finish system.

1.2 SUBMITTALS

- A. Within 30 days of Notice of Award and in ample time prior to shipping materials for framing, the Contractor shall submit the following in accordance with requirements of Section 013000:
 - a. Samples and Materials Data indicating component details, and product performance data.

1.3 QUALITY ASSURANCE

A. Inspections

- 1. 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.

B. Applicators

- 1. 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
- 2. Protection
 - a. Provide temporary coverings and coordinate Work, As Required, so that adjacent surfaces are protected from materials and operations specified in this Section.

1.4 JOB CONDITIONS

- A. In cold weather and during finish applications, cement board, skim or base coats, mortar, finish material and air temperature must be at least 45 degrees Fahrenheit and must remain at this temperature or higher for at least 24 hours after application. Hot and dry weather may affect working time of skim or basecoat and finish materials. Under rapid drying conditions, dampening of board, skim or base coat surface may be required to improve workability.

PART 2 – PRODUCT

2.1 MATERIALS

- A. Cement Board: USG, Or Equal products, ½" thickness, 48" width, and 8' lengths, unless otherwise noted on Contract Drawings.
- B. Fasteners: 1 1/4" or 1 5/8" wafer head steel screws with anti corrosive coating for steel framing; and 1 1/4", 1 5/8", or 2 1/4" wafer head steel screws with anti corrosive coating for wood framing.
- C. Joint and Corner Reinforcement: 2" or 4" wide, open weave exterior tape as recommended by manufacturer.
- D. Skim and Bond Coats meeting ANSI A118.4, latex fortified mortar, for ceramic tile finishes.
- E. Grout meeting ANSI A118.6, latex fortified grout, for ceramic tile finishes.
- F. Control Joint: USG Sheetrock zinc Control Joint No. 093 or prior Approved equal.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Cement Board Application: Apply cement board with ends and edges over supports. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses.
1. Fasten cement board to framing with specified fasteners. Drive fasteners in field of cement board first, working towards ends and edges. Hold cement board in firm contact with framing while driving fasteners. Space fasteners max. 6" o.c. for walls, 6" o.c. for ceilings and soffits, with

perimeter fasteners at least 3/8" and less than 5/8" from ends and edges. Drive nails and screws so bottom of heads are flush with surface of cement board, to provide firm panel contact with framing. Do not overdrive fasteners.

2. For tile finishes, prefill joints with latex fortified mortar. Embed exterior tape centered over all joints and corners but not overlapped.

B. Ceramic Tile Systems:

1. Apply a 1/8" min. thick skim coat of latex fortified mortar over cement board surfaces. Apply skim coat uniformly over entire surface. Leave surface smooth and flat. Allow to set 24 hours before application of bond coat for setting tile and thin brick.
2. Ceramic tile walls may not exceed 3/4" thickness, 18"x18" size, and 10 psf. Install ceramic tile in accordance with ANSI 108.5 specifications and manufacturer's directions. Using the notched trowel required for the thickness of tile being installed, apply latex fortified mortar to obtain uniform setting bed. Back-butter the ceramic tile for 100% mortar contact. Install units by firmly pressing them into freshly applied mortar. Use sliding and twisting motion to embed units and obtain a 100% mortar contact. Beat-in ceramic tile in accordance with accepted practice. Apply latex fortified grout after mortar has set firmly for 24 hours. Mix and apply grout according to directions on package. Force maximum amount of grout into joints. Tool and compress grout into joints to provide neat and uniform appearance. Clean grout from finished surfaces and cure installation as required by ANSI A108.10 Specification.

3.2 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 092813

DIVISION 09 – FINISHES

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 PANEL PRODUCTS

- A. Provide in maximum lengths available to minimize end-to-end butt joints.
- B. Interior Gypsum Board: ASTM C 36/C 36M or ASTM C 1396/C 1396M, in thickness indicated, with manufacturer's standard edges. Regular type unless otherwise indicated. Sag-resistant type for ceiling surfaces.
- C. Water-Resistant Gypsum Backing Board: ASTM C 630/C 630M or ASTM C 1396/C 1396M, in thickness indicated. Regular type unless otherwise indicated. Use in toilet rooms.

2.2 ACCESSORIES

- A. Trim Accessories: ASTM C 1047, formed from galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet. For exterior trim, use accessories formed from hot-dip galvanized-steel sheet, plastic, or rolled zinc.
 - 1. Provide cornerbead at outside corners unless otherwise indicated.
 - 2. Provide LC-bead (J-bead) at exposed panel edges.
 - 3. Provide control joints where indicated.
- B. Aluminum Accessories: Extruded-aluminum accessories indicated with manufacturer's standard corrosion-resistant primer.
- C. Joint-Treatment Materials: ASTM C 475/C 475M.
 - 1. Joint Tape: Paper unless otherwise recommended by panel manufacturer.
 - 2. Joint Compounds: Setting-type compounds.
 - 3. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.



- D. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant complying with ASTM C 834.
- E. Sound-Attenuation Blankets: ASTM C 665, Type I (unfaced).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install gypsum board to comply with ASTM C 840.
 - 1. Isolate gypsum board assemblies from abutting structural and masonry work. Provide edge trim and acoustical sealant.
 - 2. Single-Layer Fastening Methods: Fasten gypsum panels to supports with screws.
- B. Install cementitious backer units to comply with ANSI A108.11.
- C. Fire-Resistance-Rated Assemblies: Comply with requirements of listed assemblies.
- D. Finishing Gypsum Board: ASTM C 840.
 - 1. At concealed areas, unless a higher level of finish is required for fire-resistance-rated assemblies, provide Level 1 finish: Embed tape at joints.
 - 2. At substrates for tile, provide Level 2 finish: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges.
 - 3. Unless otherwise indicated, provide Level 4 finish: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges.
 - 4. Where indicated, provide Level 5 finish: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges. Apply skim coat to entire surface.
- E. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.
- F. Cementitious Backer Units: Finish according to manufacturer's written instructions.
- G. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.

END OF SECTION 092900

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 Contract 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 Project Manager'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 and that all new tile work matches existing tiles in size and color as selected both at the floor and the walls.
- 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. Specific Tile- Ceramic Tile

1. Tile 1, Floor Tile: 1" x 1", unglazed ceramic mosaic tile, all to match adjacent existing in size, configuration and color
2. Tile 2, Wall/Base Tile: 4-1/4" x 4-1/4" glazed ceramic tile, color to match adjacent existing in size and color in adjacent existing Comfort Station rooms. Provide with cove base at floor.
3. Tile 3, Floor Tile: 2" x 2", porcelain tile. Olympia Tile + Stone, Quebec Series. Color to be selected.
4. Tile 4, Wall Tile: 6" x 6" and 6" x 12" unglazed 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 Contract 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. One (1) at each new shower; see Contract Drawings.

D. Mortar Cement: Portland Cement meeting ASTM C-150, Type 1.

E. Mortar Sand: ASTM C-144. Lime: Hydrated lime, ASTM C-206, Type S or C-207, Type S.

F. Grouting Cement: Trinity White or "Neat White" Portland Cement.

G. Grouting Sand: Approved, fine white grouting sand.

H. Grout Tinting Pigment: Industry standard, as Approved.

I. Grout: (replaces grouting cement, pigment and sand references) Latex-Portland Cement Mortar meeting ANSI A118.6, Bostik, Hydroment Ceramic Tile Grout, sanded (unsanded), Or Equal. Color to be selected for each tile type.

J. Reinforcing: 2" x 2" x 16/16 gauge welded wire mesh, conforming to ASTM A185.

- K. Cleavage Membrane: 15 lb. roofing felt or 4 mil polyethylene film.
- L. Anti-Fracture Membrane: N.A.C. Products, Inc. ECB 36" x 40 mil self bonding modified bitumen fiber sheet membrane, Or Equal.
- M. 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.
- N. Bond Coat: Portland Cement paste on a plastic bed, or Dry-Set mortar on a cured bed or latex Portland Cement mortar on a cured bed.
- O. Joint Sealant: Bostik, Chem-Calk 550 two component, pourable, horizontal grade urethane sealant. Custom color as required to match adjacent grout joints.
- P. Grout Sealer: Bostik, CeramaSeal, Magic Seal water-based penetrating sealer. (Could be used as a tile sealant, non kitchen/oil areas.)
- Q. Tile and Grout Sealer: Bostik, Cerama Seal, Silox 8, solvent based penetrating sealer. (Use in kitchen, oil areas.)
- R. Backer Board: TCA approved rigid GFR cement composite board units for use as substrate for wall tile assemblies as specified. USG 'Durock' or Approved. Thickness 1/2", or as otherwise noted.
 - 1. Expansion Joints: Type to match existing As Required for type of CT installation, as approved by P Showers/Wet Conditions:
- S. Adhesive: Epoxy conforming to ANSI A118.3.
- T. Specific Assemblies: Refer to Tile Council Handbook and select each system as noted to fit the construction as stated below, submit for Project Manager's review and approval.
 - 1. Interior Slabs on Grade, Showers/Wet Conditions:
 - 2. Exterior Wall, Frame: Showers/Wet Conditions:
 - 3. Interior Walls, Frame, Showers/Wet Conditions:

PART 3 – EXECUTION

3.1 INSTALLATION

1. Install Backerboard in strict accordance with manufacturer's instructions and recommendations. (Where merging with existing wall surfaces, shim out board to adjust thickness of mortar bed As Required and Approved.)
2. Basic Installation Specification: ANSI A108.
3. Conform to Tile Council of America recommendations for the assemblies specified above.
4. 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.
5. 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.
6. Maintain straight and uniform joints throughout field of work.
7. Install all required trim pieces as detailed for the various tiles specified.
8. 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.
9. Thoroughly wash out joints and saturate with clean water before grouting. Thoroughly grout into all joints to fill entire length and depth.
10. Apply grout flush with face of tiles making a neatly finished, smooth surface. Prevent staining of grouted joints.
11. Apply sealer to horizontal all tile type grout and tile surfaces per manufacturer's recommendations.



3.2 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 093000

DIVISION 09 – FINISHES

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and Samples.
- B. Extra Materials: Deliver to Project Manager at least 30 linear feet of each type and color of resilient wall base installed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

- A. Available Products:
 - 1. Roppe.
- B. Color and Pattern: As selected by Architect.
- C. ASTM F 1861, Type TS (rubber, vulcanized thermoset).
- D. Group (Manufacturing Method): I (solid).
- E. Style: Cove (base with toe).
- F. Minimum Thickness: 0.125 inch.
- G. Height: 4 inches.
- H. Lengths: coils in manufacturer's standard lengths.
- I. Outside Corners: preformed.
- J. Inside Corners: preformed.
- K. Finish: As selected.

2.2 INSTALLATION ACCESSORIES

- A. Adhesives: Water-resistant type recommended by manufacturer to suit products and substrate conditions.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Prepare concrete substrates according to ASTM F 710. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
- B. Adhesively install resilient wall base and accessories.
- C. Install wall base in maximum lengths possible. Apply to walls, columns, pilasters, casework, and other permanent fixtures in rooms or areas where base is required.
- D. Install reducer strips at edges of floor coverings that would otherwise be exposed.

END OF SECTION 096513

DIVISION 09 – FINISHES

SECTION 099100.1 – PAINTING (CABINS)

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals Paint and Wood Stain Finishes

1. Product Data. Include printout of MPI's "MPI Approved Products List" with product highlighted.
2. Sample; provide and apply 1 qt samples as requested by Project Manager.

B. Submittals – Concrete Stain Finishes:

1. Submit manufacturer's product data and color samples

C. Mockups: Full-coat finish sample of each type of coating, color, and substrate, applied where directed by Project Manager. Mockups for concrete stain: provide up to 6 mockup stain samples on 24"x24" concrete sample squares. Cast squares on site at time of slab pour and finish same as slabs to receive stain. Apply stain per manufacturer's recommendations.

D. Extra Materials: Deliver to Project Manager 1 gal. of each color and type of finish coat paint used on Project, in containers, properly labeled and sealed.

PART 2 - PRODUCTS

2.1 PAINT

A. Available Products:

1. Sherwin Williams.

B. MPI Standards: Provide materials that comply with MPI standards indicated and listed in its "MPI Approved Products List."

C. Material Compatibility: Provide materials that are compatible with one another and with substrates.

1. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

D. Use interior paints and coatings that comply with the following limits for VOC content:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints, Coatings: 150 g/L.
3. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
4. Clear Wood Finishes, Varnishes: 350 g/L.
5. Clear Wood Finishes, Lacquers: 550 g/L.
6. Floor Coatings: 100 g/L.
7. Stains: 250 g/L.
8. Primers, Sealers, and Undercoaters: 200 g/L.

E. Colors: As selected.

2.2 Semi Transparent Stain

A. Available Products:

1. Benjamin Moore.
2. Penofin.

B. Colors: As selected.

2.3 Concrete Stain:

A. Basis of Design Product.

1. Kemiko Concrete Stain: Kemiko Concrete Products; P.O. Box 1109 Leonard, TX 75452.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, lighting fixtures, and similar items that are not to be painted. Mask items that cannot be removed. Reinstall items in each area after painting is complete.
- C. Clean and prepare surfaces in an area before beginning painting in that area. Schedule painting so cleaning operations will not damage newly painted surfaces.

3.2 APPLICATION

- A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Paint exposed surfaces unless otherwise indicated.
 - 1. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces.
 - 2. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint the back side of access panels.
 - 4. Color-code mechanical piping in accessible ceiling spaces.
 - 5. Do not paint prefinished items, items with an integral finish, operating parts, and labels unless otherwise indicated.
- C. Apply paints according to manufacturer's written instructions.
 - 1. Use brushes only for exterior painting and where the use of other applicators is not practical.
 - 2. Use rollers for finish coat on interior walls and ceilings.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- E. Apply stains and transparent finishes to produce surface films without color irregularity, cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other imperfections. Use multiple coats to produce a smooth surface film of even luster.

3.3 EXTERIOR PAINT APPLICATION SCHEDULE

A. Concrete, Nontraffic Surfaces:

1. Stain: Integral Color Stain (mixed in batch). Color as selected by Project Manager.

B. Steel:

1. Semigloss, Quick-Dry Enamel: Two coats over rust-inhibitive primer: MPI EXT 5.1A.

C. Galvanized Metal:

1. Semigloss Latex: Two coats over cementitious galvanized-metal primer: MPI EXT 5.3A.

D. Dressed Lumber: Including architectural woodwork doors.

1. Semitransparent Stain: Two coats: MPI EXT 6.3D.

E. Wood Panel Products: Including siding, fascias and soffits.

1. Semitransparent Stain: Two coats: MPI EXT 6.4D.

F. Cement Board Siding and Trim: Board and Batt siding, Trim & Fascia; shop painted by cement board manufacturer. See Section 062000-Finish Carpentry.

3.4 INTERIOR PAINT APPLICATION SCHEDULE

A. Concrete, Nontraffic Surfaces:

1. Stain: Two coats. Apply per manufacturer's written directions.

B. Steel:

1. Semigloss, Quick-Dry Enamel: Two coats over quick-drying alkyd metal primer: MPI INT 5.1A.

C. Galvanized Metal:

1. Semigloss Latex: Two coats over cementitious galvanized-metal primer: MPI INT 5.3A.

D. Dressed Lumber: Including architectural woodwork doors.

1. Satin Polyurethane: Two coats over stain: MPI INT 6.3E.

E. Gypsum Board:

1. Eggshell Latex: Two coats over primer/sealer: MPI INT 9.2A.

END OF SECTION 099100.1

DIVISION 09 – FINISHES

SECTION 099100.2 – PAINTING (COMFORT STATION)

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Provide all painting and finishing Work as specified herein and as noted on the Contract 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 permanently concealed from view.
 - 2. Wood (or plastic) structural/framing elements permanently concealed from view.
 - 3. Concrete slabs.
 - 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 Contract 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, resilient flooring, topset resilient bases.
 - 10. Areas noted as "unfinished" or "existing to remain" on Finish Schedules, or "existing finish to remain" on Contract Drawings.
- D. All surfaces and items not excluded above shall receive the various paint finishes, as scheduled, except for the following items which shall receive the scheduled stained finish(es).

1.2 Certain items of wood trim noted for stain on the Contract Drawings.

1.3 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 Project Manager before final payment and obtain a signed receipt therefore.

1.4 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.

1.5 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.

1.6 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.

1.7 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 3.4 Finishing Schedule. When substitutes are proposed, use only those substitutes that are approved by MPI and the Project Manager in writing per conditions outlined in Division 1.
- 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: 2 different color schemes for painting rooms; 2 different stain colors for wood doors, trim, and millwork. 10% approximately, of overall painting work (area) shall consist of "deep colors", which require one additional coat above those specified.

1.8 SUBMITTALS

- A. Unless otherwise specified hereinafter and before any painting or finishing work is started, submit samples of all finishes, selections, etc., to the District per Section 013000-Administrative Requirements.
- 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.

1.9 ENVIRONMENTAL CONDITIONS

- A. Conform to all requirements of APSM unless otherwise specified hereinafter.
- 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 shall 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 Project Manager 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. 15% for wood
 - b. 12% for plaster and gypsum board

1.10 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 door and relite frames, painted doors, painted or finished casework, 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 and on the Contract Drawings.
- 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.

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 Inspection Agency 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. Stain shall be applied to wood by brush and/or hand wiping with a rag only.
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.

- B. Color Uniformity

1. In staining of wood or other similar materials, since final color depends both on the stain and the color of the material itself, which varies, stain formulation and/or application will often have to be modified from piece to piece so that the finished color of all pieces in the finished application are within a reasonably uniform range matching the Approved sample.
2. Pre-bleaching and/or washcoats of primer/sealer, whether specifically scheduled or not, shall be used, if necessary, to achieve acceptable uniformity of application throughout the many pieces.

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 Project Manager. Request final inspection from the Inspection Agency and/or MPI, if any.

3.4 FINISHING SCHEDULE

- A. **Exterior Surfaces:** (to match existing finishes as Approved by Project Manager)

1. New Wood - Noted to be Stained (semi-transparent): Exterior 6.4D, "Custom Grade"; 2-coats approved (semi-transparent) exterior wood stain.

2. New Wood - Noted to be Stained "Solid Color": Exterior 6.4A "Premium Grade"; 3 coats; 1-coat primer, 2-coats approved latex solid color exterior wood stain.
 3. **All wood siding, and trim pieces 3" or wider, shall be back-primed prior to installation with APSM approved primer.**
 4. New Wood - Noted to be Painted: Exterior 6.4G, "Premium Grade"; alkyd primer and 2-coats latex exterior, gloss to match existing.
 5. Existing Wood - Noted to be (Re)Painted: Exterior 6.4G without prime coat.
 6. New Ferrous Metal (Not Galvanized): Exterior 5.1D, "Premium Grade"; alkyd metal primer and 2-coats alkyd, enamel, gloss/sheen to match existing.
 7. New Non-Ferrous Metal (Including Galvanized Steel): Exterior 5.3A-Latex "Premium Grade"; cementitious primer and 2-coats exterior latex, gloss/sheen to match existing.
 8. New 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/sheen to match existing.
 9. New Galvanized Sheet Metal: Exterior 5.3H, "Premium Grade"; pretreatment primer, W.B. primer, 2-coats exterior latex, gloss/sheen to match existing.
 10. Existing Metal Noted to be (Re)Painted: Exterior 5.3A or 5.1D without primer coat. (2) coats finish. Verify if latex or alkyd existing finish, gloss/sheen to match existing.
 11. **All exterior mechanical grilles and louvers shall be painted whether galvanized or not, unless finished in anodized aluminum.**
 12. 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:** (to match existing finishes as approved by Project Manager)
1. New Gypsum Wallboard - Scheduled for Paint #1: Interior 9.2A; "Premium Grade"; 1-coat latex primer sealer and 2-coats interior latex, egg shell

- satin, (except low gloss at toilet/shower rooms.) gloss/sheen to match existing.
2. New Gypsum Wallboard - Scheduled for Paint #2: Interior 9.2C "Premium Grade"; 1-coat latex primer sealer and 2-coats alkyd enamel, gloss/sheen to match existing.
 3. Existing Wall and Ceiling Surfaces - Scheduled for Paint #1: 2 coats interior latex egg shell satin, except low gloss at toilet rooms, kitchen and janitor rooms.
 4. Existing Wall and Ceiling Surfaces - Scheduled for Paint #2: 2 coats interior alkyd enamel, gloss/sheen to match existing.
 5. New Wood - Noted to be Stained. Interior 6.4K modified, "Premium Grade"; clear alkyd finish on stained close grain woods. (Stain plus 3 coats tung oil finish, Daly's 'Ben Matte' or prior Approved.) NOTE: certain wood requires application of a pre-stain sealer under stain; refer to General provisions of this Section.
 6. New Wood - Noted to be Painted: Interior 6.4R; "Premium Grade"; latex primer and 2-coats interior latex, gloss/sheen to match existing.
 7. Existing Stained Wood - Noted to be Refinished: Clean, sand lightly and apply 1 coat of clear alkyd varnish to match existing finish.
 8. Existing Stained or Painted Wood - Noted to be (Re) Painted: Interior 6.4R "premium" without primer coat (2 coats). gloss/sheen to match existing.
 9. New Exposed Ferrous Metal (Latex): Interior 5.1Q "Premium Grade"; rust inhibitive alkyd primer and 2-coats interior latex enamel, gloss/sheen to match existing.
 10. New Exposed Ferrous Metal (Alkyd): Interior 5.1E "Premium Grade"; 1-coat rust inhibitive primer, 2-coats interior alkyd enamel, gloss/sheen to match existing.
 11. New Exposed Non-Ferrous Metal (Including Galvanized): Interior 5.3A "Premium Grade"; pre-treatment primer, cementitious primer, 2-coats interior latex enamel, gloss/sheen to match existing.
 12. Existing Metal - Noted to be (Re) Painted: 2-coats latex or alkyd (verify existing) enamel, gloss/sheen to match existing.



13. Existing (Interior) Wood Doors and exterior surfaces of stained/clear finished wood shelving and casework shall be scrub cleaned, touch sanded, and receive 1 coat of clear alkyd finish.
14. Existing (Interior) Wood Door Frames and miscellaneous trim shall be cleaned, have minor damage filled and sanded, be touch sanded and receive 2 coats of specified latex enamel finish, gloss/sheen to match existing.
15. All Existing Steel Door, Relite and Window Frames shall be cleaned, sanded and painted with 2 coats specified latex enamel finish gloss/sheen to match existing.
16. 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.

NOTE: Verify that prime coating of all steel items, concealed or exposed (unless galvanized) is included, either in these schedules, or various Sections, as "shop-prime."

END OF SECTION 099100.2

DIVISION 10 –SPECIALTIES

SECTION 101400 – IDENTIFYING DEVICES

PART 1 – GENERAL

1.1 SUMMARY

1.2 All signage mounted in or on building(s).

1.3 SUBMITTALS

- A. Within 45 days of Notice of Award, submit complete Shop Drawings to the Project Manager 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 manufacturer's name, catalog number, and catalog cut for each item where applicable.

1.4 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.

1.5 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 Contract Drawings, the more stringent provisions shall govern.

1.6 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.

1.7 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. .125” 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 to match existing.

2. Exterior retroflective sheets cut to size, color to match existing background color (brown). Punch letters and images from white to match existing exterior retroflective sheet.

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 Project Manager.

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 and 3/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 Contract 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 Contract 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 Project Manager.

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 101400



DIVISION 10 – SPECIALTIES
SECTION 101453 – SITE SIGNAGE

PART 1 – GENERAL

1.1 DESCRIPTION

The Work of this section consists of furnishing and installing exterior signs and signposts.

1.2 REFERENCES

- A. Washington State Department of Transportation (WSDOT) – Standard Specifications for Road, Bridge, and Municipal Construction (latest edition)
- B. American Welding Society (AWS) – Standard Welding Procedure Specifications.
- C. American Society for Testing and Materials (ASTM)
 - 1. ASTM A123 – Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products
 - 2. ASTM B209-10 – Standard Specifications for Aluminum and Aluminum Alloy Sheet and Plate
 - 3. ASTM D4956-11a – Standard Specification for Retroreflective Sheeting for Traffic Control
 - 4. ASTM A666-10 – Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
 - 5. ASTM A588 / A588M-10 – Standard Specifications for High-Strength Low-Alloy Structural Steel, up to 50 ksi (345 MPa) Minimum Yield Point, with Atmospheric Corrosion Resistance.
 - 6. ASTM A606 / A606M-09a – Standard Specifications for Steel, Sheet and Strip, High Strength, Low Alloy, Hot Rolled and Cold Rolled, with Improved Atmospheric Corrosion Resistance
 - 7. ASTM B209-10 – Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate
 - 8. ASTM D1730-09 – Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting
 - 9. ASTM D3451-05 – Standard Guide for Testing Coating Powders and Powder Coatings
 - 10. ASTM D7378-10 – Standard Practice for Measurement of Thickness of Applied Coating Powders to Predict Cured Thickness

11.ASTM D7396-08 – Standard Guide for Preparation of New, Continuous Zinc-Coated (Galvanized) Steel Surfaces for Painting

1.3 SUBMITTALS

- A. Manufacturer's Product Data: Submit manufacturer's product data indicating compliance with Specifications for the following:
1. Reflective Sheeting, including manufacturer's full range of colors for selection by the District
 2. Weathering steel
 3. Stainless steel
 4. Finish: Powder coating, including manufacturer's full range of colors for selection by the District
 5. Fasteners
- B. Shop Drawings: Show materials, dimensions, fasteners, blockings, joints, assembly and installation details.
- C. Samples: Actual material illustrating thickness, color, and finish:
1. Wayfinding Signs: 4"x4" Sample of powder coated aluminum with vinyl letter attached
 2. Traffic Signs: 4"x4" Sample of powder coated aluminum with vinyl letter attached
- D. Graphic Proofs: Submit graphic proof for each sign to be fabricated indicating overall dimensions, text size, spacing, font, colors, and attachments.
- E. Installer qualifications: Submit firm profile and references from three projects of similar size and complexity as this project.

1.4 QUALITY ASSURANCE

Fabricator/installer qualifications: Engage an installer with a minimum of 5 years of experience fabricating and installing signs of similar scope and complexity to this project.

1.5 STORAGE AND HANDLING

Protect signs from damage during transportation. Store all materials off ground under protective covering.

PART 2 – PRODUCTS

2.1 POSTS

Galvanized Steel: Hollow Steel Sections, in sizes indicated on Contract Drawings, with closed top, drilled to accept fasteners, hot dip galvanized.

2.2 TRAFFIC AND WAYFINDING SIGNS

A. Material per WSDOT Standard Specification 9-28:

1. Aluminum alloy: T6061-T6 Meeting ASTM B209
2. Facing Materials:
 - a. Traffic signs (stop, wrong way, one way):
 - 1) Face: Reflective, weatherproof, adhesive sheeting meeting ASTM D4956, Scotchlite High Intensity sheeting series 3930 Or Equal
 - 2) Back: powder coated
 - b. Wayfinding signs:
 - 1) Face: Powder coated to match existing State Park signs with letters cut from reflective, weatherproof, adhesive sheeting meeting ASTM D4956, Scotchlite Engineer Grade sheeting series 3430 Or Equal
 - 2) Back: match existing State Park signs
3. Color to be selected by the District from manufacturer's full range.
4. Hardware: Per WSDOT Standard Specifications table 9-28.11, material type to match sign.
5. Powder Coating: Exterior grade thermoset polyester-epoxy powder coating.

PART 3 – EXECUTION

3.1 WAYFINDING AND TRAFFIC

A. Fabrication

1. Fabricate from sheet material with thickness per WSDOT Standard Specifications 9-28.8
2. Fabricate signs with smooth edges and rounded corners.
3. Connect metal plates with continuous, watertight fillet welds, ground smooth for architectural finish per AWS standards.
4. Clean signs, prepare metal, and powder coat by electrostatic process.
 - a. Galvanized and zinc coated metal surfaces: Galvanize and apply thermosetting polyester/epoxy resin-based powder coat.
 - b. Aluminum surfaces: Pre-treat per ASTM D1730 using a multi-stage chromate process or an Approved chrome-free pretreatment process approved by powder coating manufacturer for optimized weather resistance.
 - c. Apply coating materials to clean surfaces to minimum 2.5 - 3.5 mil dry film thickness or as specified by manufacturer.



- B. Pre-installation review: Stake locations of signs and obtain approval from the Project Manager prior to installation.
 - 1. Posts
 - 2. Install plumb and rotated so that face of sign is turned 3% toward direction of travel.
 - 3. Crown top of concrete footing to shed water.
- C. Signs
 - 1. Install plumb and level with face of sign turned 3% toward direction of travel.
 - 2. Attach signs to posts with tamper proof stainless steel fasteners. Install nylon or dielectric washers to separate dissimilar metal types.

END OF SECTION

DIVISION 10 – SPECIALTIES
SECTION 102100 – TOILET PARTITIONS

PART 1 – GENERAL

1.1 SUBMITTALS

- A. Within 30 days of Notice of Award, and in accordance with requirements of Section 013000, 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 Project Manager's review prior to fabrication.
- B. Samples: Manufacturers' standard colors and hardware for selection and review by the Project Manager 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.

1.2 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 Owner.

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 to ensure a complete operating installation.

1.4 MEASUREMENTS

- A. Verify all dimensions shown on Contract Drawings by taking field measurements; proper fit and attachment of all parts is required.

PART 2 – MATERIALS

2.1 MANUFACTURER

- A. Sanymetal, Accurate, Bobrick. Equal products of other manufacturers may be used contingent upon prior approval by Project Manager.

2.2 PRODUCTS

A. Toilet Partitions and Doors:

1. Type: As detailed on Contract Drawings.
2. Materials/Construction – 1” thick Polymer to match existing adjacent construction and in same color and finish.
3. Hardware and Fittings: Top hinge pin shall be secured at three points with all door hinge fittings fully flush with face plates of the door.
 - a. Each door shall be equipped with chrome plated cast alloy coat hook and bumper, concealed latch with bolt of stainless steel permitting exterior access, a one piece chrome plated stop and keeper and #7961 concealed controlled power bearing gravity hinge, all equipped as to match adjacent existing Partitions and Doors.
 - b. The door shall be adjustable to permit rest position at any angle within a 270 degree arc and the weight at all times shall be carried by a thrust bearing with all moving parts concealed within the door thickness.
 - c. Pilaster hinge brackets shall be factory mounted flush to the pilaster and of zamac alloy.

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 doors 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 , side panels and details 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 approximately 1". 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 102100



DIVISION 10 – SPECIALTIES

SECTION 102800.1 - TOILET, BATH, AND LAUNDRY ACCESSORIES (CABINS)

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, No. 4 finish (satin), 0.0312-inch minimum nominal thickness unless otherwise indicated.
- B. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- C. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.2 TOILET AND BATH ACCESSORIES

A. Toilet Tissue Dispenser:

1. Type: Single-roll dispenser.
2. Mounting: Recessed.
3. Material: Stainless steel.
4. Controlled-delivery units cannot be used at accessible toilets.
5. Operation: Noncontrol delivery with standard spindle.

B. Grab Bar:

1. Material: Stainless steel, 0.050 inch thick.
2. Mounting: Concealed.
3. Gripping Surfaces: Slip-resistant texture.
4. Outside Diameter: 1-1/2 inches for heavy-duty applications.

C. Shower Curtain Rod:

1. Outside Diameter: 1-1/4 inches.
2. Mounting: Flanges with concealed fasteners.
3. Material and Finish: Stainless steel, No. 4 finish (satin)

D. Robe Hook

1. Description: Double-prong unit.
2. Material and Finish: Stainless steel, No. 4 finish (satin).

E. Towel Bar:

1. Description: 3/4-inch round tube with circular end brackets.
2. Mounting: Flanges with concealed fasteners.
3. Length: 24 inches.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

F. Underlavatory Guard:

1. Description: Insulating pipe coverings for supply and drain piping assemblies, which prevent direct contact with and burns from piping, and allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded plastic, white.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
1. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.
- B. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items. Remove temporary labels and protective coatings.

END OF SECTION 102800.1

DIVISION 10 – SPECIALTIES

SECTION 102800.2 – TOILET AND BATH ACCESSORIES

PART 1 – GENERAL

1.1 SUBMITTALS

- A. Within 30 days of Notice of Award, and in accordance with requirements of Section 013000, submit:
 - 1. Complete manufacturers' information on all items intended for installation under Work of this Section, including Shop 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 manufacturer's templates provided to Contractor to ensure a proper rough opening is provided.
- C. For OFCI and OFOI items, obtain templates and instructions from Project Manager in ample time to provide blocking, backing, openings, etc.

1.4 MEASUREMENTS

- A. Verify all dimensions shown on Contract Drawings by taking field measurements; proper fit and attachment of all parts is required.

PART 2 – MATERIALS

2.1 PRODUCTS

- A. Toilet Paper Dispensers (TPD) to match existing: surfaced mounted.
- B. Paper Towel Dispensers (PTD) to match existing: surfaced mounted, “C”-fold towel dispenser, satin chrome finish.
- C. Soap Dispensers (SD) to match existing: surfaced mounted liquid soap dispenser, satin finish stainless steel.
- D. Sanitary Napkin Receptacle (SNR): to match existing: surfaced mounted, satin finished stainless steel.
- E. Waste Receptacles (Movable) to match existing open top, free standing waste receptacle, satin finish stainless steel.
 - 1. Provide (1) in each Toilet Restroom.
- F. Purse/Book Shelves to match existing folding utility shelf, provide (1) at Toilet Restroom as directed.
- G. Coat Hooks match existing heavy duty robe/coat hook, provide (1) at Toilet Restroom as directed.
- H. Other Items:
 - 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: 36” grab bar, straight, matching construction of GB-1.
 - 4. GB-4: 48” grab bar, straight, matching construction of GB-1.



- I. Permanent Bench: Construct as detailed with 1-3/8" Polymer board to match existing in detail and color with pipe and metal brackets, set into sleeve and grouted all as called for on the Contract Drawings.

PART 3 – EXECUTION

3.1 INSTALLATION

- 3.2 Install items per respective manufacturers' published instructions and Approved Shop Drawings.
- 3.3 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.
- 3.4 Adhesive installations not permitted.

END OF SECTION 102800.2

DIVISION 10 – SPECIALTIES

SECTION 104413 - FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Units and Location: Provide 2 units and locate where directed by Project Manager.
- B. Submittals: Product Data.
- C. Fire-Rated, Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

PART 2 - PRODUCTS

2.1 FIRE-PROTECTION CABINETS

- A. Fire-Protection Cabinets: Enameled-steel, surface-mounted cabinets.
 - 1. Available Products:
 - a. Badger Fire Protection, A Kidde Company.
- B. Cabinet Construction: Nonrated.
- C. Cabinet Material: Steel sheet.
 - 1. Trim Style: Trimless.
 - 2. Trim Material: Steel.
- D. Door Material: Steel.
 - 1. Door Style: Fully glazed with frame.
 - 2. Door Glazing: Break glass.
- E. Accessories: Mounting brackets.

F. Finishes:

1. Manufacturer's standard baked-enamel paint for the following:
 - a. Exterior of cabinet, door, and trim except for those surfaces indicated to receive another finish.
 - b. Interior of cabinet and door.
2. Steel: Baked enamel or powder coat.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cabinets at 54 inches above finished floor to top of cabinet or heights acceptable to authorities having jurisdiction.
- B. Fire-Rated Hose or Valve Cabinets: Install cabinet with not more than 1/16-inch tolerance between pipe OD and knockout OD. Seal through penetrations with firestopping sealant.
- C. Identification: Apply decal or vinyl lettering identification at locations acceptable to authorities having jurisdiction.

END OF SECTION 104413



DIVISION 10 – SPECIALTIES
SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS AND BRACKETS

A. Portable Fire Extinguishers: 2A10BC minimum per 2009 IFC.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install mounting brackets in locations indicated at 54 inches above finished floor to top of fire extinguisher or heights acceptable to authorities having jurisdiction.

B. Install fire extinguishers in cabinets where indicated.

END OF SECTION 104416

DIVISION 12 – FURNISHINGS
SECTION 129300 – SITE FURNISHINGS

PART 1 – GENERAL

1.1 DESCRIPTION

This Section includes Work to Provide the following site furnishings:

- A. Benches
- B. Fire Rings
- C. Picnic Tables
- D. RV Pedestals
- E. Charcoal Grills
- F. Dog Litter Station

1.2 QUALITY ASSURANCE

Adhere to manufacturer's instructions for product handling, installation and operations.

1.3 SUBMITTALS

Submit manufacturer's product data, Shop Drawings, owner's manual and warranty for the following: benches, fire rings, and picnic tables.

PART 2 – PRODUCTS

2.1 GENERAL

Comply with Specifications and manufacturer's data. Where these may be in conflict, the more stringent requirements govern.

2.2 TIMBER BENCH

Bench shall be TimberForm® Greenway™ series model 2151 Or Equal.

- A. Dimensions: 5 feet 10 inches long by 1 foot 3 1/8 inches wide by 1 foot 4 1/8 inches tall.
- B. Bench slats shall be cedar color, recycled plastic.
- C. Frame shall be black coated with CASPAX-7, a tough, opaque, UV resistant exterior grade polyester powder coating applied to a minimum thickness of 6 mils.

D. Manufacturer: TimberForm®, Telephone (800) 547-1940, Website, www.timberform.com

2.3 FIRE RINGS

A. Fire Ring: Steel ring with flange top and steel bar adjustable cooking grate, 30-inch inside diameter x 11 3/8 inch height x 3/16 inch thick steel ring, 1/2 inch to 5/8 inch bar grate, tip back anchors. Pilot Rock model FS-30/11TB Or Equal.

1. Manufacturer: Pilot Rock 5648 Hwy. 59 South, Cherokee, Iowa, USA 51012, Phone (800) 762-5002
2. Finish: Black

B. ADA Fire Ring: Steel ring with flange top and steel bar swivel cooking grate, 30-inch inside diameter x 17 3/8 inch height x 3/16 inch thick steel ring, 1/2 inch to 5/8 inch bar grate, tip back anchors. Pilot Rock model FSDW-30/18/TB Or Equal.

1. Manufacturer: Pilot Rock 5648 Hwy. 59 South, Cherokee, Iowa, USA 51012, Phone (800) 762-5002
2. Finish: Black

C. Group Campsite Fire Ring: Steel ring with flange top and steel bar swivel cooking grate, 48-inch inside diameter x 11 3/8 inch height x 3/16 inch thick steel ring, 1/2 inch to 5/8 inch bar grate, tip back anchors. Pilot Rock model FS 48/11/PA Or Equal.

1. Manufacturer: Pilot Rock 5648 Hwy. 59 South, Cherokee, Iowa, USA 51012, Phone (800) 762-5002
2. Finish: Black

2.4 PICNIC TABLE

Eight (8) feet long, aluminum, ADA universal access at both ends, full length seats, 2-3/8 inch O.D. steel pipe frames. Pilot Rock Model WXT/G-8AL Or Equal.

- A. Manufacturer: Pilot Rock, 5648 Hwy. 59 South, Cherokee, Iowa, USA 51012, Phone (800) 762-5002.
- B. Furnish 40 Total. District to provide remainder of tables from existing inventory. Install all tables to concrete picnic pads (See anchoring detail in Contract Drawings).

2.5 RV PEDESTAL

A. Load Center: See Exhibit S, Section 264710 – RV Load Centers.

- B. Hose Bib: Haws Model 6275 hose bib faucet with 3/4 inch male hose thread and rough chrome plate finish Or Equal.
- C. Vacuum Breaker (for hose bib): Apollo Model HBVAF2 Or Equal.

2.6 CHARCOAL GRILLS

- A. Type A Cabin Grill (1 total): Pilot Rock Model ASW-20 Or Equal.
- B. Type B Cabin Grill (7 total): Pilot Rock Model H-16 Or Equal.
- C. Manufacturer: Pilot Rock, 5648 Hwy. 59 South, Cherokee, Iowa, USA 51012, Phone (800) 762-5002

2.7 DOG LITTER STATION

- A. Aluminum Dogipot Junior Bag Dispenser model number 1002-2.
- B. Mount to Contractor furnished and installed 4x4 treated post. Post bury depth equal to 3 feet, final height equal to 6 feet. Install dispenser between 4 feet and 5 feet height.

PART 3 – EXECUTION

3.1 EXAMINATION

Verify installation conditions as Satisfactory to receive Work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as Satisfactory.

3.2 INSTALLATION

- A. Protect site furnishings from scratches, dents or other damage during handling and installation.
- B. Install all equipment in accordance with Specifications, Contract Drawings and manufacturer's directions.
- C. Benches
 - 1. Install benches so legs are plumb and seats are level.
 - 2. Anchor timber bench by embedding legs in concrete.
- D. Fire Rings
 - 1. Orient fire rings as shown on Contract Drawings, with level top
 - 2. Install fire rings by embedding tip back anchors in concrete
- E. Picnic Tables
 - 1. Assemble picnic tables according to manufacturer instructions.



2. Fasten to concrete slab according to Contract Drawings.
- F. Clean furnishings and touch up any scratches in method recommended by manufacturer and Approved by the Project Manager.

END OF SECTION 129300

DIVISION 22 – PLUMBING

SECTION 220500.1 - COMMON WORK RESULTS FOR PLUMBING (CABINS)

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Work includes the following: Provide all materials, equipment, labor, supervision, tools and items necessary for the construction, installation, connection, testing and operation of all mechanical Work for this project.
- B. Work includes the following:
 - 1. Motors
 - 2. Motor Control equipment
 - 3. Supports and support accessories
 - 4. Anchoring Hardware
 - 5. Identification
 - 6. Balancing Work
 - 7. Painting

1.2 DEFINITIONS AND ABBREVIATIONS

- A. The word "accepted", as used in these specifications, means the acceptance of the Engineer.
- B. Definitions and abbreviations of all terms shall be in accordance with applicable definitions of:
 - ANSI American National Standards Institute
 - ASHRAE American Society of Heating, Refrigerating & Air Conditioning Engineers
 - ASME American Society of Mechanical Engineers
 - ASTM American Society for Testing and Materials
 - AWS American Welding Society
 - CISPI Cast Iron Soil Pipe Institute
 - FM Factory Mutual Engineering Corporation
 - HI Hydraulic Institute
 - MSS Manufacturers' Standardization Society of the Valve and Fittings Industry, Inc.
 - NEC National Electric Code
 - NEMA National Electrical Manufacturer's Association
 - NFPA National Fire Protection Association
 - NSF National Sanitation Foundation
 - OSHA Occupational Safety and Health Administration
 - SMACNA Sheet Metal and Air-Conditioning Contractors' National Association
 - UL Underwriters' Laboratories, Inc.
 - IBC International Building Code
 - UPC Uniform Plumbing Code
 - IMC International Mechanical Code

WAC	Washington Administrative Code
WSEC	Washington State Energy Code
WISHA	Washington Industrial Safety & Health Act

- C. Refer also to GC-1 Definitions for additional definitions and explanations of terms.
- D. Some of these abbreviations may not be used. All other abbreviations shall have the definition commonly associated with them by the trade or industry. Confirm the meaning of any unclear or unknown definitions with the Project Manager before proceeding with any Work.

1.3 PLANS AND SPECIFICATIONS

- A. The Contract Drawings and Specifications are intended to cover all mechanical Work, unless otherwise shown. Provide all materials that are necessary for the proper completion of the installation or operation of the equipment.
- B. The Contract Drawings are diagrammatic and do not show exact or complete ductwork and piping configurations or the necessary number and types of fittings. Provide all labor and materials required to complete the Work indicated.
- C. Any questions occurring during bidding or construction shall be resolved by direction in writing from the District. Any issues not so resolved or any conflicts shall result with the Contractor bidding, furnishing and installing the most stringent condition. No exceptions.

1.4 LAW AND ORDINANCES

- A. General:
 - 1. All mechanical Work specified under this Contract shall be in strict accordance with the latest rules and regulations of all applicable codes.
 - 2. Contractor is not relieved from furnishing and installing Work shown or specified which may be beyond requirements of ordinances, laws, regulations, and codes. This Work shall be included within the construction contract.
- B. Approval: If not previously performed by the District, file necessary plans, prepare documents and obtain necessary approval of governmental departments having jurisdiction and required certificates of inspection for Work and deliver same to Project Manager before requesting acceptance and final payment for Work.

C. Standards Compliance and Certification:

1. Where equipment or materials are specified to conform with requirements of standards of recognized technical or industrial organizations such as American National Standards Institute (ANSI), American Society for Mechanical Engineers (ASME), Underwriters Laboratories Refrigeration Institute (ARI), or National Electrical Manufacturer's Association (NEMA), that use a label or published listing as a method of indicating compliance, proof of such conformance shall be submitted and accepted.
2. Submit certification for the product submitted and not pre-printed certifications. Do not make statements in the certifications that could be interpreted to imply the product does not meet all requirements specified, such as "as good as"; "achieve the same end use and results as materials formulated in accordance with the referenced publications"; "equal or exceed the service and performance of the specified material." Simply state that the product conforms to the requirements specified.

D. Substitution of Materials: Substitutions of materials will only be considered where specified materials cannot be obtained. All Work and equipment required incidental to the substitution is the responsibility of the Contractor.

1.5 SAFETY AND PROTECTION:

- A. Drive Guards: Provide OSHA-accepted drive and shaft guards for all exposed, rotating shafts and drive connections between motors and driven equipment. Include steel frames securely fastened for easy removal to the equipment frame. Provide tachometer cut-out at shafts where applicable.
- B. Head Protection: Where pipe hangers, equipment support angles, etc., are exposed in walkways, or in access ways for any maintenance, cover all such potentially injurious protrusions less than 7 feet 2 inches above the floor with padding; secure and permanently fasten, and finish to match adjacent finishes.

1.6 TESTING AND DEMONSTRATION

- A. Demonstrate that all equipment operates as indicated and in accordance with manufacturer's recommendations. Support the inspections and testing of components and systems called for to commission the mechanical system. Commissioning shall be by the District; coordinate efforts and support required with the District's Project Manager. Perform tests in the presence of the Project Manager or his designated representative; give minimum one-week notice prior to test. Provide all instruments and personnel required to conduct the tests.

1.7 OPERATIONS AND MAINTENANCE MANUALS

- A. Furnish operations and maintenance (O&M) manuals to the Project Manager before conducting District instruction session in accordance with Section 017823-Operation and Maintenance Manuals.

1.8 INSTRUCTION PERIODS FOR DISTRICT'S PERSONNEL

- A. Description: Following installation of all mechanical equipment and prior to acceptance of the mechanical Work, conduct demonstrations and instruction periods to point out locations of servicing points and required points of maintenance and operation to the Project and his designated representatives.

1.9 INDUSTRY STANDARDS, CODES AND SPECIFICATIONS

- A. All materials, equipment, and systems shall conform to the following applicable industry standards, codes and specifications:

ANSI	AWS	IBC	NEMA	SMACNA	WISHA
ASHRAE	CISPI	IMC	NFPA	UL	WSEC
ASME	FM	MSS	NSI	UPC	
ASTM	HI	NEC	OSHA	WAC	

- B. Where differences occur between state laws, local ordinances, industry standards, utility company regulations and contract documents, the most stringent shall govern.

1.10 QUALITY ASSURANCE:

- A. Regulatory Requirements: Comply with all applicable city, county, and state codes and ordinances. In case of conflict with Contract Drawings or Specifications, the more stringent requirements govern.
- B. All equipment specified herein, including but not limited to motors, motor control equipment, starters, panels, etc., shall be UL listed. European standard shall not be considered as an equivalent.
- C. Basis: International Building Code, Uniform Plumbing Code; International Mechanical Code and local amendments to the same.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with "Quality Assurance" provisions, Specifications, and Manufacturers' Data. Where these may be in conflict, the more stringent requirements govern. Coordinate Work with Division 26-Electric.

2.2 EXPANSION SHELLS AND BOLTS

- A. Expansion Shells for Rod Hangers
 1. Phillips, Gregory, Omark, Fastite Or Equal, in holes drilled in concrete.
- B. Expansion Bolts for Equipment
 1. USM or McCullough in holes drilled in concrete Or Equal.
 2. No screwed adapters underground.

2.3 FORMED STEEL CHANNELS AT SLAB

- A. Provide for all equipment; number and size per manufacturer's recommendations or as indicated.

2.4 ANCHOR BOLTS

- A. Provide for all equipment; number and size per manufacturers' recommendations or as indicated.

2.5 SUPPLEMENTARY STEEL FRAMING

- A. Standard structural steel shapes or Schedule 40 steel pipe, galvanized with extra-heavy finish.

2.6 SLEEVES

- A. Materials, General Schedule: 40 galvanized steel pipe with unthreaded ends, or standard structural steel shapes.
- B. Firestopping: Three-hour rated penetration sealing system per UL 1479 and ASTM E-814. 3M Fire Barrier, Dow Chemical RTV, Manville Cerafiber, Or Equal.
- C. Seal: Seal annulus with bolted compression type seal. Link Seal Or Equal.

2.7 WELDING TO BUILDING STRUCTURAL MEMBERS

- A. Not allowed except as indicated.

2.8 CONCRETE BASES (HOUSEKEEPING PADS)

- A. Provide bases under all floor-mounted equipment. Provide bases 4 inches larger than the equipment footprint in all directions, and 4 inches thick, unless noted otherwise.

2.9 NAMEPLATES

- A. Laminated black plastic with lettering cut through to white background. Plastic strips with raised letters made by a marking device are not acceptable.

2.10 VALVE TAGS

- A. Shall be 0.030 inch thick brass, 1 inch diameter size; state the service and destination of the line controlled. Provide tag inscriptions made with a lettering device with 5/16 inch high cut lettering. Laminated plastic tags, construction similar to nameplates, will also be acceptable.

2.11 PIPING IDENTIFICATION

- A. Self-adhesive, pre-printed identification labels indicating direction of flow and pipe contents, using common industry abbreviations. Identify pipe at every change of direction.

2.12 SPECIAL MAINTENANCE MATERIALS

- A. Provide for equipment requiring frequent replacement of maintenance materials. Provide an extra set of filters, and belts; together with application devices and instructions.

2.13 PAINTING

- A. Paint all exposed fixtures and equipment in conformance with Section 099100.1- Painting. Coordinate color with Project Manager.

2.14 EQUIPMENT LISTING REQUIREMENTS

- A. Whenever UL Standards exist for equipment, provide UL-accepted equipment bearing the UL label.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify installation conditions as Satisfactory to receive Work of this Section. Do not install until any unsatisfactory conditions are corrected. Beginning Work constitutes acceptance of conditions as Satisfactory.

3.2 PREPARATION

- A. Field Measurements: Field-verify locations of new and existing Work prior to commencing Work of this Section.
- B. Protect surrounding areas and surfaces to preclude damage from Work of this Section.

3.3 INSTALLATION, ERECTION, AND PERFORMANCE

- A. Install, apply, erect, and perform the Work in accordance with "Quality Assurance" provisions, Specifications, and manufacturers' installation instructions and directions. Where these may be in conflict, the more-stringent requirements govern.

3.4 CLEANING

- A. Promptly remove waste material and rubbish caused by mechanical construction Work. At completion of the project, clean all equipment, piping and fixtures installed or provided under this Contract.

3.5 CUTTING AND PATCHING

- A. Cut all openings and holes required for mechanical Work. Carefully examine existing conditions prior to commencing Work.

3.6 ACCESSIBILITY

- A. Locate valves, dampers, controls, etc., to be easily accessible.
- B. Install all equipment that requires periodic servicing or repairs to be readily accessible. Otherwise, obtain Project Manager's approval of location. Where valve and equipment are concealed behind access panels or by ceiling tiles, label panel or tile appropriately.
- C. Provide access panels as indicated or As Required for piping, valve or equipment access. The access panel size shall be in proportion to the equipment, piping, or valve requiring access. Minimum access panel size shall be 12 inches x 12 inches.

3.7 SPECIAL PROTECTION

- A. Exercise maximum precaution to provide positive protection for the existing building and equipment from damage of any kind, and in particular prevent any water and dust seepage into the existing building.
- B. Storage of materials: Make all necessary provisions to prevent damage or corrosion of materials.

3.8 EQUIPMENT INSTALLATION

- A. General: Provide supports for all equipment and appurtenances As Required, including braces As Required for seismic restraint; these include frames or supports for pumps and air handlers and all mechanical equipment. Bracing shall conform with the requirements of IBC and IMC. The design, engineering and installation of these members is the responsibility of the contractor.
- B. Suspended Equipment: Provide hangers from structure as required; span between structural members with additional structural steel as required to mount equipment in locations shown. Do not fasten hangers to metal deck. Do not use powder-actuated fasteners.
- C. Floor-Mounted Equipment - General:
 - 1. Provide machine and floor or foundation fastenings; set equipment on concrete pads. Provide equipment base drawings, bolt-setting information, and anchors for all floor-mounted equipment. Provide concrete expansion anchors through concrete equipment pads, installed into existing structural concrete slabs.
 - 2. Install all equipment at the locations, and to the dimensions indicated. Set equipment accurately with principal centerlines and level, using manufacturers' leveling screws, blocks, shims, or wedges. Do not distort equipment or base plates.

3. Install all equipment, piping and ducting such as to provide adequate access for service. This includes access to equipment covered in other divisions or sections of this Specification.

3.9 PIPE SUPPORTS

- A. Attach hangers and support rigidly to the building structure; provide supplementary steel framing and bracing at all changes in pipe direction to resist thrust of flowing water. Provide seismic bracing as required by codes. Do not fasten hangers to metal deck. Do not use powder-actuated fasteners.
- B. Provide additional steel support for piping runs through tight confinements. Provide trapeze system with vibration isolation and seismic restraint for piping through joists and as applicable, due to accessibility of ductwork and mechanical equipment.

3.10 EXPANSION SHELLS AND BOLTS

- A. Use only where necessary to support piping or equipment from existing concrete slabs or walls.

3.11 SLEEVES AND SEALING OF SLEEVES

- A. Provide all sleeving and sealing of sleeves for pipes and ducts.
- B. Provide annular clear space of approximately $\frac{1}{4}$ inch to $\frac{1}{2}$ inch; size to accommodate insulation passing through sleeve where applicable.
- C. Wherever piping passes through any floor slab above occupied space or equipment, provide pipe sleeves extending 1" above floor.
- D. Set sleeves in place prior to pouring of concrete in new construction; core drill and grout sleeves in place for unit masonry construction and existing construction.
- E. Sealing of sleeves through floor slabs and firewalls: Provide firestop system by 3M Or Equal.
- F. Sealing of sleeves for below grade floors and walls: Provide Link Seal Or Equal.

3.12 NAMEPLATES

- A. Provide for all equipment; fasten mechanically. Label access panel or ceiling appropriately for concealed equipment.

3.13 VALVE TAGS

- A. Provide on all new valves; fasten with brass chain to the valve stem.

3.14 PIPING IDENTIFICATION

- A. Provide pipe identification labels on not less than 10 foot centers, on both sides of a wall penetration, and at every change in direction, so that a label is visible from a

standing position on the floor, not more than three feet from the wall. Refer also to Section 230553-Identification for HVAC Piping and Equipment for pipe labeling requirements.

3.15 PAINTING

- A. General - Paint exposed equipment, ducts, piping, sheet metal Work and mechanical system appurtenances unless noted otherwise. Coordinate color with Architect. Refer also to Section 099100.1-Painting.
- B. Application:
 - 1. Thoroughly clean surfaces to be painted to remove dirt, grease and scale. Wash galvanized surfaces with mild solution of acid prior to painting to effectively clean oils from surface and to etch zinc.
 - 2. Paint insulated surfaces and covered piping with one primer coat and two finish coats.
 - 3. Paint exposed equipment, pipes and supports with one primer coat and two finish coats. Paint factory painted equipment to match colors selected by the Project Manager: touch up damaged areas with paint to match factory color.
 - 4. Paint the supporting devices for mechanical devices or systems specified to be painted.

3.16 MISCELLANEOUS EQUIPMENT AND FIXTURE CONNECTIONS

- A. Provide piping, ductwork, and make all final mechanical connections in accordance with manufacturers' recommendations for District-furnished equipment and fixtures, and equipment and fixtures specified.
- B. Perform on-site review and refer to manufacturers' shop drawings for details of connections. Provide rough-in at locations to conveniently serve items.

3.17 BALANCING WORK

- A. General: The Mechanical Subcontractor shall provide all support for balancing and testing Work. Coordinate with Section 230593-Testing, Adjusting, and Balancing for HVAC.
- B. Work by Mechanical Subcontractor:
 - 1. Provide the balancing Subcontractor with access to all equipment installed under this Contract requiring balancing. Provide ladders, scaffolding, lifts As Required to permit the Subcontractor to complete its Work.
 - 2. Operate the mechanical systems and be responsible for all equipment until the balancing and testing is complete. Before balancing and testing commences, check all rotating equipment for proper rotation and lubricate per the manufacturers' recommendations.
 - 3. Do not assume that equipment is shipped from the factory configured to meet specified volumes and quantities. Include belt, sheave, starter heater and other equipment changes, and all Work As Required as part of this Contract in order to permit balancing to required values.

4. Before balancing and testing commences, operate all pumps and auxiliary equipment for a minimum of one hour. During this period, check out and calibrate all control components under operating service.
- C. Work Coordinated With District:
1. Coordinate balancing with other Work and building occupancy to ensure no interruptions occur.

3.18 WIRING

- A. Wiring shall conform to applicable sections of these Specifications. Provide wiring from branch circuit over current device to motor controller to motor terminals, including installation of starter and all connections. Provide raceway and conductors as shown for remote control, or interlock connections. Coordinate other control wiring with Division 26-Electric of the Specifications. Provide overload elements in controllers sized to match motor nameplate full load amperes. Space within controllers shall not be used as a junction box.

END OF SECTION 220500.1

DIVISION 22 - PLUMBING

SECTION 220500.2 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. General Requirements
 2. Piping materials and installation instructions common to most piping systems.
 3. Access Doors
 4. Joining Materials
 5. Dielectric fittings.
 6. Mechanical Sleeve Seals
 7. Sleeves
 8. Escutcheons
 9. Plumbing Demolition.
 10. Flushing and Cleaning of Piping Systems
 11. Pressure Testing of Piping Systems
 12. Piping Systems Common Requirements
 13. Piping Joint Construction
 14. Piping Connections
 15. Equipment Installation Common Requirements
 16. Concrete Bases, Curbs and Housekeeping Pads
 17. 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.
- 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.

1.4 SUBMITTALS

- A. In addition to the requirements of Section 013000, comply with the following:
 - 1. Provide submittal data for each product required by the Specifications. All material and equipment required by the Specifications shall be Approved by the Engineer before being released for shipment.
 - 2. Preparation:
 - a. Clearly mark each copy of the submittals to identify pertinent products or models. Indicate material or equipment by reference to Specification section number, schedule designation on the Contract Documents, or by reference to Sheet or detail on the Contract Drawings.
 - b. Show performance characteristics and capacities.
 - c. Show dimensions and clearances required.
 - d. Show wiring, piping and control diagrams
 - 3. Manufacturer's standard schematic drawings and diagrams:
 - a. Modify drawings and diagrams to delete information which is not applicable to the Work.
 - b. Supplement standard information to provide information specifically applicable to the Work.
 - 4. Submission:
 - a. Provide number of product submittals as required by Section 013000.

B. Contractor Responsibilities:

1. Review Shop Drawings, product data and samples prior to submission.
2. Determine and verify:
 - a. Field measurements
 - b. Field construction criteria
 - c. Catalog numbers and similar data
 - d. Conformance with specifications
3. Coordinate each submittal with requirements of the work and of the Contract Documents.
4. Notify the Project Manager in writing, at the time of submission, of any deviations in the submittals from requirements of the Contract Documents.
5. Begin no fabrication or work which requires submittals until return of submittals with Project Manager acceptance.

C. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.
2. The project title and number
3. The contract identification
4. The names of:
 - Contractor
 - Supplier
 - Manufacturer

D. Provide on submittals contractor's stamp, initialed or signed, certifying review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the Work and of the Contract Documents.

E. Materials or equipment without prior approval will not be acceptable.

F. Resubmission requirements:

1. Submittals which require resubmission shall be returned to the Contractor with corrections noted thereon.
2. Make any corrections or changes in the submittals and resubmit.

1.5 SUPERVISION

A. Contractor shall have in charge of the work at all times a thoroughly competent superintendent with considerable experience in this work. Any superintendent judged not competent by the Project Manager shall be removed at once upon the request of the Project Manager and be replaced by an Approved superintendent.



1.6 CODES, FEES AND RELATED COSTS

- A. All materials and workmanship shall comply with all applicable codes, Specifications, local ordinances, industry standards and utility company regulations.
- B. If building codes, state laws, local ordinances, industry standards and/or utility company regulations conflict with the Contract Documents, the most stringent shall govern. Contractor shall promptly notify the Project Manager in writing of any such difference.
- C. Noncompliance: Should the Contractor perform any work that does not comply with the local ordinances, industry standards and utility company regulations, it shall bear all costs arising in correcting the deficiencies.
- D. Requirements of Regulatory Agencies:
 - 1. Contractor shall be responsible for obtaining and payment for all permits, licenses, and inspection certificates required in accordance with provisions of Contract Documents, and shall pay all fees for the utility connections As Required for this part of the Work.
 - 2. In addition to requirements shown or specified, comply with latest current local and/or state ordinances and codes; and applicable standards, specifications or codes published by:

Building Codes:

- IBC - International Building Code
- IFC - International Fire Code
- UPC - Uniform Plumbing Code
- IMC - International Mechanical Code
- NEC - National Electric Code

Industry Standards, Codes and Specifications:

- AIEE - American Institute of Electrical Engineers
- AMCA - Air Moving & Conditioning Association
- ASA - American Standards Association
- ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers
- ASME - American Society of Mechanical Engineers
- ASTM - American Society of Testing Materials
- IBR - Institute of Boiler & Rating Manufacturers
- SMACNA - Sheet Metal and Air Conditioning Contractors National Association, Inc.
- AWWA - American Water Works Association
- ANSI - American National Standards Institute
- ARI - Air Conditioning and Refrigeration Institute
- FIA - Factory Insurance Association



FM - Factory Mutual
NEMA - National Electrical Manufacturers Association
OSHA - Occupational Safety and Health Act
ADC - Air Diffusion Council
WISHA - Washington Industrial Safety & Health Act
APWA - Standard Specification for Municipal Public Works
NFPA - National Fire Protection Association
WSRB - Washington Survey & Rating Bureau
AIEE - American Institute of Electrical Engineers
WDOE - Washington Department of Ecology
WSEC - Washington State Energy Code
WSVC - Washington State Ventilation Code

1.7 PROJECT RECORD DOCUMENTS

- A. In addition to the requirements of Division 01, project record documents shall include the following:
1. Log the depth of all outside utility lines. Include both new and existing lines encountered during construction.
 2. Log the leaving inverts of all waste and storm lines.
 3. All Field Work Order/Change Orders to the Contract shall be noted on the project record documents and shall include all revisions accomplished by these Change Orders.
 4. No cost Change Orders shall be noted on the project record documents.
 5. Where buried piping has been rerouted from as shown on the Contract Drawings, dimension piping from grid lines, columns, or a fixed part of the building.

1.8 CUTTING AND PATCHING

- A. Provide all cutting and patching of existing building components required by the work of this Division, in accordance with Division 01. This shall include patching of holes left by the removal of mechanical utilities, equipment and fixtures. Materials of the same quality and appearance as adjacent surfaces shall be used unless otherwise indicated.
- B. Holes of 13" diameter or less shall be core drilled by the Contractor. All holes core drilled shall be approved by the Project Manager prior to drilling.
- C. Negligent damage to existing or new structures by the Contractor shall be repaired at the Contractor's expense.

1.9 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.

1.10 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.

1.11 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 Washington State.
- B. This statement is being interpreted by the Washington 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 its suppliers and equipment manufacturers) to purchase and install only equipment bearing the UL or other approved label whenever that equipment



so labeled is available. If the Contractor installs any equipment without the proper UL label, it shall bear the entire cost of correction to the satisfaction of the Washington State Electrical Inspector.

1.12 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 Project Manager's representative or the code authority having jurisdiction.

1.13 CLEANUP

- A. Upon the completion of the Work hereinafter specified and at times during the progress of the Work or when requested by the Project Manager, the Contractor shall remove all surplus materials, debris, and rubbish resulting from its operations, and shall leave the entire building and involved portions of the site, insofar as the Work of the Contract is concerned, in a neat, clean and acceptable condition as Approved by the Project Manager.
- B. The Contractor shall be expected to police its day-to-day operation and maintain a clean and safe working area.

1.14 EXISTING SIDEWALKS, CONCRETE PAVING, CURBS AND BLACKTOP PAVING

- A. Unless indicated otherwise, above items removed or damaged by the Contractor during the Work required under Division 22, or as a result thereof, shall be replaced with like material as specified in Division 32.

1.15 SOD REMOVAL AND REPLACEMENT

- A. Unless indicated otherwise, sod removed or damaged by the Contractor during the Work required under Division 22, or as a result thereof, shall be replaced with like material as specified in Division 31.

1.16 BARRICADES AND BRIDGES

- A. Barricades shall be provided for all Work under Division 22, As Required. Barricades shall be erected to meet all state and local requirements and standards.
- B. Temporary bridges and supports shall be provided for all work under Division 22, As Required, to accommodate vehicle and pedestrian traffic over open trenches or obstructions. All temporary supports and bridges shall be constructed of sufficient strength to safely accommodate the normal vehicle or pedestrian traffic.

1.17 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. At the completion of the Project, at such time as designated by the Project Manager, an operational and maintenance instruction period for the Owner shall take place. Contractor shall have present during this entire period its 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 Project Manager.
- 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 Owner, Contractor shall provide letter to the Project Manager indicating that the instructions have been completed and accepted, and Project Manager shall sign same.

1.18 OPERATION AND MAINTENANCE MANUALS

- A. In addition to the requirements of Section 017823 provide the following for Division 22 Operation and Maintenance Manuals:
 - 1. Arrange material per order of Specifications.
 - 2. Include a copy of all Approved material and equipment submittals (equipment submittals to indicate specific model furnished, capacity, voltage, etc.).
 - 3. Provide operating and maintenance instructions for all equipment to include the following:
 - a. Complete word description of all equipment, including systems and areas served, methods of control and sequence of controls.
 - b. Description of routine maintenance for equipment.
 - c. Suggested frequency of maintenance.
 - d. Lubrication chart for all equipment, listing lubricant to be used and time interval for lubrication.
 - e. Parts list
 - f. Warranties for equipment
 - g. Complete valve schedule for all piping systems to indicate valve tag number, valve location by room number, system served, and valve purpose.
 - h. Copy of Test Log
 - i. Guarantee for work.



1.19 PROJECT CLOSEOUT

A. In addition to the requirements of Division 01, 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:

- 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 Contract 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 insulation complete. _____
- All valves tagged. _____
- All piping systems labeled & with flow Arrows. _____
- All plumbing fixtures installed, properly connected and operational. _____
- All plumbing fixtures cleaned. _____

1.20 QUALITY ASSURANCE

- A. The Contractor shall guarantee all Work included in this section for a period of one year after final Completion. During that period, all defects due to faulty materials or workmanship and damage to other work, resulting therefrom or the correction of same, shall be remedied at the Contractor's expense.
- B. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- C. 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.

1.21 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.

1.22 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. Contract Drawings do not attempt to show complete details of building construction which affect the mechanical installation. Contractor shall refer to the Architectural, Structural, and Electrical Contract 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 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 Project Manager.

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.

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:
 - Capitol Manufacturing Co.
 - Central Plastics Company.
 - Eclipse, Inc.
 - Epcos Sales, Inc.
 - Hart Industries, International, Inc.
 - Watts Industries, Inc.; Water Products Div.
 - 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, Provide products by one of the following:
 - Capitol Manufacturing Co.
 - Central Plastics Company.
 - Epcos Sales, Inc.
 - 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, Provide products by one of the following:
 - Perfection Corp.
 - Precision Plumbing Products, Inc.
 - Sioux Chief Manufacturing Co., Inc.
 - 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, Provide products by one of the following:
 - Advance Products & Systems, Inc.
 - Calpico, Inc.
 - Metraflex Co.
 - Pipeline Seal and Insulator, Inc.
 - Link-Seal

Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.

2. Pressure Plates: Carbon steel. Include two for each sealing element.
3. 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 PLUMBING DEMOLITION

- A. Refer to Division 01 Section "Cutting and Patching", Section 220500 "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.

- B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Project Manager.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 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.

3.3 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 Owner's representatives. Adequate advance written notice of tests shall be given to Project Manager 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 to Project Manager.
- 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 shall not be considered complete until all certificates have been submitted.

3.4 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, and 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 Contract 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 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. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- 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.

3.5 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 Non-pressure Piping: Join according to ASTM D 2855.
 - 6. PVC to ABS Non-pressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Non-pressure 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.

3.6 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.

3.7 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 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.

3.8 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. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 03.

3.9 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 Washington State.
- 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 Engineer.

3.10 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 220500.2

DIVISION 22 - PLUMBING

SECTION 220519 - METERS AND GAGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Thermometers.
 2. Gages.
 3. Test plugs.

1.2 DEFINITIONS

- A. CR: Chlorosulfonated polyethylene synthetic rubber.
B. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.3 SUBMITTALS

- A. Submit product data for items of this specification.

PART 2 - PRODUCTS

2.1 METAL-CASE, LIQUID-IN-GLASS THERMOMETERS

- A. Manufacturers: , Provide products by one of the following:
1. Palmer - Wahl Instruments Inc.
 2. Trerice, 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 gages with valves and snubbers.
- B. Manufacturers: 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: 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. Terice, 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 220519

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. Iron, single-flange butterfly valves.
3. Iron, grooved-end butterfly valves.
4. Bronze lift check valves.
5. Bronze swing check valves.
6. Iron swing check valves.
7. Iron, grooved end, swing check valves.
8. Bronze gate valves.
9. Iron gate valves.
10. Bronze globe valves.
11. Iron globe valves.
12. Chainwheels.
13. 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 Project Manager and at no additional cost to the Owner.

1.4 SUBMITTALS

- A. Submit product data for all items of this specification.

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 IRON, SINGLE-FLANGE BUTTERFLY VALVES

A. 200 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Aluminum-Bronze Disc:

1. Description:

Standard: MSS SP-67, Type I.

CWP Rating: 200 psig.

Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.

Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.

Seat: EPDM.

Stem: One- or two-piece stainless steel.

Disc: Aluminum bronze.

Stem: One- or two-piece stainless steel.

Disc: Stainless steel.

2.5 IRON, GROOVED-END BUTTERFLY VALVES

A. 175 CWP, Iron, Grooved-End Butterfly Valves:

1. Description:

Standard: MSS SP-67, Type I.

CWP Rating: 175 psig.

Body Material: Coated, ductile iron.

Stem: Two-piece stainless steel.

Disc: Coated, ductile iron.

Seal: EPDM.

2.6 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.

2.7 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.

2.8 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.

2.9 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.

2.10 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.

2.11 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.

2.12 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.

2.13 IRON GLOBE VALVES

A. Class 125, Iron Globe Valves:

1. Description:

Standard: MSS SP-85, Type I.
CWP Rating: 200 psig.
Body Material: ASTM A 126, gray iron with bolted bonnet.

Ends: Flanged.
Trim: Bronze.
Packing and Gasket: Asbestos free.

2.14 CHAINWHEELS

- A. Manufacturers: Subject to compliance with requirements, Provide products by one of the following:
 - 1. Babbitt Steam Specialty Co.
 - 2. Roto Hammer Industries.
 - 3. Trumbull Industries.
- B. Description: Valve actuation assembly with sprocket rim, brackets, and chain.
 - 1. Brackets: Type, number, size, and fasteners required to mount actuator on valve.
 - 2. Attachment: For connection to butterfly valve stems.
 - 3. Sprocket Rim with Chain Guides: Ductile iron, of type and size required for valve.
 - 4. Chain: Hot-dip, galvanized steel, of size required to fit sprocket rim.

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.

B. Pipe NPS 2-1/2 and Larger:

1. Iron, Single-Flange Butterfly Valves: 200 CWP, EPDM seat, aluminum-bronze disc.
2. Iron, Grooved-End Butterfly Valves: 175 CWP.
3. Iron Swing Check Valves: Class 125, metal seats.
4. Iron, Grooved-End Swing Check Valves: 300 CWP.
5. Iron Gate Valves: Class 125, NRS or OS&Y.
6. Iron Globe Valves: Class 125.

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 220523

DIVISION 22 - PLUMBING

SECTION 220529 - 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. Submit product data for all items specified in this section.

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 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 220529

DIVISION 22 – PLUMBING

SECTION 220553 - 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. Submit product data for all items specified in this section.

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 Contract 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 Contract 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 220553

DIVISION 22 – PLUMBING

SECTION 220700.1 - PLUMBING INSULATION (CABINS)

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Work includes insulation for piping and equipment.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with all applicable city, county, and state codes and ordinances. In case of conflict with Contract Drawings or Specifications, the codes and ordinances govern.

B. Basis: International Building Code; Uniform Plumbing Code; International Mechanical Code; Washington State Energy Code.

C. Applicable industry Standards. Refer to Section 220500.1-Common Work Results for Plumbing.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013000-Administrative Requirements, and the following.

B. Product Data: Insulation, Insulation Covers; Inserts.

1.4 APPLICABLE PUBLICATIONS (MOST RECENT EDITIONS)

A. American Society for Testing and Materials (ASTM) Standards:
1. E84 Surface Burning Characteristics of Building Materials
2. E96 Test for Water Vapor Transmission of Materials

B. National Fire Protection Association (NFPA) Standards:
1. 90A Air Conditioning and Ventilating Systems
2. 255 Building Materials, Tests of Surface Burning Characteristics

C. Underwriters' Laboratories, Inc. (UL) Publications:
1. 723 Hazard Classification of Building Materials

1.5 DEFINITIONS AND ABBREVIATIONS USED IN THIS SECTION

A. Definitions:
1. "Exposed" is Work exposed to the view of occupants in normally occupied areas and in equipment rooms.



2. "Concealed" is Work located in ceiling spaces, chases and other locations not exposed to view.
3. "Cold Piping" includes the piping to 70° F:
4. "Hot Piping" includes the piping from to 71° to 250° F

B. Abbreviations:

- ASJ All-Service Jacket,
- FSK Foil-Scrim-Kraft Jacket,
- K Thermal Conductivity, BTU per hour per square foot per degree F for each inch of thickness,
- PCF Pound per cubic foot density,
- Perm Water vapor transmission rate (permeability),
- SSL Self-Sealing Lap.

1.6 SURFACE BURNING CHARACTERISTICS:

- A. Provide composite or component ratings per NFPA 255, ASTM E84, or UL 723, as follows: Fiberglass Insulation, flame spread 25, smoke developed 50.
- B. Composite includes insulation, jacketing and adhesive used to secure jacketing or facing.
- C. Components include PVC jacketing and fittings, adhesive, mastic, cement, tape and cloth.

1.7 MINIMUM INSULATION THICKNESS:

- A. Thickness of insulation is defined as the thickness of the basic insulating medium not including finishing materials.
- B. Mechanical Pipe Insulation, Fiberglass ASJ, Flexible Elastomeric: Thickness shall conform to the following table:

MINIMUM PIPE INSULATION

Service	<u>Insulation Thickness for Pipe Sizes</u>					
	Fluid Temp. Max °F	Runouts	1" & Less	1-1/4" – 2"	2-1/2" – 4"	5" – 6"
a. Domestic Hot Water (HW, HWC)	120	.5	1.0	1.0	1.5	1.5
b. Non-Potable Water, Rainwater Leaders, Coil Condensate	55	.5	.5	.75	1.0	1.0

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with "Quality Assurance" provisions, Specifications, and manufacturers' data. Where these may be in conflict, the more stringent requirements govern.

2.2 ACCEPTABLE MANUFACTURERS

- A. Fiberglass: Owens-Corning; Knauf; Certainteed; Johns Manville Or Equal.
- B. Flexible Elastomeric: Armstrong, Rubatex Or Equal.

2.3 PIPING INSULATION

- A. Fluid Piping Insulation: One-piece fiberglass, molded heavy density with ASJ/SSL; K value not greater than 0.23 at 75° F mean temperature.
- B. Fluid Piping Insulation Fittings:
 - 1. General: Provide insulation of equal thickness to adjacent pipe insulation.
 - 2. Indoor: Pre-formed fiberglass, mitered sections of pipe insulation, or fiberglass blanket.
- C. Fluid Valves: Flexible blanket consisting of sandwich section of fiberglass, equal thickness as adjacent insulation, enclosed in glass cloth cover, machine sewn at the ends; provide copper eyehooks and wire for lacing the blanket to the valve or pump.

2.4 INSERTS (LOAD-BEARING INSULATION) BETWEEN PIPES AND PIPEHANGERS/SUPPORTS

- A. General: Coordinate with the Work of Section 230700.1-HVAC Insulation.
- B. Provide rigid insulation inserts, thickness equal to the adjoining insulation with vapor barrier.
- C. Provide insulation protection shields between inserts and pipe hangers/supports, minimum 12 inches long, 18-gauge galvanized steel; Grinnell, Fee & Mason, Elcen, Or Equal.

2.5 FLUID PIPING INSULATION PROTECTION

- A. Hot water piping and fittings: PVC insulation jacket, fitted covers at fittings. Fire and flame spread rating not to exceed 25 and 50 respectively. Zeston Or Equal.

2.6 EQUIPMENT

- A. Unfaced board, 6 PCF density, consisting of glass fibers bonded with thermosetting resin. Suitable for temperatures to 450° F

2.7 ADHESIVES, CEMENTS AND FINISHES

- A. Insulation Cement: Manville No. 460, Or Equal, mineral wool based insulating cement with good adhesion to cold surfaces and rated to 1800° F.
- B. Lagging Adhesive: Arabol E1658E, Foster 30-36, Or Equal, thinned per manufacturer's instructions.
- C. Vapor Barrier coating: Non-flammable, fire-resistant, polymeric resin, compatible with insulation.
- D. Spray Mastic: Insulcoustic 551, Foster 35-01, Or Equal.
- E. Glass Cloth: Twinberg-Miller "Glasfab" No. 2020-X, Foster "Mast-a-Fab", Or Equal.
- F. Bonding Adhesive: Foster 85-17 Or Equal.
- G. Insulation Weather Cover for Piping Installed Outdoors: Embossed soft aluminum sheet, .016 inch minimum thickness.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify installation conditions as Satisfactory to receive Work of this Section. Do not install until unsatisfactory conditions are corrected. Install insulation and related equipment in accordance with the manufacturer's written instructions. Beginning Work constitutes acceptance of conditions as Satisfactory.

3.2 PREPARATION

- A. Field Measurements: Field-verify locations of new and existing Work prior to commencing Work of this Section.
- B. Protect surrounding areas and surfaces to preclude damage from Work of this Section.

3.3 INSTALLATION, APPLICATION, ERECTION AND PERFORMANCE

- A. Install, apply, erect, and perform the Work in accordance with "Quality Assurance" provisions, Specifications, and manufacturers' installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.4 TIME OF APPLICATION

- A. Apply insulation only after piping and or duct systems have been tested and certified by the Project Manager or his designated representative as ready for insulation. If insulation is applied prior to testing, necessary removals, repairs and modifications to insulation due to leaks that may occur in piping systems shall be made without additional cost to the District.

3.5 EXTENT OF INSULATION

- A. Insulate all piping, ductwork and equipment completely, except as indicated.
- B. Do not insulate the following:
 - 1. Piping: Valve stems, handwheels and operators and unions.
 - 2. Equipment: Items with factory-applied insulation meeting the requirements of this Section. Do not apply insulation over coil and damper access panels, or over internally lined ductwork that satisfies the specified insulation requirements.

3.6 INSTALLATION, GENERAL

- A. Apply in a workmanlike manner, by skilled workmen regularly engaged in this type of Work.
- B. Apply to clean and dry surfaces.
- C. On cold surfaces, apply with continuous, unbroken moisture and vapor seal. Insulate and vapor seal all hangers, supports, anchors, and other projections that are secured to cold surfaces, to prevent condensation.
- D. Extend all surface finishes to protect all raw edges, ends, and surfaces of insulation.
- E. Install all piping and duct insulation continuous through walls, ceilings, and floor openings and sleeves, except where firestop or firesafing materials are required.
- F. Install with all joints tightly butted.
- G. Tuck and tuft all edges of insulation.
- H. Install insulation to allow easy access to equipment for inspection and repairs.
- I. Carefully bevel and seal insulation around equipment nameplates.

3.7 PIPING INSULATION

- A. Determine if piping requires heat tracing before applying insulation. Coordinate with pipe fitter.

- B. Cold Piping:
 - 1. Secure all ends with SSL butt strips, minimum 3 inches wide.
 - 2. Secure all joints and exposed ends at fittings, valves, and equipment with vapor-barrier mastic.
- C. Hot Piping: Secure all ends with ASJ or SSL butt strips, minimum 3 inches wide; secure ASJ laps and butt strips with outward clinch staples at 4 inch spacing, or with suitable lap adhesive.
- D. PVC Covers for Piping Fittings and Valves: Seal all circumferential edges by an overlap of at least 2 inches onto adjacent pipe cover. Secure ends of PVC covers solvent-type PVC adhesive.
- E. Insulated piping located outdoors: Verify heat-tracing system has been installed and tested for operation prior to installation of insulation. Apply insulation as specified. Apply embossed aluminum weather cover to entire surface of exposed pipe. Double fold seam and seal with approved mastic.

3.8 FINISHES

- A. Vapor Barrier: Cold water piping insulation shall be continuously covered with an accepted vapor barrier. Apply two coats of the vapor barrier coating over all surfaces and lagging not covered with continuous vapor barrier jackets. Fill all joints, cracks, seams and depressions, and apply additional lagging as necessary to form smooth continuous surfaces.

END OF SECTION 220700.1

DIVISION 22 – PLUMBING

SECTION 22 07 00.2 - PLUMBING INSULATION (COMFORT STATION)

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.

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 manufacturer's 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 inch thick, 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 inch thick, for all pipe sizes.
- D. Domestic Hot and Re-circulated Hot Water Below Grade:
1. Insulation shall be Flexible Elastomeric pipe insulation: minimum 1 inch thick, 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 220700.2

DIVISION 22 – PLUMBING

SECTION 221000 - PLUMBING PIPING AND PUMPS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Work includes piping and associated appurtenances for the following systems.
 - 1. Sanitary, drain, waste, vent and rainwater piping.
 - 2. Domestic cold, and hot water circulation systems.
 - 3. Drain and drip piping from equipment, relief valves, etc.
 - 4. Circulating water pumps and accessories.

- B. Related Work Specified or Indicated Elsewhere:
 - 1. Section 221116-Domestic Water Piping
 - 2. Section 224200-Plumbing Fixtures
 - 3. Contract Drawings and Specifications

1.2 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with all applicable city, county, and state codes and ordinances. In case of conflict with Contract Drawings or Specifications, the codes and ordinances govern.

- B. Basis: International Building Code; Uniform Plumbing Code; International Mechanical Code.

- C. Applicable industry standards. Refer to Section 220500.1-Common Work Results for Plumbing.

1.3 SUBMITTALS

- A. General:
 - 1. Submit in accordance with Section 013000-Administrative Requirements and the following.

- B. Product Data:
 - 1. Pipe and Fittings
 - 2. Valves
 - 3. Strainers
 - 4. Flanges and Unions

1.4 STANDARDS

- A. The most recent edition of the following is hereby referenced.

- B. American National Standards Institute, Inc. (ANSI):
 - B1.1 Unified Screw Threads
 - B2.1 Pipe Threads (Except Dry Seal)
 - B16.1 Cast-Iron Pipe Flanges & Flanged Fittings, 125, and 250 psi
 - B16.3 Malleable Iron Threaded Fittings, Class 150 and 300 Pound
 - B16.5 Steel Pipe Flanges, Flanged Valves and Fittings Including Ratings for Class 150.
 - B16.18 Cast Bronze Solder Joint Fitting
 - B16.22 Wrought Copper and Bronze Solder-Joint Pressure Fittings
 - B18.2.1 Square Hex Bolts, Screws, Including Askey
- C. American Society for Testing and Materials (ASTM):
 - A53 Pipe, Steel, Black and Hot-Dipped, Zinc- Coated, Welded, and Seamless
 - A120 Pipe, Steel, Black and Hot-Dipped, Zinc-Coated (Galvanized), Welded and Seamless, for Ordinary Uses
 - A47 Malleable Iron Castings
 - A536 Ductile Iron Castings
 - A183 Heat-Treated, Carbon-Steel Track Bolts and Carbon-Steel Nuts
 - A126 Gray Iron Castings for Valves, Flanges, and Pipe Fittings
 - A181 Forgings, Carbon Steel for General Purpose Piping
 - A307 Carbon Steel Externally-Threaded Standard Fasteners
 - A36 Structural Steel
 - B32 Solder Metal
 - B61 Seam or Valve Bronze Casting
 - B62 Composition Bronze or Ounce-Metal Castings
 - B88 Seamless Copper Water Tube

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with "Quality Assurance" provisions, Specifications, and Manufacturers' Data. Where these may be in conflict, the more stringent requirements govern.
- B. Pressure Ratings: Provide all components with minimum pressure rating of 150 psig working pressure.

2.2 DRAIN, WASTE, AND VENT PIPING

- A. Below Ground: Service weight cast iron, ASTM 74/ASTM 120. Soil pipe and fittings with bell and spigot joints, or, no-hub cast-iron pipe with elastomeric sealing sleeve and stainless steel clamp, conforming to CISPI 301 if permitted by local plumbing authority.

- B. Above Ground: Service weight cast iron, ASTM 74/ASTM 120. No-hub cast-iron pipe with elastomeric sealing sleeve and stainless steel clamp, conforming to CISPI 301 or galvanized steel with cast-iron drainage type fittings, ASTM C564, CISPI 310.
- C. Vent Piping Termination: Terminate vent piping as shown on the Contract Documents with a vandal-proof cap. Zurn Z-193 Or Equal.

2.3 WATER PIPING

- A. Provide copper piping and fitting system for domestic water piping. Copper as required by Specification Section 221116-Domestic Water Piping.

2.4 HANGERS, SUPPORTS AND ACCESSORIES

- A. Refer to Specification Section 221116-Domestic Water Piping.

2.5 SOLDER

- A. Lead free, 95/5 tin antimony solder.

2.6 VALVES

- A. As required by Specification Section 221116-Domestic Water Piping.

2.7 PRESSURE AND TEMPERATURE RELIEF VALVES

- A. Zurn/Wilkins, or Watts series 40-140 bronze Or Equal, ASME rated, automatic reseating, test lever.

2.8 HOOD AND FLASHING ASSEMBLY

- A. Stoneman 1000-3 or 1000-5 Or Equal.

2.9 CONDENSATE AND DRIP DRAINAGE PIPING

- A. Copper DWV piping with drainage fittings.

PART 3 - EXECUTION

3.1 GENERAL

- A. Verify installation conditions as Satisfactory to receive Work of this Section. Do not install until any unsatisfactory conditions are corrected. Install all equipment in accordance with the manufacturers' written instructions. Beginning Work constitutes acceptance of conditions as Satisfactory.
- B. Piping shall be installed routed directly as possible with the fewest fittings, parallel and true to building lines, avoiding architectural fixtures and building illumination.

- C. Couplings shall not be installed in wall or floor sleeves.
- D. Open piping shall be capped during construction to prevent dirt and debris from entering the piping.
- E. All piping shall be concealed above the ceiling or inside the walls unless indicated or noted otherwise on the Contract Documents.
- F. All items requiring service shall be installed in accessible locations or provided with an access door of adequate size to service the valve or equipment, minimum 12 inches x 12 inches. Coordinate rating of access door with the fire separation rating indicated on the Contract Drawings.

3.2 SLEEVES

- A. Pipes passing through walls or floors shall be sleeved by 24 gauge steel pipe sleeves sized two inches greater than the pipe diameter. Fill annular space with fire rated, non-hardening caulking compound. Piping shall not directly contact the sleeve.
- B. Pipe passing through concrete walls, floors or any roof penetration shall be sleeved with schedule 40 steel pipe sleeves, flashed, sealed and caulked.

3.3 FIRE SEPARATIONS

- A. All pipe penetrations through fire-rated walls shall be sealed or caulked with a non-combustible flame retardant caulking to maintain the rating of the fire rated partition. 3M or Approved equal. Review Contract Drawings to confirm the location of all fire rated partitions before initiating Work.

3.4 DRAIN, WASTE, AND VENT PIPING

- A. Install piping as indicated and to provide every plumbing fixture and equipment item requiring water with suitable soil, waste or vent connection, as required by governing code.
- B. Install piping at a minimum grade of ¼ inch per lineal foot of run; not less than 1/8 inch per lineal foot with permission of local plumbing authority. Hold all piping as close to the structure as possible to maximize headroom. Extend sanitary and rainwater piping to a point five feet outside building wall, or to the point of connection indicated by the Contract Documents. Install main vertical soil and waste stacks with provisions for expansion and contraction and extend full size to roof line as vents.
- C. Install clean-outs at all deadends, at all changes of direction and at fifty-foot intervals on horizontal runs.
- D. Do not join any buried cast iron piping with couplings of dissimilar metals. Joints shall be hub and spigot or with use of accepted cast iron couplings.
- E. Fittings at bottom of stacks shall have supporting shoes and anchors.

- F. Carry each soil or waste stack and vent stack continuously full size up and through the roof. Where possible, combine vent stacks to minimize roof penetrations. Extend all vent stacks at least 12 inches above the roof. Install vents with vandal-proof hood and flashing assembly.
- G. Terminate each vent with an accepted frostproof jacket. Caulk fully and completely around the pipe and jacket to form a gas and watertight seal between the vent, roof and the building.
- H. Coordinate with fixtures provided under other Divisions. Furnish all equipment, connections, and Work required.
- I. Trap all fixtures as required by the Uniform Plumbing Code. Size the traps in accordance with Uniform Plumbing Code requirements.
- J. Test piping at the completion of the installation and with the Construction Inspector present. Fill system with water to a minimum height of 10 feet and check for leaks. Eliminate leaks before concealing Work. Contractor may air test piping in accordance with Uniform Plumbing Code requirements as an option.

3.5 DOMESTIC WATER PIPING

- A. General:
 - 1. Conceal in finished areas. Grade cold and hot water piping so it can be drained from low points. Wherever such points cannot be drained through fixtures or hose bibs, run valved drain to nearest floor drain or provide valved hose connection.
- B. Leak Testing:
 - 1. Piping shall be tested and prove tight prior to concealment under a test pressure not less than 1-1/2 times working pressure. System shall maintain the test pressure for not less than 15 minutes.
- C. Sterilization:
 - 1. Sterilize system in accordance with AWWA C601 or local plumbing authority. Flush system, introduce chlorine or chlorine compound sufficient to provide residual of 50 ppm. Flush system after 24 hour contact period to eliminate all traces of chlorine. Do not place into service until accepted by Construction Inspector.

END OF SECTION 221000

DIVISION 22 – PLUMBING

SECTION 221116.1 - DOMESTIC WATER PIPING (CABINS)

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Work includes general requirements for piping and associated appurtenances.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with all applicable city, county, and state codes and ordinances. In case of conflict with Contract Drawings or Specifications, the codes and ordinances govern.

B. Basis: International Building Code; Uniform Plumbing Code; International Mechanical Code.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013000-Administrative Requirements and the following.

B. Shop Drawings, prepared on the architectural background.

C. Product Data

1. Pipe and Fittings
2. Valves
3. Gaskets
4. Strainers
5. Sleeves
6. Seals
7. Unions
8. Dielectric Unions
9. Pipe, Hangers and Support
10. Accessories

1.4 STANDARDS

A. The most recent edition of the following is hereby referenced.

- B. American National Standards Institute, Inc. (ANSI)
 - B1.1 Unified Screw Threads
 - B2.1 Pipe Threads (Except Dry Seal)
 - B16.1 Cast-Iron Pipe Flanges & Flanged Fittings, 125, and 250 psi
 - B16.3 Malleable Iron Threaded Fittings, Class 150 and 300 Pound
 - B16.5 Steel Pipe Flanges, Flanged Valves and Fittings Including Ratings for Class 150.
 - B16.18 Cast Bronze Solder Joint Fitting
 - B16.22 Wrought Copper and Bronze Solder-Joint Pressure Fittings
 - B18.2.1 Square Hex Bolts, Screws, Including Askey

- C. American Society for Testing and Materials (ASTM)
 - A53 Pipe, Steel, Black and Hot-Dipped, Zinc- Coated, Welded, and Seamless
 - A120 Pipe, Steel, Black and Hot-Dipped, Zinc-Coated (Galvanized), Welded and Seamless, for Ordinary Uses
 - A47 Malleable Iron Castings
 - A536 Ductile Iron Castings
 - A183 Heat-Treated, Carbon-Steel Track Bolts and Carbon-Steel Nuts
 - A126 Gray Iron Castings for Valves, Flanges, and Pipe Fittings
 - A181 Forgings, Carbon Steel for General Purpose Piping
 - A307 Carbon Steel Externally-Threaded Standard Fasteners
 - A36 Structural Steel
 - B32 Solder Metal
 - B61 Seam or Valve Bronze Casting
 - B62 Composition Bronze or Ounce-Metal Castings
 - B88 Seamless Copper Water Tube

- D. Federal Specification (Fed. Spec.)
 - WW-H-171D Hangers and Supports, Pipe

- E. Manufacturers' Standardization Society (MSS)
 - SP-69 Pipe Hangers and Supports - Selection and Application

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with "Quality Assurance" provisions, Specifications, and manufacturers' data. Where these may be in conflict, the more stringent requirements govern.
- B. Pressure Ratings: Provide all components with minimum pressure rating of 150 psig steam working pressure.

2.2 PIPE MATERIALS

- A. Other piping is specified under related sections, including Section 221000-Plumbing, Piping and Pumps and 224200-Commercial Plumbing Fixtures.

2.3 ACCEPTABLE MANUFACTURERS

A. Pipe:

1. Copper Tubing: Chase, Anaconda, Revere, Mueller, Phelps-Dodge, Reading Tube, Bridgeport Or Equal.
2. Steel Pipe: U.S. Steel, National, Bethlehem, Youngstown, Republic Tube, Jones & Laughlin Or Equal

B. Fittings:

1. Copper/Brass Fittings: Nibco, Tube Turns, Crane, Anaconda, Chase, Revere, Phelps-Dodge Or Equal
2. Steel Pipe Fittings: Grinnell, Grabler, Stockham, Walworth, Kuhns, Flagg Or Equal.

C. Valves:

1. General: Crane, Lunkenheimer, Jenkins, Walworth, Kennedy, Stockham, Nibco, W-K-M, Milwaukee, Powell, DeZurik, Homestead, Ohio Or Equal
2. Non-metallic: Corrosion Resistant, Valves, ASAHI/ American Or Equal.
3. Pressure ratings indicated are steam working pressure (SWP).

D. Gaskets: Crane, Garlock, U.S. Rubber, Anchor, Flexitallic Or Equal.

E. Strainers: Armstrong, McAlear, Sarco, Hoffman, Crane, Nicholson Or Equal.

2.4 COPPER PIPING

A. Above Ground (CW, HW, HWC)

1. Type L hard drawn seamless copper water tube, ANSI H23.1, ASTM B88 with cast brass or wrought copper pressure fittings, ANSI B16.22.

B. Below Ground (CW, HW, HWC)

1. Pipe: Type K soft copper tube, ANSI H23.1, ASTM B88, with cast brass or wrought copper pressure fittings, ANSI B16.22; cast-bronze solder joint fittings and screwed adapters, ANSI B16.18

C. Condensate and Drip Drainage Piping (C)

1. Pipe: Type DWV copper.

D. Unions For Similar Materials: Wrought-copper solder joint unions, ANSI B16.22; cast-bronze solder joint fittings, ANSI B16.18.

1. For Dissimilar Materials: See Dielectric Unions Below.

E. Flanges and Flanged Fittings: Cast bronze, 125-pound Class, ASME Standards.

- F. Joint Compound: Teflon Type
- G. Solder, above ground piping 2-1/2 inch and smaller: 95 percent tin, 5 percent antimony solder, ASTM B32, 95TA.
- H. Solder, above ground piping 3 inches and greater: Sil-fos or Sil-braz.
- I. Strainers: 250-pound cast bronze, Y-pattern, screwed or solder end, ASTM B61; 0.045 inch perforations, brass screen, ANSI B2.1.
- J. Valves
 - 1. Gate: 150-pound bronze, screwed or solder end, union bonnet, rising stem, solid bronze disc, repackable under pressure, ASTM B62.
 - 2. Globe or Angle: 150-pound bronze, screwed or solder end, union bonnet, rising stem, solid bronze 500 BHN disc and seat ring or Teflon disc, repackable under pressure, ASTM B62.
 - 3. Check: 150-pound bronze screwed or solder end, screwed cap, Y pattern, swing disc, regrindable seat, ASTM B62.
 - 4. Ball: 150-pound bronze or brass body, ball and stem; solder or screwed ends, three piece construction, Teflon seat and seal.

2.5 SLEEVES

- A. Footing Encasement Sleeve: Schedule 80 PVC sleeve.
- B. Floor, Wall and Roof Sleeves: Schedule 40 steel pipe.
- C. Underground walls: Rubberized link assembly fitting in the wall/pipe annulus with compression/expansion adjusted by through bolts. Link Seal or Approved equal.

2.6 PIPE HANGERS AND SUPPORTS

- A. Description: Provide in accordance with Federal Specification WW-H-171D and MSS SP-69.
- B. Acceptable Manufacturers: ITT-Grinnell, Fee & Mason, Elcen, Unistrut, Powerstrut, Superstrut, Or Equal.
- C. Materials
 - 1. Match piping material at point of contact with piping; carbon steel, cast iron or malleable iron for black steel pipe; carbon steel, iron or malleable with zinc coating or cadmium-plated for galvanized steel pipe; carbon steel or malleable iron with copper finish or PVC plastic coated for copper pipe or plastic pipe.

2. Rods: Hot rolled steel, ASTM A36. Size in conformance with the following:

Rod Diameter (Inches)	Pipe Size (Inches)	Load at 650F (Pounds)
3/8	2 and smaller	610
1/2	2-1/2 and 3-1/2	1,130
5/8	4 and 5	1,810
3/4	6	2,710
7/8	8 to 12	3,770

D. Components

1. Ring Hangers:
 - a. 2 inches and smaller: Adjustable swivel type, Grinnell 97 or 104 Or Equal.
 - b. 2-1/2 inches and larger: Adjustable split-ring swivel type, Grinnell Figure 104 Or Equal.
2. Clevis Hangers: Grinnell Figure 260 Or Equal
3. Trapeze Hangers and Multiple Pipe Supports: Structural steel shapes in conformance with Section 220500-Common Results for Plumbing, supported by rods or structural steel shapes As Required.
4. Horizontal Pipes at Walls:
 - a. 2-1/2" and smaller: Malleable-iron, one-hole clamp, Grinnell 126 Or Eequal.
 - b. 3" and larger: Welded-steel bracket, Grinnell Figure 213, 194, 195, 199, Or Equal, used in conjunction with ring or clevis hangers.
5. Vertical Pipes at Walls:
 - a. 1 inch and smaller: Galvanized steel pre-formed metal shapes, Unistrut P1100 Series with P2024 clamps for O.D. tubing and P2909 clamps for pipe Or Equal.
 - b. 2-1/2 inches and smaller: Galvanized steel pre-formed metal shapes, Unistrut P1100 Series with P2558 pipe straps Or Equal.
 - c. 3 inches and larger: Welded-steel brackets as specified for horizontal pipes at walls, connected to Grinnell Figure 212 pipe clamp with Figure 110R eye socket Or Equal.
6. Insulation Protection: Coordinate with insulation Subcontractor, Section 220700-Plumbing Insulation.

2.7 DIELECTRIC UNIONS

- A. Provide at each joint between dissimilar metals:
 1. 2 inches and smaller: Capital insulating unions per specification sheet IUS-2; Epco dielectric unions per Catalog 12-70 Or Equal.
 2. 2-1/2 inches and larger: Capital insulating flange union per companion, 1/2 flange union with bolt insulators, dielectric gasket, bolts and nuts per Catalog 12-70 Or Equal.

2.8 PIPE THERMOMETERS

- A. Industrial Grade, separable socket construction, bi-metallic type, 3 inch minimum dial diameter; 50-250° F for hot water piping; 30-120° F for cold water piping. American, Ashcroft, Palmer, Weksler, Or Equal.

2.9 PRESSURE REDUCING VALVE

- A. Bronze body construction without integral basket strainer, 300 psi working inlet pressure, 160° F working temperature, 10 to 35 psi range. Watts 223 LLP, Cash, Fisher, Spence Or Equal.

2.10 BACKFLOW PREVENTER, RPBP (AS REQUIRED)

- A. All bronze body reverse pressure backflow preventer with strainer, Y pattern check valves and hydraulically dependent differential relief valve. 175 psi working pressure, 180° F working temperature. As manufactured by Hersey, Febco, Watts Or Equal.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify installation conditions as Satisfactory to receive Work of this Section. Do not install until any unsatisfactory conditions are corrected. Beginning Work constitutes acceptance of conditions as Satisfactory.

3.2 PREPARATION

- A. Field Measurements: Field verify locations of new and existing Work prior to commencing Work of this Section.
- B. Protect surrounding areas and surfaces to preclude damage from Work of this Section.

3.3 INSTALLATION, APPLICATION, ERECTION AND PERFORMANCE

- A. Install, apply, erect, and perform the Work in accordance with "Quality Assurance" provisions, Specifications, and manufacturers' written installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.
- B. Provide thrust bracing of all ells and tees on the following piping systems 3 inches and larger in size: CW.
 - 1. Thrust bracing shall be affixed to fittings with metallic clamp devices with minimum 1-1/4 inch schedule 40 pipe struts. Paint all metallic parts for corrosion protection. Meet requirement of NFPA-13 for fire sprinkler piping thrust bracing.

3.4 INSTALLATION OF PIPING

- A. General: Install pipe generally sloped to permit drainage at all low points, free from traps, and in a manner to conserve space for other Work; cap or plug all open ends.
- B. Location of Piping:
 - 1. Piping plans, sections, details and diagrams are diagrammatic indicating general arrangement of piping installation. Locate piping to avoid interference with building structural members, equipment, building openings, light fixtures, ductwork, electrical Work, and other obstructions. Provide offsets as required.
 - 2. Arrange piping to allow access for operation, service, disconnection, and removal and replacement of valves, fixtures and equipment.
 - 3. In general, maintain the maximum possible headroom in ways of egress, including pedestrian walkways and maintenance aisles, maintain a headroom of 7 feet 2 inches from the floor to the bottom of any component.
 - 4. Route piping parallel to column lines and perpendicular to floor unless indicated otherwise.
- C. Provide unions or flanges at valves, fixtures and equipment if a means of disconnection is not otherwise provided.
- D. Provide reducing fittings (eccentric type) for all changes in pipe size; bushings are not acceptable.
- E. Use fittings for all changes in direction of piping.
- F. 2 Position valve stems horizontal or above.

3.5 SLEEVES

- A. Pipes passing through walls, floors or roofs shall be sleeved by schedule 40 steel pipe sleeves sized two inches greater than the pipe diameter. Fill annular space with fire rated, non-hardening caulking/safing compound. Piping shall not directly contact the sleeve.
- B. Pipes passing through underground exterior walls shall be sleeved and sealed with a link-type seal.

3.6 JOINTS

- A. Screwed
 - 1. Provide threads of iron and steel pipes, fittings and couplings in accordance with ANSI B31.1.
 - 2. Produce sufficient lengths of high-quality threads to ensure full metal-to-metal contacts when screwed home in fittings; countersink, ream, and clean ends of pipes after threading.

3. Make up full connections with not more than one full thread exposed, by such method that will not subject pipes or fittings to twisting or cross strains; lubricate male threads only with thread lubricant.

B. Soldered

1. Cut ends square and remove all fins and burrs. Replace all dents and damaged tubing with new tubing.
2. Remove all grease and oil from all joints by wiping with clean cloth saturated with a suitable chemical solvent and then clean with energy cloth.
3. After cleaning, apply non-corrosive flux, apply heat and solder and hold joint rigidly until solder has hardened.
4. Before soldering, remove stems and washers of solder-joint valves.

3.7 PIPE HANGERS AND SUPPORTS

A. Coordinate all hanging and supports with the Engineer prior to installation.

1. All attachments to existing concrete structure must conform to Contract Drawings to avoid damage to internal tension cables:
2. See Contract Drawings for locations of exposed conduit, piping and duct penetrations.
3. All nonstructural components/systems weighing more than 20 lbs. or 5 plf shall be attached to anchorage zones per detail L/S5.2. See Contract Drawings for locations of anchorage zones.
4. Components of lesser weight can be anchored as noted in Contract Drawings.
5. For attachments of components less than 200 lbs. to existing walls, expansion bolts or drive pins may be used. Locate & avoid damage to existing reinforcing.

B. Spacing of Hangers and Supports:

1. Maximum Spacing between supports for straight runs of piping:

Nominal Pipe Sizes (Inches)	Maximum Span (Feet)		
	<u>STEEL</u>	<u>COPPER</u>	<u>PVC-CPVC</u>
1	7	6	3
1-1/2	9	6	3
2	10	8	4
2-1/2	11	10	4
3	12	10	4
4	14	10	5
5	16	-	5
6 & larger	17	-	5
6	17	-	5
8	-	-	6
10	-	-	7

2. Support all piping independent from connected equipment. Provide additional hangers or supports at concentrated loads such as flanges, valves, equipment, and similar items.
- C. In general, route vertical piping in a manner in which it can be attached to adjacent walls or columns.
- D. Anchoring, Guiding and Supporting Piping:
1. Anchor all piping and support in a manner such that expansion and contraction will take place in the direction desired.
 2. Prevent vibration with vibration dampers and prevent undue strains on equipment served.
 3. Fabricate hangers used for the support of 2 inch nominal pipe size and larger piping to permit adequate adjustment after erection while still supporting the load.
 4. Use wall brackets where the pipes are adjacent to walls or other vertical supports which may be used for supports.
 5. Provide supports to adequately carry the weight of the lines and maintain proper alignment.
 6. Provide inserts and sleeves for supports in concrete where necessary.
 7. Provide pipe guides and anchors at all points where necessary to keep pipes in accurate alignment, to direct the expansion movement, and to prevent buckling, swaying and undue strain.
 8. Provide seismic bracing and thrust bracing on all piping.
- E. Insulation Protection: Provide insulated piping with a pipe insulation protection device at each support.

3.8 PRESSURE TESTING

- A. Provide all equipment and apparatus necessary for the tests. Rectify all defects disclosed by the tests without additional cost to the District. Make test in the presence of the Project Manager or his designated representative. Furnish report to Project Manager on letterhead indicating that the testing has been successfully completed.
- B. Test piping systems after the lines have been cleaned and flushed, and before any insulation has been applied.
- C. Test Pressures: Test piping systems at pressure of one and one-half times the design working pressure or at 50 psig, whichever is greater.
- D. Hydrostatically test all liquid piping using water not exceeding 100° F.
- E. Test Procedure:
1. Before tests, remove or valve off from the system all gauges, traps and other apparatus which may be damaged by the test procedure.
 2. Subject the system to a calibrated test pressure for a sufficient length of time to enable an inspection to be made at all joints and connections.

3. Maintain the required test pressure for a sufficient length of time to enable an inspection to be made at all joints and connections.
 4. Rectify all defects which develop during testing and retest the piping systems until they show no defect or weakness and are tight.
- F. Systems Which Connect to Existing Piping: Isolate new piping system from existing system by the closest valve or valves to the existing system.

3.9 THERMOMETERS

- A. General: Provide where indicated by the Contract Drawings or required to monitor conditions. Provide nipple and pipe tapping, isolation valve, and gauge. Mount so that the gauge or thermometer is easily readable by an observer standing on the floor.

END OF SECTION 221116.1

DIVISION 22 – PLUMBING

SECTION 221116.2 - DOMESTIC WATER PIPING (COMFORT STATION)

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. Submit product data for all items specified in this section.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in 3.11 "Piping Schedule" see below 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 2 and 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 ENCASUREMENT 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.
- 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. Shut-off valves may or may not be shown on the Contract 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.
- B. 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.
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- E. 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
- F. Install supports for vertical copper tubing every 10 feet.

3.6 CONNECTIONS

- A. Contract 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 (DN 80) 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 (ASTM B 88M, Type A); 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 221116.2

DIVISION 22 – PLUMBING

SECTION 221119 - 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. Submit product data for all items specified in this section.

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 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 $\frac{3}{4}$ 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 $\frac{3}{4}$ 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 221119

DIVISION 22 – PLUMBING

SECTION 221316 - 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. Submit product data for all items specified in this section.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Refer to Part 3 Execution 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 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 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 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. Seismic-restraint devices are specified in Division 22.
- 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. Seismic-restraint devices if specified in Division 22.
- B. 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.
- C. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.
- F. 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.
- G. Install supports for vertical cast-iron soil piping every 15 feet.
- H. 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.
- I. Install supports for vertical steel piping every 15 feet.
- J. 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.
- K. Install supports for vertical copper tubing every 10 feet.
- L. 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.
- M. Install supports for vertical ABS piping every 48 inches.
- N. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.6 CONNECTIONS

- A. Contract 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 221316

DIVISION 22 – PLUMBING

SECTION 221319 - 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.

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 Contract 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 Contract 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 Contract 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 Contract Drawings.
 - B. Install stack air-admittance valves at top of stack vent and vent stack piping only where indicated on Contract 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 221319

DIVISION 22 – PLUMBING

SECTION 223300 - 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 01.
- 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 SUBMITTALS

A. Submit product data for all items specified in this section.

1.4 WARRANTY

- A. Warranty Period(s): From date of Final Completion:
1. Commercial Electric Water Heaters: Three year Limited Tank and Parts Warranty

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 Contract Drawings Or Equal 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 Contract Drawings Or Equal 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 as 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, or suspended platform.
- C. Install water heaters level and plumb, according to Contract Drawings, 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 223300

DIVISION 22 – PLUMBING

SECTION 224000 - 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 Contract 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. Submit product data for all items specified in this section.

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 Contract Drawings, Or Equal product by one of the following:
1. American Standard
 2. Eljer
 3. Kohler
 4. Mansfield
 5. Briggs

2.2 STAINLESS STEEL FIXTURES

- A. Basis-of-Design Product: Subject to compliance with requirements, Provide product by manufacturer as scheduled on the Contract Drawings, Or Equal product by one of the following:
1. Elkay
 2. Just
 3. Dayton
- B. Minimum 18 gauge stainless steel, unless noted otherwise.

2.3 METERING FAUCETS

- A. Basis-of-Design Product: Subject to compliance with requirements, Provide product by manufacturer as scheduled on the Contract Drawings, Or Equal product by one of the following:
1. Symmons
 2. Chicago Faucet

2.4 MANUAL FLUSH VALVES

- A. Basis-of-Design Product: Subject to compliance with requirements, Provide product by manufacturer as scheduled on the Contract Drawings, Or Equal product by one of the following:
1. Sloan
 2. Zurn

2.5 WASTES AND SUPPLIES

- A. Basis-of-Design Product: Subject to compliance with requirements, Provide product by manufacturer as scheduled on the Contract Drawings, Or Equal product by one of the following:
1. American Standard
 2. Kohler
 3. Elkay

4. Just
5. McGuire
6. Speedway
7. Dearborn Brass

2.6 FIXTURE CARRIERS

- A. Basis-of-Design Product: Subject to compliance with requirements, Provide product by manufacturer as scheduled on the Contract Drawings, Or Equal product by one of the following:
1. J.R. Smith
 2. Zurn
 3. Josam
 4. Wade
 5. Mifab
 6. Watts Drainage
- B. Determine from Contract Drawings, required hand and type.

2.7 TOILET SEATS

- A. Basis-of-Design Product: Subject to compliance with requirements, Provide product by manufacturer as scheduled on the Contract Drawings, Or Equal product by one of the following:
1. Olsonite
 2. Church
 3. Kohler
 4. Beneke
 5. Bemis

2.8 UNDER SINK PIPING COVERS

- A. Basis-of-Design Product: Subject to compliance with requirements, Provide product by manufacturer as scheduled on the Contract Drawings, Or Equal 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 Contract Drawings. Install fixtures at height and location as indicated on the Contract Drawings, or as directed by the Project Manager.
- 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 224000



DIVISION 22 – PLUMBING

SECTION 224200 - COMMERCIAL PLUMBING FIXTURES

PART 1 - GENERAL

1.1 DESCRIPTION

A. General:

1. Work includes all Plumbing Products, including all material, equipment and installation. Provide all plumbing products as required by the mechanical system design, the Specifications and/or the Contract Drawings. Provide a complete and operable system.
2. Provide plumbing systems and fixtures for the buildings.

B. Code: All Work shall be installed in accordance with International Mechanical Code, Uniform Plumbing Code, International Building Code and all local codes. Refer also to Specification Sections 220500-Common Work Results for Plumbing.

C. Faucets: Faucets shall comply with NSF/ANSI Standard 61.

1.2 SUBMITTALS

A. Comply with the requirements of Section 013000-Administrative Requirements. Furnish complete product data, describing all plumbing fixtures and equipment.

1.3 QUALITY ASSURANCE

A. As required by Section 014000-Quality Requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. As specified or by American Standard, Kohler, Josam, Smith, Wade Or Equal.

2.2 COLOR

A. Deliver fixtures in manufacturer's standard white, unless specified otherwise. Coordinate final finish and color sections with Project Manager or his designated representative prior to ordering.

2.3 PIPE AND FITTINGS

A. Soil, Waste, Piping in Building Underground: As required by Specification Section 221000-Operation & Maintenance of Plumbing. Hubless complying with CISPI Standard 301 will be accepted if permitted by local code.

- B. Soil, Waste, and Vent, Piping in Building Aboveground: As required by Section 221000-Operation & Maintenance of Plumbing.
- C. Domestic Cold, Hot, and Recirculating Water Piping Aboveground: Copper throughout as required by Section 221000.
- D. Condensate Drain Piping: As required by Section 221000-Operation & Maintenance of Plumbing.
- E. Alternate Materials and Installation: As required by Sections 220500-Common Work Results from Plumbing and 221000-Operation & Maintenance of Plumbing.

2.4 CLEANOUTS AND CLEANOUT ACCESS COVERS

- A. Provide caulked or threaded type cleanout extended to finished floor or wall surface. Insure ample clearance at cleanout for rodding of drainage system.
- B. Floor Cleanout Access Covers in unfinished and finished areas: Round with nickel bronze scored frames and plates. Provide round access covers in finished areas with depressed center section to accommodate floor finish. Wall cleanouts shall have chrome plated caps.
- C. Floor: Bronze scoriated cover, Zurn Z-1400-2 Or Equal.
- D. Walls: Bronze plug with stainless steel access cover. Zurn Z-1440 Or Equal.
- E. Grade Level: Cast iron with cover marked "C.O.". Olympic Foundry Or Equal.

2.5 WATER HAMMER ARRESTORS

- A. Bellows type, compression chamber pre-charged with inert gas, stainless steel casing and bellows. Provide sizes complying with PDI Standard WH-201. Wade, Zurn Or Equal.

2.6 TRAP PRIMERS

- A. Zurn Z-1022, J.R. Smith S-2699, Josam 1465, or Precision Plumbing Products P-1 or P-2 Or Equal.

2.7 PLUMBING HARDWARE

- A. General:
 - 1. Trim: Brass faucet handles; all exposed metal parts, chrome plate over nickel.
 - 2. Escutcheons: Provide escutcheons at each point where a pipe or other fitting enters the wall or ceiling, and at each plumbing fixture.
 - 3. Anchors: No equipment or fixture anchors shall be plastic. Anchors and supports shall all be cast iron or welded steel channel, galvanized.
- B. Stops:

1. Provide stops in all water connections to all lavatories and sinks; compression inlet; loose key pattern with shield; as manufactured by Speedway, Brasscraft Or Equal. No plastic stems. Use only chromed brass.
 2. Provide check stops for all mixing fixtures and faucets. No added stops are required where service sink faucets have check-stops as part of the assembly.
 3. Exposed Supplies from stops to faucets for lavatories shall be 1/2" outer diameter. Tubing; one end to have a brazed or formed end for compression joint.
- C. Traps: Chrome plate 17 gage brass seamless tubing, Bridgeport, Frost, Brasscraft, Or Equal manufacture; imprinted with manufacturer and gage; ground joint brass connection Sterling Series 24000, or Frost No. 6440 or 6457 Series Or Equal, on outlet of each trap.

2.8 WATER CLOSETS

A. Water Closet Type WC - 1:

1. Bowl: Tank type, vitreous china, elongated siphon jet, water saver 1.6 gallon per flush. Provide with all necessary installation accessories. American Standard Cadet Or Equal.
2. Seat: Bemis 1955C open front seat, less cover.
3. Water Closet: Coordinate height with the Project Manager or his designated representative: Install in accordance with IBC and Washington State amendments and WAC 51-40.

B. Water Closet Type WC - 2:

1. Bowl: Tank type, ADA height, vitreous china, elongated siphon jet, water saver 1.6 gallon per flush. Provide with all necessary installation accessories. American Standard Cadet 3 Or Equal.
2. Seat: Bemis 1955C open front seat, less cover.
3. Water Closet: Coordinate height with the Project Manager or his designated representative: Install in accordance with IBC and Washington State amendments and WAC 51-40.

2.9 LAVATORIES

A. Lavatory L-1:

1. Under Counter Lavatory: vitreous china, rear overflow and mounting kit, Kohler Caxton 2210 Or Equal.
2. Faucet: Chicago 802 Or Equal.
3. Traps: Provide insulated trap wrapping. Trubro "LavGuard", Brocar "TrapWrap." Or Equal.

2.10 SINKS

A. Sink S-1:

1. Sink: Single compartment sink, self rimming, 18 gauge type, 302 stainless steel, 21 inches x 15.75 inches x 10 inches deep bowl. Provide with cup strainer,

tailpiece, trap and stops, punch for 8 inch centers and vegetable spray. Elkay ADA compliant Or Equal.

2. Faucet: Deck mounted goose neck faucet, blade handles, vegetable spray, permit spout to swivel. Chicago 200 Or Equal.
3. Vegetable Spray: Deck mounted spray accessory.

B. Sink S-2:

1. Sink: Single compartment sink, self rimming, 18 gauge type, 302 stainless steel, 21 inches x 15.75 inches x 10 inches deep bowl. Provide with cup strainer, tailpiece, trap and stops, punch for 8 inch centers and vegetable spray. Elkay Or Equal.
2. Faucet: Deck mounted goose neck faucet, blade handles, vegetable spray, permit spout to swivel. Chicago 200 Or Equal.

2.11 VEGETABLE SPRAY: DECK MOUNTED SPRAY ACCESSORY.SHOWER

A. Shower SH-1:

1. The bathing enclosure shall be one-piece, heavy duty, fiberglass reinforced polyester, gel-coated to provide sanitary, unbroken clean lines and a smooth surface. Wood reinforced wall panels shall be used to accept grab bars and seat installation. Measurements, hardware, and structural integrity shall meet all requirements for ADA standards as specified A.N.S.I. 117. Special reinforcing, contouring and sandwich panel construction with a polyurethane core gives strength to exceed A.N.S.I. Z 124-1, Z 124-2 and UPC - 11 - 60 standards. The shower units shall be self-supporting with nailing flanges on front and top edges of the walls. Units shall be warranted against factory defects for three years. The under portion of the bathing enclosures shall be coated with an integrated resin compound to provide stable bearing against the floor. Verify accessibility requirement prior to ordering. As manufactured by American Reinforced Plastics, Inc., model S-4837-BF, Or Equal.
2. Shower Trim: Delta Hand Shower Or Equal. Provide with mounting brackets, flexible hose and wand and Delta mixing valve assembly. Single handle pressure balancing mixing unit, ceramic control cartridge with stainless steel balancing piston, built in reverse connection capability, control for shower wand assembly. Provide flow limiter to limit shower flow to 2.5 gpm.
3. Shower Floor drain: Chrome grid strainer assembly, removable for cleaning.

B. Shower, SH -2:

1. Similar to SH-1 above, dimensions to fit accessible unit.
2. Shower Trim: Delta Hand Shower Or Equal. Provide with mounting brackets, flexible hose and wand and Delta mixing valve assembly. Single handle pressure balancing mixing unit, ceramic control cartridge with stainless steel balancing piston, built in reverse connection capability, control for shower wand assembly. Provide flow limiter to limit shower flow to 2.5 gpm.
3. Shower Floor drain: Chrome grid strainer assembly, removable for cleaning.

2.12 DOMESTIC HOT WATER HEATER

- A. Instantaneous Electric Domestic Hot Water Heater DWH-1: Refer to equipment schedule for water heater characteristics.. Heater shall be rated at 150 psi working pressure, 240V. Heater shall satisfy ASHRAE 90 requirements. Furnish heater installed with temperature and pressure relief valve, disconnect and all mounting accessories. Basis of design: Rheem RTE Or Equal.
- B. Water Heater Expansion Tank (ET): Provide with straps and accessories for mounting. Refer to Section 221000-Operation & Maintenance of Plumbing.

2.13 FLOOR DRAIN

- A. Floor Drain (FD): General room floor drain. Provide 2 and 3 inch outlet with 6 inch diameter Type B strainer. Provide 4 inch outlet with 8 inch diameter Type B strainer. Cast iron body with flashing collar, nickel bronze adjustable strainer head, trap primer connection. Zurn Z 415 Or Equal.

2.14 HOSE BIBS

- A. Wall Hydrant (HB-1): Encased automatic draining wall hydrant for flush installation. Complete with non-freeze type integral backflow preventer, bronze casing, all bronze construction, non-turning operating rod with replaceable bronze seat and seat washer and ¾ inch inlet. Nickel bronze box and hinged cover with key lock and “WATER” cast on the cover. Zurn Z-1300 Or Equal.

2.15 HEAT TRACING TAPE

- A. Self regulating heating cable, to prevent freeze-up of hot water and cold water piping, 5 watt per lineal foot. UL listed. Raychem XL Trace Or Equal.
- B. Control: Provide line voltage thermostat to energize heat tracing tape below 40°. Honeywell Or Equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify conditions, including defects or errors which would cause defective installation/ application or products or cause latent defects in workmanship or function. Install all fixtures and equipment in accordance with the manufacturer's written instructions.

3.2 PLUMBING FIXTURES:

- A. Traps for Floor Drains: Install traps for all drains, same materials as soil and waste piping. Extend water piping to traps and provide trap primers for all traps.

- B. Drains: Drains above grade shall have seepage pan and where installed in slabs with waterproof membrane, shall have clamping collar. Provide adapters on drains suitable for anchoring to construction.
- C. Cleanouts:
1. Install at locations and as indicated and required to clean piping, including the end of the main building sewer, 50 feet maximum spacing on all below-grade runs; and elsewhere as required by ordinances or code; accessible for use with conventional cleaning equipment.
 2. Provide brass plug, with Teflon base lubricant on threads. All exposed wall and floor cleanouts shall be chrome-plated trim.
 3. Lubricate cleanout plugs with mixture of graphite and linseed oil. Prior to final inspection, remove cleanout plugs, re-lubricate and re-install using only enough force to insure permanent leakproof joint.
- D. Vacuum Breakers: Install vacuum breakers on plumbing lines where contamination of domestic water may occur and on hose bibs, faucets with hose connectors, and flush valves.
- E. Water Hammer Arrestors: Install unit at top of each riser, at end of group fixture runouts. Units may be used for single fixtures per PDI Standard.
- F. Fixtures:
1. Mount fixtures at height above finished floor as indicated by Contract Drawings or As Required to comply with local, state and accessibility regulations.
 2. Through bolt all equipment and fixture anchors through walls.
 3. Provide all janitor, service, and slop sinks with 22 gauge galvanized steel backsplash behind faucet and sink. Extend backsplash minimum 6" beyond sink and faucet.
 4. Seal edge of fixtures at top and sides with plastic sealant, GE or DOW, color to match fixture.
 5. Adjust flush valves and run time of fixtures to provide uniform operation.

END OF SECTION 224200



DIVISION 23 – MECHANICAL

SECTION 230500.1 - COMMON WORK RESULTS FOR HVAC (CABINS)

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Work includes the following: Provide all materials, equipment, labor, supervision, tools and items necessary for the construction, installation, connection, testing and operation of all mechanical Work for this project.
- B. Work includes the following:
 - 1. Motors
 - 2. Motor Control equipment
 - 3. Supports and support accessories
 - 4. Anchoring Hardware
 - 5. Identification
 - 6. Balancing work
 - 7. Painting

1.2 DEFINITIONS AND ABBREVIATIONS

- A. Definitions and abbreviations of all terms shall be in accordance with applicable definitions of:
 - ANSI American National Standards Institute
 - ASHRAE American Society of Heating, Refrigerating & Air Conditioning Engineers
 - ASME American Society of Mechanical Engineers
 - ASTM American Society for Testing and Materials
 - AWS American Welding Society
 - CISPI Cast Iron Soil Pipe Institute
 - FM Factory Mutual Engineering Corporation
 - HI Hydraulic Institute
 - MSS Manufacturers' Standardization Society of the Valve and Fittings Industry, Inc.
 - NEC National Electric Code
 - NEMA National Electrical Manufacturer's Association
 - NFPA National Fire Protection Association
 - NSF National Sanitation Foundation
 - OSHA Occupational Safety and Health Administration
 - SMACNA Sheet Metal and Air-Conditioning Contractors' National Association
 - UL Underwriters' Laboratories, Inc.
 - IBC International Building Code
 - UPC Uniform Plumbing Code
 - IMC International Mechanical Code
 - WAC Washington Administrative Code
 - WSEC Washington State Energy Code
 - WISHA Washington Industrial Safety & Health Act

- B. Refer also to GC-1 Definitions for additional definitions and explanations of terms.
- C. Some of these abbreviations may not be used. All other abbreviations shall have the definition commonly associated with them by the trade or industry. Confirm the meaning of any unclear or unknown definitions with the Project Manager before proceeding with any Work.

1.3 PLANS AND SPECIFICATIONS

- A. The Contract Drawings and Specifications are intended to cover all mechanical Work, unless otherwise shown. Provide all materials that are necessary for the proper completion of the installation or operation of the equipment.
- B. The Contract Drawings are diagrammatic and do not show exact or complete ductwork and piping configurations or the necessary number and types of fittings. Provide all labor and materials required to complete the Work indicated.
- C. Any questions occurring during bidding or construction shall be resolved by direction in writing from the District. Any issues not so resolved or any conflicts shall result with the Contractor bidding, furnishing and installing the most stringent condition. No exceptions.

1.4 LAW AND ORDINANCES

- A. General:
 - 1. All mechanical Work specified under this Contract shall be in strict accordance with the latest rules and regulations of all applicable codes.
 - 2. Contractor is not relieved from furnishing and installing Work shown or specified which may be beyond requirements of ordinances, laws, regulations, and codes. This Work shall be included within the construction Contract.
- B. Approval: If not previously performed by the District, file necessary plans, prepare documents and obtain necessary approval of governmental departments having jurisdiction and required certificates of inspection for Work and deliver same to Project Manager before requesting acceptance and final payment for Work.

1.5 MATERIAL REVIEW, SUBMITTALS AND SHOP DRAWINGS:

- A. General:
 - 1. Deliver material, submittal and Shop Drawing data to Project Manager in accordance with the requirements of the General Conditions and Section 013000-Administrative Requirements.
 - 2. Do not place orders for materials, fixtures, or equipment until approval is obtained from Project Manager in writing. Verbal approval will not be considered.
 - 3. Provide submittals in accordance with Section 013000-Administrative Requirements.
 - 4. Make every attempt to respond to the District's comments in a timely manner.
- B. Standards Compliance and Certification:

1. Where equipment or materials are specified to conform with requirements of standards of recognized technical or industrial organizations such as American National Standards Institute (ANSI), American Society for Mechanical Engineers (ASME), Underwriters Laboratories Refrigeration Institute (ARI), or National Electrical Manufacturer's Association (NEMA), that use a label or published listing as a method of indicating compliance, proof of such conformance shall be submitted to Project Manager and accepted.
 2. Submit certification for the product submitted and not pre-printed certifications. Do not make statements in the certifications that could be interpreted to imply the product does not meet all requirements specified, such as "as good as"; "achieve the same end use and results as materials formulated in accordance with the referenced publications"; "equal or exceed the service and performance of the specified material." Simply state that the product conforms to the requirements specified.
- C. Substitution of Materials: Substitutions of materials will only be considered where specified materials cannot be obtained. All Work and equipment required incidental to the substitution is the responsibility of the Contractor.
- 1.6 SAFETY AND PROTECTION:
- A. Drive Guards: Provide OSHA-accepted drive and shaft guards for all exposed, rotating shafts and drive connections between motors and driven equipment. Include steel frames securely fastened for easy removal to the equipment frame. Provide tachometer cut-out at shafts where applicable.
 - B. Head Protection: Where pipe hangers, equipment support angles, etc., are exposed in walkways, or in access ways for any maintenance, cover all such potentially injurious protrusions less than 7 feet 2 inches above the floor with padding; secure and permanently fasten, and finish to match adjacent finishes.
- 1.7 TESTING AND DEMONSTRATION
- A. Demonstrate that all equipment operates as indicated and in accordance with manufacturer's recommendations. Support the inspections and testing of components and systems called for to commission the mechanical system. Commissioning shall be by the District, coordinate efforts and support required with the District's Project Manager. Perform tests in the presence of the Project Manager or his designated representative; give minimum one-week notice prior to test. Provide all instruments and personnel required to conduct the tests.
- 1.8 OPERATIONS AND MAINTENANCE MANUALS
- A. Furnish operations and maintenance (O&M) manuals to the Project Manager before conducting District instruction session in accordance with Section 017823-Operation and Maintenance Manuals.



1.9 INSTRUCTION PERIODS FOR DISTRICT'S PERSONNEL

- A. Description: Following installation of all mechanical equipment and prior to acceptance of the mechanical Work, conduct demonstrations and instruction periods to point out locations of servicing points and required points of maintenance and operation to the Project Manager and his designated representatives.

1.10 INDUSTRY STANDARDS, CODES AND SPECIFICATIONS

- A. All materials, equipment, and systems shall conform to the following applicable industry standards, codes and specifications:

ANSI	AWS	IBC	NEMA	SMACNA	WISHA
ASHRAE	CISPI	IMC	NFPA	UL	WSEC
ASME	FM	MSS	NSI	UPC	
ASTM	HI	NEC	OSHA	WAC	

- B. Where differences occur between state laws, local ordinances, industry standards, utility company regulations and Contract Documents, the most stringent shall govern.

1.11 QUALITY ASSURANCE:

- A. Regulatory Requirements: Comply with all applicable city, county, and state codes and ordinances. In case of conflict with Contract Drawings or Specifications, the more stringent requirements govern.
- B. All equipment specified herein, including but not limited to motors, motor control equipment, starters, panels, etc., shall be UL listed. European standard shall not be considered as an equivalent.
- C. Basis: International Building Code, Uniform Plumbing Code; International Mechanical Code and local amendments to the same.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with "Quality Assurance" provisions, Specifications, and manufacturers' data. Where these may be in conflict, the more stringent requirements govern. Coordinate Work with Division 26-Electrical.

2.2 MOTORS AND CONTROL EQUIPMENT

- A. Refer to Division 26-Electrical sections for additional requirements.
- B. Provide motors conforming to the following unless noted otherwise:
 1. Design and Construction: Unless otherwise indicated, Provide electric motors and enclosures described by this specification conforming to the applicable definitions and requirements of NEMA MG-1.
 2. Standard Commercial Product: Provide motors of manufacturers' standard commercial product. A standard commercial product is a product that has been

or will be sold on the commercial market through advertisements or manufacturers' catalogs or brochures, and represents the latest production model(s).

3. Nameplates: Provide all motors with readily visible nameplates containing the information required in NEMA MG-1.
- C. Motor Requirements:
1. Manufacturer: General Electric, Lincoln, Allis-Chalmers, Goulds or U.S. Motors Or Equal.
 2. Type: All motors furnished shall be High Efficiency. Motor efficiencies shall meet or exceed the efficiency values required by the Washington State Energy Code.

2.3 MOTOR CONTROL EQUIPMENT

- A. General: The mechanical Subcontractor is responsible for providing and installing motor control equipment as required for all mechanical equipment and systems, unless otherwise indicated or directed. Refer also to the requirements of Division 26-Electric. Motor control equipment shall be comprised of and comply with the following:
- B. Magnetic motor starters: Where equipment is under automatic control and is furnished with a disconnecting means, provide magnetic motor starters. Starters shall conform to or contain items called for below and, unless noted otherwise, shall be full voltage non-reversing for NEMA size 3 and under. No starters smaller than NEMA size 0 and no half size starters are permitted. Provide starters with protection for phase loss, phase imbalance, overload, and ground fault. Wye-delta type must have motor designed for this use. Contractor is responsible for coordination.
1. Overload devices: Shall be melting alloy or bimetallic type. One overload shall be provided for each phase. Provide ambient compensated overload devices only when the motor is at a constant temperature and the controller is subject to a separate, varying temperature. Automatic reset overload devices are not permitted.
 2. Accessories: Each magnetic motor controller shall include, "HAND-OFF-AUTO" selector switch, 120 volt coil (unless noted otherwise), red running pilot light, green off pilot light, 100VA (minimum) control transformer (except for 115 volt motors), surge suppression kit, with fused primary and secondary, two spare auxiliary interlock contacts and all other accessories required or noted.
 3. Enclosures: All motor controllers shall be contained in an enclosure suitable for the environment in which the controller is mounted. Enclosures located in damp, moist locations and outdoors shall be NEMA 3R throughout.
- C. Combination motor controller motor starter and disconnect. Where equipment is under automatic control and is not provided with a disconnecting means, Provide combination motor starter and disconnect. Provide as specified above, and also include a disconnecting means. Shall be fused switch type (Class RK5), or motor circuit protector type rated for 22,000 RMS A.I.C. minimum unless noted otherwise and containing all accessories as listed above. If externally powered control circuits are used, Provide an auxiliary switch on the disconnect switch or protector and fuse in lieu of the control transformer. Switch or protector shall be capable of being padlocked in the off position.

D. Manual Starters: Where equipment is under manual control, provide manual starter. Starter shall be toggle switch type, lockable in the "off" position, with overload relays, pilot light and enclosure per above.

E. Accepted Manufacturers: Allen Bradley Or Equal as accepted through prior approval.

2.4 ELECTRICAL ENCLOSURES

A. All electrical equipment shall be contained in an enclosure suitable for the environment where mounted. Enclosures located in damp, moist areas and outdoors shall be NEMA 3R throughout.

2.5 NAMEPLATES

A. Laminated black plastic with lettering cut through to white background. Plastic strips with raised letters made by a marking device are not acceptable.

2.6 SPECIAL MAINTENANCE MATERIALS

A. Provide for equipment requiring frequent replacement of maintenance materials. Provide an extra set of filters, and belts; together with application devices and instructions.

2.7 PAINTING

A. Paint all exposed fixtures and equipment in conformance with Section 099100-Painting. Coordinate color with Project Manager. Refer to Specifications for paint and application requirements.

2.8 EQUIPMENT LISTING REQUIREMENTS

A. Whenever UL Standards exist for equipment, Provide UL-accepted equipment bearing the UL label.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify installation conditions as Satisfactory to receive Work of this Section. Do not install until any unsatisfactory conditions are corrected. Beginning Work constitutes acceptance of conditions as Satisfactory.

3.2 PREPARATION

A. Field Measurements: Field-verify locations of new and existing Work prior to commencing Work of this Section.

B. Protect surrounding areas and surfaces to preclude damage from Work of this Section.

3.3 INSTALLATION, ERECTION, AND PERFORMANCE

- A. Install, apply, erect, and perform the Work in accordance with "Quality Assurance" provisions, Specifications, and manufacturers' installation instructions and directions. Where these may be in conflict, the more-stringent requirements govern.

3.4 CLEANING

- A. Promptly remove waste material and rubbish caused by mechanical construction Work. At completion of the Project, clean all equipment, piping and fixtures installed or provided under this Contract.

3.5 CUTTING AND PATCHING

- A. Cut all openings and holes required for mechanical Work. Carefully examine existing conditions prior to commencing Work.

3.6 ACCESSIBILITY

- A. Locate valves, dampers, controls, etc., to be easily accessible.
- B. Install all equipment which requires periodic servicing or repairs to be readily accessible. Otherwise, obtain Project Manager's approval of location. Where valve and equipment are concealed behind access panels or by ceiling tiles, label panels or tiles appropriately.
- C. Provide access panels as indicated or required for piping, valve or equipment access. Refer to Specifications to determine fire rating requirements. The access panel size shall be in proportion to the equipment, piping, or valve requiring access. Minimum access panel size shall be 12 inches x 12 inches.

3.7 SPECIAL PROTECTION

- A. Exercise maximum precaution to provide positive protection for the existing building and equipment from damage of any kind, and in particular prevent any water and dust seepage into the existing building.
- B. Storage of materials: Make all necessary provisions to prevent damage or corrosion of materials.

3.8 EQUIPMENT INSTALLATION

- A. General: Provide supports for all equipment and appurtenances As Required, including braces As Required for seismic restraint; these include frames or supports for pumps and air handlers and all mechanical equipment. Bracing shall conform with the requirements of IBC and IMCThe design, engineering and installation of these members is the responsibility of the Contractor.
- B. Suspended Equipment: Provide hangers from structure As Required; span between structural members with additional structural steel As Required to mount equipment

in locations shown. Do not fasten hangers to metal deck. Do not use powder actuated fasteners.

C. Floor-Mounted Equipment - General:

1. Provide machine and floor or foundation fastenings; set equipment on concrete pads. Provide equipment base drawings, bolt-setting information, and anchors for all floor-mounted equipment. Provide concrete expansion anchors through concrete equipment pads, installed into existing structural concrete slabs.
2. Install all equipment at the locations, and to the dimensions indicated. Set equipment accurately with principal centerlines and level, using manufacturers' leveling screws, blocks, shims, or wedges. Do not distort equipment or base plates.
3. Install all equipment, piping and ducting such as to provide adequate access for service. This includes access to equipment covered in other divisions or sections of this Specification.

3.9 MISCELLANEOUS EQUIPMENT AND FIXTURE CONNECTIONS

- A. Provide piping, ductwork, and make all final mechanical connections in accordance with manufacturers' recommendations for District-furnished equipment and fixtures, and equipment and fixtures specified.
- B. Perform on-site review and refer to manufacturers' shop drawings for details of connections. Provide rough-in at locations to conveniently serve items.

3.10 BALANCING WORK

- A. General: The Mechanical Subcontractor shall provide all support for balancing and testing Work. Coordinate with Section 230593-Testing, Adjusting, and Balancing for HVAC.
- B. Work by Mechanical Subcontractor:
 1. Provide the balancing Subcontractor with access to all equipment installed under this Contract requiring balancing. Provide ladders, scaffolding, and lifts as required to permit the Subcontractor to complete its Work.
 2. Operate the mechanical systems and be responsible for all equipment until the balancing and testing is complete. Before balancing and testing commences, check all rotating equipment for proper rotation and lubricate per the manufacturers' recommendations.
 3. Do not assume that equipment is shipped from the factory configured to meet specified volumes and quantities. Provide belt, sheave, starter heater and other equipment changes, and all Work as required as part of this Contract in order to permit balancing to required values.
 4. Before balancing and testing commences, operate all pumps and auxiliary equipment for a minimum of one hour. During this period, check out and calibrate all control components under operating service.
- C. Work Coordinated With District:
 1. Coordinate balancing with other Work and building occupancy to ensure no interruptions occur.

3.11 WIRING

- A. Wiring shall conform to applicable sections of these Specifications. Provide wiring from branch circuit over current device to motor controller to motor terminals, including installation of starter and all connections. Provide raceway and conductors as shown for remote control, or interlock connections. Coordinate other control wiring with Division 26-Electric of the Specifications. Provide overload elements in controllers sized to match motor nameplate full load amperes. Space within controllers shall not be used as a junction box.

END OF SECTION 230500.1

DIVISION 23 – HEATING, VENTILATION AND AIR CONDITIONING

SECTION 230500.2 – COMMON WORK RESULTS FOR HVAC (COMFORT STATIONS)

PART 1 - GENERAL

1.1 SUMMARY

A. Summary: This SECTION includes the following:

1. General Requirements
2. Access Doors
3. Joining Materials
4. Dielectric fittings
5. Mechanical Sleeve Seals
6. HVAC Piping Sleeves
7. HVAC Piping Escutcheons
8. HVAC Demolition
9. Flushing and Cleaning of HVAC Piping Systems
10. Pressure Testing of HVAC Piping Systems
11. HVAC Piping Systems Common Requirements
12. HVAC Piping Joint Construction
13. HVAC Piping Connections
14. Equipment Installation Common Requirements
15. Concrete Bases, Curbs and Housekeeping Pads
16. Supports and Anchorages

1.2 DEFINITIONS

A. Definitions

1. **FINISHED SPACES:** Spaces other than Mechanical and Electrical Equipment Rooms, Furred Spaces, Pipe Chases, Unheated Spaces immediately below roof, and Spaces above Ceilings, Unexcavated Spaces, Crawlspace, and Tunnels.
2. **EXPOSED, INTERIOR INSTALLATIONS:** Exposed to view indoors. Examples include Finished Occupied Spaces and Mechanical Equipment Rooms.
3. **EXPOSED, EXTERIOR INSTALLATIONS:** Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions.

Examples include Rooftop locations.

4. CONCEALED, INTERIOR INSTALLATIONS: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
5. 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.

1.3 PRODUCT SELECTION PROCEDURES

A. Product Selection Procedures:

1. Where the Specifications list one or more Manufacturers, provide product by one of the named Manufacturers on the list that complies with Specification requirements.

1.4 2. SUBMITTALS

A. Comply with the requirements of SECTION 013000.

1.5 SUPERVISION

A. Supervision:

Contractor shall have in charge of the Work at all times a thoroughly competent superintendent with considerable experience in this work. Any superintendent judged not competent by the Project Manager shall be removed at once upon the request of the Project Manager and be replaced by an Approved superintendent.

1.6 CODES, FEES AND RELATED COSTS

A. Codes, Fees and Related Costs:

1. All materials and workmanship shall comply with all applicable codes, Specifications, local ordinances, industry standards and utility company regulations.

2. If building codes, state laws, local ordinances, industry standards and/or utility company regulations conflict with the Contract Documents, the most stringent shall govern. Contractor shall promptly notify the Project Manager in writing of any such difference.
3. Noncompliance: Should the Contractor perform any work that does not comply with the local ordinances, industry standards and utility company regulations, it shall bear all costs arising in correcting the deficiencies.
4. Requirements of Regulatory Agencies:
5. Contractor shall be responsible for obtaining and payment for all permits, licenses, and inspection certificates required in accordance with provisions of Contract Documents, and shall pay all fees for the utility connections as required for this part of the Work.
6. In addition to requirements shown or specified, comply with latest current local and/or state ordinances and codes and applicable standards, specifications or codes published by:
 - a. Building Codes:
 - 1) IBC - International Building Code
 - 2) IFC - International Fire Code
 - 3) UPC - Uniform Plumbing Code
 - 4) IMC - International Mechanical Code
 - 5) NEC - National Electric Code
 - b. Industry Standards, Codes and Specifications:
 - 1) AIEE - American Institute of Electrical Engineers
 - 2) AMCA - Air Moving & Conditioning Association
 - 3) ASA - American Standards Association
 - 4) ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers
 - 5) ASME - American Society of Mechanical Engineers
 - 6) ASTM - American Society of Testing Materials
 - 7) IBR - Institute of Boiler & Rating Manufacturers
 - 8) SMACNA - Sheet Metal and Air Conditioning Contractors National Association, Inc.
 - 9) AWWA - American Water Works Association
 - 10) ANSI - American National Standards Institute
 - 11) ARI - Air Conditioning and Refrigeration Institute
 - 12) FIA - Factory Insurance Association
 - 13) FM - Factory Mutual
 - 14) NEMA - National Electrical Manufacturers Association
 - 15) OSHA - Occupational Safety and Health Act

- 16) ADC - Air Diffusion Council
- 17) WISHA - Washington Industrial Safety & Health Act
- 18) APWA - Standard Specification for Municipal Public Works
- 19) NFPA - National Fire Protection Association
- 20) WSRB - Washington Survey & Rating Bureau
- 21) AIEE - American Institute of Electrical Engineers
- 22) WDOE - Washington Department of Ecology
- 23) WSEC - Washington State Energy Code
- 24) WSVL - Washington State Ventilation Code

1.7 CUTTING AND PATCHING

A. Cutting and Patching:

- 1. Provide all cutting and patching of existing building components required by the work of this DIVISION, in accordance with Division 01. This shall include patching of holes left by the removal of mechanical utilities and equipment. Materials of the same quality and appearance as adjacent surfaces shall be used unless otherwise indicated.
- 2. Holes of 13" diameter or less shall be core drilled by the Contractor. All holes core drilled shall be approved by the Project Manager prior to drilling.
- 3. Negligent damage to existing or new structures by the Contractor shall be repaired at the Contractor's expense.

1.8 CONCRETE BASES, CURBS AND HOUSEKEEPING PADS

A. Concrete Bases, Curbs and Housekeeping Pads:

- 1. All concrete bases, curbs and housekeeping pads as required for the work of DIVISION 23, shall be provided under the work of DIVISION 23.

1.9 SUPPORTS

A. Supports:

- 1. Provide all pipe stands, mounting brackets and metal bases required for HVAC material and equipment.

2. 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.

1.10 LISTED EQUIPMENT

A. Listed Equipment:

1. 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 Washington State.
2. This statement is being interpreted by the Washington 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.
3. 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.
4. 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.
5. Consequently, it shall be the sole responsibility of the Contractor (through its suppliers and equipment manufacturers) to purchase and install only

equipment bearing the UL or other approved label whenever that equipment so labeled is available. If Contractor installs any equipment without the proper UL label, Contractor shall bear the entire cost of correction to the satisfaction of the Washington State Electrical Inspector.

1.11 TEST LOG DATA

A. Test Log Data:

1. 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, and other testing requirements on the Project. All log data test entries shall be signed by the Contractor's superintendent and the Owner's representative or the code authority having jurisdiction.

1.12 CLEANUP

A. Cleanup:

1. Upon the completion of the Work hereinafter specified and at times during the progress of the Work or when requested by the Project Manager, the Contractor shall remove all surplus materials, debris, and rubbish resulting from its operations, and shall leave the entire building and involved portions of the site, insofar as the Work of the Contract is concerned, in a neat, clean and acceptable condition as approved by the Project Manager.
2. The Contractor shall be expected to police its day-to-day operation and maintain a clean and safe working area.

1.13 BARRICADES AND BRIDGES

A. Barricades and Bridges:

1. Barricades shall be provided for all Work under DIVISION 23, As Required. Barricades shall be erected to meet all state and local requirements and standards.
2. Temporary bridges and supports shall be provided for all Work under DIVISION 23, As Required, to accommodate vehicle and pedestrian traffic over open trenches or obstructions. All temporary supports and bridges shall be constructed of sufficient strength to safely accommodate the normal vehicle or pedestrian traffic.

1.14 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Operating and Maintenance Instructions:

1. At the completion of the project, at such time as designated by the Project Manager, an operational and maintenance instruction period for the Owner shall take place. Contractor shall have present during this entire period its 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 Project Manager.
2. Contractor shall provide sign in sheet and shall be responsible for all parties present to sign in.

1.15 OPERATION AND MAINTENANCE MANUALS

A. Operation and Maintenance Manuals:

In addition to the requirements of SECTION 017823 provide the following for DIVISION 23 Operation and Maintenance Manuals:

1. Arrange material per order of Specifications.
2. Include a copy of all approved material and equipment submittals (equipment submittals to indicate specific model furnished, capacity, voltage, etc.).
3. Provide operating and maintenance instructions for all equipment to include the following:
 - a. Complete word description of all equipment including systems and areas served, methods of control and sequence of controls.
 - b. Description of routine maintenance for equipment.
 - c. Suggested frequency of maintenance.
 - d. Lubrication chart for all equipment, listing lubricant to be used and time interval for lubrication.
 - e. Parts list
 - f. Warranties for equipment
4. Include final Test and Balance Report
5. Include approved Temperature Control Submittals and Control Diagrams

6. Include copy of Test Log

1.16 PROJECT CLOSEOUT/INSPECTION MATRIX

A. Project Closeout:

In addition to the requirements of Division 01, 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 insulation complete on HVAC duct systems	_____	_____
All HVAC equipment labeled	_____	_____
Control System fully operational	_____	_____

1.17 QUALITY ASSURANCE

A. Quality Assurance:

1. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

1.18 DELIVERY, STORAGE, AND HANDLING

A. Delivery, Storage and Handling:

1. 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.
2. 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 Project Manager.
3. 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.
4. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.19 COORDINATION

A. Coordination:

1. 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.
2. Contract Drawings do not attempt to show complete details of building construction which affect the mechanical installation. Contractor shall refer to the Architectural, Structural, Electrical Contract Drawings for additional building details which affect installation of its work.
3. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for piping installations.
4. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
5. **Note that access panels are provided by the mechanical Subcontractor**

6. 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 Project Manager.

1.20 COMMISSIONING

- A. Commissioning shall be performed per the requirements of the Washington State Energy Code, by the Owner, under separate contract.

PART 2 - PRODUCTS

2.1 ACCESS DOORS

A. Access Doors:

1. 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.
2. Manufacturers: Subject to compliance with requirements, Provide products by one of the following:
 - a. Elmdor/Stoneman; Div. of Acorn Engineering Co.
 - b. MIFAB, Inc.
 - c. Milcor Inc.
3. Lightweight Flush Access Doors and Frames with Exposed Trim: Fabricated from lightweight metal.
 - a. Locations: Wall and ceiling surfaces.
 - b. Door: Minimum 0.018-inch- thick steel sheet.
 - c. Frame: Minimum 0.045-inch- thick extruded aluminum with 1-1/4-inch- wide rolled flange.
 - d. Hinges: Fully concealed, continuous piano type.
 - e. Latch: Screwdriver-operated cam latch.
4. Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.
 - a. Locations: Wall and ceiling surfaces.
 - b. Fire-Resistance Rating: Not less than 1-1/2 hours in walls and 3 hours in ceilings.
 - c. Temperature Rise Rating: 250 deg F at the end of 30 minutes.

- d. Door: Flush panel with a core of 2” thick mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036 inch.
- e. Frame: Minimum 0.060-inch- thick sheet metal with 1-inch- wide, surface-mounted trim.
- f. Hinges: Fully concealed, continuous piano type.
- g. Automatic Closer: Spring type
- h. Latch: Self-latching device operated by knurled knob with interior release.

2.2 HVAC PIPING SLEEVES

A. HVAC Piping Sleeves:

- 1. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- 2. PVC Pipe: ASTM D 1785, Schedule 40.

2.3 HVAC PIPING ESCUTCHEONS

A. HVAC Piping Escutcheons:

- 1. 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.
- 2. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- 3. One-Piece, Cast-Brass Type: With set screw.
 - a. Finish: Polished chrome-plated.
- 4. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - a. Finish: Polished chrome-plated.
- 5. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.
- 6. Split-Plate, Stamped-Steel Type: With concealed hinge, set screw or spring clips, and chrome-plated finish.
- 7. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- 8. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

PART 3 - EXECUTION

3.1 HVAC DEMOLITION

A. HVAC Demolition:

1. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material, until connection to new piping is made.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Project Manager.

2. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Equipment Installation – Common Requirements:

1. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
2. 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.
3. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
4. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
5. Install equipment to allow right of way for piping installed at required slope.
6. 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.
7. 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.
 8. 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.

3.3 CONCRETE BASES, CURBS AND HOUSEKEEPING PADS

A. Concrete Bases, Curbs and Housekeeping Pads:

1. Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 - a. Construct reinforced concrete bases, curbs and housekeeping pads of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 - b. 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.
 - c. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 - d. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - e. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - f. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 - g. Use 3000-psi, 28-day compressive-strength concrete and reinforcement.

3.4 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Erection of Metal Supports and Anchorages:

1. Refer to DIVISION 05 SECTION "Metal Fabrications" for structural steel.
2. Provide Shop Drawings showing sizing, design and location of supplementary steel and sizing calculations stamped by a structural engineer registered in Washington State.
3. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.
4. Field Welding: Comply with AWS D1.1. Do not weld to building structural components without written approval of the Project Manager.

END OF SECTION 230500.2

DIVISION 23 – HEATING, VENTILATION AND AIR CONDITIONING

SECTION 230513 – COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

This section includes requirements for magnetic starters, disconnects and for single-phase and polyphase, 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. Submit product data for all items specified in this section.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

A. General Motor Requirements:

1. Provide all motors as required by DIVISION 23 specifications.
2. Comply with requirements in this SECTION except when stricter requirements are specified in HVAC equipment schedules or SECTIONS.
3. Comply with NEMA MG 1 unless otherwise indicated.
4. Nameplates in accordance with NEMA MG 1.

2.2 MOTOR CHARACTERISTICS

A. Motor Characteristics:

1. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
2. 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.

3. 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 POLYPHASE MOTORS

A. Polyphase Motors:

1. Description: NEMA MG 1, Design B, medium induction motor.
2. Efficiency: Energy efficient, as defined in NEMA MG 1, and in accordance with the following table:

Synchronous Speed (RPM)	Open Motors			Closed Motors		
	3,600	1,800	1,200	3,600	1,800	1,200
HP	Efficiency	Efficiency	Efficiency	Efficiency	Efficiency	Efficiency
1.0	-	82.5	80.0	75.5	82.5	80.0
1.5	82.5	84.0	84.0	82.5	84.0	85.5
2.0	84.0	84.0	85.5	84.0	84.0	86.5
3.0	84.0	86.5	86.5	85.5	87.5	87.5
5.0	85.5	87.5	87.5	87.5	87.5	87.5
7.5	87.5	88.5	88.5	88.5	89.5	89.5
10.0	88.5	89.5	90.2	89.5	89.5	89.5
15.0	89.5	91.0	90.2	90.2	91.0	90.2
20.0	90.2	91.0	91.0	90.2	91.0	90.2
25.0	91.0	91.7	91.7	91.0	92.4	91.7
30.0	91.0	92.4	92.4	91.0	92.4	91.7
40.0	91.7	93.0	93.0	91.7	93.0	93.0
50.0	92.4	93.0	93.0	92.4	93.0	93.0
60.0	93.0	93.6	93.6	93.0	93.6	93.6
75.0	93.0	94.1	93.6	93.0	94.1	93.6
100.0	93.0	94.1	94.1	93.6	94.5	94.1
125.0	93.6	94.5	94.1	94.5	94.5	94.1
150.0	93.6	95.0	94.5	94.5	95.0	95.0
200.0	94.5	95.0	94.5	95.0	95.0	95.0

3. Service Factor: 1.15.
4. Multispeed Motors: Separate winding for each speed.
5. Rotor: Random-wound, squirrel cage.

6. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
7. Temperature Rise: Class B.
8. Insulation: Class F.
9. Code Letter Designation:
 - a. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - b. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
10. Power Factor Correction:
 - a. Motor suppliers shall furnish power correction capacitors as follows:
 - 1) All motors 25 HP and larger shall be furnished with a power factor correction capacitor. The motor supplier of mechanical equipment shall furnish power factor correction capacitors sized to accommodate its motors. Correction to 0.95 shall be provided.
 - 2) The power factor correction capacitors shall be delivered for mounting and wiring under the work of DIVISION 26.
 - 3) The capacitors shall be connected between the overloads and motor. Where reduced voltage starting is used, the capacitors shall not be connected to the motor until full voltage is attained.

2.4 SINGLE-PHASE MOTORS

A. Single-Phase Motors:

1. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
 - a. Permanent-split capacitor.
 - b. Split phase.
 - c. Capacitor start, inductor run.
 - d. Capacitor start, capacitor run.
2. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
3. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
4. Motors 1/20 HP and Smaller: Shaded-pole type.
5. 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.

2.5 MAGNETIC STARTERS AND DISCONNECTS

A. Magnetic Starters and Disconnects:

1. Magnetic starters and disconnects as required for DIVISION 23 motors shall be provided under the work of DIVISION 26.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 220513

DIVISION 23 – HEATING, VENTILATION AND AIR CONDITIONING

SECTION 230529 – HANGERS AND SUPPORTS HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This SECTION includes the following hangers and supports for HVAC system piping and HVAC equipment (piping to include condensate drains and refrigerant piping):

1. Steel pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Fastener systems.
5. Roof Pipe stands.
6. Equipment supports.

1.2 DEFINITIONS

A. Definitions

1. MSS: Manufacturers Standardization Society for the Valve and Fittings Industry Inc.
2. TERMINOLOGY: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.3 PERFORMANCE REQUIREMENTS

A. Performance Requirements:

1. Provide supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Provide equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.4 SUBMITTALS

A. Submit product data for all items specified in this section.

PART 2 - PRODUCTS

2.1 STEEL PIPE HANGERS AND SUPPORTS

A. Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3.1 "Hanger and Support Applications" for where to use specific hanger and support types.
2. Manufacturers: Subject to requirements, Provide products by one of the following:
 - a. ERICO/Michigan Hanger Co.
 - b. Anvil
 - c. Pipe Shields, Inc.
 - d. PHD Manufacturing, Inc.
3. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.
4. Nonmetallic Coatings: Plastic coating, jacket, or liner.
5. 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. Trapeze Pipe Hangers:

1. 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. Metal Framing Systems:

1. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.
2. Manufacturers: Subject to requirements, Provide products by one of the following:
 - a. ERICO/Michigan Hanger Co.; ERISTRUT Div.
 - b. Power-Strut Div.; Tyco International, Ltd.
 - c. Thomas & Betts Corporation.
 - d. Unistrut Corp.; Tyco International, Ltd.
3. Metallic Coatings: Manufacturer's standard finish for indoor use, hot dip galvanized for outdoor use.

4. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.4 FASTENER SYSTEMS

A. Fastener Systems

1. 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.
 - a. Manufacturers: Subject to requirements, Provide products by one of the following:
 - 1) Hilti, Inc.
 - 2) ITW Ramset/Red Head.
 - 3) Masterset Fastening Systems, Inc.
 - 4) MKT Fastening, LLC.
 - 5) Powers Fasteners.
2. 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.
 - a. Manufacturers: Subject to requirements, Provide products by one of the following:
 - 1) B-Line Systems, Inc.; a Division of Cooper Industries.
 - 2) Empire Industries, Inc.
 - 3) Hilti, Inc.
 - 4) ITW Ramset/Red Head.
 - 5) MKT Fastening, LLC.
 - 6) Powers Fasteners.

2.5 PIPE STANDS FOR ROOF APPLICATION

A. Pipe Stands for Roof Application:

1. Pipe Stands, General: Factory fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.

2. 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.
 - a. Manufacturers: Subject to requirements, Provide products by the following:
 - 1) MIRO Industries.
3. Low-Type, Single-Pipe Stand: One-piece plastic base unit with plastic roller, for roof installation without membrane penetration.
 - a. Manufacturers: Subject to requirements, Provide products by the following:
 - 1) MIRO Industries.
4. High-Type, Single-Pipe Stand: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
 - a. Manufacturers:
 - 1) MIRO Industries.
 - b. Base: Plastic.
 - c. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
 - d. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.
5. High-Type, Multiple-Pipe Stand: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.
 - a. Manufacturers: Subject to requirements, Provide products by the following:
 - 1) MIRO Industries.
 - b. Bases: One or more plastic.
 - c. Vertical Members: Two or more protective-coated-steel channels.
 - d. Horizontal Member: Protective-coated-steel channel.
 - e. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.

6. 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.
 - a. Manufacturers: Subject to requirements, Provide products by the following.
 - 1) ERICO/Michigan Hanger Co.; Pipe Pier

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

A. Hangers and Support Applications:

1. Specific hanger and support requirements are specified in sections specifying piping systems and equipment.
2. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system sections.
3. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
4. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
5. Use padded hangers for piping that is subject to scratching.
6. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system sections, install the following types:
 - a. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of no insulated or insulated stationary pipes, NPS 1/2 to NPS 30.
 - b. 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.
 - c. 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.
 - d. 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.
 - e. 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.

- f. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of no insulated stationary pipes, NPS 3/4 to NPS 8.
- g. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of no insulated stationary pipes, NPS 1/2 to NPS 8.
- h. Adjustable Band Hangers (MSS Type 9): For suspension of no insulated stationary pipes, NPS 1/2 to NPS 8.
- i. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of no insulated stationary pipes, NPS 1/2 to NPS 2.
- j. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of no insulated stationary pipes, NPS 3/8 to NPS 8.
- k. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of no insulated stationary pipes, NPS 3/8 to NPS 3.
- l. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
- m. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
- n. 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.
- o. 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.
- p. 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.
- q. 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.
- r. 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.
- s. 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.

- t. 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.
 - u. 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.
7. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system SECTIONS, install the following types:
- a. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
 - b. 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.
8. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system SECTIONS, install the following types:
- a. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 - b. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 - c. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 - d. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 - e. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
9. Building Attachments: Unless otherwise indicated and except as specified in piping system sections, install the following types:
- a. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 - b. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
 - c. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.

- d. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 - e. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 - f. C-Clamps (MSS Type 23): For structural shapes.
 - g. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 - h. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 - i. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 - j. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 - k. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 - l. 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:
 - 1) Light (MSS Type 31): 750 lb.
 - 2) Medium (MSS Type 32): 1500 lb.
 - 3) Heavy (MSS Type 33): 3000 lb.
 - m. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 - n. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 - o. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- 10. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system SECTIONS.
 - 11. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
 - 12. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

3.2 HANGER AND SUPPORT SPACING

A. Hanger and Support Spacing:

1. Install coated hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - a. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 - b. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
 - c. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
 - d. NPS 2-1/2: 108 inches with 1/2-inch rod.
 - e. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
 - f. NPS 6: 10 feet with 5/8-inch rod.
 - g. NPS 8: 10 feet with 3/4-inch rod.
 - h. Install supports for vertical copper tubing every 10 feet.

2. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
 - a. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
 - b. NPS 1-1/2: 108 inches with 3/8-inch rod.
 - c. NPS 2: 10 feet with 3/8-inch rod.
 - d. NPS 2-1/2: 11 feet with 1/2-inch rod.
 - e. NPS 3 and NPS 3-1/2: 12 feet with 1/2-inch rod.
 - f. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
 - g. NPS 6: 12 feet with 3/4-inch rod.
 - h. NPS 8 to NPS 12: 12 feet with 7/8-inch rod.
 - i. Install supports for vertical steel piping every 15 feet.

3. Install vinyl-coated hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:
 - a. NPS 2 and Smaller: 48 inches with 3/8-inch rod.
 - b. NPS 2-1/2 to NPS 3-1/2: 48 inches with 1/2-inch rod.
 - c. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
 - d. NPS 6: 48 inches with 3/4-inch rod.
 - e. NPS 8: 48 inches with 7/8-inch rod.
 - f. Install supports for vertical PVC piping every 48 inches.

4. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.3 HANGER AND SUPPORT INSTALLATION

A. Hanger and Support Installation:

1. 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.
2. 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.
 - a. 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.
 - b. Field fabricated from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
3. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
4. Fastener System Installation:
 - a. Verify suitability of fasteners in two subparagraphs below for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick.
 - b. 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. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
5. Roof Pipe Stand Installation:
 - a. Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
6. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

7. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
8. 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.
9. Install lateral bracing with pipe hangers and supports to prevent swaying.
10. 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.
11. 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.
12. 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.
13. 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.

3.4 EQUIPMENT SUPPORTS

A. Equipment Supports:

1. Fabricate structural-steel stands or metal framing systems to suspend equipment from structure overhead or to support equipment above floor.
2. Grouting: Place grout under supports for equipment and make smooth bearing surface.
3. Provide lateral bracing, to prevent swaying, for equipment supports.

3.5 ADJUSTING

A. Adjusting:

1. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
2. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

END OF SECTION 230529

DIVISION 23 – HEATING, VENTILATION AND AIR CONDITIONING
SECTION 230553 – IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes:
1. Equipment labels.
 2. Warning signs and labels.

1.2 COORDINATION

- A. Coordination:
1. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
 2. Coordinate installation of identifying devices with locations of access panels and doors.
 3. Install identifying devices before installing acoustical ceilings and similar concealment.

1.3 SUBMITTALS

- A. Submit product data for all items specified in this section.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Equipment Labels:
1. Plastic Labels for Equipment:
 - 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: Black.
 - 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.
2. Label Content: Include equipment's Contract Drawing designation or unique equipment number.

2.2 WARNING SIGNS AND LABELS

A. Warning Signs and Labels:

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: Red.
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.
9. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 WARNING TAGS

A. Warning Tags:

1. Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
 - a. Size: 3 by 5-1/4 inches minimum.
 - b. Fasteners: Brass grommet and wire.
 - c. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
 - d. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Preparation:

1. 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 encapsulates.

3.2 EQUIPMENT LABEL INSTALLATION

A. Equipment Label Installation:

1. Install or permanently fasten labels on each major item of mechanical equipment.
2. Locate equipment labels where accessible and visible.

3.3 WARNING-TAG INSTALLATION

A. Warning Tag Installation:

1. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 230553

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

SECTION 230593.1 - TESTING, ADJUSTING AND BALANCING FOR HVAC (CABINS)

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Work includes testing, adjusting and balancing (TAB) and commissioning per Washington State Energy Code of mechanical systems as shown on the Contract Drawings.
- B. Summary of Work: Test and balance the heating systems as shown on the Contract Drawings.
- C. Contract requirements of the General Conditions and GC-1 Definitions apply to all Work in this Section.

1.2 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with all applicable city, county and state codes and ordinances. In case of conflict with Contract Drawings or Specifications, the codes and ordinances govern.
 - 2. Basis: Balancing contractor shall be NEBB or AABA certified.
- B. Accepted TAB Contractors:
 - 1. American Air Measurement
 - 2. Hardin and Sons
 - 3. Neudorfer Engineers

1.3 SUBMITTALS

- A. General: Submit in accordance with Section 013000-Submittal Procedures and the following.
- B. Preliminary Data: Submit the following within 30 days after Notice of Award:
 - 1. Name of TAB Subcontractor.
 - 2. Individual qualifications of all persons responsible for supervising and performing the Work of this project.
 - 3. TAB agenda listing methods and procedures and including blank forms applicable to this project.
- C. Pre-Balance System Check-Out Report (Balancing Report): Prior to commencement of TAB Work, mechanical contractor shall confirm in writing that equipment and system pre-operational inspection has been performed. Contractor shall deliver written certification to the Project Manager or his designated representative that all equipment and controls are operational and functioning as designed prior to beginning balancing.

D. Balancing Report:

1. Comply with Section 013000-Submittal Procedures.
2. Provide sample copy of complete Balancing Report as indicated, including the following:
 - a. System Diagrams/Floor Plans.
 - b. Air Apparatus Test Reports.
 - c. Apparatus Coil/Heat Exchanger Test Reports.
 - d. Air Handler and Fan Test Reports.
 - e. Rectangular and Round Duct Traverse Reports.
 - f. Air Inlet and Outlet Test Reports.
 - g. Report all operating motor voltages, amperages, rotating speeds and adjustments as required.
 - h. Instrument Calibration Report.

E. Commissioning Report:

1. Prior to final completion provide commissioning report in accordance with the requirements of the Washington State Energy Code.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with "Quality Assurance" provisions, Specifications and Manufacturer's Data. Where these may be in conflict, the more stringent requirements govern.

2.2 TAB INSTRUMENTATION

- A. Tab Subcontractor shall use materials and equipment necessary to properly measure system capacities, electrical voltage and current, fan speeds, static pressures, air velocities, water pressure drops, refrigeration pressures and other readings necessary to evaluate system performance and adjust quantities to those indicated.
- B. Instrumentation shall be accurate, calibrated within the last 12 months, with calibration histories available for examination upon request.
- C. Instrumentation shall be used in accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify installation conditions as Satisfactory to receive Work of this Section. Do not install until any unsatisfactory conditions are corrected. Beginning Work constitutes acceptance of conditions as Satisfactory.

3.2 PREPARATION

- A. Field verify locations of new and existing Work prior to commencing Work of this Section.
- B. Protect surrounding areas and surfaces to preclude damage from Work of this Section.

3.3 PERFORMANCE

- A. Perform the Work in accordance with "Quality Assurance" provisions, Specifications and Manufacturer's equipment operation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.4 WORK BY MECHANICALSUBCONTRACTOR

- A. System Performance: Subcontractor is responsible for the performance of the equipment and the system. Do not assume that supplier will ship equipment adjusted to meet the Project requirements.
- B. Equipment Operation:
 - 1. Check equipment for proper operation as soon as electrical power is available. Perform adjustments required for proper operation.
 - 2. Report malfunctions promptly and make corrective action immediately to prevent delay of the Work.
 - 3. Inspect equipment for electrical problems, check rotation of motors, read voltage and current in each leg of each motor, verify/install correct starter heaters, etc., and check the readings against the nameplate. Lubricate per manufacturer's recommendations.
 - 4. Before balancing and testing commences, operate (test run) equipment for a minimum of one week.
- C. Air Distribution System Inspection: Inspect the air distribution system to ensure that each outlet is properly connected to the branch duct, and that a volume damper exists for each outlet (supply, return and exhaust) and is in the wide-open position; in addition, verify existence and function of all other volume dampers.
- D. Controls Operation: Inspect and calibrate all control components under equipment and system operation service; these components include, but are not limited to, thermostats to ensure they are connected to the appropriate device, respond to the temperature changes, and are of the correct action to be compatible with the controlled device.
- E. Strainers and Filters: After equipment and system check-out Work has been completed and prior to commencement of TAB Work, perform the following:
 - 1. Replace air filters in air distribution equipment and systems with new filters.
 - 2. Tighten belts to accommodate new stretch.

- F. Access: Provide scaffolds, staging and accessories required to allow TAB Subcontractor to gain access to equipment, dampers, valves and other devices located beyond the range of a 6-foot stepladder.
- G. Fan Drives: Do not assume that the equipment drives as delivered can be adjusted to meet the specified volume/pressure values. Provide drive changes necessary as directed by TAB Subcontractor, including required sheaves and belts; coordinate with Sections 233400-HVAC Fans and 233100-HVAC Ducts & Casings. The costs for sheave changes required to meet specified equipment operating points, including labor, sheaves and belts, shall be included in the contract.
- H. Cleaning: Clean equipment and devices after check-out and test run period prior to TAB Work.

3.5 WORK BY TAB SUBCONTRACTOR

- A. General: Perform TAB of mechanical systems in accordance with SMACNA publication "HVAC Systems - Testing, Adjusting and Balancing", 1st Edition, 1983; adjust quantities to within plus 10 percent and minus 10 percent of design values, and/or as subsequently directed by the Engineer to secure an adequate balance for distribution and noise.
- B. Systems: Include, but are not limited to, the following:
 - 1. Supply air system.
 - 2. Return air system.
 - 3. Exhaust air systems.
 - 4. Ventilation systems.
- C. Readings:
 - 1. General: Provide readings including, but not limited to, the following:
 - a. Air Quantities: Supply, return, exhaust and outdoor air at each terminal. Air quantities for some supply ducts may be required to be adjusted and balanced with orifice plates or perforated plates, provided, modified and secured As required by the balancing contractor. Refer to Contract Drawings.
 - b. Air Temperatures and humidity:
 - 1) Outside air at equipment.
 - 2) Return air at equipment.
 - 3) Supply air leaving equipment.
 - 4) Mixture of outside and return air before entering the cooling (evaporator) coil and before entering the heating coils.
 - c. Electrical
 - 1) Measured voltage and amps on each phase of each motor (compressors, pumps, fans, etc.) while the equipment is under maximum normal load.
 - 2) The nameplate voltage and current for each motor.
- D. Outside Air/Economizer Cycles: After supply and return air in balance and the quantity correct, adjust the outside air dampers to the air quantities indicated. If economizer control is specified, check for proper setting of the controls and for

- proper operation of the dampers (outside air, return air and relief). Adjust the return/relief system to result in a slight positive pressure in the building.
- E. Inspection and Recheck:
1. Upon request, recheck random selections of up to 10 percent of the readings recorded in the Balancing Report in the presence of the District's Project Manager.
 2. The Balancing Report will be rejected if more than 20 percent of the rechecked readings deviate more than 10 percent of the recorded reading in the report. In such an event, provide complete re-balancing.
- F. Marking of Adjustments:
1. Permanently mark and date dampers, valves and other adjustment devices to allow adjustment to be restored if disturbed in the future.
 2. If recheck requires re-balancing, eradicate previous markings and remark.
- G. System Difficulties: Obtain readings on each unit or piece of equipment as early as possible, such that any apparent difficulties can be resolved before the anticipated close of the job.

END OF SECTION 230593.1

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)
SECTION – 230593.2 TESTING, ADJUSTING AND BALANCING FOR HVAC
(COMFORT STATION)

PART 1 - GENERAL

1.1 SUMMARY

A. Summary

1. Section Includes balancing of Air systems as indicated in 1.6 Description of Work.

1.2 DEFINITIONS

A. Definitions

1. AABC: Associated Air Balance Council.
2. NEBB: National Environmental Balancing Bureau.
3. TAB: Testing, Adjusting, and Balancing.
4. TABB: Testing, Adjusting, and Balancing Bureau.
5. TAB Specialist: An Entity Engaged to Perform TAB Work.

1.3 SUBMITTALS

A. Submittals

1. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB Subcontractor and this Project's TAB team members meet the qualifications specified in 1.4 "Quality Assurance."
2. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3 Execution.
3. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in 3.3 "Preparation."
4. Submit Certified TAB reports prior to Final Completion.
5. Sample report forms.
6. Submit Instrument calibration reports prior to Final completion. 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. Quality Assurance

1. TAB Contractor Qualifications: Engage a TAB entity certified by AABC or NEBB.
 - a. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC or NEBB.
 - b. TAB Technician: Employee of the TAB contractor and who is certified by AABC or NEBB as a TAB technician.
2. TAB Conference: Meet with Engineer and Construction Manager on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide seven days' advance notice of scheduled meeting time and location.
 - a. Agenda Items:
 - 1) The Contract Documents examination report.
 - 2) The TAB plan.
 - 3) Coordination and cooperation of trades and subcontractors.
 - 4) Coordination of documentation and communication flow.
3. Certify TAB field data reports and perform the following:
 - a. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
 - b. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.
4. TAB Report Forms: Use standard TAB contractor's forms approved by Engineer and Construction Manager.
5. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

1.5 COORDINATION

A. Coordination

1. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

1.6 DESCRIPTION OF WORK

A. Description of Work

1. Air Balance supply fan and all exhaust fan systems for total airflow and for minimum outside air flow.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 TAB SPECIALISTS

A. Tab Specialists

1. Subject to compliance with requirements, engage one of the following:
 - a. TESTCOM, LLC, and Maiani Construction Services Inc.

3.2 EXAMINATION

A. Examination

1. 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.
2. Examine systems for installed balancing devices. Verify that locations of these balancing devices are accessible.
3. Examine the approved submittals for HVAC systems and equipment.
4. 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.
5. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

6. Examine test reports specified in individual system and equipment Sections.
7. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
8. Examine HVAC equipment and verify that they are accessible and their controls are connected and functioning.
9. Examine operating safety interlocks and controls on HVAC equipment.
10. 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. Preparation

1. Prepare a TAB plan that includes strategies and step-by-step procedures.
2. Complete system-readiness checks and prepare reports. Verify the following:
 - a. Permanent electrical-power wiring is complete.
 - b. Automatic temperature-control systems are operational.

3.4 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. General Procedures for Testing and Balancing

1. 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.
 - a. Comply with requirements in ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."
2. Cut insulation, ducts, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - a. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
3. Mark equipment and balancing 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. Remeasure 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 patterns of adjustable outlets for proper distribution without drafts.

3.7 TOLERANCES

A. Tolerances

1. Set HVAC system's air flow rates within the following tolerances:

- a. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.

3.8 FINAL REPORT

A. Final Report

1. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
 - a. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 - b. Include a list of instruments used for procedures, along with proof of calibration.
2. Final Report Contents: Certified field-report data.
3. General Report Data: In addition to form titles and entries, include the following data:
 - a. Title page.
 - b. Name and address of the TAB Subcontractor.
 - c. Project name.
 - d. Project location.
 - e. Architect's name and address.
 - f. Engineer's name and address.
 - g. Contractor's name and address.
 - h. Report date.
 - i. Signature of TAB supervisor who certifies the report.
 - j. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 - k. Summary of contents including the following:
 - 1) Indicated versus final performance.
 - 2) Notable characteristics of systems.
 - 3) Description of system operation sequence if it varies from the Contract Documents.
 - l. Nomenclature sheets for each item of equipment.
 - m. Data for pumps, including manufacturer, model, impeller size and motor horsepower.

- n. Notes to explain why certain final data in the body of reports vary from indicated values.
- 4. Electric-Coil Test Reports: For electric duct coils, include the following:
 - a. Unit Data:
 - 1) Unit identification.
 - 2) Capacity in KW
 - 3) Number of stages.
 - 4) Connected volts, phase, and hertz.
 - 5) Rated amperage.
 - b. Test Data (Indicated and Actual Values):
 - 1) Air flow rate in cfm.
 - 2) Entering-air temperature in deg F.
 - 3) Leaving-air temperature in deg F. at full KW
- 5. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
 - a. Report Data:
 - 1) System and fan coil unit or terminal unit number.
 - 2) Traverse air temperature in deg F.
 - 3) Duct size in inches.
 - 4) Duct area in sq. ft.
 - 5) Indicated air flow rate in cfm.
 - 6) Indicated velocity in fpm.
 - 7) Actual air flow rate in cfm.
 - 8) Actual average velocity in fpm.
- 6. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
 - a. Unit Data:
 - 1) Unit identification.
 - 2) Location.
 - 3) Make and type.
 - 4) Model number and unit size.

- 5) Manufacturer's serial number.
 - 6) Unit arrangement and class.
 - 7) Discharge arrangement.
 - 8) Sheave make, size in inches, and bore.
 - 9) Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - 10) Number, make, and size of belts.
 - 11) Number, type, and size of filters.
- b. Motor Data:
- 1) Motor make, and frame type and size.
 - 2) Horsepower and rpm.
 - 3) Volts, phase, and hertz.
 - 4) Full-load amperage and service factor.
 - 5) Sheave make, size in inches, and bore.
 - 6) 6) Center-to-center dimensions of sheave, and amount of adjustments in inches.
- c. Test Data (Indicated and Actual Values):
- 1) Total air flow rate in cfm.
 - 2) Total system static pressure in inches wg.
 - 3) Fan rpm.
 - 4) Discharge static pressure in inches wg .
 - 5) Outdoor airflow in cfm.
 - 6) Return airflow in cfm.
 - 7) Outdoor-air damper position.
 - 8) Return-air damper position.
7. Fan Test Reports: For supply, return, and exhaust fans, include the following:
- a. Fan Data:
- 1) System identification.
 - 2) Location.
 - 3) Make and type.
 - 4) Model number and size.

- 5) Manufacturer's serial number.
 - 6) Arrangement and class.
 - 7) Sheave make, size in inches, and bore.
 - 8) Center-to-center dimensions of sheave, and amount of adjustments in inches.
- b. Motor Data:
- 1) Motor make, and frame type and size.
 - 2) Horsepower and rpm.
 - 3) Volts, phase, and hertz.
 - 4) Full-load amperage and service factor.
 - 5) Sheave make, size in inches, and bore
 - 6) Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - 7) Number, make, and size of belts.
- c. Test Data (Indicated and Actual Values):
- 1) Total airflow rate in cfm.
 - 2) Total system static pressure in inches wg.
 - 3) Fan rpm.
 - 4) Discharge static pressure in inches wg.
 - 5) Suction static pressure in inches wg.
8. Instrument Calibration Reports:
- a. Report Data:
- 1) Instrument type and make.
 - 2) Serial number.
 - 3) Application.
 - 4) Dates of use.
 - 5) Dates of calibration.

3.9 INSPECTIONS

A. Inspection

1. Initial Inspection:

- a. After testing and balancing are complete, operate each system and randomly check measurements to verify that the

- system is operating according to the final test and balance readings documented in the final report.
- b. Check the following for each system:
 - c. Verify that balancing devices are marked with final balance position.
 - d. Note deviations from the Specifications in the final report.
2. Final Inspection:
- a. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Engineer.
 - b. The TAB Subcontractor's test and balance engineer shall conduct the inspection in the presence of Engineer.
 - c. Engineer shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
 - d. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
 - e. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
3. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:
- a. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
 - b. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the Contractor's final payment.
4. Prepare test and inspection reports; submit to Project Manager.

END OF SECTION 230593.2

DIVISION 23 – MECHANICAL

SECTION 230700.1 - HVAC INSULATION (CABINS)

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Work includes insulation for ductwork, and equipment.

1.2 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with all applicable city, county, and state codes and ordinances. In case of conflict with Contract Drawings or Specifications, the codes and ordinances govern.
- B. Basis: International Building Code; Uniform Plumbing Code; International Mechanical Code; Washington State Energy Code.
- C. Applicable industry Standards. Refer to Section 230500 - Common Work Results for HVAC.

1.3 SUBMITTALS

- A. General: Submit in accordance with Section 013000 - Administrative Requirements and the following.
- B. Product Data: Insulation, Insulation Covers; Inserts.

1.4 APPLICABLE PUBLICATIONS (MOST RECENT EDITIONS)

- A. American Society for Testing and Materials (ASTM) Standards:
 - 1. E84 Surface Burning Characteristics of Building Materials
 - 2. E96 Test for Water Vapor Transmission of Materials
- B. National Fire Protection Association (NFPA) Standards:
 - 1. 90A Air Conditioning and Ventilating Systems
 - 2. 255 Building Materials, Tests of Surface Burning Characteristics
- C. Underwriters' Laboratories, Inc. (UL) Publications:
 - 1. 723 Hazard Classification of Building Materials

1.5 DEFINITIONS AND ABBREVIATIONS USED IN THIS SECTION

A. Definitions:

1. "Exposed" is Work exposed to the view of occupants in normally occupied areas and in equipment rooms.
2. "Concealed" is Work located in ceiling spaces, chases and other locations not exposed to view.

B. Abbreviations:

ASJ	All-Service Jacket,
FSK	Foil-Scrim-Kraft Jacket,
K	Thermal Conductivity, BTU per hour per square foot per degree F for each inch of thickness,
PCF	Pound per cubic foot density,
Perm	Water vapor transmission rate (permeability),
SSL	Self-Sealing Lap.

1.6 SURFACE BURNING CHARACTERISTICS:

- A. Provide composite or component ratings per NFPA 255, ASTM E84, or UL 723, as follows: Fiberglass Insulation, flame spread 25, smoke developed 50.
- B. Composite includes insulation, jacketing and adhesive used to secure jacketing or facing.
- C. Components include PVC jacketing and fittings, adhesive, mastic, cement, tape and cloth.

1.7 MINIMUM INSULATION THICKNESS:

- A. Thickness of insulation is defined as the thickness of the basic insulating medium, not including finishing materials.
- B. Equipment, including but not limited to heat exchangers, air separators, etc. Rigid fiberglass board- 2 inch thickness.
- C. Concealed supply ductwork within conditioned space: Insulate ductwork to a total installed thermal resistance of R-5, unless internally acoustically lined.
- D. Exposed supply ductwork within conditioned space: Not insulated or acoustically lined, refer to Contract Drawings.
- E. Supply and Return Ductwork Outside of Conditioned Space: Insulate ductwork to a total installed thermal resistance of R-7.
- F. Outside Air Ductwork: Insulate ductwork to a total installed thermal resistance of R-7.

- G. Supply and Return Ductwork installed exposed to weather: Insulate ductwork to a total installed thermal resistance with a rigid board product as specified. Finish with embossed soft aluminum sheet weather proof barrier as specified.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with "Quality Assurance" provisions, Specifications, and manufacturers' data. Where these may be in conflict, the more stringent requirements govern.

2.2 ACCEPTABLE MANUFACTURERS

- A. Fiberglass: Owens-Corning; Knauf; Certainteed; Johns Manville Or Equal.
- B. Flexible Elastomeric: Armstrong, Rubatex Or Equal.

2.3 EQUIPMENT

- A. Unfaced board, 6 PCF density, consisting of glass fibers bonded with thermosetting resin. Suitable for temperatures to 450° F

2.4 DUCT INSULATION

- A. General: Coordinate with the duct installation Work.
- B. Fiberglass board: Base Product: Owens-Corning Fiberglass type 703/705 with FRK vapor barrier jacket. Thermal conductivity not greater than 0.23 at a mean temperature of 75° F. Accepted Alternative Products: Manville, Knauf, Certainteed or equal.

2.5 ADHESIVES, CEMENTS AND FINISHES

- A. Insulation Cement: Manville No. 460, Or Equal, mineral wool based insulating cement with good adhesion to cold surfaces and rated to 1800° F.
- B. Lagging Adhesive: Arabol E1658E, Foster 30-36, Or Equal, thinned per manufacturer's instructions.
- C. Vapor Barrier coating: Non-flammable, fire-resistant, polymeric resin, compatible with insulation.
- D. Spray Mastic: Insulcoustic 551, Foster 35-01, Or Equal.
- E. Glass Cloth: Twinberg-Miller "Glasfab" No. 2020-X, Foster "Mast-a-Fab", Or Equal.
- F. Bonding Adhesive: Foster 85-17 Or Equal.
- G. Insulation Weather Cover for Ductwork Installed Outdoors and/or exposed to weather: Embossed soft aluminum sheet, .016 inch minimum thickness.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify installation conditions as Satisfactory to receive Work of this Section. Do not install until unsatisfactory conditions are corrected. Install insulation and related equipment in accordance with the manufacturer's written instructions. Beginning Work constitutes acceptance of conditions as Satisfactory.

3.2 PREPARATION

- A. Field Measurements: Field-verify locations of new and existing Work prior to commencing Work of this Section.
- B. Protect surrounding areas and surfaces to preclude damage from Work of this Section.

3.3 INSTALLATION, APPLICATION, ERECTION AND PERFORMANCE

- A. Install, apply, erect, and perform the Work in accordance with "Quality Assurance" provisions, Specifications, and manufacturers' installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.4 TIME OF APPLICATION

- A. Apply insulation only after duct systems have been tested and certified by the Project Manager or his designated representative as ready for insulation. If insulation is applied prior to testing, necessary removals, repairs and modifications to insulation due to leaks that may occur in duct systems shall be made without additional cost to the District.

3.5 EXTENT OF INSULATION

- A. Insulate all ductwork and equipment completely, except as indicated.
- B. Do not insulate the following:
 - 1. Equipment: Items with factory-applied insulation meeting the requirements of this Section. Do not apply insulation over coil and damper access panels, or over internally lined ductwork that satisfies the specified insulation requirements.

3.6 INSTALLATION, GENERAL

- A. Apply in a workmanlike manner, by skilled craftsmen regularly engaged in this type of Work.
- B. Apply to clean and dry surfaces.
- C. On cold surfaces, apply with continuous, unbroken moisture and vapor seal. Insulate and vapor seal all hangers, supports, anchors, and other projections that are secured to cold surfaces, to prevent condensation.

- D. Extend all surface finishes to protect all raw edges, ends, and surfaces of insulation.
- E. Install all duct insulation continuous through walls, ceilings, and floor openings and sleeves, except where firestop or firesafing materials are required.
- F. Install with all joints tightly butted.
- G. Tuck and tuft all edges of insulation.
- H. Install insulation to allow easy access to equipment for inspection and repairs.
- I. Carefully bevel and seal insulation around equipment nameplates.

3.7 DUCTWORK

- A. Extent of Insulation: Insulate all ductwork as specified.
- B. Application:
 - 1. Adhesive: Apply adhesive in strips to the sheet metal, as recommended by the manufacturer, with 100 percent coverage to bottom horizontal duct and plenum surfaces.
 - 2. Pins: Apply welded pins on the duct surfaces on minimum 24 inch centers in each dimension.
 - 3. Insulation: Install insulation to all duct surfaces with insulation and jacket impaled on the pins and with tightly fitted transverse and longitudinal butt joints.
 - 4. Jackets: Install insulation jacket with all jacket joints lapped 2 inches, lap stapled on 6 inch centers. Seal jacket lap with a vapor barrier adhesive recommended by the insulation manufacturer. Use adhesive to seal the entire surface of all laps and also stapled areas. Repair all small punctures and holes with insulation adhesive.
 - 5. Washers: Install washers flush with the jacket and trim pins flush with the washers.
 - 6. Insulated ductwork installed outdoors and/or exposed to weather: Apply embossed aluminum weather cover to entire surface of exposed duct insulation. Double fold seams and seal with approved mastic.

3.8 FINISHES

- A. Apply two coats of the vapor barrier coating over all surfaces and lagging not covered with continuous vapor barrier jackets. Fill all joints, cracks, seams and depressions, and apply additional lagging as necessary to form smooth continuous surfaces.

END OF SECTION 230700.1

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

SECTION 230700.2 – HVAC INSULATION (COMFORT STATION)

PART 1 - GENERAL

1.1 SUMMARY

A. Summary:

1. Section Includes:

- a. Insulation Materials:
 - 1) Mineral fiber, Blanket Insulation
 - 2) Flexible Elastomeric Pipe Insulation
- b. Insulation Installation Requirements
- c. Duct and Plenum Insulation Requirements
- d. HVAC Piping Insulation Schedule

1.2 SCOPE OF WORK

- A. Provide mineral fiber, blanket duct insulation only on portions of ductwork which are affected due to the installation of the replacement split-system heat pump units, fan coil units and rooftop units. Work is to include new insulation on new ductwork transitions from new terminal units to connection to existing ductwork, and includes repair of insulation on existing ductwork (where it exists) damaged by new ductwork connections.
- B. Provide mineral fiber preformed pipe insulation on all new piping as indicated.

1.3 SUBMITTALS

- A. Submit product data for all items specified in this section.

1.4 QUALITY ASSURANCE

A. Quality Assurance:

- 1. 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.

- a. Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery, Storage and Handling:

1. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordination:

1. Coordinate size and location of supports, hangers, and insulation shields specified in Division 230529, Section "Hangers and Supports for HVAC Piping and Equipment."
2. 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.

1.7 SCHEDULING

A. Scheduling:

1. Schedule insulation application after pressure testing systems. Insulation application may begin on segments that have Satisfactory test results.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Insulation Materials:

1. General:
 - a. Comply with requirements in Part 3 Execution for where insulating materials shall be applied.
 - b. Products shall not contain asbestos, lead, mercury, or mercury compounds.
 - c. Thermal conductivity of all insulation materials (k-value) at mean temperature shall be as noted in Part 3 Execution.

- d. Manufacturers: Subject to compliance with requirements, Provide products by one of the following:
 - 1) CertainTeed Corp.; Duct Wrap.
 - 2) Johns Manville; Microlite.
 - 3) Knauf Insulation; Duct Wrap.
 - 4) Owens Corning; All-Service Duct Wrap.
2. Mineral-Fiber, Blanket Insulation:
 - a. 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. Insulation density and thickness shall provide for minimum thermal resistance of R-3.3.
3. Flexible Elastomeric Pipe Insulation
 - a. Closed-cell, sponge or expanded rubber materials. Comply with ASTM C 534, Type I for tubular materials

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examination:

1. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
 - a. Verify that systems and equipment to be insulated have been tested and are free of defects.
 - b. Verify that surfaces to be insulated are clean and dry.
 - c. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Preparation:

1. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
2. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that applies to insulation.

3.3 GENERAL INSULATION INSTALLATION REQUIREMENTS

A. General Insulation Installation Requirements:

1. 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.
2. 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.
3. 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.
4. Install insulation with longitudinal seams at top and bottom of horizontal runs.
5. Install multiple layers of insulation with longitudinal and end seams staggered.
6. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
7. Keep insulation materials dry during application and finishing.
8. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
9. Install insulation with least number of joints practical.
10. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
11. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
12. 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.
13. Insulation shall be continuous through walls, floors, or sleeves with thickness same as adjacent piping.

14. Do not install insulation to the following:
 - a. Vibration-control devices.
 - b. Testing agency labels and stamps.
 - c. Nameplates and data plates.
 - d. Manholes.
 - e. Handholes.
 - f. Cleanouts.

3.4 MINERAL FIBER BLANKET INSULATION

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 over compress 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.

B. 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 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.

D. 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 DUCT AND PLENUM INSULATION REQUIREMENTS

A. SCHEDULE

1. Insulate all new supply and return air ductwork serving the Supply Fan Mineral Fiber Blanket Insulation, to provide a minimum R-3.3.
2. Insulate all new outside air ductwork serving Supply Fan with Mineral Fiber Blanket Insulation, or Duct Liner Insulation to provide a minimum R-7 insulating value.

END OF SECTION 230700.2

DIVISION 23 – MECHANICAL

SECTION 233100 - HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Work includes sheet metal Work and related components.
- B. Contract requirements of the General Conditions apply to all Work in this Section.

1.2 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with all applicable city, county and state codes and ordinances and local amendments to codes and ordinances. In case of conflict with Contract Drawings or Specifications, the codes and ordinances govern.
 - 2. Basis: International Building Code; Uniform Plumbing Code; International Mechanical Code; NFPA 90A.

1.3 SUBMITTALS

- A. General: Submit in accordance with Sections 013000 – Administrative Requirements and 230500 - Common Work Results for HVAC, and the following.
- B. Coordinated ductwork Shop Drawings for the building. Prepare Shop Drawings on backgrounds provided by the Contractor coordinated with steel, plumbing, piping and electrical.
- C. Product Data:
 - 1. Ductwork.
 - 2. Fasteners
 - 3. Hangers
 - 4. Flex Duct
 - 5. Flexible Connectors
 - 6. Diffusers, Registers and Grilles
 - 7. Louvers and Wall Caps

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with "Quality Assurance" provisions, Specifications and Manufacturer's Data. Where these may be in conflict, the more stringent requirements govern.



2.2 ACCEPTABLE MANUFACTURERS:

- A. Listed manufacturers with products equivalent to specific product indicated (if any) are acceptable; Project Manager or his designated representative is sole judge of equivalency.
- B. Non-listed manufacturers may be considered in accordance with Section 265000 - Product Requirements.

2.3 SHEETMETAL WORK:

- A. Duct Construction: Comply with SMACNA HVAC Duct Construction Standards, Metal and Flexible; galvanized steel.
- B. Ductwork; supply ductwork: Construct in accordance with SMACNA HVAC Duct Construction Standards as follows:
 - 1. 2 inch w.g. static pressure, positive or negative, Seal Class A (typical)
- C. Ductwork; exhaust and return ductwork: Construct in accordance with SMACNA HVAC Duct Construction Standards as follows:
 - 1. 2 inch w.g. static pressure, positive or negative, Seal Class B.
- D. Round duct and flat oval duct: Table 3-2, 10 inch w.g. static pressure, positive or negative.
- E. Exposed ductwork:
 - 1. Spiral wound round duct, complying with specified gauge standards.
- F. Gauge for ductwork and fittings not described above, or otherwise indicated:

<u>Maximum</u>	<u>Size,</u>	<u>Minimum Gauge</u>
<u>Inches</u>		

Rectangular Ducts:

Up to 12	26
13 to 30	24
41 to 54	22
55 to 84	20
85 and over	18

Round Ducts:

Up to 13	24
14 to 22	22
23 to 36	20
37 to 50	18
51 to 60	16
61 to 84	14

- G. Fabricate fan plenums, plenums downstream of fan, and hoods in accordance with the most stringent of the minimum gauge requirements as recommended by ASHRAE, SMACNA or tabulated above. Substitute the maximum dimension of fitting or device for diameter to determine gauge.
- H. Turning Vanes: Acoustical double thickness type with runners. Acousti-San or equal. Furnish all rectangular elbows with turning vanes.
- I. Sheet metal Connections To Building Construction: Use steel angles, riveted to the sheet metal and bolted, using embedded bolts to the building surface with compressible glass fiber under the angle; angle size same as for bracing, except 1 inch x 1 inch x 1/8 inch minimum.
- J. Access Doors and Frames:
 - 1. General: Include access door wherever access to ducts is necessary for reaching equipment; double construction, tight fitting, hinged, with latch, insulation or sound lining equivalent to that of the duct; steel angle frame.
 - 2. Fire Rating: Coordinate rating with enclosure rating requirement.
 - 3. Access Doors Sizes: As indicated; 12 inches x 16 inches minimum size.
 - 4. Latches: Die-cast, Vent fabrics No. 100 for doors 2 foot - 0 inches high or smaller; Catalog No. 260 for up to 3 foot - 0 inches height; Catalog No. 310 or larger and use minimum two.
- K. Duct Lining-Standard: Fiberglass, 1 inch thickness with a black pigmented neoprene coated mat surface on the airstream side, 1-1/2 pounds per cubic foot density, Fire Hazard Classification FHC 25/50 per UL 723; Owens-Corning Aeroflex duct liner, Knauf, Manville or Certainteed or equal.
- L. Duct Lining-Round Ductwork: 1 inch thick insert duct liner, manufactured product for lining round ductwork. The installed 1 inch lining shall have a Thermal Resistance (R-Value) of 4.3 at 75° F (0.76 at 24° C) mean temperature, and Noise Reduction Coefficient (NRC) of 0.75 per ASTM C 423, Type "A" mounting. Johns Manville Spiracoustic or equal.

2.4 FASTENERS:

- A. General: Use blind rivets, sheetmetal screws, or bolted connections where required by SMACNA for attachment purposes for sheetmetal. Sheetmetal screws and rivets shall be of the minimum length required for a secure fastening.
- B. For all ductwork, grilles, and accessories exposed to view in finished rooms, provide finish type fasteners.
 - 1. Permanent Work: Blind and stainless steel pop rivets.
 - 2. Removable Items and Grilles: Stainless steel pan head or countersunk tapping screws.

2.5 HANGERS FOR SHEETMETAL WORK:

- A. Description: Provide hangers, supports and anchor bolts for all sheet metal Work and equipment. Comply with SMACNA and other applicable industry standards. Refer to Section 230500 - Common Work Results for HVAC.
- B. Duct Sizes: Refer to maximum cross-section dimension, at location of hangers.
- C. Horizontal Low Pressure Ducts:
 - 1. Concealed Ducts Under 36 inches Width: Galvanized straps running down the side and turning under the bottom, attached with rivets.
 - 2. Exposed Ducts Under 36 inch Width: ¼ inch rods, one on each side at each point of suspension, end of the rod flattened and riveted at the top.
 - 3. Ducts 36 inches and Larger: 3/8 inch minimum rods through the ends of the angle stiffeners under the ducts. If stiffeners are not located properly for the hangers, provide additional angles of same size.
 - 4. Spacing: 8 feet maximum, in general; 4 feet maximum for ducts 38 inches maximum size and larger.
- D. Horizontal Medium Pressure Ducts:
 - 1. Round Ducts 10 inches and smaller: 1 inch by 18 gauge encircling strap, wrapped around ducts and extended to structure.
 - 2. Round Ducts 11 through 24 inches: Same as 10 inches and smaller except provide 1/4 inch steel rods bolted through clips attached to the bracing angles or straps around the ducts.
 - 3. Round Ducts 25 inches through 33 inches: Same as ducts 11 through 24 inches except 1 inch by 16 gauge strap and 3/8 inch rod.
 - 4. Round Ducts 34 through 42 inches: Same as ducts 25 through 33 inches except 1/2 inch rods.
 - 5. Round Ducts over 42 inches: Formed structural steel saddle supports, supporting entire underneath section of duct, with 5/6 inch or 3/4 inch rod hangers; two rod suspension at each point of support.
 - 6. Rectangular Ducts: Same as round ducts listed above, applied to the maximum dimension, except provide two-rod suspension at each of support secured to the duct reinforcing or a separate trapeze type hanger.
- E. Vertical Ducts: Angles riveted to the sides, in pairs; size same as bracing; 1 inch x 1 inch x 1/8 inch minimum. In shafts, provide supplementary steel angles or saddles at each floor, to distribute loads from bracing angles or channels, to the steel supports for the gratings and walkways and to the slabs.

2.6 FLEXIBLE DUCTWORK

- A. Insulated type, 1-1/4 inch thick fiber glass bonded to vinyl coated spring steel helix. Outer jacket shall be reinforced mylar/neoprene laminate reinforced with fiber glass

scrim. Thermoflex Type M-KC or equal. Not allowed in exposed ceiling areas or on return or exhaust systems.

2.7 FLEXIBLE CONNECTIONS

- A. Flexible fire retardant material. Durolon or equal. Fasten between rotating equipment and ductwork with rivets and sheet metal collars.

2.8 DIFFUSERS, REGISTERS AND GRILLES

- A. General: Provide air diffusion devices, including grilles, register and diffusers as specified herein and indicated by the Contract Drawings.
- B. Diffusers, register and grilles: Coordinate color with Project Manager or his designated representative. Diffusers shall conform to the schedules shown on the Contract Drawings.
- C. Coordinate location, ceiling frame type and fire rating requirement with the Contract Drawings.
- D. Manufacturers: Price, Anemostat, Krueger, or equal.

2.9 LOUVERS, WALL CAPS

- A. Louvers shall be stationary type drainable style blades in a louver frame. Each factory-assembled louver section shall be designed to withstand wind loading of 25 pounds per square foot (100MPH wind equivalent). Frames shall be 16 gauge and blades shall be 20 gauge. Each louver shall be equipped with a framed, removable rear-mounted screen of 1/2 inch x 1/2 inch mesh 19 gauge galvanized wire. Coordinate color and finish with the Project Manager or his designated representative. Basis of Design: Greenheck ESD 435 Or Equal.
- B. Wall Caps
 - 1. Provide wall cap termination where indicated. Exhaust fan wall caps shall have screen and backdraft flap.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify installation conditions as Satisfactory to receive Work of this Section. Do not install until any unsatisfactory conditions are corrected. Beginning Work constitutes acceptance of conditions as Satisfactory.

3.2 PREPARATION

- A. Field Measurements: Field verify locations of new and existing Work prior to commencing Work of this Section.

- B. Protect surrounding areas and surfaces to preclude damage from Work of this Section.

3.3 CLEANING AND ADJUSTING

- A. Plenums and casings shall be thoroughly cleaned of all debris and blown free of all small particles of rubbish and dust before installing and making final duct connections. Equipment shall be wiped clean, with all traces of oil, dust, dirt or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and after construction dirt has been removed from the building, new filters shall be installed. Bearings shall be properly lubricated with oil and grease as recommended by the manufacturer. Belts shall be tightened to proper tension. All controls and other miscellaneous equipment requiring adjustment shall be adjusted to setting indicated or directed. Fans shall be adjusted to the speed indicated by the manufacturer to meet specified conditions, ready for air balancing.

3.4 INSTALLATION, APPLICATION, ERECTION AND PERFORMANCE

- A. Install, apply, erect and perform the Work in accordance with "Quality Assurance" provisions, Specifications, and Manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.
- B. Ductwork: All ductwork shall be installed in workmanlike manner, by craftsmen with at least five years of experience in the sheet metal trade. Fabrications, fittings, joints, take-offs, attachment to sheet metal work, turning vanes, dampers and sealing shall be in accordance with the requirements of SMACNA HVAC Duct Construction Standards and as indicated.
- C. Ductwork exposed to the view of the occupants: Take great care to maintain a high standard of appearance of ductwork exposed to the view of the occupants. Insure duct is installed plumb and true to building lines free of dents and all defects that would detract from the appearance. Do not install deformed ductwork. Secure Project Manager's or his designated representative's acceptance of duct prior to installation if there are questions about the appearance.
- D. Offsets: The Contract Drawings do not show all easements, offsets or fittings that may be required to clear structure or other systems; provide As Required. Make offsets with fittings with as small an angle of offset as possible; do not use square corners unless specifically shown; when square corners are used, install turning vanes.
- E. Access Doors: Provide at each duct smoke detector, motor-operated damper, plenum, fire damper, or at other points requiring maintenance access.
- F. Access Doors, Kitchen Hood Ductwork: Install access doors at every elbow to service and clean ductwork not accessible from the inlet or discharge.
- G. Flexible Connections: Provide at all fans except internally isolated equipment and air terminal units.

H. Install equipment so as to allow maintenance access to all equipment covered by other sections and Divisions of this Specification.

3.5 LOCATION OF DIFFUSERS AND GRILLES

A. Location: Locate per Contract Drawings in areas with finished ceilings, otherwise where shown.

B. Verification: Verify that ceiling diffuser and grille frames match ceiling type and finish prior to ordering.

3.6 COLLARS

A. Provide 2 inch wide 18 gauge sheet metal angle collars wherever exposed ducts pass through walls, slabs or ceilings.

3.7 PRESSURE TESTING FOR LEAKAGE

A. Extent: Test ductwork, supply and exhaust.

B. Test Apparatus: Portable blower with volume adjustment; flow measuring assembly for determining CFM of air being added to ductwork consisting of a calibrated orifice mounted in a straight tube with straightening vane and pressure taps; U-tube manometers. Provide calibration curve for orifice assembly.

C. Test Procedures:

1. Test ductwork before insulation is installed.

2. Test for audible leaks as follows:

- a. Close off and seal all openings in the duct section to be tested - connect the test apparatus to the duct by means of a section of flexible duct;
- b. Start blower with its control damper closed;
- c. Gradually open the control damper until the duct pressure reaches 2 inch W.G. in excess of designed duct operating pressure;
- d. Survey all joints for audible leaks. Mark each leak and repair after shutting down blower. Do not apply a retest until sealants have set.

3. After all audible leaks have been sealed, measure the remaining leakage with the orifice section of the test apparatus as follows:

- a. Start blower and open damper until pressure in duct reaches 25 percent in excess of designed duct operating pressure;
- b. Make sufficient preliminary tests and examinations of each section, and seal all observable leaks such that leakage during final tests will be at or below maximum permissible leakage.
- c. Maximum permissible leakage shall not exceed ten percent of the total system design air flow rate. When partial sections of the duct system are tested, the summation of the leakage for all sections shall not exceed the total allowable leakage;

- d. Final test of each section will be witnessed by Project Manager or his designated representative. Give Project Manager or his designated representative at least seven days prior notice before such test.
- e. Test Documentation: Copies of all completed tests, certifications, or reports required in the specifications shall be provided to the Project Manager or his designated representative.

END OF SECTION 233100

DIVISION 23 – HEATING, VENTILATION AND AIR CONDITIONING

SECTION 233113 – METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Summary:

1. Section Includes:

- a. Sheet Metal materials
- b. Single-wall rectangular ducts and fittings.
- c. Single-wall round ducts and fittings.
- d. Sealants and gaskets.
- e. Hangers and supports.
- f. Ductwork Static Pressure Classifications
- g. Duct Sealing

1.2 QUALITY ASSURANCE

A. Quality Assurance:

1. Welding Qualifications: Qualify procedures and personnel according to the following:
 - a. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
 - b. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
 - c. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.
2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."
3. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

A. Sheet Metal Materials:

1. 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.
2. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - a. Galvanized Coating Designation: G90.
 - b. Finishes for Surfaces Exposed to View: Mill phosphatized.

2.2 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. Single-Wall Rectangular Ducts and Fittings:

1. Material: Galvanized Steel.
2. 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.
3. 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."
 - a. 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.
4. 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."

5. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Provide types as indicated on the Contract 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."
6. 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. Single-Wall Round Ducts and Fittings:

1. Material: Galvanized Steel.
2. 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.
3. 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."
 - a. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.
 - b. 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.
4. 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."

- a. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
5. Tees and Laterals: Provide types as indicated on the Contract 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."
6. 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. Sealant and Gaskets:

1. 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.
2. Two-Part Tape Sealing System:
 - a. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
 - b. Tape Width: 3 inches.
 - c. Sealant: Modified styrene acrylic.
 - d. Water resistant.
 - e. Mold and mildew resistant.
 - f. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 - g. Service: Indoor and outdoor.
 - h. Service Temperature: Minus 40 to plus 200 deg F.
 - i. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
 - j. 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).

3. Water-Based Joint and Seam Sealant:
 - a. Application Method: Brush on.
 - b. Solids Content: Minimum 65 percent.
 - c. Shore A Hardness: Minimum 20.
 - d. Water resistant.
 - e. Mold and mildew resistant.
 - f. VOC: Maximum 75 g/L (less water).
 - g. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 - h. Service: Indoor or outdoor.
 - i. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
4. Flanged Joint Sealant: Comply with ASTM C 920.
 - a. General: Single-component, acid-curing, silicone, elastomeric.
 - b. Type: S.
 - c. Grade: NS.
 - d. Class: 25.
 - e. Use: O.
 - f. 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).
5. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

2.5 HANGERS AND SUPPORTS

- A. Hangers and Supports:
 1. Unless otherwise indicated or detailed, comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Section IV "Hangers and Supports"
 2. 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."
 3. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
 4. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.
 5. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

6. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
7. Trapeze and Riser Supports:
 - a. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 - b. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
 - c. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCTWORK STATIC PRESSURE CLASSIFICATIONS

A. Ductwork Static Pressure Classifications:

1. 1" Water Gage Systems:
 - a. All supply, return, outside air and relief ductwork.

3.2 DUCT SEALING

A. Duct Sealing:

1. All ductwork 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, and as follows:
 - a. Seal all transverse and longitudinal joints (SMACNA Seal Class B).
 - b. Duct tape and other pressure sensitive tape shall not be used as the primary sealant where ducts are designed to operate at static pressure of 1" and greater.

3.3 DUCT INSTALLATION

A. Duct Installation:

1. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
2. Offsets in Ductwork: All offsets necessary in ductwork are not shown on the Contract Drawings. Provide all offsets required without additional cost. Offset angles shall be as small as possible.
3. 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.

4. Duct Sizes:
 - a. Duct dimensions indicated on the Contract Drawings for internally lined single wall ductwork refer to inside clear dimensions inside the lining.
5. Install round ducts in maximum practical lengths.
6. Install ducts with fewest possible joints.
7. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
8. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
9. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
10. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
11. Exposed Ductwork:
 - a. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
 - b. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
 - c. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
 - d. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
 - e. Repair or replace damaged sections and finished work that does not comply with these requirements.
12. 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.

3.4 FIELD QUALITY CONTROL

A. Field Quality Control:

1. Duct System Cleanliness Tests:

- a. Visually inspect new ductwork to ensure that no visible contaminants are present.

END OF SECTION 233113

DIVISION 23 – HEATING, VENTILATION AND AIR CONDITIONING

SECTION 233300 – AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Summary:

1. SECTION Includes:

- a. Control Dampers
- b. Damper Operators
- c. Flexible Connectors.
- d. Flexible Ducts
- e. Manual Volume Dampers
- f. Grilles, Registers and Diffusers
- g. Electric Duct Heaters

1.2 SUBMITTALS

- ###### **A. Submit product data for all items specified in this section.**

PART 2 - PRODUCTS

2.1 CONTROL DAMPERS

A. Control Dampers:

1. Manufacturers:

- a. Air Balance Inc.
- b. Ruskin.
- c. TAMCO (T. A. Morrison & Co. Inc.).

2. Dampers: All Control Dampers not provided with the mechanical equipment are to be provided by the Temperature Control Contractor.
3. All Control Dampers shall be AMCA-rated, parallel blade design; 0.108-inch- minimum thick, galvanized-steel or 0.125-inch- minimum thick, extruded-aluminum frames with holes for duct mounting; damper blades shall not be less than 0.064-inch- thick galvanized steel with maximum blade width of 8 inches and length of 48 inches.
 - a. Secure blades to 1/2-inch- diameter, zinc-plated axles using zinc-plated hardware, with blade bearings, blade-linkage hardware of

zinc-plated steel and brass, ends sealed against spring-stainless-steel blade bearings, and thrust bearings at each end of every blade.

- b. Operating Temperature Range: From minus 40 to plus 200 deg F.
- c. Edge Seals, Low-Leakage Applications: Use inflatable blade edging or replaceable rubber blade seals and spring-loaded stainless-steel side seals, rated for leakage at less than 10 cfm per sq. ft. of damper area, at differential pressure of 4-inch wg when damper is held by torque of 50 in. x lbf; when tested according to AMCA 500D.

2.2 DAMPER OPERATORS

- A. Manufacturers: Subject to compliance with requirements, Provide products by the following:
 - 1. Belimo
- B. 24V, 2 position (open/closed), spring return, or modulating, as required.

2.3 FLEXIBLE CONNECTORS

- A. Flexible Connectors:
 - 1. Manufacturers: Subject to compliance with requirements, Provide products by one of the following:
 - a. Ductmate Industries, Inc.
 - b. Duro Dyne Inc.
 - c. Ventfabrics, Inc.
 - 2. Description: Metal edged, coated heavy glass fabric.
 - 3. Coatings and Adhesives: Comply with UL 181, Class 1.
 - 4. Metal Edged Connectors: Strip of fabric permanently attached to 2 strips of minimum 24 gage galvanized sheet metal.
 - 5. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 - a. Minimum Weight: 26 oz. /sq. yd.
 - b. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 - c. Service Temperature: Minus 20 to plus 200 deg F.

2.4 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 w.g. positive and 1-inch w.g. negative.
 2. Maximum Air Velocity: 4000 fpm.
 3. Temperature Range: Minus 20 to plus 250 deg F
 4. Insulation R-Value: R-4.2.
- C. Flexible Duct Connectors:
- D. 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.

2.5 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:
 - a. Standard leakage rating.
 - b. Suitable for horizontal or vertical applications.
 - c. Frame: 22 gage galvanized steel
 - d. Blades: Single blade, 22 gage galvanized steel with center V-groove for reinforcement.
 - e. Blade Axle: 3/8" square steel shaft, full length of damper blade.
 - f. Bearings: Molded synthetic
 - g. Hand Quadrant: Locking hand quadrant with 2" standoff bracket.
 2. Dampers larger than 12"x12", up to 48"x48" in size:

- a. Standard leakage rating.
- b. Suitable for horizontal or vertical applications.
- c. Frame: 16 gage galvanized steel formed into structural hat channel with tabbed corners for reinforcement.
- d. Blades: Multiple opposed blades, maximum 8" width, 16 gage galvanized steel with 3 longitudinal grooves for reinforcement.
- e. Blade Axles: 1/2" hex, positively locked into damper blades.
- f. Bearings: Molded synthetic
- g. Control Shaft: 3" x 3/8" square plated steel.
- h. Linkage Assembly: Out of airstream.
- i. Hand Quadrant: Locking hand quadrant with 2" standoff bracket.
- j. 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:

- a. Standard leakage rating.
- b. Suitable for horizontal or vertical applications.
- c. Frame: 20 gage galvanized steel
- d. Blade: Single blade, 20 gage galvanized steel.
- e. Blade Axle: 3/8" square steel shaft, full length of damper blade.
- f. Bearings: Molded synthetic, or oilite
- g. Hand Quadrant: Locking hand quadrant with 2" standoff bracket.

2.6 GRILLES, REGISTERS AND DIFFUSERS

A. Manufacturers: Subject to compliance with requirements, Provide products as scheduled on the Contract Drawings, or a comparable product by one of the following:

1. Titus
2. Kreuger
3. Anemostat
4. Tuttle and Bailey
5. Carnes

B. Comparable products to those scheduled shall meet scheduled certified catalog ratings as to noise criteria, pressure drops and throw.

2.7 ELECTRIC DUCT HEATERS

A. Manufacturers: Subject to compliance with requirements, Provide products as scheduled on the Contract Drawings, or a comparable product by one of the following:

1. Indeeco
 2. Warren
 3. Brasch
 4. Nailor
- B. Duct Coils
1. Coil Type: Open coil, for slip in or flanged installation.
 2. Heating Elements: 80% nickel, 20% chromium resistance wire.
 3. Heater Frames and Terminal Boxes: Corrosion resistant steel. Terminal box shall be NEMA construction and shall be provided with hinged, latching cover and multiple concentric knockouts for field wiring.
 4. Cutouts: Automatic and manual reset thermal cutouts. Heat limiters or other fusible over temperature devices are not acceptable. Airflow switch shall be provided.
 5. Terminal blocks: To be provided for all field wiring and sized for installation of 75 deg C copper wire.
 6. Controls: Single stage SCR control, with control circuit transformer.
 7. Accessories:
 - a. Door interlocked disconnect switch.

PART 3 - EXECUTION

3.1 CONTROL DAMPER INSTALLATION

- A. Control Damper Installation:
1. Install dampers so that actuators are not in the air stream.
 2. Install control dampers in locations as indicated.

3.2 FLEXIBLE CONNECTOR INSTALLATION

- A. Flexible Connector Installation:
1. 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.

3.3 FLEXIBLE DUCT 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.

3.4 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.

3.5 GRILLES, REGISTER AND DIFFUSER INSTALLATION

- A. Install in locations as indicated on the Contract Drawings, and in accordance with the reflected ceiling plan where indicated. Where locations indicated on the Contract Drawings are not feasible, or there is a discrepancy between locations shown on the Contract 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.

END OF SECTION 233300

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

SECTION 233400 - HVAC FANS

PART 1 - GENERAL

1.1 USE OF DOCUMENTS

- A. All information contained in Section 230500 - Common Work Results for HVAC, Mechanical General Provisions, is considered a part of this section.

1.2 DESCRIPTION

A. General

- 1. Work includes all air handling equipment, including all products, material, equipment, and installation. Provide all air handling equipment as required by the mechanical system design, the Specifications, and/or the Contract Documents. Provide a complete and operable system.

B. Work Included

- 1. Exhaust fans
- 2. Destratification fans

C. Related Sections

- 1. GC - General Conditions
- 2. Section 230500 - Common Work Results for HVAC
- 3. Section 230923 - Temperature Control System for HVAC
- 4. Division 26 - Electrical

D. Code

- 1. All Work shall be installed in accordance with International Mechanical Code, International Building Code, Washington State Energy Code and all local codes. Refer to Specification Section 230500 - Common Work Results for HVAC. All assemblies shall be UL listed.

E. Standards

- 1. AMCA Testing Standard 210
- 2. Testing and Rating Code for Finned Tube Commercial Radiation: IBR 1966.
- 3. Advanced Installation Guide for Hydronic Heating Systems: IBR 250, 2nd Edition.

F. Abbreviations

AMCA	Air Moving and Conditioning Association
ADC	Air Diffusion Council
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
UL	Underwriters Laboratories

1.3 SUBMITTALS

A. Provide submittal information in accordance with Section 013000 requirements. Provide product data for all equipment items specified, including but not limited to the following:

1. Exhaust Fans
2. Destratification Fans

1.4 QUALITY ASSURANCE

A. Comply with the requirements of Section 230500-Common Work Results for HVAC.

PART 2 - PRODUCTS

2.1 EXHAUST FANS (EF-1)

A. Wall Mounted Exhaust Fan

1. Direct Drive Centrifugal Wall Exhaust Fan. Provide with birdscreen. Provide with all necessary mounting equipment and options. See Contract Drawings.

2.2 DESTRATIFICATION FANS (DF-1)

A. Ceiling Mounted Destratification fan

1. Provide with variable speed control. Provide with all necessary mounting equipment and options. See Contract Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify conditions, including defects or errors, which would cause defective installation/application of products or cause latent defects in workmanship or function.

3.2 INSTALLATION

A. Install in accordance with manufacturer's written recommendations and as specified. Furnish all required materials, accessories, appurtenances and Work required to support or suspend equipment. Install equipment with associated ductwork and piping to permit access to doors and panels as required for periodic maintenance.



- B. Provide and install all options and equipment per the manufacturer's written instructions.

3.3 LOCATION AND SIZE

- A. The equipment scheduled on the Contract Drawings is selected and configured to fit in the mechanical space available. Insure that substitute equipment will fit without change in function or quality. Cost of all materials and Work to accommodate substitute equipment is the sole responsibility of the Contractor.

END OF SECTION 233400

DIVISION 23 – HEATING, VENTILATION AND AIR CONDITIONING

SECTION 233423 – HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Centrifugal Roof Ventilators.

1.2 SUBMITTALS

- A. Submit product data for all items specified in this section.

1.3 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.

1.4 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.

PART 2 - PRODUCTS

2.1 DUCT-MOUNTED, SQUARE, IN-LINE SUPPLY 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. Acme Engineering & Mfg. Corp.
 2. Breidert Air Products.
 3. Carnes Company HVAC.
 4. Greenheck.
 5. Loren Cook Company.
 6. Penn Ventilation.
 7. Twin City
- B. Description: Supply fan shall be duct-mounted, direct driven centrifugal square inline fan.
- 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 (3) 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. Nameplate shall indicate design airflow (CFM) and static pressure. Unit shall be shipped in ISTA certified transit tested packaging.
- D. Fan Wheels: 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 balanced in accordance with AMCA standard 204-05, balance quality and vibration levels for fans.
- E. Motor: Motor shall be an electronically commutated motor rated for continuous duty and furnished with an internally mounted potentiometer speed controller.
- 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.

2.2 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.

PART3 - EXECUTION

3.1 POWER VENTILATOR INSTALLATION

- A. Install power ventilators level and plumb.
- B. Secure roof mounting power ventilators to roof curbs.
- 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 Piping and Equipment."

END OF SECTION 233423

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

SECTION 238126 - SPLIT-SYSTEM AIR-CONDITIONERS AND HEAT PUMP

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work includes all room heating ventilation and air conditioning equipment, including temperature controls, all products, material, equipment, and installation. Provide all equipment as required by the system design, the Specifications, and/or the Contract Drawings. Provide a complete and operable system. Coordinate electrical requirements of all equipment furnished hereunder with Division 26.

1.2 CODES

- A. All Work shall be installed in accordance with International Mechanical Code, International Building Code, Washington State Energy Code and all local codes. Refer to Specification Section 230500. All assemblies shall be UL listed.

1.3 SUBMITTALS

- A. Provide submittal information in accordance with Section 013000. Provide product data for all equipment items specified, including the following.
 1. Air conditioner and heat pump layout, sections, hardware,
 2. Performance information,
 3. Outdoor unit characteristics.
 4. Submit the manufacturer's installation & startup manual as a part of the initial equipment submittal.
 5. Submit the manufacturer's operating and maintenance manual as a part of the initial equipment submittal.

1.4 QUALITY ASSURANCE

- A. Comply with the requirements of Section 230500.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The room air conditioner or heat pump shall be split system, air cooled, ceiling or wall mounted with integral grilles. Conditioning capacities as scheduled. The unit shall include a non-automatic disconnect switch mounted in the high voltage section of the electric panel. Furnish air conditioner with controls, thermostat, refrigerant line set and all necessary accessories for a complete installation. Provide hard wired room thermostat control.

B. Basis of Design: Mitsubishi. Acceptable Manufacturers: Carrier, LG, Sanyo, Trane

2.2 AIR COOLED REFRIGERATION CIRCUIT

A. Indoor Unit:

1. The coil shall be copper tube with maximum 12 fins per inch of corrugated aluminum. Expansion valve shall be of adjustable thermostatic type. Compressor shall be hermetic type with complete overload protection anti-slug device, crankcase heater, sightglass, short cycle timer, and low override pressure timer. Filter drier shall be high capacity flare fitting type for non-torch servicing. The circuit shall contain high and low pressure switches and suction line accumulator. Reheat coil shall be electric.

B. Outdoor Air-Cooled Unit:

1. The system shall have a direct drive propeller fan type air cooled condenser. The condenser shall be constructed of galvanized steel and contain a copper tube aluminum fin. All components shall be factory assembled, charged with refrigerant, sealed and be capable of being connected to the evaporator section using pre-charged refrigerant line sets. Condenser shall be capable of operations to -20° Fahrenheit. All controls shall be factory mounted in the outdoor unit. The outdoor unit shall be manufactured by the manufacturer of the indoor unit and matched to the indoor unit.

C. Piping:

1. Contractor shall verify refrigerant line size with the manufacturer before ordering or installing piping. The Contractor shall submit factory line sizing information to the Project Manager for review before installation.
2. Provide condensate piping and pump.

2.3 TEMPERATURE CONTROLS

A. Furnished by the equipment manufacturer, for installation by the Contractor.

1. As manufactured by selected manufacturer, or an Approved equivalent.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify conditions, including defects or errors, which would cause defective installation/application of products or cause latent defects in workmanship or function.

3.2 INSTALLATION

A. Install in accordance with manufacturer's written recommendations and as specified. Furnish all required materials, accessories, appurtenances and Work required to support or suspend equipment. Install equipment with associated ductwork and piping to permit access to doors and panels as required for periodic maintenance.

- B. Start up shall be performed by a manufacturer authorized technician and per the manufacturer's written instructions.
- C. Equipment Manufacturer's Participation in Project Commissioning
 - 1. Assist in developing the final functional test procedures as specified in Division 1, Division 26 and related sections.
 - 2. Provide authorized startup technician to perform functional performance testing as specified in Division 01, Section 230800, Division 26 and related sections.
 - 3. Provide building commissioning support as specified in Division 01, Section 230800, Division 26 and related sections.

3.3 LOCATION AND SIZE

- A. The equipment scheduled on the Contract Drawings is selected and configured to fit in the mechanical space available. Insure that substitute equipment will fit without change in function or quality. Cost of all materials and Work to accommodate substitute equipment is the sole responsibility of the Contractor.

3.4 ROOM AIR CONDITIONER OR HEATPUMP

- A. Equipment shall be wiped clean, with all traces of oil, dust, dirt or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and after construction dirt has been removed from the building, new filters shall be installed.
- B. All controls and other miscellaneous equipment requiring adjustment shall be adjusted to setting indicated or directed. Fans shall be adjusted to the speed indicated by the manufacturer to meet specified conditions.
- C. Furnish and install complete all pipe, refrigerant piping, and control connections required.

END OF SECTION 238126

DIVISION 23 – MECHANICAL

SECTION 238239 - UNIT HEATERS

PART 1 - GENERAL

1.1 USE OF DOCUMENTS

- A. All information contained in Section 230500.1 - Common Work Results for HVAC, Mechanical General Provisions, is considered a part of this section.

1.2 DESCRIPTION

A. General

- 1. Work includes all air handling equipment, including all products, material, equipment, and installation. Provide all air handling equipment as required by the mechanical system design, the Specifications, and/or the Contract Drawings. Provide a complete and operable system. Coordinate electrical requirements of all equipment furnished hereunder with the Temperature Control Contractor, Division 26 - Electrical, and the Electrical Contractor.

B. Work Included

- 1. Unit Heaters

C. Related Sections

- 1. GC - General Conditions
- 2. Section 230500 - Common Work Results for HVAC
- 3. Division 26 - Electrical

D. Code

- 1. All Work shall be installed in accordance with International Mechanical Code, International Building Code, Washington State Energy Code and all local codes. Refer to Specification Section 230500 - Common Work Results for HVAC. All assemblies shall be UL listed.

E. Standards

- 1. AMCA Testing Standard 210
- 2. Testing and Rating Code for Finned Tube Commercial Radiation: IBR 1966.
- 3. Advanced Installation Guide for Hydronic Heating Systems: IBR 250, 2nd Edition.

F. Abbreviations

AMCA	Air Moving and Conditioning Association
ADC	Air Diffusion Council
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
UL	Underwriters Laboratories

1.3 SUBMITTALS

A. Provide submittal information in accordance with the Section 013000, Administrative Requirements. Provide product data for all equipment items specified, including but not limited to the following:

1. Unit Heaters

1.4 QUALITY ASSURANCE

A. Comply with the requirements of Section 230500 - Common Work Results for HVAC.

PART 2 - PRODUCTS

2.1 UNIT HEATERS, (UH-1)

A. Provide fan forced air electric unit heater. Capacity and configuration shall be as specified. Provide with external wall thermostat option. The fan and element housing shall be of unitized construction. The motor and all wiring shall be totally isolated from the heating chamber. Metal grille shall be of one piece construction, corrosion protected and painted with a baked enamel and shall only protrude ½ inch from the wall or ceiling surface. Unit heater shall be UL listed. Manufactured by King Or Equal.

PART 3 - EXECUTION

3.1 EXAMINATION

Verify conditions, including defects or errors which would cause defective installation/application of products or cause latent defects in workmanship or function.

3.2 INSTALLATION

A. Install in accordance with manufacturer's written recommendations and as specified. Furnish all required materials, accessories, appurtenances and Work required to support or suspend equipment. Install equipment with associated ductwork and piping to permit access to doors and panels as required for periodic maintenance.

B. Provide and install all options and equipment per the manufacturer's written instructions.

3.3 LOCATION AND SIZE

A. The equipment scheduled on the Contract Drawings is selected and configured to fit in the mechanical space available. Insure that substitute equipment will fit without change in function or quality. Cost of all materials and Work to accommodate substitute equipment is the sole responsibility of the Contractor.



3.4 AIR MOVING EQUIPMENT

- A. Furnish and install complete all pipe, duct and control connections required.

END OF SECTION 238239

DIVISION 26 – ELECTRICAL

SECTION 260500 – ELECTRICAL GENERAL

PART 1 – GENERAL

1.1 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 Contract Drawings and schedules included in this project are functional in nature and do not specify exact locations of equipment or equipment terminations.
2. The Contractor shall examine all mechanical and civil Contract Drawings and Specifications to determine actual locations, sizes, materials, and ratings of all equipment provided by others.
3. Items of Work shown on Contract Drawings and not specified or mentioned in the Specifications shall be considered required as if they had been both specified and shown on the Contract 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 Contract 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 Contract Drawing 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. Bidder 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. Bidder shall resolve its questions regarding the perceived inconsistency, errors, or omissions in the Contract Documents prior to bid. Failure of the Bidder to resolve its 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. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.

1.2 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 Contract Drawings 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 are not shown or specified but which are 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.

1.3 PROJECT DESCRIPTION

A. General

In general, the project shall consist of all electrical construction required to make a complete and operating system. The following is a description of the work anticipated by the Contractor:

Construct improvements at two separate project areas in the Park:

1. The Cabin Loop area will include construction of (8) new cabins, (3) back-in RV stalls with 50 amp RV pedestals, a new sewer lift station and a new 800 amp, 120/240V service.
2. The Group Camp area includes renovation and expansion of the existing comfort station to include new family shower areas. The Group Camp area will also include (3) back-in RV stalls with 50 amp RV pedestals. The existing 300 amp, 120/240V service will be upgraded to a new 800 amp, 120/240V service.

1.4 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 including lighting and HVAC 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.

1.5 THERMAL (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 75oC operation above 100 amperes; 60oC for 100 amperes and below. All products furnished on this project shall have electrical terminations rated for 60oC for ampacities of 100 amperes and below, and rated for 75oC for ampacities above 100 amperes.
- B. These requirements cover all electrical equipment provided under this Contract.

1.6 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.

1.7 SITE FAMILIARIZATION

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 Contractor's expense.

1.8 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 Contract 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 Contract 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 Contract 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.

1.9 ELECTRICAL SUBMITTALS

Electrical submittals shall be submitted in accordance with Exhibit S Section 013000 Administrative Requirements.

PART 2 - PRODUCT

2.1 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.

2.2 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 Contract 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

3.1 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.

3.2 TESTS

- A. The Contractor shall conduct testing for installed feeder cables and motors in accordance with Section 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 to the District 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.

3.3 FINAL ACCEPTANCE

- A. Prior to final acceptance, the Engineer will perform one or more site observation trips to develop a “punch list” of items deemed incomplete. The Contractor 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.

3.4 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 260500

DIVISION 26 – ELECTRICAL

SECTION 260519 – WIRE AND CABLE

PART 1 – GENERAL

1.1 DESCRIPTION

This section specifies conductors and cables rated to 600 volts used for power, lighting, receptacle, signal, and control circuits.

1.2 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.

1.3 SUBMITTALS

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

2.1 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.

2.2 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

2.3 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

2.4 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 for type a and b signals specified in

paragraph 17010.1.01.B, 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.

2.5 **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

2.6 **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.

2.7 **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.

2.8 WIRING SCHEDULE

Refer to cable schedule on Contract Drawings for description of conductors required.

2.9 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.

2.10 WIRE MARKERS

Field installed wire markers shall be T&B SMS pre-printed clip-on markers, Or Equal.

PART 3 - EXECUTION

3.1 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.

3.2 600 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.).

3.3 **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.



3.4 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.

3.5 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.

3.6 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.

3.7 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.

3.8 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.

3.9 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	Vca
		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 260519

DIVISION 26 – ELECTRICAL
SECTION 260526 – GROUNDING

PART 1 – GENERAL

1.1 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).
- C. Equipotential bonding shall be provided pools and pumping equipment in accordance with the National Electrical Code (NEC), article 680.

1.2 SUBMITTALS

- A. Submit product data for all items of this specification.

PART 2 - PRODUCT

2.1 MATERIALS

- A. Ground wire: Soft drawn bare stranded copper wire, sized as noted on the Contract 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 Contract Drawings.

PART 3 - EXECUTION

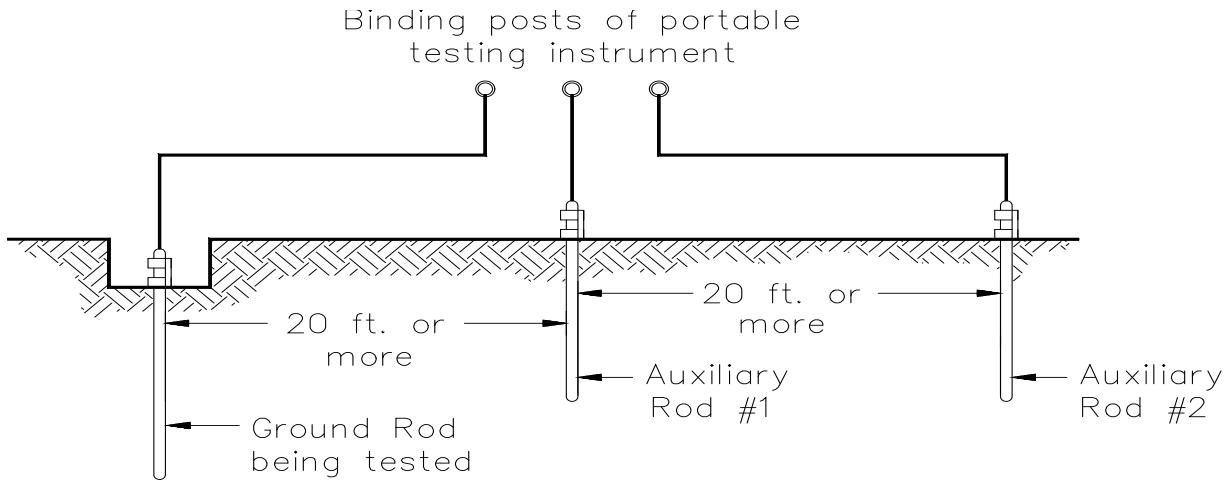
3.1 PREPARATION

- A. All contacting surfaces of ground connections shall be cleaned to bright metal before connection is made.

3.2 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 Contract 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 260526



DIVISION 26 – ELECTRICAL
SECTION 260529 – WIRING DEVICES

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

This section covers furnishing and installing all receptacles, switches and other wiring devices indicated on the Contract Drawings.

1.2 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.

1.3 SUBMITTALS

Submit all catalog data in accordance with Section 013000, Appendix 013000-1, Required Submittals. Show material information and confirm compliance with these Specifications.

PART 2 - PRODUCT

2.1 GENERAL

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.

2.2 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.

2.3 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 presswitch 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.

2.4 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.

2.5 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

3.1 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.

3.2 POSITION OF OUTLETS

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 Contract Drawings shall be installed symmetrically along trim; where necessary, set the long dimension of the plate horizontal or gang in tandem.

3.3 MOUNTING HEIGHTS

Unless otherwise noted, wall mounted outlet devices shall generally be 24 inches above the floor, 18 inches in architecturally treated areas. Switches shall be 48 inches above the floor. All measurements are to centerline of device.

END OF SECTION 260529

DIVISION 26 – ELECTRICAL

SECTION 260533 – RACEWAYS, FITTINGS, AND SUPPORTS

PART 1 – GENERAL

1.1 DESCRIPTION

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.

1.2 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.

1.3 SUBMITTALS

The Contractor shall submit catalog data showing material information and conformance with Specifications in accordance with the "Submittals" requirements of Section 013000.

PART 2 - PRODUCTS

2.1 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 Contract Drawings.. 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 Section 260500.

C. Scheduled Raceway

1. The size and type of raceway shall be as specified on the Contract Drawings. In case of conflicts between the Contract Drawings and paragraph 3.01, the Contract Drawings shall prevail.

2.2 RACEWAY

A. Application:

1. All conduits shall be Galvanized Rigid Steel (GRS), unless otherwise noted or specifically allowed in Section 260500, Area Classifications.
2. All connections to vibrating equipment or motors shall be liquid-tight flexible metallic conduit.
3. All underground power, control and telephone conduits shall be Schedule 40 PVC, meeting NEMA 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 an 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.

2.3 FITTINGS AND BOXES

A. Material

Materials for fittings and boxes shall be chosen to satisfy the requirements of Section 260500. 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 liquid-tight connection to the box and an insulating bushing for the wiring. Hubs shall be Thomas and Betts bullet type, Or Equal.

E. Liquid-tight Flexible Metallic Conduit Connectors:

Connectors for liquid-tight 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 be 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.

2.4 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.

2.5 CONDUIT SCHEDULE

Refer to conduit schedule on Contract Drawings for raceway sizing and routing description.

2.6 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.

2.7 HANDHOLES

Handholes shall be precast concrete with checker plate, galvanized, traffic covers designed for H-20 loading. Dimensions shall be as specified on the Contract Drawings, or as required to meet minimum sizes as required by the NEC. Handholes shall be constructed of 3000 psi reinforced concrete.

2.8 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

3.1 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 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 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.

3.2 HANDHOLES

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.

3.3 RACEWAY NUMBERING

Each conduit shall be provided with a number tag at each end and in each handhole and/or pullbox. Trays shall be identified by stencils at intervals not exceeding 50 feet, at intersections, and at each end.

END OF SECTION 260533

DIVISION 26 – ELECTRICAL

SECTION 260800 – EQUIPMENT TESTING

PART 1 - GENERAL

1.1 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 a Testing Agency (Testing Firm) independent of the Contractor. The Contractor shall obtain the services of the Testing Firm and allow time in the construction schedule for tests to take place.

1.2 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.

1.3 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.

1.4 TESTING CRITERIA

All tests of equipment listed in Part 3 of this section will be conducted in accordance with the National Electrical Testing Association.

1.5 APPLICATION

Requirements for testing in accordance with this section are specified in this and other sections of Section 260500. 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.

PART 2 - PRODUCTS

2.1 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.

2.2 PRODUCT DATA

Functional checkout procedures shall be provided in accordance with Section 260500. The Contractor shall provide proposed functional test procedures 30 days prior to performing functional checkout tests.

PART 3 - EXECUTION

3.1 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 when 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 Contractor's expense until the equipment performs as specified.

3.2 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 260500.3.2.

All power feeders shall be tested in accordance with Section 260519, and grounding tests shall be performed in accordance with Section 260526.

END OF SECTION 260800



DIVISION 26 – ELECTRICAL

SECTION 262416 – PANELBOARDS

PART 1 – GENERAL

1.1 DESCRIPTION

This section specifies electric panelboards for general lighting and power distribution.

1.2 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.

1.3 EQUIPMENT SIZE

Electrical equipment shall fit in the space provided on the Contract Drawings or as specified. Equipment heights shall not exceed those shown or specified. Larger equipment shall not be considered equivalent or acceptable.

1.4 SUBMITTALS

Submit all catalog data in accordance with Section 013000, Appendix 013000-1, Required Submittals. Show material information and confirm compliance with these Specifications.

In addition to the submittal information required in Section 260500, submit the following:

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

2.1 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.

2.2 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.

2.3 CIRCUIT BREAKERS

The following interrupting capacity shall be considered minimum. Other ratings shall be as specified on the Contract 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.

2.4 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 Contract Drawings.

Doors shall be provided with a lock for each cabinet door. All electrical distribution equipment locks shall be keyed identically.

2.5 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 Contract Drawings), baked enamel finish.

2.6 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.

2.7 SYSTEM OF NUMBERING AND BUS ARRANGEMENT

Bus arrangement shall be as shown on the Panel Schedules on the Contract Drawings.

2.8 SERVICE ENTRANCE PANELBOARD

Service entrance equipment shall contain molded case circuit breakers indicated on the Contract 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 Contract 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.

2.9 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

3.1 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.

3.2 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.

3.3 DEAD FRONT CLOSURES

All openings in dead front shall be closed with closures manufactured for the purpose or install spare breakers.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 262700 – SERVICE AND METERING

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the new electrical services, pad-mounted transformer and service entrance equipment.

1.2 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.

1.3 CONTRACTOR/UTILITY INTERFACE RESPONSIBILITIES

The electrical utility providing service to these facilities is Douglas County PUD (Utility). The Contractor shall comply with all utility company standards and requirements. General Utility requirements are listed on the PUD website at douglaspud.org. Verify all materials with Utility prior to submittal.

All utility company charges for the new service shall be paid by the District.

A. Contractor shall provide:

Cabin Loop:

1. New transformer vault and lid per Utility requirements for the new Cabin Loop service.
2. Installation of the vault and lid in location specified by Utility.
3. All trenching, backfill, secondary conductors, conduit, and other materials and labor from Utility transformer to the Cabin Loop service entrance equipment. Contractor shall also provide lug kits for Utility connection to transformer, per Utility requirements. Note: The location shown on the Contract Drawings is approximate. Contractor shall provide all secondary materials and labor from actual Utility installed transformer location to service entrance equipment.
4. Installation of Utility provided fiber optic conduit from utility vault to Cabin Loop service area, as shown on the Contract Drawings.

Group Camp:

1. Removal of existing service conductors and raceway.
2. Coordination with Utility for service upgrade.
3. New raceway and conductors from Utility transformer to Utility meter.
4. Secondary lugs for new transformer connection.

B. Utility shall:

Cabin Loop:

1. Provide new pad mount transformer, and install on Contractor provided utility vault.
2. Provide fiber conduit to Contractor for installation.
3. Provide all primary raceway, conductors and connections to transformer primary.
4. Connect Contractor provided secondary conductors and lugs to transformer.
5. Utility metering equipment at transformer.

Group Camp:

1. Replace existing transformer with new 120/240V pad mount transformer on existing vault.
2. Provide any required modifications to service primary.
3. Make all connections of Contractor conductors and lugs to transformer.
4. Provide Utility metering equipment at transformer.

1.4 QUALITY ASSURANCE

The Contractor shall comply with all serving Utility company standards and requirements.

The Contractor shall call the Utility for inspection of the vault and lid on site, prior to unloading.

1.5 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".

1.6 SUBMITTALS

Submit all catalog data in accordance with the Submittals requirements in Section 260500. Show material information and confirm compliance with these Specifications.

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.

Submittals shall include the following information:

1. Service Entrance Main Breaker
2. Transformer Vault and Lid
3. Letter of Acceptance of material from Utility.

PART 2 - PRODUCT

2.1 METER ENCLOSURE (BY UTILITY)

2.2 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

3.1 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.

3.2 UNDERGROUND SECONDARY SERVICE

Install in accordance with Section 260533.

END OF SECTION 262700

DIVISION 26 – ELECTRICAL

SECTION 262816 – DISCONNECTS AND SWITCHES

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies all disconnects, fused and unfused, required by code for equipment furnished under this and other Divisions of these Specifications.

1.2 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.

1.3 SUBMITTALS

Submit all catalog data in accordance with the Submittals requirements in Section 013000. Show material information and confirm compliance with these Specifications.

PART 2 - PRODUCT

2.1 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 Section 260500.8.

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.

2.2 MANUFACTURER

Disconnect switches shall be manufactured by Cutler Hammer, or Square D.

PART 3 - EXECUTION

3.1 INSTALLATION

Switches shall be mounted at locations shown on Contract Drawings. 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 inches above the finished floor or work platform.

3.2 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

DIVISION 26 – ELECTRICAL

SECTION 264710 – RV LOAD CENTERS

PART 1 – GENERAL

1.1 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 013000. Show material information and confirm compliance with these Specifications.

1.2 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.

1.3 SUBMITTALS

Submit catalog data showing material information and conformance with Specifications.

PART 2 - PRODUCTS

2.1 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 Contract 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.

2.2 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 Contract Drawing details for water connection requirements.

PART 3 - EXECUTION

3.1 MOUNTING

- A. Boxes shall be direct burial installed at the depth and with materials as shown on the Contract 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 264710

DIVISION 26 – ELECTRICAL
SECTION 265119 – LED LIGHTING

PART 1 – GENERAL

1.1 SCOPE

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.

1.2 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 Energy Code. See Section 26 09 23.

1.3 SUMMARY

Section Includes:

- A. Interior solid-state luminaires that use LED technology.
- B. Lighting fixture supports.

1.4 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.

1.5 CATALOG NUMBERS

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.

1.6 REFERENCES

- A. National Electrical Manufacturer's Association (NEMA).
- B. Underwriters Laboratories, Inc. (UL).
- C. National Electrical Contractors Association (NECA).

1.7 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.

1.8 SUBMITTALS

- A. 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.
- B. 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.
- C. Product Samples, complete with housing, trim, plug, and specified lamp, shall be submitted if requested.

1.9 QUALITY ASSURANCE

Fixtures and components shall be new and listed by Underwriters Laboratories (UL) or other testing lab acceptable to local jurisdiction.

1.10 WARRANTY

- A. Warranty: Manufacturer and installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCT

2.1 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. Recessed Fixtures: Comply with NEMA LE 4.
- C. CRI of minimum 80. CCT of 4000K.
- D. Rated lamp life of 50,000 hours.
- E. Internal driver.

- F. Nominal Operating Voltage: 120 volt ac or 277 volt ac.

2.2 RECESSED LED CANOPY FIXTURE

- A. Manufacturers: Subject to compliance with requirements, Provide product by the following, or Engineer approved equal:
 - 1. Kenall
- B. Basis of Design: Kenall HRDL6ICL-26L40K-DV-SCC-FW-CSS-G

2.3 PENDANT LED 4' FIXTURE

- A. Manufacturers: Subject to compliance with requirements, Provide product by the following, or Engineer approved equal:
 - 1. Kenall
- B. Basis of Design: Kenall MLHA5-48-F-MW-CP-1-50L40K-DCC-1-DV

2.4 SURFACE LED 4' FIXTURE

- A. Manufacturers: Subject to compliance with requirements, Provide product by the following, or Engineer approved equal:
 - 1. Kenall
- B. Basis of Design: Kenall MLH12-48-F-MW-CP-1-50L40K-DCC-1-DV

2.5 UNDER COUNTER SURFACE MOUNT LED FIXTURE

- A. Manufacturers: Subject to compliance with requirements, Provide product by the following, or Engineer approved equal:
 - 1. Kenall
- B. Basis of Design: AUCLED-I-MW-20L40K-48-120

2.6 ILLUMINATED BOLLARD

- A. Manufacturers: Subject to compliance with requirements, Provide product by the following, or Engineer approved equal:
 - 1. Kim Lighting – Vandal Resistant Illuminated Bollard
- B. Basis of Design: VRB1-10L-4K-UV-DB

2.7 OTHER FIXTURES

Provide all fixtures as specified herein or as shown on the Contract Drawing fixture schedules.

2.8 METAL FINISHES

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 during equipment submittals.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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 points, equally spaced around circumference of luminaire.
 - 3. Trim ring flush with finished surface.

3.3 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.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.

END OF SECTION 265119

DIVISION 31 – EARTHWORK
SECTION 311000 – SITE CLEARING

PART 1 – GENERAL

1.1 DESCRIPTION

This Section includes site preparation work as indicated on the Contract Drawings. Work includes but is not limited to the following:

- A. Protect from harm existing trees and vegetation not designated for removal.
- B. Protect from harm existing structures, and objects not designated for removal.
- C. Clear, grub and remove existing vegetation, as shown on Contract Drawings.
- D. Disposal of all trees, vegetative material, miscellaneous steel and other debris from the site.
- E. General demolition activities.

1.2 SUBMITTALS

Prior to mobilization on-site, provide written clearing and disposal procedures and operational sequence with stockpile areas and construction access routes for review by the District. Include the following information:

Disposal locations.

- 1. Demolition equipment and methods.
- 2. Project staging, access, fencing, and material storage plan.

1.3 EXISTING CONDITIONS

- A. Protection of Existing Elements: Protect trees and vegetation noted on Contract Drawings and described below.
- B. If there is doubt about which vegetation shall remain, the Contractor shall consult the District prior to clearing activities.
- C. Protect existing utilities to remain.
- D. Contractor is responsible for the verification of all utility locations. Contractor shall meet with District and Contractor's location service to locate all known utilities.
- E. Verify that all appropriate services have been disconnected. Contractor shall coordinate with Washington State Parks and the District for connecting to existing utilities.
- F. Do not shut off or cap utilities without prior notice. Coordinate Work with Division 01 General Requirements. Maintain roadway and site drains and sewers open for free drainage. Provide catch basin protection, if applicable.

- G. Objectionable Noises: Limit use of air hammers and other noisy equipment as much as possible. Conform to local governing requirements regarding noise control.
- H. Maintain vehicular and pedestrian traffic routes:
 - 1. Do not close or obstruct streets, paths, easements, or passageways without approval of Washington State Parks.
 - 2. If required by Washington State Park authorities, provide alternate routes around closed or obstructed traffic ways.

1.4 PROJECT CONDITIONS

- A. Access routes for construction shall be as shown on Contract Drawings, and be Approved by District prior to use.
- B. Contractor to install and maintain construction high visibility fence as needed to secure site and prevent public access.
- C. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations. Do not close or obstruct streets, walks, driveways or other adjacent occupied or used facilities without permission from the District and Washington State Parks.

PART 2 – PRODUCTS

2.1 TEMPORARY FENCING

- A. Construction fencing and vegetation protection fencing: high-visibility, high density polyethylene fencing.
 - 1. Height: 48”
 - 2. Color: Orange
- B. Posts: Steel “T” profile posts
- C. Ties: Galvanized wire
- D. Mesh Openings: 3.5 x 1.5 inches

2.1 STUMP CONTROL AGENT

- A. May contain potassium nitrate.
- B. Submit product information, including SDS’s for product.

PART 3 – EXECUTION

3.1 GENERAL

- A. Review clearing, grubbing and demolition activities with the District on site prior to commencement.
- B. Obtain required permits and permission from local governing authorities and the District prior to commencing Work.
- C. Protect and maintain benchmarks and survey control points from disturbance during construction, if any.
- D. Verify that existing utilities, structures, and other items designated to remain are tagged or identified.
- E. Locate and clearly flag and protect trees and vegetation to remain or to be relocated. If any trees and/or tree branches are within the public right-of-way (ROW), the Contractor shall contact the property owner(s) and make provisions to protect or remove such.
- F. Protect existing site conditions from damage during construction. If damage occurs, restore damaged improvements to their original condition, as acceptable to the District.

3.2 SITE DEMOLITION

- A. Remove existing above and below-grade impediments as indicated on Contract Drawings and as necessary to facilitate new construction.
- B. Remove and properly dispose of slabs, paving, curbs, gutters, sidewalks, and aggregate base as indicated.
 - 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.
- C. Pulverize existing concrete slabs west of cabin site or alternatively remove concrete from site. If removed from site, Provide suitable fill material as Approved by the District to attain final grades shown on the Contract Drawings.
 - 1. Pulverize concrete by lifting and breaking, hydraulic hoe hammer or other means as determined by the Contractor to reduce existing concrete rubble to dimensions no less than 18-inches in any direction.
 - 2. Eliminate voids in rubble piles through demolition, backfill and compaction of on-site materials. Provide water for dust control and compaction.

3.3 TREE AND PLANT PROTECTION

- A. Protect vegetation to remain by installing construction fence surrounding the plants. Fence shall be located at dripline (branch perimeter) of individual plants, or plant groups. Review fence location and layout on site with the District prior to installation. Maintain fence in place until Substantial Completion and remove when approved by Owner.
- B. No material storage, vehicle access or equipment use shall be within fenced area. Work, including clearing and grubbing of non-native plants and debris, grading, planting, seeding, and mulching, shall be conducted with hand tools only.

3.4 TREE REMOVAL

- A. Remove trees, including root systems, within the Project area which are not identified as to be saved and protected.
- B. Excavations resulting from tree removal shall be filled to finish grade. Fill within 12-inch depth of finish grade shall be imported topsoil. Depths greater than 12-inches may be native soil.

3.5 CLEARING AND GRUBBING

Clear all shrubs, grasses, herbaceous plants rubbish and other objectionable matter within clearing limits shown on Contract Drawings. Remove all stumps and roots within the clearing limits to a depth of 12-inches or as needed for new construction.

3.6 TREE DAMAGES

The Contractor shall protect all trees and other plant types on site from damage until Project completion. If any tree or other types of plants are destroyed, disfigured or damaged so that in the District's opinion removal is required, the Contractor shall remove the tree at no additional cost to the District and be assessed damages in accordance with the following chart. Use "tree caliper" or greatest tree trunk diameter measured 30-inches above ground from lowest elevation or lowest point at the base of the tree.

SIZE (Inches)	COST
¾	\$60
1	\$100
2	\$200
3	\$310
4	\$450
5	\$600
6	\$880
7	\$1,200
8	\$1,530
9	\$1,950
10	\$2,430
11	\$2,950
12	\$3,480
13	\$4,070
14	\$4,730
15	\$5,480
16	\$6,330
17	\$7,250
18	\$8,300
19 and over	Use \$500 per caliper inch

Note: Go to next higher classification if a fraction above an indicated caliper. Remove interfering branches and roots without damage to trunks as directed upon approval of the District.

3.7 LIMITING DUST

- A. Sprinkle water over excavated material and stripped areas and during grading or soil preparation operations as necessary to limit dust to lowest practicable level. Do not use water to the extent causing flooding, contaminated runoff or icing.
- B. Water for dust control shall be provided by the Contractor.

3.8 DRAINAGE

- A. Keep roadway and site drains open for drainage at all times. Mud and sediment build-up shall be removed As Directed.
- B. Open pits and holes caused as a result of site preparation work shall be kept free of standing water.

3.9 DISPOSAL OF MATERIALS

- A. Dispose of all debris materials, including barbed wire fencing, concrete, pavement, metals, and plant material, in a legal manner off site.
- B. The refuse resulting from clearing and grubbing shall be disposed of by the Contractor in a manner consistent with all government regulations. Debris hauled off site shall not be deposited in any stream or body of water, or in any street or alley, or upon any private property except by written consent of the private property owner. Maintain hauling routes clean and free of any debris resulting from Work of this Section.
- C. The Contractor may burn trees and vegetation off or on-site in accordance with all local and state regulations. If on-site, Contractor shall coordinate burning locations with the Project Manager and Washington State Parks. The Contractor shall submit to the Project Manager a copy of its Washington State Department of Ecology Burn Permit.

3.10 CLEAN UP

Clean trucks and other equipment as required before entering access drive and roads. Clean drives and roads daily or as required to avoid dust, unsightly appearance, or water quality impacts

3.11 TEMPORARY FACILITY REMOVAL

After Substantial Completion, and upon approval by District, Contractor shall remove temporary facilities, including fences, access drives, parking areas, storage areas, offices and restrooms, and restore grade, pavement, and vegetation to match adjacent areas.

END OF SECTION 311000

DIVISION 31 – EARTHWORK

SECTION 312000 – 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. Exhibit U – Additional Information – LR Cabin Loop Geotech Report
- B. Washington State Department of Transportation (WSDOT) – Standard Specifications for Road, Bridge, and Municipal Construction (latest edition)
- C. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18 inch Drop
- D. ASTM D2487 - Classification of Soils for Engineering Purposes
- E. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- F. 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 monitoring archaeologist or other designated District representative.

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

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, 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. Inspection and testing will be performed under provisions of Exhibit S, Section 014000 – Contractor Quality Control.
- D. Tests and analysis of soil material will be performed in accordance with ANSI/ASTM D1557.
- E. If tests indicate materials do not meet specified requirements, change material and retest at no cost to Owner.

1.7 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 014000 – Contractor Quality Control.
- B. 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 Materials:
 - 1. Pipe zone bedding for all ductile iron pipe shall conform to WSDOT Standard Specification 9-03.12(3)-Gravel Backfill for Pipe Zone Bedding.
 - 2. Pipe zone bedding for all PVC and HDPE pipe shall conform to WSDOT Standard Specification 9-03.13 – Backfill for Sand Drains.
- 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. Permeable Ballast for Roadside Ditches: Shall conform to WSDOT Standard Specification 9-03.9(2) Permeable Ballast.
- E. Crushed Rock Paving and fire rings: Shall conform to WSDOT Standard Specification 9-03.9(3) – Crushed Surfacing Top Course
- F. Streambed Cobbles: Shall conform to WSDOT Standard Specification 9-03.11(2) – Streambed Cobbles.
- G. Landscape Boulders: Shall conform to WSDOT Standard Specification 9-03.11(3) Streambed Boulders. Contractor may use existing on-site boulders which meet this specification.
- H. Crushed rock screenings for tent pads shall consist of 1/4 inch minus crushed rock fractured all sides. Crushed rock type shall remain consistent and supplier shall remain the same for all areas of the project. Gradation shall be as follows:

Sieve Size	Percent Passing (by weight)
¼ inch	100
No. 10	40 Max
No. 40	15 Max
No. 200	7 Max

- I. Aggregate base for Asphalt and Concrete: Shall conform to WSDOT Standard Specification 9-03.9(4) – Crushed Surfacing Base Course. Alternatively Contractor may process on-site asphalt designated for demolition and reuse as aggregate base (see Recycled Asphalt).
- J. Recycled Asphalt: May be used as Aggregate Base under roads and trails and shall contain a max size of 3-inches, an average size of 2-inches and a minimum size of ½-inch. If used under roads as aggregate base the depth shall be increased to 8-inches and if used under trails the depth shall be increased to 6 inches.

- K. Cobble Mulch: Shall conform to WSDOT Standard Specification 9-03.11(2) – for 12-inch Streambed Cobbles. Native material conforming to this specification may be reused.
- L. Topsoil: Shall be imported sandy loam soil materials conforming to the gradation below; free of debris, waste, frozen materials, vegetable and other deleterious matter. Topsoil shall consist largely of sand, but with enough silt and clay present to give it a small amount of stability. Individual sand grains can be seen and felt readily. On squeezing in the hand when dry, it shall fall apart when the pressure is released; on squeezing when moist, it shall form a cast that will hold its shape when the pressure is released, and withstand handling without breaking.

Sieve Size	Percent Passing (by weight)
1 inch	100
3/8 inch	80 - 100
No. 10	80 Max
No. 40	40 Max
No. 200	7 Min

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.
 - 1. 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.
 - 2. Upon completing the Work, the Contractor shall remove all shoring unless the Contract Drawings or the Engineer direct otherwise.
 - 3. Damages resulting from improper shoring or failure to shore shall be the sole responsibility of the Contractor.
 - 4. The Contractor may perform extra excavation without shoring if worker safety is ensured As Required by law.
 - 5. 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 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.

3.6 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. Incorporate soil amendments and fine grade per Section 32 92 00 - Irrigated Turf and Section 32 93 00 - Landscaping.
4. 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.

3.7 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.

3.8 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% in roadways	In top one foot of trench once per every 500 feet of utility type trench installed
Aggregate Base	95%	<ul style="list-style-type: none"> • Below all structures (i.e. Foundations) once before concrete or structure placement; • For roadways once every 250 LF; • For paved trails once every spur trail or every 500 feet along main trail; • For RV sites – 6 total in spaces designated by District;
Crushed Rock Surfacing	95%	Once per area
Embankment or Landscape berms	85%	Once per every 1,000 cubic yards placed
Planting Mix/Soil	70%	None required

3.9 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. The interpretive trail cross section shall be constructed in accordance with the Contract Drawings.
- E. Compact crushed rock to required density.
- F. Keep path clean and free of stains, discolorations, dirt and other foreign material throughout contract period and rake clean just prior to final inspection.

3.10 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.

3.11 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.

3.12 PROTECTION OF FINISHED WORK

- A. Protect finished Work.
- B. Reshape and re-compact fills subjected to vehicular/equipment traffic.

END OF SECTION 312000

DIVISION 31 – EARTHWORK

SECTION 312500 – EROSION AND SEDIMENT CONTROL

PART 1 – GENERAL

1.1 DESCRIPTION

- 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 Drawings. 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 Contractor. The Contractor shall employ a Certified Erosion and Sedimentation Control Lead (CESCL). The CESCL shall have successfully completed the Washington State Department of Ecology approved CESCL Course. Contractor's CESCL shall have and maintain active CESCL registration for the duration of Work.

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.
- B. The Contractor shall prepare a Stormwater Pollution Prevention Plan (SWPPP) using Washington State Department of Ecology template. The Contractor assumes full responsibility for implementation of the SWPPP. The Contractor shall consider additional practices to ensure avoidance of water quality violations.
- C. The Contractor shall be responsible for phasing Work in areas allocated for its exclusive use during this Project, including any proposed stockpile areas, to restrict sediment transport. This will include installation of any temporary erosion control devices, ditches, or other facilities.
- D. The areas set aside for the Contractor's use during the Project may be temporarily developed to provide satisfactory working, staging, and

- administrative areas for its exclusive use. Preparation of these areas shall be in accordance with other requirements contained within these Specifications and shall be done in such a manner to control sediment transport away from the area.
- E. All permanent stockpiles shall be seeded with soil stabilization seed and protected by construction of silt fences and permanent 2-foot minimum depth ditches, completely surrounding stockpiles and located within 10 feet of the toes of the stockpile slopes.
 - F. Sediment transport and erosion from working stockpiles shall be controlled and restricted from moving beyond the immediate stockpile area by construction of temporary toe-of-slope ditches and accompanying silt fences, as necessary. The Contractor shall keep these temporary facilities in operational condition by regular cleaning, re-grading, and maintenance. Erosion control or covering with clear plastic or other mulching materials of stockpiles should be completed within 15 days (October 1 through June 30) or 30 days (July 1 through September 30) of the formation of the stockpile.
 - G. The Contractor shall maintain all elements of the Soil Erosion Stabilization and Sediment Control systems and facilities to be constructed during this Project for the duration of its activities at the site. Formal inspections may be made by the Construction Inspector at any time to evaluate Contractor's conformance to the requirements of these Specifications.
 - H. All silt traps shall be cleaned of collected sediment after every storm or As Required by the District following inspections. Cleaning shall be done in a manner that will not direct the sediment into any storm drain piping system or water course. Removed sediment shall be taken to an area Approved by the Project Manager where it can be cleaned of sticks and debris, then allowed to dry. Final sediment and debris disposal shall be at an Approved off-site location.
 - I. Contractor's CESCL shall inspect the project site on weekly basis, and daily during runoff producing rain events. Replacement or repair of failed or overloaded silt fences or other temporary erosion control devices shall be accomplished by the Contractor within 7 days per CESCL's guidance.
 - J. Unpaved earth drainage ditches shall be re-graded as needed to maintain original grade and remove sediment buildup. If a ditch becomes difficult to maintain, the Contractor shall install additional erosion control devices such as check dams, temporary paving, or silt fences as necessary to facilitate maintenance and proper functioning of the canal.

1.4 SUBMITTALS

- A. Submit manufacturer's product data for the silt fence Preconstruction Conference.
- B. Submit name and registration number of Contractor's CESCL to Project Manager prior to mobilization on-site.

C. Contractor’s Stormwater Pollution Prevention Plan (SWPPP)

1. The Contractor shall submit a SWPPP to the Project Manager prior to mobilization on-site. The Contractor’s SWPPP must be Approved by the District and comply with the requirements of the Washington State Department of Ecology Stormwater Management Manual for Eastern Washington
2. The Contractor’s SWPPP shall address in detail the elements and best management practices required for controlling and minimizing erosion and transport of sediments during and following construction activities, and measures to prevent spills and control pollution by oil, fuels, and chemical pollutants.

PART 2 – PRODUCTS

2.1 SILT FENCE

- A. Provide and install silt fences in accordance with the Department of Ecology, Stormwater Management Manual for Eastern Washington, latest edition, with the details shown on the Contract Drawings. 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 Project Manager, 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 Contract Drawings. 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.

2.2 CONSTRUCTION GEOTEXTILE FOR PERMANENT EROSION CONTROL

Geotextile shall conform to WSDOT Standard Specification Section 9-33, Moderate Survivability, Class A.

2.3 CONSTRUCTION ENTRANCE (IF USED)

- A. Construction Entrances shall be used if traffic will be leaving the construction site during earthwork operations and tracking sediment onto paved roads or other paved areas.
- B. The surface material shall be 4” – 8” quarry spalls. Smaller crushed rock such as base course may be appropriate in some situations but must be approved by the Project Manager prior to construction.
- C. A separation geotextile shall be placed under the spalls to prevent fine sediment from pumping up into the rock pad. The geotextile shall meet the following standards:

Item	Description	Standard
1	Grab Tensile Strength (ASTM D4751)	200 psi min.
2	Grab Tensile Elongation (ASTM D4632)	30% max.
3	Mullen Burst Strength (ASTM D3786-80a)	400 psi min.
4	AOS (ASTM D4751)	20-45 (U.S. std sieve size)

2.4 STRAW BALE BARRIER (IF USED)

- A. Straw bale barriers are to be used at the option of the Contractor as necessary to control erosion. If used, Provide and install straw bale barriers in accordance with the Department of Ecology, Stormwater Management Manual for Eastern Washington, latest edition.
- B. All straw material shall be in an air-dried condition free of noxious weeds and other materials detrimental to plant life.

2.5 STRAW MULCH (IF USED)

- A. Straw mulch is to be provided at the option of the Contractor to maintain water quality protection. If used, Provide and install straw mulch according to the Department of Ecology, Stormwater Management Manual for Eastern Washington, latest edition.
- B. Threshed straw of oats, wheat, barley, or rye, free from seed of noxious weeds, or clean salt hay.
- C. Straw mulch so provided shall be suitable for spreading with mulch blower equipment.

PART 3 – EXECUTION

3.1 SWPP IMPLEMENTATION

- A. The implementation of the SWPP and the construction, maintenance, replacement, and upgrading of these SWPP facilities is the responsibility of the Contractor until all construction is completed and approved and vegetation/landscaping is established.
- B. Approval of the SWPP does not constitute an approval of permanent road or drainage design (e.g. size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.).
- C. 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
- D. The SWPP facilities shown on Contract Drawings 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.
- E. The SWPP facilities shall be inspected daily by the Contractor and maintained as necessary to ensure their continued functioning and operation.
- F. The SWPP facilities on inactive sites shall be inspected and maintained a minimum of once a week and within 24 hours following a storm discharge event.
- G. 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.
- H. The SWPP facilities shown on Contract Drawings are the minimum requirements for anticipated site condition. During the construction period, these SWPP 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 Project Manager requires.
- I. 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 – June 30) and 30 days during the dry season (July 1 – September 30), shall be immediately stabilized with approved SWPP 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.

- J. Any area needing SWPP measures, but not requiring immediate attention during the wet season (October 1 – April 30), shall be addressed within 15 days.
- K. Erosion control measures identified are the minimum required. Contractor shall provide additional SWPP measures as necessary to control erosion and sediment from its construction operations at no additional cost to the District.
- L. Where possible, natural vegetation shall be maintained for silt control and to minimize erosion.
- M. All temporary stockpiles and any area which has been stripped of vegetation shall be stabilized with seed, fertilizer and mulch or other approved measure.
- N. 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.

3.2 REVEGETATION

Revegetation of all disturbed areas shall be performed per the Planting Plan and Approved by the Project Manager.

3.3 DUST ABATEMENT AND WATER MANAGEMENT PLAN

- A. Dust is likely to occur in disturbed areas, cuts, fills, and stockpiles.
- B. Control of dust on the site shall be the sole responsibility of the Contractor.
- C. 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.
- D. A temporary irrigation system shall be installed if necessary for dust control.

3.4 SILT FENCES AND STRAW BALE DAMS

- A. Silt fences and straw bale dams shall be constructed to control erosion and migration of soils disturbed during construction. The fences and dams 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 SWPP devices installed prior to the beginning of any clearing activities. Runoff from cleared or disturbed area shall be directed through the SWPP 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 Project Manager.
- M. All SWPP 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 Project Manager. These devices shall be inspected thereafter on a weekly basis and after all large storm events.
- O. All ESCP devices shall be removed no sooner than 30 consecutive calendar days after final site stabilization has been achieved as determined by the District. SWPP devices such as straw bales, 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 Project manager.

3.5 CONSTRUCTION GEOTEXTILE FOR PERMANENT EROSION CONTROL

Construct in accordance with WSDOT Standard Specification Section 2-12.3.

3.6 CONSTRUCTION ENTRANCE

A. Maintenance Standards

1. Quarry spalls shall be added if the pad is no longer in accordance with Specifications.
2. If the entrance is not preventing sediment from being tracked onto pavement, then alternative measures to keep the streets free of sediment shall be used. This may include street sweeping, an increase in the dimensions of the entrance, or the installation of a wheel wash as Approved by the Project Manager.
3. Any sediment that is tracked onto pavement shall be removed by shoveling or street sweeping. The sediment collected by sweeping shall be removed or stabilized on site. The pavement shall not be cleaned by washing down the street, except when sweeping is ineffective and there is a threat to public safety. If it is necessary to wash the streets, the construction of a small sump shall be considered. The sediment would then be washed into the sump where it can be controlled.
4. Any quarry spalls that are loosened from the pad, which end up on the roadway shall be removed immediately.
5. If vehicles are entering or exiting the site at points other than the construction entrance(s), fencing (See BMPs C103 and C104) shall be installed to control traffic.
6. Upon Project Completion and site stabilization, all construction accesses intended as permanent access for maintenance shall be permanently stabilized.

END OF SECTION 312500

DIVISION 32 – SITE WORK

SECTION 321216 – ASPHALT PAVING GENERAL

PART 1 - GENERAL

1.1 DESCRIPTION

This section includes Work related to furnishing and installing hot-mix asphalt pavement.

1.2 REFERENCES

- A. Hot-Mix Asphalt Paving Terminology: Refer to American Society for Testing and Materials (ASTM) D8 for definitions of terms.
- B. Washington State Department of Transportation (WSDOT) Standard Specifications, latest edition.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated, include technical data and tested physical and performance properties.
- B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
- C. Job-Mix Designs: For each job mix proposed for the Work.
- D. Material Test Reports: For each paving material.
- E. Material Certificates: For each paving material, signed by manufacturers.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall be a paving-mix manufacturer registered with and Approved by WSDOT.
- B. Regulatory Requirements: Provide all asphalt paving work in accordance with WSDOT Standard Specifications for materials, workmanship, and other applicable requirements. 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 WSDOT and Approved by the Project Manager.
- D. 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 one year.

1.5 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 WSDOT Standard Specifications for Class ½ inch Performance Grade (PG).
- B. Mineral Filler: Finely ground mineral particles, free of foreign matter.
- C. Soil Sterilant: Use monoborochlorate, or Approved, soil sterilant.
- D. Tack Coat (Bonding Oil): WSDOT 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.

3.2 SUBGRADE

- A. Ensure that sub-grade is prepared in accordance with Section 312000 - Earthwork.
- B. Maintain optimum moisture content of fill materials to attain required compaction density.

3.3 HOT-MIX ASPHALT PAVEMENT

Furnish and place hot mix asphalt in accordance with section 5-04 of WSDOT Standard Specifications.

- A. Do not place asphalt when ambient or base surface temperature is less than 40 degrees F or base surface is wet or frozen.
- B. 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.
- C. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.
- D. Tack Coat: Apply tack coat in accordance with WSDOT 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.
- E. 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.
- F. 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.

3.4 JOINTS

- A. 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.
- B. Clean contact surfaces and apply tack coat to joints.
- C. Offset longitudinal joints, in successive courses, a minimum of 6-inches (150 mm).
- D. Offset transverse joints, in successive courses, a minimum of 24-inches (600 mm).

3.5 COMPACTION

- A. 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.

- B. Complete compaction before mix temperature cools to 185 deg F (85 deg C).
- C. 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.
- D. 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:
- E. 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.
- F. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- G. 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.
- H. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- I. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Compacted Scheduled Thickness: Within 1/4 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.

3.7 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.

3.8 FIELD QUALITY CONTROL

Field inspection will be performed under provisions of Section 014000 – Contractor Quality Control.

END OF SECTION 321216



DIVISION 32 – SITE WORK

SECTION 321723 – ASPHALT PAVEMENT STRIPING

PART 1 - GENERAL

1.1 DESCRIPTION

This section includes Work related to furnishing and installing pavement markings upon the pavement surface.

1.2 SUBMITTALS

Product Data: Submit manufacturer's Product Data Sheets.

1.3 QUALITY ASSURANCE

Environmental Requirements: Apply marking paint in dry weather when pavement and atmospheric temperatures are 50 degrees F and are anticipated to remain above 50 degrees F for 4 hours after completing application.

PART 2 - PRODUCTS

2.1 MATERIALS

Low VOC Waterborne Paint per WSDOT Standard Specifications and as Approved by the Project Manager.

2.2 EQUIPMENT

- A. Commercial compressed air spray striping machine capable of applying an even coating at the manufacturer's recommended thickness in an even width across the strip and as Approved by the Project Manager.
- B. Commercial airless striping machine capable of applying an even coating at the manufacturer's recommended thickness in an even width across the stripe and as Approved by the Project Manager.

PART 3 - EXECUTION

3.1 PREPARATION OF ROADWAY SURFACES

- A. All surfaces shall be dry, free of any loose debris and within the proper temperature range prior to striping.
- B. Remove all other contaminants from pavement surfaces that may adversely affect the installation of new pavement markings by sandblasting, shot-blasting, or sweeping. Air blast the pavement with a high pressure system to remove extraneous or loose material.



- C. Apply materials to the Hot Mix Asphalt (HMA) that is sufficiently cured according to the manufacturer's recommendations.
- D. After the surface is clean and dry, apply primer as recommended by the manufacturer to the area receiving the pavement markings. Apply the primer in a continuous, solid film according to the recommendations of the primer manufacturer and the pavement markings manufacturer.

3.2 INSTALLATION

- A. Place material according to the manufacturer's recommendations.
- B. The top of pavement marking shall be smooth and uniform.
- C. Line ends shall be square and clean.
- D. Place pavement marking lines parallel and true to line.

3.3 APPLICATION THICKNESS

Pavement markings shall be applied per WSDOT Standard Specifications and as Approved by the Project Manager.

END OF SECTION 321723

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 328400 - SITE IRRIGATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Furnish and install irrigation systems in conformance with the Contract Drawings and Specifications, complete and ready for use. The Work consists of furnishing all materials necessary for a complete installation, including: Shop Drawings, wire sleeves, pipe, valves, fittings, sprinklers, controller, valves, back-flow prevention device, and all appurtenances related thereto. Included shall be all labor of installation, including trenching, plumbing, backfilling, electrical work, adjustments, and all other items of labor necessary for a Satisfactory operating system.
- B. Underground automatic (remote) controlled irrigation system.
- C. The layout of the irrigation system is schematic; follow as closely as is practicable.
- D. Alterations in the locations of pipelines, valves, and related equipment shall only be made with the Project Manager's approval.
- E. Before proceeding with the installation of any section or unit of the irrigation system, check and verify the correlation between ground measurements and the Contract Drawings. Advise the Project Manager of any discrepancies.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM) A53 – Pipe, Steel, Black and Hot Dipped Zinc Coated Welded and Seamless.
- B. ASTM B3 - Soft or Annealed Copper Wire.
- C. ASTM D1784 - Rigid Poly Vinyl Chloride (PVC) Compounds and Chlorinated Poly Vinyl Chloride Compounds.
- D. ASTM D1785 - Rigid Poly Vinyl Chloride (PVC) Plastic Pipe, Schedules 40 and 80.
- E. ASTM D2241 - Rigid Poly Vinyl Chloride (PVC) Pressure Rated Pipe (SDR-PR).
- F. ASTM D2466 - Rigid Poly Vinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.
- G. ASTM D2564 - Solvent Cements for Poly Vinyl Chloride (PVC) Pipe and Fittings.
- H. ASTM D2672 - Bell-End Poly Vinyl Chloride (PVC) Pipe.

1.3 QUALITY ASSURANCE

- A. All Work specified herein shall conform to or exceed the requirements of the International Building Code.
- B. All work hereunder shall be in full accordance with the latest rules and regulations of the governing authorities, Washington State OSHA, the Uniform Plumbing Code published by the Western Plumbing Officials Association and other applicable local codes and regulations.
- C. Qualifications: System installer shall be a Washington State licensed landscape contractor. The irrigation system must be installed under the direct supervision of a journey irrigation mechanic or journey plumber.
- D. Manufacturer's Instructions: Adhere to manufacturer's instructions for product handling, installation and operations.

1.4 SUBMITTALS

- A. Submit irrigation system product data no later than 30 days prior to installation. Submit prior to final acceptance product data for all irrigation equipment installed in the irrigation system, and written operating and maintenance instructions on all equipment including winterization procedures.
- B. Record drawings: shall be provided at completion of irrigation system installation by installer of system.

1.5 JOB CONDITIONS

- A. Solvent weld PVC pipe only during non-freezing weather. Solvent weld PVC pipe only under cover in rainy weather.
- B. Site inspection and layout: Before proceeding with any Work, the Contractor shall inspect the site, carefully check all grades and verify all dimensions and conditions affecting the Work to satisfy Contractor so that Contractor may safely proceed. Changes or alterations to the system to meet actual conditions shall be made at the Contractor's expense. Irrigation plan is diagrammatic and is not intended to show exact locations of existing or proposed piping, valves or controllers. Locate new items as closely as possible to related curbs, walls, fences or edges of paving. Pipe lines shown parallel on Contract Drawing may be placed in a common trench but separated by at least 6 inches. Irrigation heads are shown accurately and shall be installed as indicated by center of symbol.
- C. The existing Group Camp irrigation system will be partially replaced by a new irrigation system. Existing irrigation system valves will be reused. Existing heads and piping shall be replaced by new heads and pipe. All existing sprinkler heads shall be salvaged and provided to the Project Manager.
- D. The Contractor shall be responsible to maintain irrigation water service to all landscaped areas, including trees and lawns, designated to remain both within and without the park. Coordinate watering service with Washington

State Parks for landscaped areas outside of the park boundaries. Any damage caused to landscaping resulting from a lack of water or Contractor's negligence shall be replaced to new or better conditions immediately following acceptance of new sprinkler irrigation system at no additional cost to District.

- E. Store PVC pipe and fittings out of direct sunlight and protect from physical damage.

1.6 PROTECTION

- A. Protect work and adjacent property, and be responsible for any damage or injury arising from this Contract, due to actions or neglect:

1. Provide protection at all times ample to keep rock, dirt, gravel, debris and all other foreign materials from entering piping, valves and other irrigation equipment.
2. Provide protective cover and barriers as necessary to prevent damage and staining.

- B. Confine work to areas designated:

1. Do not disturb existing vegetation outside of construction limits.
2. Protect all trees within construction limits not designated to be removed.
3. Coordinate root pruning as required for the installation of irrigation system around existing trees to remain. Adjust pipe locations in field As Required to ensure protection of existing trees and root system. Verify location of pipe alignment with District before trenching and installation around tree roots.
4. Repair or replace vegetation damaged as a result of Contractor's operation to satisfaction of the Project Manager.

- C. Protection of utility lines and other existing facilities:

1. Verify locations of all utility lines and underground obstructions.
2. Be familiar with all utility, irrigation, mechanical, and electrical plans so that digging and drilling operations do not damage lines.
3. Repair or replace any damage to buildings, equipment, underground utilities, irrigation equipment, paving, surfacing, stairs, and/or forms in a manner Satisfactory to the District.
4. Call the Underground Utilities Locator Service (1-800-424-5555) prior to commencing work.

1.7 INSPECTIONS AND TESTS

Cover or enclose Work only after it has been inspected, tested, and approved by District.

1.8 WARRANTY

- A. In addition to other Contract warranties, the sprinkler system installer shall provide in writing to District a statement that sprinkler system installer will come back to job site at beginning of first winter season to perform:
1. General inspection of system, limited to the new areas installed.
 2. Test all lines, valves, sprinkler heads, double-check valves.
 3. Repair all leaks and any faulty work.
 4. Check operation of system and adjust spray patterns if necessary for full coverage.
 5. Do other necessary work for adequately functioning system.
 6. Drain system completely and show grounds person and irrigation specialist location of all drain valves and/or “blow out” points. Winterize irrigation system using compressed air to evacuate all lines.
- B. Contractor shall repair grades that have settled at all trenches, and adjust sprinkler heads to finish grade. This includes both shrub heads and lawn heads. Contractor shall provide topsoil and sod as needed to bring lawn or shrub bed to finished grade. Contractor shall return in spring, after first winter, for system check-up and, if necessary, restore system for spring and summer operation.
- C. Contractor shall ensure District designated parks grounds person(s) fully understands the system and operational methods. Irrigation specialist shall be present at spring start up. During first irrigation season, be available within one week of request to make required repairs to the system.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with Specifications and manufacturer’s data. Where these may be in conflict, the more stringent requirements govern.
- B. Materials and equipment shall be new and of brands, types and manufacturers as shown on Contract Drawings, specified in this Section, or Approved substitutions.
- C. Whenever references are made to a product of a particular manufacturer, such reference is for the purpose of facilitating the description and representative quality of the product intended for use.
- D. Each type of material or model of equipment shall be of one manufacturer throughout.

2.2 IRRIGATION HEADS

- A. Refer to irrigation legend on the Contract Drawings for model number and manufacturer.
- B. All irrigation heads and rotor heads shall be Hunter as shown on the Contract Drawings Or Equal.
- C. Bubbler: See irrigation legend on the Contract Drawings.
- D. Drip Irrigation: See irrigation legend on the Contract Drawings.

2.3 PIPES AND FITTINGS

- A. Markings: All PVC pipe and fittings shall bear the manufacturer's name or trademark, material designation, nominal size, applicable IPS schedule or class rating, NSF seal of approval; and on pipe ASTM Standard Number.
- B. PVC Pipe: Schedule 40 PVC
- C. Galvanized Pipe and Fittings:
 - 1. Pipe: Schedule 40, 125 psi, ASTM A120-72a, hot dipped galvanized and threaded.
 - 2. Fittings: Galvanized, malleable, screwed, 150 psi, FS WW-P521.

2.4 PIPE SLEEVE

PVC Schedule 40 pipe as specified.

2.5 PVC SOLVENT CEMENTS AND PRIMERS

- A. Solvent Cement: NSF approved, meet requirements of ASTM 02564.
- B. Primer: NSF approved

2.6 VALVES AND VALVE KEYS

- A. Valves
 - 1. Automatic Control Valve: Existing control valves (Group Site), Toro 220-26-0 (Cabin Loop), size per Contract Drawings Or Equal.
 - 2. Gate Valve: Nibco T-113-K, line size Or Equal.
 - 3. Drain Valve: Mueller Mark II Oriseal H-10284 stop and waste, Or Equal.
 - 4. Quick Coupler Valve: Rainbird Model 44LRC Or Equal.
- B. Valve keys: provide Quick Coupler Key and other tools necessary for operating valves.

2.7 VALVE BOXES

- A. Automatic control valves, when in groups of two: Carson Standard Box #1419 with locking lid, Or Equal.

- B. Automatic control valves, singular: Carson 1419B with bolt down locking lid and extensions as required, green color, Or Equal.
- C. Valve Protective Sleeve: 4-inch PVC, length as required, with tight fitting cap, Rainbird #6100, Or Equal.
- D. Keys for valve boxes: provide 5 sets of all keys required for valve boxes and covers.

2.8 CONTROL WIRE

- A. Type UF bearing U/L approval for direct underground burial in National Electrical Code Class II circuits, ASG sizes, minimum size #14.
- B. Conductor of electrical conductivity-grade copper meeting requirements of ASTM B-3.
- C. Control wire bundle shall include a spare wire.

2.9 ELECTRICAL CONNECTORS

- A. Scotch-lock connector sealing pack No. 3577 with Type R.
- B. Rain Bird Pen-Tite Wire Connectors No. PT 101 through 104.

2.10 IRRIGATION CONTROLLER

- A. Toro EV0-040D Or Equal.
- B. Manufacturer: Toro Irrigation
- C. Model number: EVO-040D with EMOD-12 12-station module
- D. Outdoor controller
- E. Soil moisture, rain sensor, and weather sensor capable.

2.11 OTHER MATERIALS

As indicated on the Contract Drawings, specified or required.

2.12 DETECTABLE TAPE

Blue detectable tape: 2-inch minimum width, with metallic backing made of plastic capable of stretching during burial, with the words "Irrigation Water" printed on it.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify installation conditions as Satisfactory to receive Work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning Work constitutes acceptance of conditions as Satisfactory.

- B. Discrepancies in Contract Drawings: Report to District any deviations between Contract Drawings and site. Failure to do so prior to the installation of equipment may result in the replacing, and/or relocating of equipment.
- C. Available pressure verification: Prior to the start of Work, verify static pressure at point of connection. Notify District of pressure available for approval to proceed.

3.2 INSTALLATION

A. General:

- 1. Locate size and type of all equipment as specified and indicated on Contract Drawings.
- 2. Make no adjustment without written approval of the Project Manager.
- 3. Water service connection: Conform to the requirements set forth by all codes and the water supplying agency.
- 4. Install all equipment per manufacturer's recommendations unless otherwise specified.

B. Layout of irrigation system:

- 1. Stake the system following the diagrammatic design shown on the Contract Drawings before irrigation system installation begins. Notify District for approval to proceed with installation.
- 2. Alterations and changes in the layout may be expected in order to conform to the conditions.
- 3. It is understood that corrective measures in the system may become necessary but make no changes or alterations in the system as planned without the prior authorization and approval of the Project Manager.

C. Trenching:

- 1. Trench bottoms with uniform slopes $\frac{1}{2}$ percent standard minimum grade. Compact trench bottom prior to placing bedding material. Bottom of trenches shall be smooth and free of sharp rock and other objects that may damage pipe.
- 2. Remove materials unsuitable for bedding of pipe to a depth of 4-inches below trench bottom and backfill with sand or suitable bedding material. Where backfill contains excessive rock and other material that may damage pipe, or in the opinion of Project Manager excavated material is not suitable for backfill, use sand acceptable to Project Manager. Keep construction gravel separate from topsoil.
- 3. Allow for minimum cover depths as follows:
 - a. All supply secondary main lines from water source to control valves or quick-coupling valves: 24-inches except as otherwise indicated.

- b. All lateral lines from control valves to head: 18-inches except as otherwise specified.
- c. Provide trench of sufficient width to allow for proper tamping around pipe.
- d. Place backfill material in maximum 4-inch lifts (loose measurements) and compact to the dry density of adjacent undisturbed soil.

D. Piping:

1. Place 4-inches of sand around and above piping, removing rock or other material that may damage pipe. Excavated material may be used for remainder of backfill. Compact thoroughly.
2. Pipe in trenches “snaked” slightly allowing for expansion and contraction of PVC pipe. Slope pipe toward drains.
3. Fill piping with water at approximately 25 psi during backfilling operation.
4. Backfill over fittings only after system has been tested and test accepted.
5. Lay pipe in accordance with manufacturer’s recommendations and industry standards.
6. Only factory threaded Schedule 80 PVC pipe may be fitted to a threaded fitting without an adapter.
7. No male PVC adapters permitted, use only female PVC adapters (3 inch minimum).
8. Street ells permitted only where indicated: “Marlex” Schedule 40 high density polyethylene (no substitutions).
9. Galvanized steel piping: Clean out threads of standard lengths, not more than two threads showing at joints. Make joints up with pipe compound applied to male threads only.

E. Jointing:

1. Threaded joints shall be sealed with Teflon tape or Rectorseal “Heavy Duty” #100 Virgin Teflon Thread sealing paste only, no substitutions. Take care not to over tighten threaded joints.
2. Keep the interior of all pipes clean and free from dirt, debris, excess solvent, or other material.
3. Solvent welded PVC pipe joints, except as otherwise indicated. Cut pipe square with cutting tool, chamfer deburr, wipe from the surface all chips, dust, dirt, moisture and foreign matter which may contaminate the cemented joint. Apply primer and solvent cement per manufacturer’s recommendations.
4. Allow the joints to cure at least 24 hours before pressure is applied to the system.

F. Control Valves:

1. Install automatic control valve and quick coupling valves as detailed on Contract Drawings or as otherwise directed by the Project Manager.
2. Provide PVC sch. 80 union at each automatic control valve.
3. Provide valve box with extensions as required for each automatic control valve or grouping of two valves. Set top flush with finish grade.
4. Install quick coupling valves as detailed.

G. Irrigation Heads:

1. Install sprinkler heads, bubblers, drip emitters, and rotors of types, sizes and coverage called for in the Irrigation Legend at locations shown and as indicated on Contract Drawings or as otherwise directed by the Project Manager.

H. Control Wiring:

1. Wiring shall comply with the National Electrical Code, latest edition.
2. Lay-in trenches, next to supply or branch lines when practicable, for maximum protection, minimum depth 18-inches. Place in pipe sleeves or conduit under all paving.
3. Single wires (red) to each solenoid from control and common neutral wire (white) to all solenoids from the control. Spare wire (yellow) to loop all valves from control.
4. Wire sizes shall meet minimum requirements published by manufacturer of automatic control valves installed. Minimum size, 14 gauge.
5. Splices permitted only at junction boxes, valve boxes, or at control equipment. Make all splices moisture proof using specified electrical connectors.
6. Provide 18-inch expansion loops at 100 foot intervals and at all changes in direction greater than 30 degrees. Provide 24-inch loops at connection to automatic control valves and at splices.

I. Control wire sleeves:

1. Required for control wires under all paving and surfacing and As Directed by the District. Extend sleeve 12 inches beyond edge of paving.
2. Provide J-boxes for long runs of controller wire sleeve and multiple changes in direction per code.

J. Irrigation Controller:

1. Install controller per manufacturer's recommendation.
2. Electrical wiring shall be installed according to local electrical code. The cost of all electrical work necessary to make the automatic equipment operate properly shall be included in this contract.

3. A 15-amp circuit breaker is to be installed for electrical connection to controllers utilizing existing electrical service.
4. Existing irrigation controller for the group camp site is located in the restroom closet north of the picnic shelter; coordinate with the Project Manager for access.
5. All wiring shall be in metal conduit, including 24-volt wire, to a point ten feet from the base of the cabinet. Conduit shall be sealed water tight to controller cabinet.

3.3 FLUSHING

- A. Mains: Two full open flushings, one prior to placement of valves, the second after placement of valves and prior to testing.
- B. Laterals: One fully open flushing prior to placement of heads or drain valves. Flush for one (1) minute minimum. Flush drip distribution tubing completely before installing drip emitters.
- C. Protect against re-entry of contaminated water into risers or piping.
- D. After flushing, immediately install sprinkler heads or cap risers until sprinkler heads are installed.

3.4 INSPECTIONS AND TESTING

- A. General:
 1. Irrigation water is only available from approximately April 15 to October 15. If pressure testing occurs outside of this time period, the Contractor shall supply water at no additional expense to District.
 2. Coordinate with Project Manager for water availability. Notify the Project Manager at least 24-hours prior to inspections and tests.
 3. Conduct test in presence of the Project Manager.
 4. All gauges used in the testing of water pressures shall be certified by an independent testing laboratory immediately prior to use on the Project.
- B. Preliminary Inspection:
 1. Install all mains and laterals with all valves and other equipment in place, except irrigation heads.
 2. Cap all risers except the first riser from valve on each lateral line.
 3. Purge all air from main lines.
- C. Pressure testing of main lines and valves:
 1. With all valves in place and closed, test at 150 psi for a minimum period of 30 minutes without the introduction of additional pressure.
 2. Install pressure gauge in system where directed by the Project Manager.

3. Repair and retest installations which show loss of pressure exceeding 5 psi at the end of the specified period.
- D. Pressure testing of lateral lines:
1. Purge all air from laterals and cap all risers.
 2. Open valves and pressurize system.
 3. Visually inspect lateral lines.
 4. Repair and retest lines which evidence visible leakage.
- E. Final inspection and coverage check:
1. Prior to request for final inspection by the Project Manager, accomplish the following:
 - a. Complete all Work, including balancing and adjusting the system to provide optimum coverage without fogging or over throw onto paved surfaces and building.
 - b. Complete all wiring adjustments to the controller and set time sequences for each valve.
 - c. Backfill all trenches.
 - d. Coverage check: Operate each zone of the system for a minimum of 5-minutes for each zone for the Construction Inspector's inspection. Make all adjustments to heads to meet full coverage requirements.

3.5 CLEANUP

- A. Keep premises reasonably free from accumulation of debris.
- B. On completion of each division of Work, remove all debris, equipment and surplus materials and leave the Project site in a neat and orderly fashion.

END OF SECTION 328400

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 329200 – 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. Product Data:

1. 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.
2. Fertilizer
3. Organic Amendment

B. Samples: Provide 1 lb sample of the following:

1. 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 after August 31, 2015, but no later than September 18, 2015.

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.

END OF SECTION 329200

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 329300 – LANDSCAPING

PART 1 - GENERAL

1.0 DESCRIPTION

The Work of this section consists of furnishing and installing the following:

- A. Plant procurement and planting
- B. Soil preparation
- C. Bark Mulch, Cobble Mulch, soil amendments, and fertilizer
- D. Seeding for upland areas
- E. Boulders
- F. Landscape Edging

1.1 REFERENCES

ANSI Z60.1 American Standard for Nursery Stock

1.2 REVIEW OF PLANT MATERIALS

- A. All plant material will be reviewed by the Project Manager before being planted and all plant material not meeting Specification requirements will be rejected and separated from acceptable plant materials.
- B. Contractor shall, at its own expense, replace rejected trees, shrubs, and groundcovers with suitable plant material of same species and/or variety that meet Specification requirements.

1.3 SUBMITTALS

- A. Material sources: Submit within thirty (30) days after District issuance of Notice of Award:
 - 1. A list of all plant material indicating source of supply, order invoice, size and quantity for each species or variety procured. The Project Manager or his representative, at their discretion, may elect to review plant material at its source.
 - 2. Seed source and seed mixture for Upland Seed Mix indicating weight and percentage by species, collection date, and planting fertilizer as a percentage of total weight.
- B. Samples: Submit one-pound material sample of each of the following in clear plastic bags, labeled to indicate source:

1. Bark Mulch
 2. Cobble Mulch
 3. Topsoil
 4. Organic soil amendments
- C. Photos: Submit photos of the following item, identifying the source location, prior to delivery to the site. Photos shall represent the range of colors, textures and sizes to be installed.
1. Boulders
- D. Inspection certificates:
1. All plant material shall meet requirements of state and federal laws with respect to inspection for plant diseases and infestation.
 2. Inspection certificates required by law shall accompany each shipment of plant material and shall be submitted to the Project Manager.
- E. Product data, including contact information for manufacturer/supplier:
1. Fertilizer and soil additives
 2. Mycorrhiza inoculant
- F. Test reports:
- Submit soil analysis for each of the following, performed on a 2 pound sample, from a soils testing laboratory. Test report shall indicate material composition, particle size and gradation, percent organic matter, ph, suitability as growth media, and recommendations for amendments.
- G. Existing soil: Test shall be performed on a sample from area of proposed tree and shrub planting.
- H. Existing soil: Test shall be performed on a sample from area of proposed tree and shrub planting.
- I. Imported soil: Indicate source and obtain the Project Manager's approval before hauling to site.
- J. Shipping Tickets
1. Provide delivery receipt for the following, indicating material, quantity, source, and date of delivery to the project site:
 2. Plant Material
 3. Upland Seed
 4. Soil
 5. Mulch

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Protection and Storage of Material:

1. Dig, pack, transport and handle plants with care to ensure protection against injury. Protect plant materials during storage and when planting from extreme weather conditions, wind drying of roots and root ball injury. If plants cannot be planted immediately upon delivery, properly heel-in root ball or bare roots with soil, or compost. Water heeled-in plants daily. Provide shade cloth or other cover to protect from excess sunlight.
2. Failure to comply with plant care as noted above may result in the rejection of materials. Plant material showing damage from shipping or while in storage or during planting may be rejected by the Project Manager and shall be replaced by the Contractor at its own expense.
3. Cover plants transported on open vehicle with a protective covering to prevent windburn. Anti-desiccant shall be applied only with the approval of the Project Manager. No plant shall be bound with rope or wire in a manner that could damage or break branches. Provide dry, loose soils for planting. Frozen or muddy soil is not acceptable. Stock shall be handled by root ball only, not by the trunks, stem, or tops.

B. Deliver fertilizer materials in original unopened containers showing weight, analysis, and name of manufacturer. Store materials in dry place and protect from deterioration and intrusion of moisture.

1.5 PROJECT CONDITIONS

- A. Work notification: Notify the Project Manager at least seven (7) working days prior to installation of plant material.
- B. Protect existing utilities, paving, and other facilities from damage caused by planting operations. Confine work to designated areas.
- C. Plant trees, shrubs and groundcovers only during periods which are normal for such work as determined by the season, weather conditions, and accepted practice. Do not install plant materials when ambient temperatures may drop below thirty-five (35) degrees F or above eighty (80) degrees F. Do not install plants when wind velocity exceeds thirty (30) MPH.
- D. Coordinate planting Work with installation of irrigation system and soil preparation.

1.6 GUARANTEE

A. Plant Material Guarantee:

1. Guarantee all plant material to remain alive and be in healthy, vigorous condition for a one year period, which will begin upon final Completion. Inspection of plants will be made by the Project Manager at Completion.

2. Guarantee shall not include damage of loss of trees, shrubs, or ground covers caused by fire, floods, freezing rains, lightning storms, winds over seventy-five (75) MPH, or acts of vandalism or negligence.
- B. Plant material replacement:
1. Replace, in accordance with the Contract Drawings and Specifications, all plants that are dead or, as determined by the Project Manager, are in an unhealthy or unsightly condition and have lost their natural shape due to dead branches or other causes due to the Contractor's negligence. The cost of such replacements is at the Contractor's expense. All replacement plants shall be guaranteed for an additional one (1) year after re-planting, unless otherwise specified.
 2. Remove and immediately replace all plants determined by the Project Manager to be unsatisfactory during the initial planting installation.

PART 2 - PRODUCT

2.0 PLANT MATERIALS

- A. Genera, species, and variety; quantity, size and conditions shall be as indicated on the Contract Drawings Plant Schedule.
- B. Plant material shall be healthy nursery stock, well-branched, full foliage when in leaf, free from disease, injury, insects, all weeds, and weed roots. Tree groups shall be matched in appearance and form.
- C. Meet requirements of American Standard for Nursery Stock, ANSI Z60.1-2004 published by the American Nursery and Landscape Association except as otherwise supplemented or modified under this Section.
- D. Potted and container stock well rooted, vigorous enough to ensure survival and healthy growth.
- E. Container plants shall have grown therein a minimum of six (6) months and a maximum of two (2) years, with roots filling the containers but not showing evidence of being or having been root bound.
- F. All grafts or budding on trees shall be at ground level except higher grafts of budding with compatible trunk and branch growth characteristics may be approved by the Project Manager.
- G. All collected native plant material shall be nursery grown for a minimum of one (1) year unless otherwise approved by the Project Manager in writing.
- H. Trees: Provide untapped, straight, single leader trees except for multiple stem (clump) trees. Deciduous trees with heavier than normal tops and balanced branching.

- I. Plant materials shall be free from disfiguring knots, swollen grafts, sunscald injuries, bark abrasions, evidence of improper pruning and other objectionable disfigurements.
- J. Trees and shrubs shall have well developed branch systems; shrubs shall have full foliage, not leggy.
- K. Thin, weak, and leggy plants will be rejected by the Project Manager.
- L. One plant of each group or massing of plants shall be properly tagged, giving the common and botanical plant name. Plant names shall be legibly printed on bright orange or yellow survey tape with a permanent marker.

2.1 SOIL AND SOIL AMENDMENTS

- A. Planting Soil Backfill or Planting mix: Two-way topsoil consisting of 2/3 sandy loam topsoil and 1/3 composted organic material (compost).
 - 1. Planting mix shall have a pH range of 5.0-6.5 with dolomitic limestone added as necessary to attain this range (pH determined by soil test).
 - 2. Planting mix shall meet the following gradation:

Screen Size	Percent Retained	Percent Passing
1/4 inch	5	95
#10	15	85
#30	50	50
#60	60	40
#100	80	20
#200	90	10

- 3. Topsoil: See Section 31 20 00.
- 4. Composted Organic Material (Compost): Shall consist of composted yard debris or organic waste material composted for a minimum of 12 months. Compost shall consist of 100% recycled content. In addition, the organic material shall have the following physical characteristics:
 - a. Shall be screened using a sieve no finer than 5/16 inch and no greater than 7/16 inch.
 - b. Shall pass a standard cress test for seed germination (90% ination compared to standard.)
 - c. Shall have a pH from 5.5 to 7.5.
 - d. Shall have a maximum electrical conductivity of 3.0 ohms/cm.
 - e. Shall have a maximum carbon to nitrogen ratio of 40:1.

- f. Shall be certified by the Process to Further Reduce Pathogens FR guidelines for hot composting as established by the United States Environmental Protection Agency.

2.2 SEED MIX

- A. Upland Seed Mix: Provide hydroseeded Upland seed mix as shown on the Contract Drawings.
 1. Seed source shall be regionally grown and specific to Central/ Eastern Washington.
 2. Supplier: BFI Native Seeds, 1145 Jefferson Ave., Moses Lake, WA 98837, Phone: (509) 765-6348, Fax: (509) 764-9978 Or Equal.
 3. The seed mixtures shall be no less than 98% pure, and shall have a minimum germination rate of 90%.
- B. Lawn Seed Mix: See Specification Section 329200.

2.3 HYDROSEED COMPONENTS FOR UPLAND SEEDED AREAS

- A. Wood Fiber Mulch EcoAegis Bonded Fiber Matrix (BFM) Or Equal.
- B. Supplier: ACF West, Contact: Aaron Schmidt (425) 415-6115.

2.4 WATER

Suitable for irrigation, free from ingredients harmful to plant life.

2.5 FERTILIZER AND ADDITIVES FOR PLANT MATERIAL

- A. Fertilizer: Triple 14 (14-14-14)
- B. Moisture Retention Agent: Terra-Sorb Or Equal.
- C. Mycorrhiza inoculants
- D. MycorrhizalROOTS by Roots Inc. Or Equal.
- E. Root Dip Gel by Roots Inc. Or Equal.
- F. Supplier: Roots Inc., Phone: (805) 659-1412, Contact: Jim Huges, Cell: (805) 340-4435

2.6 SLOW RELEASE PELLET FERTILIZER FOR PLANT MATERIAL

- A. 21-5-12 formula
- B. APEX "Tree & Shrub" Or Equal

2.7 BARK MULCH

Description: Ground fir or hemlock fine bark, free from noxious weed seeds, sawdust, splinters or other debris. Bark mulch shall not contain foreign material, chemicals and substances detrimental to plant life, including resin, tannin, wood fiber, or other compounds.

- A. Ground Fir and/or Hemlock bark shall meet the following gradation requirements for quality assurance.

Percent Passing	Sieve Sizes
95%-100%	1/4 inch
80%-100%	No. 8
0%- 80%	No. 35

- B. On-site chipped material of similar size may be used with prior approval by Project Manager. Chipped material may not include blackberry bramble and other non- native vegetation.

2.8 LANDSCAPE EDGING

- A. 3000psi concrete.
- B. Tool joints per manufacturer’s recommendations or 10’ o.c in the absence of manufacturer guidance. Additional tool joints added on radius as necessary.
- C. Curb shall be installed with smooth transitions both horizontally and vertically from curved sections to linear sections with no angle points.
- D. Curbing shall be laid out in the field for approval by the Project Manager.

PART 3 - EXECUTION

3.0 INSPECTION

- A. Finish grading shall be inspected and approved by the Project Manager prior to planting. Verify that planting bed grades and layout are in accordance with those indicated on the project grading and drainage and layout Contract Drawings before proceeding with Work.
- B. Plant material shall be inspected and approved by the Project Manager at the nursery or project site prior to installation. Remove unsatisfactory material from the site immediately.
- C. Soil conditions:
 1. Examine planting areas for conditions that will adversely affect execution, permanence, and quality of work and survival of plant material.
 2. Planting work shall not begin until soil and planting conditions are satisfactory, and have been Approved by the Project Manager.

3.1 PREPARATION

Contractor shall locate plants by staking with stakes and flags as indicated on the Contract Drawings or as Approved by layout of plants in the field. If obstructions are encountered that are not shown on the Contract Drawings, do

not proceed until alternate locations have been selected by the Project Manager.

3.2 SOIL PREPARATION

A. Verify that planting beds and substrate grades are in accordance with those indicated on the project grading and drainage Contract Drawings before proceeding with Work. Verify that soil conditions are Satisfactory for construction.

1. Examine planting areas for conditions that will adversely affect execution, permanence, and quality of Work and survival of plant material.
2. Planting Work shall not begin until soil and planting conditions are Satisfactory.

B. Planting Bed Grades:

Establish grades 1.5-inch to 2-inch below bordering paving, and curbs immediately adjacent to same to allow application of mulch.

C. Prepare soil in planting areas, lawns and seeding areas as follows:

1. Pit Planting Backfill: For pit planting backfill for all container or B&B plants installed within prepared upland seed and lawn areas, Provide planting mix material prepared in accordance with Contract Drawings.
2. Planting Beds:
 - a. Definition: Planting beds are required in areas shown in the Contract Drawings to contain a high volume of plants (i.e., high intensity planting). Requirements for individual plantings (i.e., pit planting) in lawn and upland areas do not necessitate a planting bed.
 - b. Planting Bed Preparation: Disturbance of entire planting bed is not necessary; the Contractor shall only displace soil where plants are to be placed. Rake and remove all deleterious debris, including rocks, sticks, roots, concrete, metal, etc., larger than 1-inch diameter for planting areas. Place 4-inches of organic amendment and till to a depth of 8-inches.
 - c. Cover entire area of planting beds with streambed cobble within two (2) days after planting. Planting beds include all planted areas not otherwise covered by seed. Apply cobble evenly, keeping all plant material free from coverage.
 - d. Upland Seed Preparation: Remove by hand all weeds or other deleterious material. Scarify existing soil to a depth of 8-inches. Rake even to remove all ridges.

3.3 PLANT INSTALLATION

A. Excavate circular plant pits with scarified vertical sides, except for plants specifically indicated to be planted in beds. Provide planting pits at least

- twice the diameter of the root system or container. Depth of pit shall accommodate the entire root system. Scarify the bottom and sides of the pit to a depth of 4-inches.
- B. Place specified planting soil (pit planting topsoil) for use around the balls and roots of the plants.
 - C. Provide fertilizer per manufacturer's specifications for all trees, shrubs, and groundcover at time of planting.
 - D. Set plant material in the planting pit to proper grade and alignment. Set plants upright, plumb, and faced to give the best appearance or relationship to each other or adjacent structure. Set crown of plant material at the finish grade. No filling will be permitted around trunks or stems or above grafts on grafted trees. Backfill the pit with specified soil in 12-inch compacted lifts. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water.

After plants are set, water in soil mixture around bases of balls and fill all voids.
 - E. Space ground cover plants using triangular spacing. Adjust spacing as necessary to evenly fill planting bed with indicated quantity of plants. Plant to within 18-inches of the trunks of trees and shrubs within planting bed and to within 12-inches of edge of bed.
 - F. Bark Mulch: Bark mulch shall be placed around all balled and burlapped and containerized trees.
 - A. Form mulch ring around each tree in lawn areas.
 - G. Pruning: Prune all trees only to remove broken or damaged branches, or for aesthetic purposes as directed by the Project Manager. Branches will be pruned at the branch collar. Neither stubs nor flush cuts will be acceptable.
 - H. Water trees, plants, and ground cover beds within the first 24 hours of initial planting. Water twice per week, including rain, during the dry season, which is approximately June through September, and water once per week, including rain, during the wet season, until final acceptance.
 - 1. Planting Dates: All plants (trees, shrubs, etc.) shall be installed prior to September 18, 2015.

3.4 FERTILIZER AND ADDITIVES

A. Container Plant Materials:

All new container plant materials shall be supplemented, at time of planting, with Roots Inc.

- The mycorrhiza inoculant, mycorrhiza roots, shall be mixed per the manufacturer's recommendation, and applied prior to removing plants

from the container. Each container shall be flooded with the mycorrhiza solution to achieve a saturated root and soil mass.

- B. All new container plants shall be fertilized with a slow release pellet form fertilizer.
 - Fertilizer application rate shall be consistent with the manufacturer's recommendation, and shall be applied to the ground surface after mulch is placed. The fertilizer shall supply, at a minimum, additional micronutrients iron manganese and zinc. Fertilizer release period shall be a minimum of six to seven (6 to 7) months, and shall be heat triggered.
- C. All new container plants shall receive a moisture retention agent. Apply per manufacturer's recommendation.

3.5 UPLAND SEEDING

- A. Scarify area to be seeded, and remove from site all deleterious debris, including rocks, sticks, roots, concrete, metal, etc., larger than 2-inch diameter.
- B. Seed Area Preparation: Fine grade area to be seeded and planted with plugs. Smooth grade using an 8 foot wide x 12 foot long weighted chain link mesh fabric dragged over the area to be seeded. Rake, remove ridges, and fill depressions as required to drain. Grade to a smooth even surface.
- C. Project Manager shall approve finished soil preparation prior to seeding. Provide 24 hour notice for inspection.
- D. All seeded areas shall be hydroseeded (or hand seeded, if re-seeding is necessary), as specified. Verify extent and location of seeded areas with District. After completion of seeding, roll seed bed with empty lawn roller to firmly imbed seed into substrate. Keep seeds continuously moist.
- E. All seeded areas that do not show a prompt catch, within seven (7) to ten (10) days after seeding, shall be reseeded (as originally specified) at ten (10) day intervals until an acceptable stand of grass is assured.
- F. Seed and mulch shall be applied in a two stage operation with Approved hydraulic equipment. Apply materials at the following rates:
 - 1. 150 LBS pure live seed per acre in first application with mulch at minimum to ensure adequate seed to soil contact.
 - 2. Second application shall include mulch and tackifier at a rate of 40 LBS per acre.
 - 3. Seeding shall not be done during windy weather or when the ground is overly wet or frozen. Contractor shall give the Owner 48 hours notice of seeding operations.

4. Equipment shall use water as the carrying agent utilizing a continuous built-in agitation system. Equipment with a gear pump is not acceptable.
 5. Pump a continuous, non-fluctuating supply of homogenous slurry to provide a uniform distribution of material over designed areas.
- G. Seeding Dates: Upland seeding shall be completed by September 18, 2015.

3.6 BOULDER INSTALLATION

- A. Lay out planting bed or coir erosion reduction or cobble erosion reduction planted areas prior to laying out boulders. Lay out each boulder with stakes for Project Manager review and approval prior to installation.
- B. One half to one third of each boulder shall be buried to prevent movement by human weight or force.
- C. Locate container plants in their containers around the boulders as in accordance with the Contract Drawings. Engineer shall approve planting locations around boulder prior to plant installation.

3.7 TREE STAKING INSTALLATION

Install stake at the rear of the vine as shown in Contract Drawings. Tie vine loosely to stake with secure knot or tie. Vine stem shall be tied at a minimum of 2 locations. Top tie shall be within 2-inches of top of vine.

3.8 ROOT BARRIER

Install in accordance with the Contract Drawings and manufacturer's instructions. Do not disturb structural integrity of neighboring features, such as the asphalt trail. Install to maintain top of barrier flush with finished ground surface.

3.9 ACCEPTANCE

- A. Review to determine acceptance of planted areas will be made by the Project Manager, upon Contractor's request. Provide notification at least ten (10) working days before requested inspection date.
- B. Planted areas will be accepted provided all requirements, including the maintenance period, have been complied with and plant materials are alive and in a healthy, vigorous condition.

3.10 CLEANING

Perform cleaning during installation of the Work and upon completion of the Work. Remove from site all excess materials, soil, debris, and equipment. Repair damage resulting from planting operations.

3.11 LANDSCAPE MAINTENANCE

- A. General: Contractor shall be responsible for maintaining all existing and new landscaping within the Contract limits of Work from Notice to Proceed through final Completion.
- B. A cooperative working relationship with Washington State Parks is required during the Contract period. The Contractor shall communicate any gaps in responsibilities between it and State Parks to the Project Manager immediately upon discovery. Where gaps have resulted in damage to landscape, the Contractor shall develop, submit and execute a corrective action plan.

END OF SECTION 329300

DIVISION 33 – SITE WORK

SECTION 330513 – MANHOLES AND COVERS

PART 1 – GENERAL

1.1 DESCRIPTION

This section includes Work related to furnishing and installing manholes, catch basins, rims and covers.

1.2 SUBMITTALS

- A. Submit product data for all items of this Section.
- B. Shop Drawings: Indicate manhole locations, elevations, piping, and sizes and elevations of penetrations.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM C478 – Precast Reinforced Concrete Manhole Sections
 - 2. ASTM C923 – Resilient Connectors between Reinforce Concrete Manhole Structures and Pipes.
- B. Washington State Department of Transportation (WSDOT) Standard Specifications, latest edition.

PART 2 – PRODUCTS

2.1 APPROVED MANUFACTURERS

H2 Pre-cast, www.h2precast.com, 3835 N. Clemons, East Wenatchee, WA 98802.

2.2 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R and the following:
 - 1. Cement: ASTM C150, Type II.
 - 2. Fine Aggregate: ASTM C33, sand.
 - 3. Coarse Aggregate: ASTM C33, crushed gravel.
 - 4. Water: Potable.
- B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.
 - 1. Reinforcing Fabric: ASTM A185/A 185M, steel, welded wire fabric, plain.

2. Reinforcing Bars: ASTM A615/A 615M, Grade 60 deformed steel.
- C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.
 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
Invert Slope: 2 percent through manhole.
 2. Benches: Concrete, sloped to drain into channel.
Slope: 4 percent.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi (20.7 MPa) minimum, with 0.58 maximum water/cementitious materials ratio.
 1. Reinforcing Fabric: ASTM A185/A 185M, steel, welded wire fabric, plain.
 2. Reinforcing Bars: ASTM A615/A 615M, Grade 60 (420 MPa) deformed steel. Calcium Hypochlorite Granules in accordance with AWWA B300, Hypochlorites.

2.3 MANHOLES/CATCH BASINS (Standard Precast Concrete Structures)

- A. Description: ASTM C478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
- B. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
- C. Riser Sections: 4-inch minimum thickness, 48-inch minimum diameter, and lengths to provide depth indicated.
- D. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
- E. Joint Sealant: ASTM C990, bitumen or butyl rubber.
- F. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
- G. Grade Rings: Include two or three reinforced-concrete rings, of 6-inch to 9-inch total thickness that match 24-inch diameter frame and grate.

2.4 MANHOLE CONNECTIONS

- A. Sewer pipe to manhole connections shall be through a flexible rubber boot which shall be securely clamped into a core drilled pipe port. Pipe ports shall

be core drilled at the point of manhole manufacture and shall be accurately located within 1/2 inch of proposed sewer centerline.

Neoprene rubber for the manhole boot shall meet ASTM Specification C443 and shall have a minimum thickness of 3/8 inch. Pipe clamp bands shall be of corrosion-resistant steel.

- B. Storm pipe to manhole/catch basin connections shall be made by using non-shrink grout for a soil tight connection. A water-stop gasket shall be placed in a pipe corrugation at the approximate center of the structure wall to provide a silt tight connection.

2.5 COMPONENTS

- A. Lid and Frame: ASTM A48, Cast Iron or Ductile Iron construction, machined flat bearing surface, removable lockable lid, and shall be interchangeable within the dimensions shown in the WSDOT Standard Plans.
- B. Steps: Individual FRP ladder; or ASTM A615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12-inch to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 48-inches
- C. Pipe Connectors: ASTM C923, resilient, of size required, for each pipe connecting to base section. Furnish chemicals and equipment, such as pumps and hoses, to accomplish disinfection.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify items provided by other sections of Work are properly sized and located.
- B. Verify that built-in items are in proper location, and ready for roughing into Work.
- C. Verify excavation for structures is correct.

3.2 CATCH BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set tops of frames and covers flush with finished surface of catch basins that occur in pavements. Join gravity-flow, non-pressure drainage piping according to the following:
 - 1. Connections - Make connections to existing piping and underground manholes. Make connections into underground manholes and structures by cutting into existing unit and creating an opening large enough to allow

3-inches of concrete to be packed around entering connection. Cut end of connection pipe passing through structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12-inches to provide additional support of collar from connection to undisturbed ground.

- a. Use concrete that will attain a minimum 28 day compressive strength of 3000 psi unless otherwise indicated.
 - b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
- C. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

END OF SECTION 330513

DIVISION 33 – UTILITIES

SECTION 331100 – WATER UTILITY DISTRIBUTION PIPING

PART 1 – GENERAL

1.1 DESCRIPTION

This section includes Work related to furnishing and installing domestic and irrigation pipelines, fittings, valves, and other hardware and appurtenances as shown on the Contract Drawings.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials AASHTO T180 Moisture-Density Relations of Soils Using a 10 lb. Rammer and an 18-inch drop.
- B. American National Standards Institute (ANSI) and American Society for Testing and Materials (ASTM) - ANSI/ASTM D698 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb. Rammer and a 12-inch drop.
- C. ANSI/ASTM D1557 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and an 18-inch drop.
- D. ANSI/ASTM D2466 Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- E. American Water Works Association (AWWA) ANSI/AWWA C500 Gate Valves, 3 through 48 in NPS, for Water and Sewage Systems.
- F. ANSI/AWWA C502 Dry Barrel Fire Hydrants.
- G. ANSI/AWWA C509 Resilient Seated Gate Valves 3 through 12 in NPS, for Water
- H. ANSI/AWWA C900 Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 through 12, for Water.
- I. ASTM D1785 Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- J. ASTM D2855 Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings. (TO SEWER SPEC)
- K. ASTM D 3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
- L. ASTM D3035 Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.

1.3 SUBMITTALS

- A. Product Data: Provide data on all pipe materials, fittings, valves and accessories. Submittal shall clearly indicate the model, size and features of the product. Submittals for substitute products submitted as “Or Equal” shall compare the specified product to the substitute product and identify differences, if any.
- B. Prior to completion of Work of this Section provide written plan and procedures for pressure testing and disinfection of domestic water systems.
- C. As-built redlines indicating final location of pipelines, valves and other related components within 30-days after completion of the Work of this Section.

1.4 QUALITY ASSURANCE

- A. Prior to installation, conduct quality assurance/control meeting.
- B. Verify that field measurements are as shown on Contract Drawings. Notify Project Manager of any discrepancies.
- C. Protect existing utilities to remain.
- D. Contractor is responsible for the verification of all utility locations. Contractor shall meet with Project Manager and Contractor’s location service to locate all known utilities.
- E. Verify that all appropriate services have been disconnected. Contractor shall coordinate with Washington State Parks and the District for connecting to existing utilities.
- F. Do not shut off or cap utilities without prior notice. Coordinate Work with Division 01 General Requirements. Maintain roadway and site drains and sewers open for free drainage. Provide catch basin protection, if applicable.

PART 2 – PRODUCTS

2.1 GENERAL

- A. All materials delivered to the job site shall be new, free from defects, and marked to identify the material, class, and other appropriate data, such as thickness for piping.
- B. Acceptance of materials shall be subject to strength and quality testing in addition to inspection of the complete product. Acceptance of installed piping systems shall be based on inspection and pressure tests as specified in Part 3 of this Section.

2.2 DUCTILE IRON PIPE (LIMITED USE)

- A. Shall be class 50, bituminous coated, cement mortar lined and meet the requirements of ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51.

- All Ductile Iron Spools and Pipe within all vaults shall be Class 54 Ductile iron Pipe.
- B. Fittings: Ductile Iron, bituminous coated, cement mortar-lined, 250 psi minimum service pressure rating and shall conform to the standards of ANSI/AWWA A21.51/C-151. Standard thickness cement lining shall be in accordance with ANSI/AWWA A21.4/C-104. Mechanical joint (MJ), ductile iron, compact fittings 12-inches and less shall be in accordance with AWWA C-153. Flange (FL) fittings shall be in accordance with AWWA C-110, with bolt pattern to match adjacent pipe. Gasket material for flanges shall be neoprene, buna-n, chlorinated butyl, or cloth-inserted rubber.
 - C. Joints: ANSI/AWWA C111/121.11, rubber gasket with rods. Flanged joint shall conform to ANSI Standard B16.1. Rubber gasket pipe joints shall be mechanical joint (MJ) in accordance with ANSI/AWWA A21.11/C-111, unless otherwise specified. All mechanical joints shall be restrained joints with a retainer. The retainer shall utilize the full circumference of the pipe for restraining and utilize standard MJ gaskets and bolts. The restrainer shall be the Mega-lug Or Equal. All joints within a casing pipe shall be restrained the full length of the casing.
 - D. Push-on (Tyton) joints will be allowed only at joints in straight runs of pipe and not at pipe fittings or changes in pipe alignment. Where push-on joints are used in lieu of restrained mechanical joints, the Field LOK gasket by US Pipe Or Equal shall be installed as indicated on the Contract Drawings and/or per Chelan PUD Water Utility Standard Detail W-205 to Provide a fully restrained piping system.
 - E. Manufactured in the USA.

2.3 PVC PIPE (IRRIGATION MAIN 1.5 inch up to 3 inch)

- A. Pipe shall be PVC I.P.S. pressure rated for 200 psi (SDR 21). Joints shall be rubber gaskets that meet or exceed ASTM D3139 for joint tightness.
- B. Fittings: Schedule 40 PVC I.P.S. pressure rated for 200 psi (SDR 21).
- C. Tracer Wire: Copper conductor 12 AWG with blue polyethylene insulation intended for a direct burial application.

2.4 HIGH DENSITY POLYETHYLENE PIPE

- A. All domestic water piping shall have the following characteristics:
 - 1. Manufactured of PE 4710, High Density Polyethylene in accordance with AWWA C901/C906, ASTM D2239, ASTM D3035, ASTM 2737 and ASTM F714.
 - 2. Minimum working pressure of 200 psi.
 - 3. Approved for potable water use in accordance with ANSI/NSF Standard 61. NSF Approved for potable water use.

4. Ultraviolet (UV) inhibitors for protection against direct sunlight for one (1) year.
 5. Inserts for polyethylene pipe may be utilized at Contractor's options, and, if used, shall be 316 stainless steel.
 6. The use of brass couplings, tees and "Y" fittings are acceptable where not located under paved surfaces.
 7. Piping shall be continuously marked at intervals of not more than five feet with the following:
 - a. Nominal size
 - b. Pressure rating
 - c. NSF seal
 - d. Manufacturer's name and/or trademark
 - e. Standard dimension ratio
 - f. ASTM Specification
- B. High-density Polyethylene (HDPE) fittings shall be standard HDPE fittings or AWWA C901, fabricated Ford Meter Box Co. OD mechanical compression fittings Or Equal fittings. If HDPE they shall meet the HDPE pipe specification requirements listed above, and be manufactured by injection molding. Pressure ratings of all HDPE fittings shall equal or exceed HDPE pressure pipe rating.
- C. Tracer Wire: Copper conductor 12 AWG with blue polyethylene insulation intended for a direct burial application.

2.5 GALVANIZED STEEL PIPE AND FITTINGS (RV PEDESTALS):

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 Contract Drawings.

2.6 GATE VALVES

- A. Valves larger than 2-inches shall be ductile iron body, resilient seat, non-rising stem, full bronze mounted gate valves. Valves shall be designed for a minimum water operating pressure of 200 pounds per square inch, 16-feet per second maximum flow velocity, and shall conform to AWWA Specifications C-509 or C-515 and any subsequent modifications thereof. Each valve shall be "O"-ring type, provided with a standard AWWA operating nut, and shall open by turning counter clockwise (left).
- B. Valve Brands: M&H, Kennedy, Clow Or Equal.

2.7 BALL VALVES

Valves 2-inches and smaller shall be Ford ball valve curb stop with compression connections for polyethylene pipe on both ends Or Equal. Provide tracer wire terminal and 2” gate valve operating nut with wrench.

2.8 VALVE BOX AND COVER

- A. Valve boxes for use with gate valves larger than 2-inches shall be 2-piece adjustable cast iron screw type with 8-inch top section and regular base section, Tyler Union 6850 Series Or Equal. Length to fit.
- B. Valve boxes used for valves 2-inches and smaller shall be 2-piece adjustable cast iron screw type with 5-inch top section and notched out base section to fit over outside diameter of pipe, Tyler Union 6500 series Or Equal. An enlarged base section shall be used for 2-inch pipe. The standard base section can be used for 1-inch and smaller pipe. Length to fit.
- C. The cover shall be cast iron, fit flush with the top of the valve box and be marked “water” as created from the manufacturer.

2.9 COMBINATION AIR VALVE ASSEMBLIES

- A. Combination air valve taps on the mainline shall be field verified to be located at high points of waterlines prior to construction. Notify Project Manager of any conflicts.
- B. Combination air valves shall allow unrestricted venting or re-entry of air, during filling or draining of the pipeline, to prevent water column separation or pipeline collapse during vacuum.
- C. Combination air valves shall be single body, double orifice type, of cast iron construction meeting the requirements of ASTM A126 Gr. B. Float shall be heavy stainless steel, hermetically sealed, designed to withstand a minimum pressure of 1000 psi, and shall meet the requirements of ASTM A240 T304. Seats shall be Buna-N rubber.
- D. Combination air valves shall be 1-inch National Pipe Thread (NPT), APCO Model Series 143C, Or Equal, as manufactured by Valve & Primer Corporation, Or Equal. Combination air valve assemblies shall be furnished complete with all materials as shown on the Contract Drawings and as specified herein.

2.10 RV HOSE BIB CONNECTION

- A. Shall be constructed of chrome plate, angle type standard male thread to accommodate a $\frac{3}{4}$ inch standard female hose connection Haws Model 6275 Or Equal.
- B. Vacuum Breaker: brass body with stainless steel working parts and durable rubber diaphragm and disc rated for a maximum pressure of 125 psi. To be



furnished with non-removable feature, freeze protection and equipped to allow sill cock to be drained.

2.11 CONCRETE VAULT

Concrete vaults for Air Vac chambers shall be H2 precast Model 3030 Handhole w/ hinged locking diamond plate traffic lid Or Equal. Insulation foam shall be sprayed on the bottom of the lid with a minimum thickness of 1-inch.

2.12 FIRE HYDRANT

Furnished by the District, installed by the Contractor.

2.13 SERVICE SADDLES

Ductile iron saddle casting per ASTM A-536, grade 65-45-12, epoxy coated. Type 304 stainless U-bolts, nuts, bolts, and washers. Nitrile Butadiene Rubber (NBR) gaskets per ASTM MBC 610 specifically compounded for water service. 1-inch outlet shall have CC threads, Romac 201S Or Equal. 1½-inch and greater outlet shall have IPT threads, Romac 202S Or Equal.

2.14 DETECTABLE MARKING TAPE

- A. Shall be placed in the trench above the pipe zone bedding and shall consist of polyethylene plastic that is impervious to all known alkalis, acids, chemical reagents, and solvents likely to be encountered in the soil, with a metallic foil core to provide the most positive detection and pipeline locators.
- B. The tape shall be color coded and shall be imprinted continuously over its entire length in permanent black ink. The message shall convey the type of line buried below and shall have the word: "CAUTION" prominently shown. Color coding of the tape shall be as follows:

UTILITY	TAPE COLOR
Domestic Water	Blue
Irrigation Water	Purple
Sewer	Green
Electrical	Red

PART 3 – EXECUTION

3.1 GENERAL

- A. All pipes, valves, and fittings shall be handled in a manner that will prevent damage to the pipe, pipe lining, or coating.

- B. Pipe shall be stacked or rolled in such a manner as to prevent damage to the pipe, to prevent dirt and debris from entering the pipe, and to prevent any movement of the pipe. The bottom tiers of the stack shall be kept off the ground on timbers, rails, or other similar supports.
- C. Valves and fittings shall be stored on pallets or similar materials to keep them off the ground and prevent dirt and debris from entering them.

3.2 PIPING INSTALLATION

- A. Where called for in the Contract Drawings, all bell and spigot connections shall be made up in strict compliance with the manufacturer's recommendations and all pipe manufacture and handling shall meet or exceed the AWWA recommended specifications, current revisions.
- B. Dirt or other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations, and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned, and relayed. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or by other means Approved by the Project Manager to ensure cleanliness inside the pipe.
- C. All valves and all fittings requiring a concrete block shall first be covered with 4 mil Visqueen plastic sheets, before concrete is poured. At no time shall the concrete be allowed to cover joints, bolt heads, or nuts.
- D. All bolts shall be coated with Armitite Anti-Seize Compound No. 609, Or Equal, prior to installation.
- E. HDPE pipe shall be butt welded in accordance with the manufacturer's recommendations and ASTM D2620. The joints shall be leak proof, thermal, butt joints or mechanical fittings. Operators of the fusing machine shall be certified by the pipe manufacturer.

3.3 VALVES

- A. All valves shall be inspected in the field to ensure proper working order before installation. Valves shall be set and jointed to the pipe in the manner as set forth in the AWWA Standards for the type of connecting ends furnished.
- B. Valves shall have the interiors cleaned of all foreign matter and shall be inspected both in open and closed position prior to installation.
- C. All valves with operating nuts located more than 3'-0" below finished grade shall be equipped with extension stems to bring the operating nut to within 18" of the finished grade. The extension stem of the length required to meet field conditions shall be a manufactured unit with a 1-inch diameter mild steel rod. At the top of the extension stem there shall be a 2-inch standard operating nut complete with a centering flange. Valves shall be set with the stems vertical.

3.4 VALVE BOX COVER

- A. Valve boxes shall be set plumb and shall be placed over the valve or valve operator in a manner that the valve box does not transmit shock or stress to the valve. The lower casting of the unit shall be installed first, in a manner as to be supported by a minimum backfill or by a styrofoam collar not less than two-inches in thickness. The casting shall not rest directly upon the body of the valve or upon the water main. Backfill shall be carefully tamped around the valve box to a distance of three-feet on all sides or to the undisturbed face of the trench if it is closer.
- B. The axis of the valve box shall be common with the projected axis of the valve stem. The tops of the adjustable valve boxes shall be set to the existing or established grade, whichever is applicable.
- C. Valve boxes shall be set such that the slots in the boxes and/or ears in the valve box lid are in-line with the run of the pipe being installed.
- D. In areas where the valve box is not in concrete or asphalt, a 2'x2' square by 4-inch reinforced cement concrete pad shall be installed around the valve box at finished grade. The valve box shall be flush with the top, and centered.

3.5 EXCAVATION

All earthwork, excavation, backfill, and compaction shall be as specified in Section 312000 - Earthwork.

3.6 WATER PIPING CONNECTIONS

- A. The existing Park domestic water system shall remain operational at all times during the Contract period except for very short durations as specifically Approved and coordinated with the Project Manager.
- B. The implementation of any measure required to protect the environment shall supersede any order of Work designated within these Specifications. The Contractor shall meet the conditions as outlined in any and all permits and requirements of the federal, state, county, and city regulatory agencies.
- C. Contractor shall have completed all pressure testing and disinfection of all new domestic water piping prior to making connections.
- D. The Contractor shall provide 48-hours notice to the Project Manager prior to commencement of connecting to the existing water system.
- E. Once work is started on a connection, it shall proceed continuously without interruption and as rapidly as possible until completed. No shutoff of mains will be permitted overnight, over weekends, or on holidays.
- F. It shall be the responsibility of the Contractor to determine the exact location and ascertain the type and size of the existing facilities prior to starting work on each connection. Before cutting or connecting to any existing pipe, the Contractor shall measure the pipe outside diameter to determine if the pipe

- was manufactured to a different diameter than presently specified in the applicable pipe standards, and if required, the Contractor shall furnish alternate or additional fittings more compatible with the pipe outside diameter.
- G. The Contractor shall Provide all equipment and or other means for dewatering trenches following the cutting of a pipe for a subsequent connection.

3.7 PRESSURE TESTING

- A. All pipelines shall be tested prior to acceptance of Work. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed and operated by the Contractor. The Contractor shall Provide an oil-filled pressure gauge with a range of 0-200 psi.
- B. The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing.
- C. All domestic water lines and appurtenances shall be continuously tested at a pressure of 150 psi for 30 minutes without a drop in pressure. All irrigation water lines shall be continuously tested at a pressure of 125 psi for 30 minutes without a drop in pressure. Testing is to be done in sections between valves with no back pressure against the valves to ensure water tightness of the valves in either direction.
- D. Do not exceed eight hours at test pressure. If test is not completed due to leakage, equipment failure, etc., depressurize the test section and allow it to relax for eight hours before retesting. Fill the pipe with water and vent any trapped air.
- E. During the initial expansion phase the test section shall be pressurized to the test pressure, and enough make-up liquid added each hour to maintain the test pressure for 2-hours.
- F. The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place for at least 7-days to allow concrete to cure before testing (if cast-in place is used). Install adequate blocking or other means of resisting test pressure.
- G. During the last hour there should be no appreciable loss of pressure as observed on the gauge.
- H. All leaks shall be repaired or defective material replaced and the test repeated As Directed by the Engineer.
- I. The Contractor shall be responsible for repair of any damage resulting from or caused by leak testing.



3.8 DISINFECTION AND TESTING

A. General:

1. Use water from the existing domestic water system.
2. Furnish chemicals and equipment, such as pumps and hoses, to accomplish disinfection.
3. Provide protection against cross connections As Required by AWWA C651, when applicable.
4. Conform to AWWA C651-05 for pipes and pipelines, except as modified in these Specifications.

B. Sequencing and Scheduling

1. Install dry disinfectant during main and service installation per AWWA C651-05 as follows:

Pipe Diameter		Calcium Hypochlorite Granules	
inch	millimeter	ounce	gram
3	75	1.4	40
4	100	1.7	48
6	150	3.8	113

2. Place granules according to measurements of calcium hypochlorite above, at every 500-ft interval of pipe and at every gate valve or appurtenance.
3. 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.
4. Fill new main from Contractor 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.
5. 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.
6. 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.

- C. The District will collect and analyze bacteriological samples from District determined locations in the main testing section.
- D. Repeat disinfection, flushing and testing until results are Satisfactory.
- E. Upon Satisfactory test results, the next sequential section of main can be tested.

3.9 BACTERIOLOGICAL 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 Locations and Frequency: As determined by the Contractor.
 - 2. Free Chlorine Residual Samples: One sample.
 - 3. De-chlorinated Disinfecting Wastewater Residual Samples: One sample per section of pipeline tested as determined by the Contractor.
- 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 331100

DIVISION 33 – UTILITIES

SECTION 333000 – SANITARY SEWERAGE PIPING

PART 1 – GENERAL

1.1 DESCRIPTION

This Section includes Work related to furnishing and installing sanitary sewer pipelines, fittings, valves, grinder pump stations and other hardware and appurtenances as shown on the Contract Drawings.

1.2 SUBMITTALS

- A. Product Data: Provide data on all pipe materials, fittings, valves, grinder pump stations and accessories. Submittal shall clearly indicate the model, size and features of the product.
- B. As-built redlines indicating final location of pipelines, valves and other related components within 30 days after completion of the Work of this Section.

1.3 QUALITY ASSURANCE

- A. Prior to installation conduct quality assurance/control meeting.
- B. Verify that field measurements are as shown on Contract Drawings. Notify Project Manager of any discrepancies.
- C. Protect existing utilities to remain.
- D. Contractor is responsible for the verification of all utility locations. Contractor shall meet with Project Manager and Contractor's location service to locate all known utilities.
- E. Verify that all appropriate services have been disconnected. Contractor shall coordinate with Washington State Parks and the District for connecting to existing utilities.
- F. Do not shut off or cap utilities without prior notice. Coordinate Work with Division 01 requirements. Maintain roadway and site drains and sewers open for free drainage. Provide catch basin protection, if applicable.

PART 2 – PRODUCTS

2.1 GENERAL

- A. All materials delivered to the job site shall be new, free from defects, and marked to identify the material, class, and other appropriate data such as thickness for piping.

- B. Acceptance of materials shall be subject to strength and quality testing in addition to inspection of the complete product. Acceptance of installed piping systems shall be based on inspection and pressure tests as specified in Part 3 of this Specification.

2.2 PVC PIPE SEWER PIPE

- A. PVC gravity sewer pipe shall have an SDR of 35, and conform to ASTM D3034.
- B. Sewer 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.
- C. Tracer Wire: Copper conductor 12 AWG with blue polyethylene insulation intended for a direct burial application.

2.3 POLYETHYLENE (PE) PIPE (FORCE MAIN)

- A. PE Pipe used as force main shall have an SIDR of 7 and shall conform to AWWA C901/ASTM D2239.
- B. Fittings shall be compression type Ford Meter Box Co., Or Equal fittings.
- C. Wye fittings shall be of the same joint, strength and material as the main sewer.

2.4 END CAP COUPLING WITH 3-INCH TAP

- A. Manufactured in the USA.
- B. Coupling shall adapt to PVC pipe and shall have a body of ductile iron meeting or exceeding ASTM A536-80 and be epoxy coated.
- C. The gasket shall be made from virgin Styrene Butadiene Rubber compounded for water and sewer service in accordance with ASTM D2000 MBA 710.

2.5 CLEANOUTS

- A. Christy Concrete Valve Box G-5 (Traffic), Or Equal.
- B. Bingham & Taylor Cast Iron Cleanout Cover, Or Equal.

2.6 RV SANITARY SEWER CONNECTION

- A. Sewer connection shall be self closing, positive flat face seal with lip, fly tight seal, lockable, standard 4-inch female npt., durable cast iron construction, powder coated throughout, able to withstand drive-over without cracking or splitting.
- B. Site sewer cap as supplied by Trumbull Recreation Supply, 800-243-0134, www.trumbullrecreation.com Or Equal.

2.7 GRINDER PUMP STATION

- A. Grinder Pump Station shall be E-One model WH482-122 or Equal.

PART 3 – EXECUTION

3.1 PIPE - GENERAL

- A. Excavation, pipe zone bedding, and backfill shall conform to the requirements of Section 312000 – Earthwork.
- B. Pipe and fittings shall be inspected for defects and all cracked, chipped or broken pieces shall be discarded. The ends and interior of the pipe shall be clean. Handling of the pipe and fittings shall be handled in a manner that will not damage the pipe. The joint shall be made in a manner recommended by the manufacturer.
- C. Pipe shall be laid accurately to the staked line and grade. All service connections shall be installed as indicated on the Contract Drawings.
- D. Pipe shall be cleaned of all foreign matter, and water shall be kept out of trenches until joints have been completed. When work is not in progress, open ends of pipe and fittings shall be securely closed to keep foreign matter and animals from entering.
- E. Each joint shall be inspected to ensure that it is properly made before backfilling is done. Where it is necessary to cut pipe, such cuts shall be made in an Approved manner. The laid pipe shall be true to line and grade and, when completed, the sewer shall have a smooth and uniform invert. No section of gravity sewer, shall have an adverse grade which would pond water in the invert of the sewer.
- F. Testing:
1. Prior to testing, all manholes, cleanouts and sections of pipe shall be cleaned as Approved by the District.
 2. Prior to testing, the sewer shall be complete and trenches shall be fully backfilled and compacted to finish grade or finished sub-grade if located under hard surface.
 3. All sections of pipe shall be tested for leakage per WSDOT Standard Plans and Approved by the Project Manager. Where leakage is in excess of the Approved rate, the sewer shall be repaired by the Contractor As Required to comply with the leakage test requirements. The District may require the Contractor to repair obvious leaks even though the total length of the test section falls within the maximum allowable leakage for the test.

3.2 GRINDER PUMP STATION

- A. Factory Test:

1. The grinder pump shall be submerged and operated for five (5) minutes (minimum). Included in this procedure will be the testing of all ancillary components such as, the anti-siphon valve, check valve, discharge assembly and each unit's dedicated level controls and motor controls. All factory tests shall incorporate each of the above listed items. Actual appurtenances and controls that will be installed in the field shall be particular to the tested pump only. A common set of appurtenances and controls for all pumps is not acceptable.
2. Certified test results shall be available upon request showing the operation of the grinder pump at two different points on its curve, with a maximum pressure of no less than 80 psi and a factory bearing vibration test. The Project Manager reserves the right to inspect such testing procedures at the Grinder Pump Manufacturer's facility.
3. All completed stations shall be factory leak tested to assure the integrity of all joints, seams and penetrations. All necessary penetrations such as inlets, discharge fittings and cable connectors shall be included in this test along with their respective sealing means (grommets, gaskets etc.).

B. Delivery:

The grinder pump unit shall be delivered to the job site 100 percent completely assembled, including testing, ready for installation. Field installation of the pump in tanks under 96 inches is not allowed. Field installation of the level sensor into the tank is not allowed. The grinder pump station shall be individually mounted on wooden pallets.

C. Installation:

1. Earth excavation and backfill are specified under Section 312000 - Earthwork, but are also to be done as a part of the Work under this section, including any necessary sheeting and bracing.
2. The Contractor shall be responsible for handling dewatering to provide a firm, dry subgrade for the structure, and shall guard against flotation or other damage resulting from general water or flooding.
3. The grinder pump stations shall not be set into the excavation until the installation procedures and excavation have been Approved by the Project Manager.
4. Remove packing material. User instructions must be given to the Project Manager. Hardware supplied with the unit, if required, will be used at installation. The basin will be supplied with a standard 4-inch inlet grommet (4.50 inch OD) for connecting the incoming sewer line. Appropriate inlet piping must be used. The basin may not be dropped, rolled or laid on its side for any reason.
5. Installation shall be accomplished so that 1-inch to 4-inches of access way, below the bottom of the lid, extends above the finished grade line.

The finished grade shall slope away from the unit. The diameter of the excavated hole must be large enough to allow for the concrete anchor.

6. A 6-inch (minimum) layer of naturally rounded aggregate, clean and free flowing, with particle size of not less than 1/8 inch or more than 3/4 inch, shall be used as bedding material under each unit.
7. A concrete anti-flotation collar, as detailed on the Contract Drawings, and sized according to the manufacturer's instructions, shall be required and shall be pre-cast to the grinder pump or poured in place. Each grinder pump station with its pre-cast anti-flotation collar shall have a minimum of three lifting eyes for loading and unloading purposes.
8. If the concrete is poured in place, the unit shall be leveled, and filled with water, to the bottom of the inlet, to help prevent the unit from shifting while the concrete is being poured. The concrete must be manually vibrated to ensure there are no voids. If it is necessary to pour the concrete to a level higher than the inlet piping, an 8" sleeve is required over the inlet prior to the concrete being poured.
9. The electrical enclosure shall be furnished, installed and wired to the grinder pump station by the Contractor. An alarm device is required on every installation, there shall be NO EXCEPTIONS. It will be the responsibility of the Contractor and the Engineer to coordinate with the individual property owner(s) to determine the optimum location for the Alarm Panel.
10. The Contractor shall mount the alarm device in a conspicuous location, as per national and local codes. The alarm panel will be connected to the grinder pump station by a length of 14-gauge, 6-conductor type SOOW cable. The power and alarm circuits must be on separate power circuits. The grinder pump stations will be provided with 75 feet of useable, electrical supply cable to connect the station to the alarm panel.

D. Backfill Requirements:

Proper backfill is essential to the long-term reliability of any underground structure. The required method of backfilling is to surround the unit to grade using Class IB backfill material as defined in ASTM 2321.

E. Start-Up and Field Testing:

1. The manufacturer shall provide the services of qualified factory trained technician(s) who shall inspect the placement and wiring of each station, perform field tests as specified herein, and instruct District representatives in the operation and maintenance of the equipment before the stations are accepted by the Project Manager.
2. All equipment and materials necessary to perform testing shall be the responsibility of the Contractor. This includes, as a minimum, a portable generator and power cable (if temporary power is required), water in each

basin (filled to a depth sufficient to verify the high level alarm is operating), and opening of all valves in the system. These steps shall be completed prior to the qualified factory trained technician(s) arrival on site.

3. The services of a trained factory-authorized technician shall be provided.
4. Upon completion of the installation, the authorized factory technician(s) will perform the following test on each station:
 - a. Make certain the discharge shut-off valve in the station is fully open.
 - b. Turn ON the alarm power circuit and verify the alarm is functioning properly.
 - c. Turn ON the pump power circuit. Initiate the pump operation to verify automatic ON/OFF controls are operative. The pump should immediately turn ON.
 - d. Consult the manufacturer's service manual for detailed start-up procedures.
- F. Upon completion of the start-up and testing, the Contractor shall submit to the Project Manager the start-up authorization form, describing the results of the tests performed for the grinder pump station. Final acceptance of the system will not occur until authorization forms have been received for pump station installed and any installation deficiencies corrected.

3.3 LOW PRESSURE AIR TEST FOR SANITARY SEWERS

Upon completion of sanitary sewer system, Contractor shall subject the new system to a low pressure air test of non air permeable materials. Testing shall follow test procedure detailed within the WSDOT standard specification for Low Pressure Air Test for Sanitary Sewers Constructed of Non Air Permeable materials. See Section 7-17.3(2)F of WSDOT Standard Specification.

END OF SECTION 333000

DIVISION 33 – UTILITIES

SECTION 334400 – STORM DRAINAGE UTILITIES

PART 1 – GENERAL

1.1 DESCRIPTION

This Section includes Work associated with constructing storm drainage culverts including: materials, excavation, placing and compacting.

1.2 REFERENCES

Washington State Department of Transportation (WSDOT) – Standard Specifications for Road, Bridge, and Municipal Construction (latest edition)

1.3 SUBMITTALS

- A. Product Data: Provide data on pipe materials, fittings, and accessories.
- B. Accurately record As-built locations of piping, connections and invert elevations.

1.4 QUALITY CONTROL

Perform Work in accordance with WSDOT Standard Specifications.

PART 2 – PRODUCT

2.1 MATERIALS

- A. Pipe Zone Bedding Materials: Pipe zone bedding for all ductile iron pipe shall conform to WSDOT Standard Specification 9-03.12(3)-Gravel Backfill for Pipe Zone Bedding.
- B. Ductile iron pipe shall conform to WSDOT Standard Specification 9-30.1(1).

PART 3 – EXECUTION

3.1 GENERAL

Shall conform to WSDOT Standard Specifications 2-09.3, 7-02.3, and 7-08.3.

END OF SECTION 334000

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END OF EXHIBIT
(End of Exhibits)

LINCOLN ROCK STATE PARK

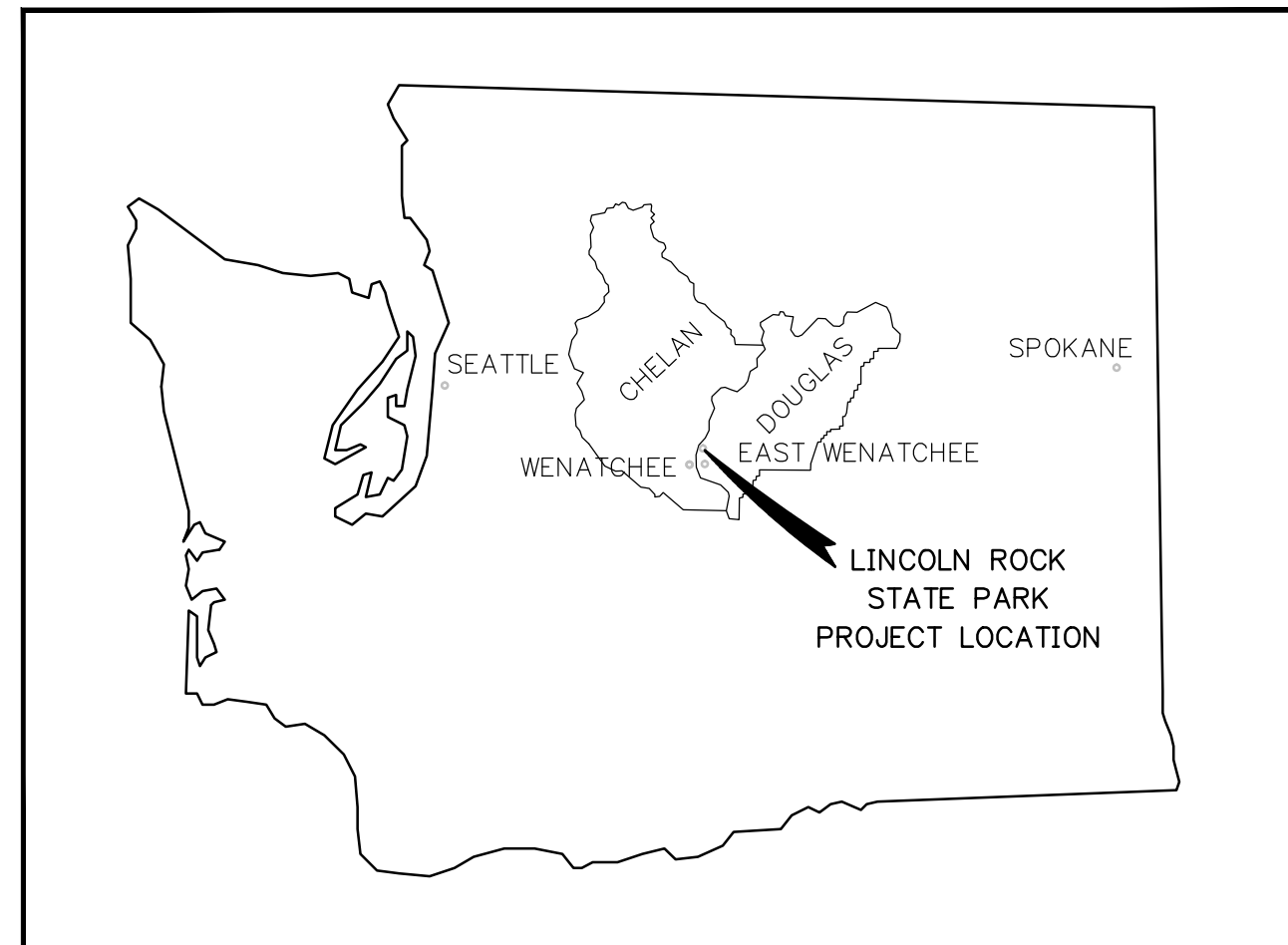
CABIN LOOP & GROUP CAMP

BID 14-31 EXHIBIT T – CONTRACT DRAWINGS

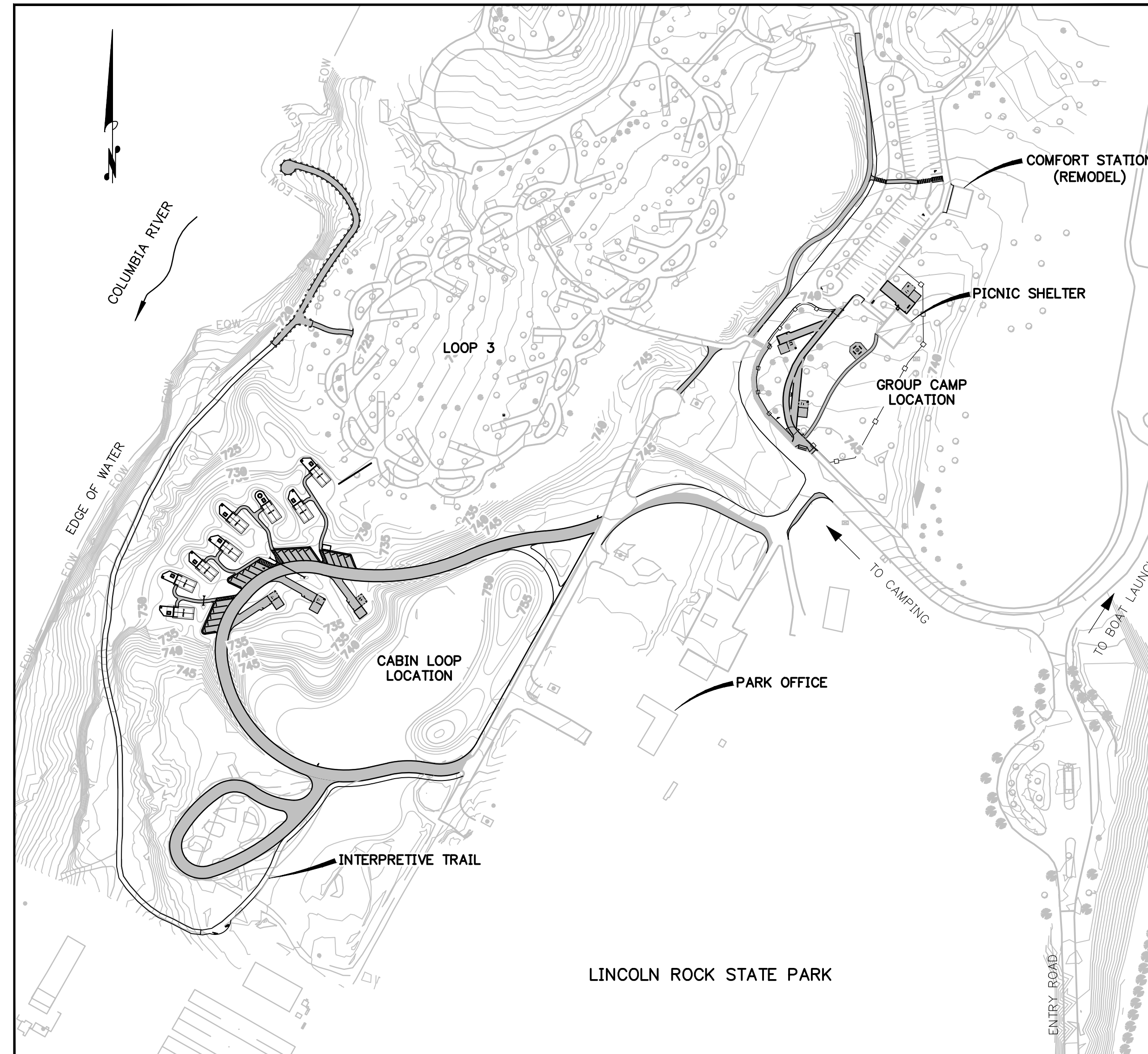
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY

WENATCHEE, WASHINGTON

LOCATION MAP



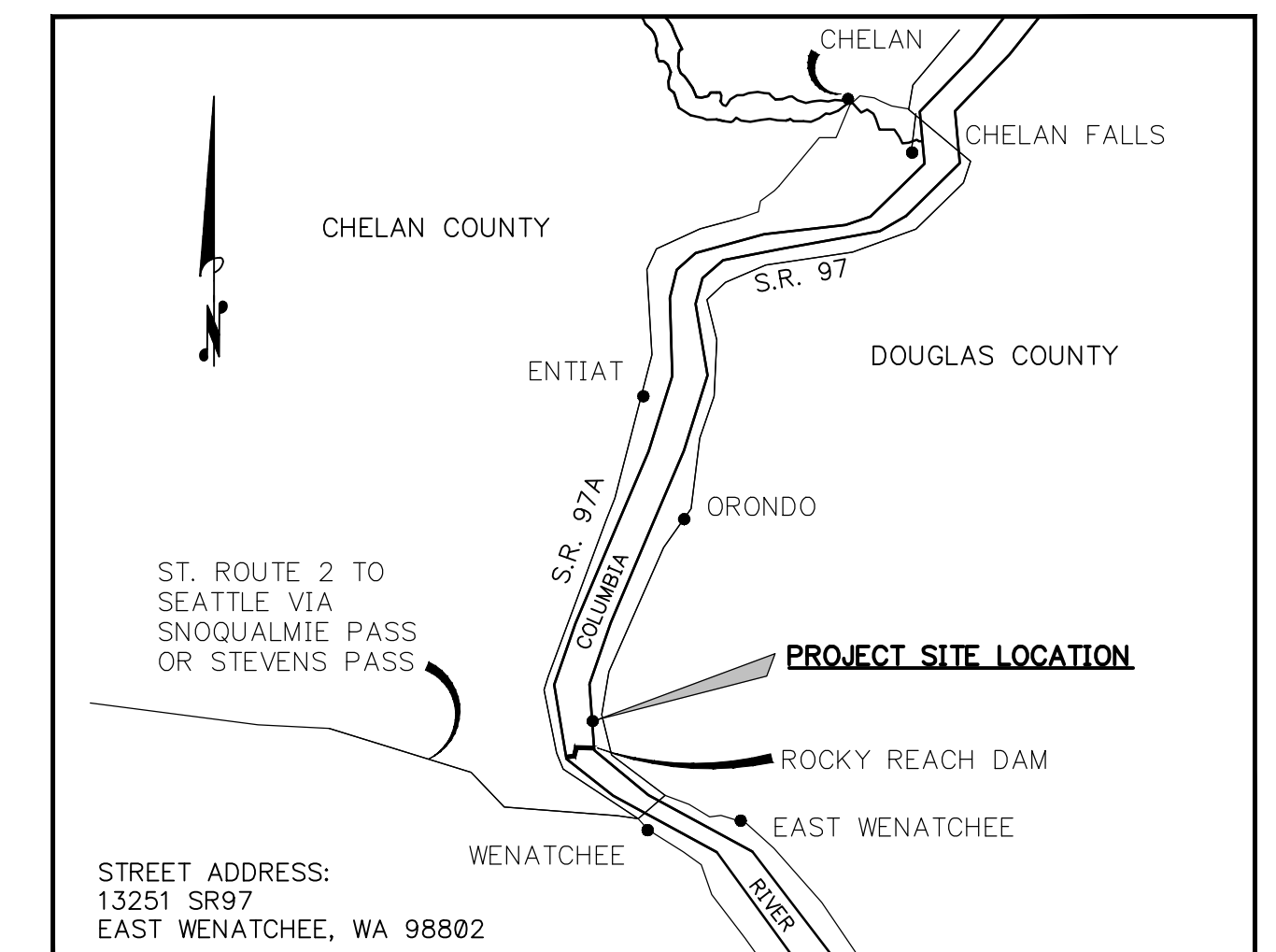
PROJECT MAP



CONTACT PERSONNEL

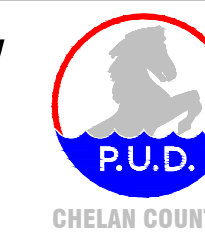
COURT HILL	CHELAN COUNTY PUD NO.1 – ENGINEER	661-4143
RAY HEIT	CHELAN COUNTY PUD NO.1 – PARKS MANAGER	661-4133
MATT MORRISON	WASHINGTON STATE PARKS, AREA MANAGER	884-8702
CASEY HALL	CHELAN COUNTY PUD NO.1 – CONSTRUCTION MANAGER	661-4965
DENNIS LOTTS	WASHINGTON STATE PARKS – PARK MANAGER	884-8702

VICINITY MAP



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PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
WENATCHEE, WASHINGTON



Lincoln Rock State Park
CABIN LOOP & GROUP CAMP
COVER SHEET
GROUP CAMP RV SITES
BID NO. 14-31

SHEET G1 OF G6
REVISION 0
DATE 11/14/2014
DWG. 0913-50GA-0010

LINCOLN ROCK STATE PARK

CABIN LOOP & GROUP CAMP

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G3	0913-50GA-0015	GENERAL NOTES, ABBREVIATIONS, LEGEND & DRAWING SYMBOLS
G4	0913-50GA-0012	GROUP CAMP EXISTING SITE CONDITIONS & DEMOLITION PLAN
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A2.2	0913-05AR-0019	COMFORT STATION ADDITION DEMOLITION PLAN, SCHEDULES, INTERIOR ELEVATIONS
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E3	0913-50SU-0014	CABIN LOOP ELECTRICAL SITE PLAN
E4	0913-50SU-0015	CABIN LOOP ELECTRICAL TYPICAL CABIN PLAN
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E9	0913-50SU-0020	GROUP CAMP ELECTRICAL COMFORT STATION LIGHTING DEMOLITION PLAN
E10	0913-50SU-0021	GROUP CAMP ELECTRICAL COMFORT STATION POWER PLAN
E11	0913-50SU-0022	GROUP CAMP ELECTRICAL COMFORT STATION LIGHTING PLAN
E12	0913-50SU-0023	GROUP CAMP ELECTRICAL ONE-LINE DIAGRAM & DETAILS
E13	0913-50SU-0024	GROUP CAMP ELECTRICAL PANEL SCHEDULES

	CHELAN PUD NO.1	SCALE NONE	<small>BAR IS ONE INCH ON ORIGINAL DRAWING.</small> VERIFY SCALE <small>IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.</small> 	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY <small>WENATCHEE, WASHINGTON</small>	 <small>CHELAN COUNTY</small>	<small>Lincoln Rock State Park</small> CABIN LOOP & GROUP CAMP SHEET INDEX BID NO. 14-31	SHEET G2 OF G6 REVISION 0 DATE 11/14/2014 DWG. 0913-50GA-0011							
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LINCOLN ROCK STATE PARK

CABIN LOOP & GROUP CAMP

GENERAL PROJECT NOTES:

- SITE CONDITIONS SHOWN ARE BASED ON AERIAL PHOTOGRAPHY AND LAND SURVEYS CONDUCTED OVER SEVERAL YEARS. CONDITIONS SHOWN ARE SUBJECT TO CHANGE. CONTRACTOR SHALL VERIFY ACTUAL SITE CONDITIONS PRIOR TO BIDDING.
- SURVEY DATUMS: VERTICAL NAV88; HORIZONTAL NAD 83 EPOCH 20010.
- CONSTRUCTION ACTIVITY SHALL BE CONTAINED WITHIN THE LIMITS OF WORK SHOWN.
- ALL GRUBBING AND OTHER DELETERIOUS MATERIAL SHALL BE REMOVED AND HAULED TO A LEGAL OFF-SITE LOCATION AS DETERMINED BY THE CONTRACTOR.
- IF THE BIDDER IDENTIFIES OMISSIONS OR AMBIGUITIES IN THE DRAWINGS BIDDER SHALL BRING THEM TO THE ATTENTION OF THE ENGINEER PRIOR TO BID OPENING. ANY CLAIM OF OMISSIONS OR AMBIGUITIES FOLLOWING BID OPENING SHALL BE RESOLVED BASED ON THE INTERPRETATION OF INTENT BY THE ENGINEER OF RECORD. ENGINEERS INTERPRETATION SHALL BE FINAL AND BINDING. CONTRACTOR SHALL COMPLETE THE WORK IN ACCORDANCE TO ENGINEERS INTERPRETATION. DISPUTES OR CLAIMS SHALL BE RESOLVED IN ACCORDANCE WITH THE GENERAL CONDITIONS.

CIVIL ABBREVIATIONS:

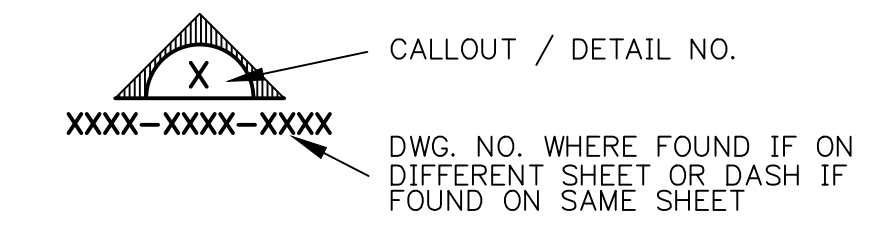
ABBRV, ABB	ABBREVIATION
ADA	AMERICANS WITH DISABILITIES ACT
ASPH	ASPHALT
DIAM, DIA	DIAMETER
CONC	CONCRETE
CONT	CONTOUR
CSBC	CRUSHED SURFACE BOTTOM COURSE
CSTC	CRUSHED SURFACE TOP COURSE
DWG	DRAWING
E	EASTING, EAST
ELEV, EL	ELEVATION
EX, EXIST	EXISTING
FH	FIRE HYDRANT
GALV	GALVANIZE
GEN	GENERAL
GND	GROUND
INFO	INFORMATION
IRRI, IRR	IRRIGATION
LF	LINEAL FOOT
MAX	MAXIMUM
MFR	MANUFACTURER
MJ	MECHANICAL JOINT
N	NORTHING, NORTH
NTS, N.T.S.	NOT TO SCALE
RV	RECREATIONAL VEHICLE
SHT	SHEET
SPECS	SPECIFICATIONS
SS	SANITARY SEWER
TYP	TYPICAL
WSDOT	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

CIVIL LEGEND:

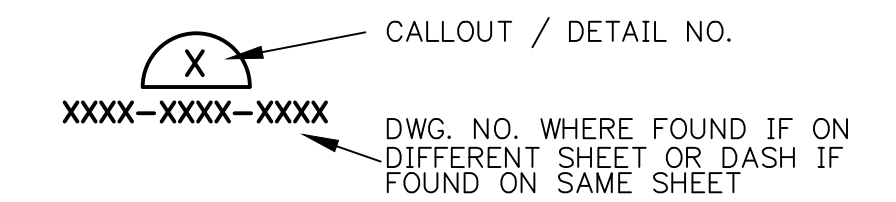
	EXIST. WATER METER VAULT
	EXIST. TELEPHONE PEDESTAL
	EXIST. PAD MOUNT TRANSFORMER
	EXIST. WATER VALVE (AS NOTED)
	EXIST. POWER POLE
	EXIST. PVC REDUCER
	EXIST. IRRIGATION VALVE
	SANITARY SEWER MANHOLE
	SIGN, KIOSK
	GATE
	EX DECIDUOUS TREE
	EX CONIFER TREE
	TREES TO BE REMOVED
	TREES TO BE LIMBED AS DIRECTED
	PROTECT TREES
	EXISTING DOMESTIC WATER
	NEW DOMESTIC WATER
	EXISTING IRRIGATION
	NEW IRRIGATION
	EXISTING SANITARY SEWER
	NEW SANITARY SEWER
	EXISTING UNDERGROUND POWER
	EDGE OF ASPHALT TRAIL
	CENTERLINE
	5' CONTOUR LINE
	1' CONTOUR LINE
	EDGE OF WATER
	TEMP. SILT FENCE
	WOOD RAIL FENCE
	CHAINLINK FENCE
	TEMP. HIGH VISIBILITY FENCE
	EDGE OF INTERPRETIVE TRAIL
	STRIP GRASS SOD
	REMOVE EXISTING ASPHALT PATH
	NEW ASPHALT PAVEMENT TRAIL
	NEW CONCRETE
	NEW SAND
	NEW GRAVEL
	NORTHING/EASTING

DRAWING SYMBOLS:

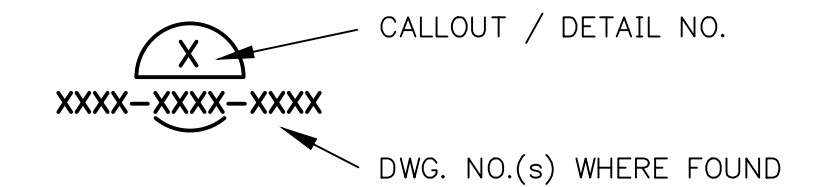
VIEW / SECTION REFERENCES



DETAIL REFERENCES

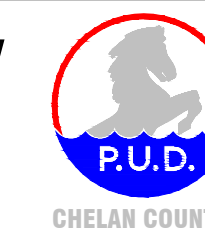


SECTION / DETAIL TITLE LABELS



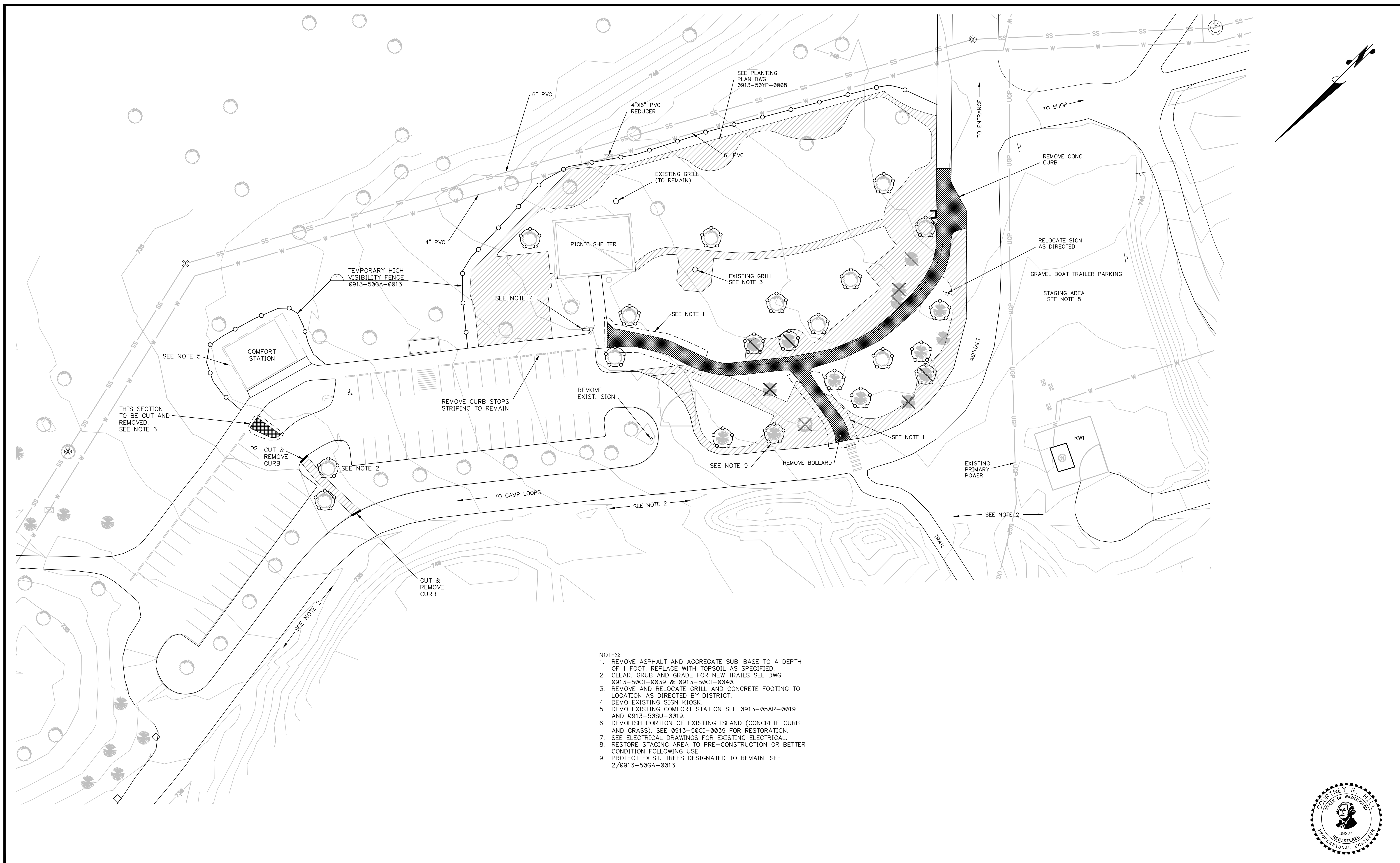
CHELAN PUD NO.1		SCALE	VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
PRIM. ENG.	COURT HILL	NONE	BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"		CRH	TRT
2ND ENG.		0	11/14/2014	BID SET	REQ. BY	DRFT
PROJ. MGR.	CASEY HALL	REV	DATE	REVISION		

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
WENATCHEE, WASHINGTON



Lincoln Rock State Park
CABIN LOOP & GROUP CAMP
GENERAL NOTES, ABBREVIATIONS, LEGEND
& DRAWING SYMBOLS
BID NO. 14-31

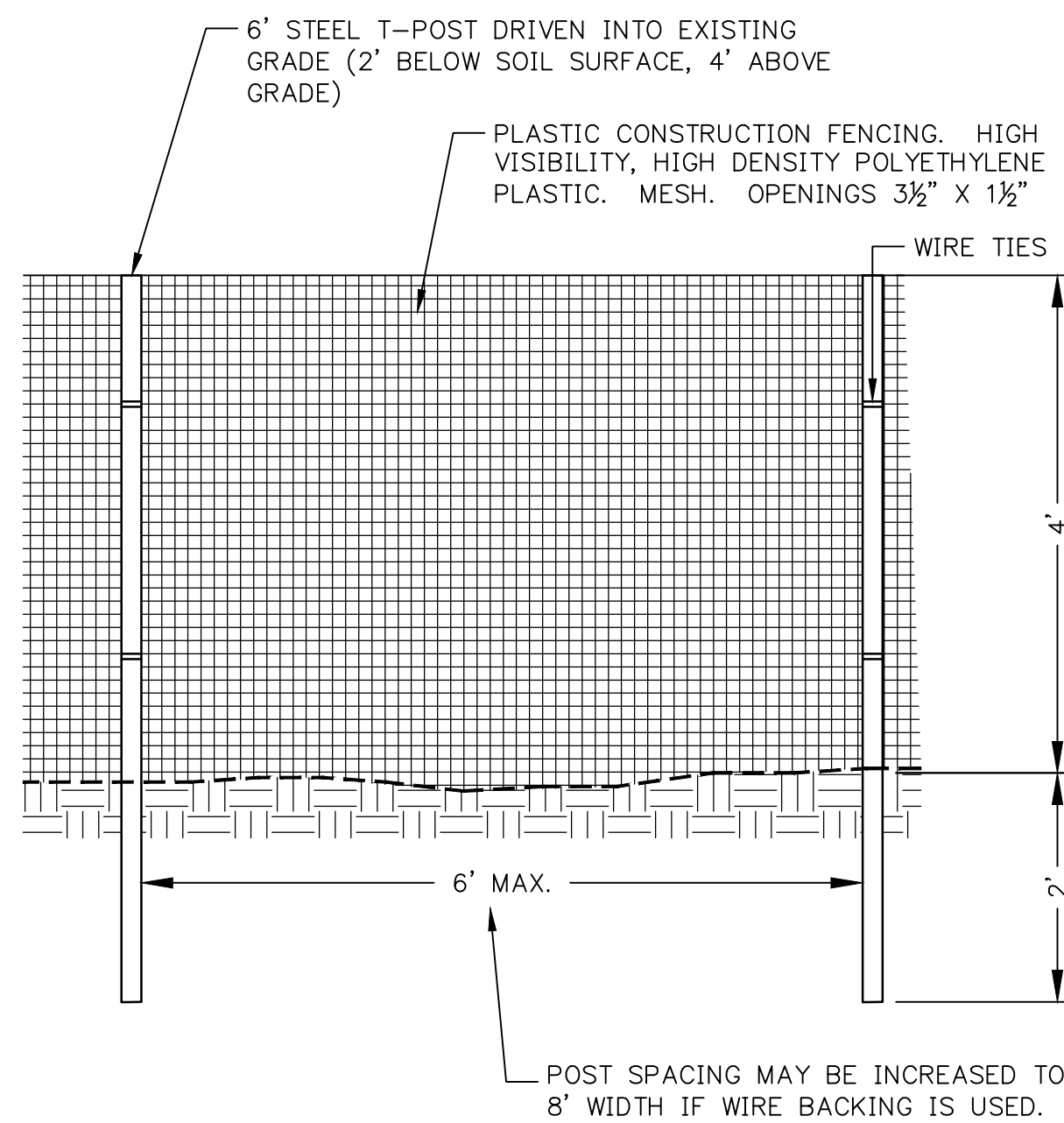
SHEET G3 OF G6
REVISION 0
DATE 11/14/2014
DWG. 0913-50GA-0015



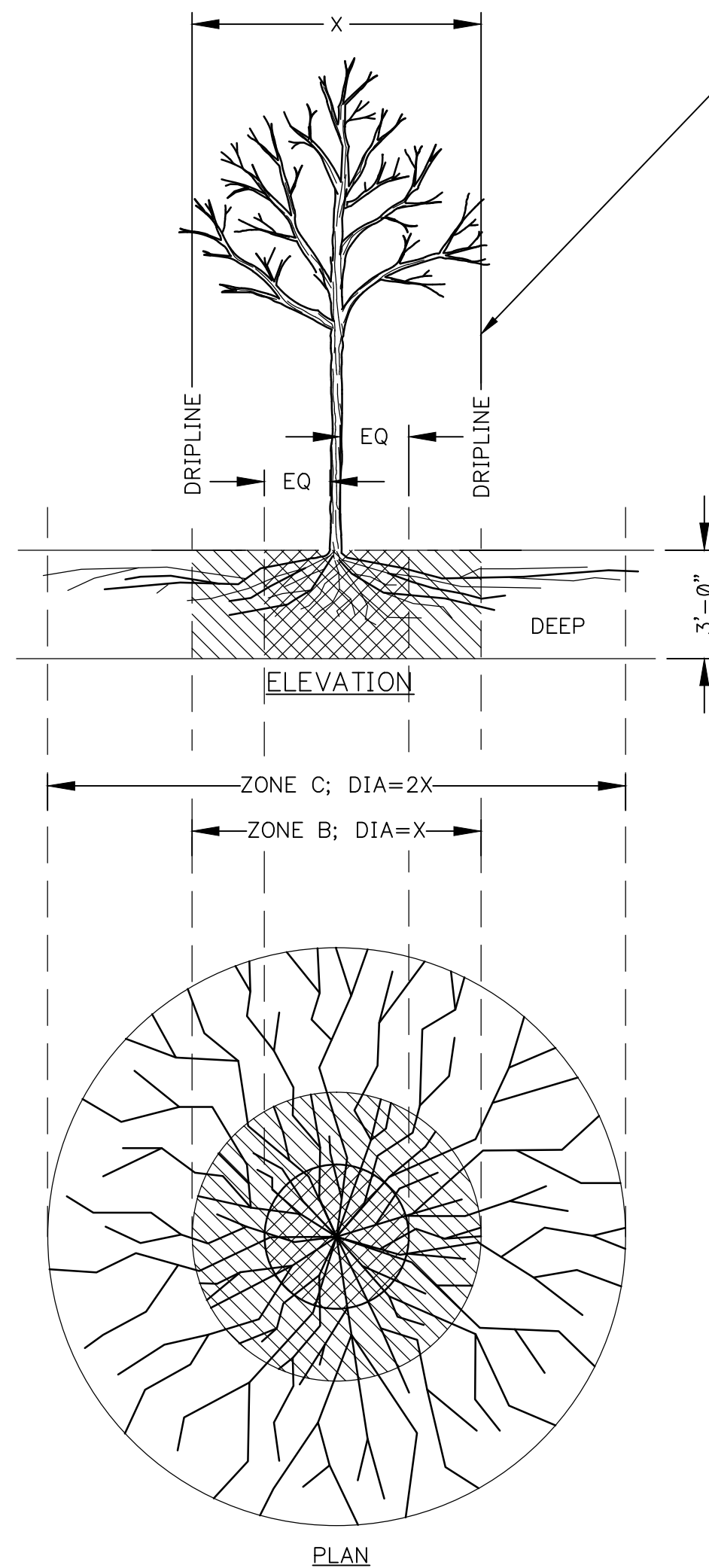
- NOTES:
1. REMOVE ASPHALT AND AGGREGATE SUB-BASE TO A DEPTH OF 1 FOOT. REPLACE WITH TOPSOIL AS SPECIFIED.
 2. CLEAR, GRUB AND GRADE FOR NEW TRAILS SEE DWG 0913-50CI-0039 & 0913-50CI-0040.
 3. REMOVE AND RELOCATE GRILL AND CONCRETE FOOTING TO LOCATION AS DIRECTED BY DISTRICT.
 4. DEMO EXISTING SIGN KIOSK.
 5. DEMO EXISTING COMFORT STATION SEE 0913-05AR-0019 AND 0913-50SU-0019.
 6. DEMOLISH PORTION OF EXISTING ISLAND (CONCRETE CURB AND GRASS). SEE 0913-50CI-0039 FOR RESTORATION.
 7. SEE ELECTRICAL DRAWINGS FOR EXISTING ELECTRICAL.
 8. RESTORE STAGING AREA TO PRE-CONSTRUCTION OR BETTER CONDITION FOLLOWING USE.
 9. PROTECT EXIST. TREES DESIGNATED TO REMAIN. SEE 2/0913-50GA-0013.



CHELAN PUD NO.1 PRIM. ENG. C. HILL 2ND ENG. PROJ. MGR. C. HILL		SCALE FULL: 1"=30' 0 11/14/2014 REV DATE	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON	 CHELAN COUNTY	Lincoln Rock State Park CABIN LOOP & GROUP CAMP GROUP CAMP EXISTING SITE CONDITIONS & DEMOLITION PLAN BID NO. 14-31	SHEET G4 OF G6 REVISION 0 DATE 11/14/2014 DWG. 0913-50GA-0012
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1 TEMPORARY HIGH VISIBILITY FENCE
0913-50GA-0012 3/4" = 1'-0"



2 TREE PROTECTION
0913-50GA-0012 1/4" = 1'-0"

1 HIGH VISIBILITY FENCE
LOCATE AT OR BEYOND DRIPLINE
DISTRICT'S APPROVAL REQUIRED FOR USE/ACCESS WITHIN ZONE B. PERMISSION FOR USE/ACCESS REQUIRES SURFACE PROTECTION FOR ALL UNFENCED, UNPAVED SURFACES WITHIN ZONE B.

* SURFACE PROTECTION MEASURES
1. MULCH LAYER, 6"-8" DEPTH
2. 3/4" PLYWOOD
3. STEEL PLATES

TRENCHING/EXCAVATION

ZONE A (CRITICAL ROOT ZONE)

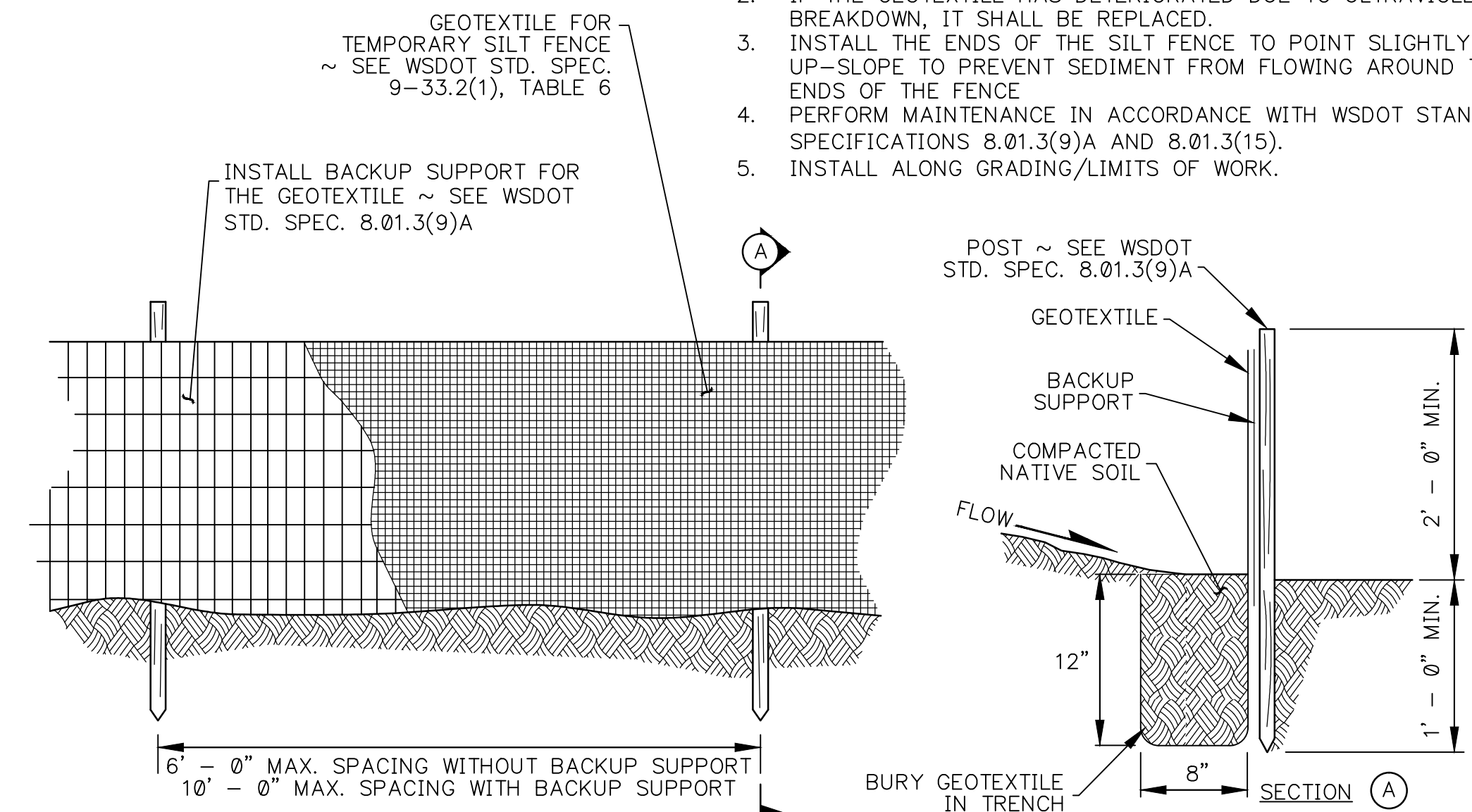
1. NO DISTURBANCE ALLOWED WITHOUT SITE-SPECIFIC INSPECTION AND APPROVAL OF METHODS TO MINIMIZE ROOT DAMAGE
2. SEVERANCE OF ROOTS LARGER THAN 2" DIAM. REQUIRES DISTRICT'S APPROVAL
3. TUNNELING REQUIRED TO INSTALL LINES 3'-0" BELOW GRADE OR DEEPER

ZONE B (DRIPLINE)

1. OPERATION OF HEAVY EQUIPMENT AND/OR STOCKPILING OF MATERIALS SUBJECT TO DISTRICT'S APPROVAL. SURFACE PROTECTION* MEASURES REQUIRED.
2. TRENCHING ALLOWED AS FOLLOWS:
 - EXCAVATION BY HAND OR WITH HAND-DRIVEN TRENCHER MAY BE REQUIRED
 - LIMIT TRENCH WIDTH. DO NOT DISTURB ZONE A MAINTAIN 2/3 OR MORE OF ZONE B IN UNDISTURBED CONDITION
3. TUNNELING MAY BE REQUIRED FOR TRENCHES DEEPER THAN 3'-0"

ZONE C (FEEDER ROOT ZONE)

1. OPERATION OF HEAVY EQUIPMENT AND/OR STOCKPILING OF MATERIALS SUBJECT TO ENGINEER'S APPROVAL. SURFACE PROTECTION* MEASURES MAY BE REQUIRED
2. TRENCHING WITH HEAVY EQUIPMENT ALLOWED AS FOLLOWS:
 - MINIMIZE TRENCH WIDTH
 - MAINTAIN 2/3 OR MORE OF ZONE C IN UNDISTURBED CONDITION

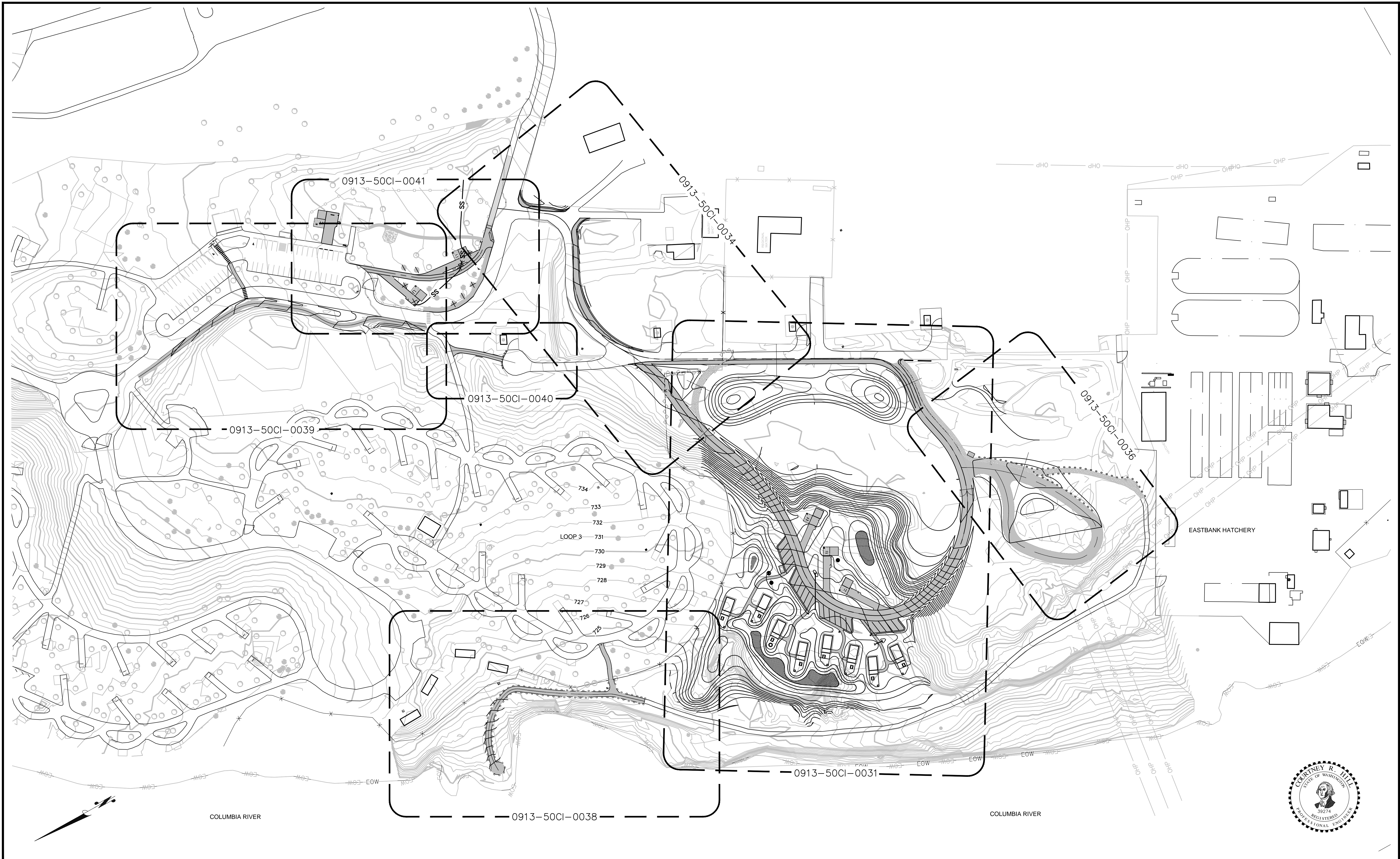


3 TEMPORARY SILT FENCE DETAIL
0913-50GA-0012 NOT TO SCALE

- NOTES:**
1. ANY DAMAGE WILL BE REPAIRED IMMEDIATELY.
 2. IF THE GEOTEXTILE HAS DETERIORATED DUE TO ULTRAVIOLET BREAKDOWN, IT SHALL BE REPLACED.
 3. INSTALL THE ENDS OF THE SILT FENCE TO POINT SLIGHTLY UP-SLOPE TO PREVENT SEDIMENT FROM FLOWING AROUND THE ENDS OF THE FENCE
 4. PERFORM MAINTENANCE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS 8.01.3(9)A AND 8.01.3(15).
 5. INSTALL ALONG GRADING/LIMITS OF WORK.



CHELAN PUD NO.1 PRIM. ENG. C. HILL 2ND ENG. PROJ. MGR. C. HILL		SCALE SEE DWG	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		Lincoln Rock State Park CABIN LOOP & GROUP CAMP TESCP & TREE PROTECTION BID NO. 14-31	SHEET G5 OF G6 REVISION 0 DATE 11/14/2014 DWG. 0913-50GA-0013
REV 0 DATE 11/14/2014 BID SET	CRH TRT REQ. BY DRFT	REVISION	DOCUMENT CLASS:	ID:	ORIGINAL DWG. #:	ORIG. DATE 6/1/2014 ORIG. DRAWN TRT		



CHELAN PUD NO.1	
PRIM. ENG.	C.HILL
2ND ENG.	
PROJ. MGR.	C.HILL

SCALE	1"=80'
REV	0

DATE	11/14/2014
BID SET	

REVISION	
CRH	TPD
REQ. BY	DRFT

**PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY**
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
OVERALL PLAN

BID NO. 14-31

SHEET G6 OF G6
REVISION 0
DATE 11/14/2014
DWG. 0913-50GA-0014

DOCUMENT CLASS:

ID:

ORIGINAL DWG. #:

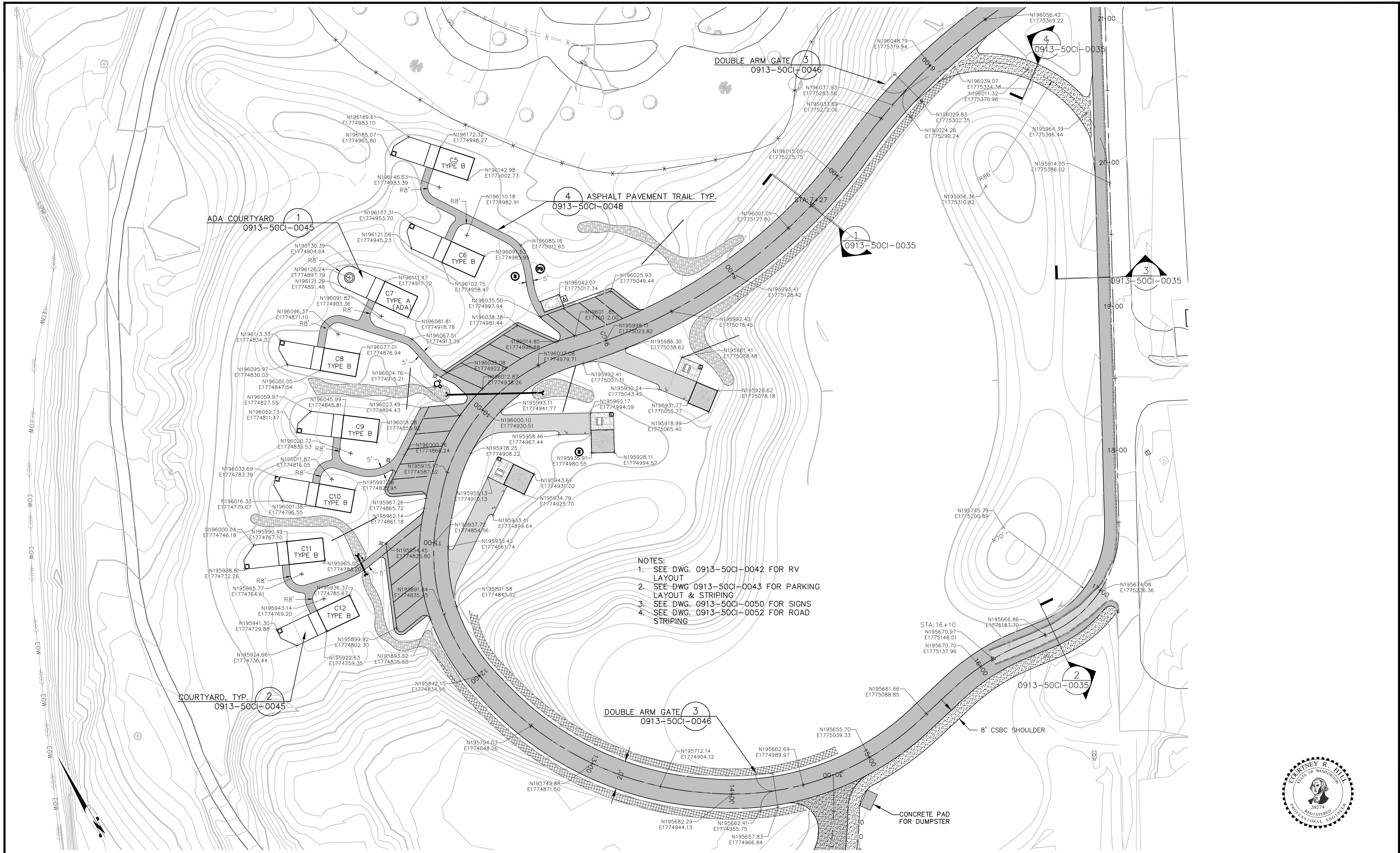
ORIG. DATE 6/19/2013
ORIG. DRAWN TPD



- NOTES:**
1. CONCRETE RUBBLE PILES SHALL BE REMOVED TO AN OFF-SITE LOCATION OR BROKEN UP INTO FRAGMENTS HAVING DIMENSIONS LESS THAN 1'-6" MEASURED IN ANY DIRECTION. FRAGMENTS SHALL BE BURIED NO LESS THAN 2'-0" BELOW FINISHED GROUND SURFACE IN FILL AREAS ONLY. ALL FERROUS MATERIAL OR OTHER DEBRIS ENCOUNTERED IN CONCRETE RUBBLE SHALL BE REMOVED AND HAULED TO A LEGAL OFF-SITE LOCATION. SEE EARTHWORK SPECIFICATION FOR ADDITIONAL INFORMATION.
 2. EXISTING BOULDERS WITHIN FILL AREAS MAY BE RE-USED AS CALLED FOR IN SITE PLANS.
 3. REMOVE EXISTING CHAINLINK FENCE AND GATE. REMOVE ALL POSTHOLE CONCRETE AND FILL VOIDS WITH ON-SITE NATIVE MATERIAL.
 4. CONTRACTOR SHALL CLEAR, GRUB, AND GRADE MITIGATION PLANTING AREAS. WORK BELOW THE 100' CRITICAL BUFFER SHALL BE CONFINED TO THESE LOCATIONS WITH THE EXCEPTION OF THE SHORELINE TRAIL SHOWN ON DWG. 0913-50CI-0038. DO NOT DISTURB EXISTING VEGETATION OUTSIDE THESE MITIGATION AREAS BELOW THE 100' CRITICAL BUFFER.



CHELAN PUD NO. 1 PRIM. ENG. C.HILL 2ND ENG. 0 PROJ. MGR. C.HILL		SCALE 1" = 30' BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP CABIN LOOP GRADING PLAN BID NO. 14-31	SHEET C1 OF C10 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0031
CRH TPD REQ. BY DRFT	DOCUMENT CLASS:	ID:	ORIGINAL DWG. #:	ORG. DATE 6/19/2013 ORG. DRAWN TPD			



- NOTES:
1. SEE DWG. 0913-50CI-0042 FOR RV LAYOUT
 2. SEE DWG. 0913-50CI-0043 FOR PARKING LAYOUT & STRIPING
 3. SEE DWG. 0913-50CI-0050 FOR SIGNS
 4. SEE DWG. 0913-50CI-0052 FOR ROAD STRIPING

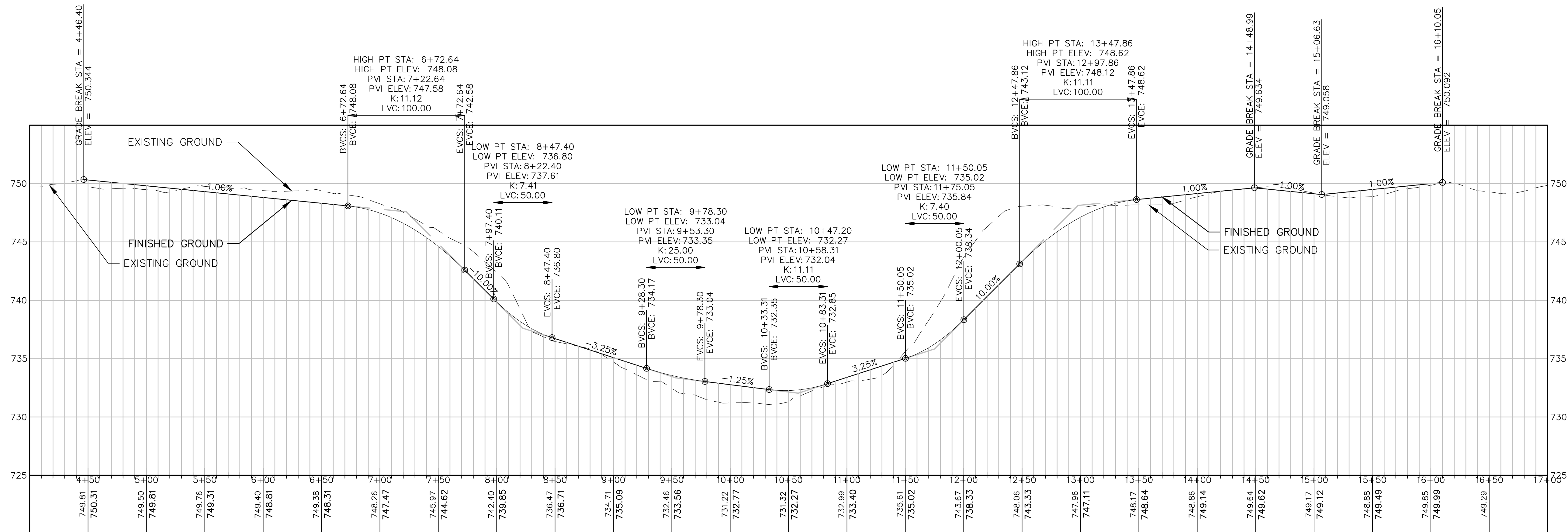


CHELAN PUD NO. 1		SCALE	VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
PRIM. ENG.	C.HILL	1" = 30'	0 1"		CRH	TPD
2ND ENG.		0 11/14/2014	BID SET		REQ. BY	DRFT
PROJ. MGR.	C.HILL	REV	DATE	REVISION		

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP CABIN LOOP LAYOUT		SHEET C2 OF C10
BID NO. 14-31		REVISION 0
DATE 11/14/2014		DWG. 0913-50CI-0032

ORG. DATE 6/19/2013
 ORG. DRAWN TPD



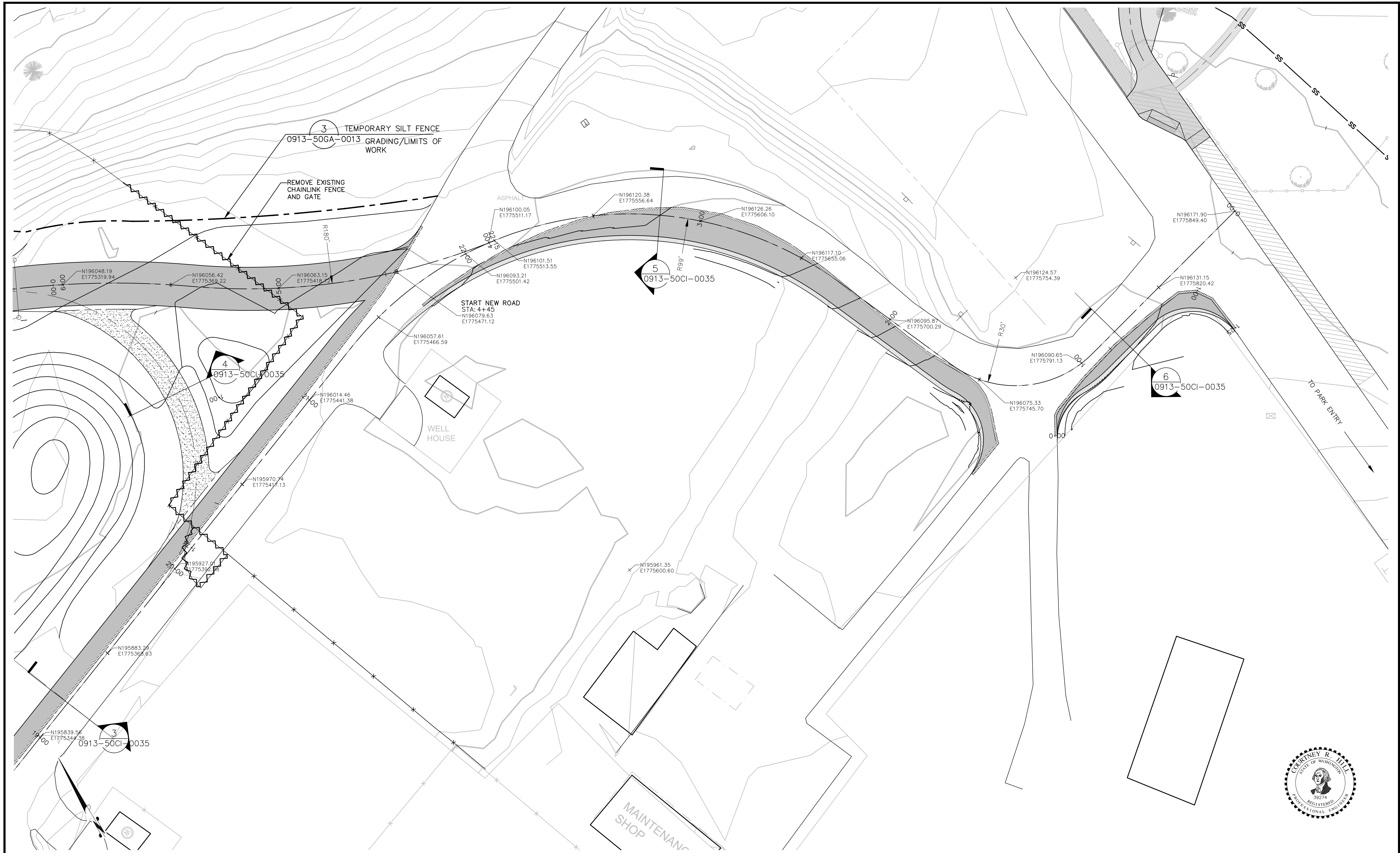
CABIN LOOP ROAD PROFILE
 SCALE: 1"=50' HORZ
 1"=5' VERT

SEE DWG 0913-50CI-0032 FOR PLAN VIEW



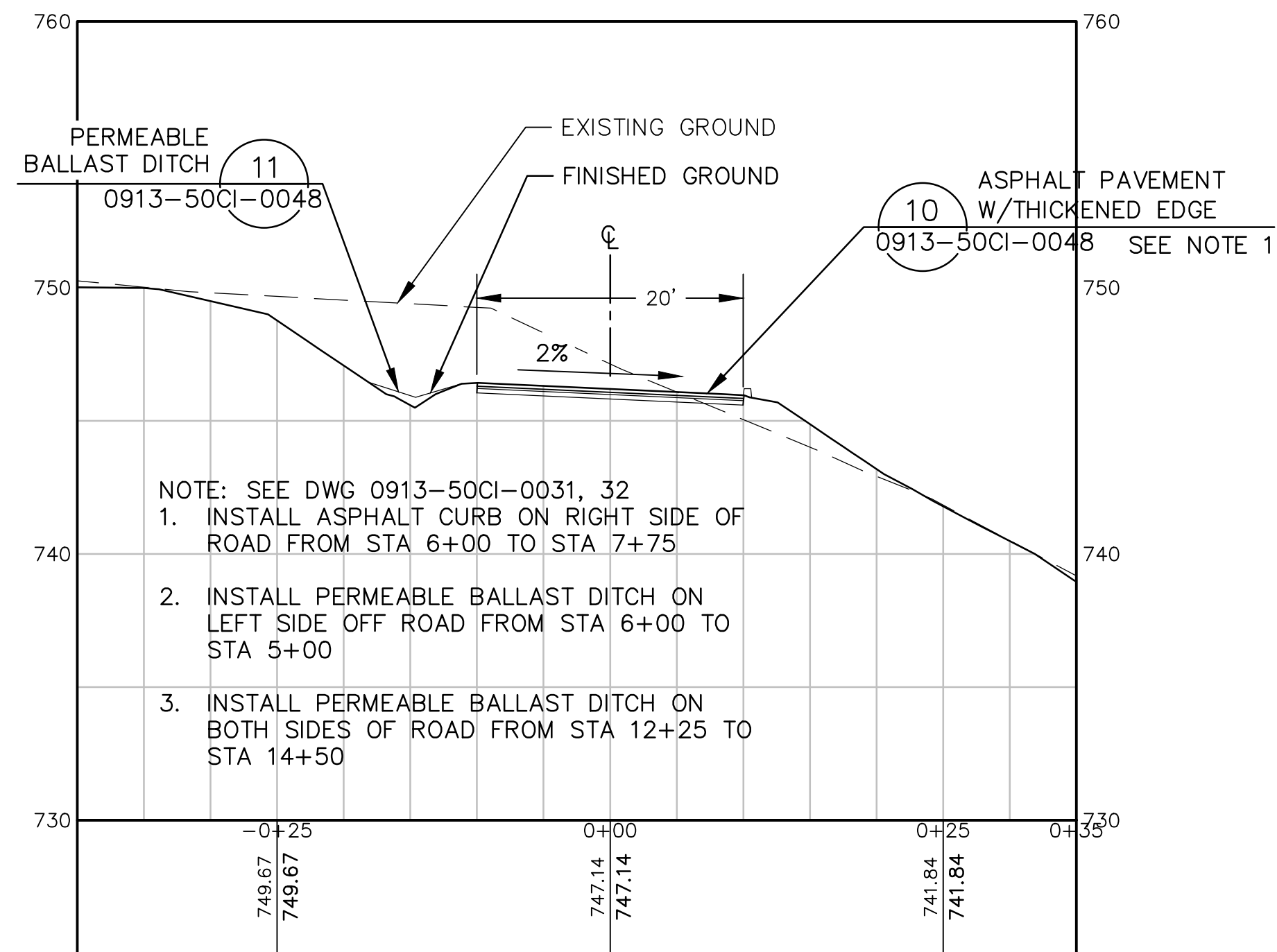
CHELAN PUD NO. 1 PRIM. ENG. C.HILL 2ND ENG. PROJ. MGR. C.HILL		SCALE 1"=30' 0 1"	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP CABIN LOOP ROAD PROFILE BID NO. 14-31	SHEET C3 OF C10 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0033
CHELAN PUD NO. 1 PRIM. ENG. C.HILL 2ND ENG. PROJ. MGR. C.HILL	SCALE 1"=30' 0 1"	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP CABIN LOOP ROAD PROFILE BID NO. 14-31	SHEET C3 OF C10 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0033	

ORIG. DATE 6/19/2013 ORG. DRAWN TPD



CHELAN PUD NO. 1 PRIM. ENG. C.HILL 2ND ENG. PROJ. MGR. C.HILL		SCALE 1"=20' 0 1 1/4 2 1/4 3 1/4 4 1/4 5 1/4 6 1/4 7 1/4 8 1/4 9 1/4 10 1/4 11 1/4 12 1/4 13 1/4 14 1/4 15 1/4 16 1/4 17 1/4 18 1/4 19 1/4 20 1/4	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP CABIN LOOP ACCESS ROAD PLAN BID NO. 14-31	SHEET C4 OF C10 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0034
CHELAN PUD NO. 1 PRIM. ENG. C.HILL 2ND ENG. PROJ. MGR. C.HILL		SCALE 1"=20' 0 1 1/4 2 1/4 3 1/4 4 1/4 5 1/4 6 1/4 7 1/4 8 1/4 9 1/4 10 1/4 11 1/4 12 1/4 13 1/4 14 1/4 15 1/4 16 1/4 17 1/4 18 1/4 19 1/4 20 1/4	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP CABIN LOOP ACCESS ROAD PLAN BID NO. 14-31	SHEET C4 OF C10 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0034

ORG. DATE 6/19/2013
 ORG. DRAWN TPD

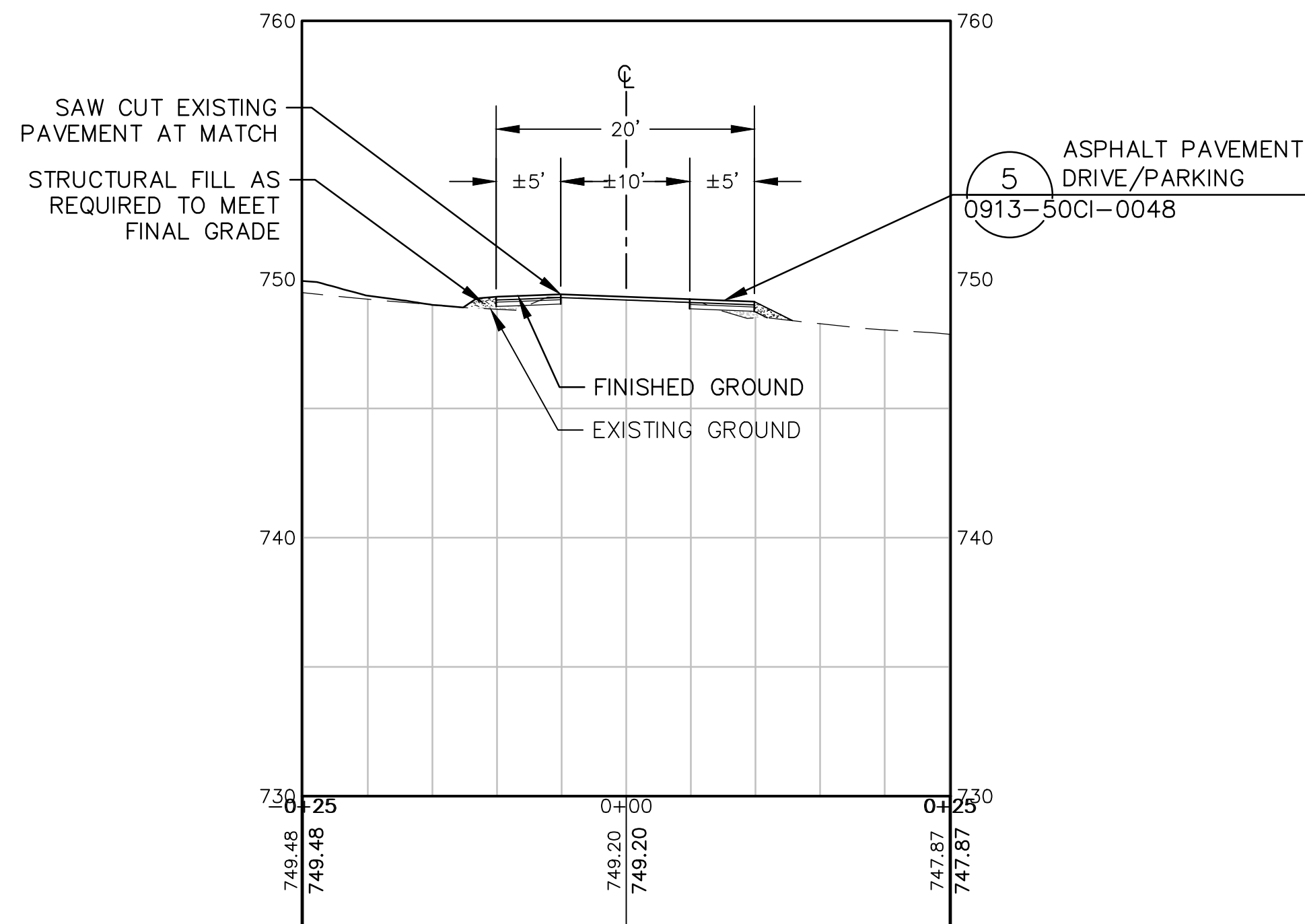


NOTE: SEE DWG 0913-50CI-0031, 32

1. INSTALL ASPHALT CURB ON RIGHT SIDE OF ROAD FROM STA 6+00 TO STA 7+75
2. INSTALL PERMEABLE BALLAST DITCH ON LEFT SIDE OFF ROAD FROM STA 6+00 TO STA 5+00
3. INSTALL PERMEABLE BALLAST DITCH ON BOTH SIDES OF ROAD FROM STA 12+25 TO STA 14+50

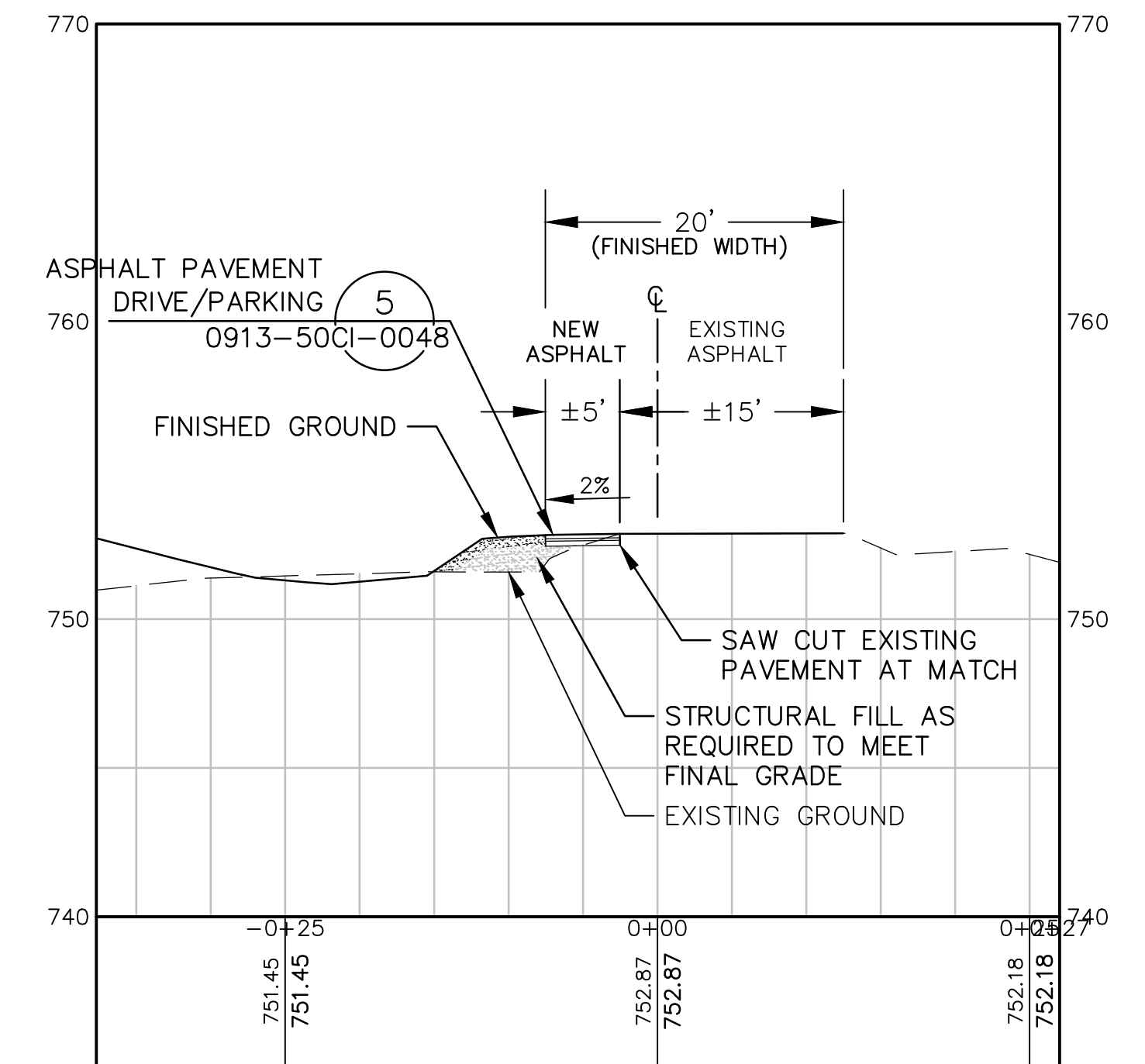
1 CABIN LOOP ACCESS ROAD SECTION

0913-50CI-0031 1" = 10' HORZ, 1" = 5' VERT
NOTE: TYPICAL SECTION FROM STA 4+45 TO 16+10 AS SHOWN @ STA 7+27



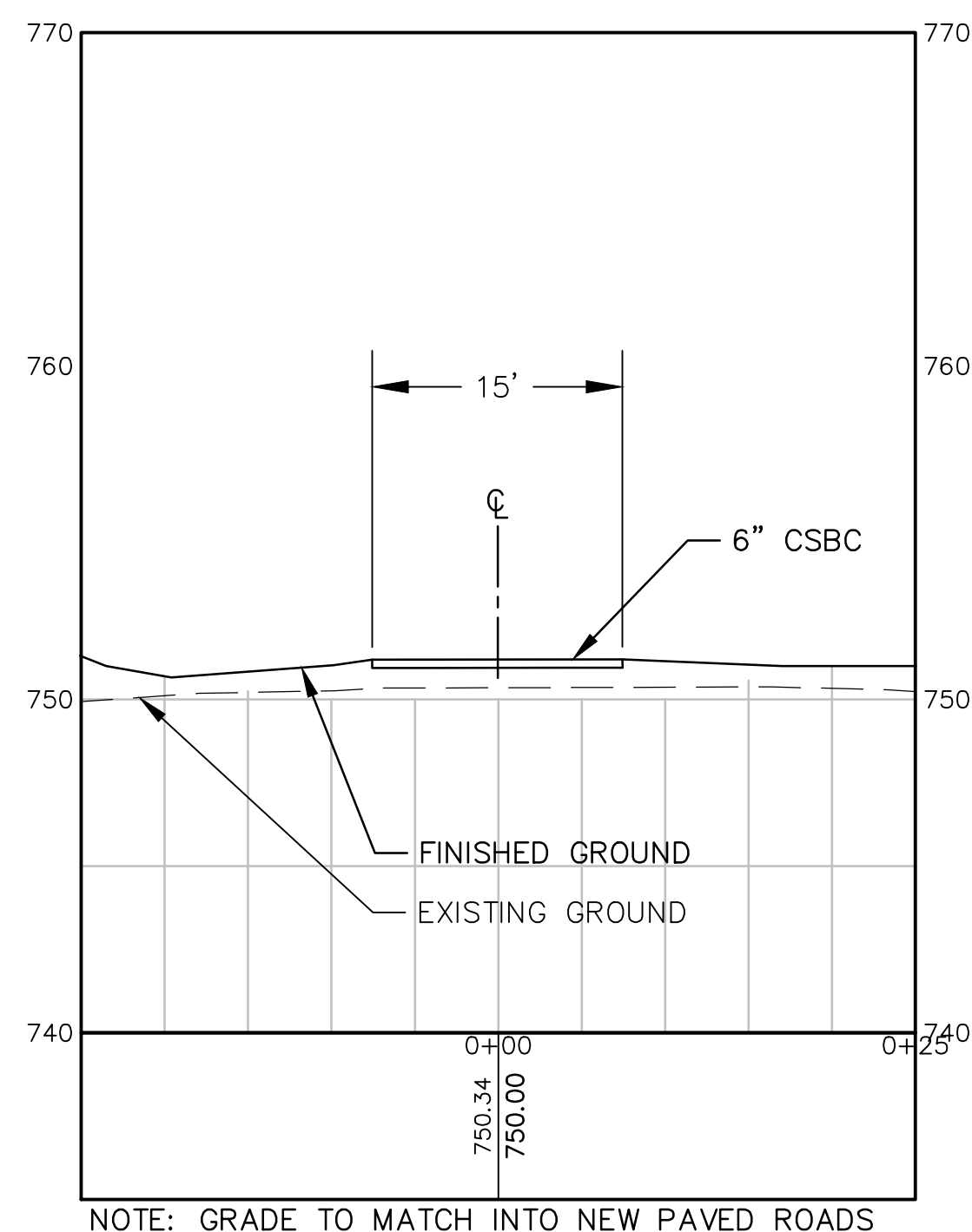
2 CABIN LOOP ACCESS ROAD SECTION

0913-50CI-0031 1" = 10' HORZ, 1" = 5' VERT
NOTE: TYPICAL SECTION FROM STA 16+10 TO STA 17+05 8" CSBC SHOULDER FROM STA 14+80 TO STA 17+05 AS SHOWN @ STA 16+56



3 CABIN LOOP ACCESS ROAD SECTION

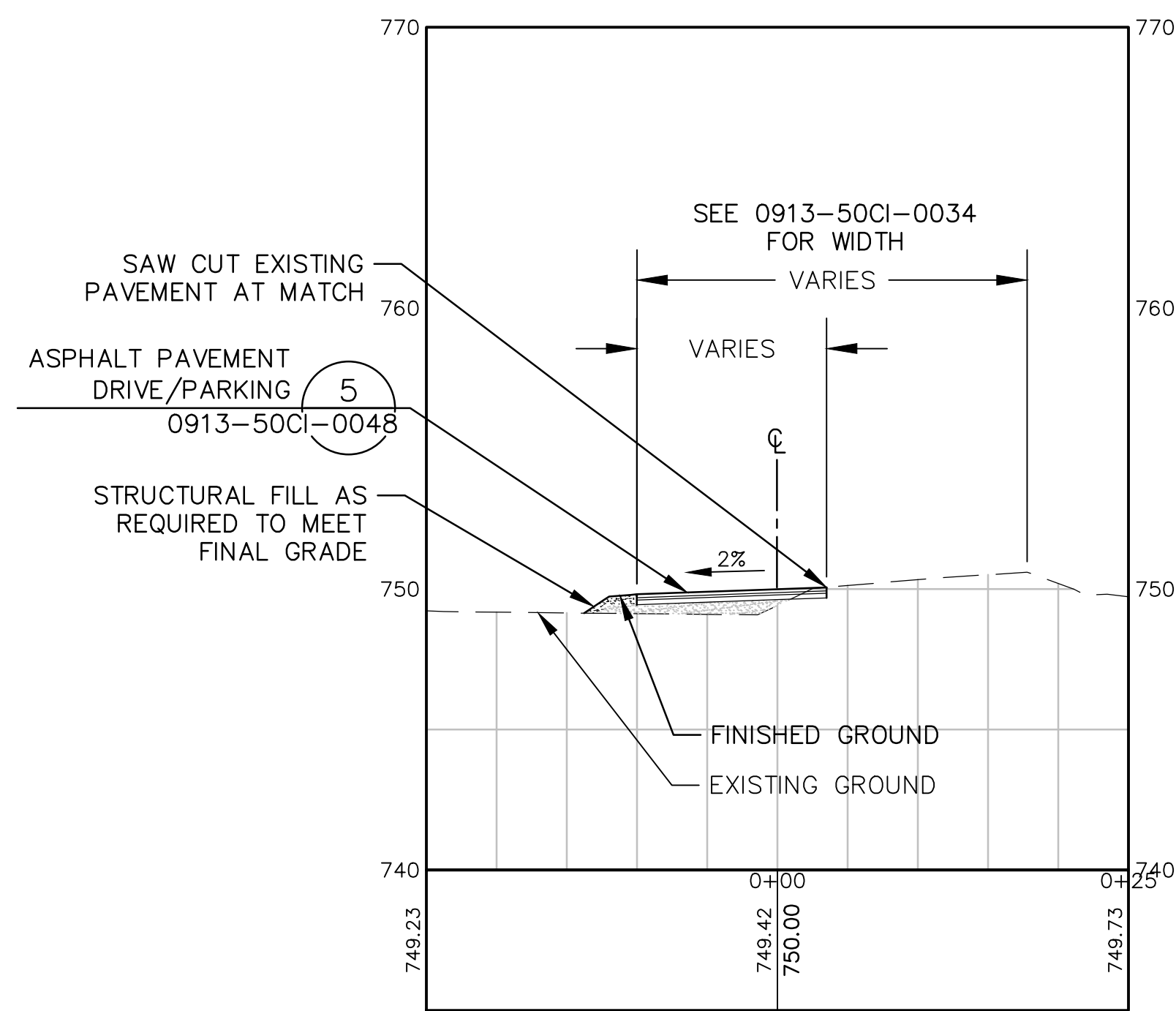
0913-50CI-0031 1" = 10' HORZ, 1" = 5' VERT
NOTE: TYPICAL SECTION FROM STA 17+05 TO STA 21+55 AS SHOWN @ STA 19+21



NOTE: GRADE TO MATCH INTO NEW PAVED ROADS

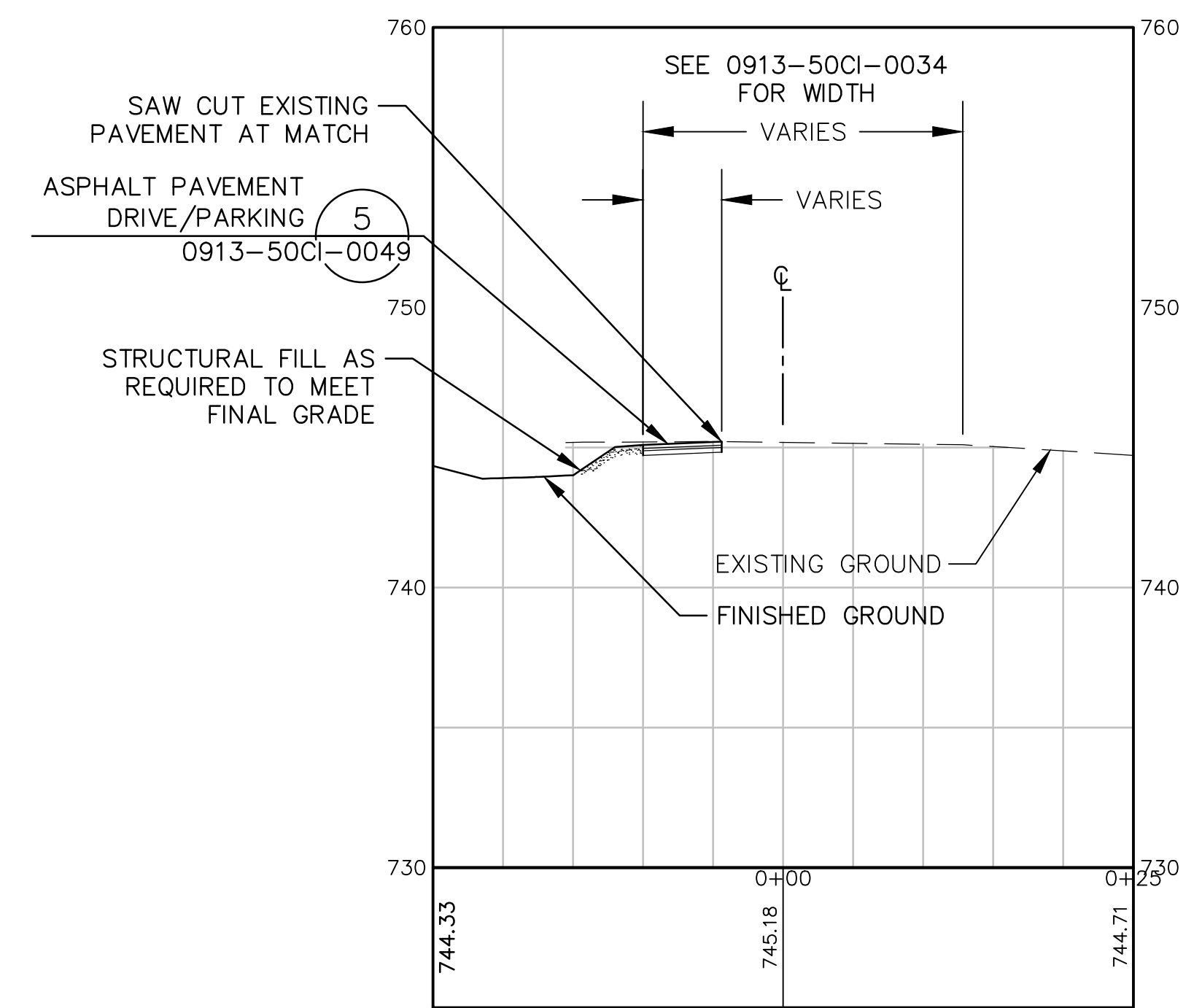
4 CABIN LOOP TURN AROUND ROAD SECTION, TYP.

0913-50CI-0031 1" = 10' HORZ, 1" = 5' VERT



5 CABIN LOOP ACCESS ROAD SECTION, TYP.

0913-50CI-0034 1" = 10' HORZ, 1" = 5' VERT
NOTE: TYPICAL SECTION FROM STA 1+25 TO STA 4+45 AS SHOWN @ STA 3+19



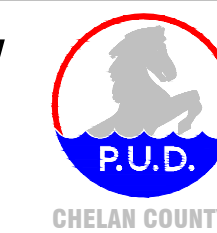
6 CABIN LOOP ACCESS ROAD SECTION

0913-50CI-0034 1" = 10' HORZ, 1" = 5' VERT
NOTE: TYPICAL SECTION FROM STA 0+00 TO STA 1+25 AS SHOWN @ STA 0+79



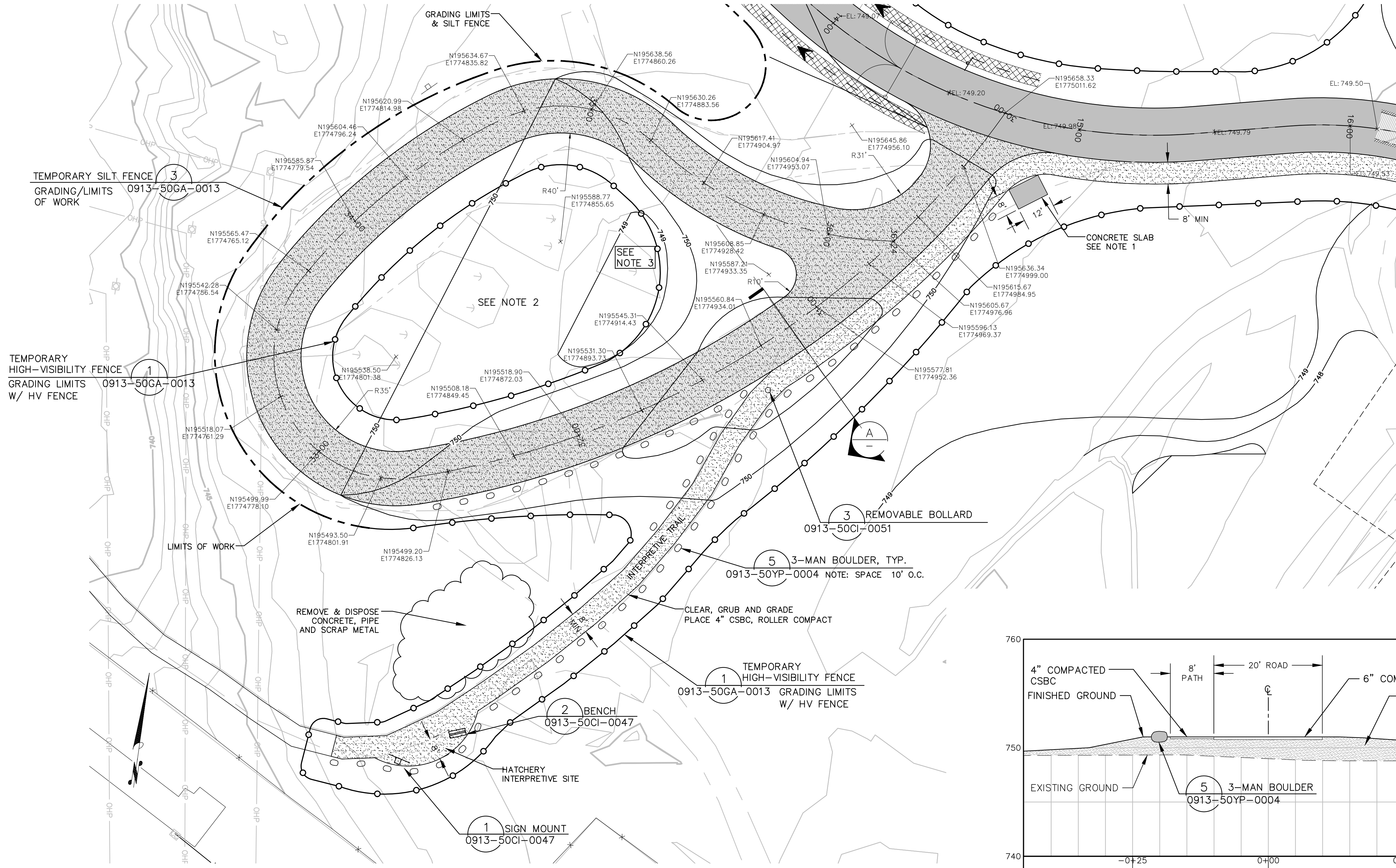
CHELAN PUD NO.1		SCALE	VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
PRIM. ENG.	C.HILL	1"=20'	0 1"		CRH	TPD
2ND ENG.		0	11/14/2014	BID SET	REQ. BY	DRFT
PROJ. MGR.	C.HILL	REV	DATE	REVISION		

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

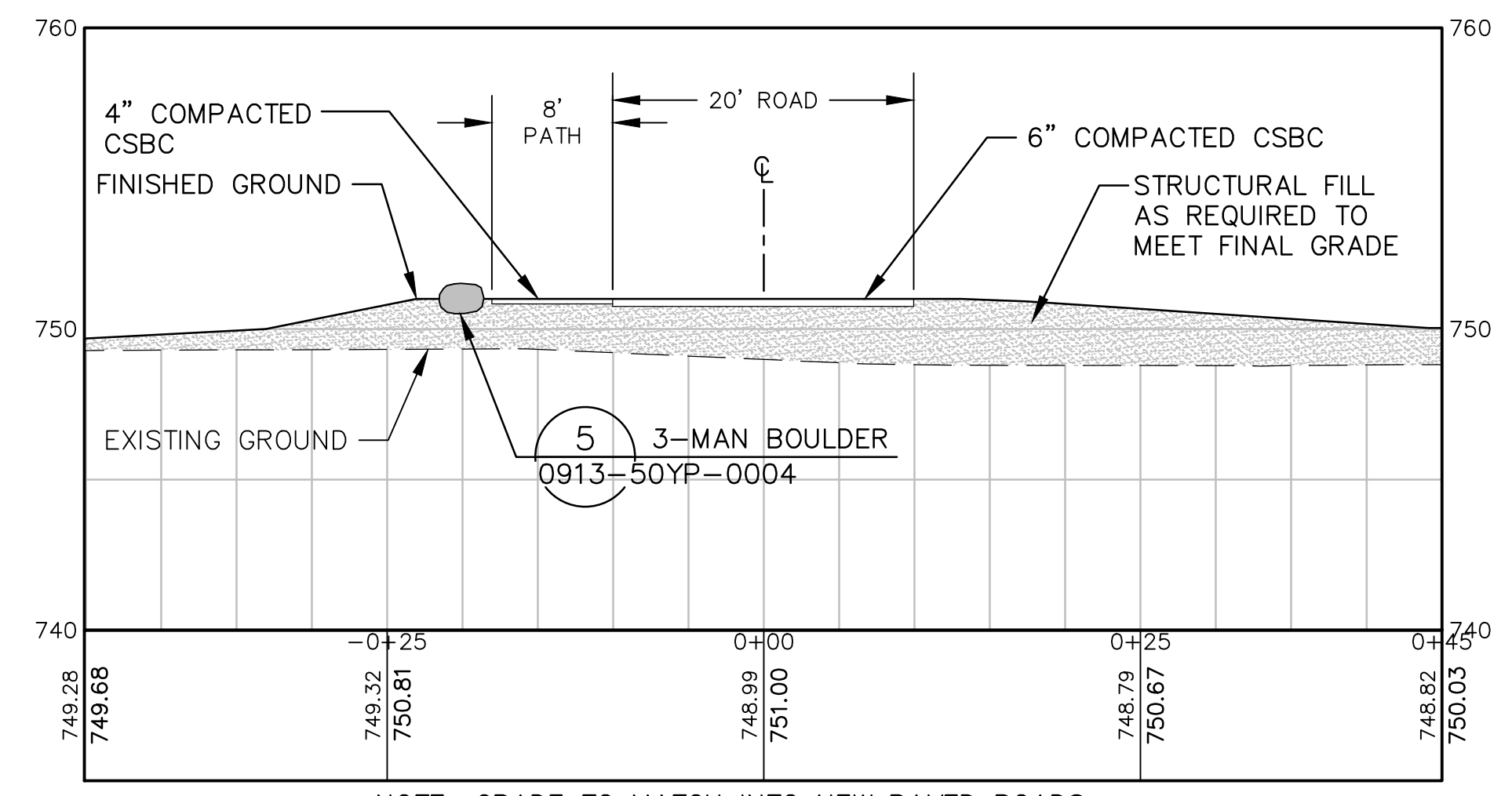


LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
CABIN LOOP ACCESS ROAD
SECTIONS
BID NO. 14-31

SHEET C5 OF C10
REVISION 0
DATE 11/14/2014
DWG. 0913-50CI-0035



- NOTES:
- 6" THICK CONCRETE SLAB ON 4" THICK COMPACTED CSBC GRADE W/#4 @ 12" O.C. EA. WAY, ROUGH BROOM FINISH.
 - NO GRADING INSIDE HV FENCE. SCARIFY AND HYDROSEED ONLY. SEE 0913-50YP-0006
 - SAVE AND PROTECT EXISTING MEMORIAL.



NOTE: GRADE TO MATCH INTO NEW PAVED ROADS

A
SOUTH PARKING AREA SECTION
 1" = 10' HORZ, 1" = 5' VERT

CHELAN PUD NO.1	
PRIM. ENG.	C.HILL
2ND ENG.	
PROJ. MGR.	C.HILL

SCALE	1"=20'
REV	0
DATE	11/14/2014

BAR IS ONE INCH ON ORIGINAL DRAWING.		VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
0	1"	CRH	TPD	REQ. BY	DRFT
REVISION					

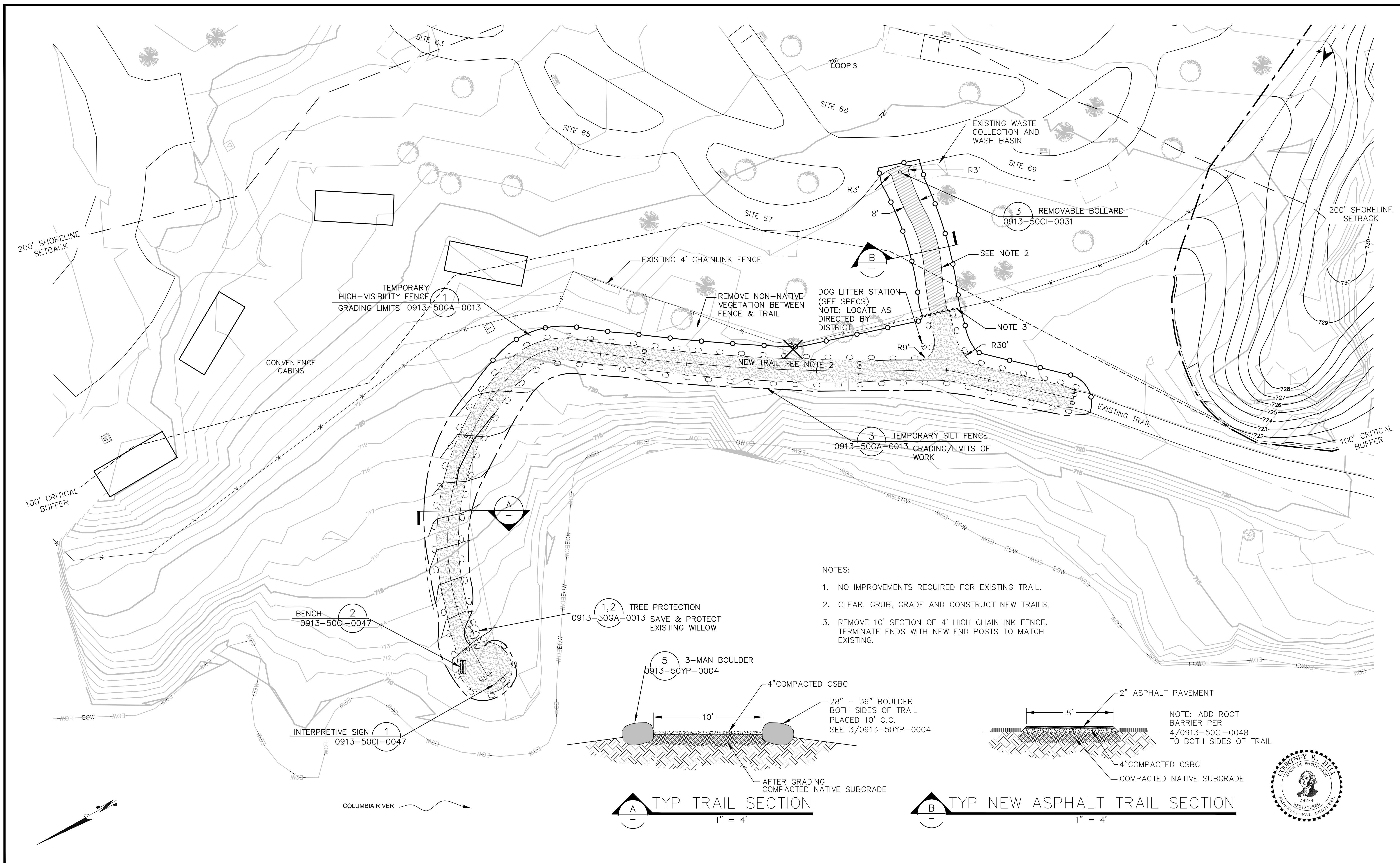
PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
 CABIN LOOP & GROUP CAMP
 SOUTH PARKING AREA
 LAYOUT AND GRADING PLAN
 BID NO. 14-31

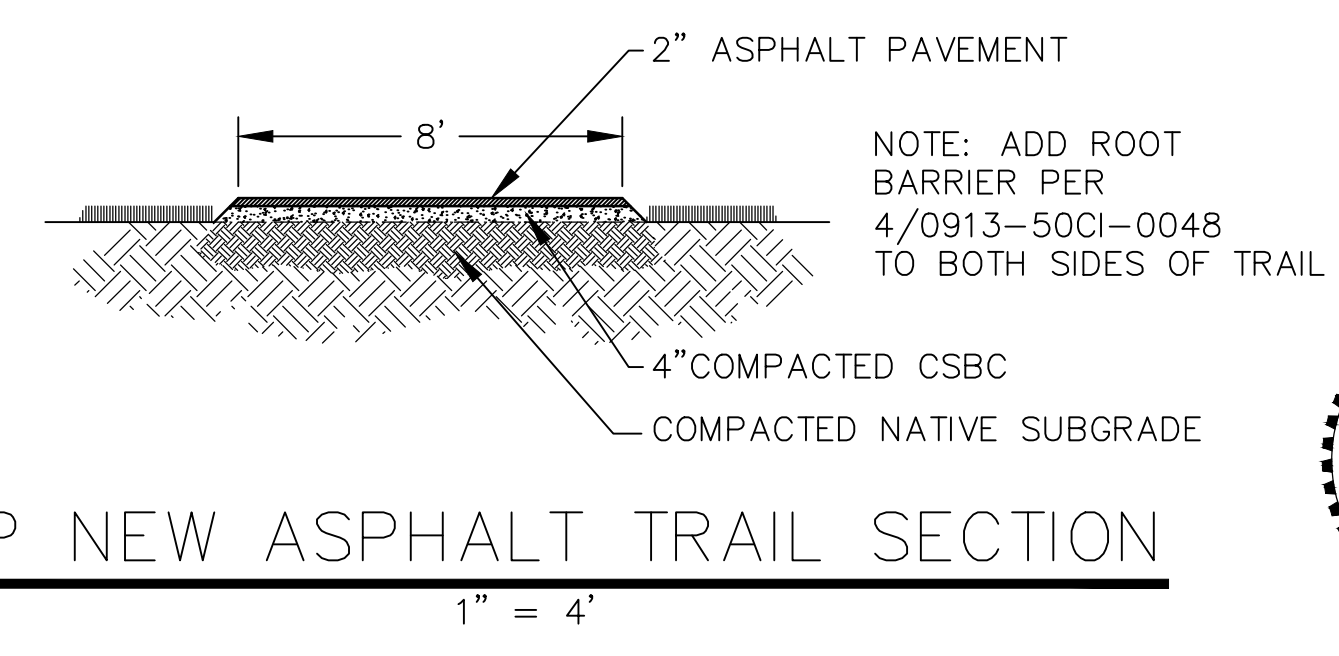
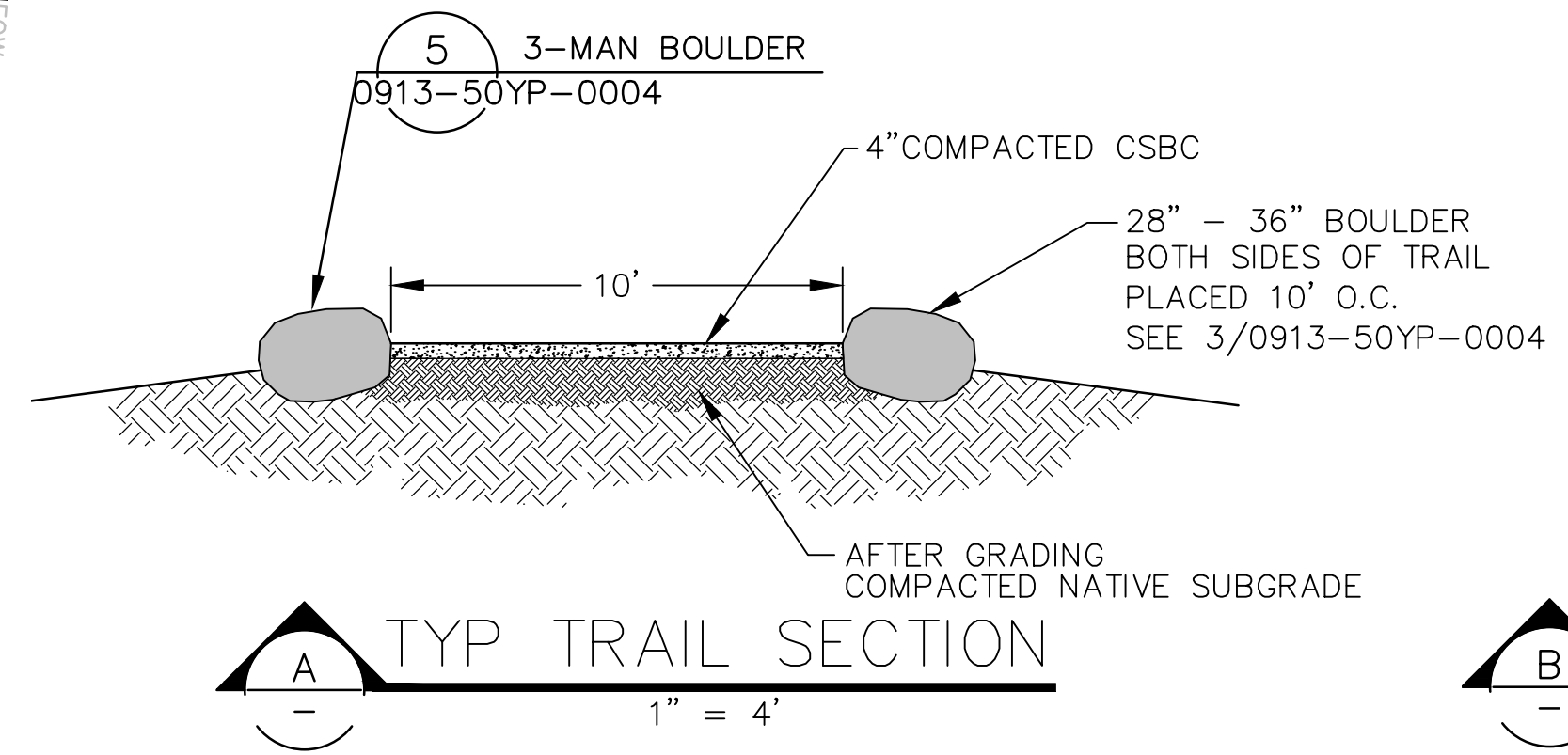
SHEET C6 OF C10
REVISION 0
DATE 11/14/2014
DWG. 0913-50CI-0036



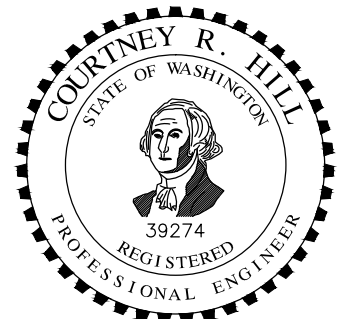
ORIG. DATE 6/19/2013 ORG. DRAWN TPD



- NOTES:
- NO IMPROVEMENTS REQUIRED FOR EXISTING TRAIL.
 - CLEAR, GRUB, GRADE AND CONSTRUCT NEW TRAILS.
 - REMOVE 10' SECTION OF 4' HIGH CHAINLINK FENCE. TERMINATE ENDS WITH NEW END POSTS TO MATCH EXISTING.

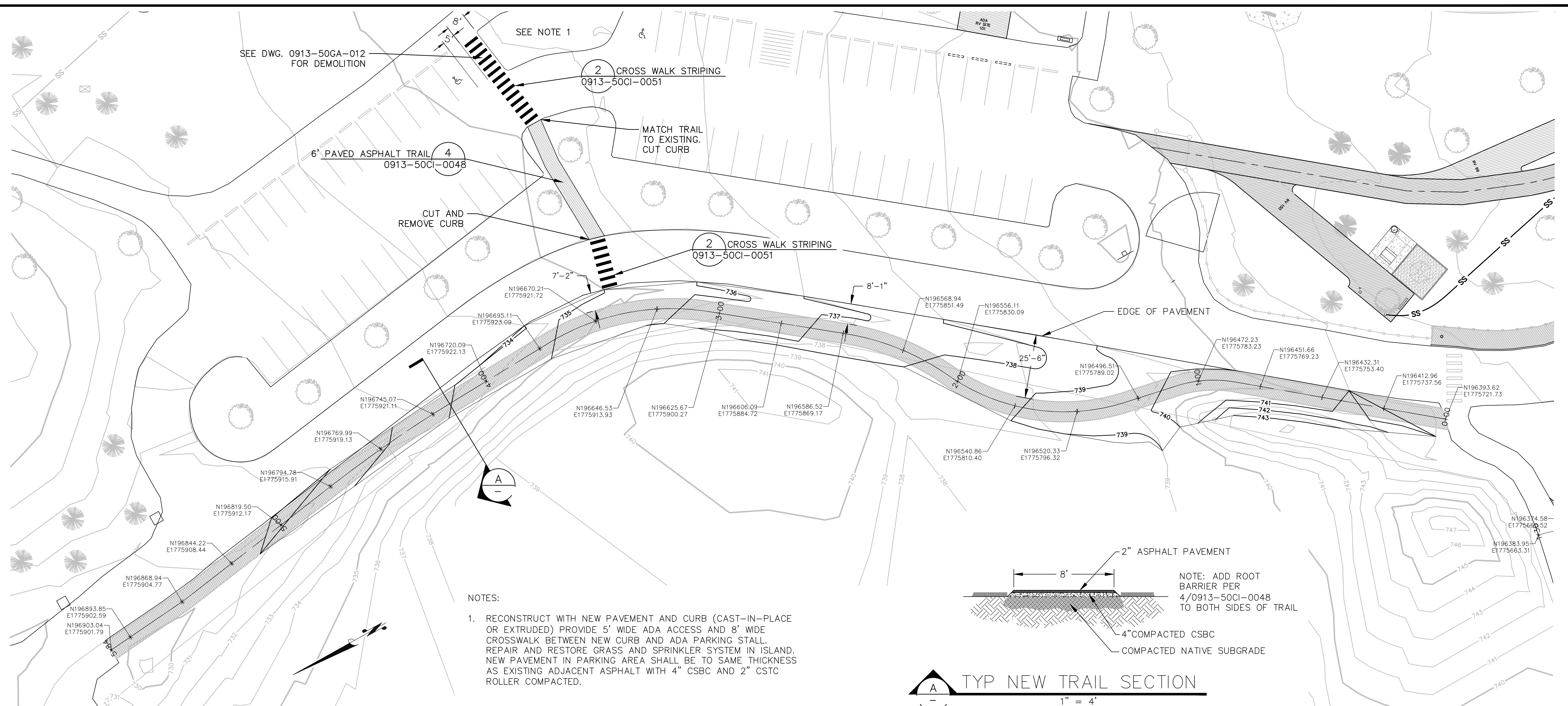


NOTE: ADD ROOT BARRIER PER 4/0913-50CI-0048 TO BOTH SIDES OF TRAIL

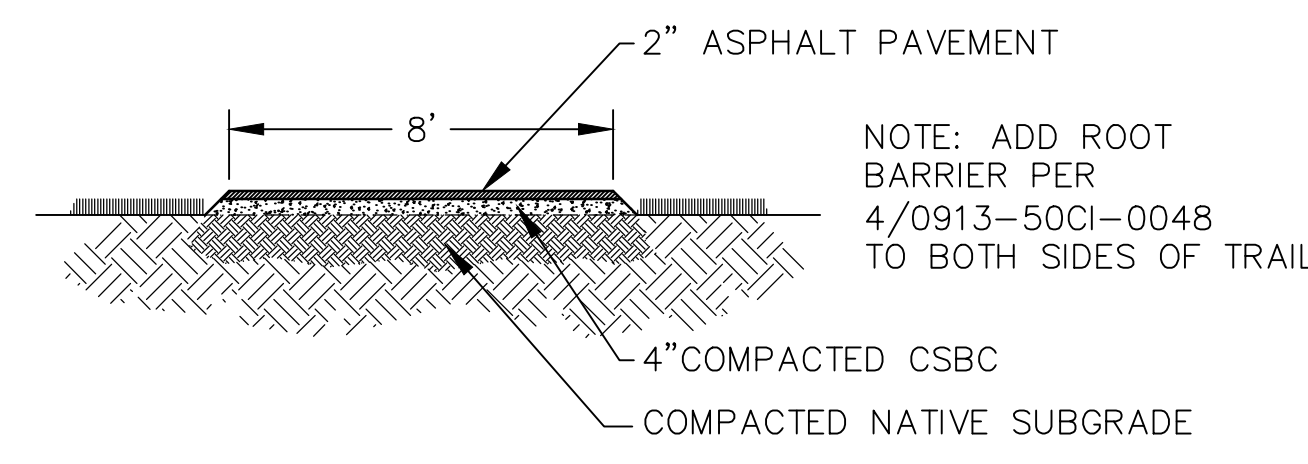


CHELAN PUD NO. 1		SCALE 1"=20'	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE 0 1"		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.		PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP SHORELINE TRAIL PLAN & PROFILE BID NO. 14-31	SHEET C7 OF C10
PRIM. ENG. C.HILL	2ND ENG.	0 11/14/2014	BID SET	CRH	TPD	REVISION 0				
PROJ. MGR. C.HILL	REV	DATE	REVISION	REQ. BY	DRFT	DATE 11/14/2014	DOCUMENT CLASS: ID: ORIGINAL DWG. #:		DWG. 0913-50CI-0038	

ORIG. DATE 6/19/2013 ORG. DRAWN TPD

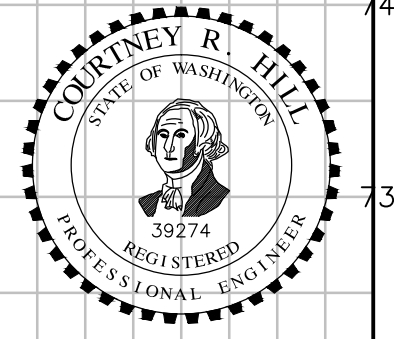
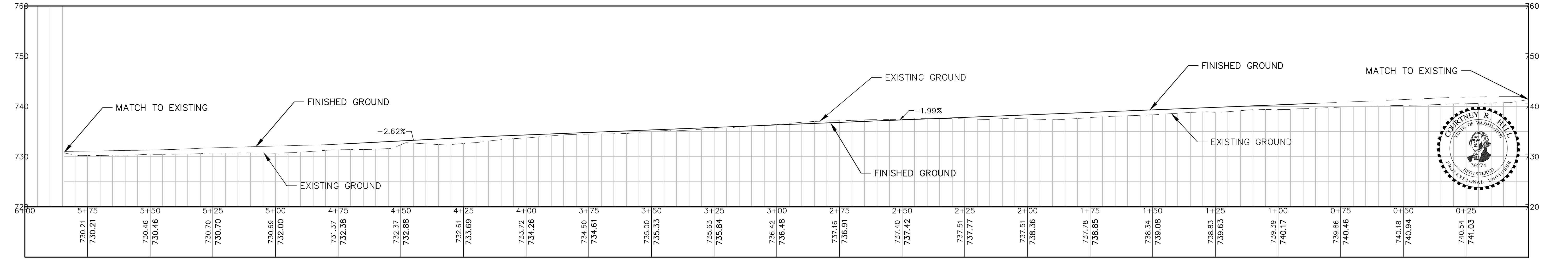


- NOTES:
1. RECONSTRUCT WITH NEW PAVEMENT AND CURB (CAST-IN-PLACE OR EXTRUDED) PROVIDE 5' WIDE ADA ACCESS AND 8' WIDE CROSSWALK BETWEEN NEW CURB AND ADA PARKING STALL. REPAIR AND RESTORE GRASS AND SPRINKLER SYSTEM IN ISLAND. NEW PAVEMENT IN PARKING AREA SHALL BE TO SAME THICKNESS AS EXISTING ADJACENT ASPHALT WITH 4" CSBC AND 2" CSTC ROLLER COMPACTED.

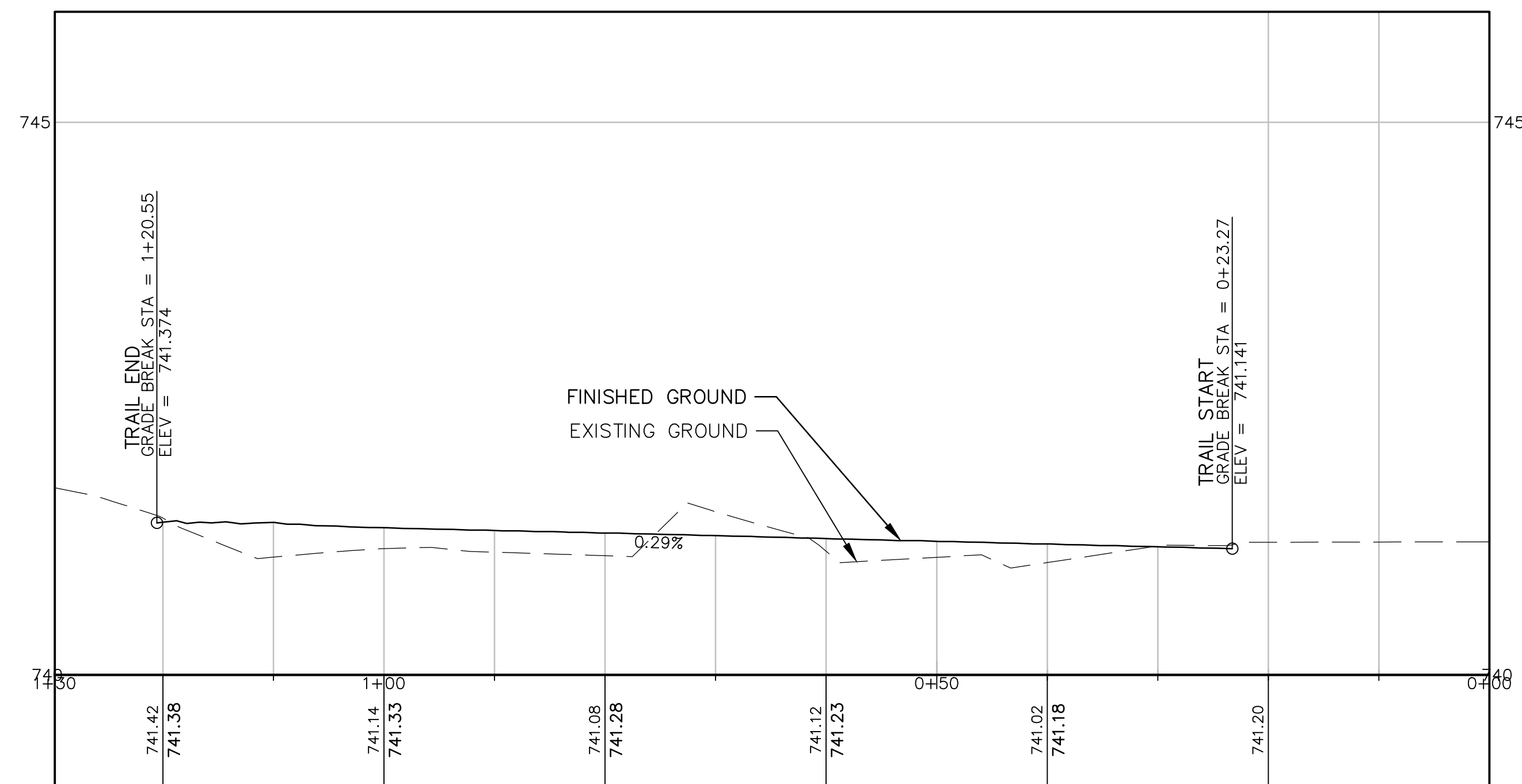
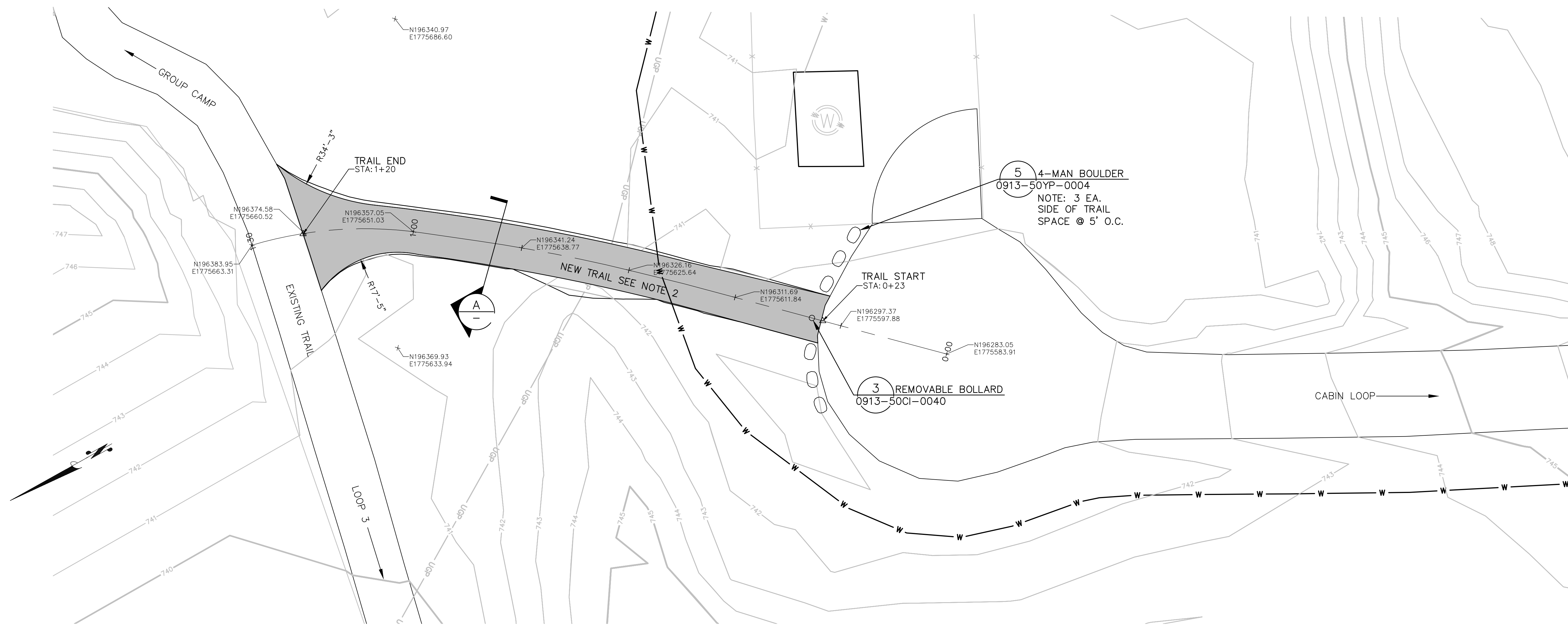


NOTE: ADD ROOT BARRIER PER 4/0913-50CI-0048 TO BOTH SIDES OF TRAIL

TYP NEW TRAIL SECTION
1" = 4'

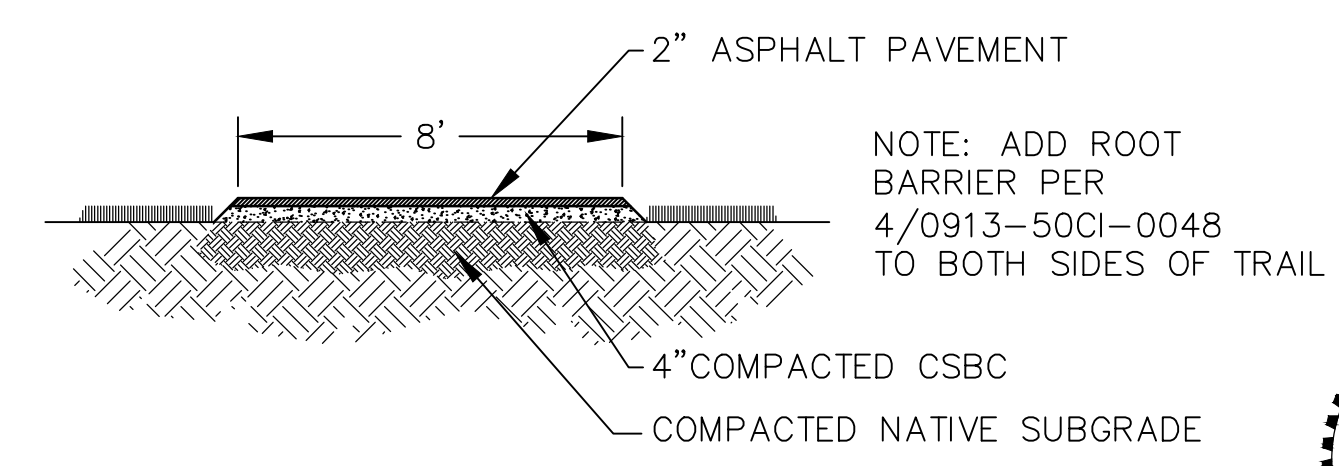


CHELAN PUD NO. 1 PRIM. ENG. C.HILL 2ND ENG. PROJ. MGR. C.HILL		SCALE 1" = 20' 11/14/2014	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY. PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP PARK ROAD TRAIL PLAN & PROFILE BID NO. 14-31	SHEET C8 OF C10 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0039
REV DATE REVISION	CRH TPD REQ. BY DRFT	0 11/14/2014 BID SET	0 1"	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP PARK ROAD TRAIL PLAN & PROFILE BID NO. 14-31	SHEET C8 OF C10 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0039

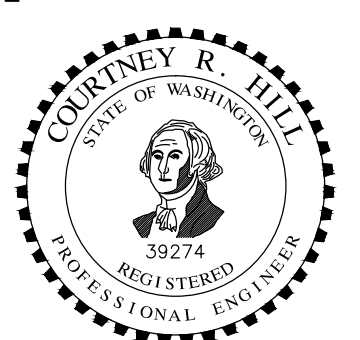


SCALE: 1"=10' HORZ
1"=1' VERT

- NOTES:
- NO IMPROVEMENTS REQUIRED FOR EXISTING TRAIL.
 - CLEAR, GRUB, GRADE AND CONSTRUCT NEW TRAIL.

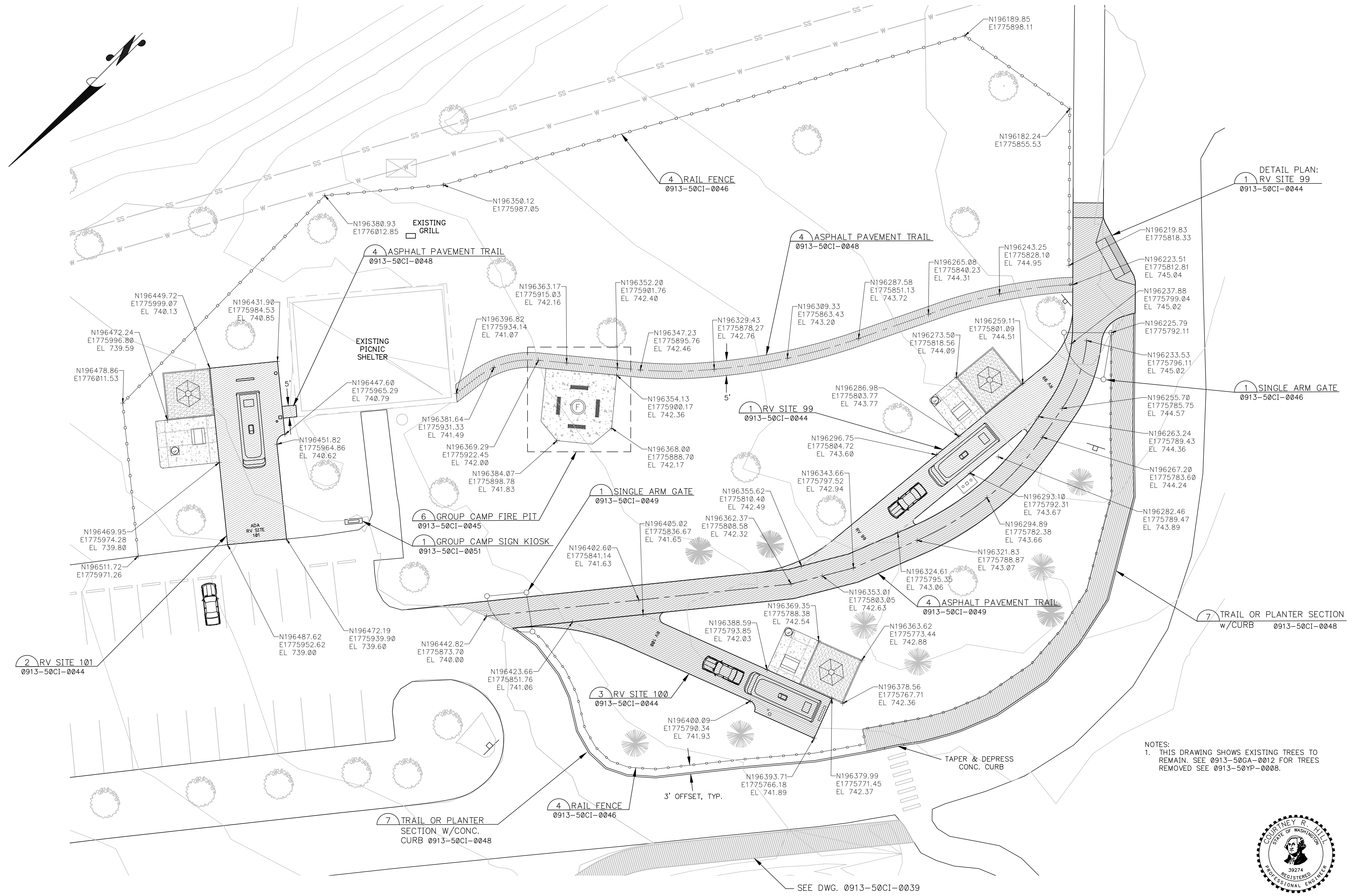


TYP NEW SPUR TRAIL SECTION
1" = 4'



CHELAN PUD NO. 1 PRIM. ENG. C.HILL 2ND ENG. PROJ. MGR. C.HILL		SCALE 1"=10' 0 11/14/2014 REV DATE	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		LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP SPUR TRAIL PLAN & PROFILE BID NO. 14-31	SHEET C9 OF C10 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0040
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ORG. DATE: 6/19/2013
 ORG. DRAWN: TPD



DETAIL PLAN:
1 RV SITE 99
0913-50CI-0044

1 SINGLE ARM GATE
0913-50CI-0046

7 TRAIL OR PLANTER SECTION
w/CURB 0913-50CI-0048

NOTES:
1. THIS DRAWING SHOWS EXISTING TREES TO REMAIN. SEE 0913-50GA-0012 FOR TREES REMOVED SEE 0913-50YP-0008.



ORIG. DATE 6/1/2014
ORIG. DRAWN PUD

CHELAN PUD NO. 1 PRIM. ENG. C. HILL 2ND ENG. PROJ. MGR. C. HILL		SCALE FULL: 1:16 11/14/2014 REV DATE	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON	 CHELAN COUNTY	Lincoln Rock State Park CABIN LOOP & GROUP CAMP GROUP CAMP LAYOUT BID NO. 14-31	SHEET C10 OF C10 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0041
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GROUP CAMP UTILITY PLAN
DWG 0913-50SU-0002

ACCESS ROAD UTILITY PLAN
DWG 0913-50SU-0003

CABIN LOOP UTILITY PLAN
DWG 0913-50SU-0004

LOOP 3 UTILITY PLAN
DWG 0913-50SU-0005

ENTRANCE

COLUMBIA RIVER

4 STEEL PIPE BOLLARD
0913-50CI-0042, 44 NOT TO SCALE



CHELAN PUD NO.1	
PRIM. ENG.	C. HILL
2ND ENG.	
PROJ. MGR.	C. HILL

SCALE	FULL: 1"=60'
REV	DATE

BAR IS ONE INCH ON ORIGINAL DRAWING.		VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
CRH	TRT	REVISION			
REQ. BY	DRFT				

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

Lincoln Rock State Park
CABIN LOOP & GROUP CAMP
OVERALL UTILITY PLAN

BID NO. 14-31

SHEET U1 OF U9
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0001

ORIG. DATE 6/1/2014
ORIG. DRAWN PUD

GENERAL NOTES

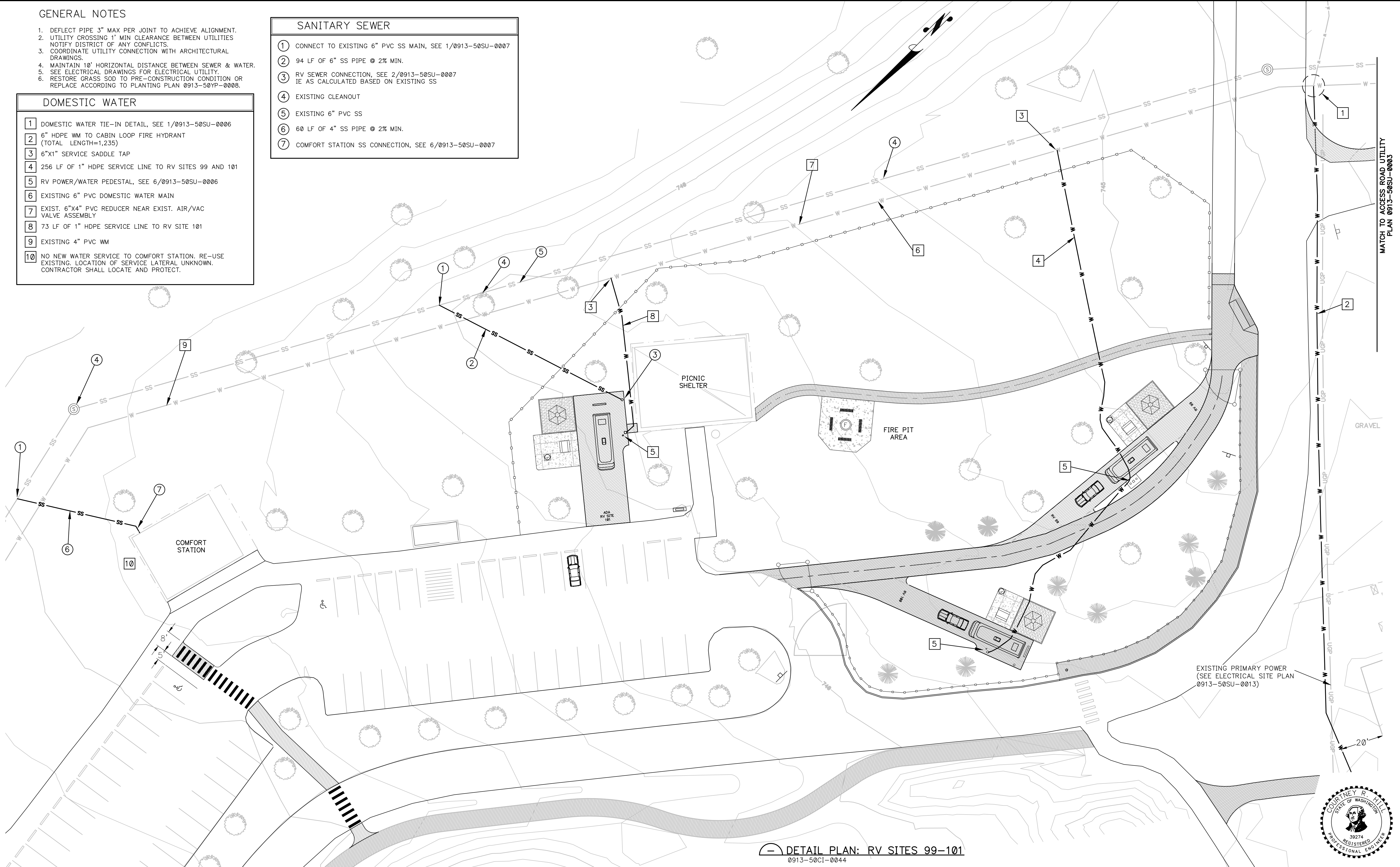
1. DEFLECT PIPE 3" MAX PER JOINT TO ACHIEVE ALIGNMENT.
2. UTILITY CROSSING 1' MIN CLEARANCE BETWEEN UTILITIES NOTIFY DISTRICT OF ANY CONFLICTS.
3. COORDINATE UTILITY CONNECTION WITH ARCHITECTURAL DRAWINGS.
4. MAINTAIN 10' HORIZONTAL DISTANCE BETWEEN SEWER & WATER.
5. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL UTILITY.
6. RESTORE GRASS SOD TO PRE-CONSTRUCTION CONDITION OR REPLACE ACCORDING TO PLANTING PLAN 0913-50YP-0008.

DOMESTIC WATER

- 1 DOMESTIC WATER TIE-IN DETAIL, SEE 1/0913-50SU-0006
- 2 6" HDPE WM TO CABIN LOOP FIRE HYDRANT (TOTAL LENGTH=1,235)
- 3 6"x1" SERVICE SADDLE TAP
- 4 256 LF OF 1" HDPE SERVICE LINE TO RV SITES 99 AND 101
- 5 RV POWER/WATER PEDESTAL, SEE 6/0913-50SU-0006
- 6 EXISTING 6" PVC DOMESTIC WATER MAIN
- 7 EXIST. 6"x4" PVC REDUCER NEAR EXIST. AIR/VAC VALVE ASSEMBLY
- 8 73 LF OF 1" HDPE SERVICE LINE TO RV SITE 101
- 9 EXISTING 4" PVC WM
- 10 NO NEW WATER SERVICE TO COMFORT STATION. RE-USE EXISTING. LOCATION OF SERVICE LATERAL UNKNOWN. CONTRACTOR SHALL LOCATE AND PROTECT.

SANITARY SEWER

- 1 CONNECT TO EXISTING 6" PVC SS MAIN, SEE 1/0913-50SU-0007
- 2 94 LF OF 6" SS PIPE @ 2% MIN.
- 3 RV SEWER CONNECTION, SEE 2/0913-50SU-0007 IE AS CALCULATED BASED ON EXISTING SS
- 4 EXISTING CLEANOUT
- 5 EXISTING 6" PVC SS
- 6 60 LF OF 4" SS PIPE @ 2% MIN.
- 7 COMFORT STATION SS CONNECTION, SEE 6/0913-50SU-0007

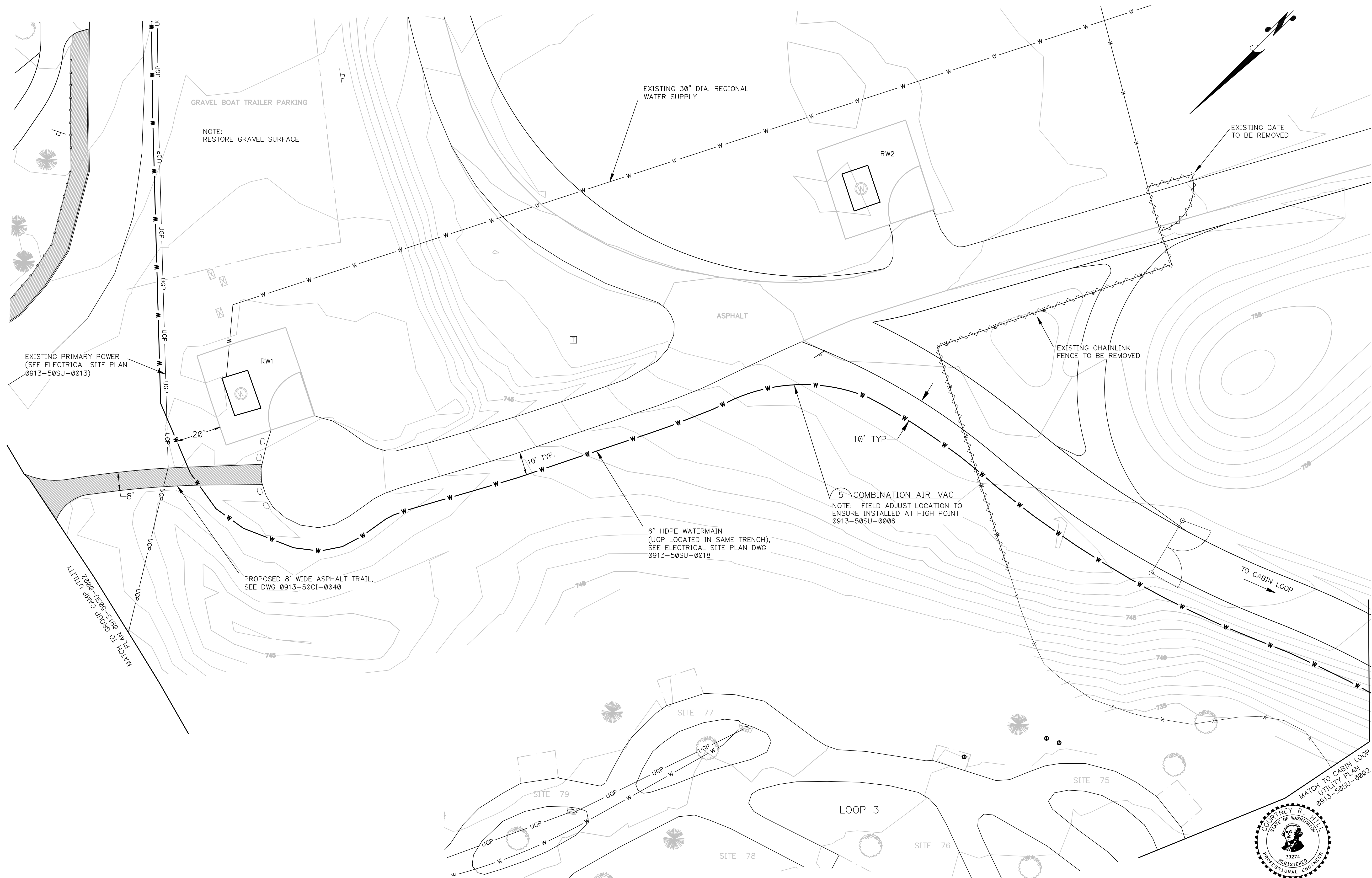


DETAIL PLAN: RV SITES 99-101
0913-50C1-0044



<p>CHELAN PUD NO. 1</p> <p>PRIM. ENG. C. HILL</p> <p>2ND ENG.</p> <p>PROJ. MGR. C. HILL</p>		<p>SCALE</p> <p>FULL: 1"=20'</p>	<p>BAR IS ONE INCH ON ORIGINAL DRAWING.</p> <p>VERIFY SCALE</p> <p>IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.</p>	<p>PUBLIC UTILITY DISTRICT NO. 1</p> <p>OF CHELAN COUNTY</p> <p>WENATCHEE, WASHINGTON</p>		<p>Lincoln Rock State Park</p> <p>CABIN LOOP & GROUP CAMP</p> <p>GROUP CAMP</p> <p>UTILITY PLAN</p> <p>BID NO. 14-31</p>	<p>SHEET U2 OF U9</p> <p>REVISION 0</p> <p>DATE 11/14/2014</p> <p>DWG. 0913-50SU-0002</p>
<p>REV</p>	<p>DATE</p>	<p>BID SET</p>	<p>CRH</p> <p>TRT</p> <p>REQ. BY</p> <p>DRFT</p>	<p>REVISION</p>	<p>DOCUMENT CLASS:</p>	<p>ID:</p>	<p>ORIGINAL DWG. #:</p>

ORIG. DATE 6/1/2014 ORIG. DRAWN PUD



GRAVEL BOAT TRAILER PARKING

NOTE:
RESTORE GRAVEL SURFACE

EXISTING 30" DIA. REGIONAL
WATER SUPPLY

EXISTING GATE
TO BE REMOVED

EXISTING PRIMARY POWER
(SEE ELECTRICAL SITE PLAN
0913-50SU-0013)

PROPOSED 8' WIDE ASPHALT TRAIL,
SEE DWG 0913-50CI-0040

6" HDPE WATERMAIN
(UGP LOCATED IN SAME TRENCH),
SEE ELECTRICAL SITE PLAN DWG
0913-50SU-0018

5 COMBINATION AIR-VAC
NOTE: FIELD ADJUST LOCATION TO
ENSURE INSTALLED AT HIGH POINT
0913-50SU-0006

EXISTING CHAINLINK
FENCE TO BE REMOVED

MATCH TO GROUP CAMP UTILITY
PLAN 0913-50SU-0002

MATCH TO CABIN LOOP
UTILITY PLAN
0913-50SU-0002



CHELAN PUD NO.1	
PRIM. ENG.	C. HILL
2ND ENG.	
PROJ. MGR.	C. HILL

SCALE	FULL: 1"=20'
REV	DATE

BAR IS ONE INCH ON ORIGINAL DRAWING.		VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
CRH	TRT	REV	DATE	REVISION	
REQ. BY	DRFT				

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
WENATCHEE, WASHINGTON

CHELAN COUNTY

Lincoln Rock State Park
CABIN LOOP & GROUP CAMP
ACCESS ROAD
UTILITY PLAN
BID NO. 14-31

SHEET U3 OF U9
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0003

GENERAL NOTES

1. DEFLECT PIPE 3' MAX PER JOINT TO ACHIEVE ALIGNMENT.
2. UTILITY CROSSING 1' MIN CLEARANCE BETWEEN UTILITIES NOTIFY DISTRICT OF ANY CONFLICTS.
3. COORDINATE UTILITY CONNECTION WITH BUILDING PLANS.
4. MAINTAIN 10' HORIZONTAL DISTANCE BETWEEN SEWER & WATER. MAINTAIN 1' VERTICAL SEPARATION WHERE CROSSING W/ SEWER BELOW WATER.

DOMESTIC WATER

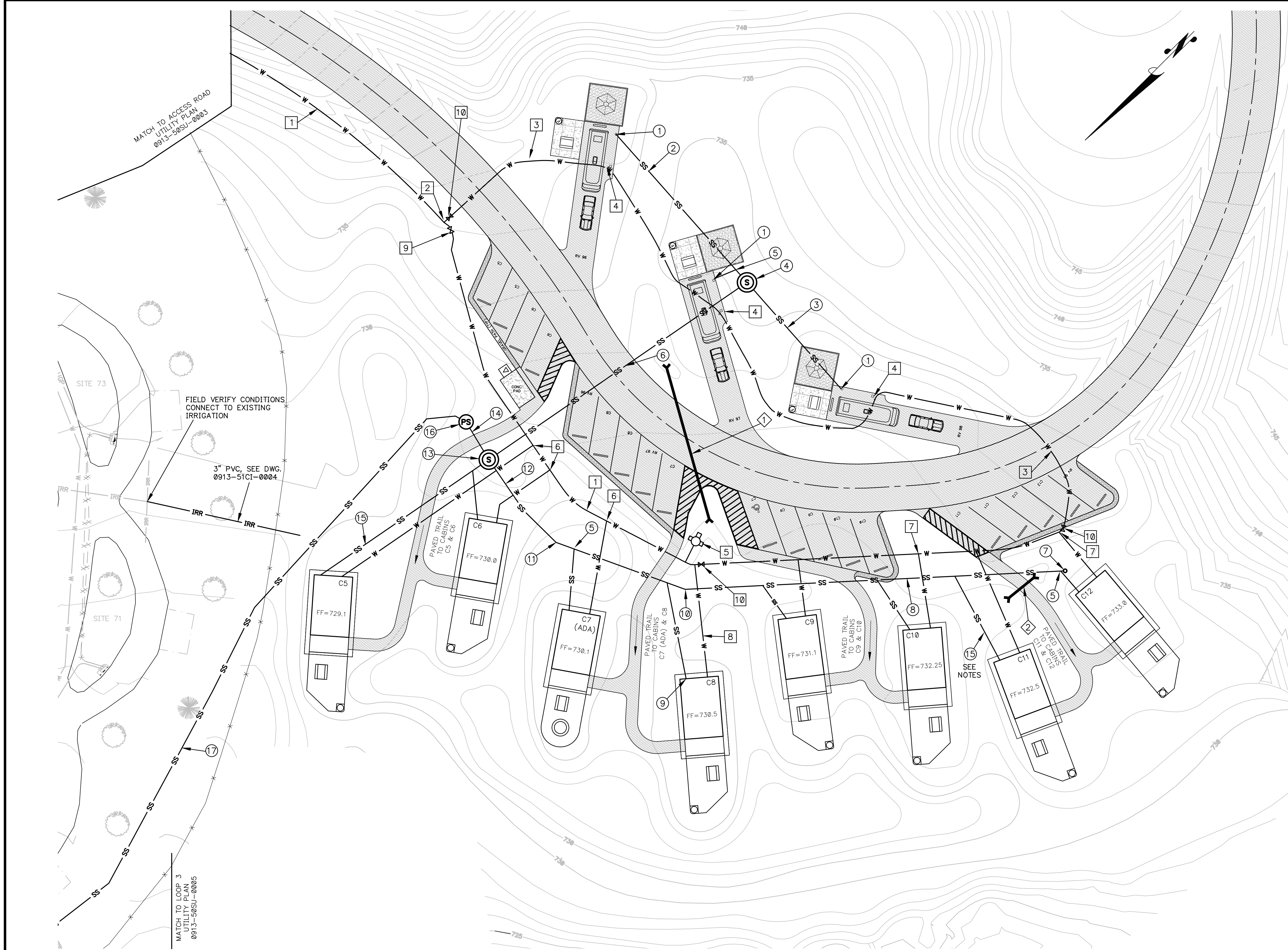
- 1 6" HDPE WM FROM CONNECTION (1/0913-50SU-0006) TO CABIN LOOP FIRE HYDRANT (2A/0913-50SU-0006) (TOTAL LENGTH=1,235)
- 2 6"x2" HDPE TEE (MJ OR FL ADAPTER KITS)
- 3 525 LF OF 2" HDPE PIPE
- 4 RV POWER/WATER PEDESTAL, SEE 6/0913-50SU-0006
- 5 FIRE HYDRANT, SEE 2A/0913-50SU-0006
- 6 6"x1" HDPE SERVICE SADDLE TAP
- 7 2"x1" HDPE TEE
- 8 1" HDPE, TYP. CABIN CONNECTION SEE 0913-50SU-0006 (TOTAL LENGTH OF ALL CONNECTIONS = 342 LF)
- 9 6" RSGV, SEE 6/0913-50SU-0007
- 10 2" VALVE, SEE 3/0913-50SU-0006

SANITARY SEWER

- 1 RV SEWER CONNECTION, SEE 2/0913-50SU-0007
- 2 82 LF OF 6" SS PIPE @ 2% MIN.
- 3 60 LF OF 6" SS PIPE @ 2% MIN.
- 4 48" RV MANHOLE, SEE 6/0913-50SU-0008 I.E. IN =728.2, I.E. OUT =728.0, N 1774973.5934, E 195940.9978
- 5 8"x6" OR 6"x6" WYE FITTING (TYP), SEE 1/0913-50SU-0007
- 6 130 LF OF 8" SS PIPE @ 2% MIN.
- 7 END LINE CLEANOUT, SEE 5/0913-50SU-0007 N 177495.7998, E 195932.3254, I.E. 729.25
- 8 160 LF OF 6" SS PIPE @ 1.5% MIN.
- 9 CABIN CONNECTION SEE 6/0913-50SU-0007
- 10 6"x8" REDUCER FOLLOWED BY 8" PVC SS 22.5' BEND, N 1774901.7978, E 196049.0856, I.E. 726.85
- 11 8" PVC SS 30' BEND, N 1774953.3571, E196073.2031, I.E. 726.1
- 12 102 LF OF 8" SS PIPE @ 1.5% MIN.
- 13 48" SS MANHOLE, SEE 7/0913-50SU-0008 I.E. IN =725.35, I.E. OUT =725.1, N 1774997.3240, E 196068.6233
- 14 20 LF OF 4" SS PIPE @ 2% MIN.
- 15 CABIN LATERAL, 4" SS PIPE, TYP. (270 LF TOTAL FOR ALL CABIN LATERALS)
- 16 SS PUMP STATION N 1775015.0200, E 196064.2577, I.E. IN=724.7, SEE 3/0913-50SU-0007
- 17 905 LF OF 3" HDPE SS FORCE MAIN

STORM WATER

- 1 67 LF 12" DIA. D.I. PIPE, S=2.45%
UPSTREAM END: N=195989.6026
E=1774972.0441
I.E. 732.20
3:1 BEVEL
DOWNSTREAM END: N=196021.4322
E=1774915.3707
I.E. 730.56
3:1 BEVEL
- 2 16 LF 12" DIA. D.I. PIPE, S=1.88%
UPSTREAM END: N=195941.7579
E=1774802.7066
I.E. 730.80
3:1 BEVEL
DOWNSTREAM END: N=195956.3669
E=1774804.2652
I.E. 730.50
3:1 BEVEL



MATCH TO ACCESS ROAD
UTILITY PLAN
0913-50SU-0003

FIELD VERIFY CONDITIONS
CONNECT TO EXISTING
IRRIGATION

3" PVC, SEE DWG.
0913-51CI-0004

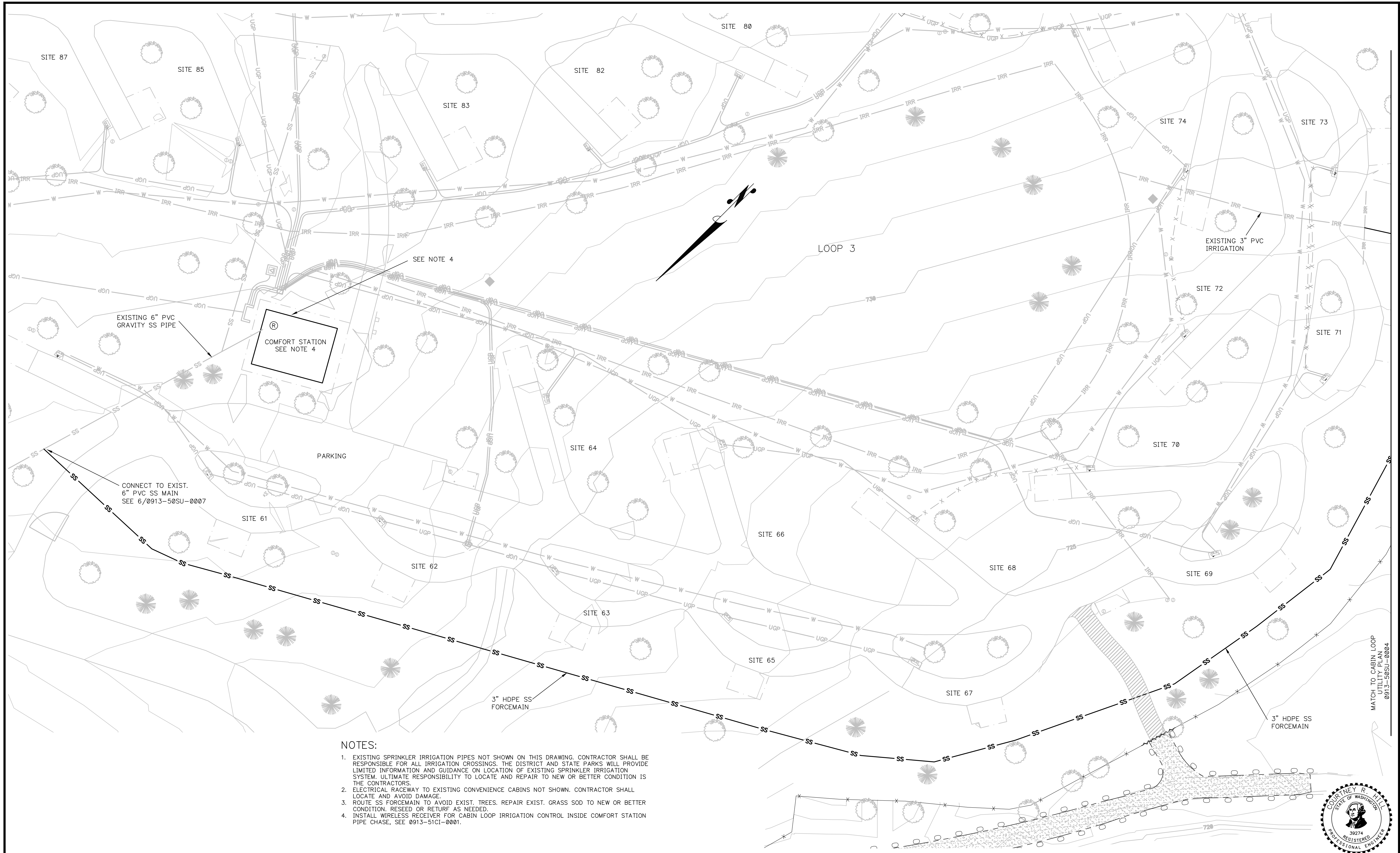
MATCH TO LOOP 3
UTILITY PLAN
0913-50SU-0005

CHELAN PUD NO.1		SCALE		VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
PRIM. ENG.	C. HILL	FULL:	1"=20'	0 1"		CRH	TRT
2ND ENG.		0	11/14/2014	BID SET		REQ. BY	DRFT
PROJ. MGR.	C. HILL	REV	DATE	REVISION			

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

Lincoln Rock State Park
CABIN LOOP & GROUP CAMP
CABIN LOOP
UTILITY PLAN
BID NO. 14-31

SHEET U4 OF U9
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0004



- NOTES:**
- EXISTING SPRINKLER IRRIGATION PIPES NOT SHOWN ON THIS DRAWING. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL IRRIGATION CROSSINGS. THE DISTRICT AND STATE PARKS WILL PROVIDE LIMITED INFORMATION AND GUIDANCE ON LOCATION OF EXISTING SPRINKLER IRRIGATION SYSTEM. ULTIMATE RESPONSIBILITY TO LOCATE AND REPAIR TO NEW OR BETTER CONDITION IS THE CONTRACTORS.
 - ELECTRICAL RACEWAY TO EXISTING CONVENIENCE CABINS NOT SHOWN. CONTRACTOR SHALL LOCATE AND AVOID DAMAGE.
 - ROUTE SS FORCEMAIN TO AVOID EXIST. TREES. REPAIR EXIST. GRASS SOD TO NEW OR BETTER CONDITION. RESEED OR RETURN AS NEEDED.
 - INSTALL WIRELESS RECEIVER FOR CABIN LOOP IRRIGATION CONTROL INSIDE COMFORT STATION PIPE CHASE, SEE 0913-51C1-0001.



CHELAN PUD NO.1	
PRIM. ENG.	C. HILL
2ND ENG.	
PROJ. MGR.	C. HILL

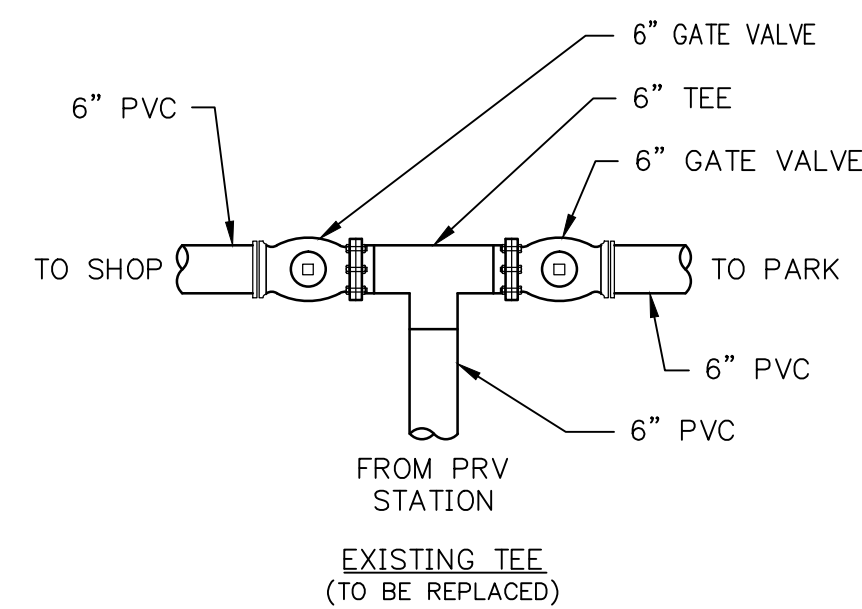
SCALE	FULL: 1"=20'
REV	DATE

BAR IS ONE INCH ON ORIGINAL DRAWING.		VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
CRH	TRT	REV	DATE	REVISION	
REQ. BY	DRFT				

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

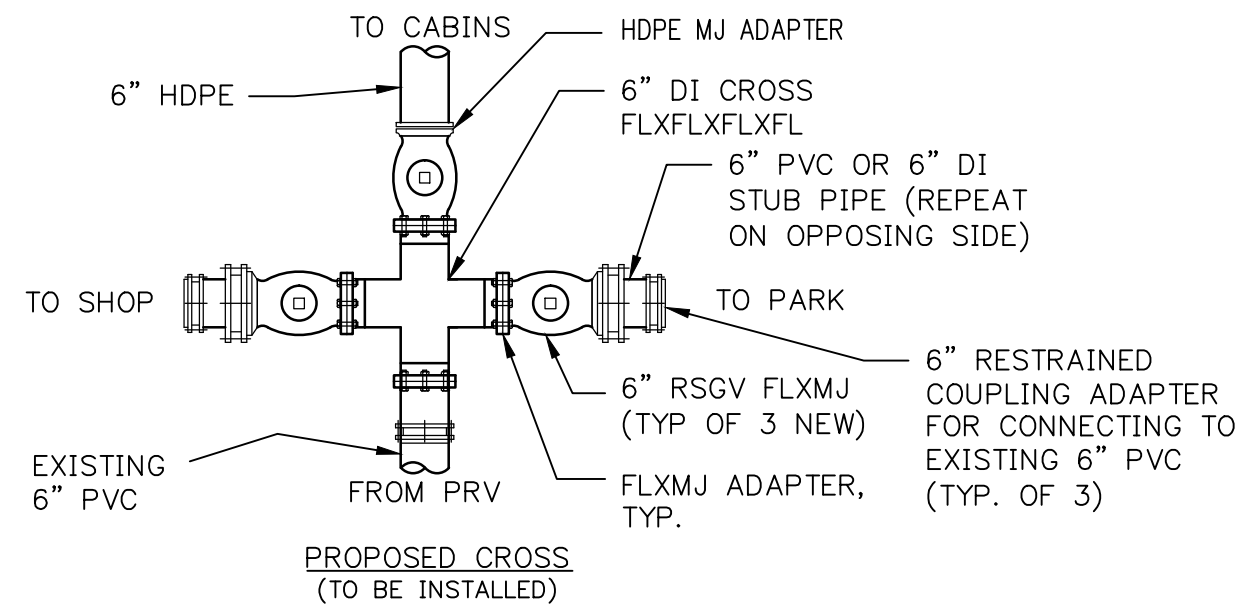
Lincoln Rock State Park
 CABIN LOOP & GROUP CAMP
 LOOP 3
 UTILITY PLAN
 BID NO. 14-31

SHEET U5 OF U9
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0005



NOTE:
1. VERIFY ORIENTATION, SIZE AND MATERIAL OF EXISTING 6" TEE CONNECTION PRIOR TO SUBMITTAL TO NEW CONNECTION.

1 DOMESTIC WATER TIE-IN DETAIL
0913-50SU-0002 NOT TO SCALE



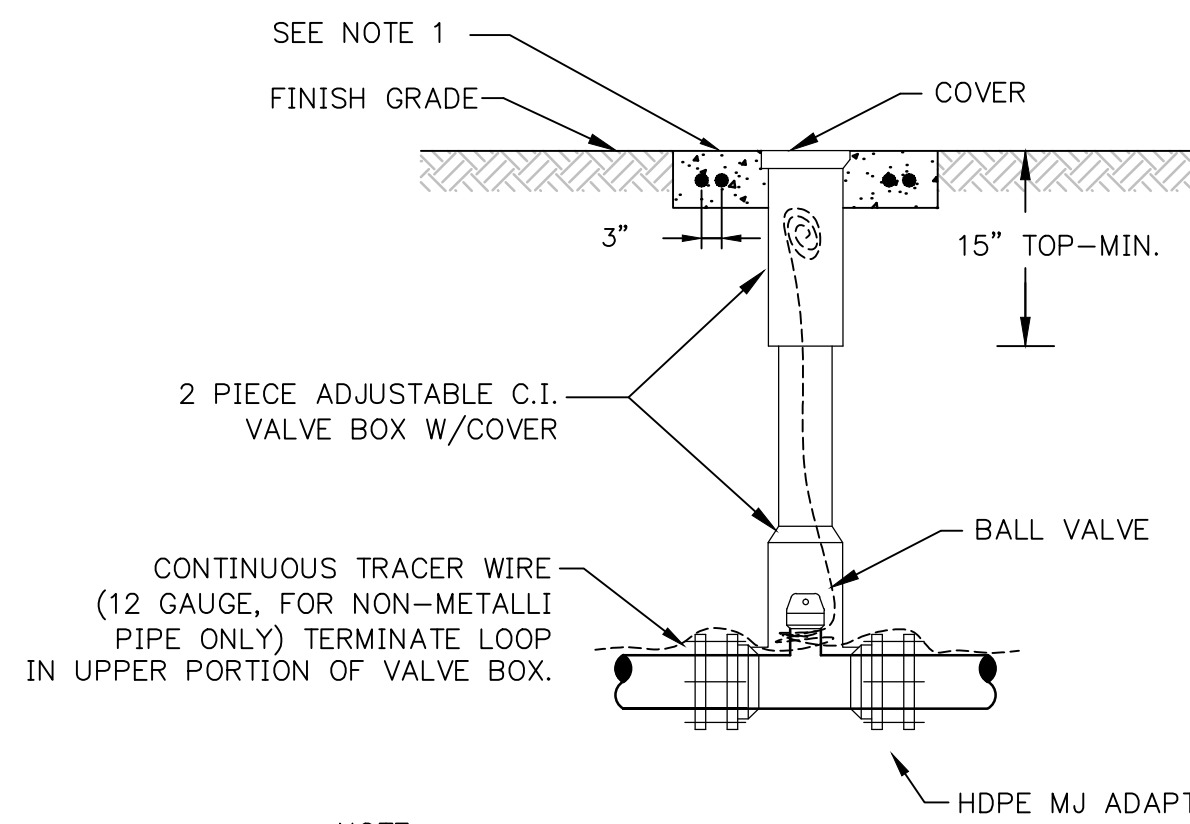
5 1/4" MVO HYDRANT ASSEMBLY PER CHELAN CO. PUD STANDARD (DISTRICT FURNISHED, CONTRACTOR SHALL PICK-UP AND INSTALL)

2A FIRE HYDRANT CONNECTION
0913-50SU-0002 NOT TO SCALE
0913-50SU-0004

NOTES:
1. INSTALL HYDRANT PLUMB. HYDRANT RUNS SHALL BE 6" DUCTILE IRON PIPE, LENGTH TO FIT. RESTRAIN ALL JOINTS ON HYDRANT RUN WITH MEGA-LUG FOLLOWERS FOR FITTINGS AND FIELD LOK GASKETS FOR BELLS.
2. 2'X2'X4" THICK CEMENT CONCRETE PAD J/# 4 BAR HOOPS EACH WAY AROUND EACH VALVE BOX.

MATERIALS:

- (1) A.L. SMITH H.P., WATEROUS 100 HP, M&H #129 MODIFIED, KENNEDY H.P., MUELLER A423, OR EQUAL.
- (1) PUMPER CONNECTION.
- (2) 2-1/2" HOSE CONNECTIONS NST THREAD WITH 1-1/4" PENTAGON OPERATING NUT.
- (1) 5-1/4" MAIN VALVE OPENING WITH 4" PACIFIC COAST THREAD.
- (2) 6" MECHANICAL JOINTS, MEGA-LUG, OR EQUAL.
- (1) 2 PIECE CAST IRON VALVE BOX, RICH VALVE CO., OR EQUAL STANDARD 8" TOP SECTION WITH REGULAR BASE SECTION. LENGTH TO FIT.
- (1) 6" RESILIENT SEAT GATE VALVE, FLX MJ.
- (1) DUCTILE IRON TEE, W/6" FLANGED OUTLET (SET TEE HORIZONTALLY). FLANGE OR MJ FOR HDPE CONNECTIONS.
- (FT) 6" DUCTILE IRON PIPE, MORTAR LINED LENGTH TO FIT.
- (1) 12"x12"x4" MINIMUM CONCRETE BLOCK.
- (1) 1/2 CU. YD. MINIMUM DRAIN ROCK (1-1/4" TO 2"). COVER ROCK W/ PLASTIC OR TAR PAPER.
- (1) HYDRANT EXTENSION IF REQUIRED. INSTALL BETWEEN BASE AND FACTORY SUPPLIED EXTENSION.

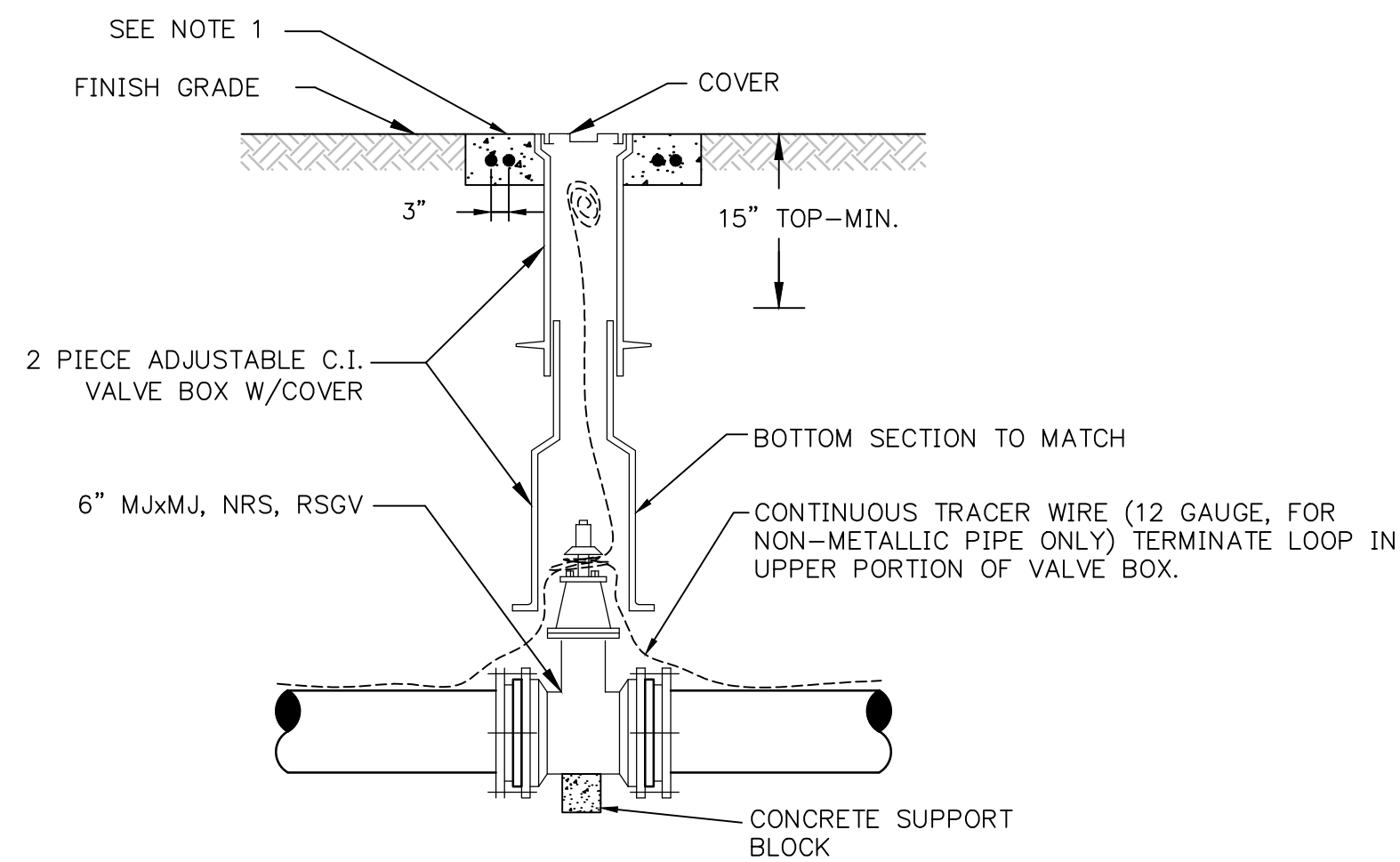


NOTE:

1. 2'X2'X4" THICK CEMENT CONCRETE PAD W/ #4 BAR HOOPS EACH WAY AROUND EACH VALVE BOX.
2. CONTRACTOR SHALL FURNISH ONE (1) OPERATING KEY TO SERVE ALL 2" OR SMALLER BALL VALVES.
3. PIPE TYPE AND CONNECTIONS VARY.

3 TYPICAL 2" OR SMALLER GATE VALVE DETAIL

0913-50SU-0002 NOT TO SCALE
0913-50SU-0004

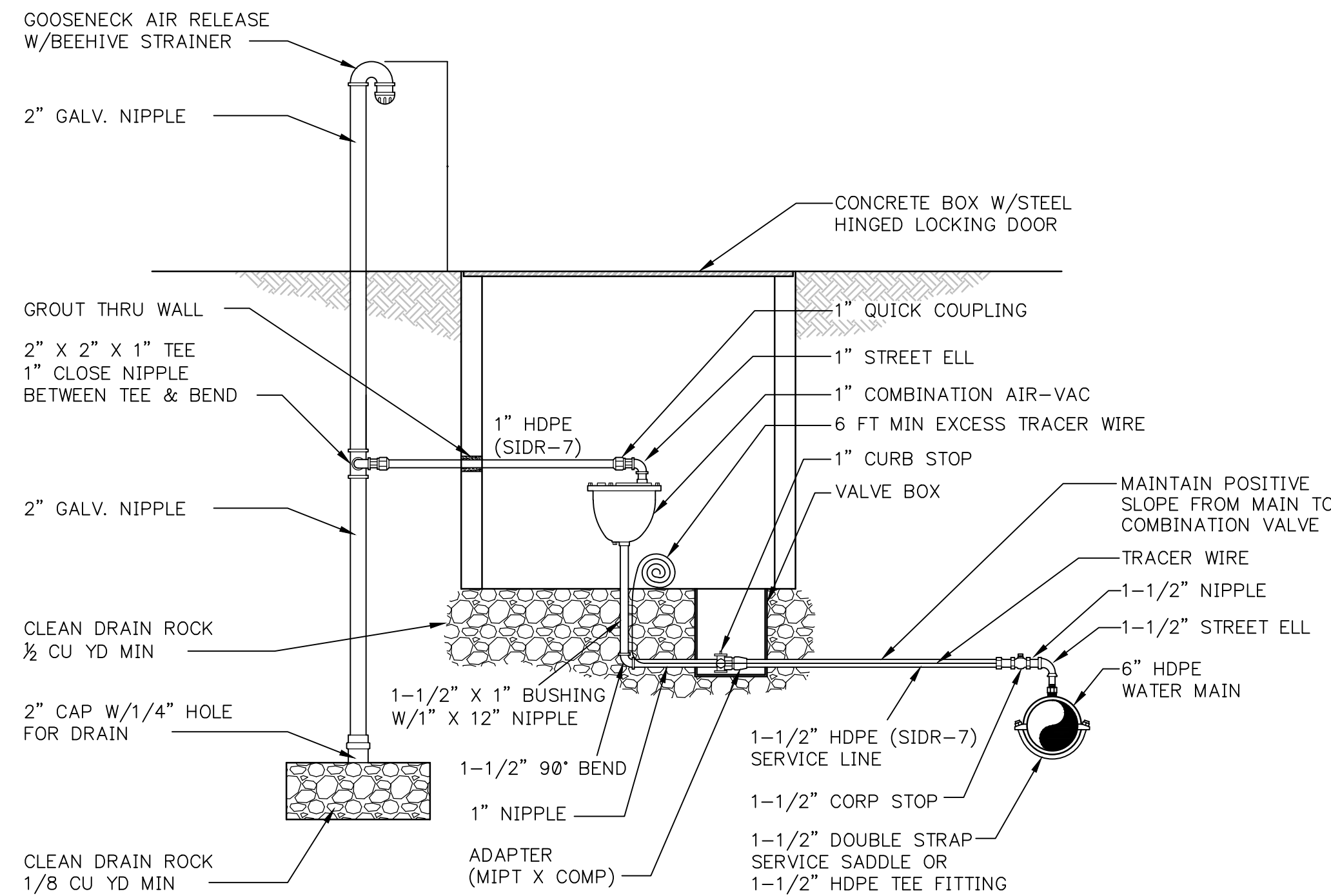


NOTE:

1. 2'X2'X4" THICK CEMENT CONCRETE PAD W/ #4 BAR HOOPS EACH WAY AROUND EACH VALVE BOX.
2. CONTRACTOR SHALL FURNISH ONE (1) OPERATING KEY TO SERVE ALL RSGVS.
3. PIPE TYPE AND CONNECTIONS VARY.

4 TYPICAL 3" OR LARGER GATE VALVE DETAIL

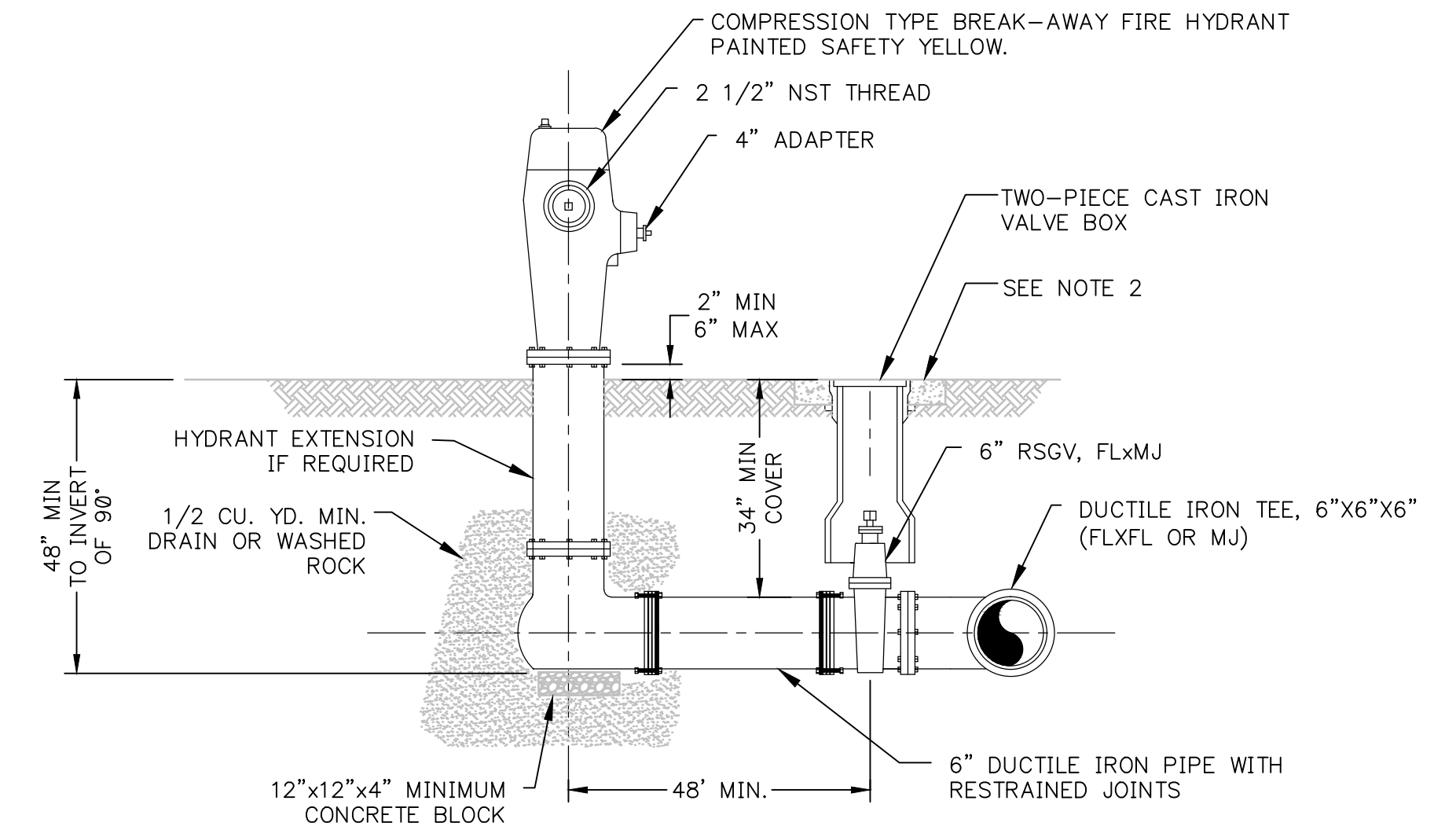
0913-50SU-0002 NOT TO SCALE
0913-50SU-0004



NOTES:
AIR VALVE ASSEMBLY SHALL BE INSTALLED AT HIGHEST POINT OF LINE

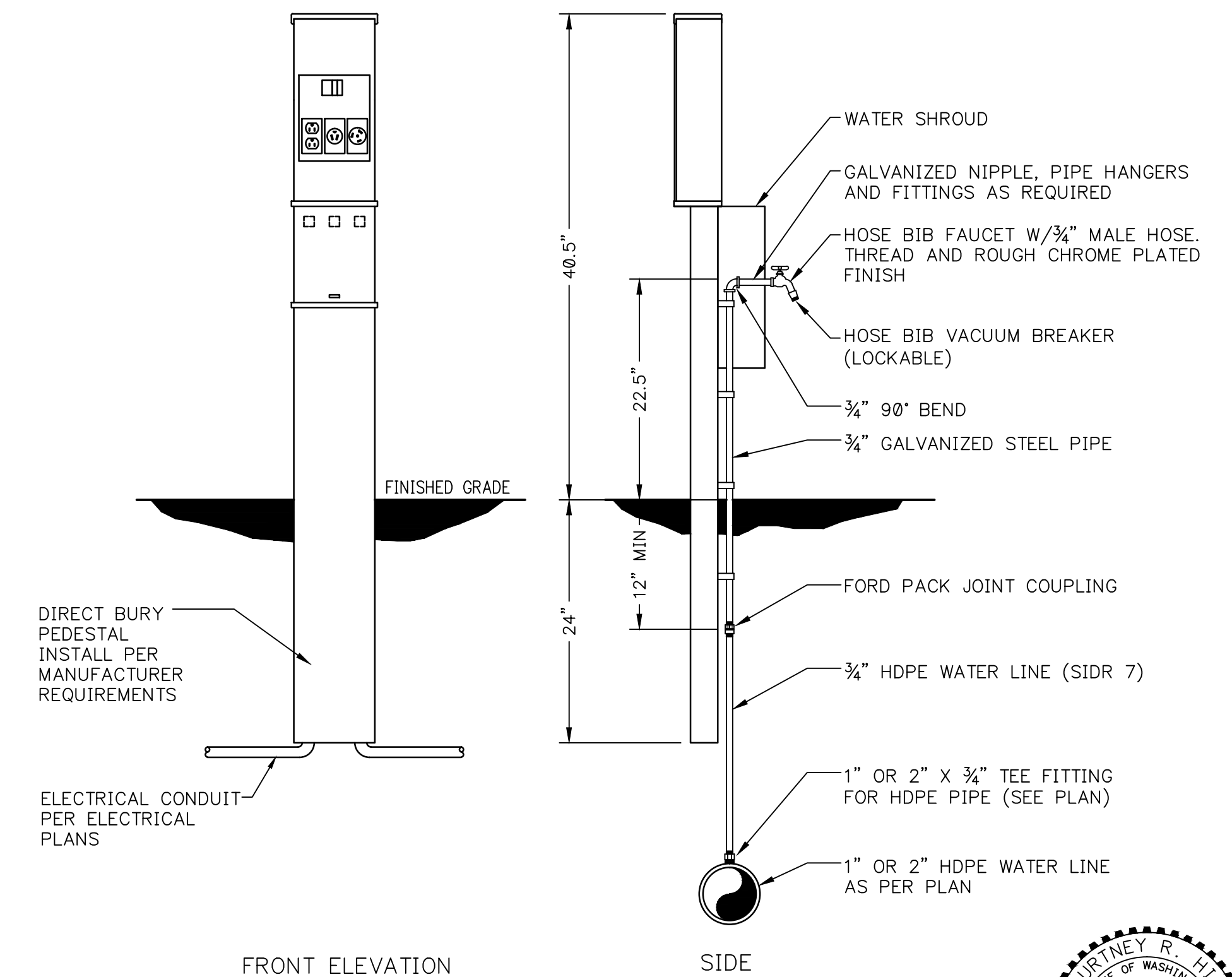
5 COMBINATION AIR-VAC DETAIL

0913-50SU-0002 NOT TO SCALE
0913-50SU-0004



2B FIRE HYDRANT ASSEMBLY

0913-50SU-0004 NOT TO SCALE



6 R.V. POWER/WATER PEDESTAL DETAIL

0913-50SU-0002 NOT TO SCALE
0913-50SU-0004

CHELAN PUD NO.1		SCALE	VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
PRIM. ENG.	C. HILL	NONE	0	1"	CRH	TRT
2ND ENG.		0	11/14/2014	BID SET	REQ. BY	DRFT
PROJ. MGR.	C. HILL	REV	DATE	REVISION		

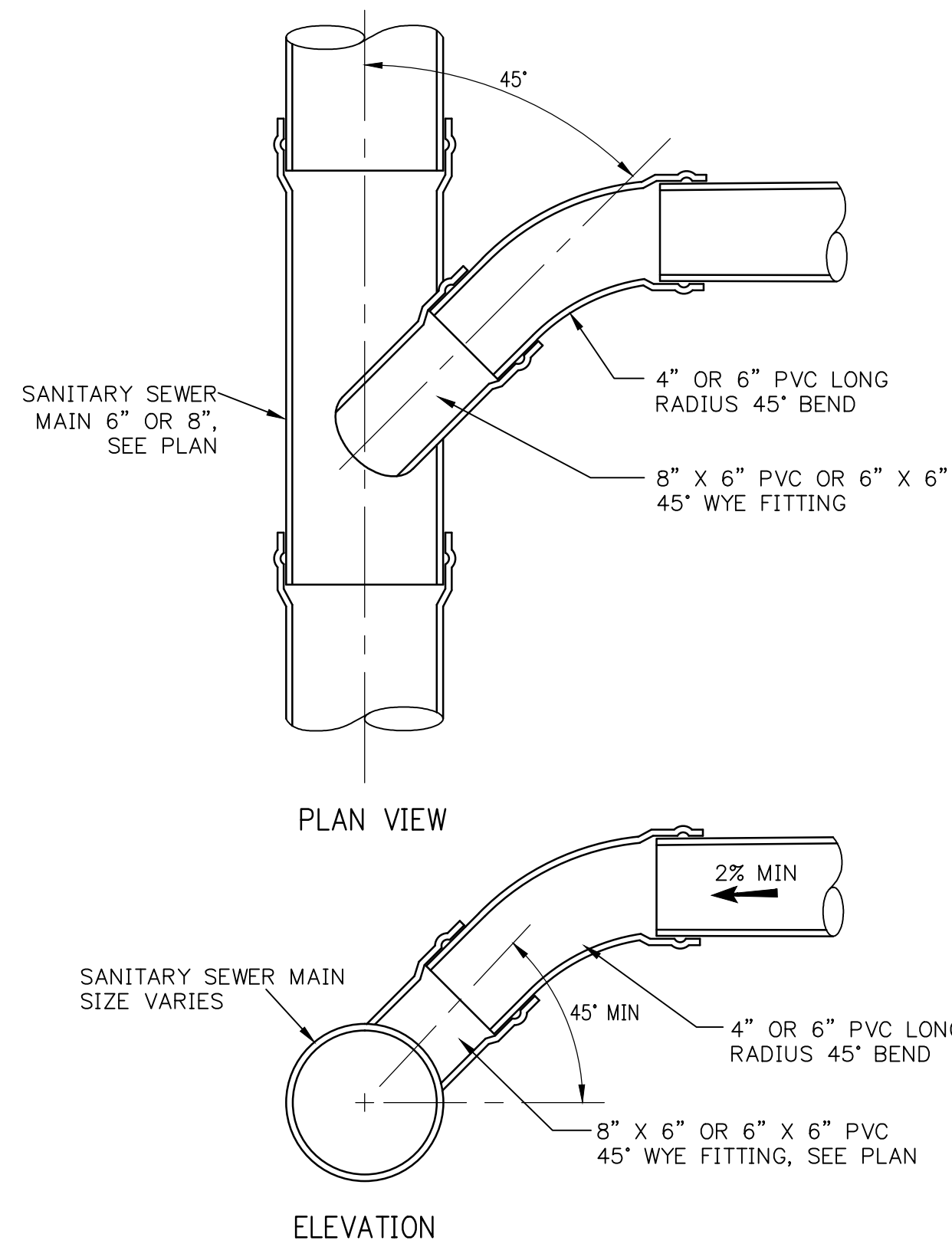
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY



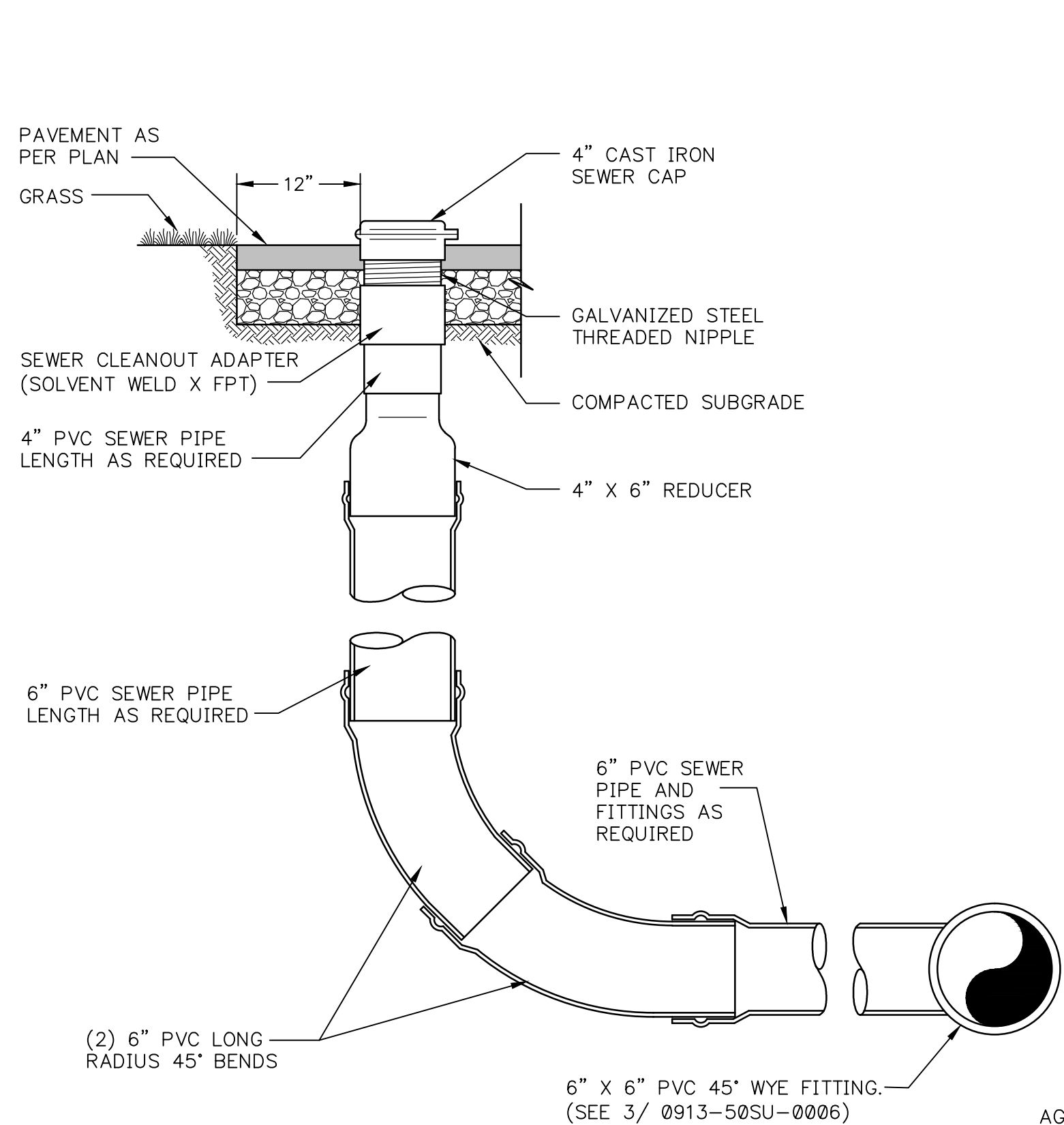
Lincoln Rock State Park
CABIN LOOP & GROUP CAMP
UTILITY DETAILS:
DOMESTIC & IRRIGATION
BID NO. 14-31



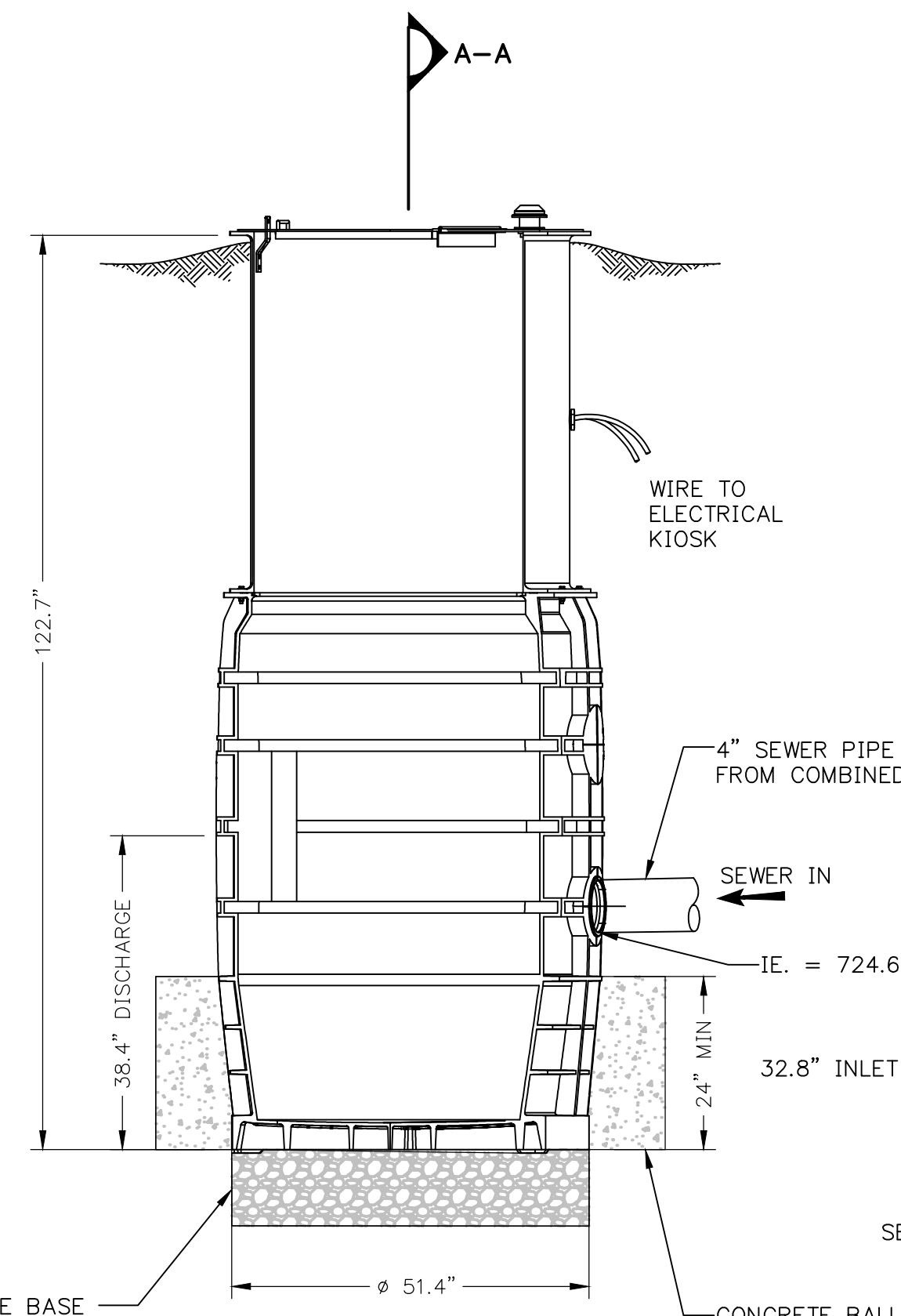
SHEET U6 OF U9
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0006



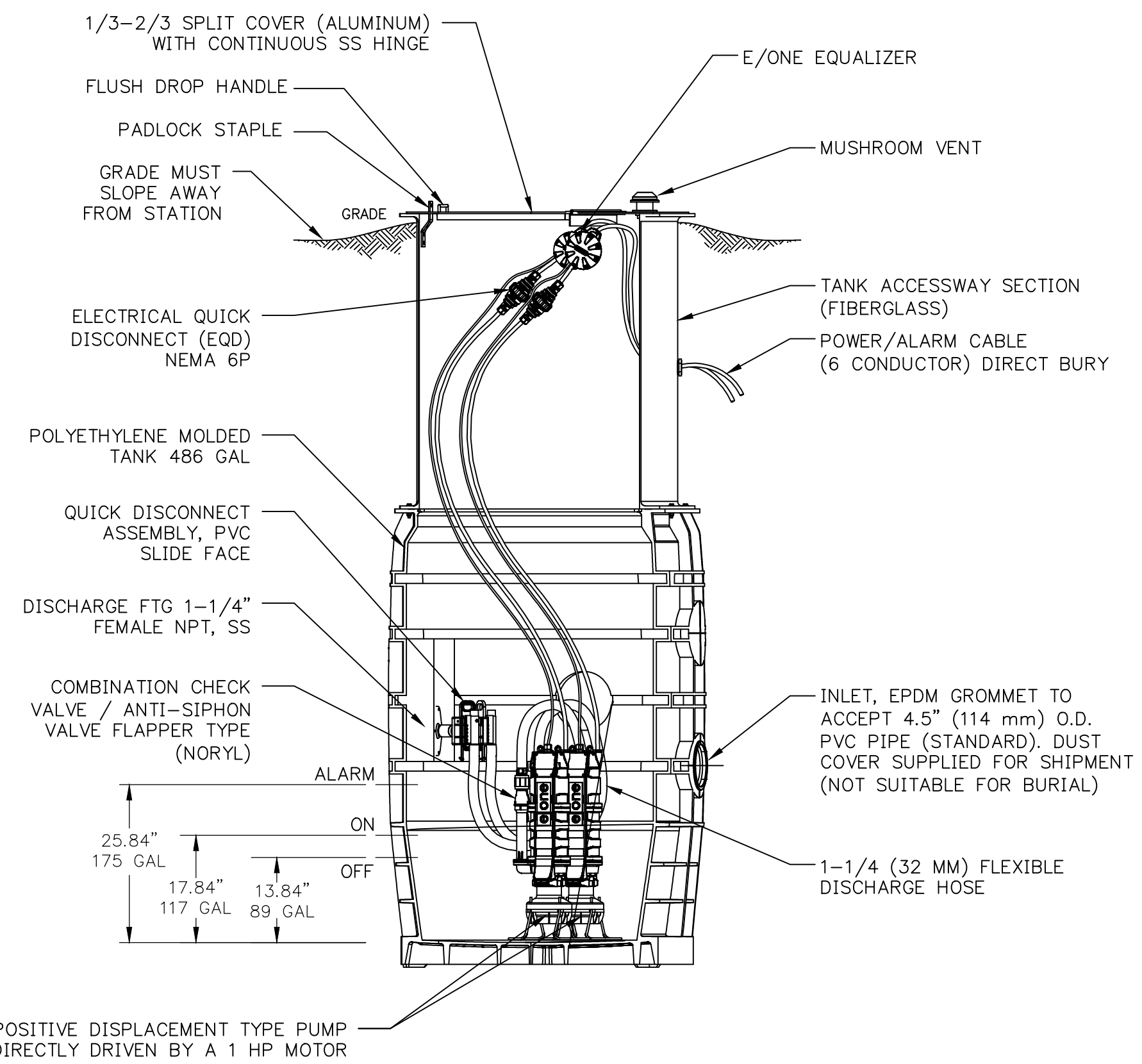
1 LATERAL TO MAIN CONNECTION DETAIL
 0913-50SU-0002 NOT TO SCALE
 0913-50SU-0004



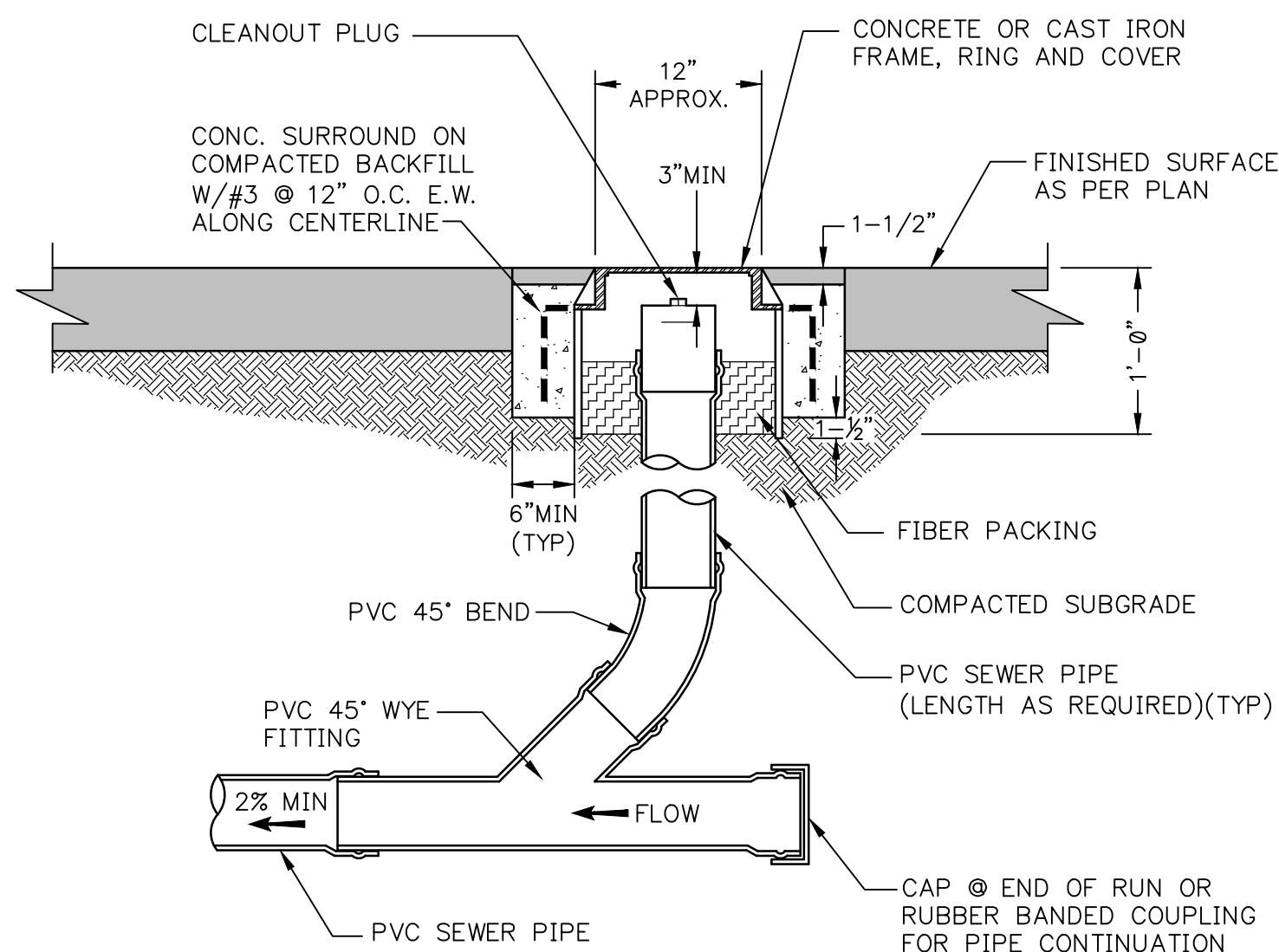
2 R.V. SANITARY SEWER CONNECTION DETAIL
 0913-50SU-0002 NOT TO SCALE
 0913-50SU-0004



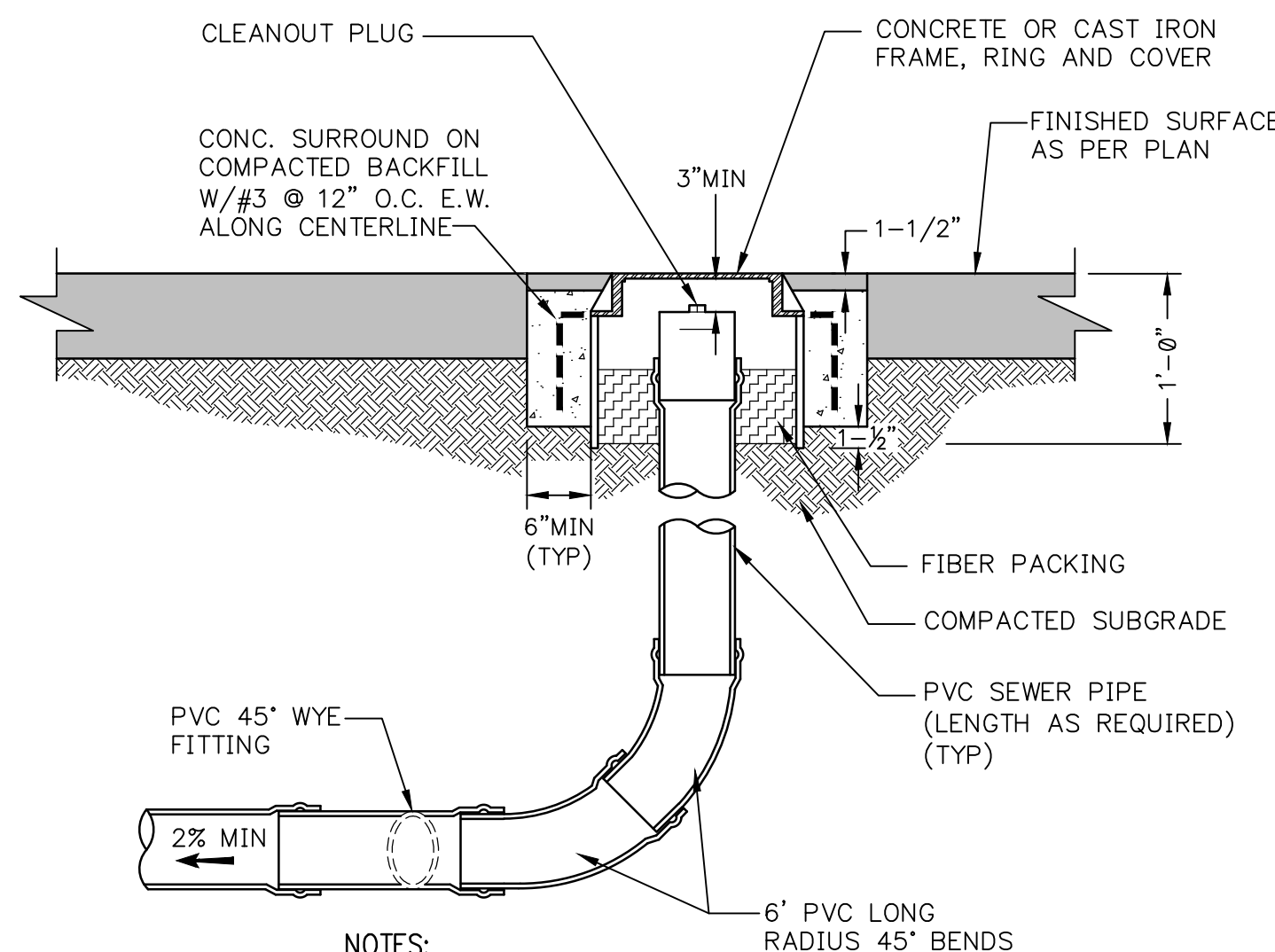
3 PUMP STATION DETAIL
 0913-50SU-0004 NOT TO SCALE



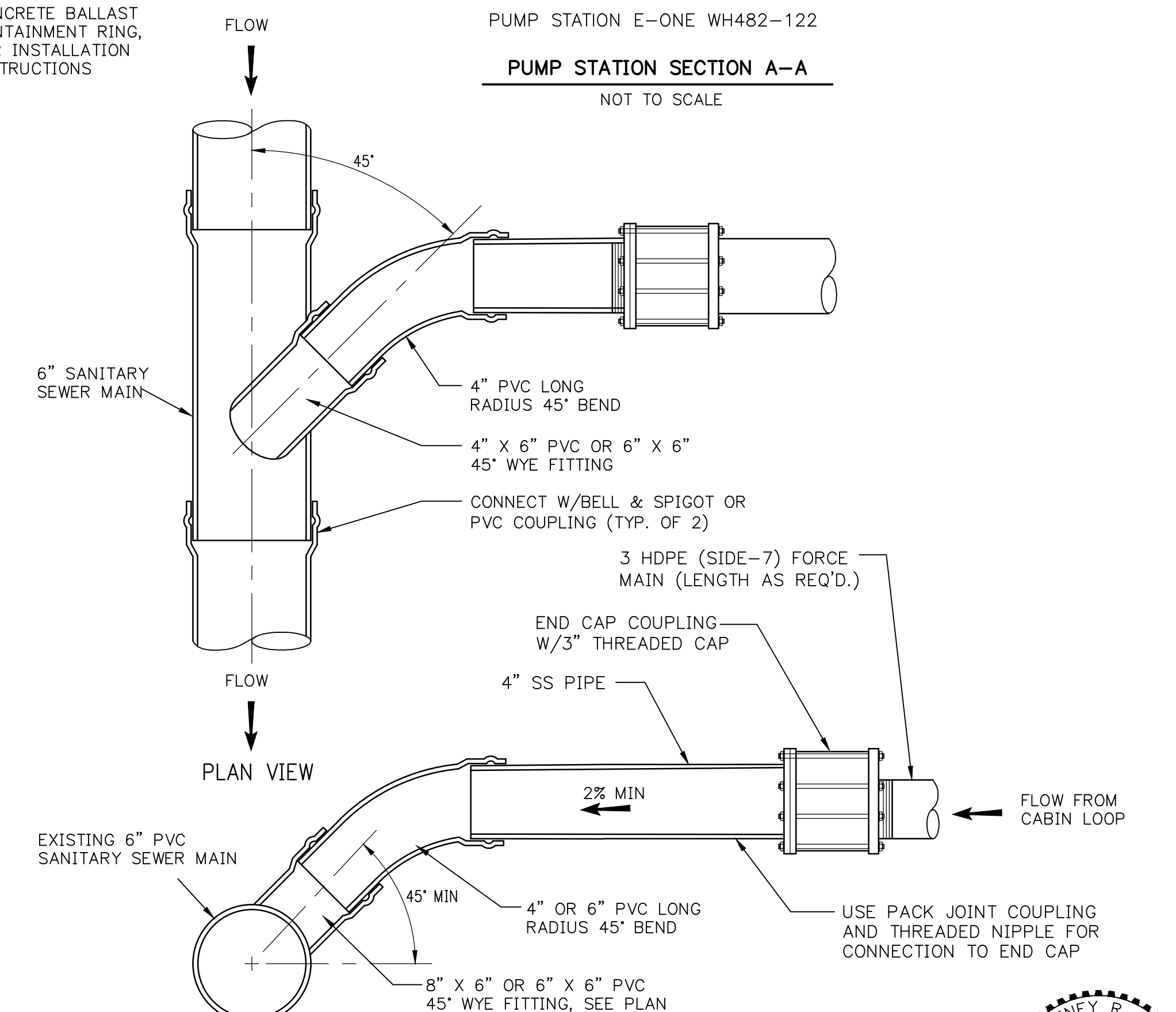
PUMP STATION SECTION A-A
 NOT TO SCALE



4 INLINE CLEANOUT ELEVATION DETAIL
 0913-50SU-0002 NOT TO SCALE
 0913-50SU-0004



5 ENDLINE CLEANOUT ELEVATION DETAIL
 0913-50SU-0002 NOT TO SCALE
 0913-50SU-0004



6 CONNECTION DETAIL
 0913-50SU-0002 NOT TO SCALE
 0913-50SU-0004

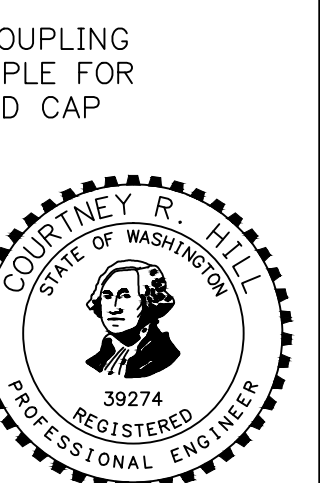
CHELAN PUD NO.1		SCALE	VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
PRIM. ENG.	C. HILL	NONE	0	1"	CRH	TRT
2ND ENG.		0	11/14/2014	BID SET	REQ. BY	DRFT
PROJ. MGR.	C. HILL	REV	DATE	REVISION		

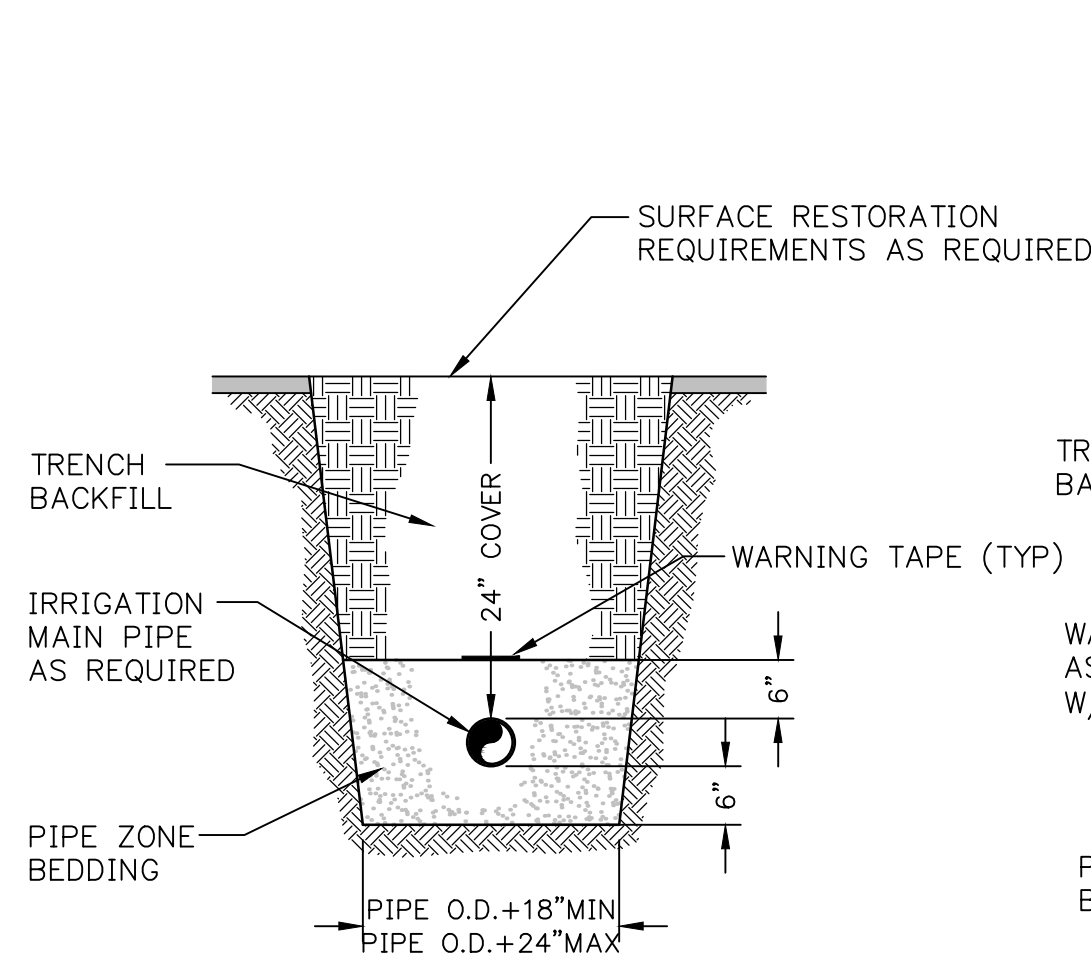
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON



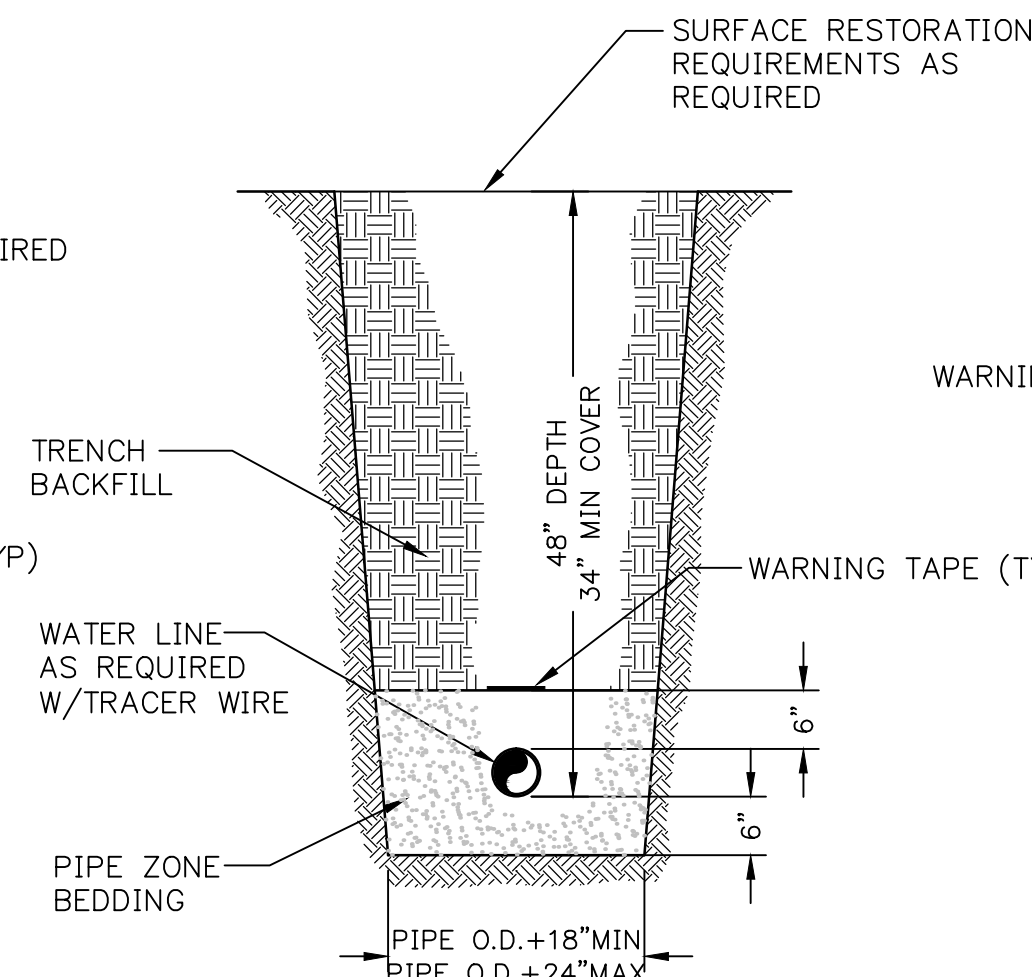
Lincoln Rock State Park
 CABIN LOOP & GROUP CAMP
 UTILITY DETAILS:
 SEWER
 BID NO. 14-31

SHEET U7 OF U9
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0007

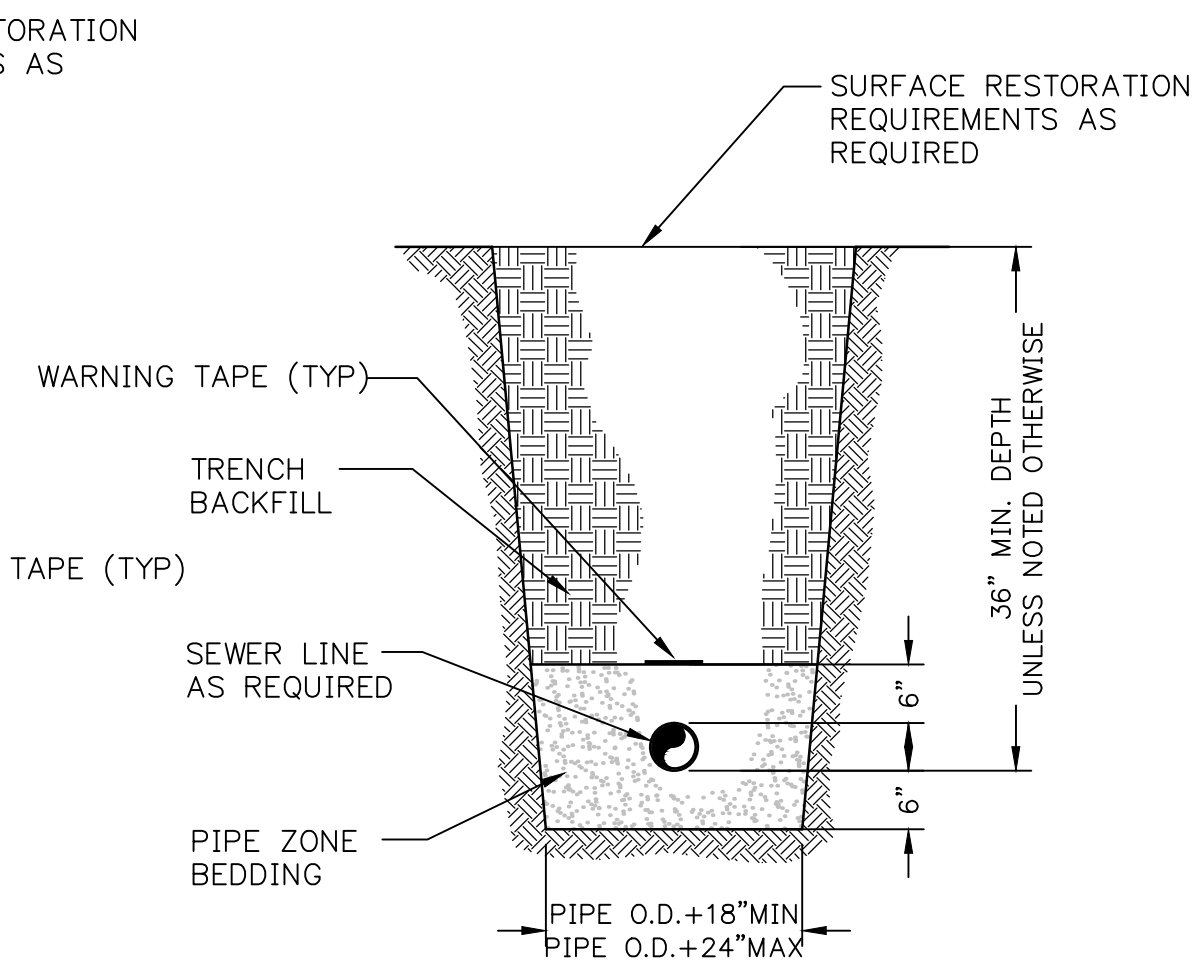




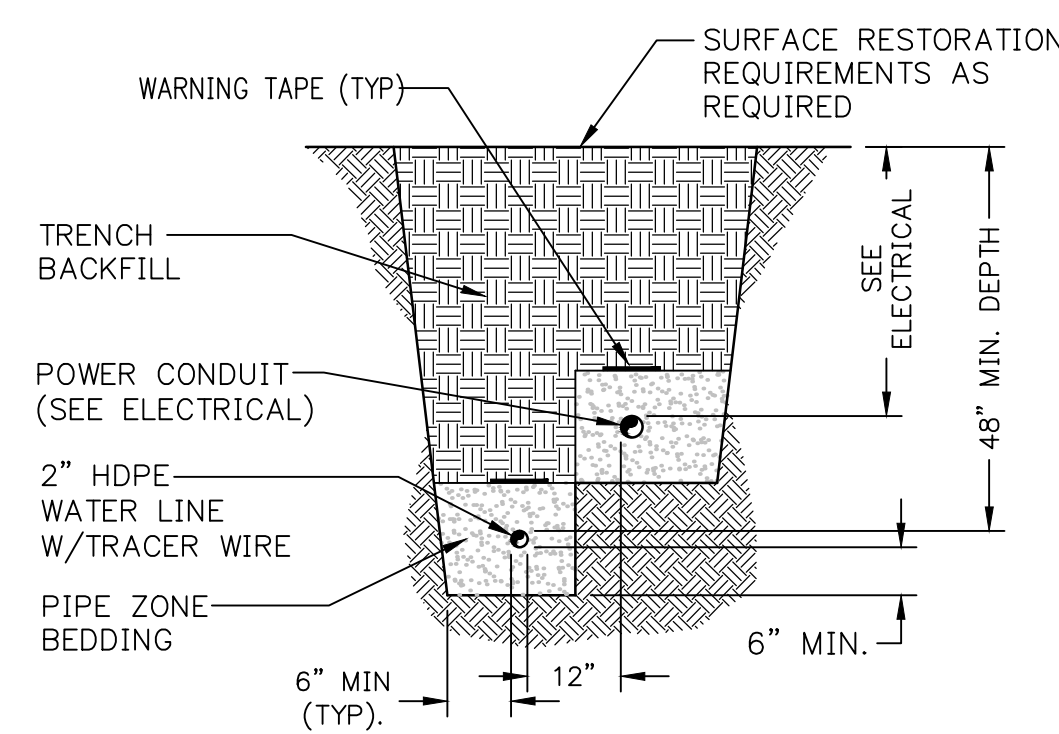
1 IRRIGATION MAIN TRENCH SECTION
0913-50SU-0002 NOT TO SCALE
0913-50SU-0004



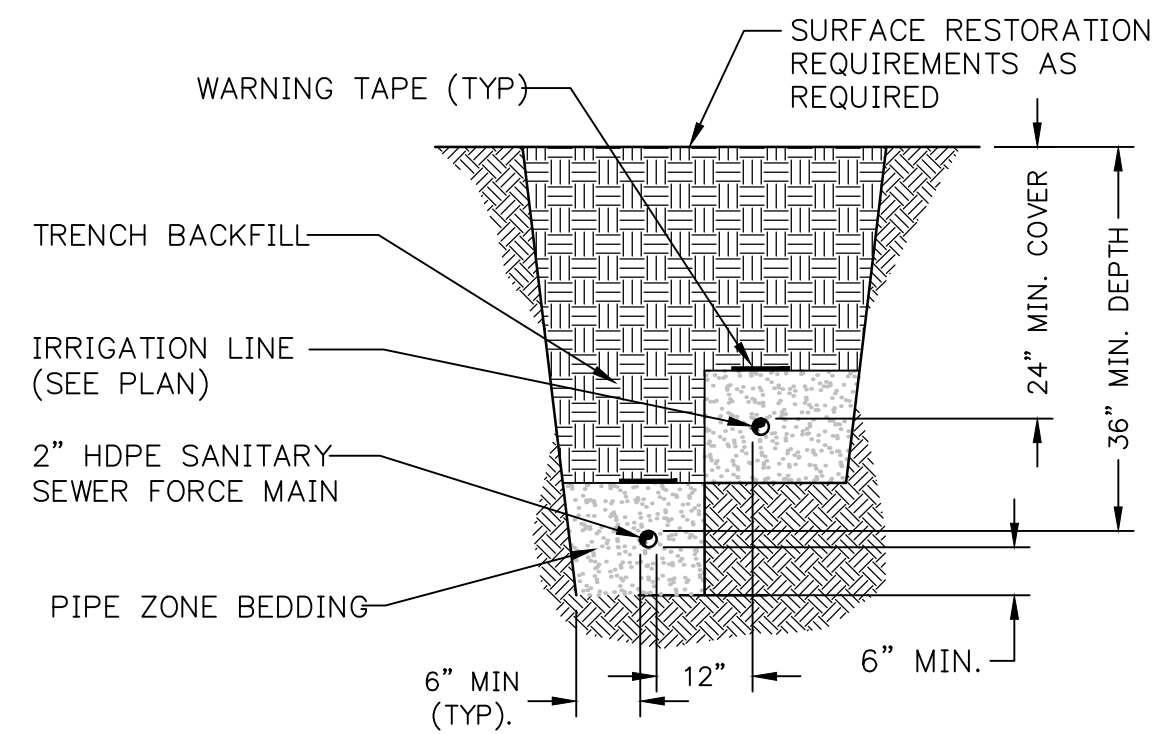
2 WATER TRENCH SECTION
0913-50SU-0002 NOT TO SCALE
0913-50SU-0004



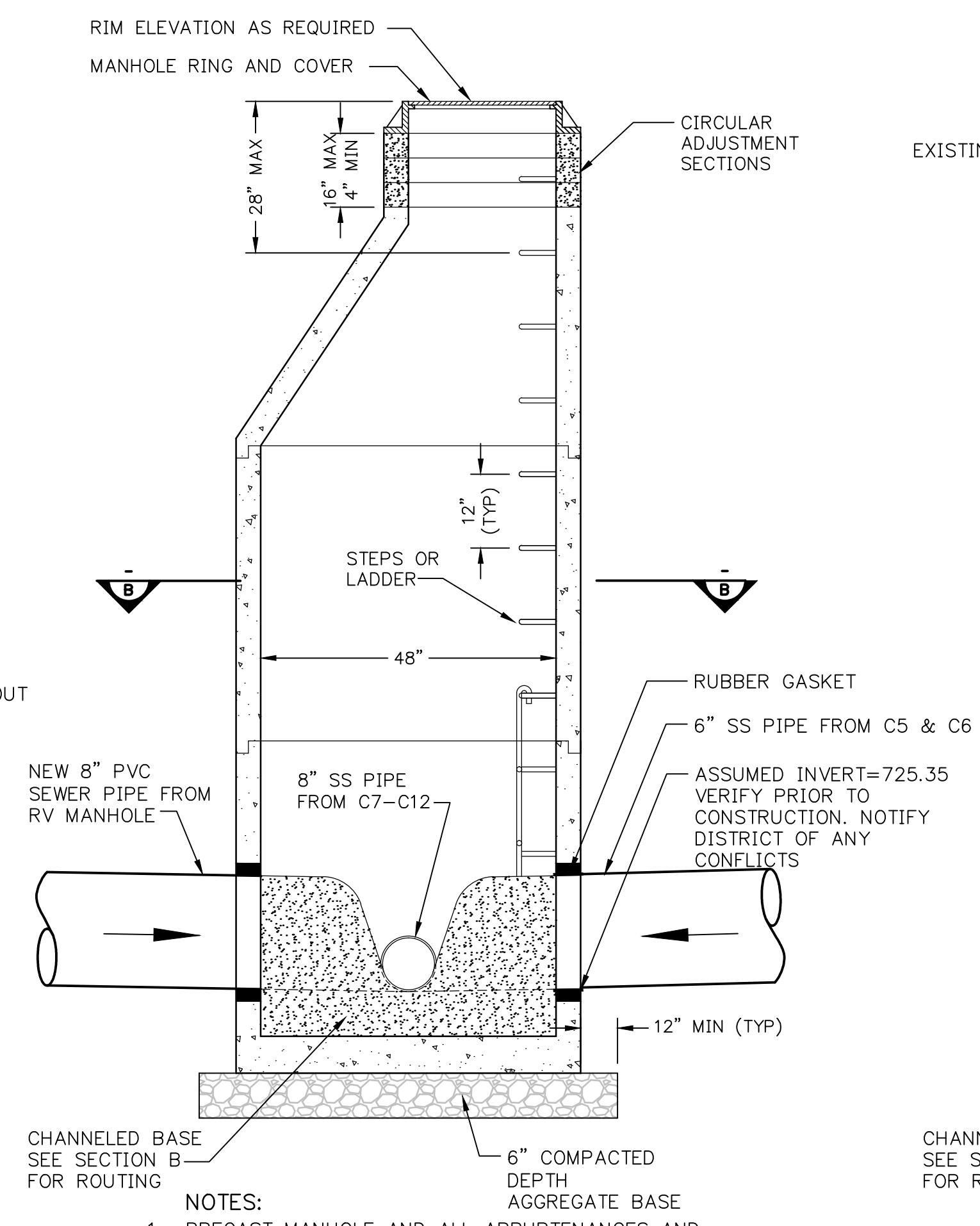
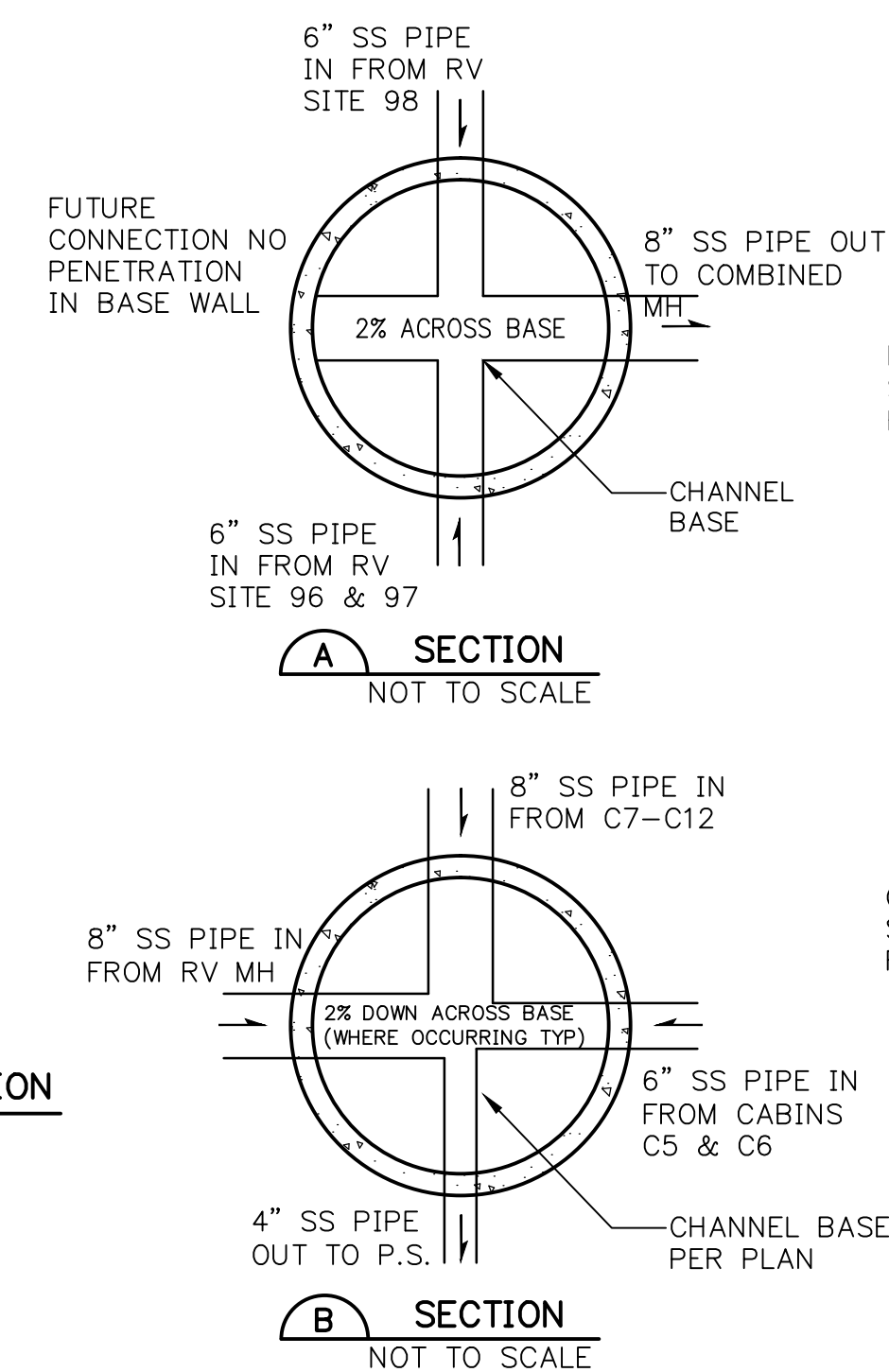
3 SEWER TRENCH SECTION
0913-50SU-0002 NOT TO SCALE
0913-50SU-0004



4 WATER & POWER COMMON TRENCH SECTION
0913-50SU-0002 NOT TO SCALE
0913-50SU-0004

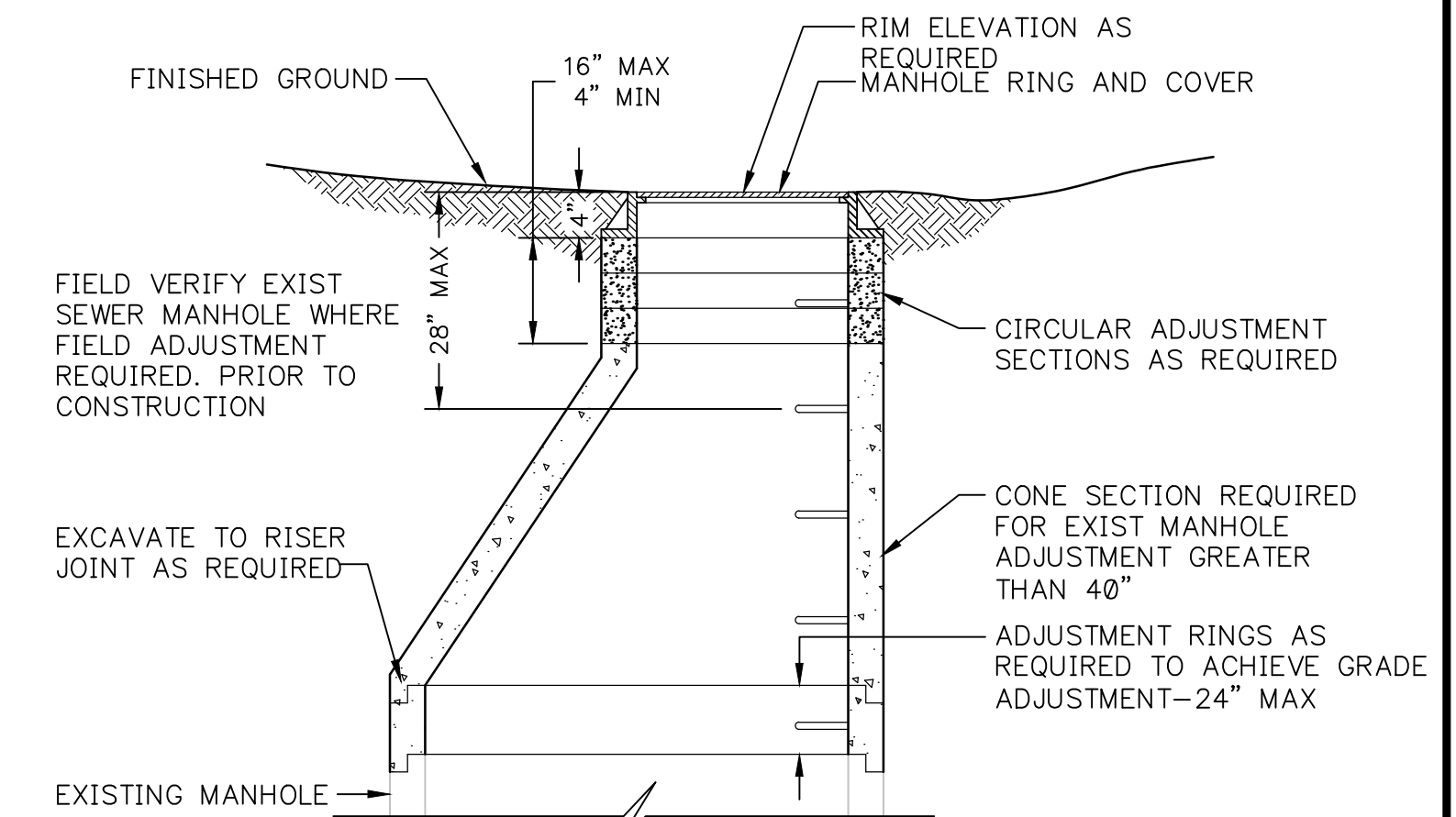


5 SEWER & IRRIGATION COMMON TRENCH SECTION
0913-50SU-0002 NOT TO SCALE
0913-50SU-0004

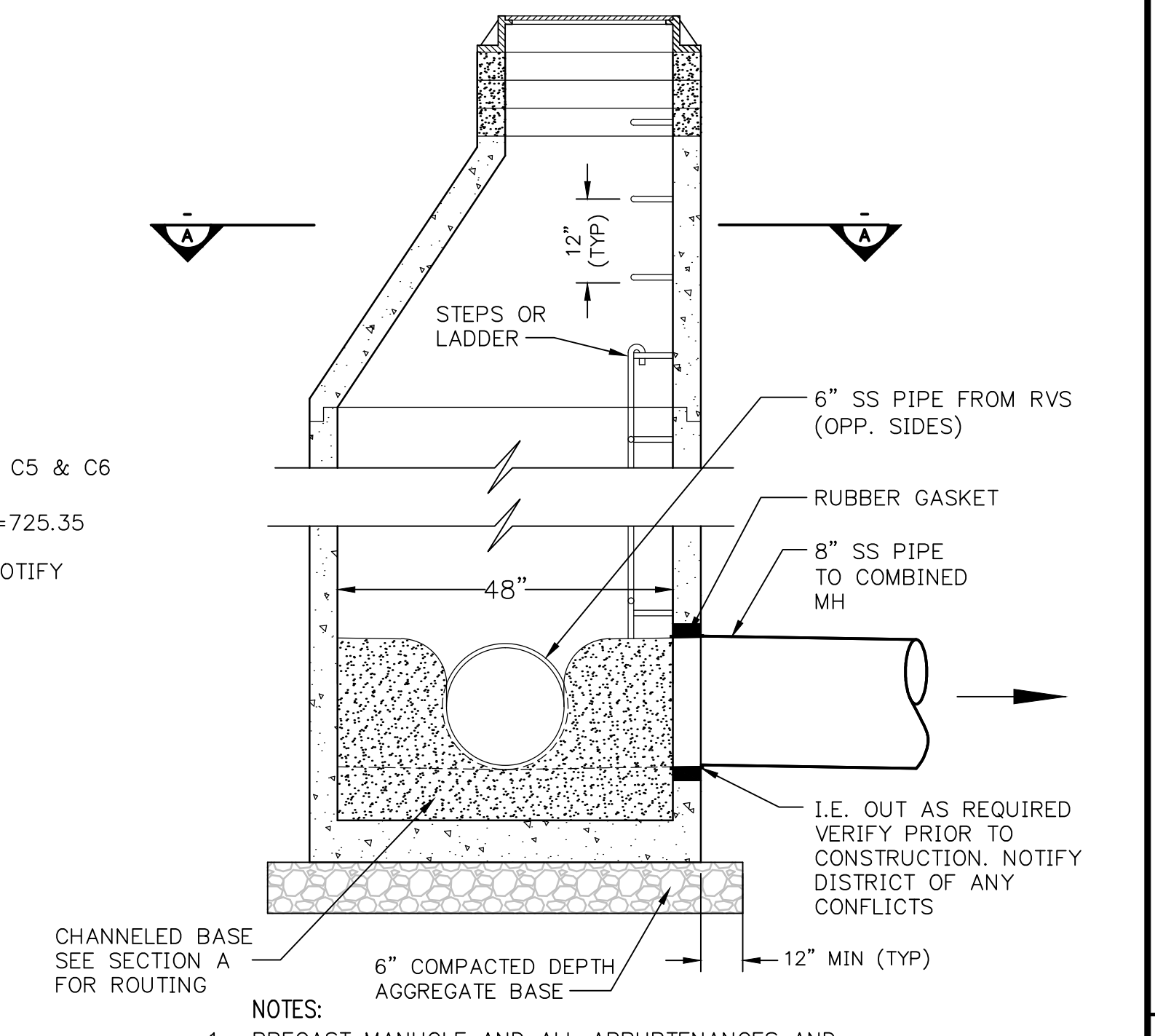


- NOTES:**
1. PRECAST MANHOLE AND ALL APPURTENANCES AND CONSTRUCTION METHODS PER WSDOT STANDARD PLANS AND SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION.
 2. DETAIL APPLIES TO NEW AND EXISTING STRUCTURES.

7 48" COMBINED MANHOLE
0913-50SU-0002 NOT TO SCALE
0913-50SU-0004

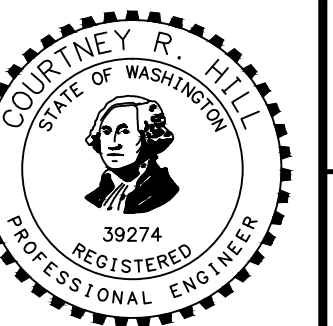


8 MANHOLE ADJUSTMENT
0913-50SU-0002 NOT TO SCALE
0913-50SU-0004



- NOTES:**
1. PRECAST MANHOLE AND ALL APPURTENANCES AND CONSTRUCTION METHODS PER WSDOT STANDARD PLANS AND SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION.
 2. DETAIL APPLIES TO NEW AND EXISTING STRUCTURES.

6 RV MANHOLE
0913-50SU-0002 NOT TO SCALE
0913-50SU-0004



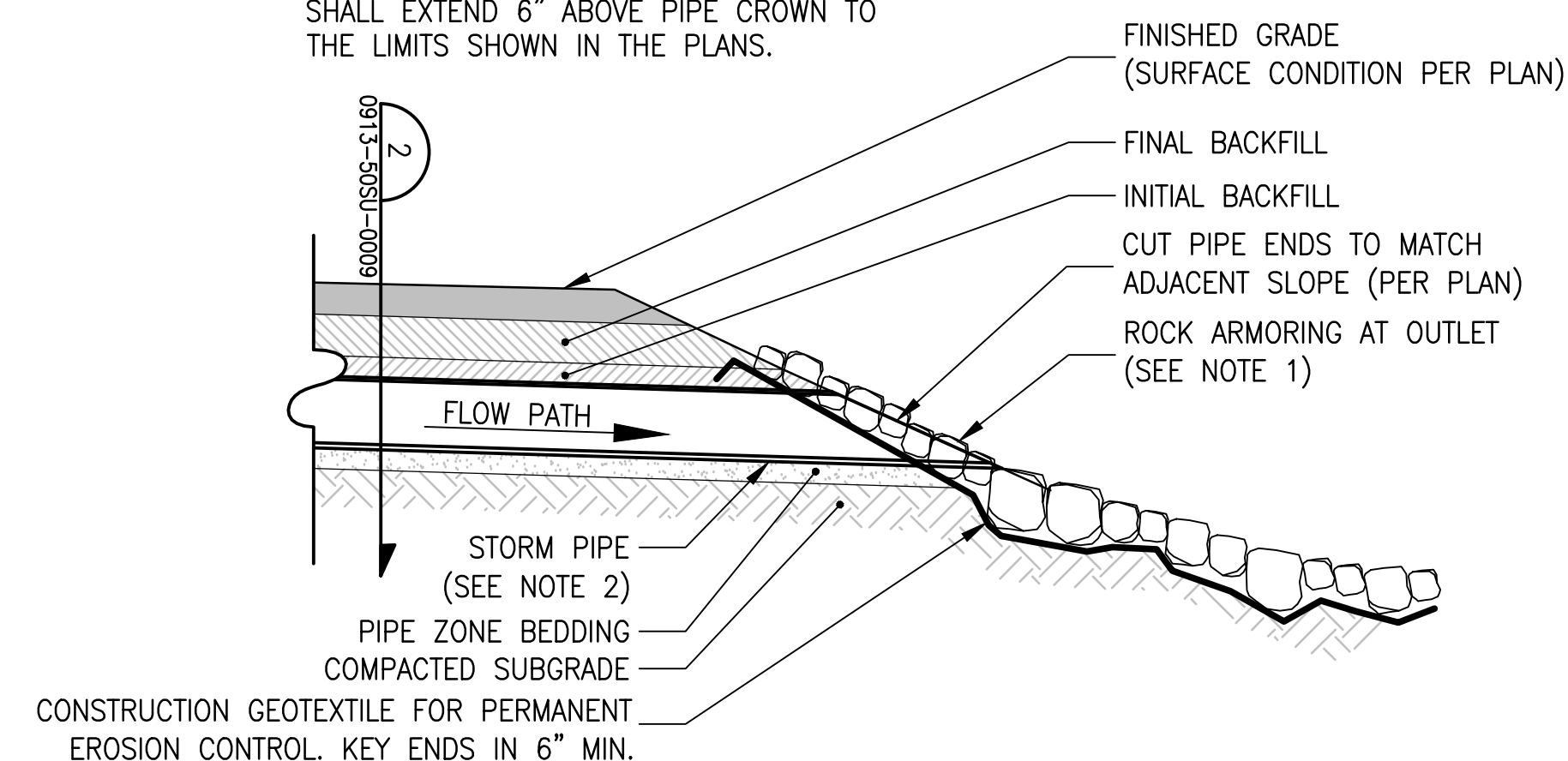
CHELAN PUD NO. 1		SCALE	VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
PRIM. ENG.	C. HILL	NONE	0 1"		CRH	TRT
2ND ENG.		0	11/14/2014	BID SET	REQ.	DRFT
PROJ. MGR.	C. HILL	REV	DATE	REVISION		

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

Lincoln Rock State Park
CABIN LOOP & GROUP CAMP
UTILITY DETAILS:
TRENCHES & MANHOLES
BID NO. 14-31

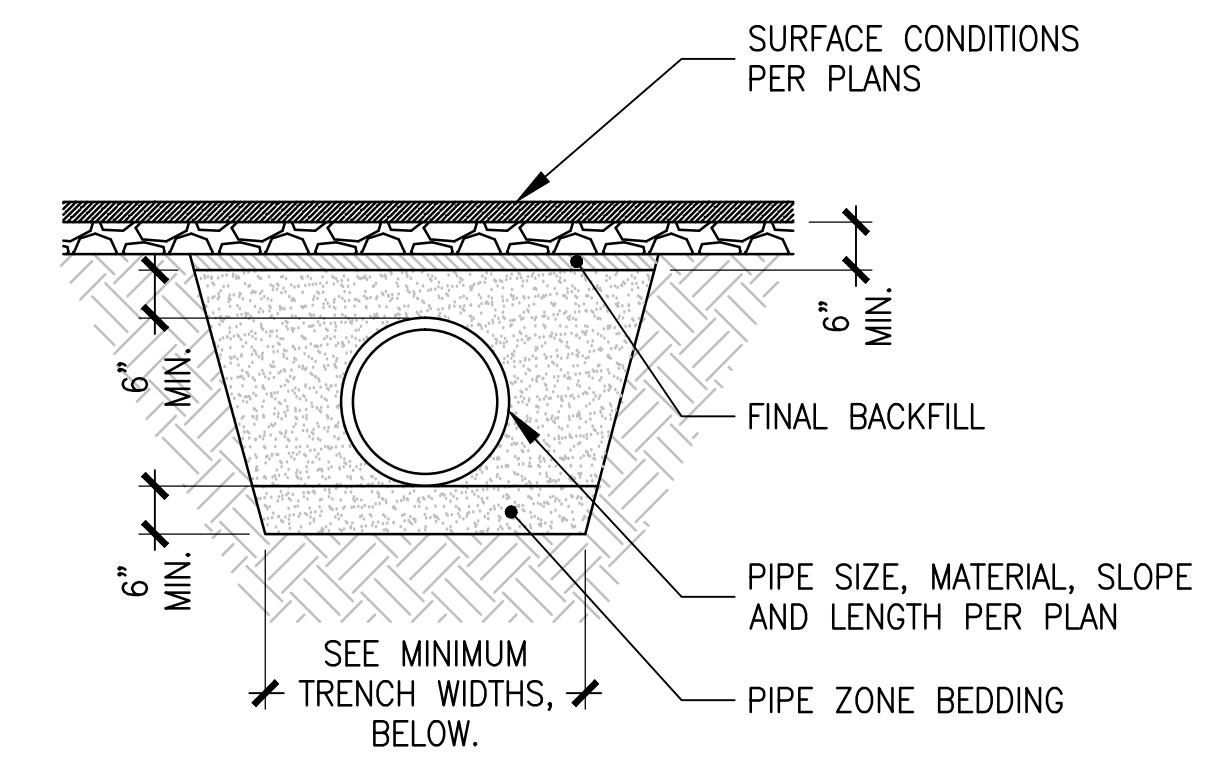
SHEET U8 OF U9
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0008

NOTES:
 1. ROCK ARMORING AT INLETS AND OUTLETS SHALL EXTEND 6" ABOVE PIPE CROWN TO THE LIMITS SHOWN IN THE PLANS.



1 STORM PIPE OUTFALL

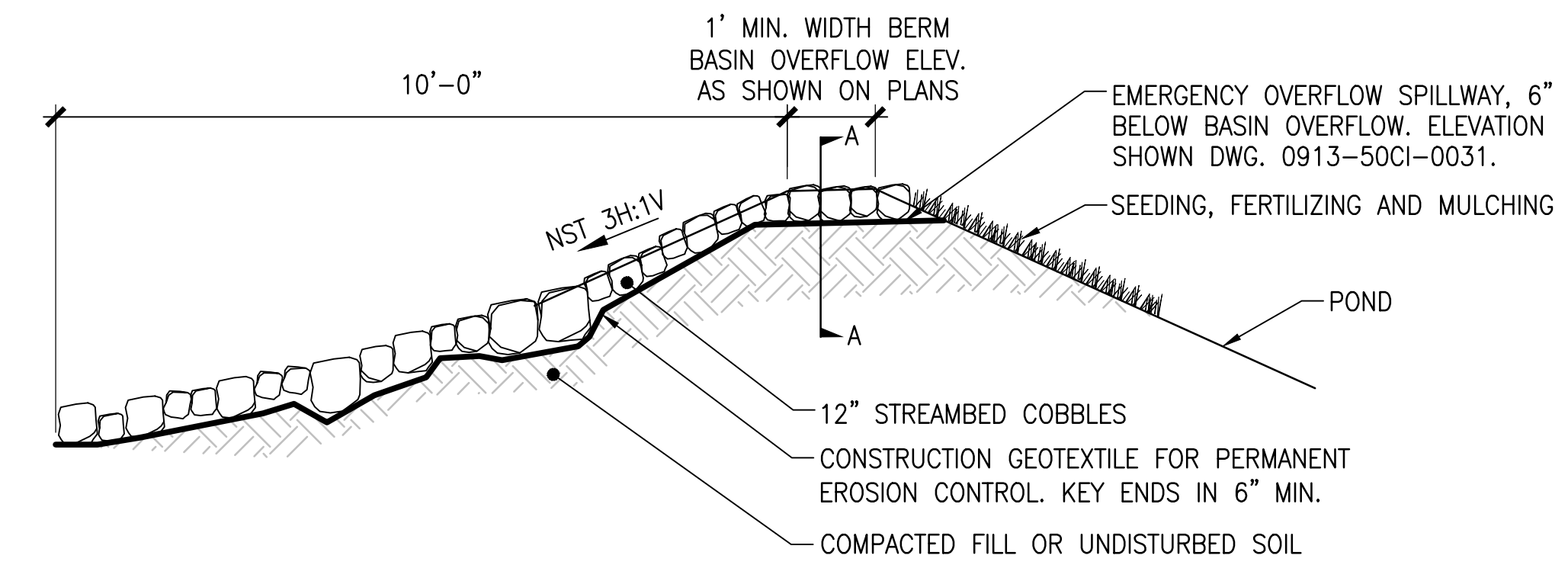
0913-50CI-0031 SCALE: NTS LRSP-C-PDT-STRM-END
 0913-50CI-0007
 0913-50SU-0004



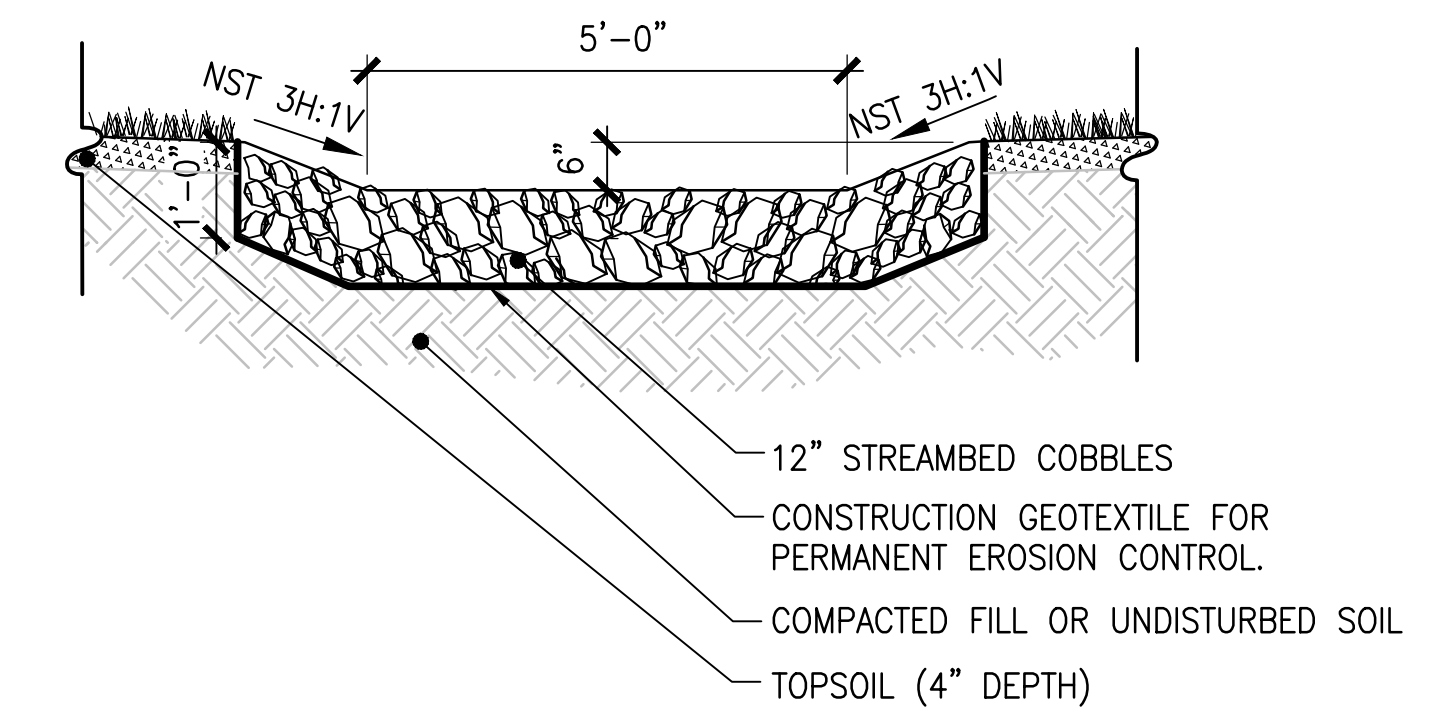
NOTES:
 1. MINIMUM TRENCH WIDTH = PIPE ID + 12 INCHES.
 2. 6" MINIMUM COVER ON STORM PIPE UNDER ASPHALT WALKWAYS.

2 STORM PIPE TRENCH SECTION

0913-50CI-0031 SCALE: 1/2"=1'-0" LRSP-SDT-TRENCH-SECTION
 0913-50CI-0007



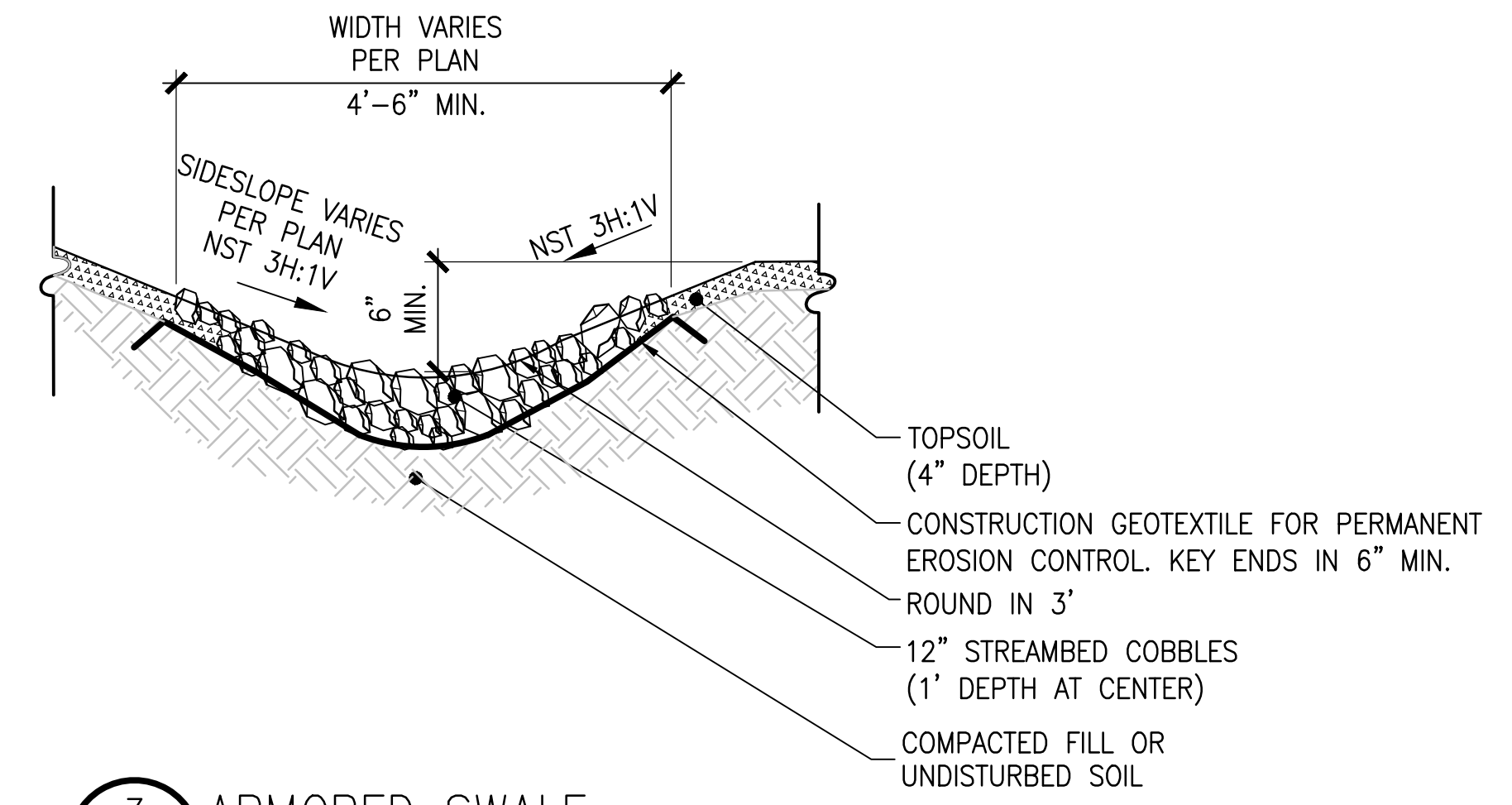
ELEVATION



A-SECTION

4 POND SPILLWAY

0913-50CI-0031 SCALE: 1/2"=1'-0" LRSP-W-RDT-PONDSPILLWAY
 0913-50YP-0007



3 ARMORED SWALE

0913-50CI-0031 SCALE: 1/2"=1'-0" LRSP-RDT-BFS
 0913-50YP-0007



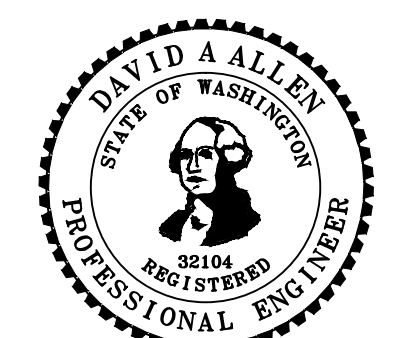
CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1	SCALE	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
	2ND ENG.	PRIM. ENG.	SEE DWG	0 1"	
DESIGNER	DLS/MSG	2ND ENG.	0	11/14/2014	BID SET
APPROVAL	DAA	PROJ. MGR. C. HILL	REV	DATE	REVISION
					CRH
					REQ. BY
					DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

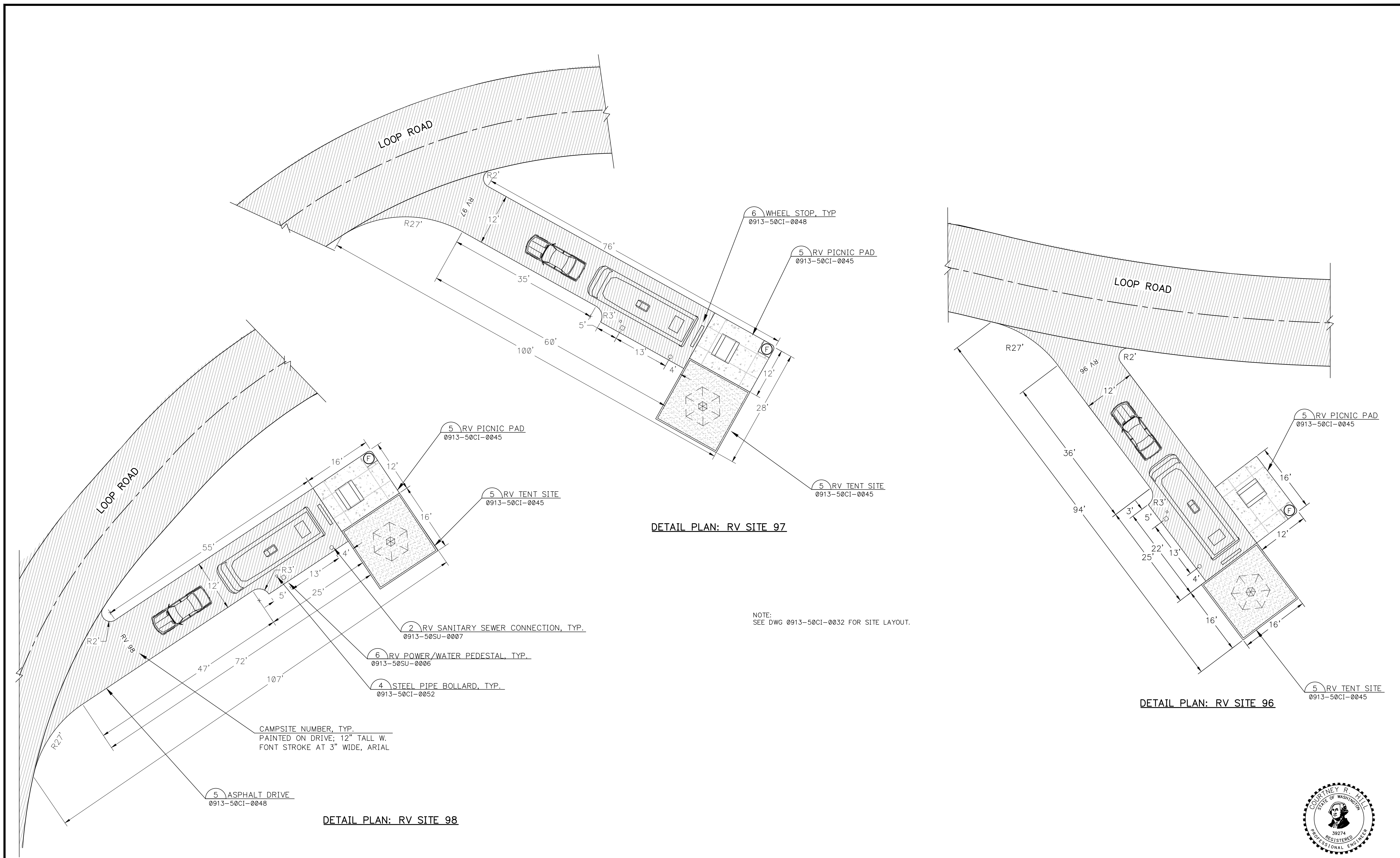
LINCOLN ROCK STATE PARK
 CABIN LOOP & GROUP CAMP
 UTILITY DETAILS: STORMWATER

BID NO. 14-31

SHEET U9 OF U9
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0009



ORIG. DATE 12/23/13 ORG. DRAWN DLS/KLR



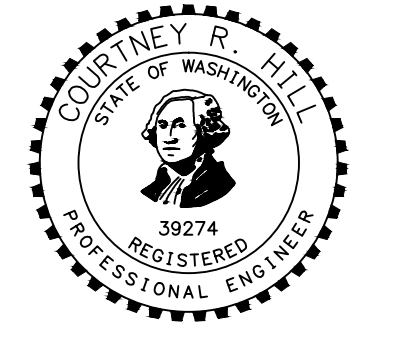
DETAIL PLAN: RV SITE 97

DETAIL PLAN: RV SITE 96

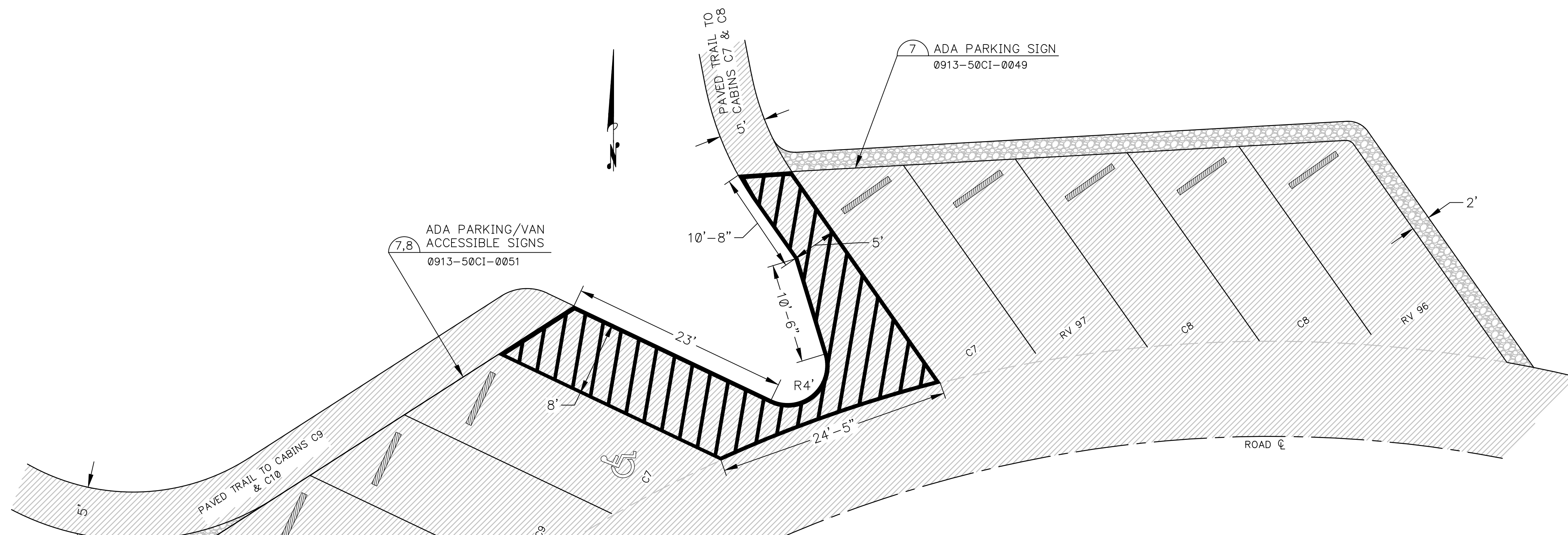
DETAIL PLAN: RV SITE 98

NOTE:
SEE DWG 0913-50CI-0032 FOR SITE LAYOUT.

CAMPSITE NUMBER, TYP.
PAINTED ON DRIVE; 12" TALL W.
FONT STROKE AT 3" WIDE, ARIAL



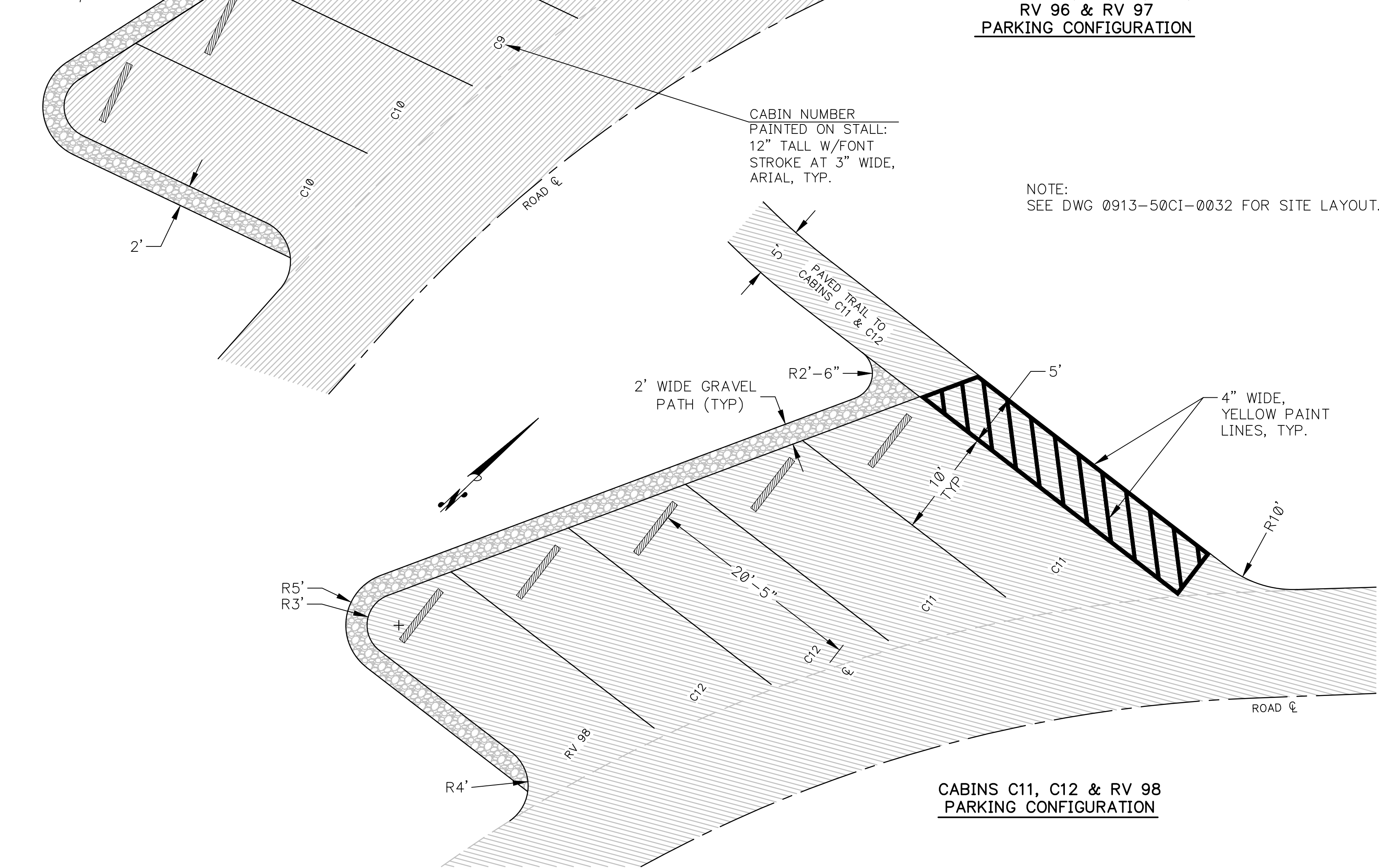
CHELAN PUD NO. 1 PRIM. ENG. C. HILL 2ND ENG. PROJ. MGR. C. HILL		SCALE SEE DWG	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON			Lincoln Rock State Park CABIN LOOP & GROUP CAMP SITE DETAILS: CABIN LOOP RV SITES BID NO. 14-31	SHEET L1 OF L11 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0042
REV DATE REVISION	CRH TRT REQ. BY DRFT	DOCUMENT CLASS:		ID:		ORIGINAL DWG. #:		ORIG. DATE 6/1/2014 ORIG. DRAWN PUD	



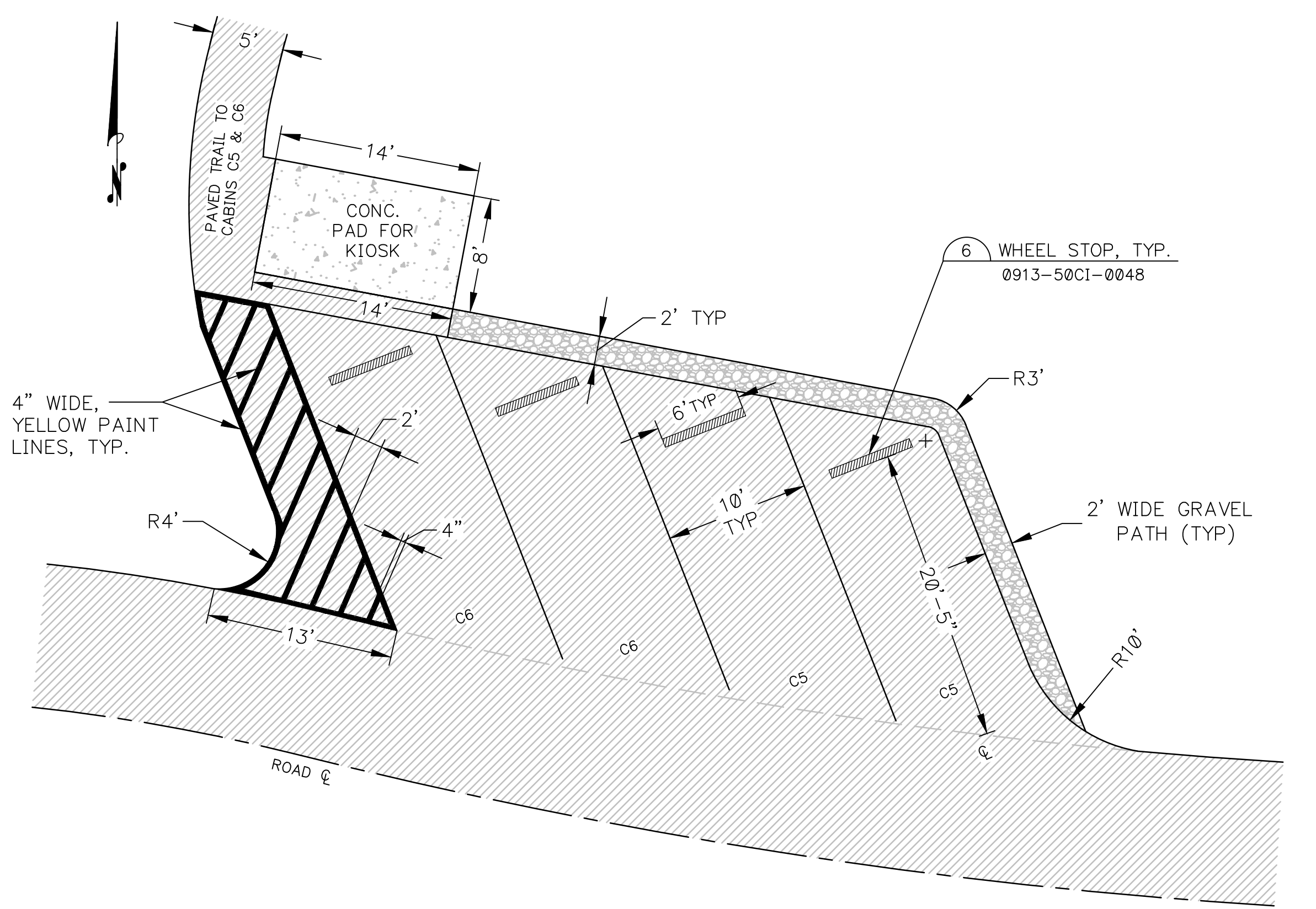
**CABINS C7, C8, C9, C10,
RV 96 & RV 97
PARKING CONFIGURATION**

CABIN NUMBER
PAINTED ON STALL:
12" TALL W/FONT
STROKE AT 3" WIDE,
ARIAL, TYP.

NOTE:
SEE DWG 0913-50CI-0032 FOR SITE LAYOUT.



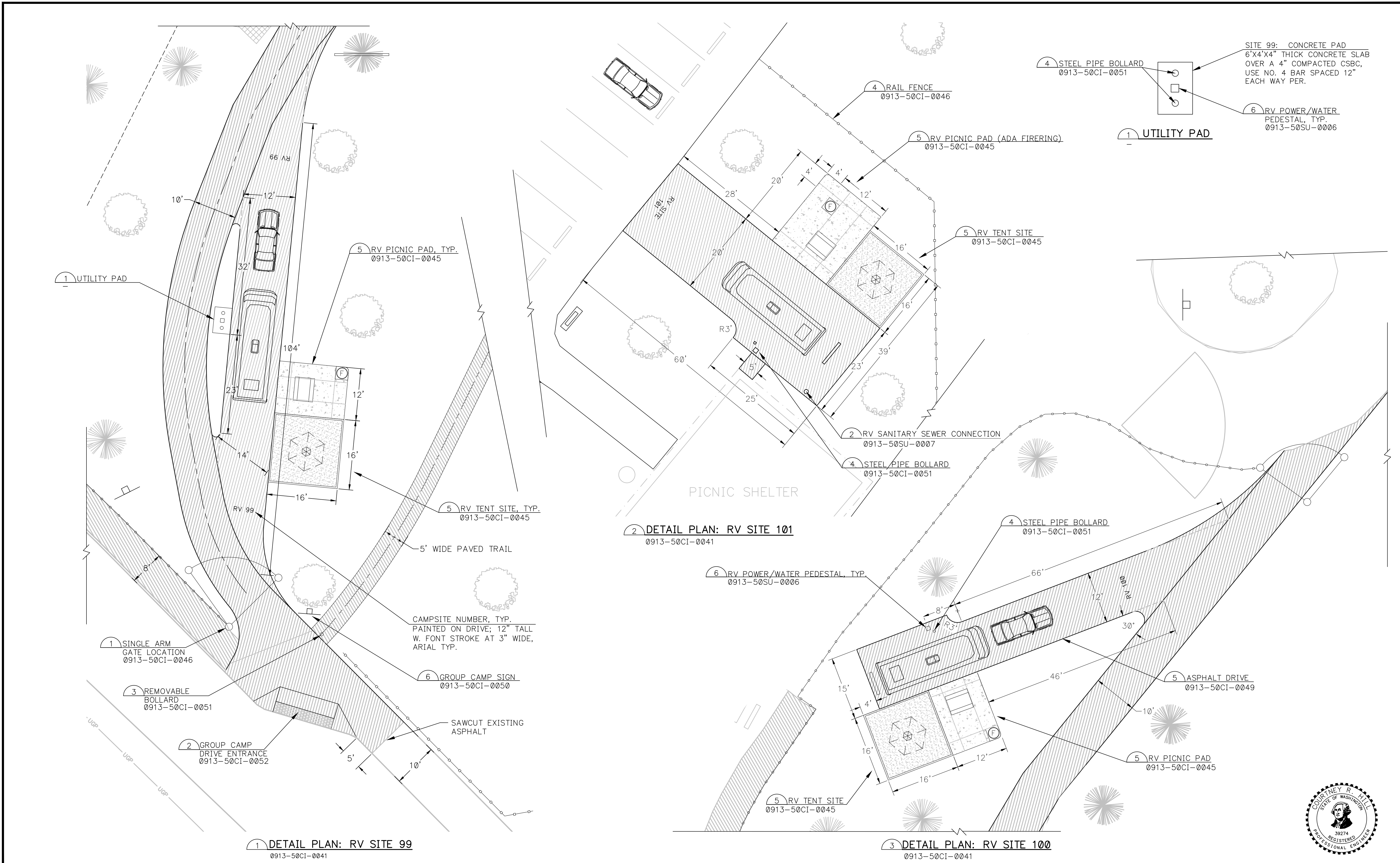
**CABINS C11, C12 & RV 98
PARKING CONFIGURATION**



**CABINS C5 & C6
PARKING CONFIGURATION**



CHELAN PUD NO.1		SCALE SEE DWG	VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"		PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		Lincoln Rock State Park CABIN LOOP & GROUP CAMP SITE DETAILS: CABIN LOOP PARKING BID NO. 14-31	SHEET L2 OF L11
PRIM. ENG.		0	11/14/2014	BID SET	CRH	TRT		REVISION 0
2ND ENG.		REV	DATE	REVISION	REQ. BY	DRFT	DATE 11/14/2014	DWG. 0913-50CI-0043
PROJ. MGR.								



1 **DETAIL PLAN: RV SITE 99**
0913-50CI-0041

2 **DETAIL PLAN: RV SITE 101**
0913-50CI-0041

3 **DETAIL PLAN: RV SITE 100**
0913-50CI-0041

CHELAN PUD NO. 1		SCALE SEE DWG		VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
PRIM. ENG.	C. HILL	0	11/14/2014	BID SET		CRH	TRT
2ND ENG.						REQ. BY	DRFT
PROJ. MGR.	C. HILL	REV	DATE		REVISION		

**PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY**
WENATCHEE, WASHINGTON

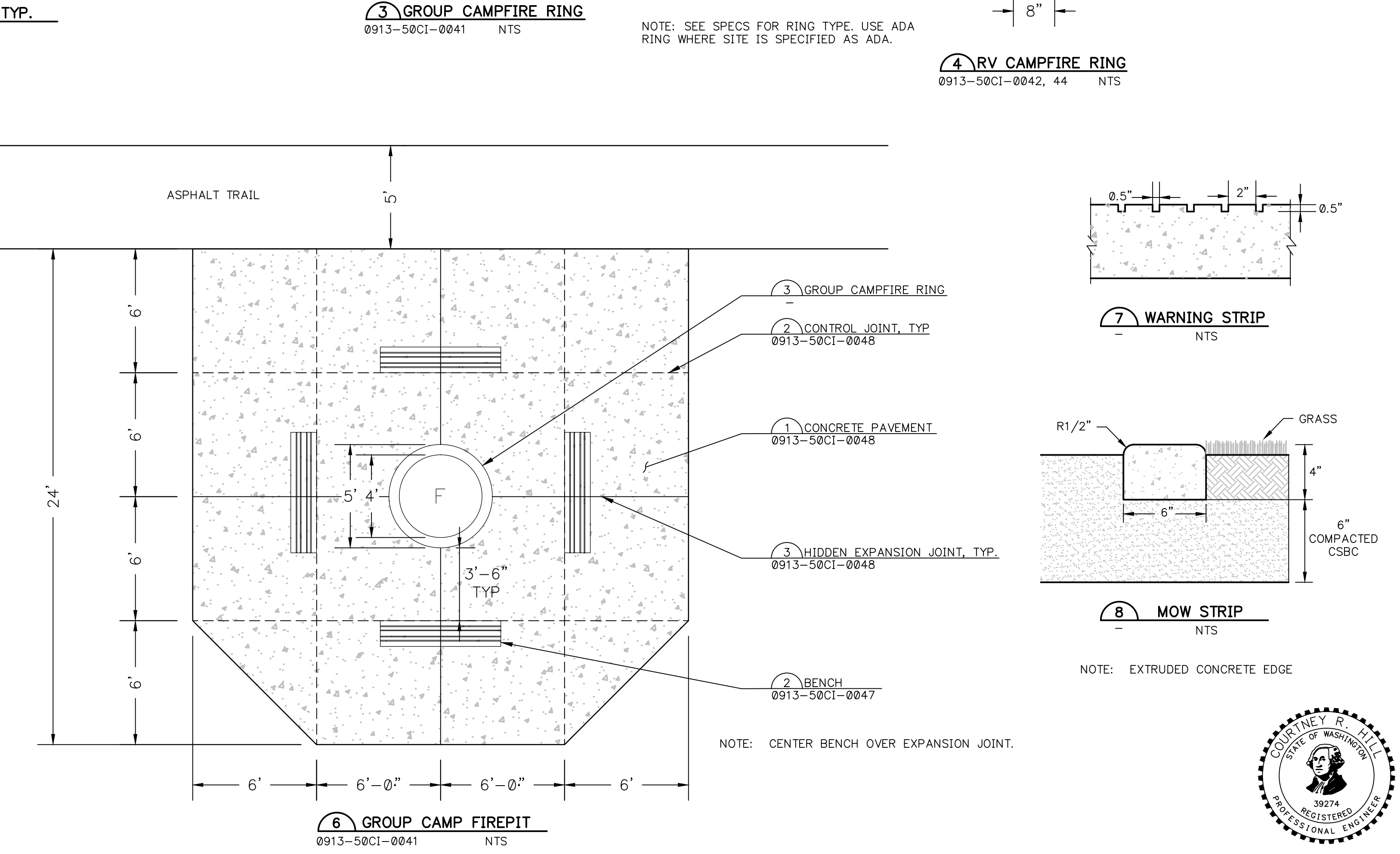
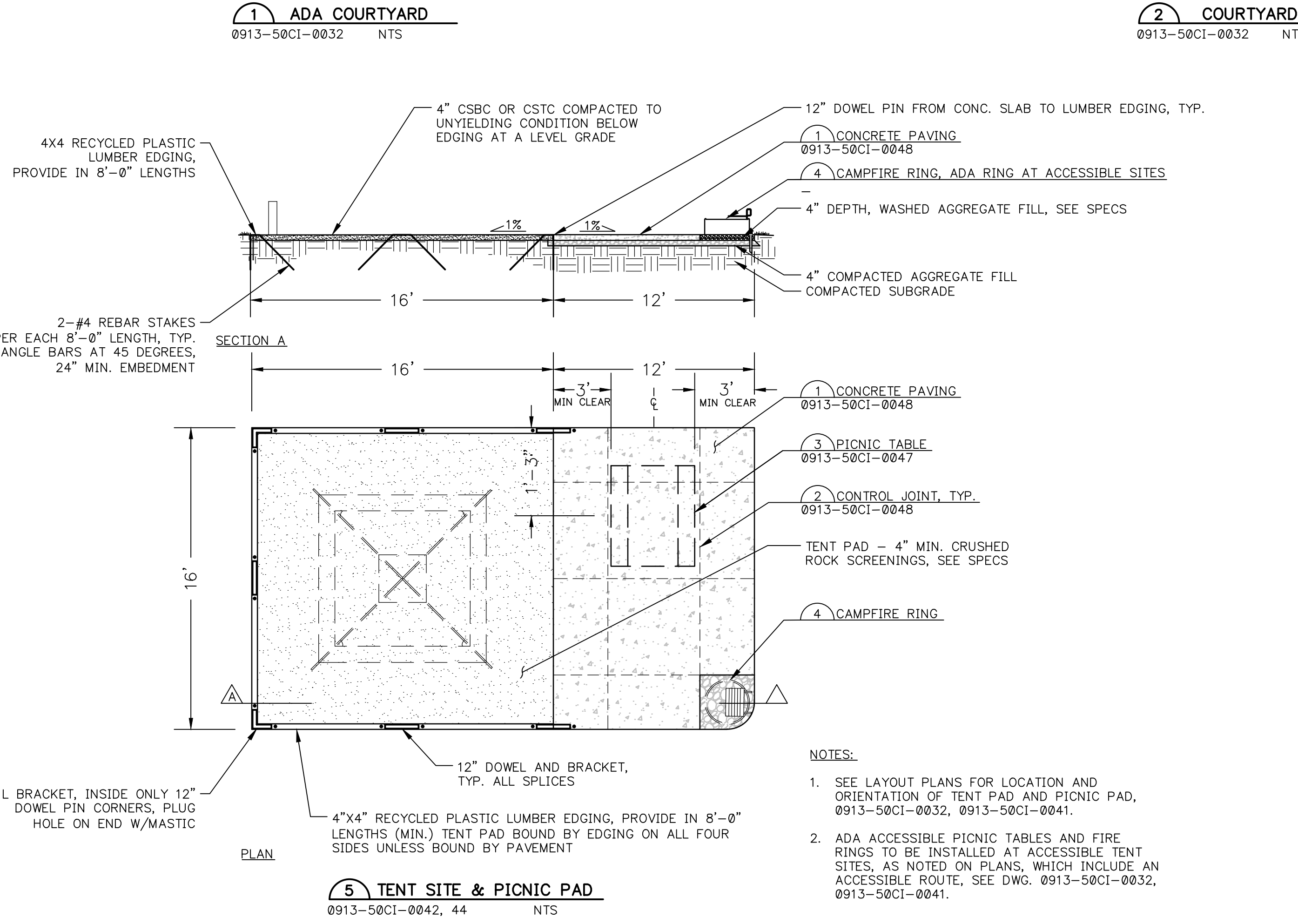
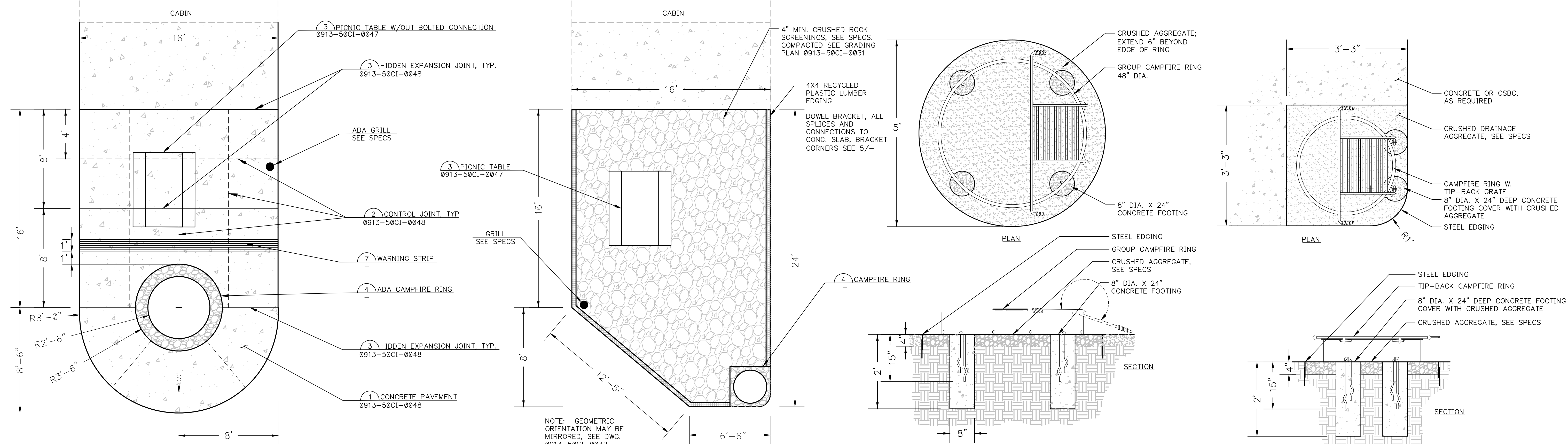


Lincoln Rock State Park
CABIN LOOP & GROUP CAMP
SITE DETAILS:
GROUP CAMP RV SITES
BID NO. 14-31

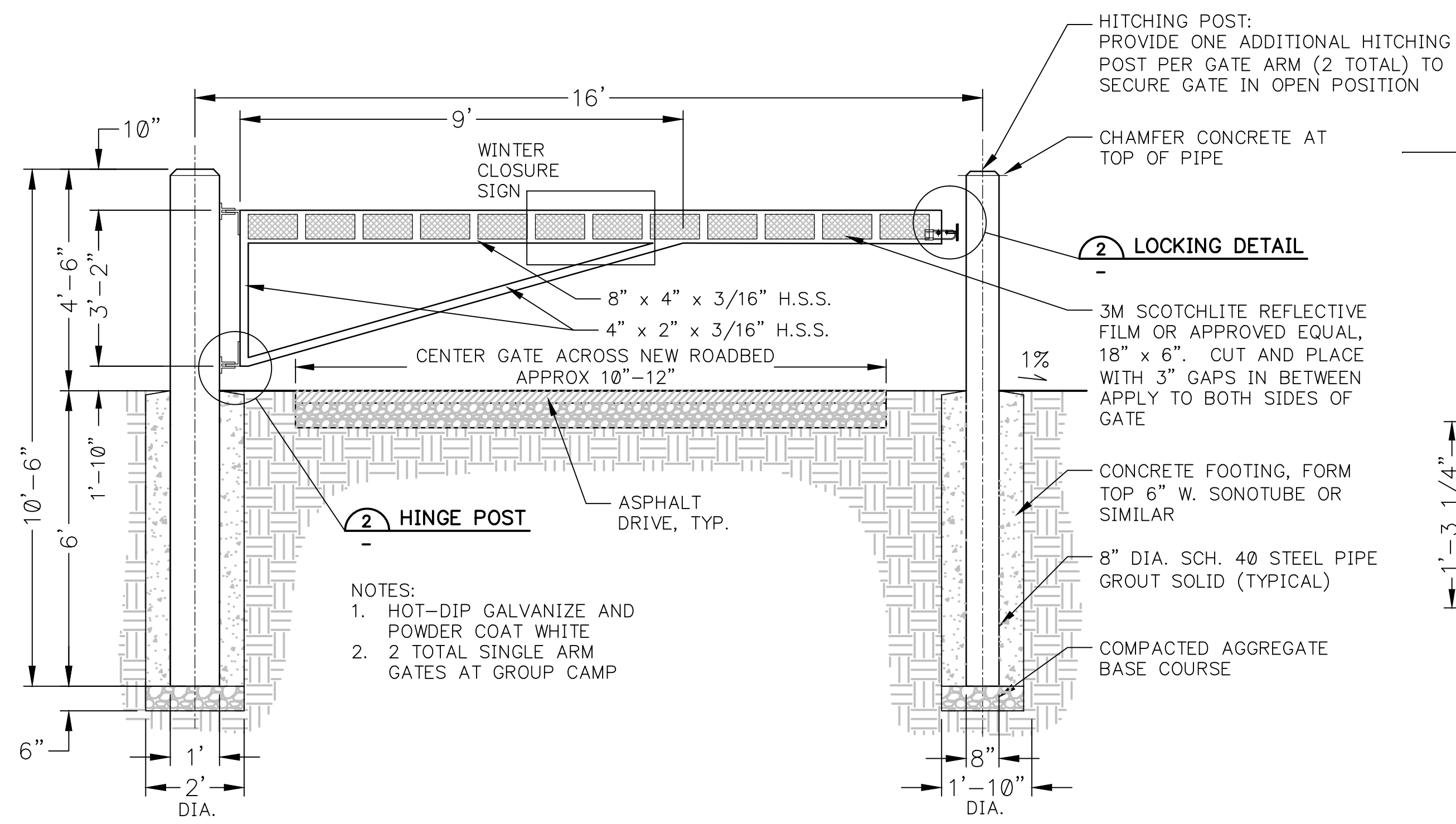
SHEET L3 OF L11	REVISION 0	DATE 11/14/2014	DWG. 0913-50CI-0044
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ORIG. DATE 6/1/2014
ORIG. DRAWN PUD

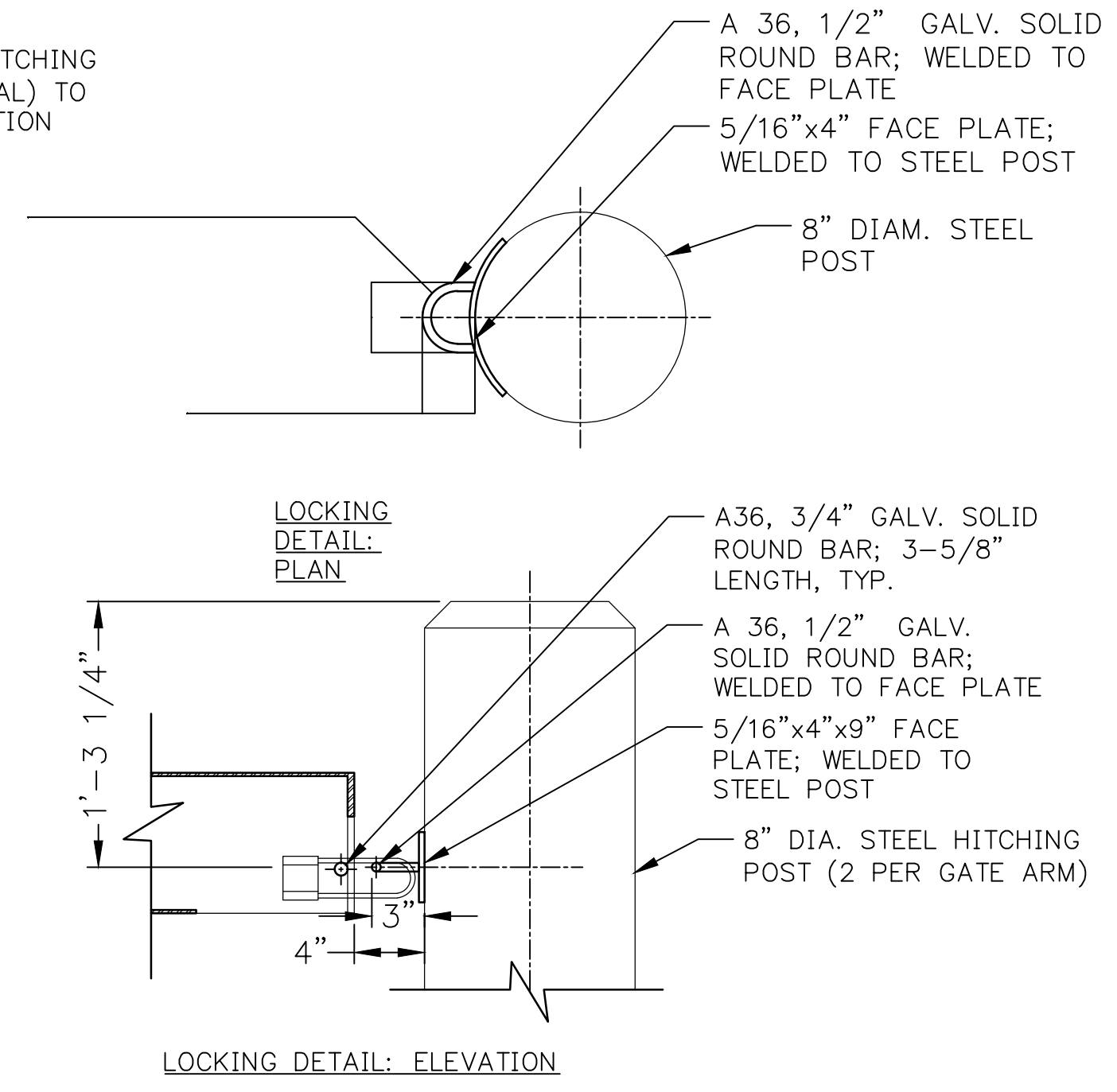


CHELAN PUD NO.1 PRIM. ENG. C. HILL 2ND ENG. PROJ. MGR. C. HILL		SCALE NONE 0 1"	VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		Lincoln Rock State Park CABIN LOOP & GROUP CAMP SITE DETAILS: SITE FURNISHINGS & CABIN COURTYARDS BID NO. 14-31	SHEET L4 OF L11 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0045
CHELAN COUNTY COURTNEY R. HILL REGISTERED PROFESSIONAL ENGINEER 39274		CRH TRT REQ. BY DRFT	DOCUMENT CLASS:	ID:	ORIGINAL DWG. #:	ORIG. DATE 6/1/2014 ORIG. DRAWN PUD		



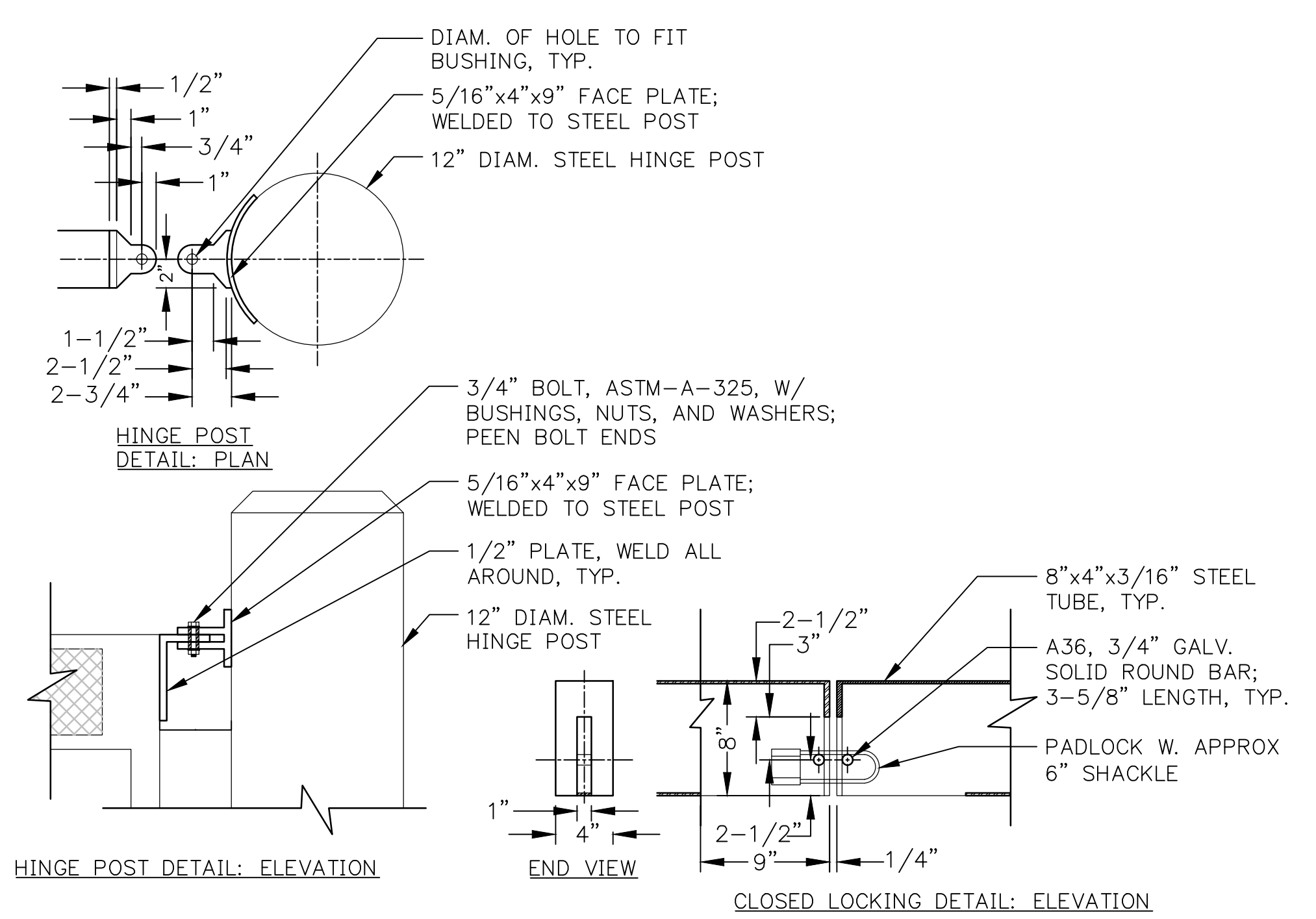
1 SINGLE ARM GATE
0913-50CI-0041 1 1/2" = 1'-0"

- NOTES:
1. HOT-DIP GALVANIZE AND POWDER COAT WHITE
2. 2 TOTAL SINGLE ARM GATES AT GROUP CAMP

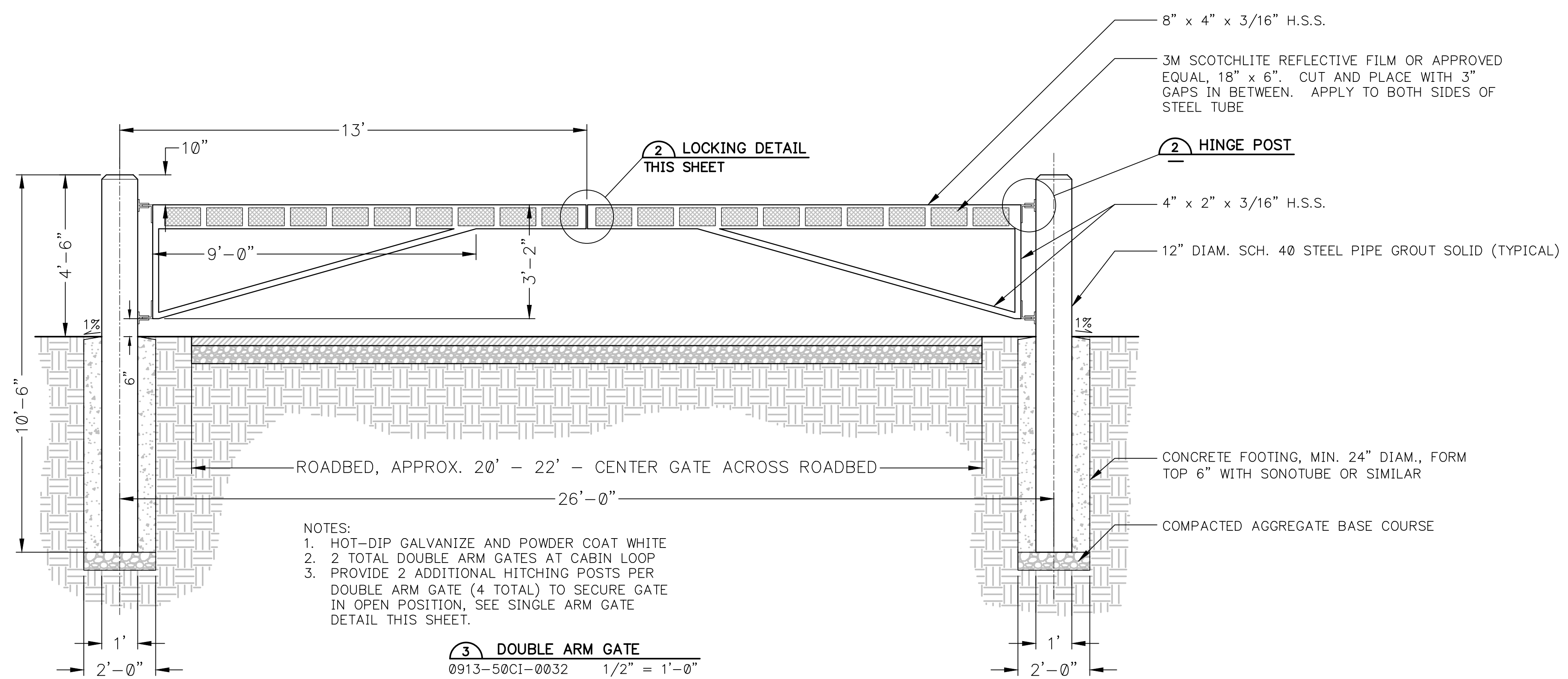


LOCKING DETAIL: ELEVATION

LOCKING DETAIL: PLAN

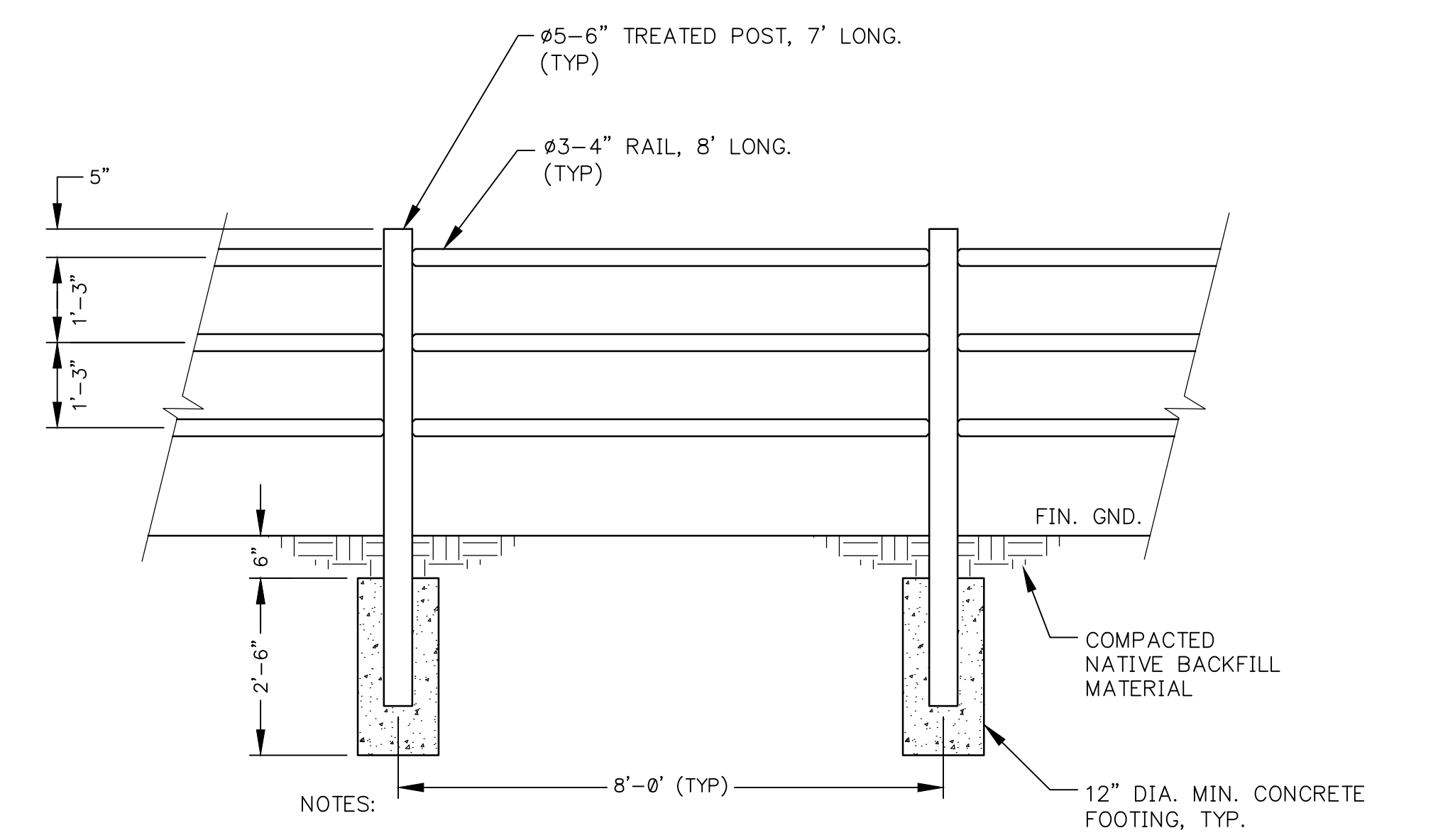


2 GATE OPENING AND LOCKING MECHANISMS
NOT TO SCALE



3 DOUBLE ARM GATE
0913-50CI-0032 1/2" = 1'-0"

- NOTES:
1. HOT-DIP GALVANIZE AND POWDER COAT WHITE
2. 2 TOTAL DOUBLE ARM GATES AT CABIN LOOP
3. PROVIDE 2 ADDITIONAL HITCHING POSTS PER DOUBLE ARM GATE (4 TOTAL) TO SECURE GATE IN OPEN POSITION, SEE SINGLE ARM GATE DETAIL THIS SHEET.



- NOTES:
1. POLES FOR RAIL FENCE SHALL BE LODGE POLE PINE, BARK FREE, SMOOTH, PRESSURE TREATED WITH CCA TO NET RETENTION OF 0.4 POUNDS PER CUBIC FOOT. TAPER ALLOWANCE FROM BUTT TO TIP SHALL NOT EXCEED 1" FOR 10' OF LENGTH.

4 RAIL FENCE
0913-50CI-0041 NOT TO SCALE

19.5"x23.5"x1/4" OVAL
SHAPE PLATE STEEL WELDED
TO POST. GALVANIZE &
POWDERCOAT FINISH, DARK
BRONZE

(6) 1/4" DIA. HOLES FOR SIGN
ATTACHMENT (ACTUAL SIGN
FURNISHED BY DISTRICT,
CONTRACTOR INSTALLED)
COORDINATE HOLE PATTERN
WITH DISTRICT

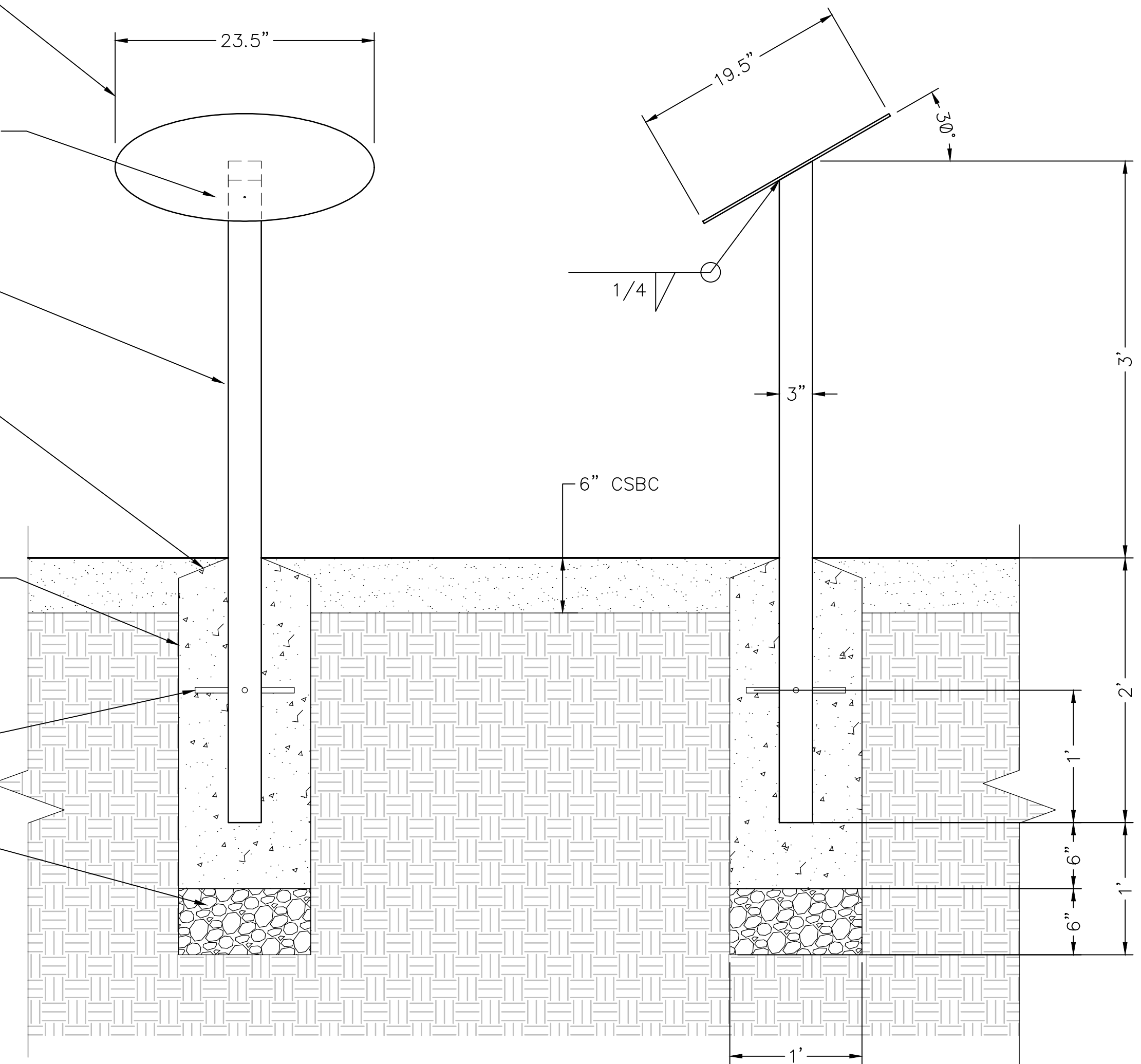
3"x3"x3/16" H.S.S. POST,
GALVANIZE & POWDERCOAT
FINISH, DARK BRONZE

CROWN FOOTING TO FINISH
GRADE

12" DIA. CONCRETE FOOTING

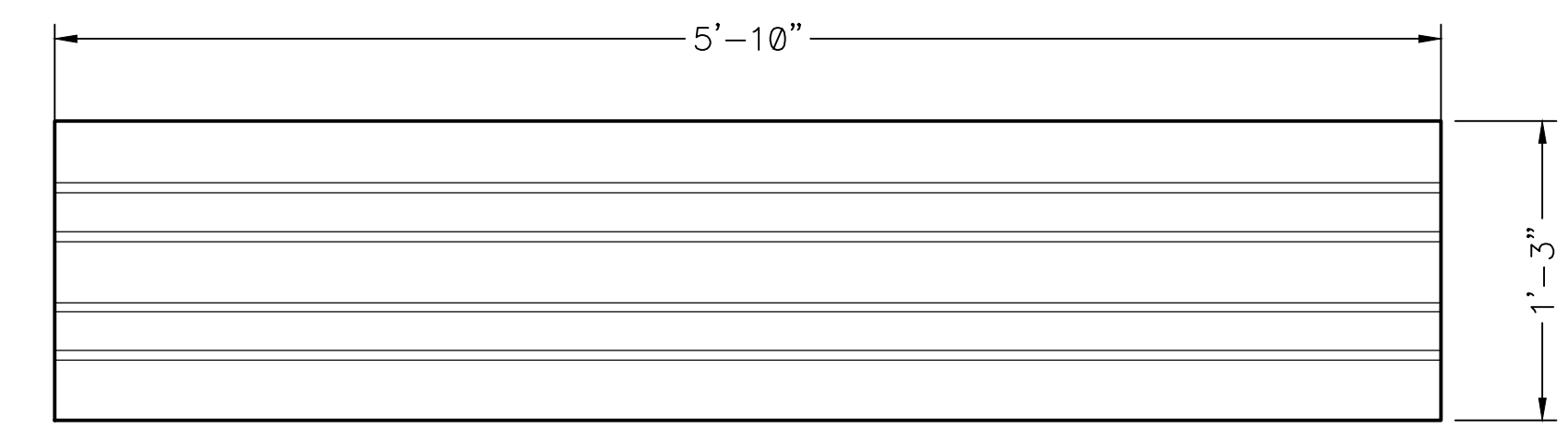
1/2" DIA. WELDED STUDS

AGGREGATE BASE

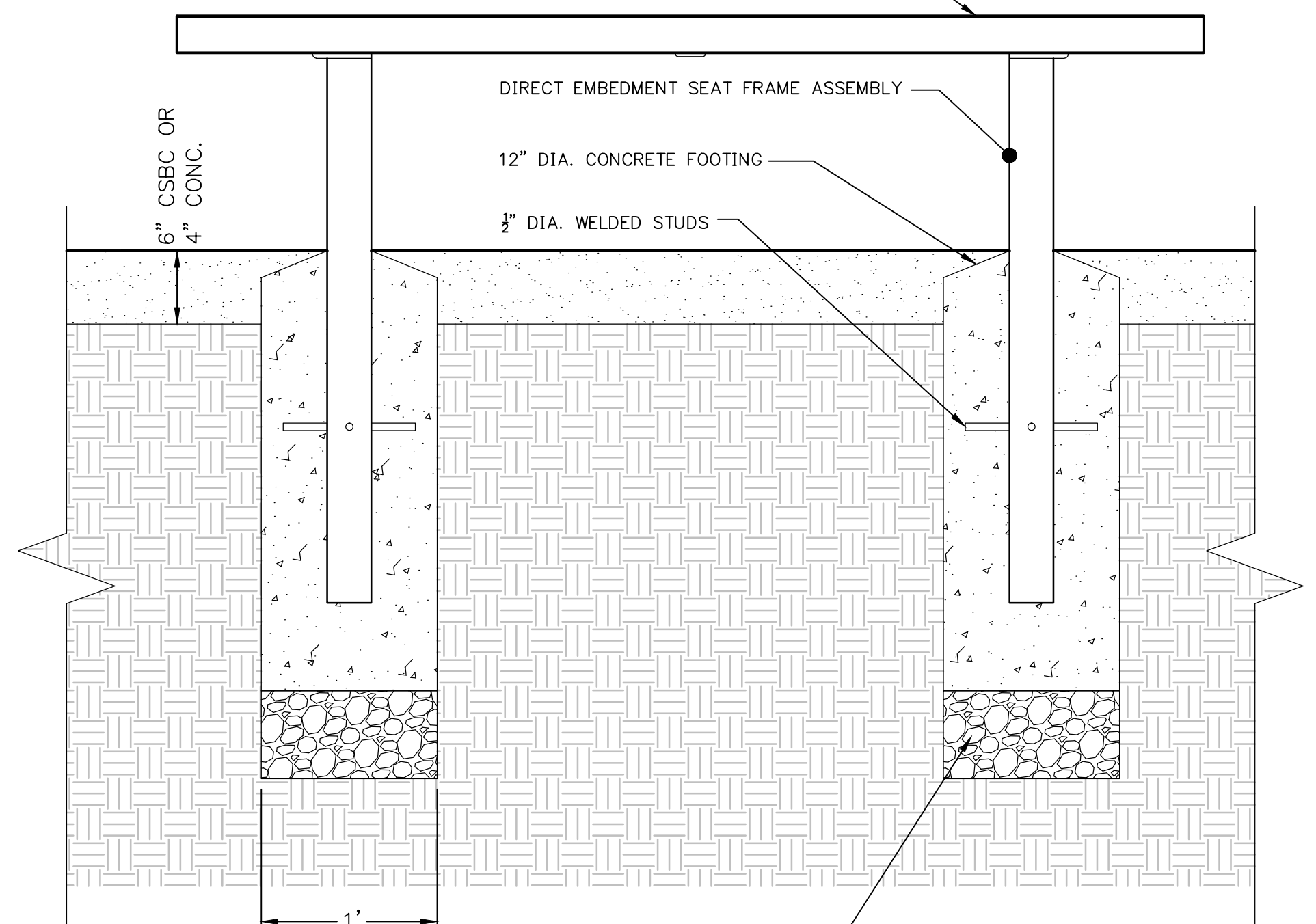


1 SIGN MOUNT
0913-50CI-0036, 38
NOT TO SCALE

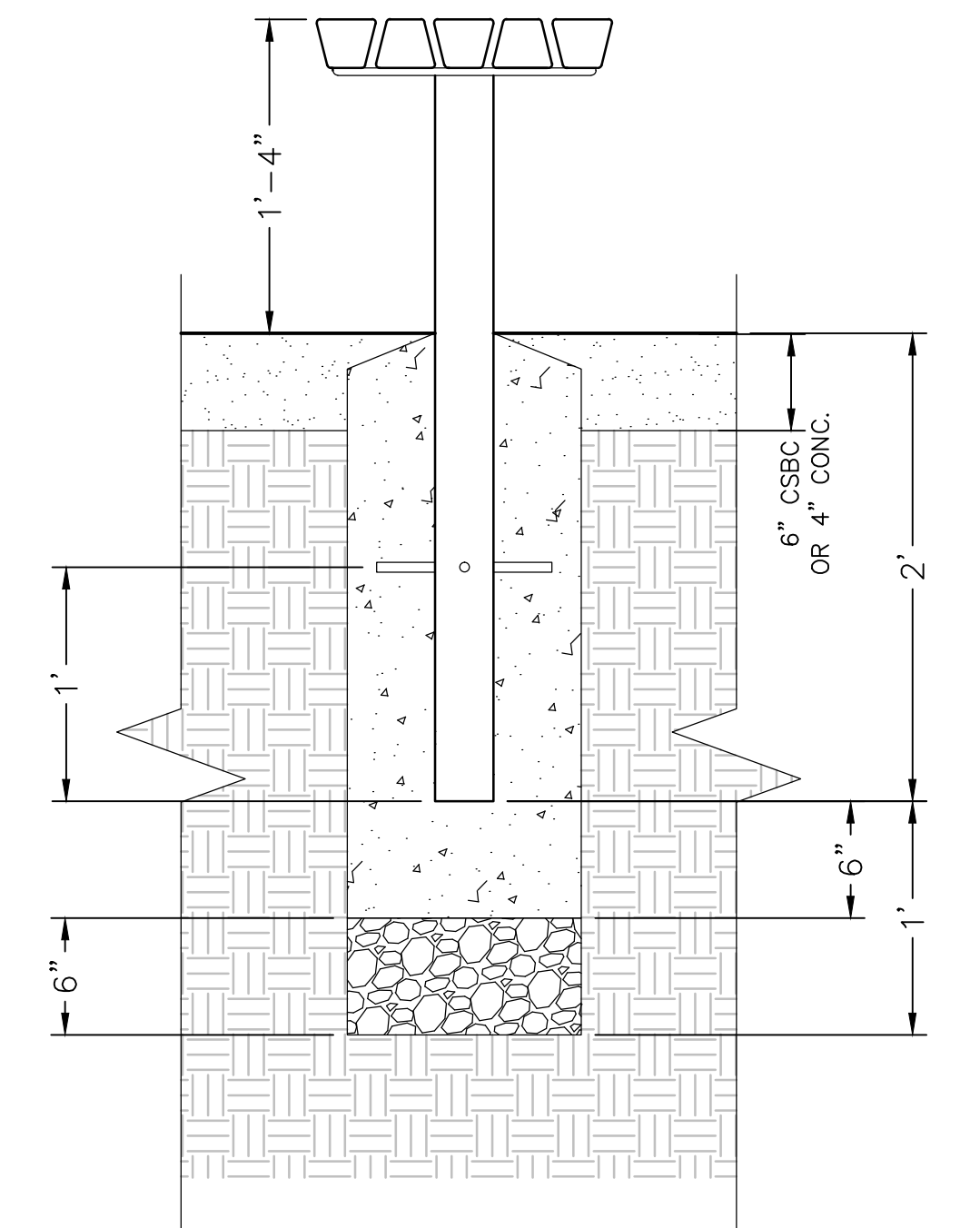
NOTE:
SIGN MOUNTS AND BENCHES TO BE LOCATED AS SHOWN AT
2 INTERPRETIVE SITES (SEE DWGS. 0913-50CI-0036, 38)
AND GROUP CAMP FIRE PIT (SEE DWG. 0913-50CI-0045).



TOP VIEW
RECYCLED PLASTIC BENCH SEE SPECS

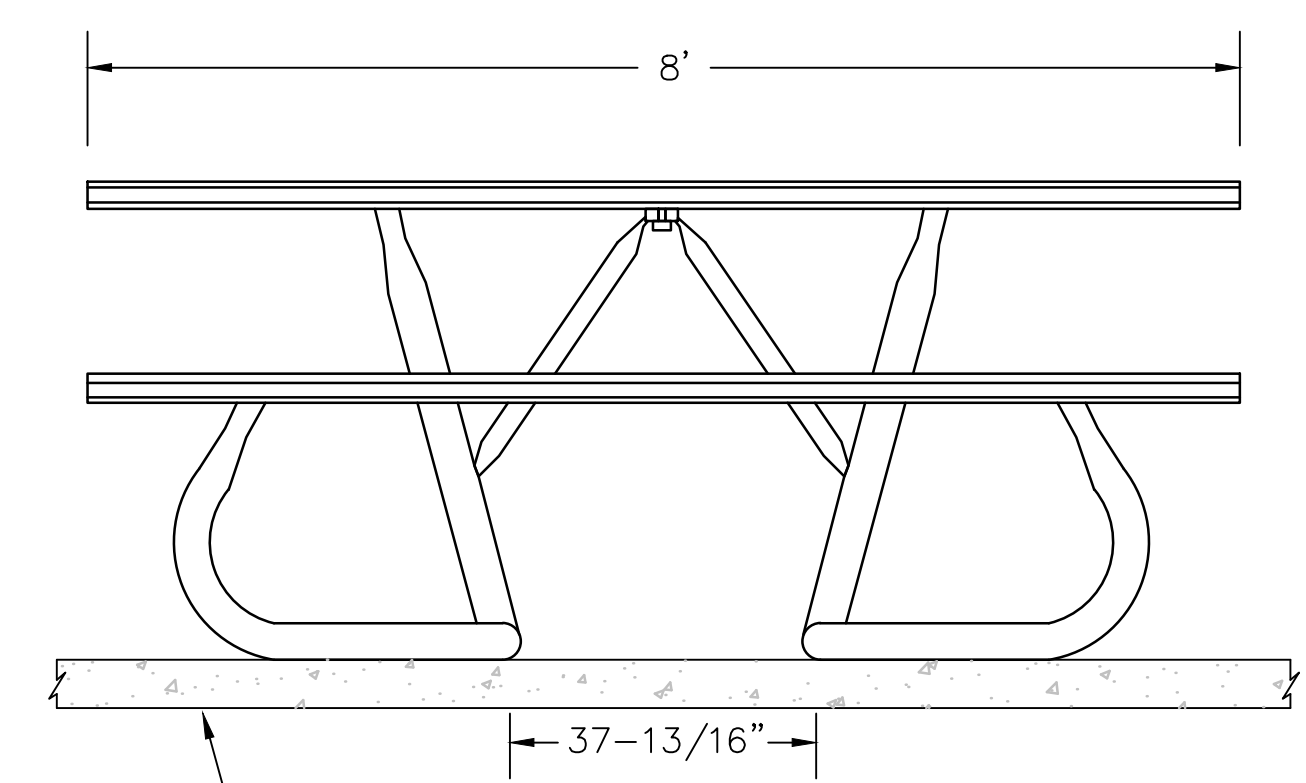


FRONT VIEW
AGGREGATE BASE



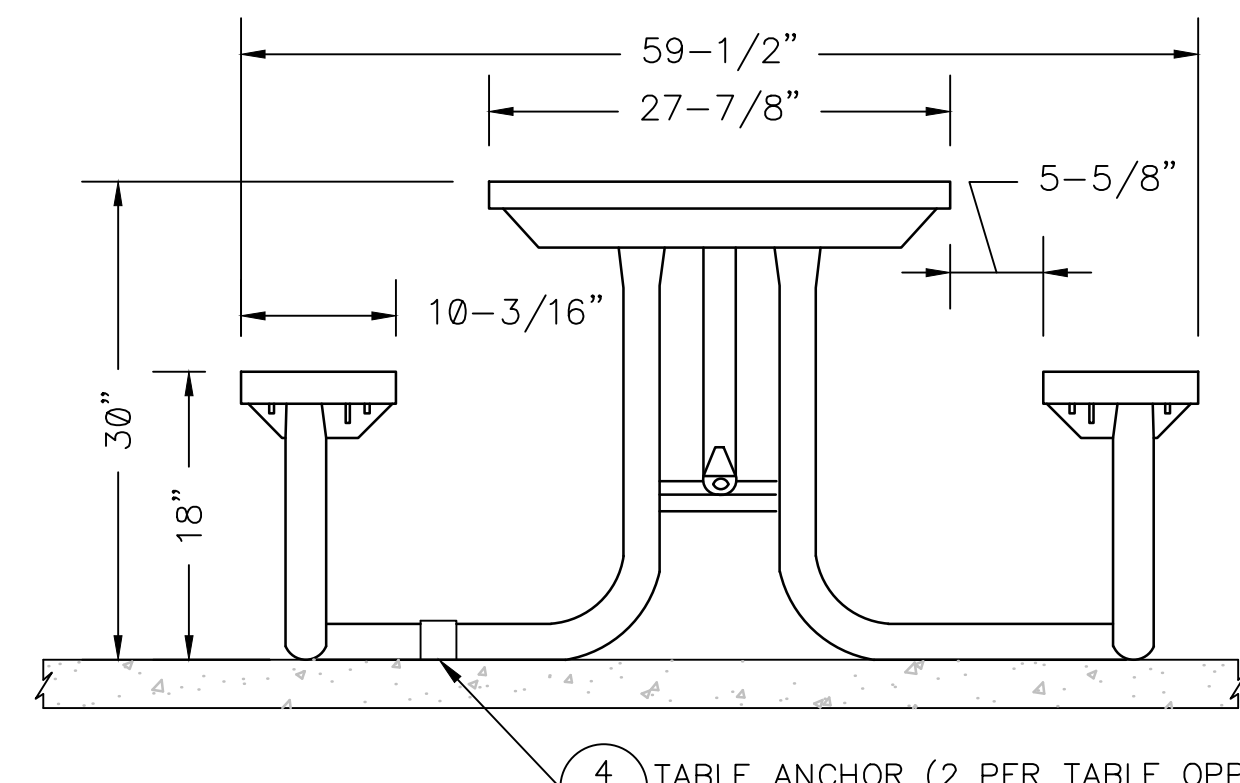
END VIEW

2 BENCH
0913-50CI-0036, 38 & 41
NOT TO SCALE



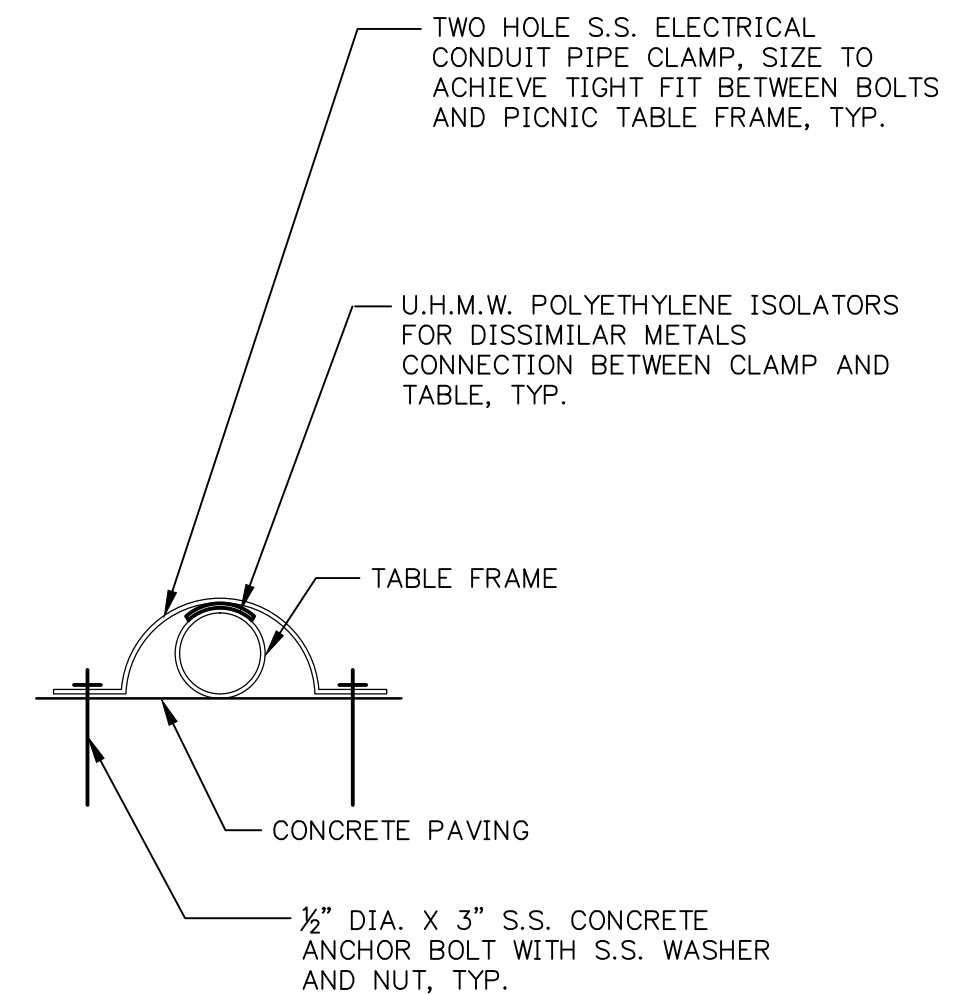
CONTRACTOR PROVIDED PICNIC
TABLE WITH GALVANIZED FRAME &
CLEAR ANODIZED ALUMINUM TOP &
SEATS. SEE SPECS

3 PICNIC TABLE
0913-50CI-0042, 44, 45



4 TABLE ANCHOR (2 PER TABLE OPPOSITE ENDS)

NOTE:
NO ANCHOR REQUIRED WHERE TABLE IS
PLACED ON CSBC.

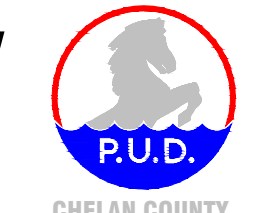


4 TABLE ANCHOR



CHELAN PUD NO.1		SCALE	VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
PRIM. ENG.	C. HILL	SEE DWG	0	1"	CRH	TRT
2ND ENG.		0	11/14/2014	BID SET	REQ.	DRFT
PROJ. MGR.	C. HILL	REV	DATE	REVISION		

**PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY**
WENATCHEE, WASHINGTON



Lincoln Rock State Park
CABIN LOOP & GROUP CAMP
SITE DETAILS:
SITE FURNITURE
BID NO. 14-31

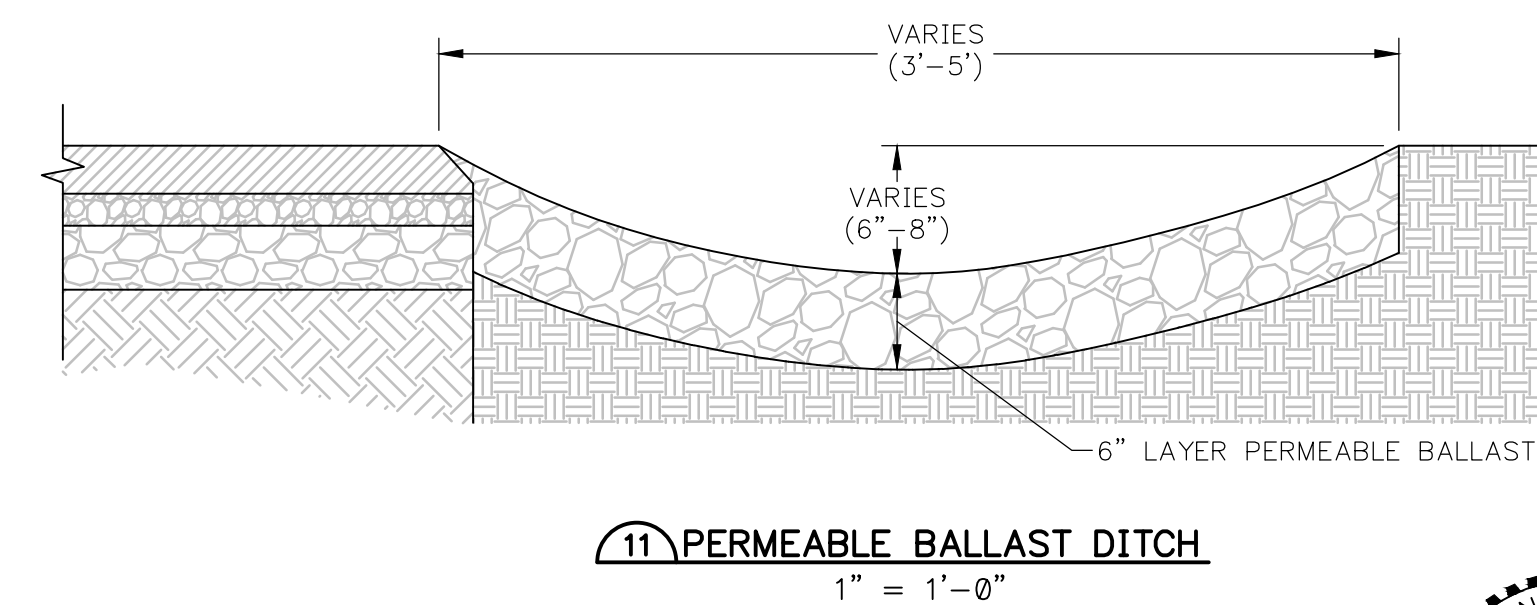
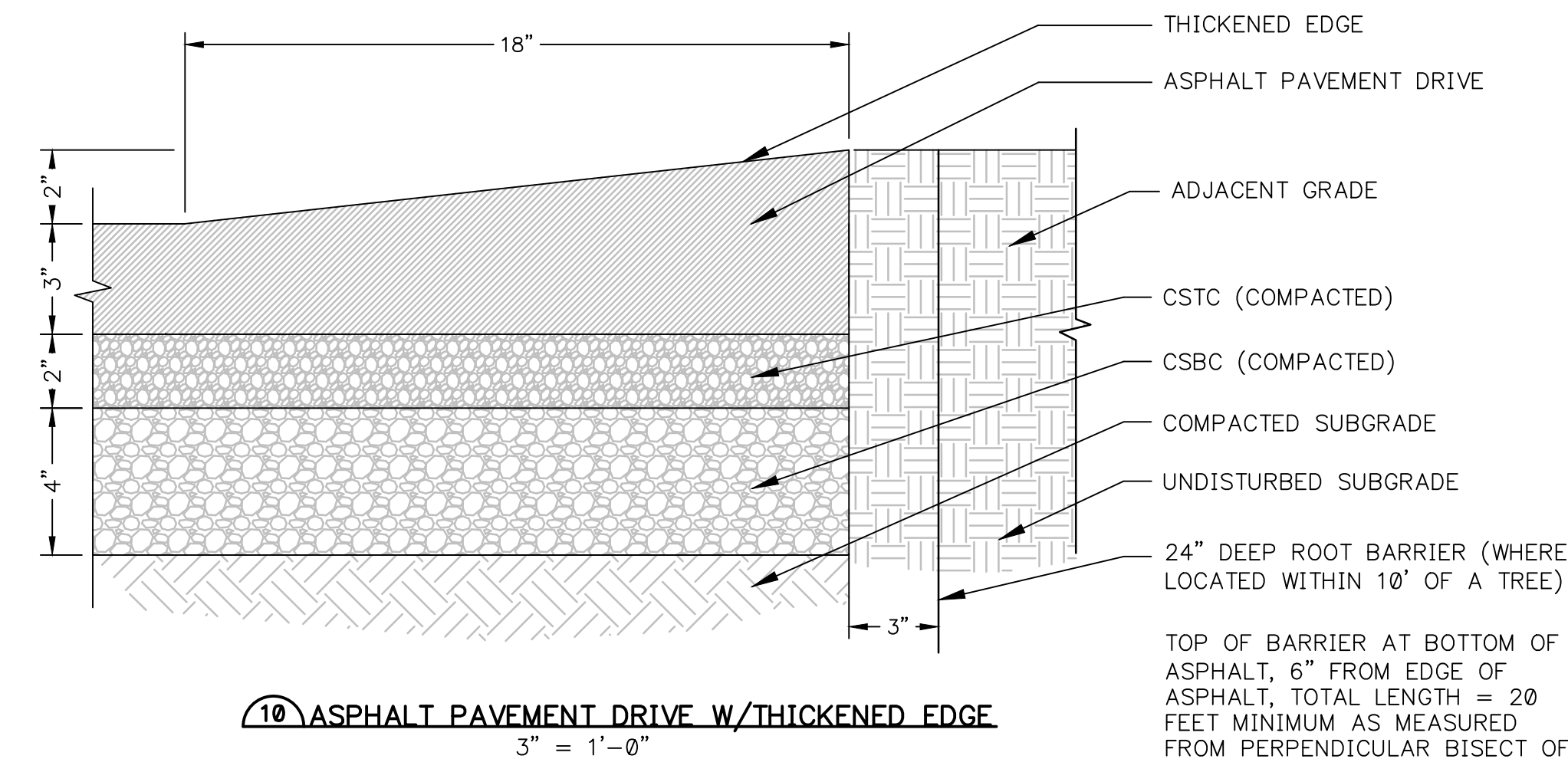
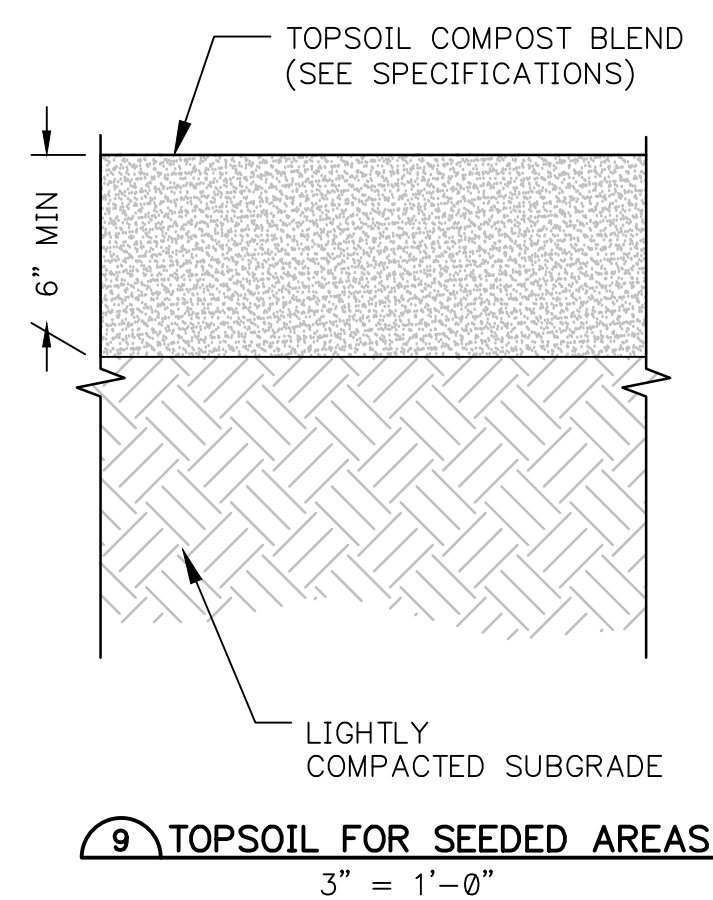
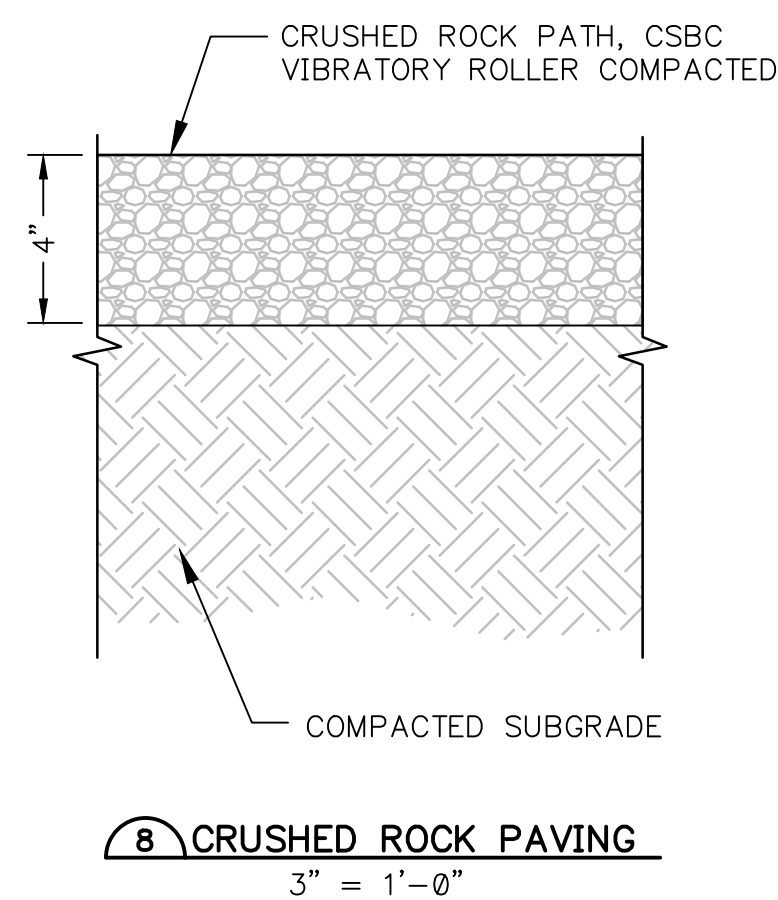
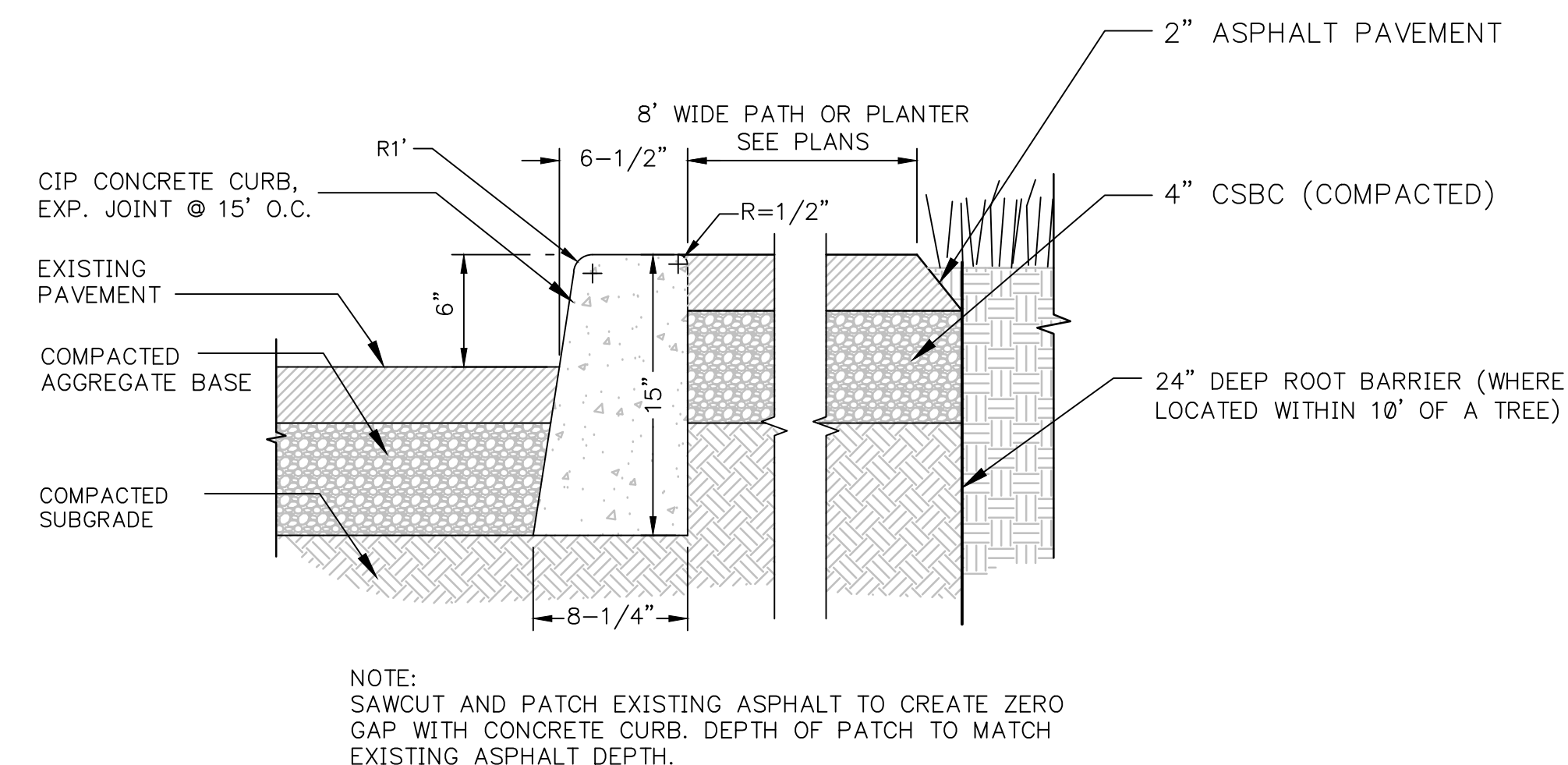
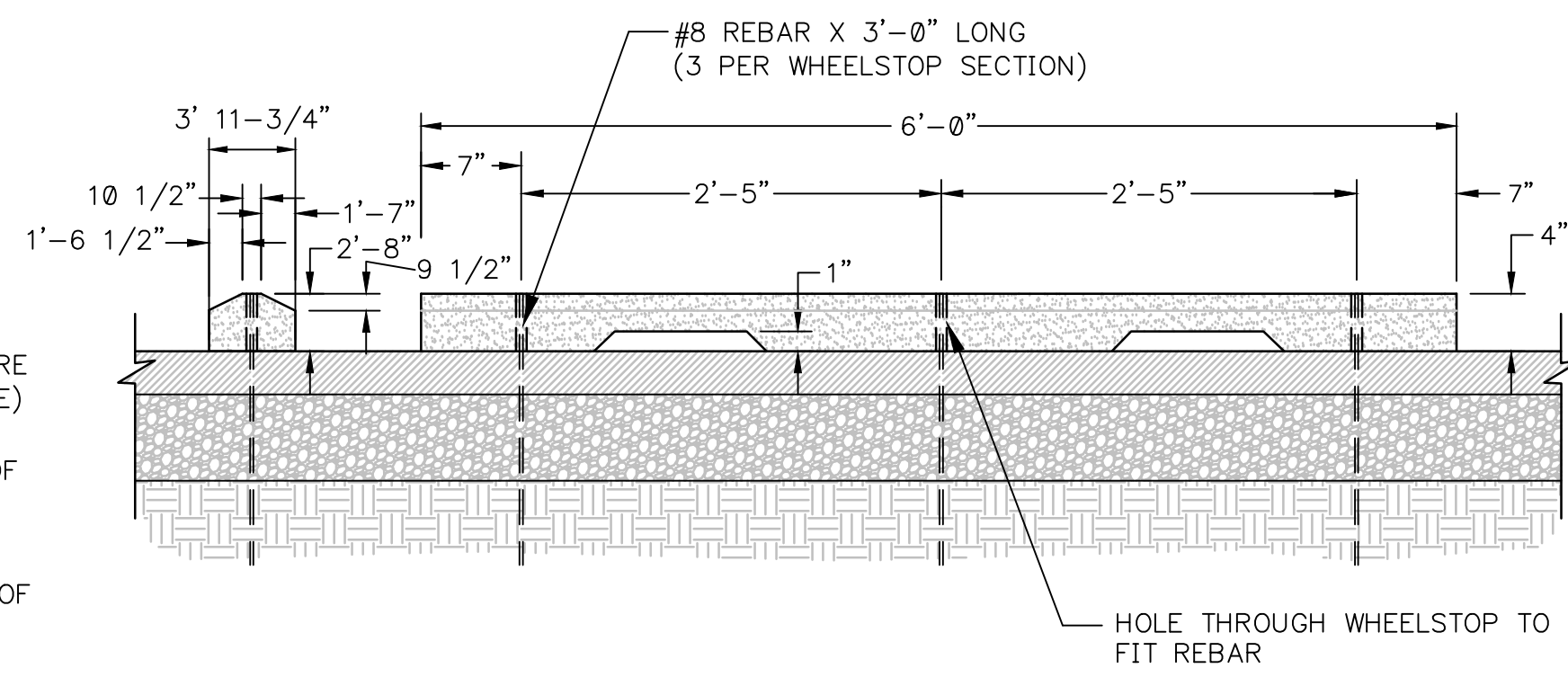
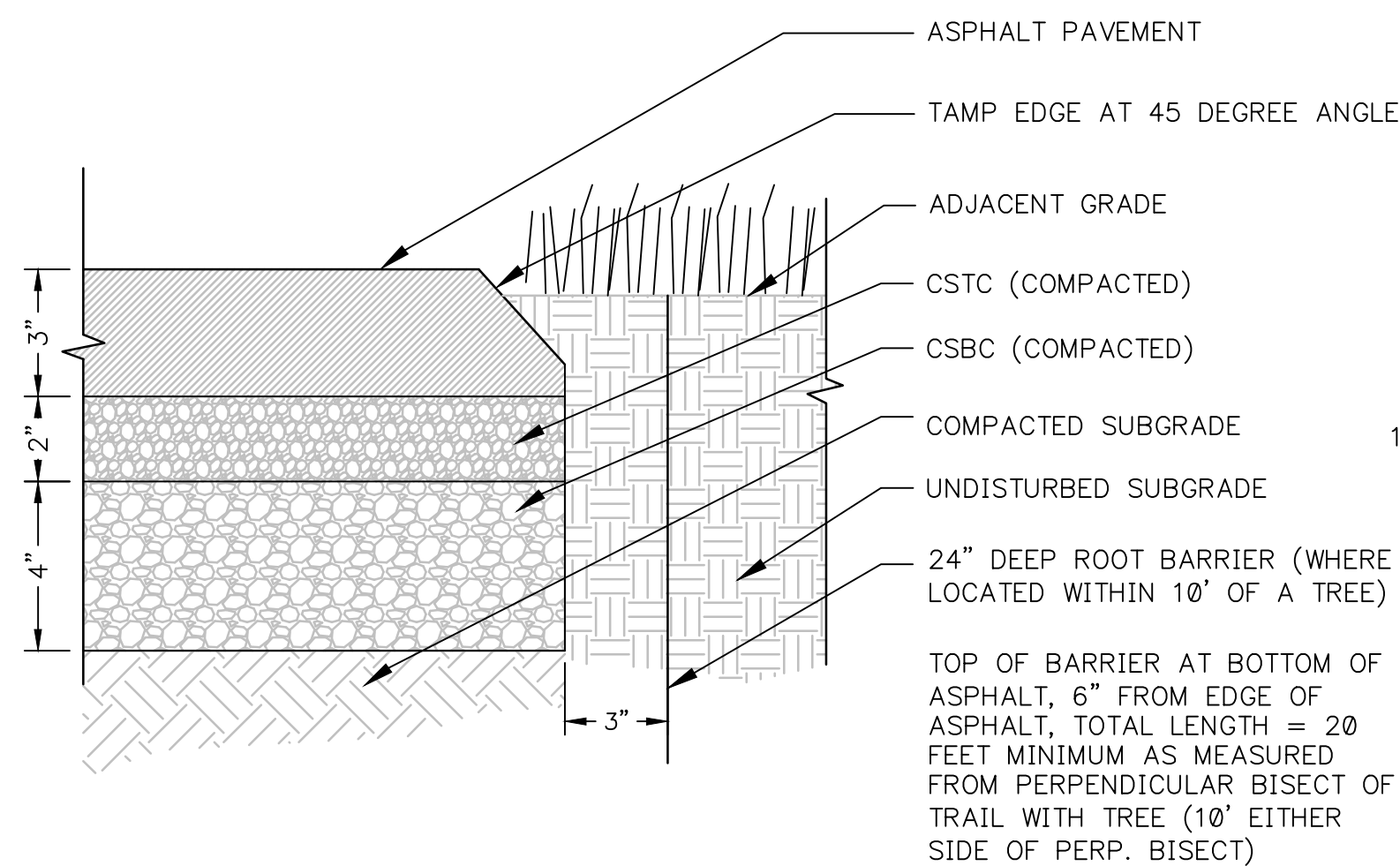
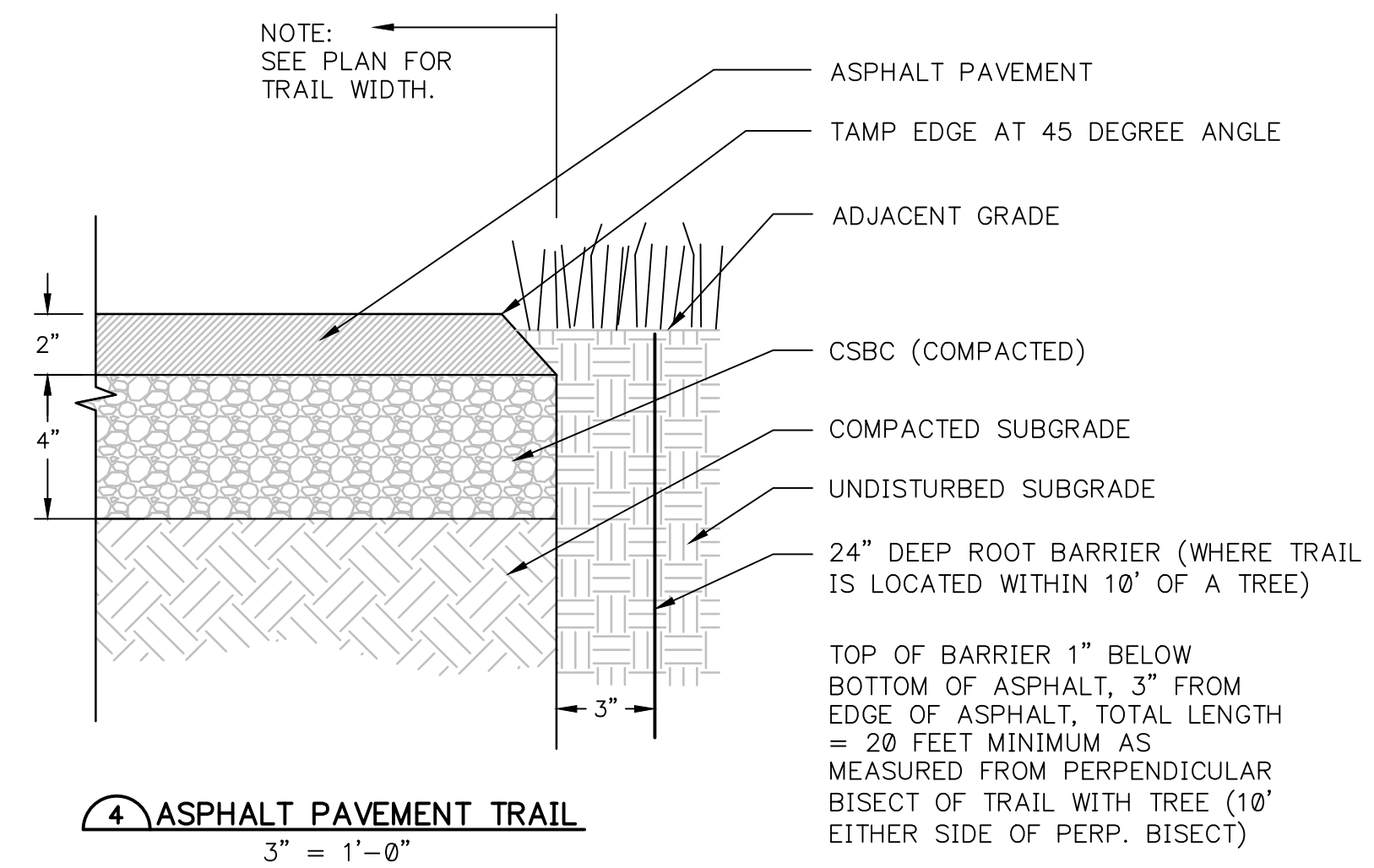
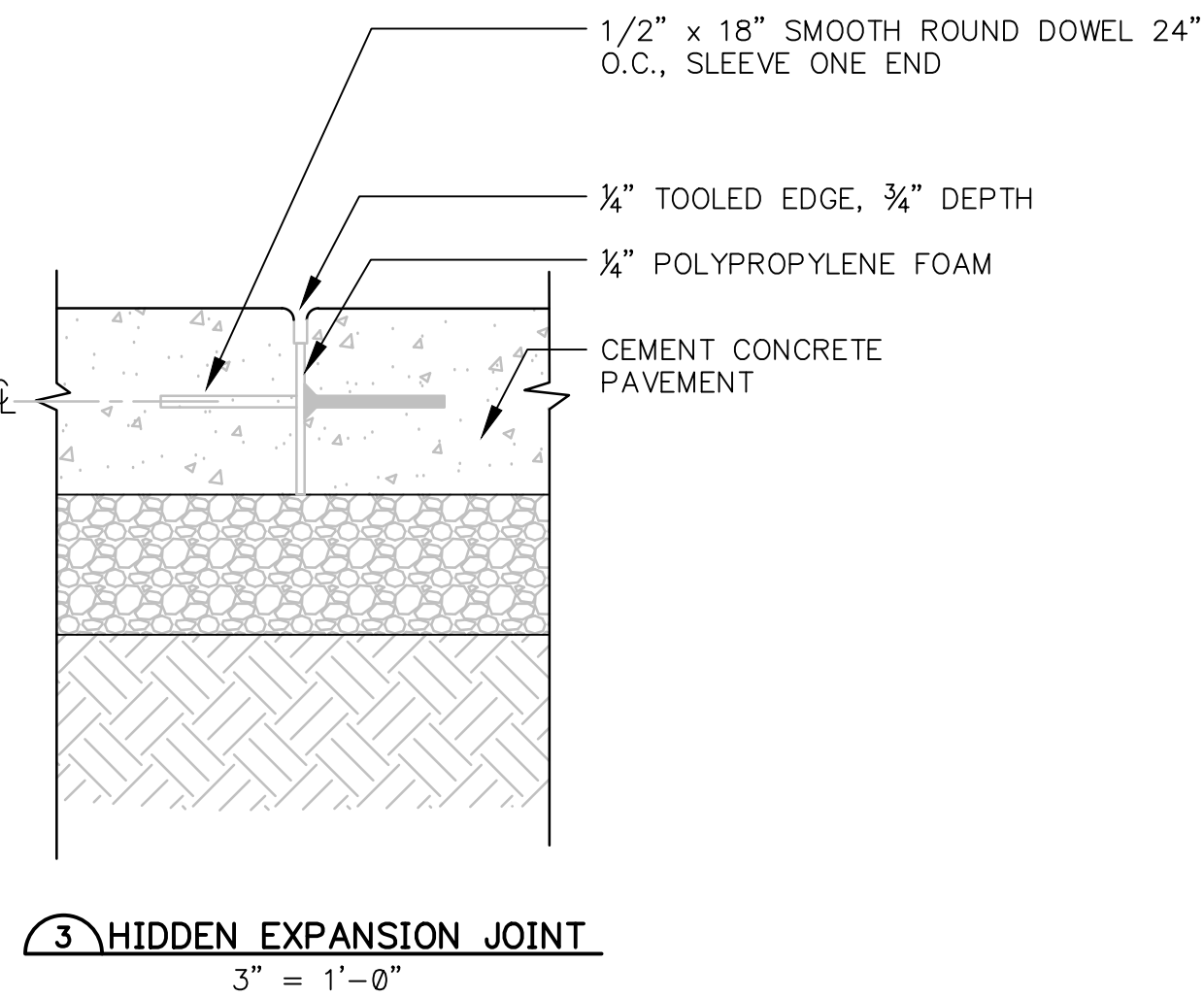
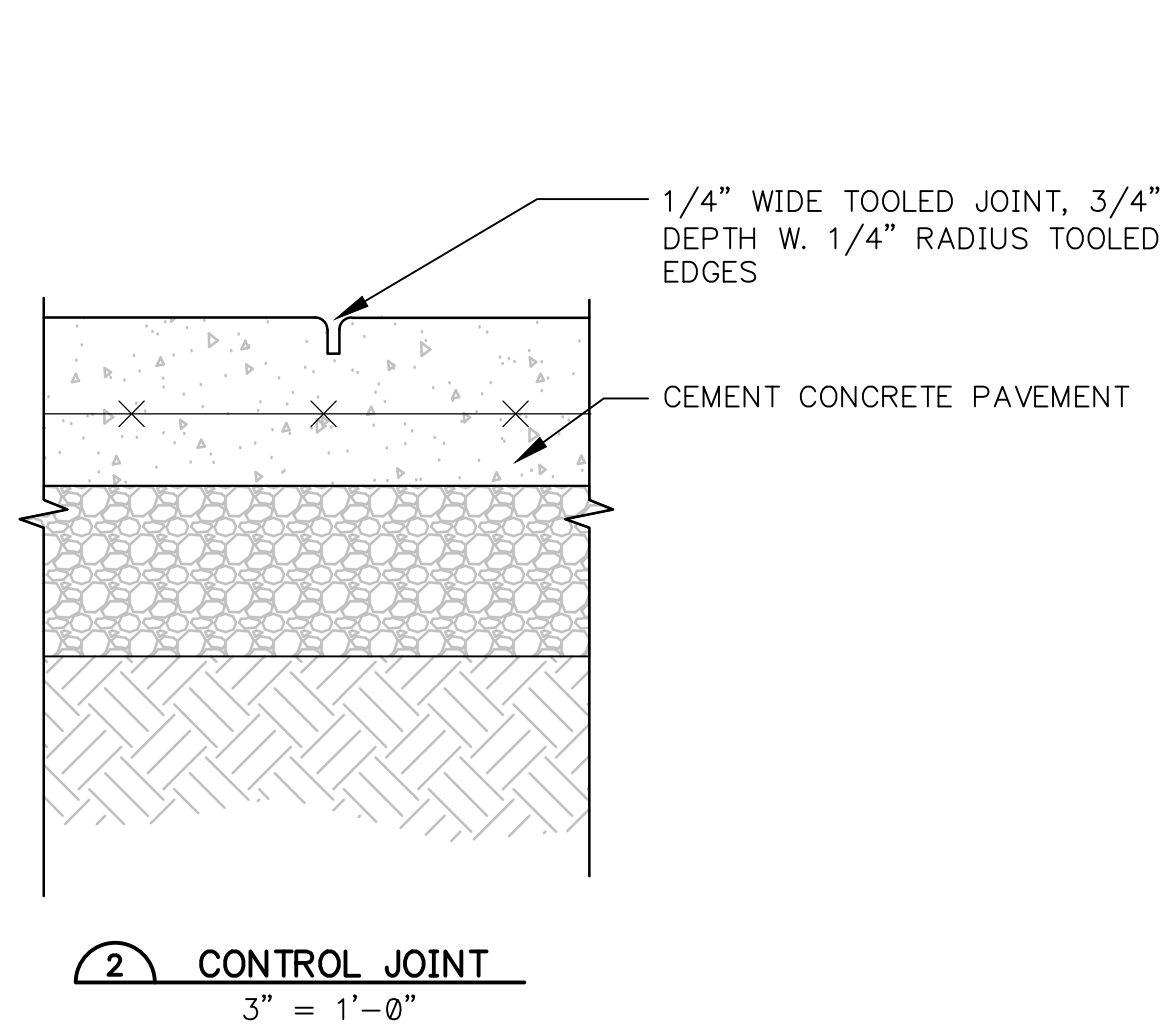
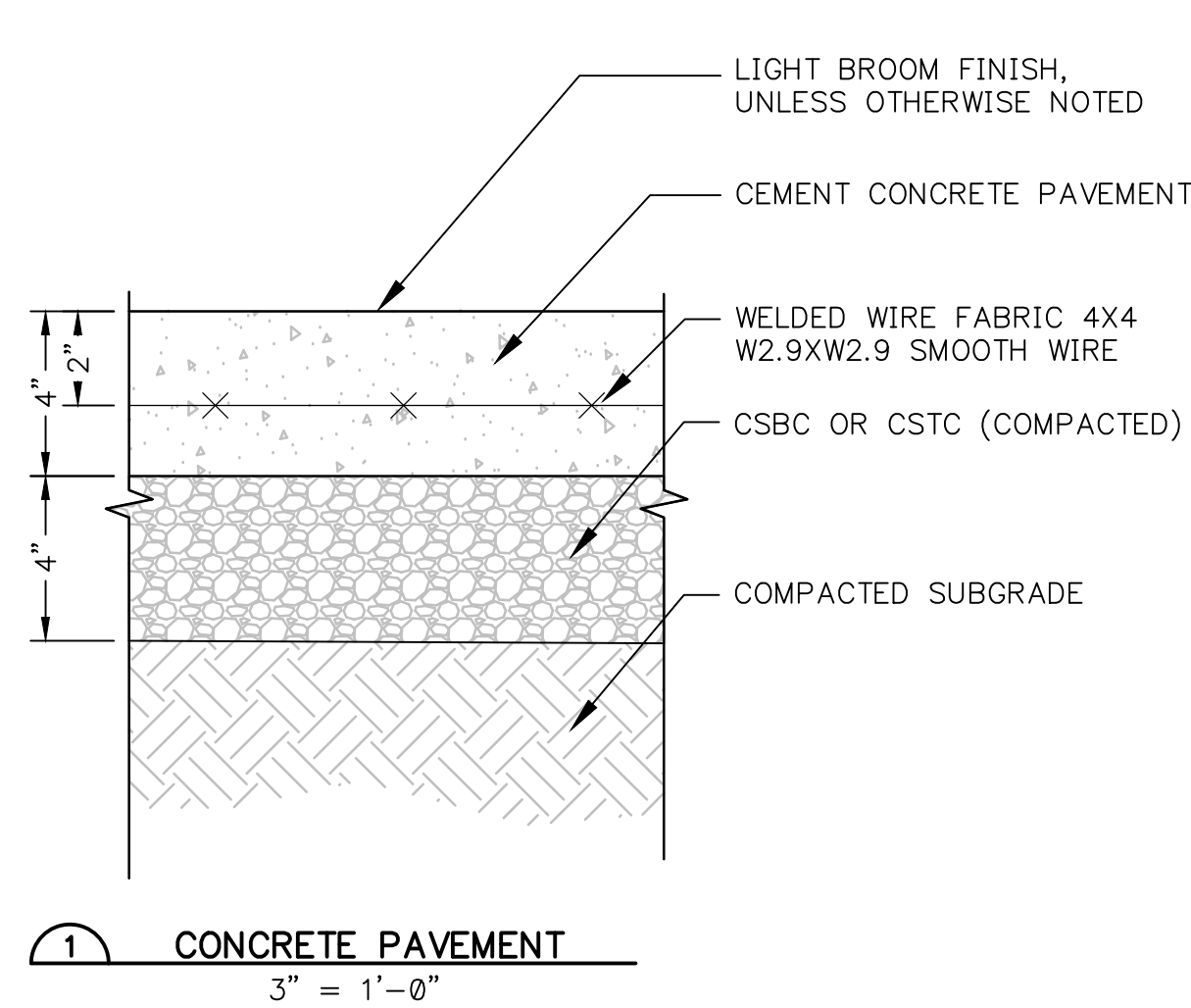
SHEET L6 OF L11
REVISION 0
DATE 11/14/2014
DWG. 0913-50CI-0047

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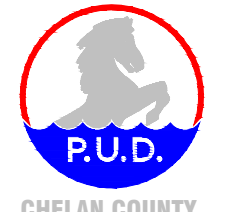
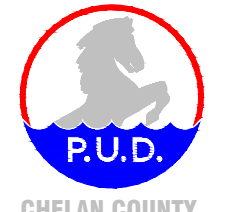
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ORIG. DATE 6/1/2014 ORIG. DRAWN PUD

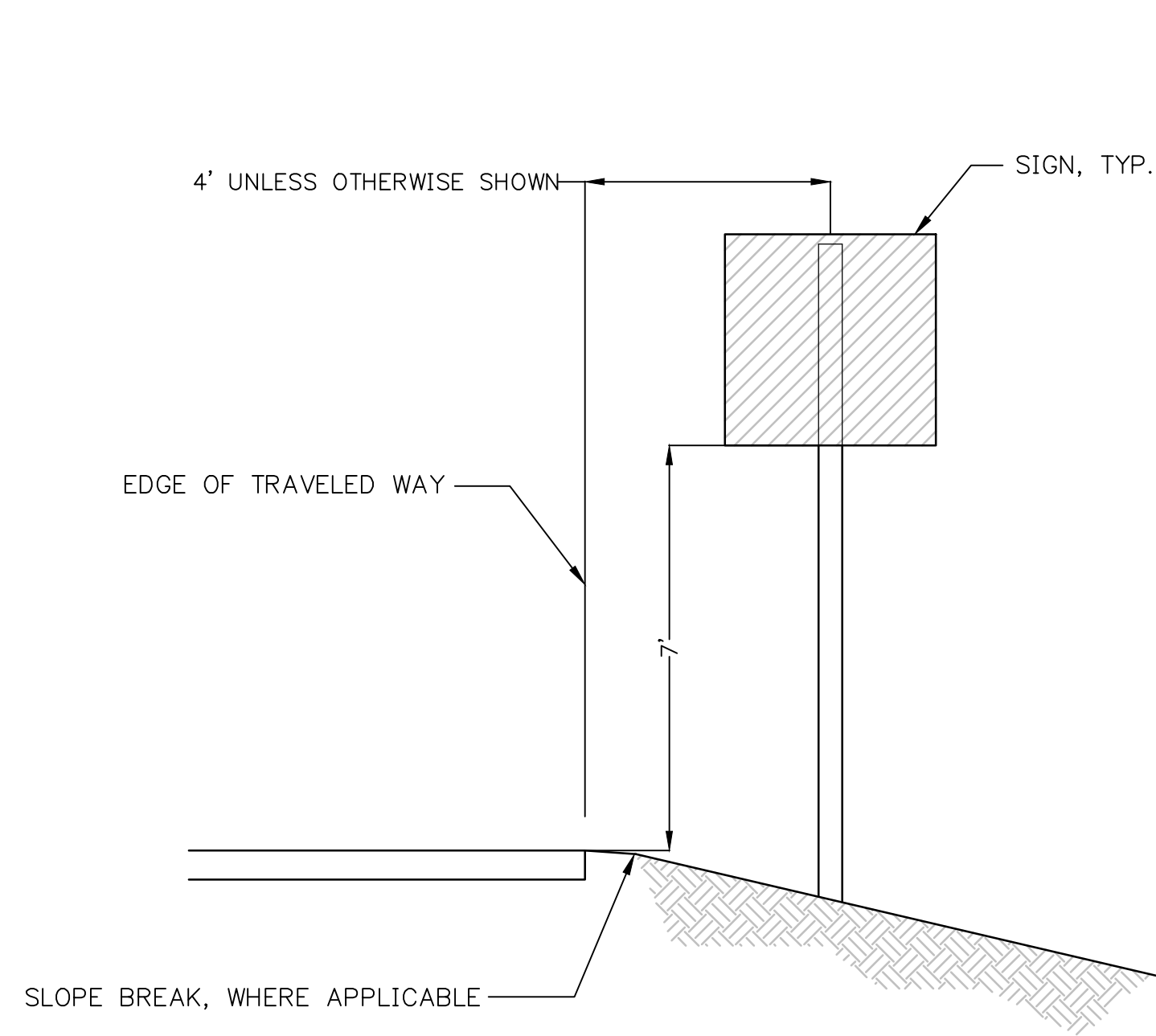


NOTE: SEE PLANS FOR APPLICATION LOCATIONS

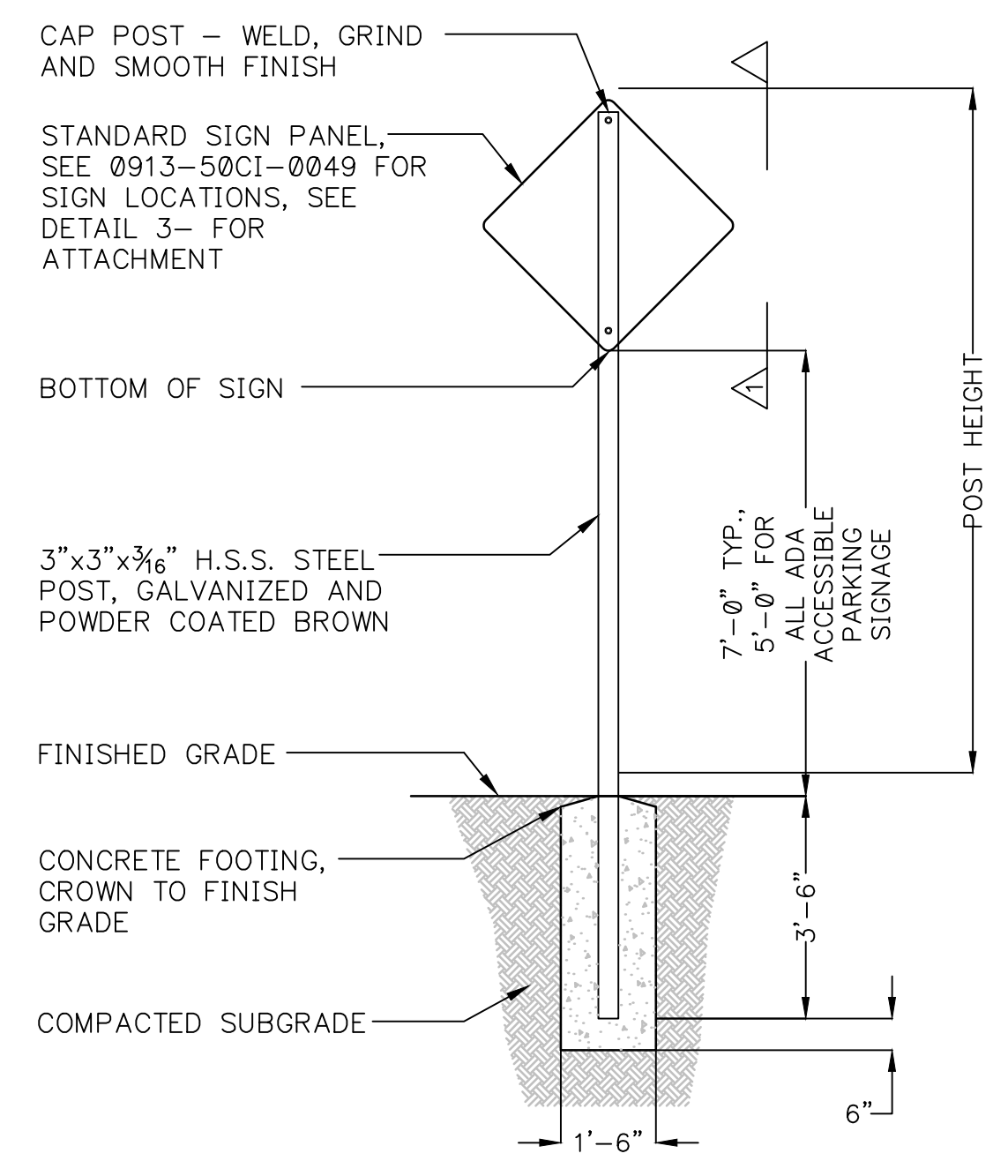
CHELAN PUD NO. 1 PRIM. ENG. C. HILL 2ND ENG. PROJ. MGR. C. HILL		SCALE SEE DWG	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON	 CHELAN COUNTY	Lincoln Rock State Park CABIN LOOP & GROUP CAMP SITE DETAILS: SURFACING BID NO. 14-31	SHEET L7 OF L11 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0048
CHELAN PUD NO. 1 PRIM. ENG. C. HILL 2ND ENG. PROJ. MGR. C. HILL	SCALE SEE DWG	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON	 CHELAN COUNTY	Lincoln Rock State Park CABIN LOOP & GROUP CAMP SITE DETAILS: SURFACING BID NO. 14-31	SHEET L7 OF L11 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0048	



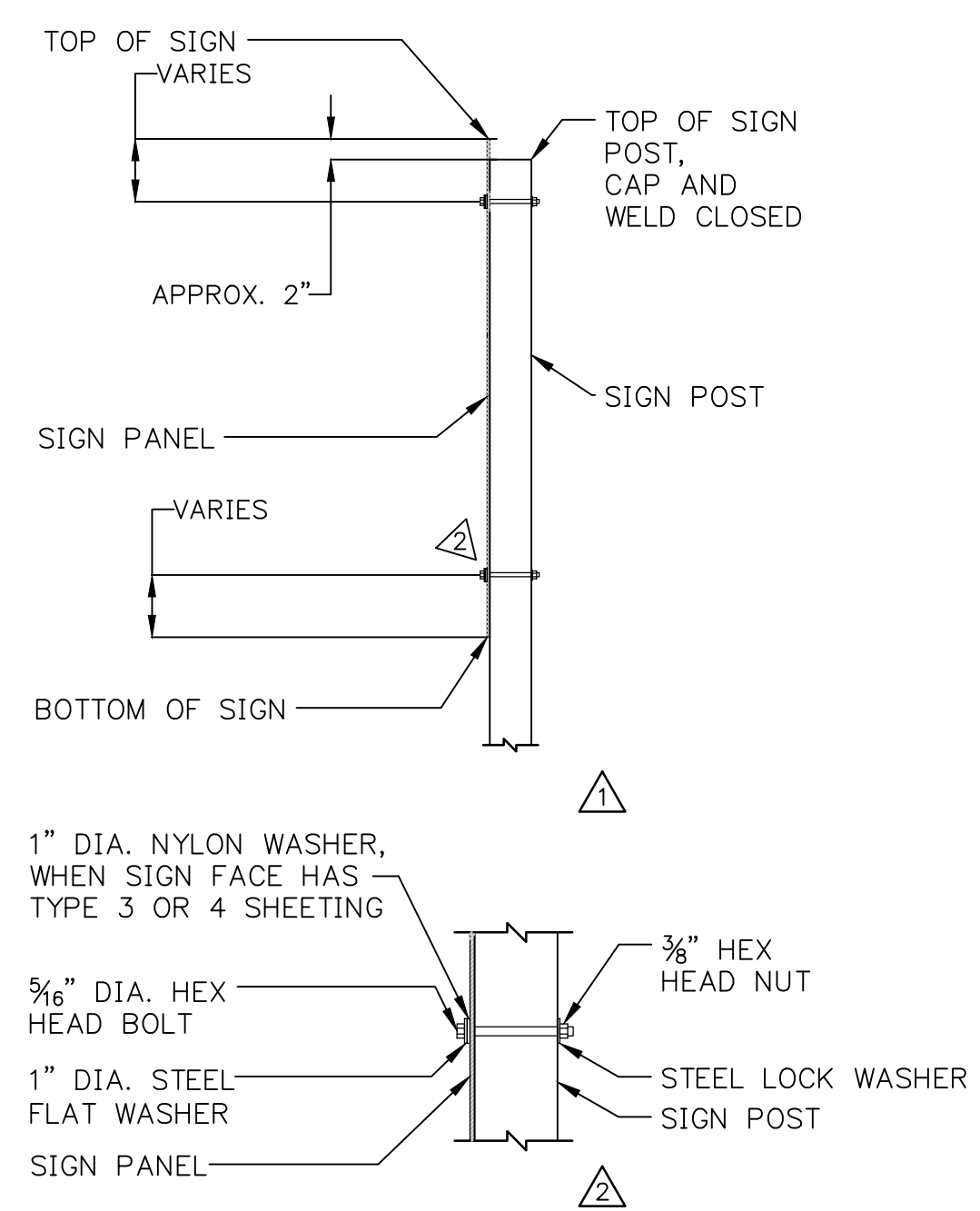
ORIG. DATE 6/1/2014 ORIG. DRAWN PUD



1 SIGN LOCATION, TYP
NOT TO SCALE



2 STANDARD SIGN MOUNT, TYP
NOT TO SCALE



3 STANDARD SIGN ATTACHMENT, TYP.
NOT TO SCALE



NOTE: POST REQUIRED
4 CABIN LOOP 1 (1 TOTAL)
0913-50CI-0049 NOT TO SCALE



NOTE: POST REQUIRED
5 CABIN LOOP (2 TOTAL)
0913-50CI-0049 NOT TO SCALE



NOTE: 1 W/SIGN POST, 1 W/OUT SIGN POST (KIOSK)
6 GROUP CAMP (2 TOTAL)
0913-50CI-0049 NOT TO SCALE



NOTE: POST REQUIRED
7 INTERPRETIVE TRAIL (2 TOTAL)
0913-50CI-0049 NOT TO SCALE



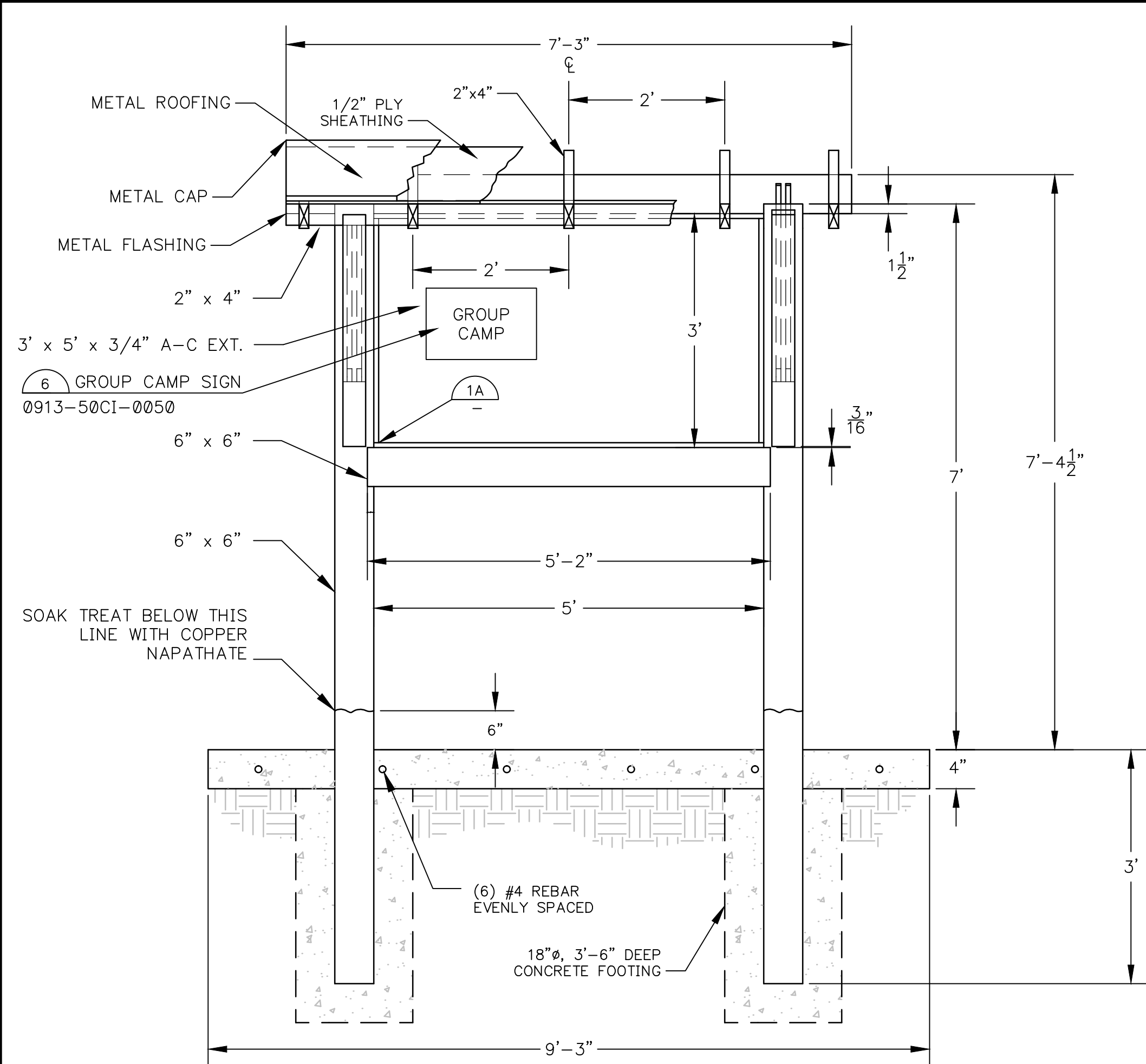
NOTES:
1. DISTRICT TO PROVIDE SIGN IMAGE FILES TO CONTRACTOR UPON REQUEST.
2. APPROX. SIGN SIZE: 11"x17"
3. COLOR: WHITE LETTERS AND BORDER, BROWN BACKGROUND AND BORDER
4. SEE SPECS FOR SIGN MATERIAL REQUIREMENTS.

NOTE: CABIN SIGNS ATTACH TO CABINS, NO POST REQUIRED

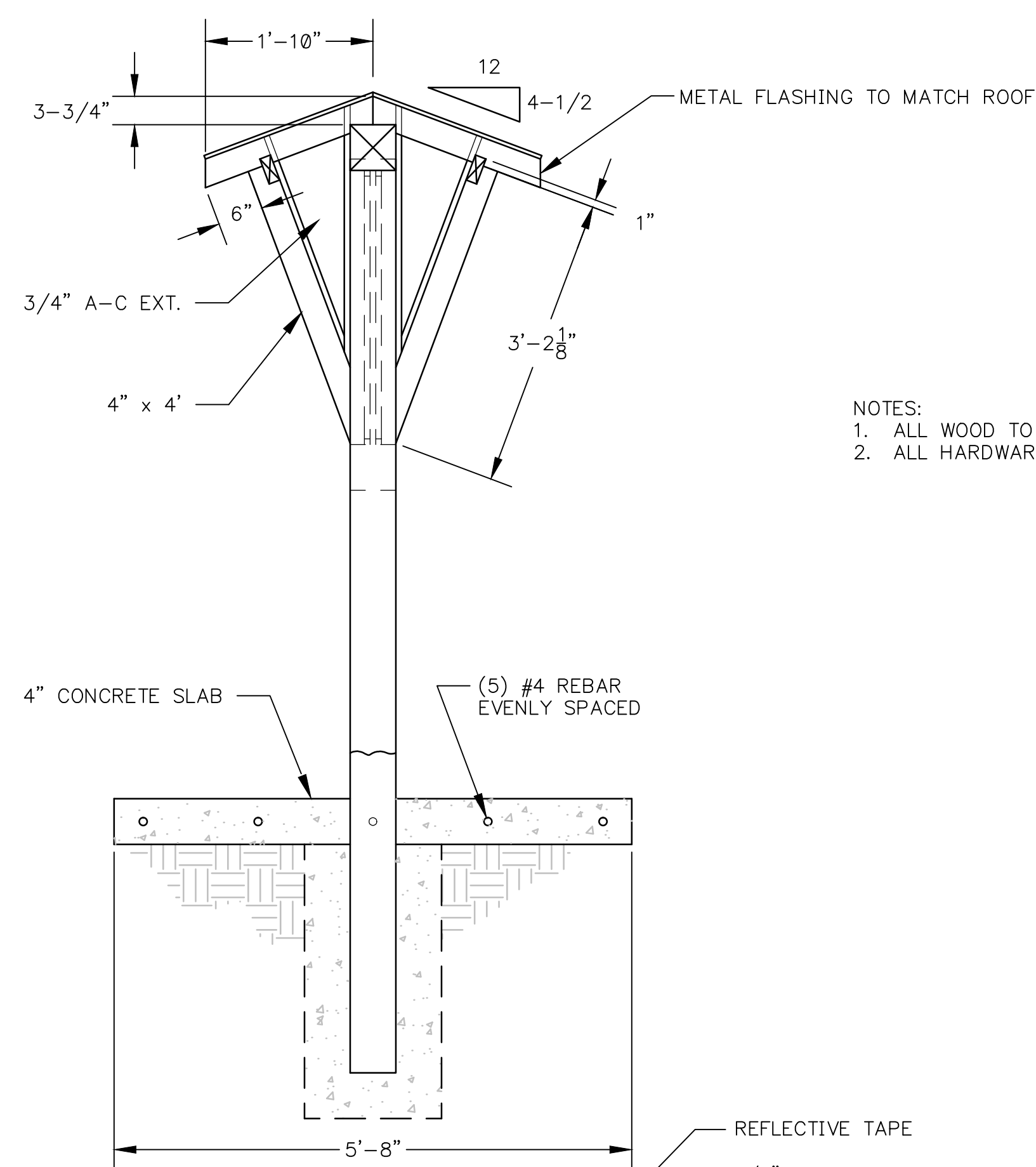
8 CABIN SIGNS (8 TOTAL)
0913-50CI-0049 NOT TO SCALE



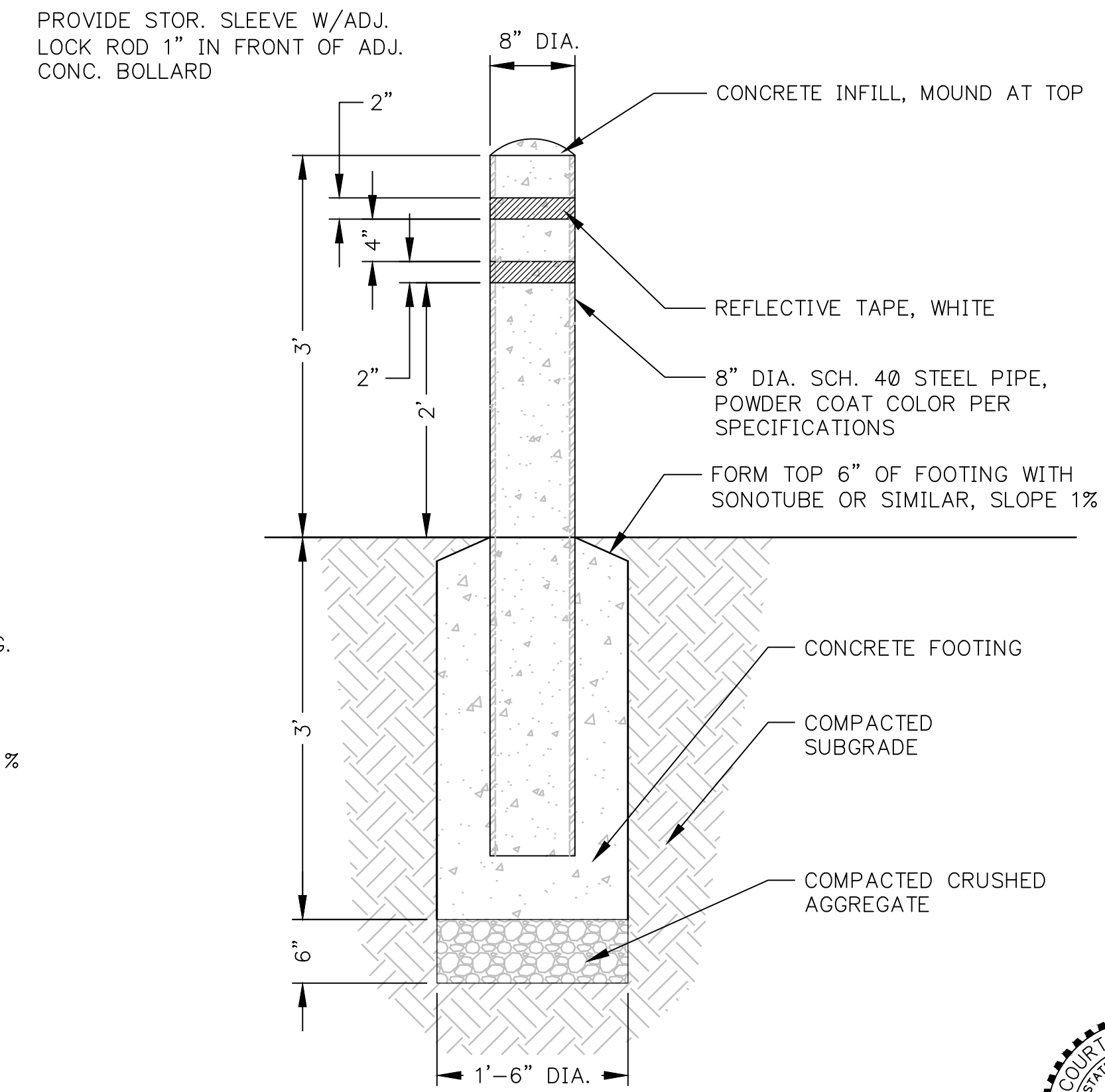
CHELAN PUD NO. 1 PRIM. ENG. C. HILL 2ND ENG. PROJ. MGR. C. HILL		SCALE SEE DWG	BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"	VERIFY SCALE IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		Lincoln Rock State Park CABIN LOOP & GROUP CAMP SITE DETAILS: SIGNS BID NO. 14-31	SHEET L9 OF L11 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0050
REV. DATE 0 11/14/2014 1	BID SET	CRH TRT REQ. BY DRFT	REVISION	DOCUMENT CLASS:	ID:	ORIGINAL DWG. #:	ORIG. DATE 6/1/2014 ORIG. DRAWN PUD	



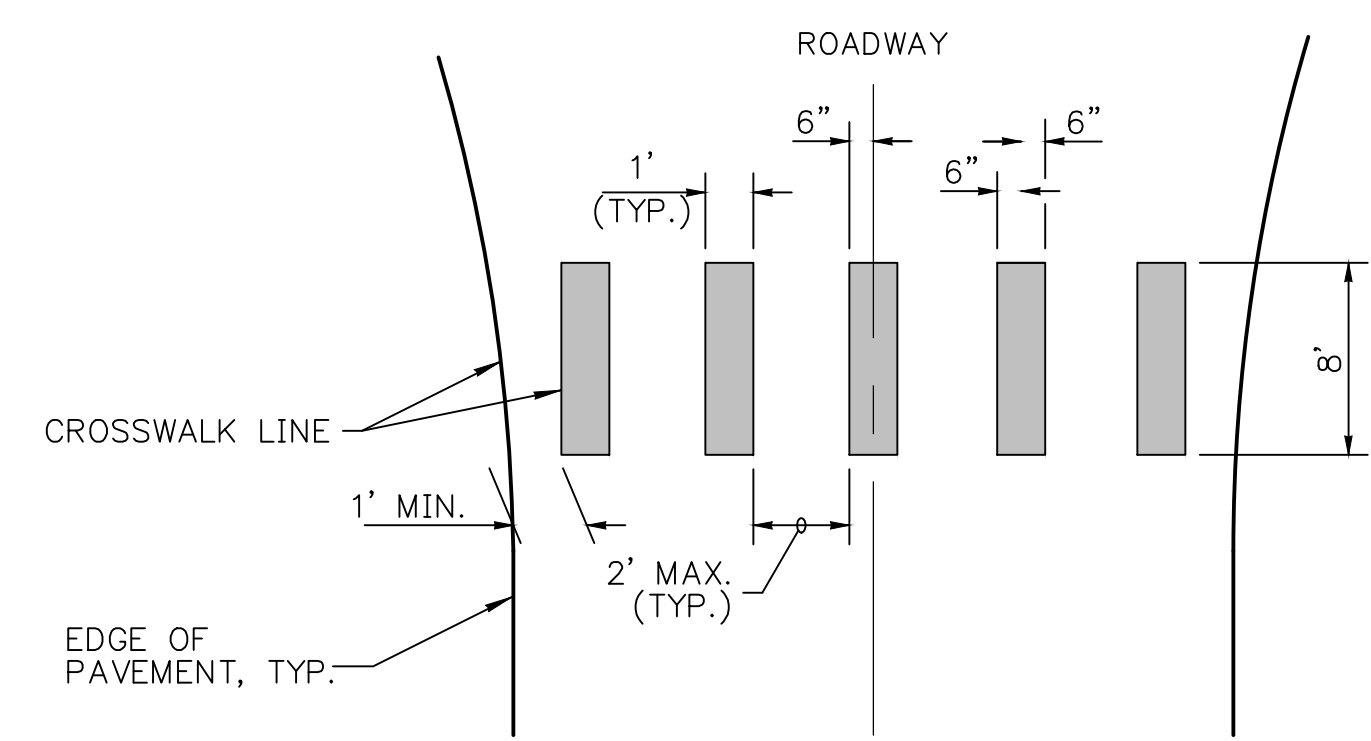
1 GROUP CAMP SIGN KIOSK
0913-50CI-0041 NOT TO SCALE



3 REMOVABLE BOLLARD
0913-50CI-0044 NOT TO SCALE

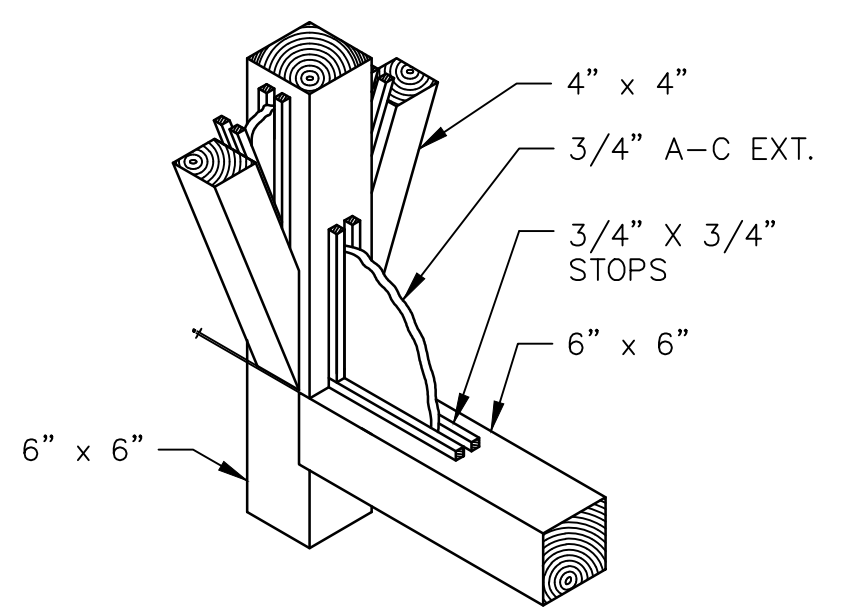


4 STEEL PIPE BOLLARD
0913-50CI-0042, 44 NOT TO SCALE



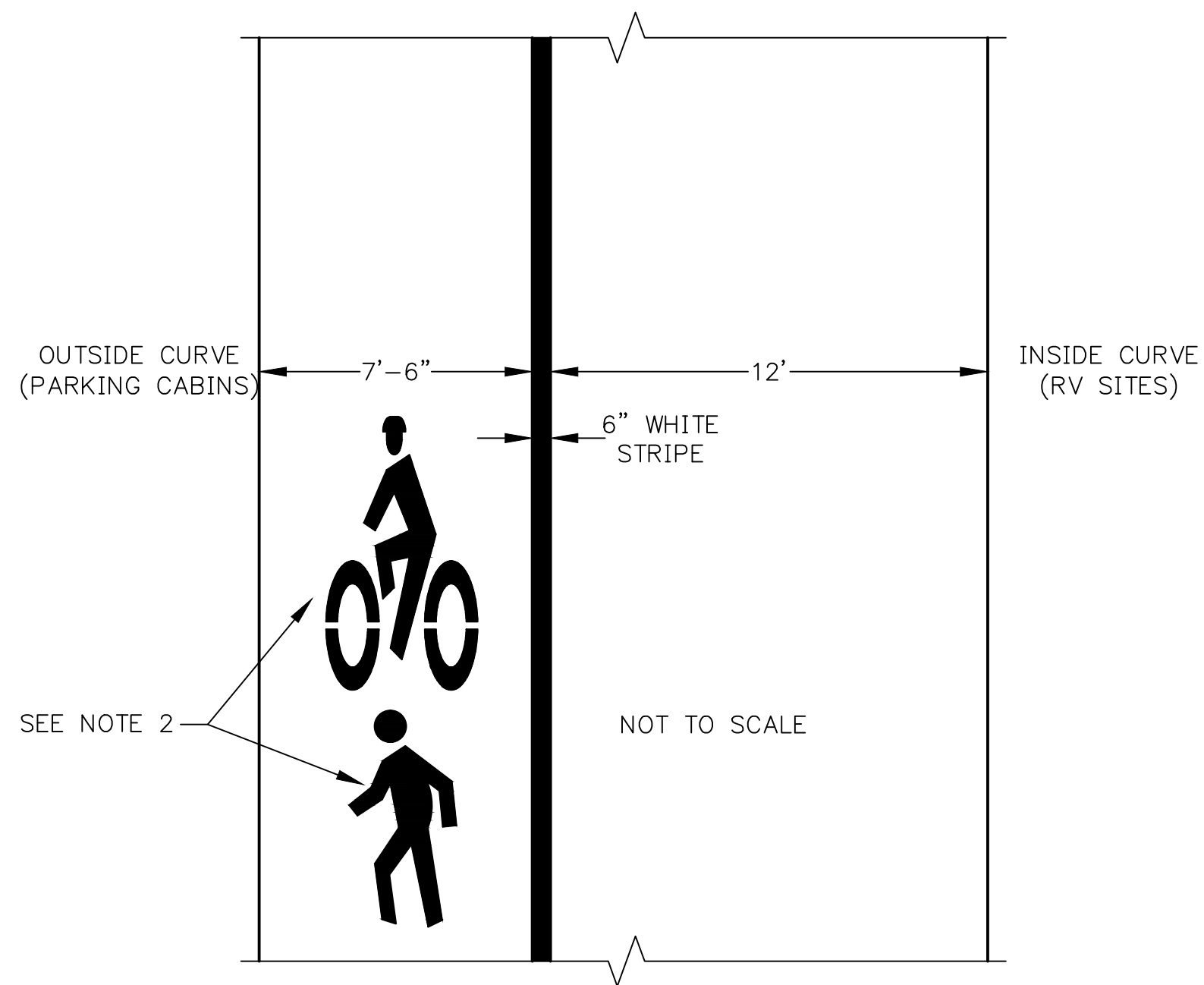
1. TO THE MAXIMUM EXTENT POSSIBLE, CROSSWALKS SHOULD BE PERPENDICULAR TO THE CENTERLINE OF THE TRAVELED WAY.

2 CROSSWALK STRIPING
0913-50CI-0039 NOT TO SCALE



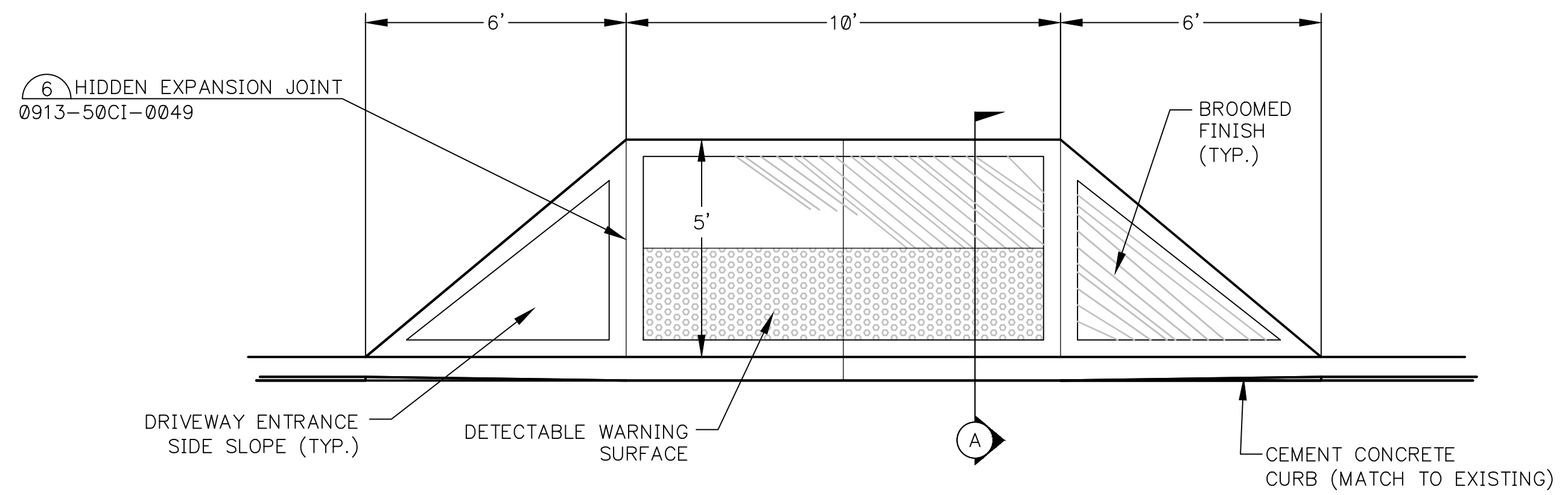
1A CORNER DETAIL
NOT TO SCALE

NOTES:
1. ALL WOOD TO BE STAINED DARK BROWN.
2. ALL HARDWARE TO BE HOT DIPPED GALVANIZED.

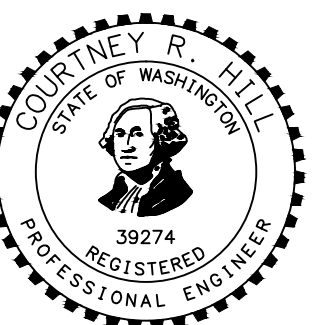
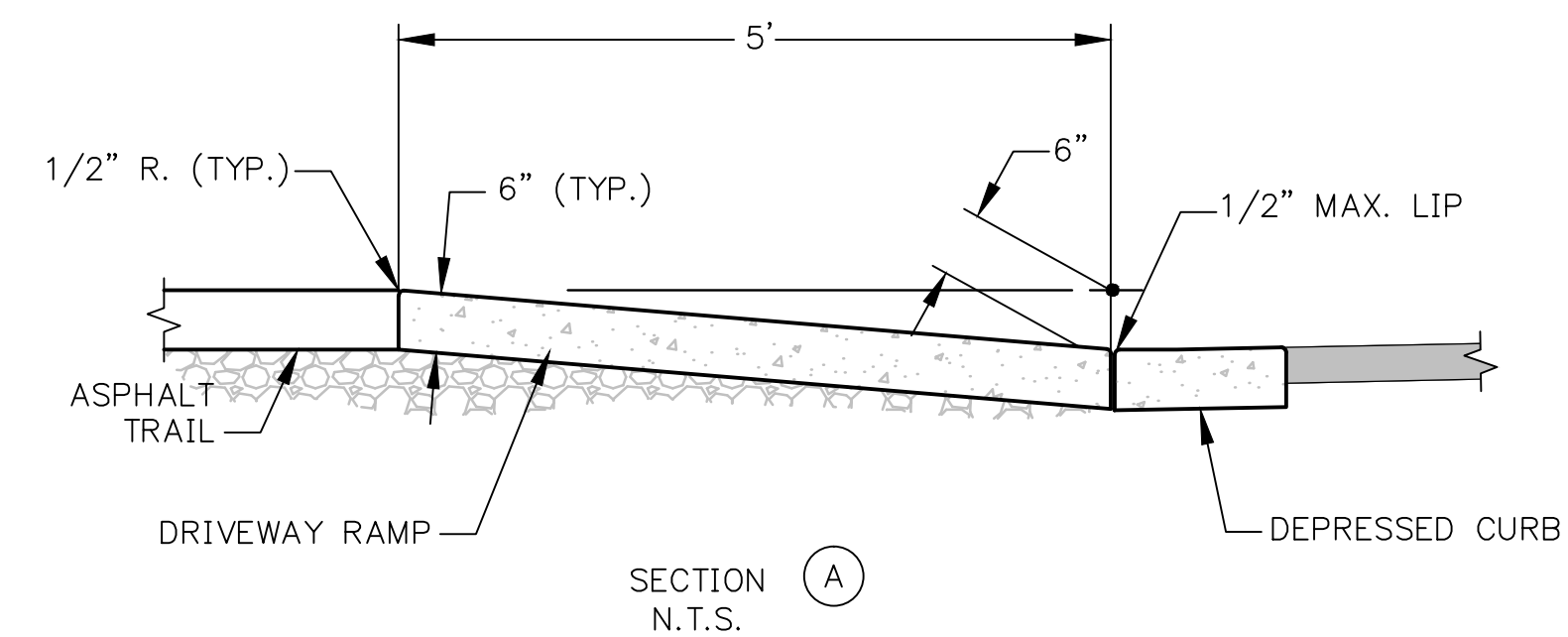


1 CABIN LOOP ACCESS ROAD STRIPING
0913-50CI-0032 NOT TO SCALE

- NOTES:
 1. TYP. STRIPING FROM STA. 4+45 TO STA. 14+50
 2. PAINTED SYMBOLS. SEE USDOT SIGN FABRICATION MANUAL APPENDIX D-1 AND D26A. 5 SYMBOLS TOTAL (3 WALKER, 2 BIKER) PLACE APPROX. EVERY 200 FEET. ALTERNATE SYMBOL TYPE. SIZE ACCORDING TO ACCEPTED INDUSTRY STANDARDS.



2 GROUP CAMP DRIVE ENTRANCE
0913-50CI-0044 NOT TO SCALE



CHELAN PUD NO. 1 PRIM. ENG. C. HILL 2ND ENG. PROJ. MGR. C. HILL		SCALE SEE DWG	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		Lincoln Rock State Park CABIN LOOP & GROUP CAMP SITE DETAILS: MISCELLANEOUS 2 BID NO. 14-31	SHEET L11 OF L11 REVISION 0 DATE 11/14/2014 DWG. 0913-50CI-0052
REV 0 DATE 11/14/2014 BID SET	CRH TRT REQ. BY DRFT	REVISION	DOCUMENT CLASS:	ID:	ORIGINAL DWG. #:	ORIG. DATE 6/1/2014 ORIG. DRAWN PUD		

IRRIGATION SCHEDULE

SYMBOL	MANUFACTURER / MODEL / DESCRIPTION
	Rain Bird 1806-SAM-PRS 15 Strip Series Turf Spray 6.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating.
	Rain Bird 1806-SAM-PRS 5 Series MPR Turf Spray 6.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating.
	Rain Bird 1806-SAM-PRS 8 Series MPR Turf Spray 6.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating.
	Rain Bird 1806-SAM-PRS 10 Series MPR Turf Spray 6.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating.
	Rain Bird 1806-SAM-PRS 15 Series MPR Turf Spray 6.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating.
	Rain Bird 1806-SAM-PRS ADJ Turf Spray 6.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating.
	Rain Bird 1806-SAM-PRS ADJ Turf Spray 6.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating.
	Rain Bird 1812-SAM-PRS W/Toro Precision Spray 5 Series Shrub Spray, 12" Pop-Up, with 30psi PRS unit and check valve. Use with Toro Precision Spray nozzles.
	Rain Bird 1812-SAM-PRS W/Toro Precision Spray 8 Series Shrub Spray, 12" Pop-Up, with 30psi PRS unit and check valve. Use with Toro Precision Spray nozzles.
	Rain Bird 1812-SAM-PRS W/Toro Precision Spray 10 Series Shrub Spray, 12" Pop-Up, with 30psi PRS unit and check valve. Use with Toro Precision Spray nozzles.
	Rain Bird 1812-SAM-PRS W/Toro Precision Spray 12 Series Shrub Spray, 12" Pop-Up, with 30psi PRS unit and check valve. Use with Toro Precision Spray nozzles.
	Rain Bird 1812-SAM-PRS W/Toro Precision Spray 15 Series Shrub Spray, 12" Pop-Up, with 30psi PRS unit and check valve. Use with Toro Precision Spray nozzles.
	Rain Bird 1812-SAM-PRS W/Toro Precision Spray 4X Strip Spray Shrub Spray, 12" Pop-Up, with 30psi PRS unit and check valve. Use with Toro Precision Spray nozzles.
	Rain Bird 1812-SAM-PRS 15 Strip Series Shrub Spray 12.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating Device.
	Rain Bird 1812-SAM-PRS 5 Series MPR Shrub Spray 12.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating Device.
	Rain Bird 1812-SAM-PRS 8 Series MPR Shrub Spray 12.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating Device.
	Rain Bird 1812-SAM-PRS 10 Series MPR Shrub Spray 12.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating Device.
	Rain Bird 1812-SAM-PRS 12 Series MPR Shrub Spray 12.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating Device.
	Rain Bird 1812-SAM-PRS 15 Series MPR Shrub Spray 12.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating Device.
	Rain Bird 1812-SAM-PRS ADJ Shrub Spray 12.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating Device.
	Rain Bird 1812-SAM-PRS ADJ Shrub Spray 12.0" Pop-Up Sprinkler with Co-Molded Wiper Seal. 1/2" NPT Female Threaded Inlet. With Seal-A-Matic Check Valve, and Pressure Regulating Device.
	Hunter MP1000 PROS-06-CV Turf Rotator, 6" (15.24 cm) pop-up with check valve, pressure regulated to 40 psi (2.76 bar), MP Rotator nozzle on PRS40 body. M=Maroon adj arc 90 to 210, L=Light Blue 210 to 270 arc, O=Olive 360 arc.

	Hunter MP2000 PROS-06-CV Turf Rotator, 6" (15.24 cm) pop-up with factory installed check valve, pressure regulated to 40 psi (2.76 bar), MP Rotator nozzle on PRS40 body. K=Black adj arc 90-210, G=Green adj arc 210-270, R=Red 360 arc.
	Hunter MP3000 PROS-06-CV Turf Rotator, 6" (15.24 cm) pop-up with factory installed check valve, pressure regulated to 40 psi (2.76 bar), MP Rotator nozzle on PRS40 body. B=Blue adj arc 90-210, Y=Yellow adj arc 210-270, A=Gray 360 arc.
	Hunter MP3500 PROS-06-CV Turf Rotator, 6.0" Pop-up with factory installed check valve, pressure regulated to 40 psi, MP Rotator nozzle on PRS40 body. LB=light brown adjustable arc, 90-210.
	Hunter MP Corner PROS-06-CV Turf Rotator, 6" (15.24cm) pop-up with factory installed check valve, pressure regulated to 40 psi (2.76 bar), MP Rotator nozzle on PRS40 body. T=Turquoise adj arc 45-105.
	Hunter MP Strip PROS-06-CV Turf Rotator, 6" (15.24 cm) pop-up with factory installed check valve, pressure regulated to 40 psi (2.76 bar), MP Rotator nozzle on PRS40 body. LST=Ivory left strip, SST=Brown side strip, RST=Copper right strip.

SYMBOL	MANUFACTURER / MODEL / DESCRIPTION
	Rain Bird XCZ-100-PRB-COM Medium Plus Flow Drip Control Kit for Commercial Applications. 1" Ball Valve with 1" PESB Valve and 1" Pressure Regulating 40psi Quick-Check Basket Filter. 3gpm to 20gpm.
	Pipe Transition Point above grade Pipe transition point from PVC lateral to drip tubing with riser to above grade installation.
	Flush Valve 3/4" PVC ball valve in 10" valve box.
	Rain Bird ARV050 1/2" Air Relief Valve, made of quality rust-proof materials, with a 6.0" drip valve box (SEB 7XB emitter box). Use with installation below soil. The valve will allow air to escape the pipeline, thus preventing water hammer or blockage.
	Rain Bird PCT on 1804-SAM-PRS Single Outlet Emitter Pressure Compensating Threaded Low-Flow Bubbler. Offered in 5 GPH, 7 GPH, and 10 GPH models, with 1/2" FPT threaded inlet. Light Brown = 5 GPH, Violet = 7 GPH, and Green = 10 GPH.
	Netafim Techline Ring Netafim Techline TLCV drip line with 0.6GPH emitters at 12" spacing. Two concentric rings at 3' and 5' diameter, approximately 25' total length. Flow is approximately 15GPH. Assemble in field. Cover depth: 6", including mulch layer.
	Area to Receive Drip Emitters Rain Bird XB-PC Single Outlet, Pressure Compensating Drip Emitters. Flow rates of 0.5gph=blue, 1.0gph=black, and 2.0gph=red. Comes with a self-piercing barb inlet x barb outlet. Emitter Notes: 4" pot plant to receive 1 of 0.5 GPH emitter. 3 gal plant to receive 2 of 1.0 GPH emitters. 5 gal plant to receive 2 of 2.0 GPH emitters.

SYMBOL	MANUFACTURER / MODEL / DESCRIPTION
	Toro Control Valve Existing brass control valve.
	Toro 220-26-0 Brass 1", 1-1/4", 1-1/2", 2", 2-1/2", and 3" Electric Remote Control Valve. With Spike Guard Solenoid. 1"-2" have In-Line Globe Body Style, and 2-1/2" - 3" are Angle Valve Body Styles.
	Rain Bird 44-LRC 1" Brass Quick-Coupling Valve, with Corrosion-Resistant Stainless Steel Spring, Locking Thermoplastic Rubber Cover, and 2-Piece Body.
	Nibco T-113-K Class 125 bronze gate shut off valve with cross handle, same size as mainline pipe diameter at valve location. Size Range - 1/4" - 3"
	Nibco P-619-RW 2" to 12" cast iron gate valve, same size as mainline pipe where located. Resilient wedge non-rising stem flow control with IPS push-on ends.
	Existing Drain Valve Existing per as-built drawing.
	Toro EVO-040D with (01) EMOD-12 16 Station Outdoor Controller. Includes one 12-station Expansion Module. Ideal for residential and light-commercial applications.

VALVE SCHEDULE

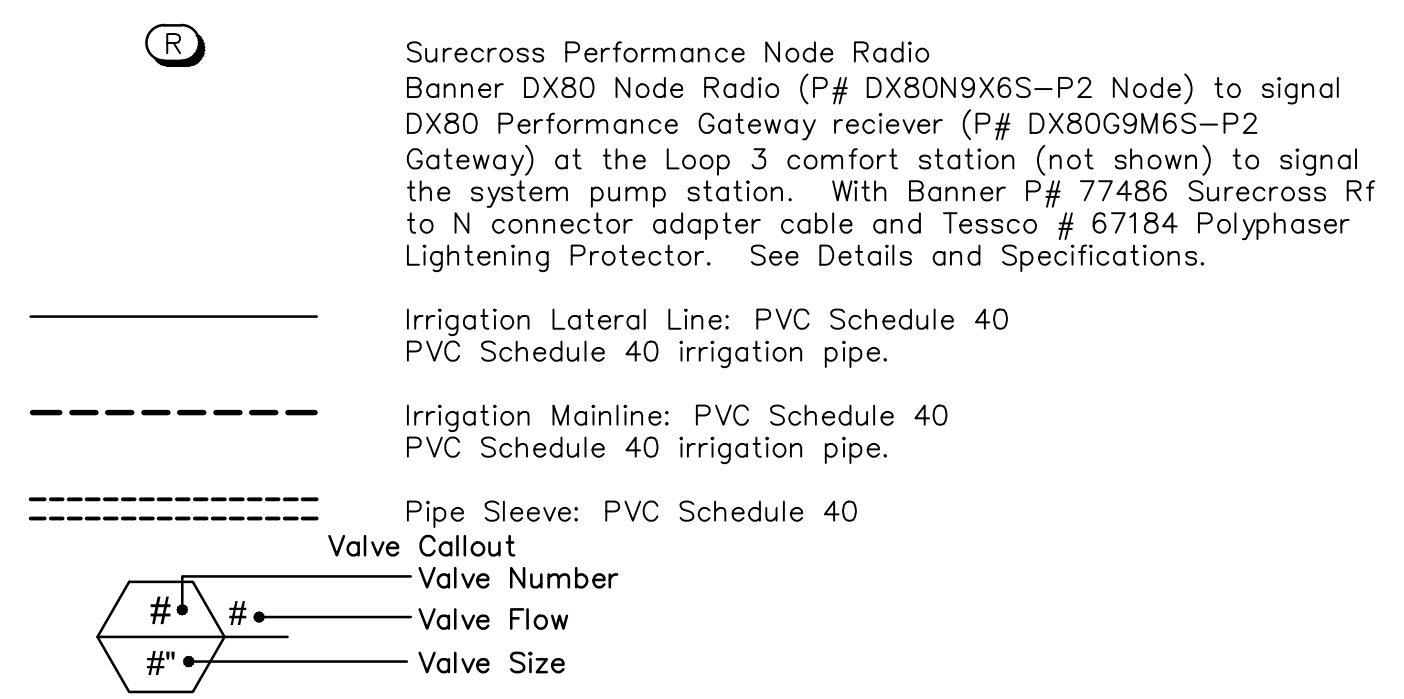
NUMBER	MODEL	SIZE	TYPE	PSI	PSI @ POC	GPM	PRECIP
CL1	Rain Bird XCZ-100-PRB-COM	1"	Area for Drip Emitters	41.51	50.48	9.72	0.51 in/h
CL2	Rain Bird XCZ-100-PRB-COM	1"	Area for Drip Emitters	35.93	40.28	5.02	0.51 in/h
CL3	Toro 220-26-0	1"	Turf Rotary	43.68	48.08	10.71	0.45 in/h
CL4	Toro 220-26-0	1"	Turf Spray	35.24	39.67	13.79	1.77 in/h
CL5	Rain Bird XCZ-100-PRB-COM	1"	Area for Drip Emitters	32.16	34.34	1.75	7.66 in/h
CL6	Toro 220-26-0	1-1/2"	Turf Rotary	48.98	60.63	63.03	0.48 in/h
CL7	Toro 220-26-0	1"	Shrub Spray	37.78	42.27	29.62	1.26 in/h
CL8	Toro 220-26-0	1"	Shrub Spray	36.90	38.39	26.01	1.38 in/h
CL9	Toro 220-26-0	1-1/2"	Turf Rotary	49.69	54.95	60.58	0.47 in/h
CL10	Toro 220-26-0	1-1/2"	Turf Spray	38.45	40.25	34.79	1.63 in/h
CL11	Toro 220-26-0	1-1/2"	Shrub Spray	40.88	46.74	67.63	1.28 in/h
CL12	Rain Bird XCZ-100-PRB-COM	1"	Area for Drip Emitters	34.15	34.18	4.43	0.51 in/h
CL13	Toro 220-26-0	1-1/2"	Turf Rotary	49.27	51.85	58.79	0.43 in/h
CL14	Toro 220-26-0	1-1/2"	Shrub Spray	39.13	40.22	44.11	1.26 in/h
G15	Toro Control Valve	2"	Turf Rotary	50.41		69.30	0.41 in/h
G17	Toro Control Valve	2"	Turf Rotary	45.36		31.02	0.34 in/h
G18	Toro Control Valve	2"	Turf Rotary	48.60		56.63	0.36 in/h
G20	Toro Control Valve	2"	Shrub Spray	38.30		50.58	0.78 in/h

REFERENCE NOTES SCHEDULE

SYMBOL	DESCRIPTION
1	USE EXTREME CAUTION WHEN TRENCHING NEAR EXISTING TREES. HAND DIG ONLY. ROUTE PIPE AROUND DRIP LINE AS NEEDED.
2	PIPE SHOWN HERE FOR GRAPHIC CLARITY ONLY. ROUTE THROUGH LANDSCAPED AREA.
3	EXISTING VALVE #19 AND DRAIN VALVE TO REMAIN IN PLACE. CONNECT TO NEW MAIN LINE.
4	NEW MAIN LINE, SLEEVING, AND CONTROL WIRE BETWEEN VALVES 17 & THE RELOCATED 18, AND EXISTING VALVE 19. INSTALL CONTROL WIRE IN SEPARATE SLEEVE.

GENERAL NOTES:

- THE GROUP CAMP AREA IS A REBUILD OF A PORTION OF THE EXISTING PARK SYSTEM. THE REMAINDER OF THE PARK SYSTEM IS TO BE FULLY OPERATIONAL DURING THE CONSTRUCTION PERIOD.
- SPRINKLER DESIGN IS BASED ON APPROXIMATELY 60 PSI AT THE EXISTING SPRINKLER HEADS. THIS MEASUREMENT WAS TAKEN VIA PITOT GAUGE ON APRIL 16, 2014. VERIFY WATER PRESSURE IN FIELD.
- SEE 0913-51CI-0002, "DEMOLITION AND RECONFIGURATION," AND EXHIBIT R, "IRRIGATION AS-BUILT" FOR COORDINATION OF THE GROUP CAMP SYSTEM.
- EXISTING MAINLINE TO REMAIN IN PLACE. EXISTING VALVES AS NOTED WILL BE REUSED.
- ALL LATERAL PIPING DOWNSTREAM OF EXISTING VALVES USED FOR THE NEW IRRIGATION SYSTEM SHALL BE NEW PIPE.
- THE CABIN LOOP AREA IRRIGATION IS ALL NEW CONSTRUCTION.
- ADJUST SPRINKLER ARC AND RADIUS AS NEEDED TO AVOID OVER SPRAY ONTO BUILDINGS, TENT SITES, PICNIC SITES, TRAILS, AND PAVED AREAS. PER MANUFACTURERS, ALL NOZZLES CAN BE ADJUSTED TO APPROXIMATELY 75% OF THEIR NOMINAL RADII.



PRIM. ENG.	CHELAN PUD NO.1		SCALE	
2ND ENG.	PRIM. ENG.	NTS		BAR IS ONE INCH ON ORIGINAL DRAWING.
DESIGNER	TL	2ND ENG.	0	11/14/2014
APPROVAL	DLS	PROJ. MGR.	COURT HILL	REV DATE

VERIFY SCALE		IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
0	1"	CRH	REQ. BY
REVISION	DRFT		



LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
IRRIGATION NOTES
& MATERIALS SCHEDULE
BID NO. 14-31

SHEET 11 OF 17
REVISION 0
DATE 11/14/2014
DWG. 0913-51CI-0001

IRRIGATION SCHEDULE-DEMO AND RECONFIGURE

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
	HUNTER MP2000 PROS-06-CV TURF ROTATOR, 6" (15.24 CM) POP-UP WITH FACTORY INSTALLED CHECK VALVE, PRESSURE REGULATED TO 40 PSI (2.76 BAR), MP ROTATOR NOZZLE ON PRS40 BODY. K=BLACK ADJ ARC 90-210, G=GREEN ADJ ARC 210-270, R=RED 360 ARC.

	HUNTER MP3000 PROS-06-CV TURF ROTATOR, 6" (15.24 CM) POP-UP WITH FACTORY INSTALLED CHECK VALVE, PRESSURE REGULATED TO 40 PSI (2.76 BAR), MP ROTATOR NOZZLE ON PRS40 BODY. B=BLUE ADJ ARC 90-210, Y=YELLOW ADJ ARC 210-270, A=GRAY 360 ARC.
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	HUNTER MP CORNER PROS-06-CV TURF ROTATOR, 6" (15.24CM) POP-UP WITH FACTORY INSTALLED CHECK VALVE, PRESSURE REGULATED TO 40 PSI (2.76 BAR), MP ROTATOR NOZZLE ON PRS40 BODY. T=TURQUOISE ADJ ARC 45-105.
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SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
	HUNTER I-20-06-SS TURF ROTOR, 6.0" POP-UP. ADJUSTABLE AND FULL CIRCLE. STAINLESS STEEL RISER. DRAIN CHECK VALVE. STANDARD NOZZLE.

	HUNTER I-20-06-SS TURF ROTOR, 6.0" POP-UP. ADJUSTABLE AND FULL CIRCLE. STAINLESS STEEL RISER. DRAIN CHECK VALVE. STANDARD NOZZLE.
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	HUNTER I-20-06-SS TURF ROTOR, 6.0" POP-UP. ADJUSTABLE AND FULL CIRCLE. STAINLESS STEEL RISER. DRAIN CHECK VALVE. STANDARD NOZZLE.
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	HUNTER I-20-06-SS TURF ROTOR, 6.0" POP-UP. ADJUSTABLE AND FULL CIRCLE. STAINLESS STEEL RISER. DRAIN CHECK VALVE. STANDARD NOZZLE.
--	---

SYMBOL MANUFACTURER/MODEL/DESCRIPTION

	TORO CONTROL VALVE EXISTING BRASS CONTROL VALVE.
--	--

	EXISTING DRAIN VALVE EXISTING PER AS-BUILT DRAWING.
--	---

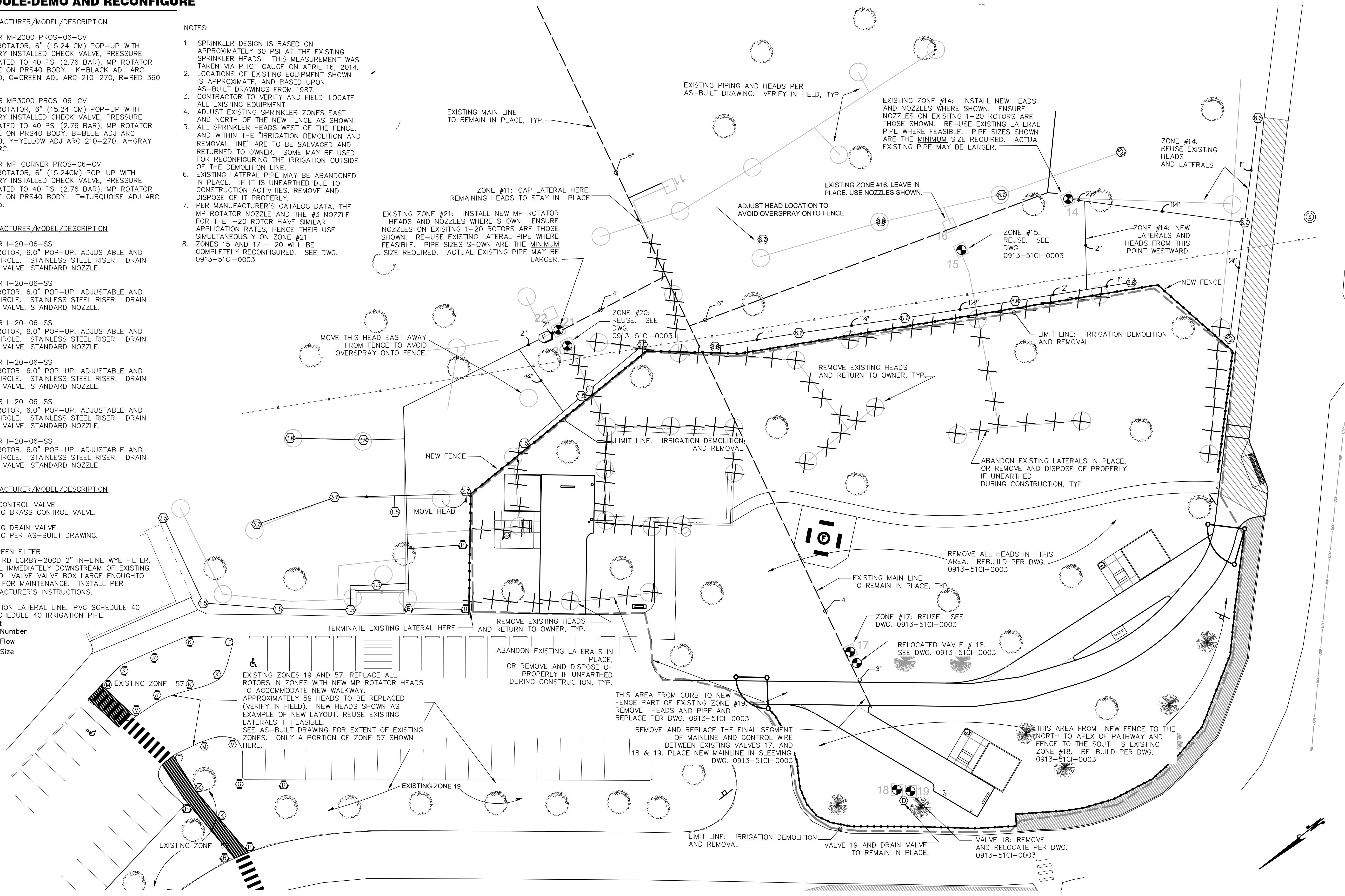
	2" SCREEN FILTER RAIN BIRD LCRBY-200D 2" IN-LINE WYE FILTER. INSTALL IMMEDIATELY DOWNSTREAM OF EXISTING CONTROL VALVE VALVE BOX LARGE ENOUGH TO ALLOW FOR MAINTENANCE. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
--	---

	IRRIGATION LATERAL LINE: PVC SCHEDULE 40 PVC SCHEDULE 40 IRRIGATION PIPE.
--	---

	Valve Callout
	Valve Number
	Valve Flow
	Valve Size

NOTES:

1. SPRINKLER DESIGN IS BASED ON APPROXIMATELY 60 PSI AT THE EXISTING SPRINKLER HEADS. THIS MEASUREMENT WAS TAKEN VIA PITOT GAUGE ON APRIL 16, 2014.
2. LOCATIONS OF EXISTING EQUIPMENT SHOWN IS APPROXIMATE, AND BASED UPON AS-BUILT DRAWINGS FROM 1987.
3. CONTRACTOR TO VERIFY AND FIELD-LOCATE ALL EXISTING EQUIPMENT.
4. ADJUST EXISTING SPRINKLER ZONES EAST AND NORTH OF THE NEW FENCE AS SHOWN.
5. ALL SPRINKLER HEADS WEST OF THE FENCE, AND WITHIN THE "IRRIGATION DEMOLITION AND REMOVAL LINE" ARE TO BE SALVAGED AND RETURNED TO OWNER. SOME MAY BE USED FOR RECONFIGURING THE IRRIGATION OUTSIDE OF THE DEMOLITION LINE.
6. EXISTING LATERAL PIPE MAY BE ABANDONED IN PLACE. IF IT IS UNEARTHED DUE TO CONSTRUCTION ACTIVITIES, REMOVE AND DISPOSE OF IT PROPERLY.
7. PER MANUFACTURER'S CATALOG DATA, THE MP ROTATOR NOZZLE AND THE #3 NOZZLE FOR THE I-20 ROTOR HAVE SIMILAR APPLICATION RATES, HENCE THEIR USE SIMULTANEOUSLY ON ZONE #21.
8. ZONES 15 AND 17 - 20 WILL BE COMPLETELY RECONFIGURED. SEE DWG. 0913-51CI-0003



Project GROUNDWORK
AN SCJ ALLIANCE STUDIO

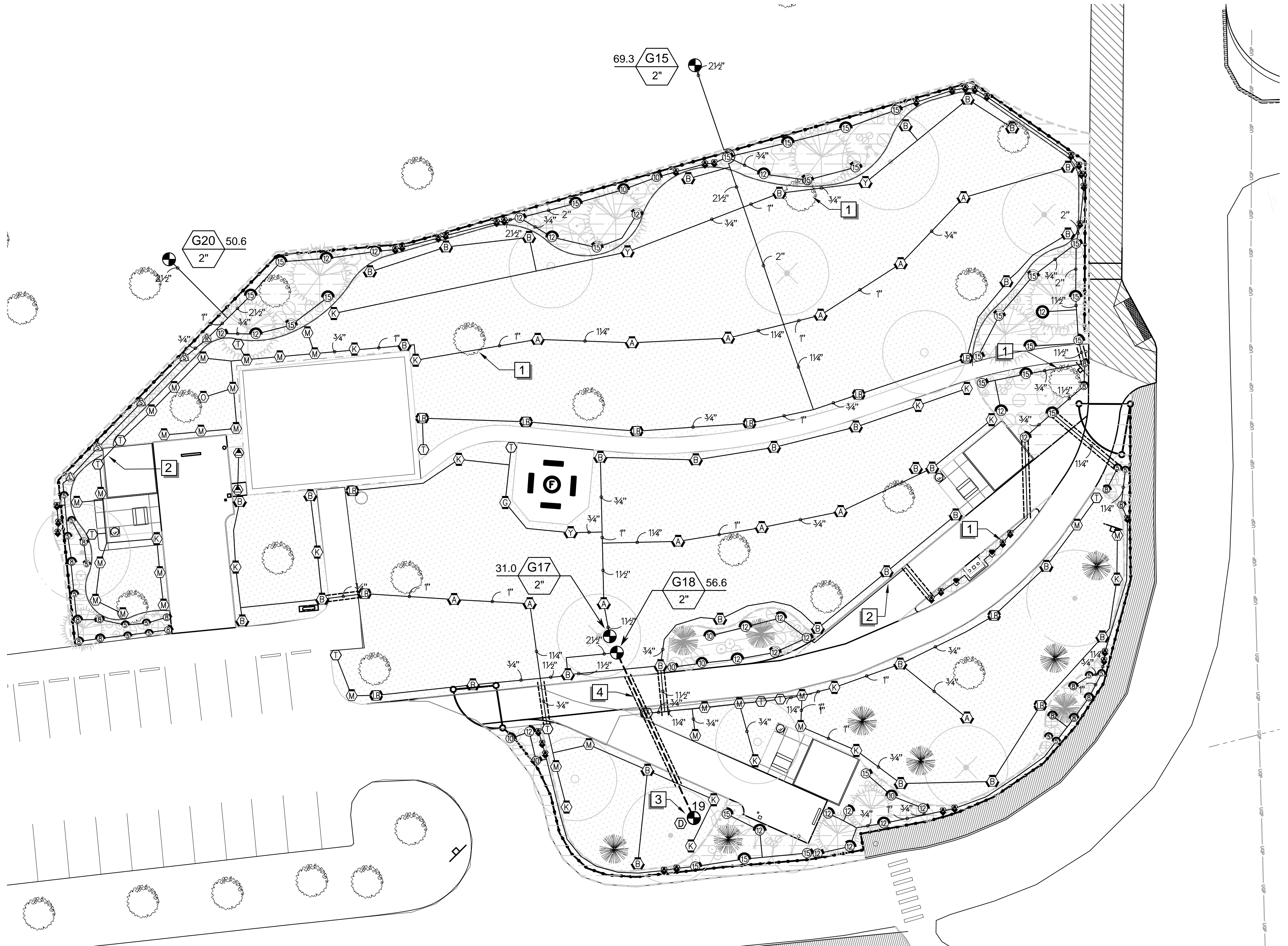
CONTRACTOR	PRIM. ENG.	CHELAN PUD NO.1
DESIGNER	TL	PRIM. ENG.
APPROVAL	DLS	2ND ENG.
		PROJ. MGR.
		COURT HILL

SCALE	1"=20'
BAR IS ONE INCH ON ORIGINAL DRAWING.	0 1"
VERIFY SCALE	
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
REV	DATE
0	11/14/2014
CRH	BID SET
REQ. BY	
DRFT	

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
GROUP CAMP IRRIGATION DEMOLITION & RECONFIGURATION PLAN
BID NO. 14-31

SHEET 12 OF 17
REVISION 0
DATE 11/14/2014
DWG. 0913-51CI-0002



IRRIGATION SCHEDULE—GROUP CAMP

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
	Rain Bird 1812-SAM-PRS W/Toro Precision Spray 5 Series Shrub Spray, 12" Pop-Up, with 30psi PRS unit and check valve. Use with Toro Precision Spray nozzles.
	Rain Bird 1812-SAM-PRS W/Toro Precision Spray 8 Series Shrub Spray, 12" Pop-Up, with 30psi PRS unit and check valve. Use with Toro Precision Spray nozzles.
	Rain Bird 1812-SAM-PRS W/Toro Precision Spray 10 Series Shrub Spray, 12" Pop-Up, with 30psi PRS unit and check valve. Use with Toro Precision Spray nozzles.
	Rain Bird 1812-SAM-PRS W/Toro Precision Spray 12 Series Shrub Spray, 12" Pop-Up, with 30psi PRS unit and check valve. Use with Toro Precision Spray nozzles.
	Rain Bird 1812-SAM-PRS W/Toro Precision Spray 15 Series Shrub Spray, 12" Pop-Up, with 30psi PRS unit and check valve. Use with Toro Precision Spray nozzles.
	Rain Bird 1812-SAM-PRS W/Toro Precision Spray 4X Strip Spray Shrub Spray, 12" Pop-Up, with 30psi PRS unit and check valve. Use with Toro Precision Spray nozzles.
	Hunter MP1000 PROS-06-CV Turf Rotator, 6" (15.24 cm) pop-up with check valve, pressure regulated to 40 psi (2.76 bar), MP Rotator nozzle on PRS40 body. M=Maroon adj arc 90 to 210, L=Light Blue 210 to 270 arc, O=Olive 360 arc.
	Hunter MP2000 PROS-06-CV Turf Rotator, 6" (15.24 cm) pop-up with factory installed check valve, pressure regulated to 40 psi (2.76 bar), MP Rotator nozzle on PRS40 body. K=Black adj arc 90-210, G=Green adj arc 210-270, R=Red 360 arc.
	Hunter MP3000 PROS-06-CV Turf Rotator, 6" (15.24 cm) pop-up with factory installed check valve, pressure regulated to 40 psi (2.76 bar), MP Rotator nozzle on PRS40 body. B=Blue adj arc 90-210, Y=Yellow adj arc 210-270, A=Gray 360 arc.
	Hunter MP3500 PROS-06-CV Turf Rotator, 6.0" Pop-up with factory installed check valve, pressure regulated to 40 psi, MP Rotator nozzle on PRS40 body. LB=light brown adjustable arc, 90-210.
	Hunter MP Corner PROS-06-CV Turf Rotator, 6" (15.24cm) pop-up with factory installed check valve, pressure regulated to 40 psi (2.76 bar), MP Rotator nozzle on PRS40 body. T=Turquoise adj arc 45-105.
	Hunter MP Strip PROS-06-CV Turf Rotator, 6" (15.24 cm) pop-up with factory installed check valve, pressure regulated to 40 psi (2.76 bar), MP Rotator nozzle on PRS40 body. LST=Ivory left strip, SST=Brown side strip.

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
	Rain Bird PCT on 1804-SAM-PRS Single Outlet Emitter Pressure Compensating Threaded Low-Flow Bubblers. Offered in 5 GPH, 7 GPH, and 10 GPH models, with 1/2" FPT threaded inlet. Light Brown = 5 GPH, Violet = 7 GPH, and Green = 10 GPH.

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
	Toro Control Valve Existing brass control valve.
	Existing Drain Valve Existing per as-built drawing.

	Irrigation Lateral Line: PVC Schedule 40 PVC Schedule 40 irrigation pipe.
	Irrigation Mainline: PVC Schedule 40 PVC Schedule 40 irrigation pipe.
	Pipe Sleeve: PVC Schedule 40
	Valve Callout
	Valve Number
	Valve Flow
	Valve Size

GENERAL NOTES:

- THIS IS A REBUILD OF A PORTION OF AN EXISTING SYSTEM. THE REMAINDER OF THE PARK SYSTEM IS TO BE FULLY OPERATIONAL DURING THE CONSTRUCTION PERIOD.
- SPRINKLER DESIGN IS BASED ON APPROXIMATELY 60 PSI AT THE EXISTING SPRINKLER HEADS. THIS MEASUREMENT WAS TAKEN VIA PITOT GAUGE ON APRIL 16, 2014.
- SEE DWG. 0919-SIC1-0002, "DEMOLITION AND RECONFIGURATION," AND EXHIBIT R FOR IRRIGATION AS-BUILT FOR COORDINATION.
- EXISTING MAINLINE TO REMAIN IN PLACE. EXISTING VALVES AS NOTED WILL BE REUSED.
- ALL LATERAL PIPING DOWNSTREAM OF EXISTING VALVES USED FOR THE NEW IRRIGATION SYSTEM SHALL BE NEW PIPE.
- ADJUST SPRINKLER ARC AND RADIUS AS NEEDED TO AVOID OVER SPRAY ONTO BUILDINGS AND PAVED AREAS. PER MANUFACTURERS, ALL NOZZLES CAN BE ADJUSTED TO APPROXIMATELY 75% OF THEIR NOMINAL RADIUS.

VALVE SCHEDULE

NUMBER	MODEL	SIZE	TYPE	PSI	PSI @ POC	GPM	PRECIP
G15	Toro Control Valve	2"	Turf Rotary	50.41	69.30	0.41 in/h	
G17	Toro Control Valve	2"	Turf Rotary	45.36	31.02	0.34 in/h	
G18	Toro Control Valve	2"	Turf Rotary	48.60	56.63	0.36 in/h	
G20	Toro Control Valve	2"	Shrub Spray	38.30	50.58	0.78 in/h	

REFERENCE NOTES SCHEDULE GROUP

SYMBOL	DESCRIPTION
	USE EXTREME CAUTION WHEN TRENCHING NEAR EXISTING TREES. HAND DIG ONLY. ROUTE PIPE AROUND DRIP LINE AS NEEDED.
	PIPE SHOWN HERE FOR GRAPHIC CLARITY ONLY. ROUTE THROUGH LANDSCAPED AREA.
	EXISTING VALVE #19 AND DRAIN VALVE TO REMAIN IN PLACE. CONNECT TO NEW MAIN LINE.
	NEW MAIN LINE, SLEEVING, AND CONTROL WIRE BETWEEN VALVES 17 & THE RELOCATED 18, AND EXISTING VALVE 19. INSTALL CONTROL WIRE IN SEPARATE SLEEVE.



PRIM. ENG.	CHELAN PUD NO.1	SCALE	1"=20'
2ND ENG.	PRIM. ENG.	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE
DESIGNER	TL	0	11/14/2014
APPROVAL	DLS	PROJ. MGR.	COURTNEY HILL

BID SET	CRH
REV	DATE
REVISION	REQ. BY
DRFT	

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

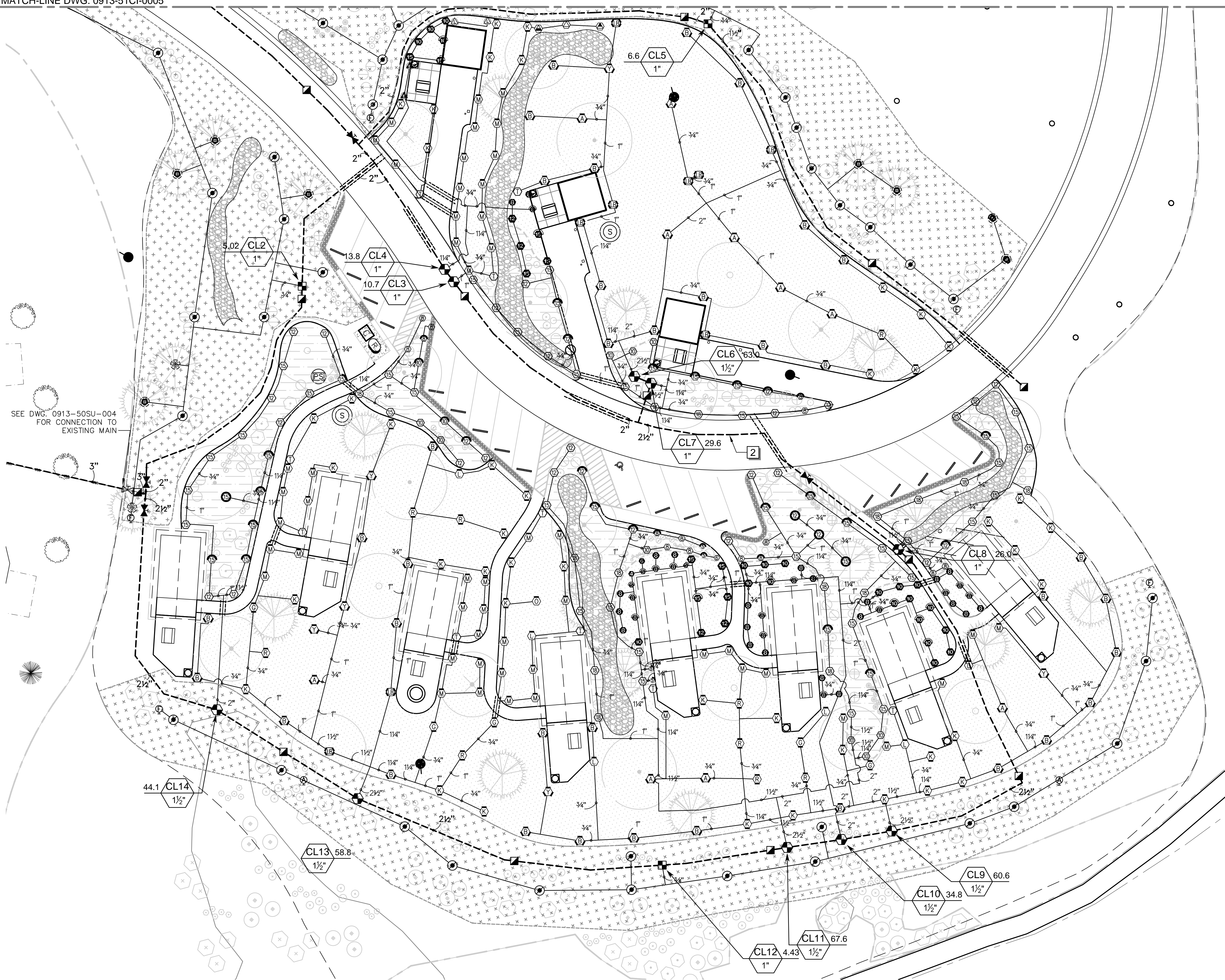
LINCOLN ROCK STATE PARK
 CABIN LOOP & GROUP CAMP
 GROUP CAMP IRRIGATION PLAN

BID NO. 14-31

SHEET 13 OF 17
REVISION 0
DATE 11/14/2014
DWG. 0913-51CI-0003

ORIG. DATE 6/1/2014 ORIG. DRAWN DLS/KLR

SEE DWG. 0913-50SU-004
FOR CONNECTION TO
EXISTING MAIN



Project
GROUNDWORK
AN SCJ ALLIANCE STUDIO

CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1
2ND ENG.	PRIM. ENG.	
DESIGNER	TL	2ND ENG.
APPROVAL	DLS	PROJ. MGR.
		COURT HILL

SCALE	1"=20'
BID SET	11/14/2014
CRH	
REQ. BY	
DRFT	

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
CABIN LOOP IRRIGATION PLAN 1

SHEET 14	OF 17
REVISION	0
DATE	11/14/2014
DWG.	0913-51CI-0004



MATCH-LINE DWG. 0913-51CI-0004



CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1	
	2ND ENG.	PRIM. ENG.	
	DESIGNER	TL	2ND ENG.
	APPROVAL	DLS	PROJ. MGR. COURT HILL

SCALE	1"=20'	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
BAR IS ONE INCH ON ORIGINAL DRAWING.	0 1"		
REV	DATE	BID SET	CRH
0	11/14/2014		REQ. BY
			DRFT

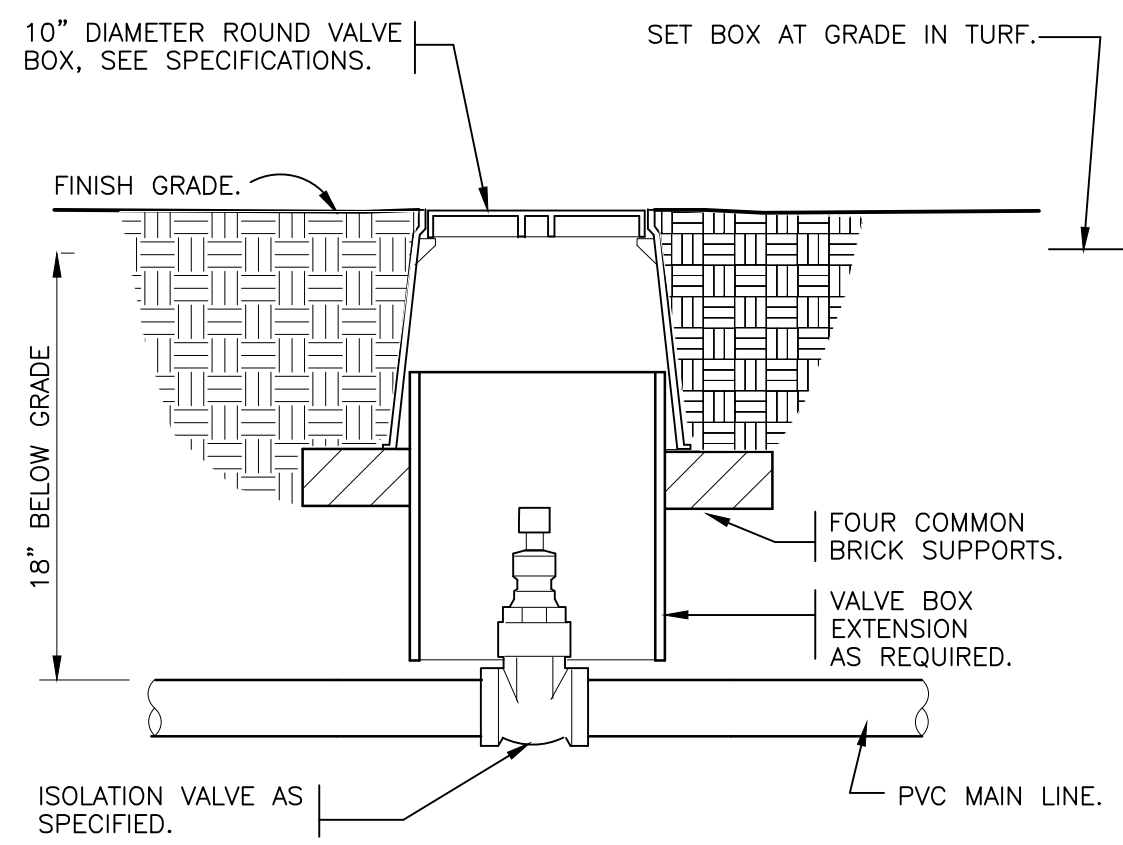
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
 CABIN LOOP & GROUP CAMP
 CABIN LOOP IRRIGATION PLAN 2

BID NO. 14-31

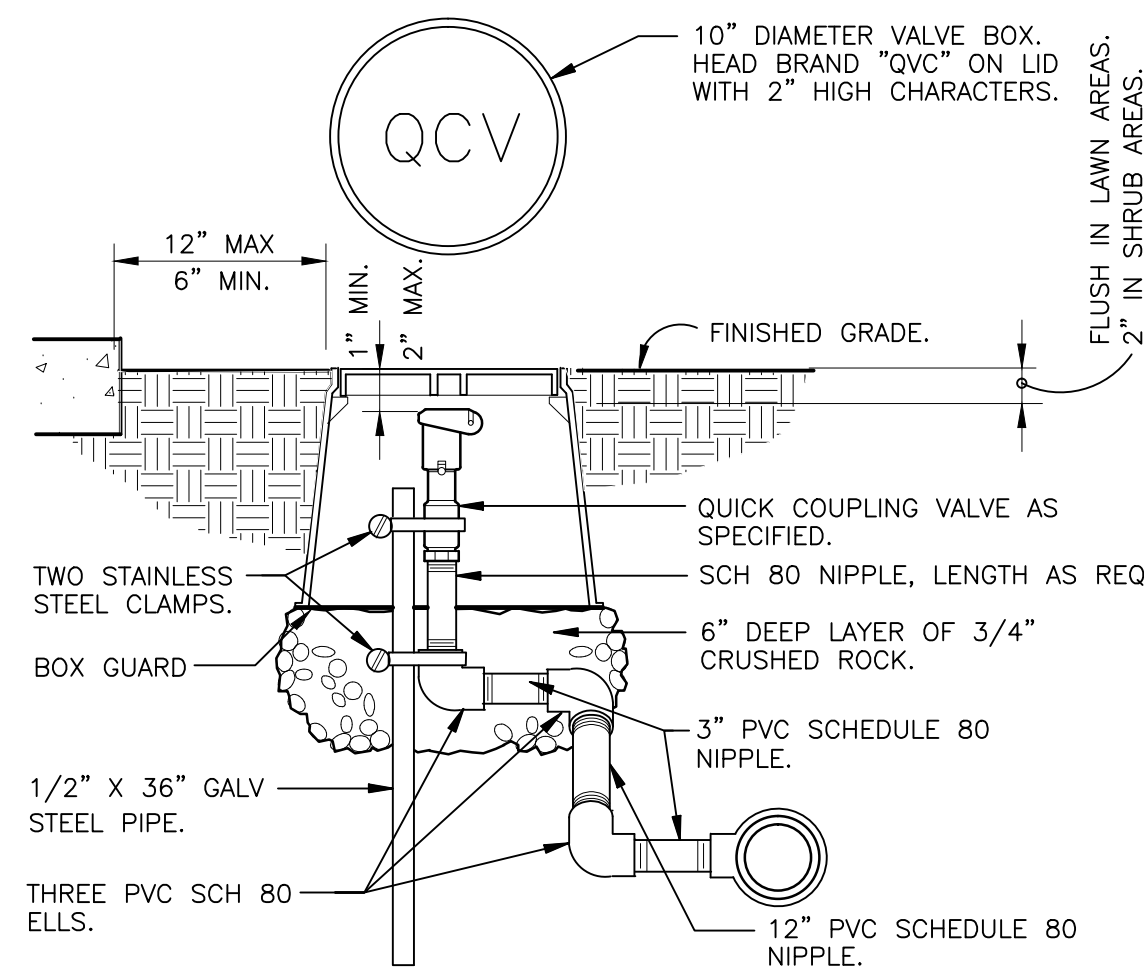
SHEET 15 OF 17
REVISION 0
DATE 11/14/2014
DWG. 0913-51CI-0005

ORIG. DATE 6/1/2014 ORG. DRAWN DLS/KLR



1 ISOLATION VALVE
NTS

DETAIL-FILE



2 QUICK COUPLING VALVE IN BOX W/BOX GUARD
NTS

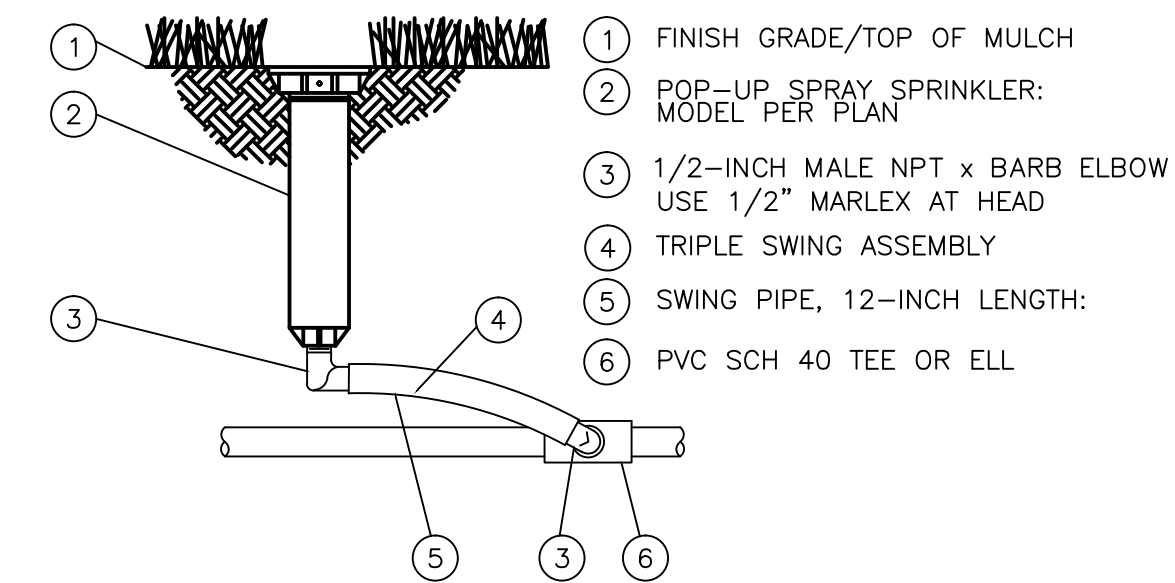
32 8406.43-08

3 RCV W/UNIONS AND BOX GUARD
NTS

32 8406.13-10

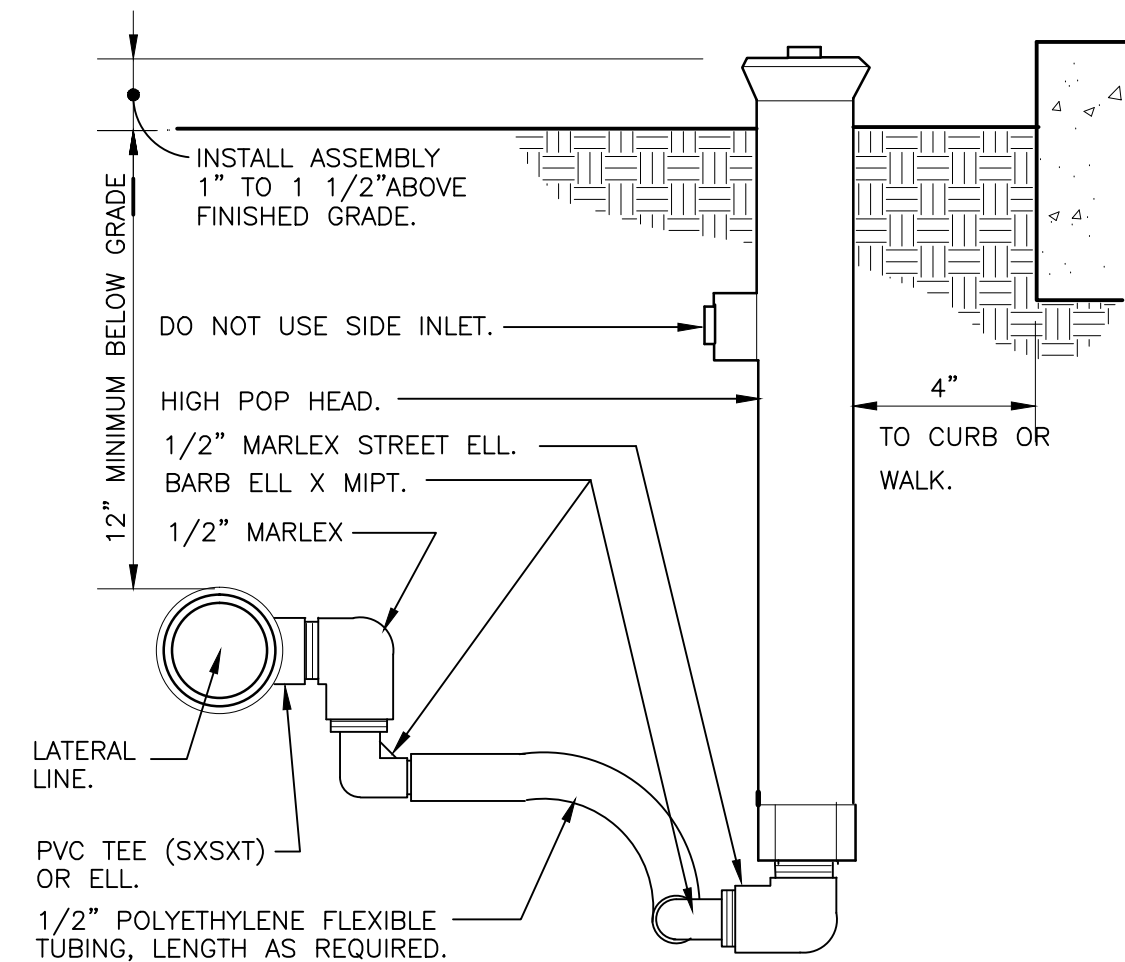
4 1" DRIP VALVE W/BASKET FILTER
1 1/2" = 1'-0"

328413.76-26



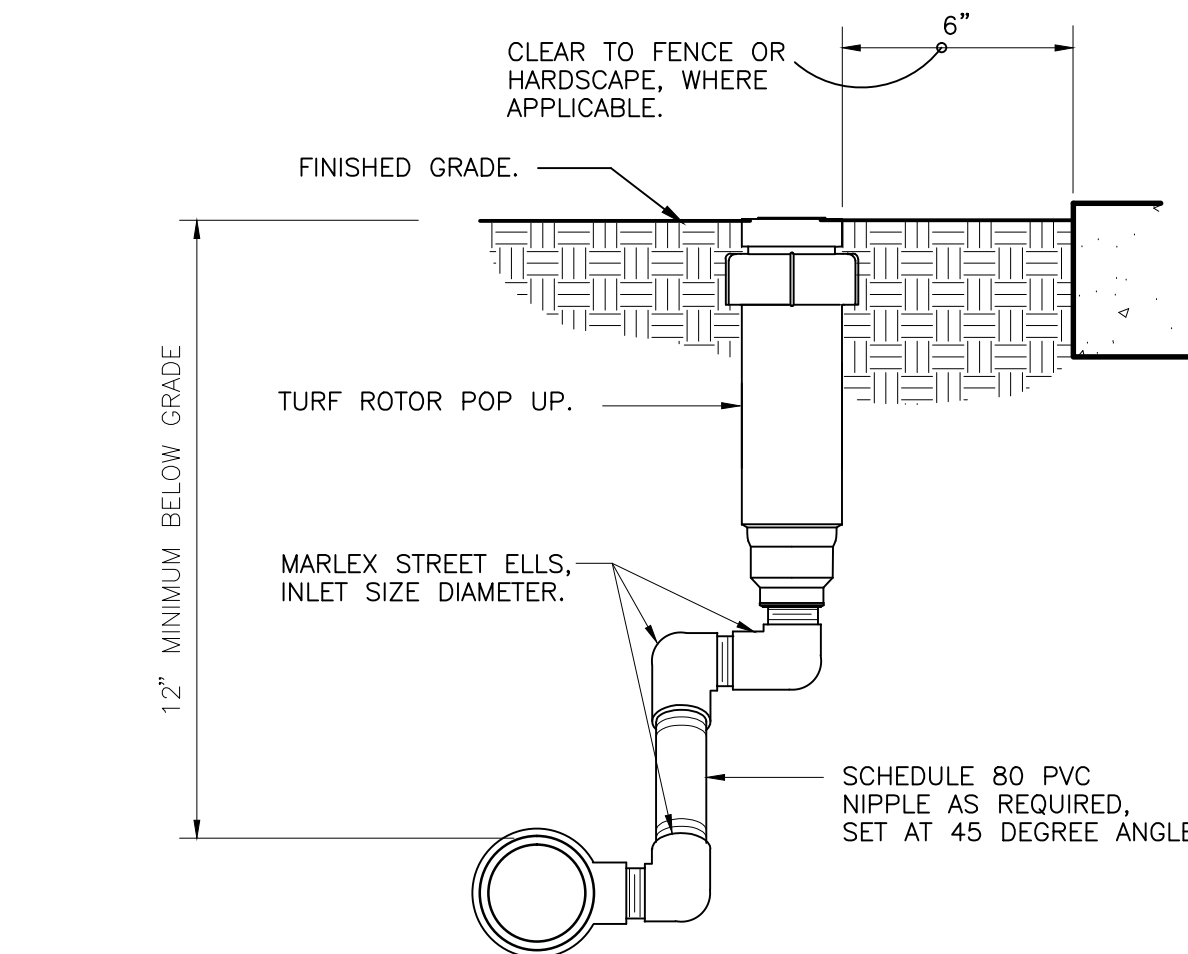
5 GENERIC SPRAY HEAD DETAIL
NTS

32 8403.13-03



6 SHRUB SPRAY HIGHPOP W/ FLEX ASSEMBLY
NTS

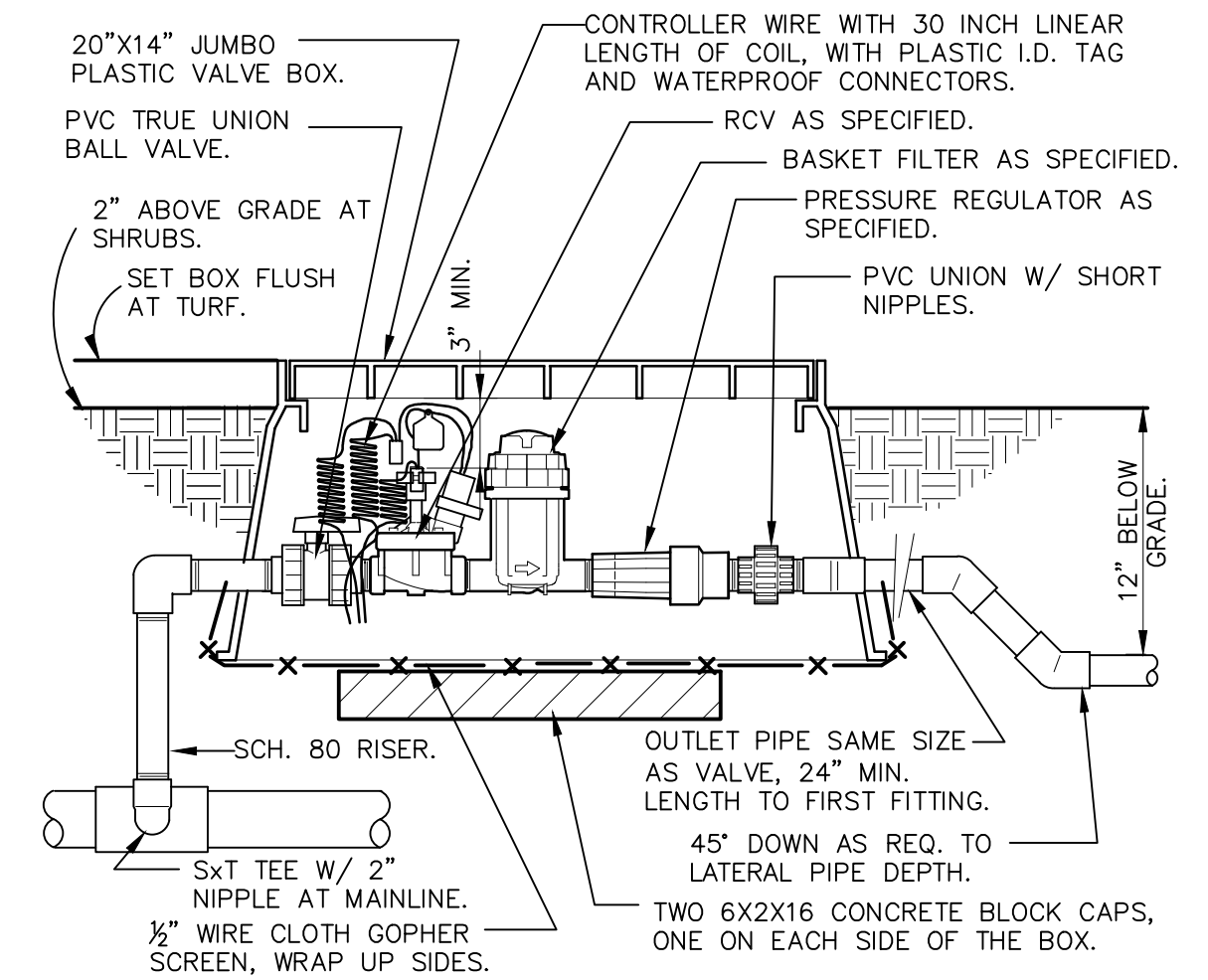
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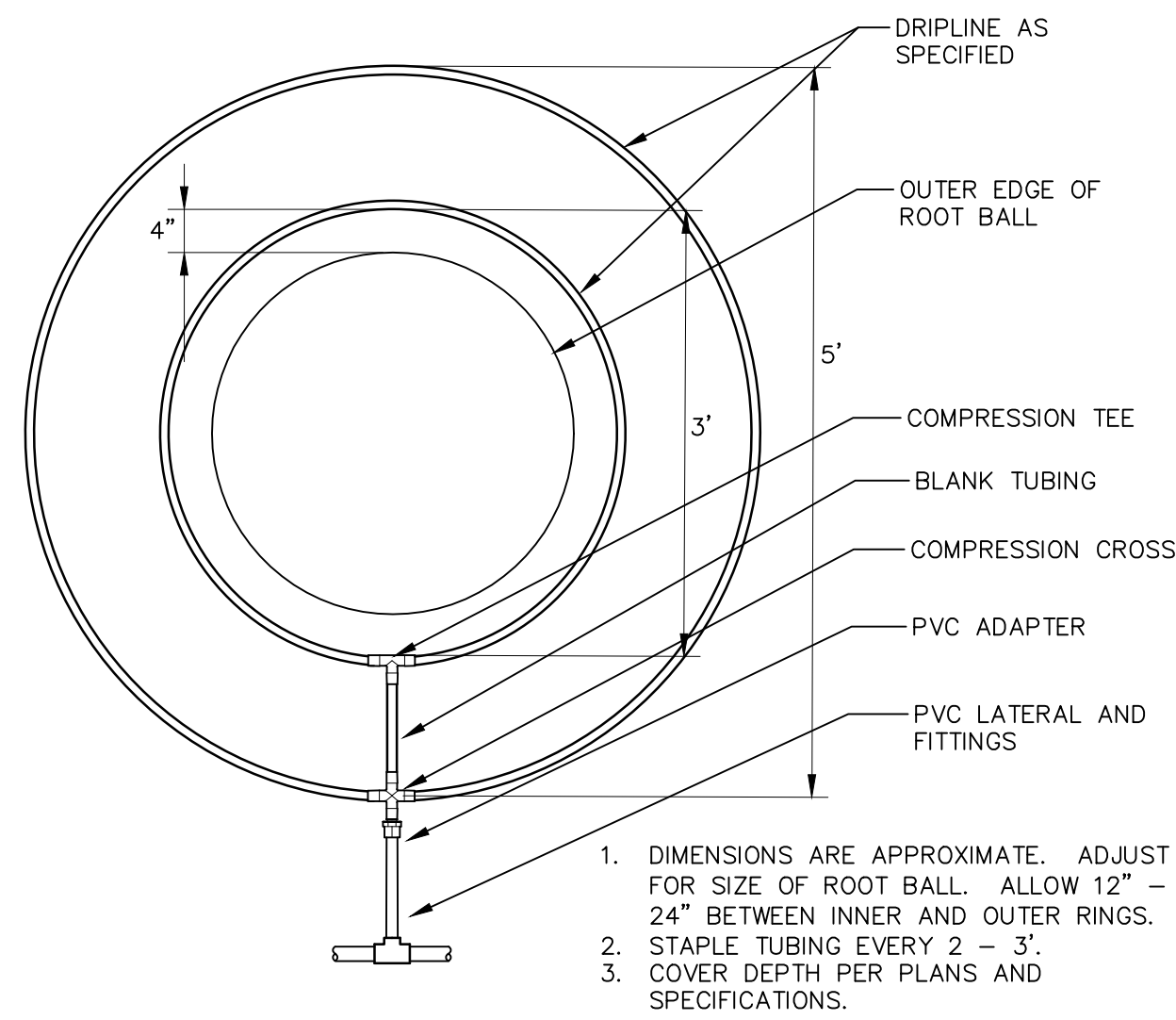


7 ROTOR MARLEX ASSEMBLY
NTS

328403.16-01

- 1 STANDARD VALVE BOX
- 2 FINISH GRADE
- 3 REMOTE CONTROL VALVE AS SPECIFIED
- 4 WATERPROOF CONNECTORS (2)
- 5 18-24" COILED WIRE
- 6 SCH 80 T.O.E. NIPPLE
- 7 MAIN LINE PIPE & FITTINGS
- 8 BRICK SUPPORTS (4)
- 9 3/4" MINUS WASHED GRAVEL
- 10 PVC SLIP UNIONS
- 11 BOX GUARD

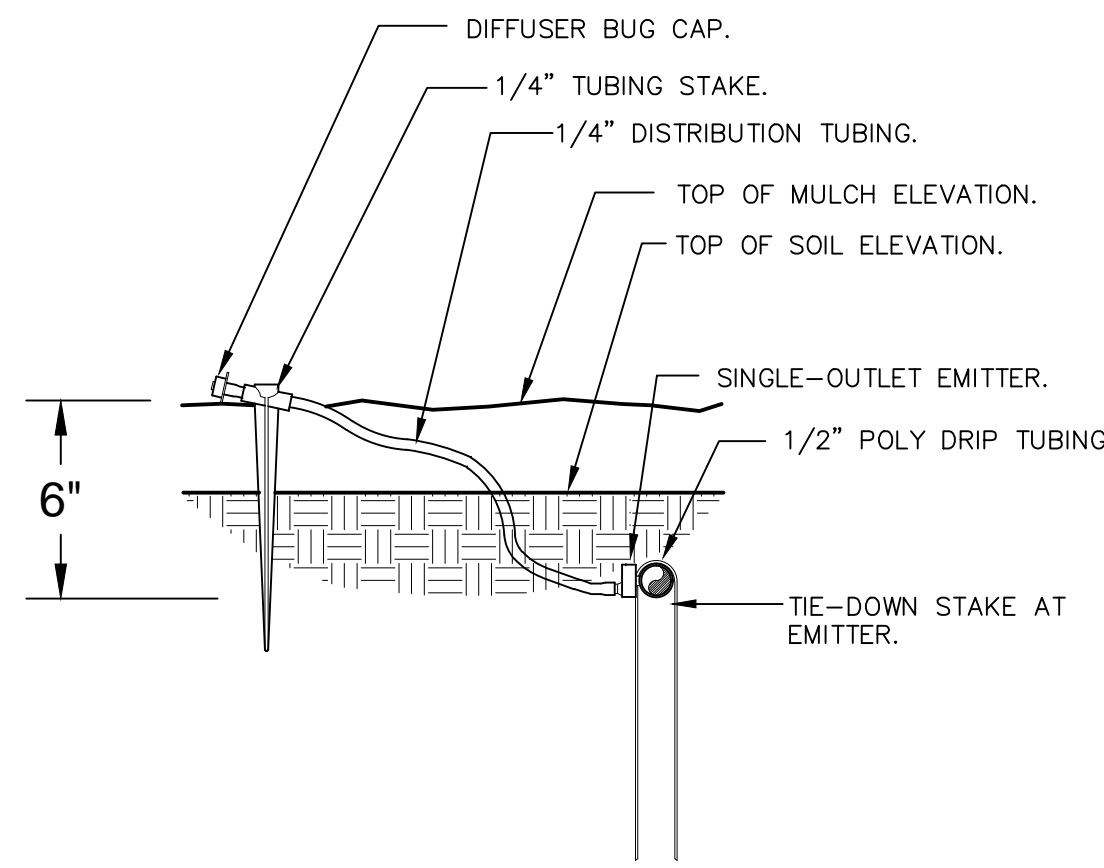




1. DIMENSIONS ARE APPROXIMATE. ADJUST FOR SIZE OF ROOT BALL. ALLOW 12" - 24" BETWEEN INNER AND OUTER RINGS.
2. STAPLE TUBING EVERY 2 - 3'.
3. COVER DEPTH PER PLANS AND SPECIFICATIONS.

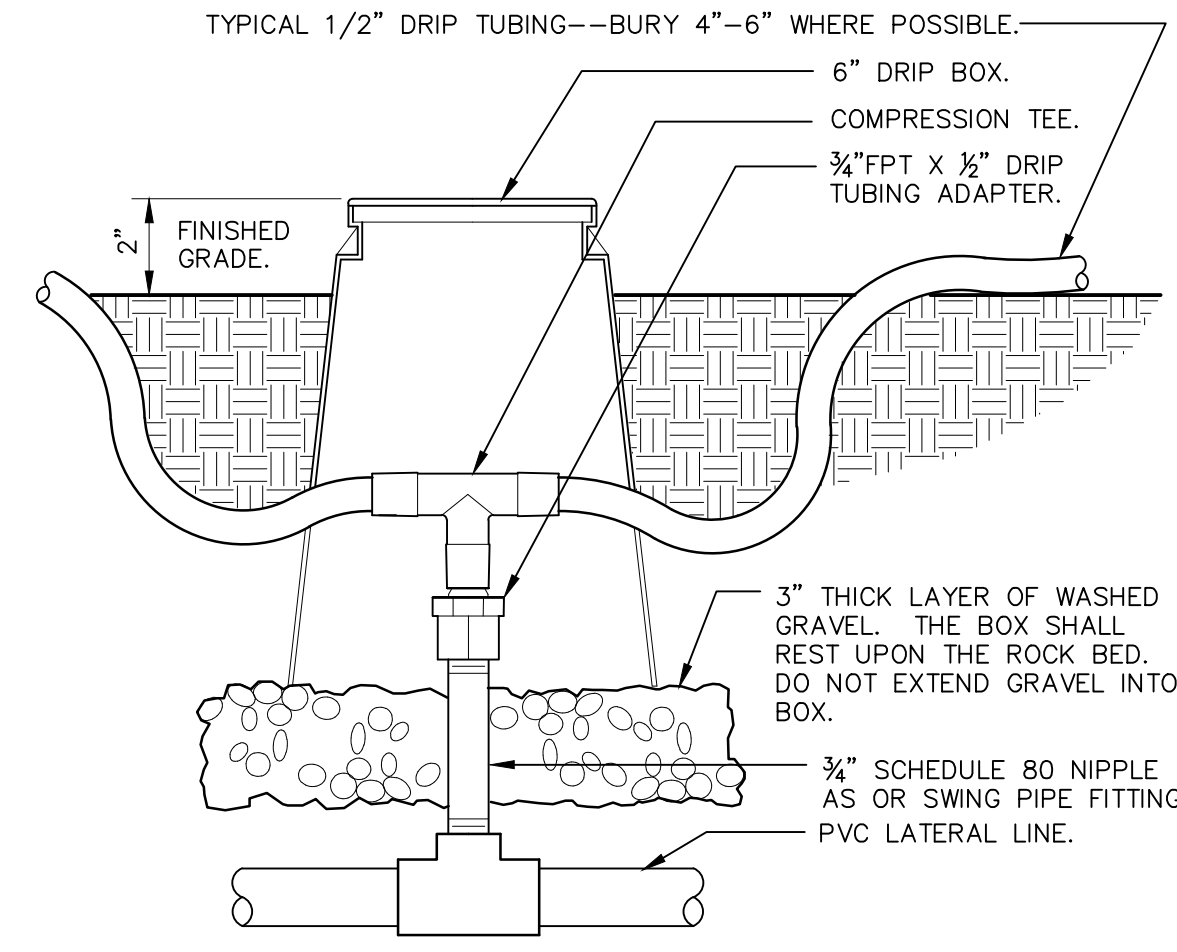
8 DRIPPER LINE RING AT TREE

NTS DETAIL-FILE



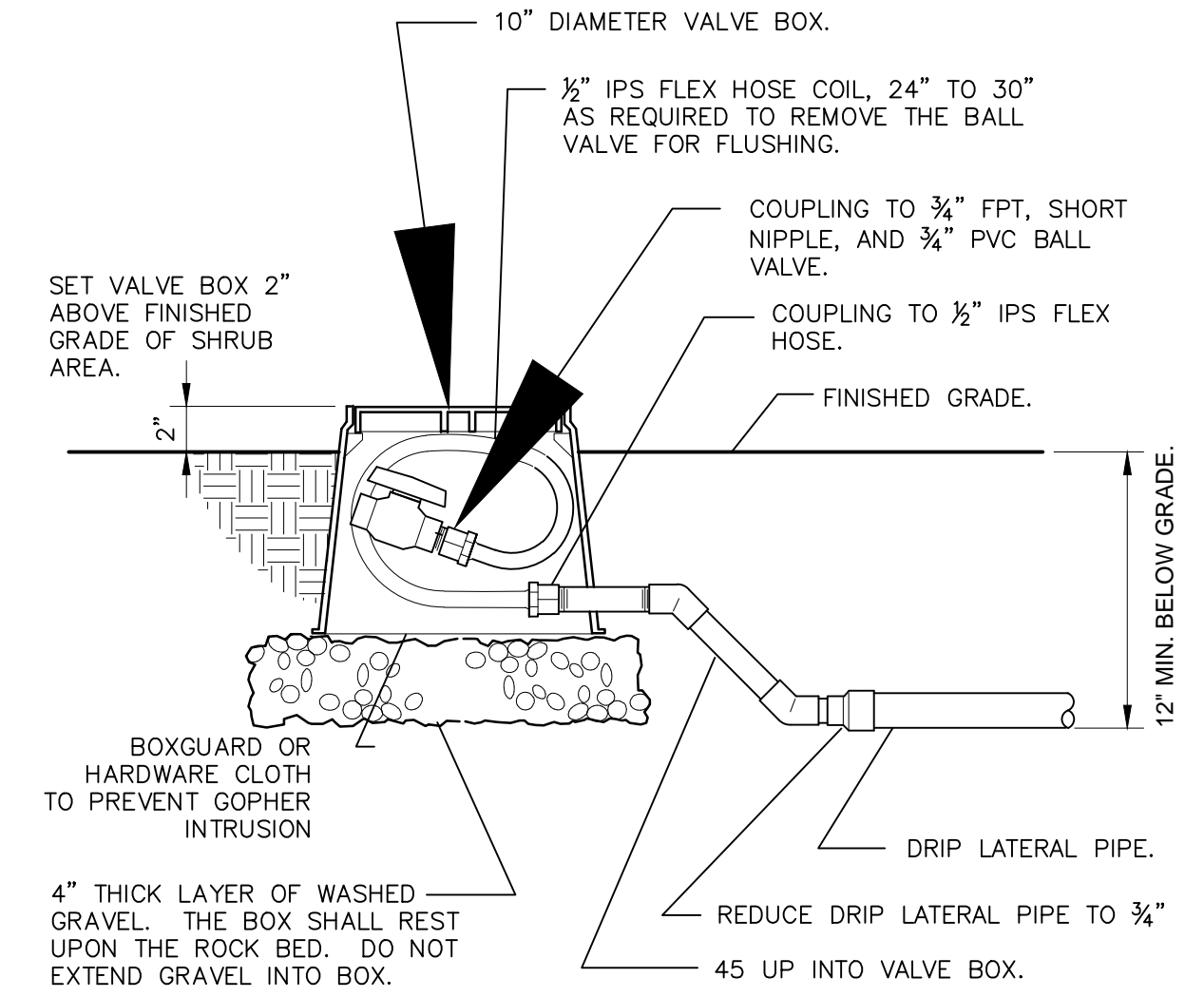
9 DRIP EMITTER AT 1/4" TUBING

NTS 328413.13-03



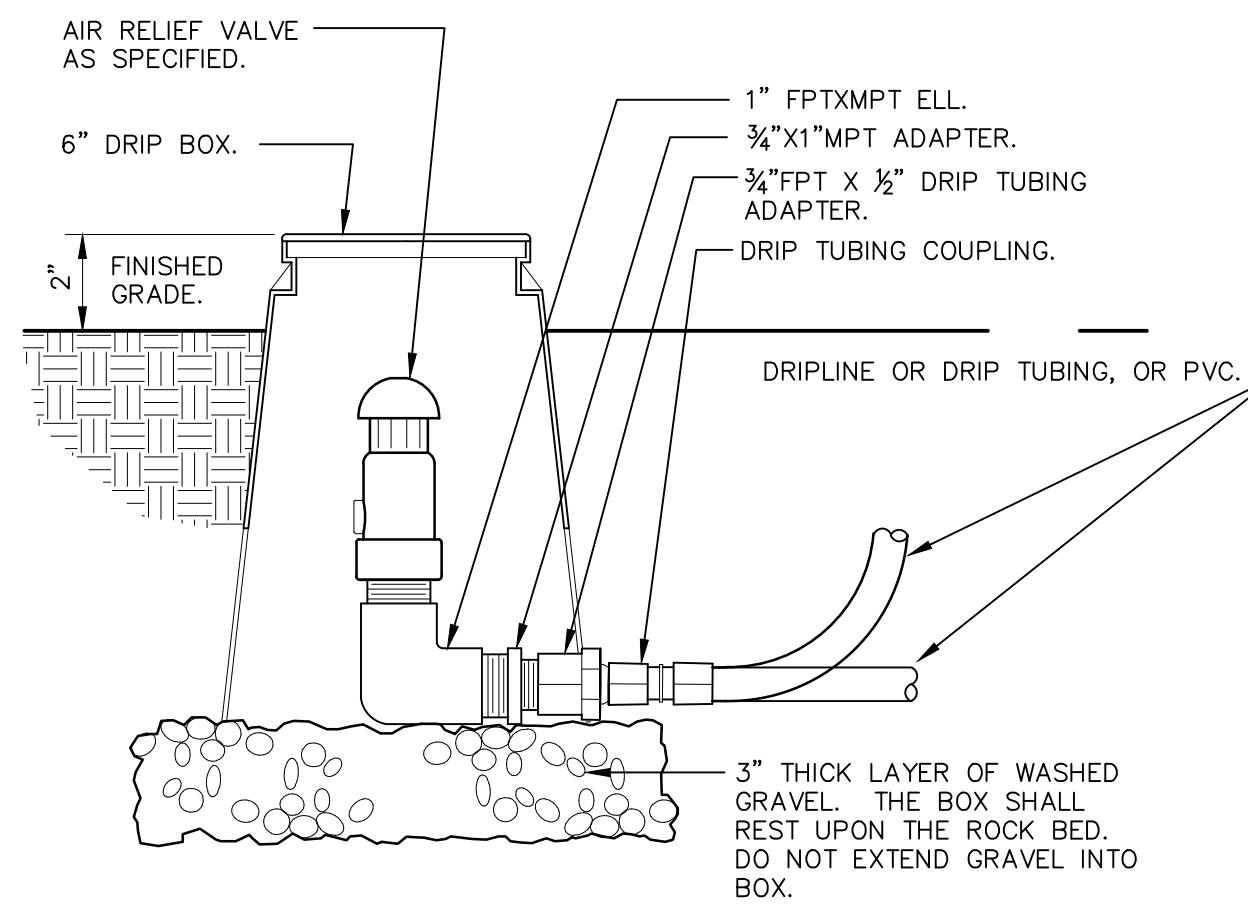
10 PIPE TRANSITION POINT

NTS 328413.46-03



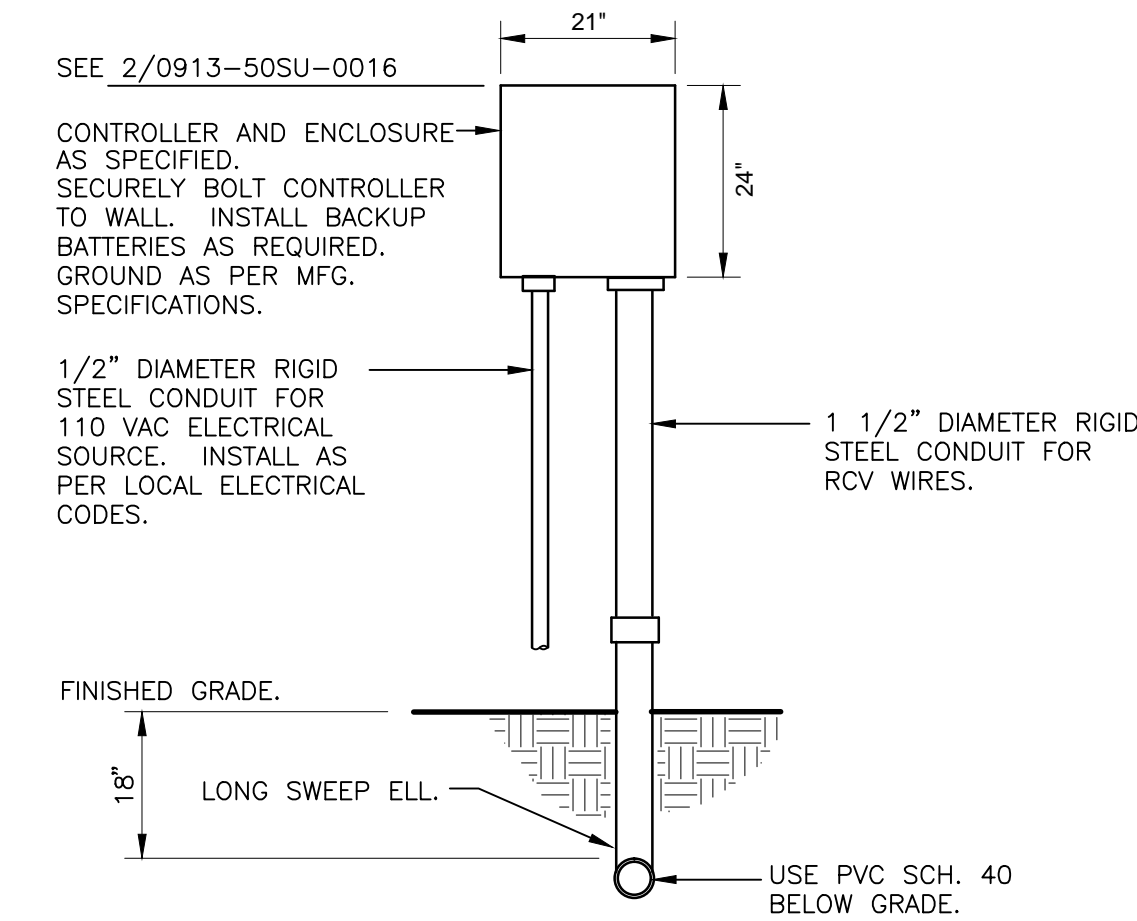
11 HARD PIPE TO FLUSH VALVE

NTS DETAIL-FILE



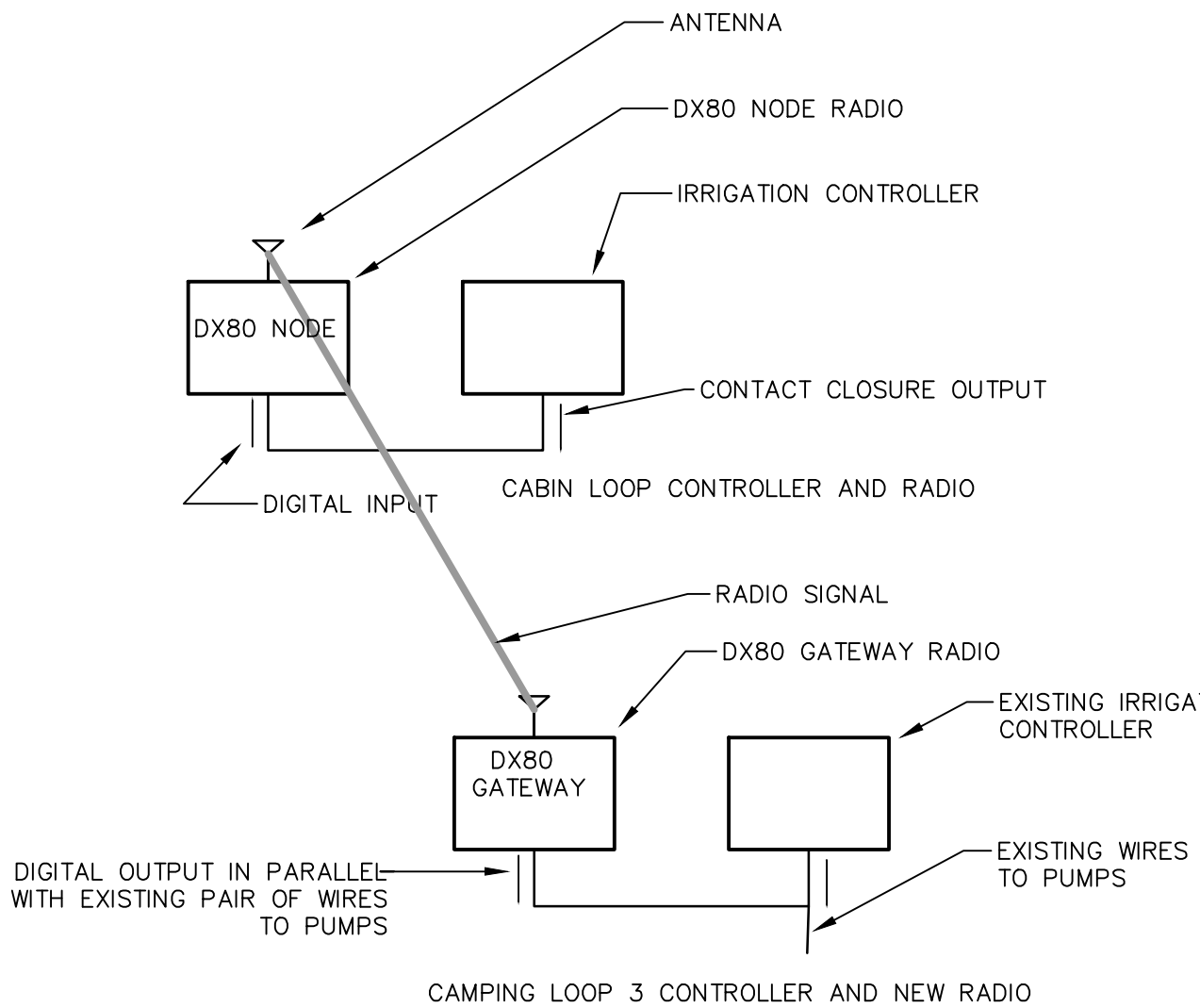
12 DRIP AIR RELIEF VALVE IN BOX

NTS 328413.53-03



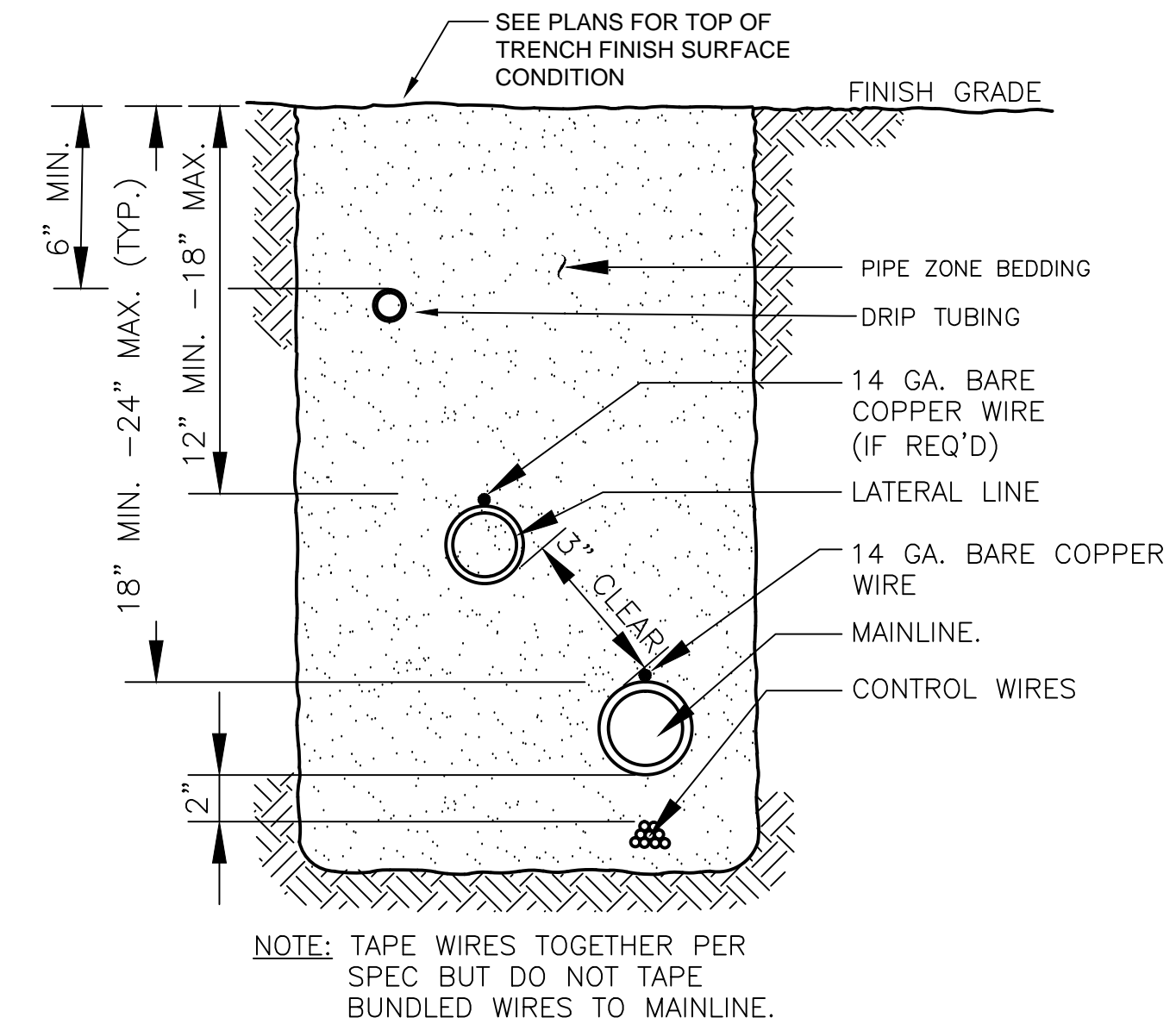
13 WALL MOUNT CONTROLLER

NTS DETAIL-FILE



14 DX80 RADIO SCHEMATIC

NTS DETAIL-FILE

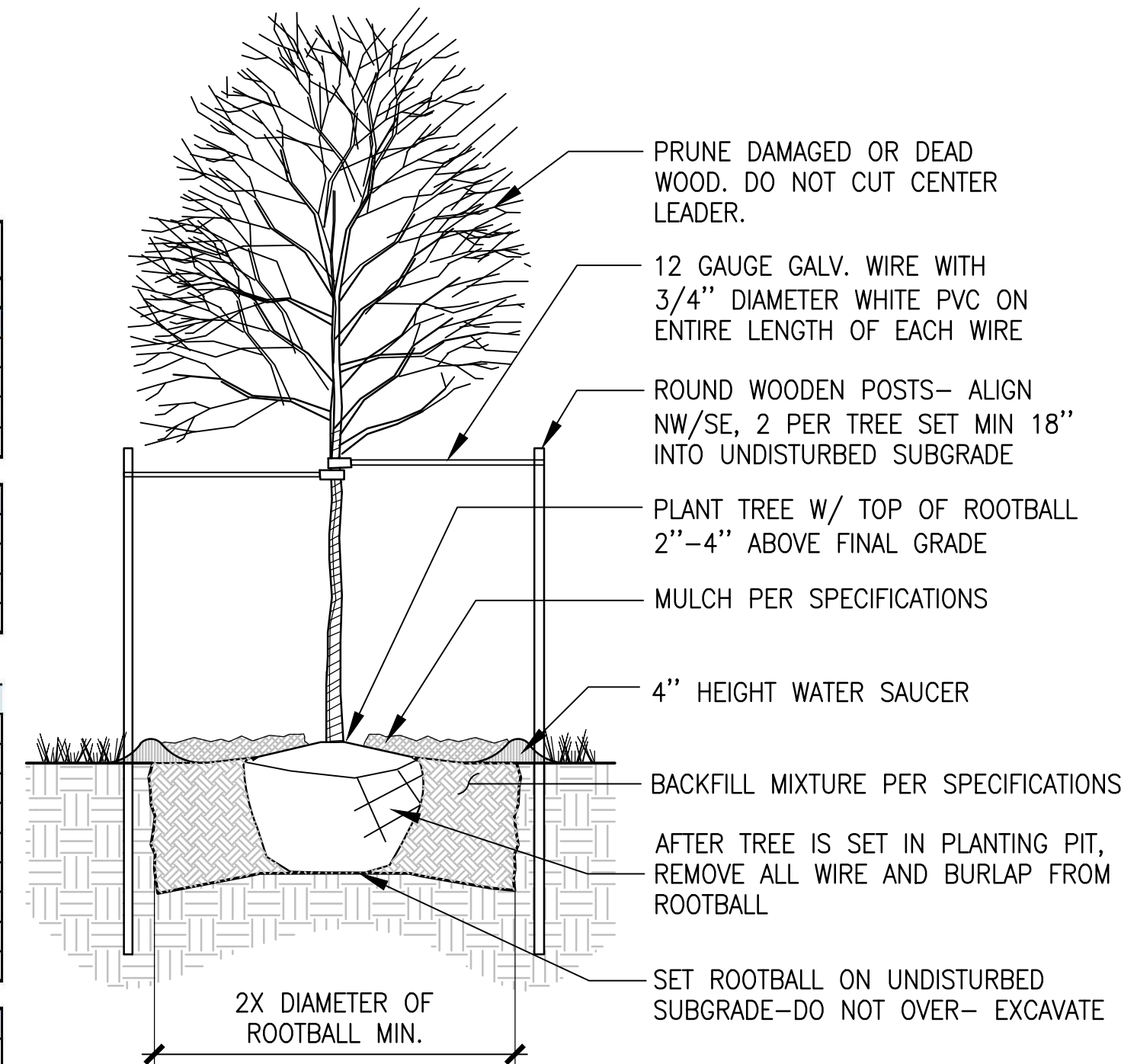


15 TRENCH DETAIL

NTS DETAIL-FILE

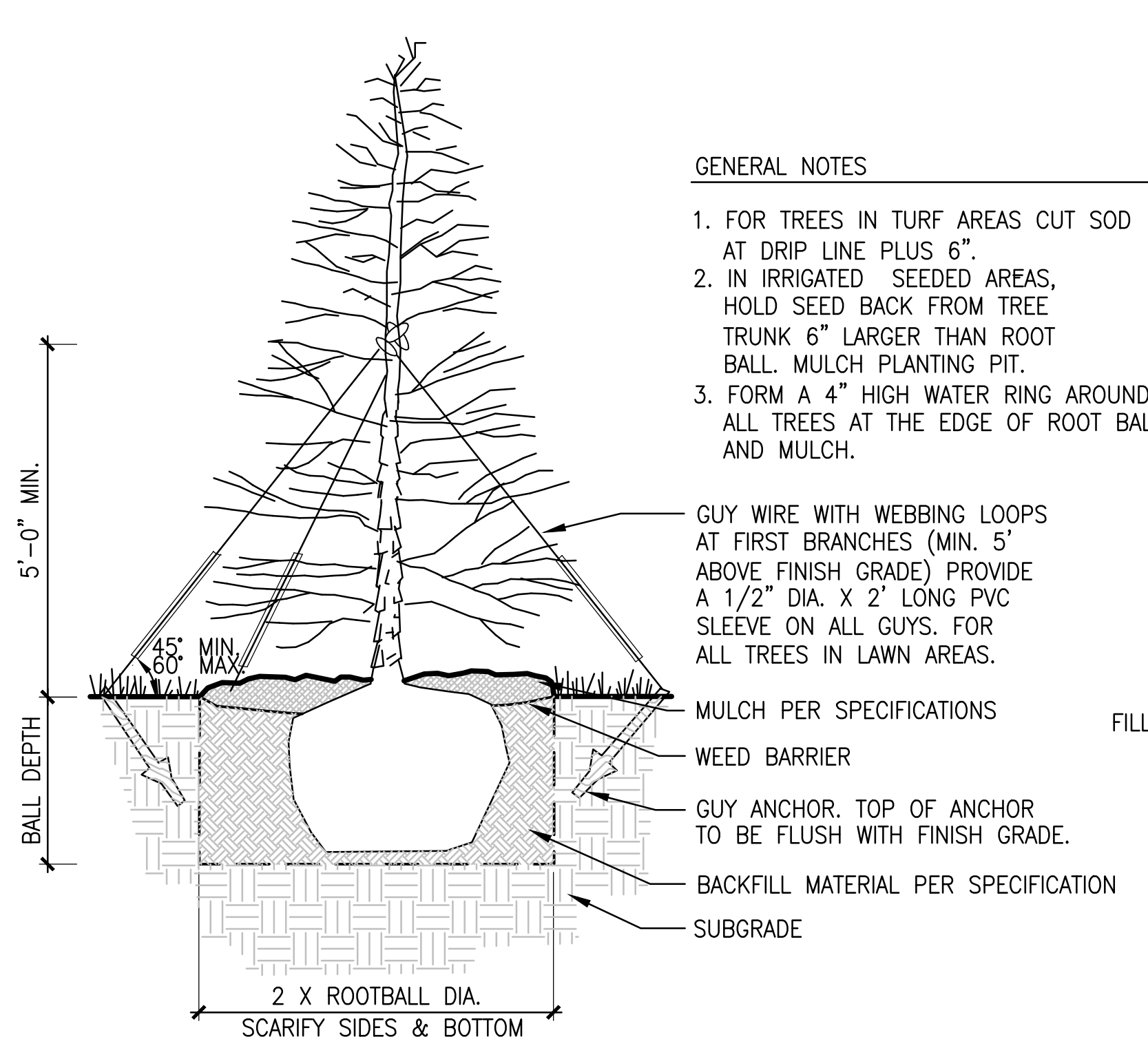
LINCOLN ROCK STATE PARK CAMPGROUND IMPROVEMENTS
PLANT SCHEDULE

Abbr.	Scientific Name	Common Name	Min. Size	Total Qty.
DECIDUOUS TREES				
ACRU	<i>Acer rubrum</i> "Frank Jr" PP 16769	Redpointe Maple	1.75" CAL.	11
CABE	<i>Carpinus betulus</i> "Frans Fontaine"	Frans Fontaine Hornbeam	1.75" CAL.	2
FRPE	<i>Fraxinus pennsylvanica</i> "Cimmaron"	Cimmaron Ash	1.75" CAL.	10
DUSH	<i>Quercus shumardii</i>	Shumard Oak	1.75" CAL.	14
CONIFEROUS TREES AND SHRUBS				
PIFU	<i>Picea pungens</i> "Hoopsii"	Hoopsii Blue Spruce	6-8"	5
PIFL	<i>Pinus flexilis</i> "Vanderwolf's Pyramid"	Vanderwolf's Pyramid Limber Pine	6-8"	8
PIPO	<i>Pinus ponderosa</i>	Ponderosa Pine	8" Tall	35
PSME	<i>Pseudotsuga menziesii</i>	Douglas Fir	8" Tall	6
DECIDUOUS SHRUBS				
ARTR	<i>Artemisia tridentata</i>	Big Sagebrush	1 GAL.	98
CACL	<i>Caryopteris x clandonensis</i> "Dark Knight"	Blue Mist Spirea	2 GAL.	58
CRNA	<i>Chrysothamnus nauseosus</i>	Dwarf Blue Rabbitbrush	1 GAL.	117
PHLE	<i>Philadelphus lewisii</i> "Cheyenne"	Lewis Mockorange	2 GAL.	3
PHDP2	<i>Physocarpus opulifolius</i> "Coppertina"	Coppertina Ninebark	2 GAL.	37
PHDP	<i>Physocarpus opulifolius</i> "Dart's Gold"	Dart's Gold Ninebark	2 GAL.	49
PUTR	<i>Purshia tridentata</i>	Antelope Bitterbrush	1 GAL.	79
RIAU	<i>Ribes aureum</i>	Golden Currant	2 GAL.	43
ROWD	<i>Rosa woodsii</i>	Woods' Rose	2 GAL.	71
PERENNIALS, GRASSES, AND GROUNDCOVERS				
BASA	<i>Balsamorhiza sagittata</i>	Arrowleaf Balsamroot	Plug	184
ECPU	<i>Echinacea 'Irresistable'</i>	Irresistable Echinacea	3.5" Pot	43
FEGL	<i>Festuca glauca</i> "Elijah Blue"	Blue Fescue	3.5" Pot	51
HESE	<i>Heliopsis scabra</i>	Blue Oat Grass	3.5" Pot	42
LESU	<i>Leucanthemum superbum</i> "Alaska"	Alaska Shasta Daisy	3.5" Pot	48
LUSE	<i>Lupinus sericeus</i>	Silky Lupine	Plug	211
PAVI	<i>Panicum virgatum</i> "Shenandoah"	Shenandoah Red Switch Grass	3.5" Pot	24
PERR	<i>Penstemon 'Red Rocks'</i>	Red Rocks Penstemon	3.5" Pot	50
RUFU	<i>Rudbeckia fulgida</i> "Goldstrum"	Black-Eyed Susan	3.5" Pot	62

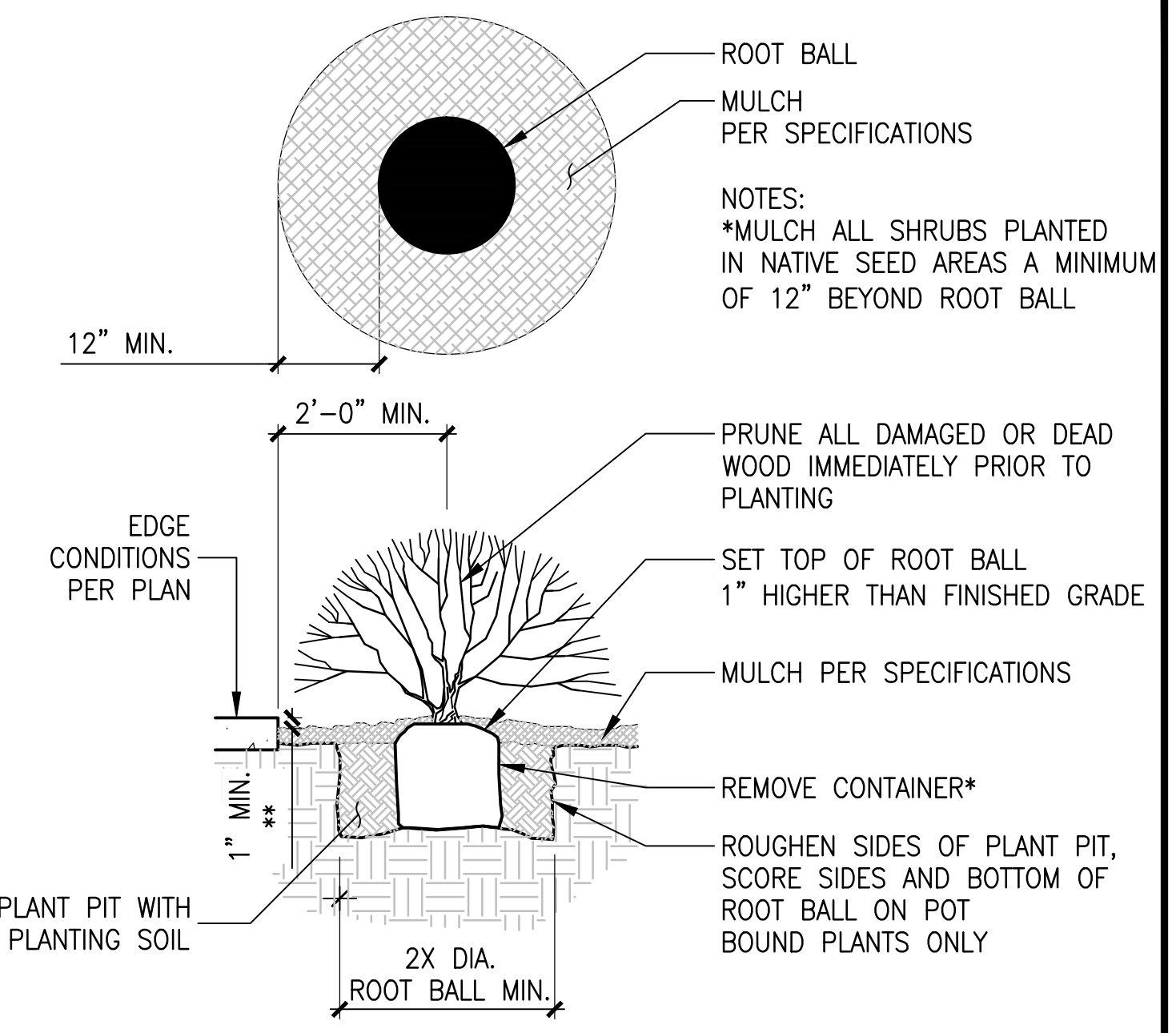


NOTE: MULCH SHOULD BE 4" DEEP IN NON-TURF AREAS, MULCH SHOULD BE 2" DEEP IN TURF AREAS.

1 DECIDUOUS TREE PLANTING - STAKE
0913-50YP-0005 TO 0009 SCALE: NTS L-PDT-TREE-DEC-STAKE-2



2 EVERGREEN PLANTING DETAIL
0913-50YP-0005 TO 0009 SCALE: NTS L-PDT-TREE-EVG



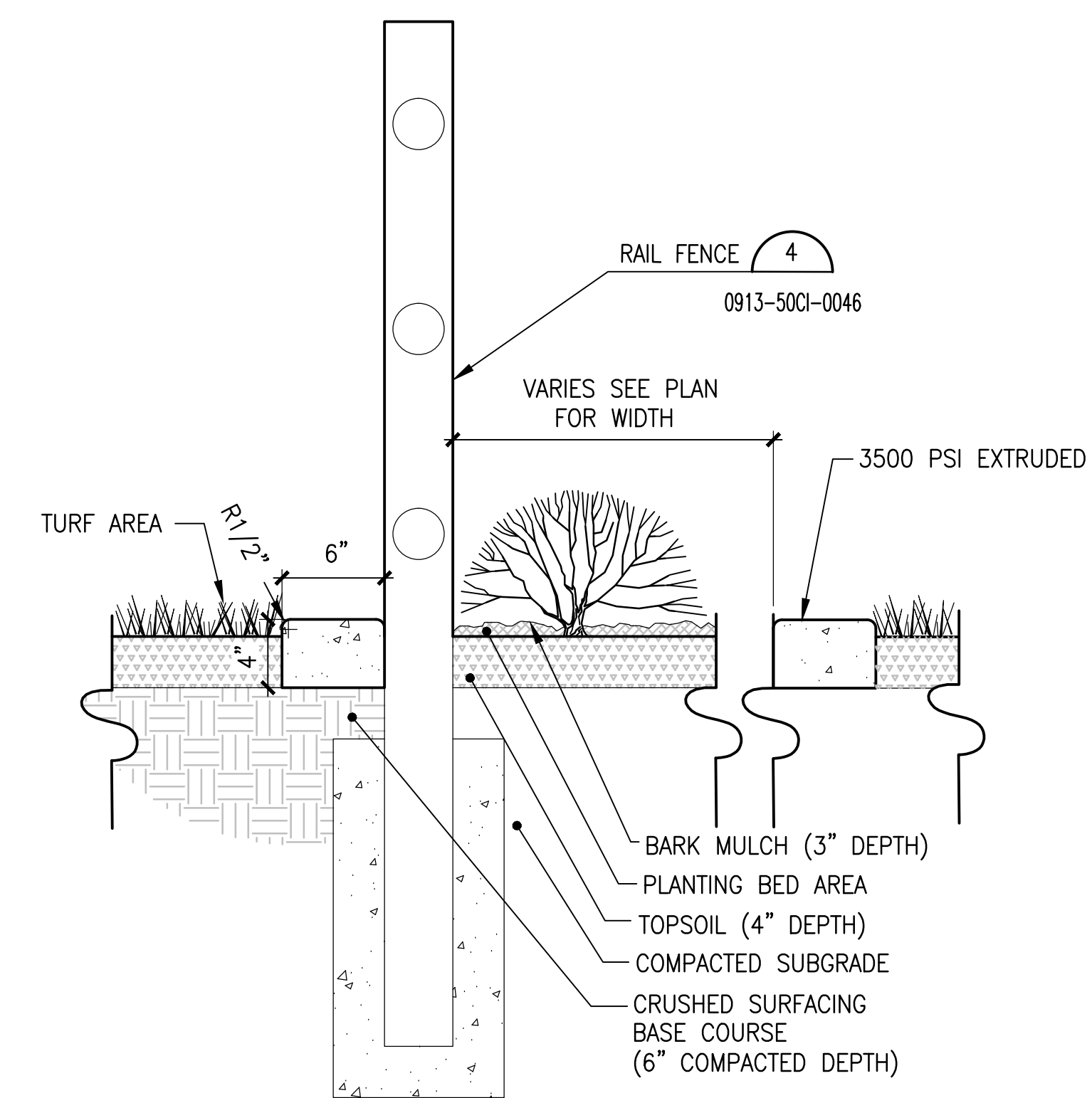
NOTES:
*ANY BROKEN OR CRUMBLING ROOT BALLS WILL BE REJECTED. REMOVING THE CONTAINERS WILL NOT BE AN EXCUSE FOR DAMAGED ROOTBALLS
**HOLD GRADE 1" BELOW EDGE OF WALK OR CURB (WHERE APPLICABLE)

3 SHRUB PLANTING
0913-50YP-0005 TO 0009 SCALE: NTS L-PDT-SHRUB

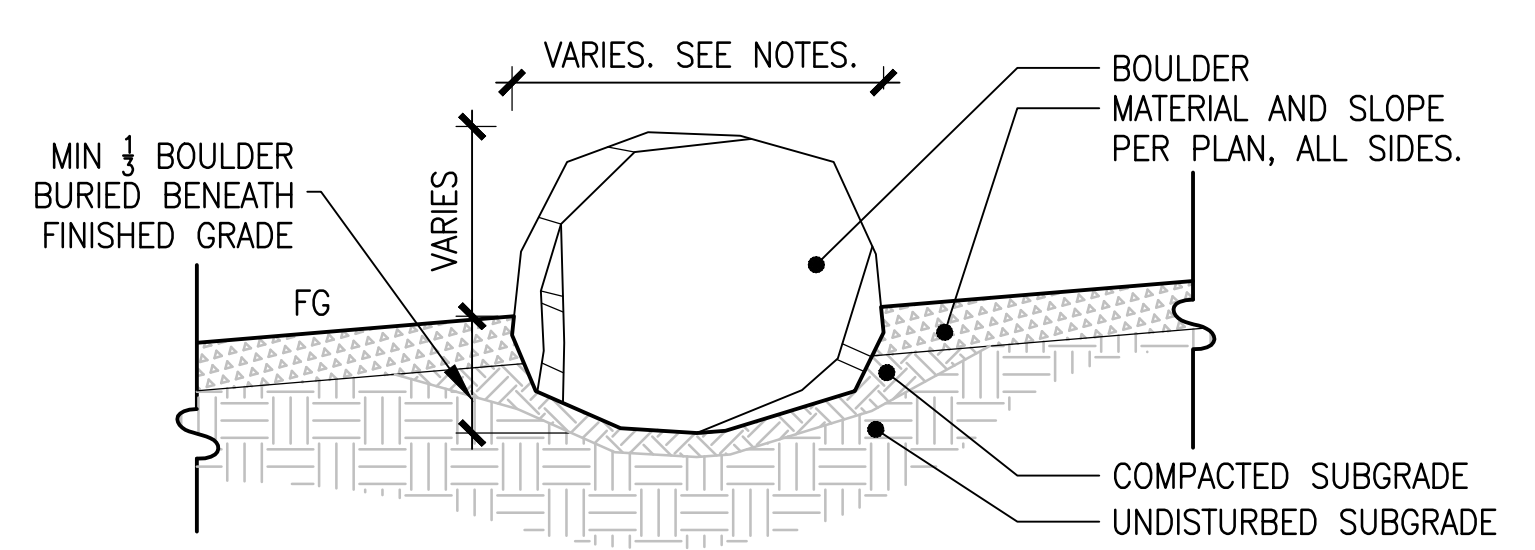
MASTER PLANTING NOTES:

- NOTES:
- THE CONTRACTOR SHALL LOCATE AND VERIFY THE EXISTENCE OF ALL UTILITIES PRIOR TO STARTING WORK.
 - THE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTING SHOWN ON ALL DRAWINGS.
 - ALL MATERIAL SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE CURRENT AMERICAN STANDARD FOR NURSERY STOCK, PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
 - NO PLANT SHALL BE PUT INTO THE GROUND BEFORE ROUGH GRADING HAS BEEN FINISHED AND APPROVED BY THE DISTRICT.
 - ALL PLANTS SHALL BEAR THE SAME RELATIONSHIP TO FINISHED GRADE AS THE PLANT'S ORIGINAL GRADE BEFORE DIGGING.
 - ALL PLANTS SHALL BE BALLED AND WRAPPED OR CONTAINER GROWN AS SPECIFIED.
 - THE DAY PRIOR TO PLANTING, THE LOCATION OF ALL TREES AND SHRUBS SHALL BE STAKED FOR APPROVAL BY THE PROJECT LANDSCAPE ARCHITECT OR DISTRICT.
 - ALL PLANT MATERIAL SHALL BE INSPECTED ON SITE AT TIME OF DELIVERY BY THE PROJECT LANDSCAPE ARCHITECT OR DISTRICT.
 - ALL PLANTS SHALL BE SPRAYED WITH AN ANTIDESSICANT WITHIN 24 HOURS AFTER PLANTING. IN TEMPERATE ZONES, ALL PLANTS SHALL BE SPRAYED WITH AN ANTIDESSICANT AT THE BEGINNING OF THEIR FIRST WINTER.
 - ALL PLANTS SHALL BE INSTALLED AS PER DETAILS AND THE CONTRACT SPECIFICATIONS.
 - ALL PLANTS AND STAKES SHALL BE SET PLUMB UNLESS OTHERWISE SPECIFIED.
 - THE LANDSCAPE CONTRACTOR SHALL PROVIDE PLANTING EXCAVATION FILL AS PER THE CONTRACT SPECIFICATIONS.
 - ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24 HOUR PERIOD AFTER PLANTING. PLANTS SHALL BE WATERED THREE TIME PER WEEK DURING THE FIRST TWO WEEKS POST PLANTING. ALL PLANTS SHALL THEN BE WATERED WEEKLY, IF NECESSARY, DURING THE FIRST GROWING SEASON.
 - ALL PLANTS SHALL BE WATER WEEKLY UNTIL THE GROUND IS FROZEN IF PLANTED AFTER SEPTEMBER 1.
 - THE LANDSCAPE CONTRACTOR SHALL REFER TO THE CONTRACT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

- LANDSCAPE EDGING 1485 LF
- IRRIGATED TURF AREAS 1.9 ACRES
- IRRIGATED PLANTING AREAS 0.49 ACRES
- NON-IRRIGATED UPLAND SEED MIX: 4.5 ACRES
 - BLUEBUNCH WHEATGRASS 36%
 - INDIAN RICEGRASS 16%
 - NEEDLE & THREAD GRASS 8%
 - SAND DROPSEED 6%
 - SANDBERG BLUEGRASS 12%
 - THICKSPIKE WHEATGRASS 22%
- COBBLE SWALE AREA .09 ACRES
SEE ARMORED SWALE DETAIL 3 ON DWG. 0913-50SU-0009



4 PLANTING STRIP W/ FENCE & CONCRETE EDGE
0913-50YP-0009 SCALE: 1 1/2" = 1'-0" LRSP-C-PDT-CURB



- NOTES:
- PLACE BOULDERS AS SHOWN IN PLANS. BOULDERS SHALL NOT BE PLACED CLOSER THAN 2' TO ANY PAVEMENT SURFACE.
 - WHERE SHOWN IN A LINE, BOULDERS SHALL BE THREE MAN BOULDERS. BOULDERS SHALL BE SPACED NO MORE THAN 4' APART UNLESS OTHERWISE SPECIFIED. BOULDERS SHALL BE PLACED SUCH THAT A BROAD FACE OF THE BOULDER SITS PARALLEL TO THE ADJACENT PAVEMENT SURFACE. THE BROAD FACE OF THE BOULDERS SHALL CREATE A UNIFORM LINE. AVOID USE OF BOULDERS WITH MANY FACETS IN THESE AREAS.
 - BOULDERS PLACED IN PLANTING AREAS MAY RANGE IN SIZE BETWEEN TWO MAN AND FOUR MAN PER SPECIFICATIONS.

5 BOULDER
0913-50YP-0005 TO 0009 & 0913-50CI-0038, 0040 SCALE: N.T.S. LRSP-L-DT-BOULDER



PRIM. ENG.	CHELAN PUD NO. 1
2ND ENG.	PRIM. ENG.
DESIGNER	DLS/MSG
APPROVAL	DLS

2ND ENG.	PRIM. ENG.
DESIGNER	DLS/MSG
APPROVAL	DLS

SCALE	SEE DWG.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0	11/14/2014	BID SET	CRH
REV	DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

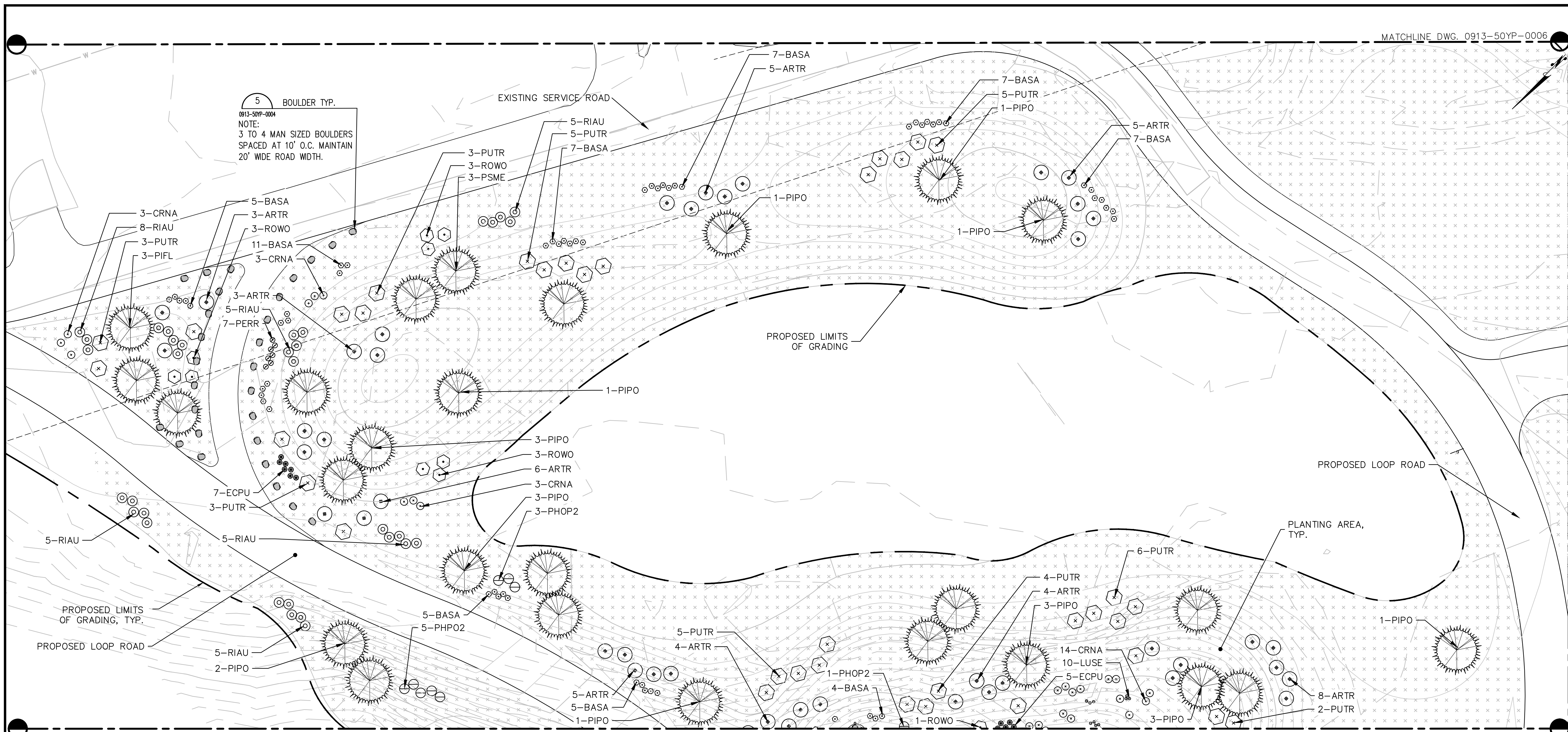
LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
PLANTING PLAN NOTES & PLANT LIST

BID NO. 14-31

SHEET P1 OF P6
REVISION 0
DATE 11/14/2014
DWG. 0913-50YP-0004



DAVID LEE STIPE
LICENSE NO. 917
EXPIRES ON 12/15/2015



LANDSCAPE EDGING
 NON-IRRIGATED UPLAND SEED AREAS
 IRRIGATED TURF AREAS
 IRRIGATED PLANTING AREAS
 COBBLE SWALE AREA SEE ARMORED SWALE DETAIL 3 ON DWG. 0913-50SU-0009



Project GROUNDWORK
AN SCJ ALLIANCE STUDIO

CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG.
	DESIGNER	2ND ENG.
	APPROVAL	PROJ. MGR. C. HILL
	DLS/MSG	
	DLS	

SCALE	1"=20'	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
BAR IS ONE INCH ON ORIGINAL DRAWING.	0	1"	
CRH		REQ. BY	DRFT
REVISION			

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

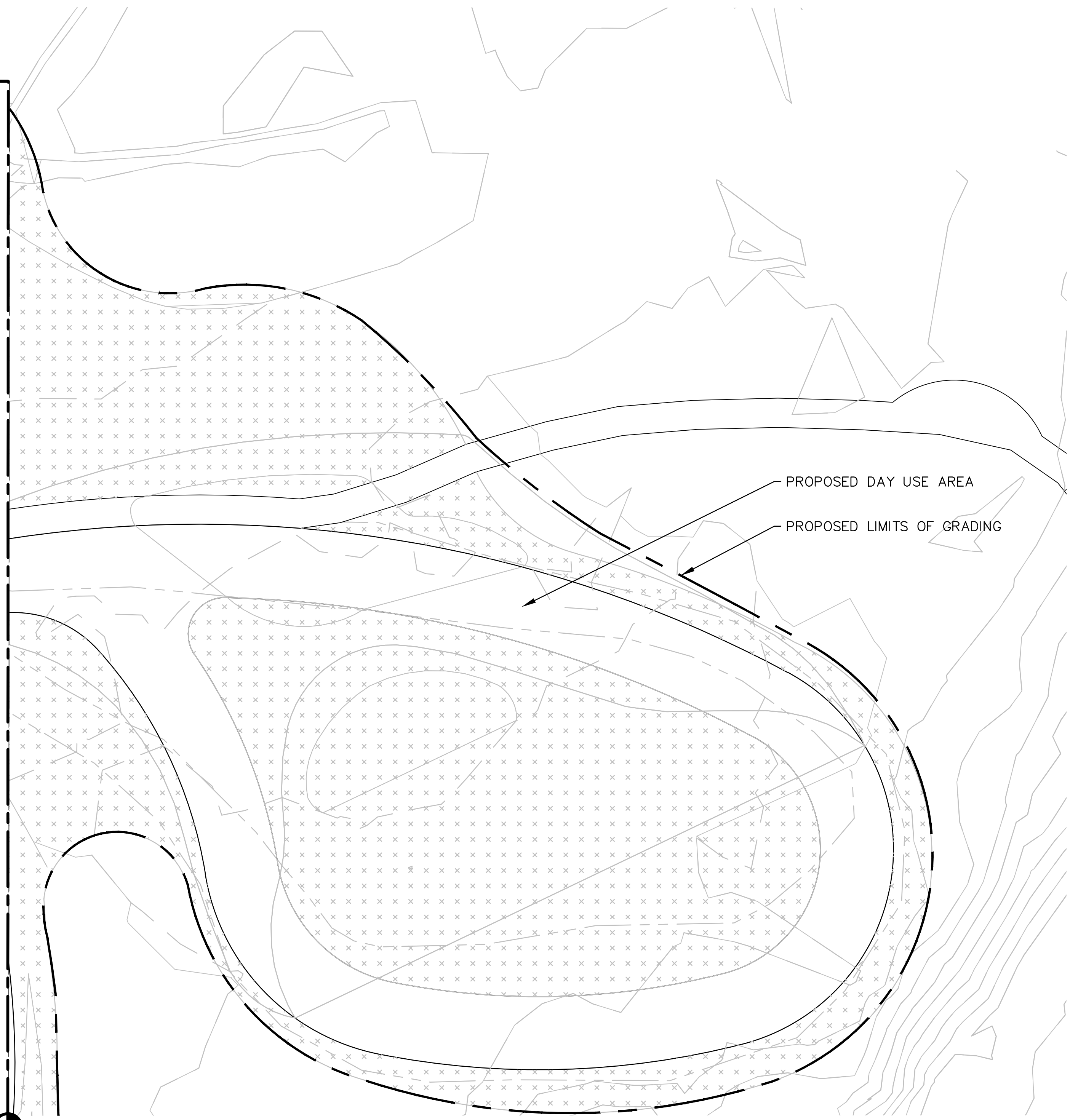
LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
CABIN LOOP PLANTING PLAN 1

BID NO. 14-31

SHEET P2 OF P6
REVISION 0
DATE 11/14/2014
DWG. 0913-50YP-0005




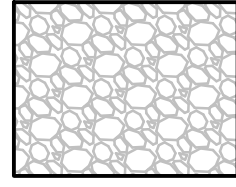
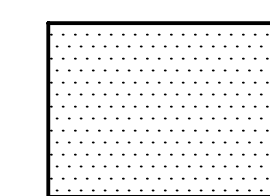
ORIG. DATE 12/23/13 ORG. DRAWN DLS/KLR

MATCHLINE DWG. 0913-50YP-0005



PROPOSED DAY USE AREA
 PROPOSED LIMITS OF GRADING

NOTE:
 1. SEE DWG. 0913-50CU-0036 FOR ADDITIONAL SITE DETAILS SUCH AS BOULDERS

 LANDSCAPE EDGING	 IRRIGATED PLANTING AREAS
 NON-IRRIGATED UPLAND SEED AREAS	 COBBLE SWALE AREA SEE ARMORED SWALE DETAIL 3 ON DWG. 0913-50SU-0009
 IRRIGATED TURF AREAS	



DAVID LEE STIPE
 LICENSE NO. 917
 EXPIRES ON 12/15/2015

Project
GROUNDWORK
 AN SCJ ALLIANCE STUDIO

CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG.
	DESIGNER	DLS/MSG
	APPROVAL	DLS

SCALE	1"=20'	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
BAR IS ONE INCH ON ORIGINAL DRAWING.	0	1"	
REV	DATE	REVISION	REQ. BY DRFT
0	11/14/2014	BID SET	CRH

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

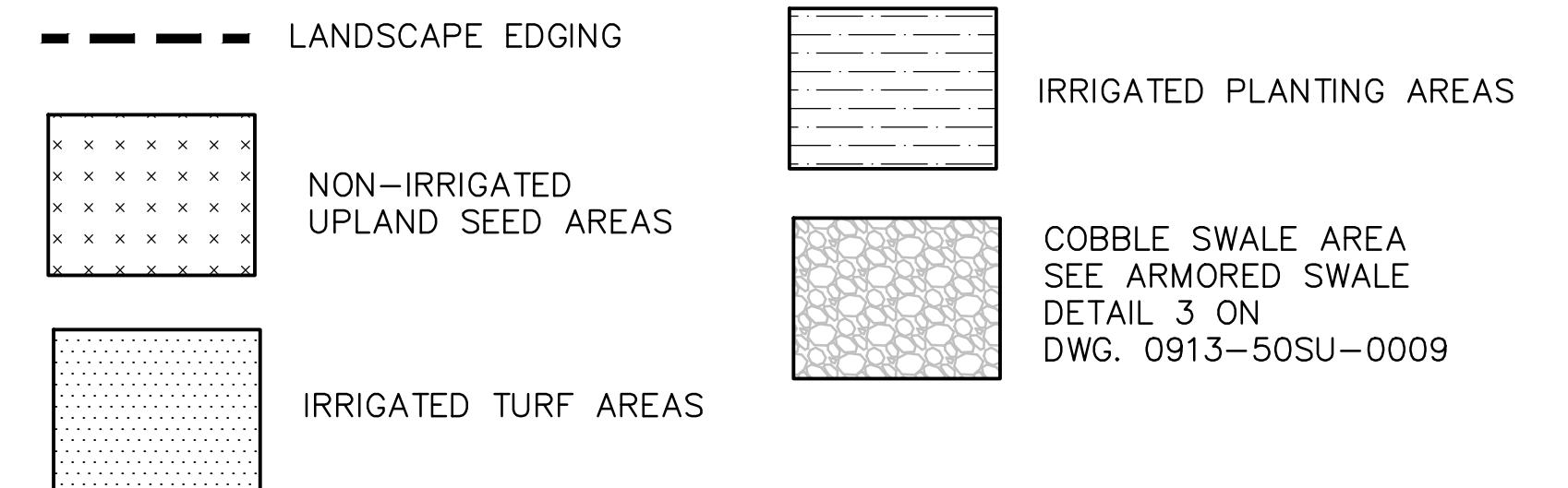
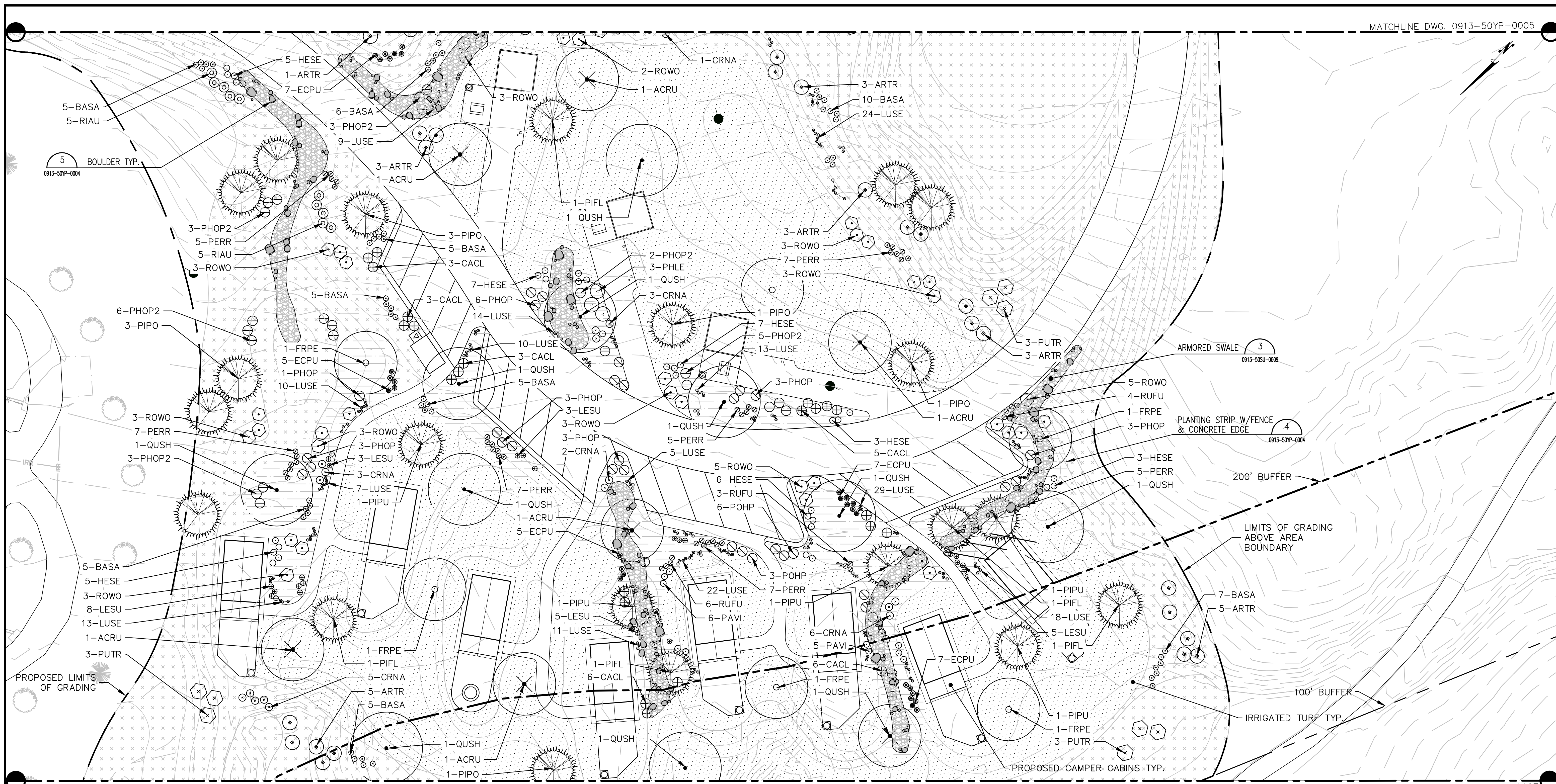


LINCOLN ROCK STATE PARK
 CABIN LOOP & GROUP CAMP
 CABIN LOOP PLANTING PLAN 2

BID NO. 14-31

SHEET P3 OF P6
REVISION 0
DATE 11/14/2014
DWG. 0913-50YP-0006

ORG. DRAWN DLS/KLR



Project GROUNDWORK
AN SCJ ALLIANCE STUDIO

CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG.
	DESIGNER	2ND ENG.
	APPROVAL	PROJ. MGR. C. HILL

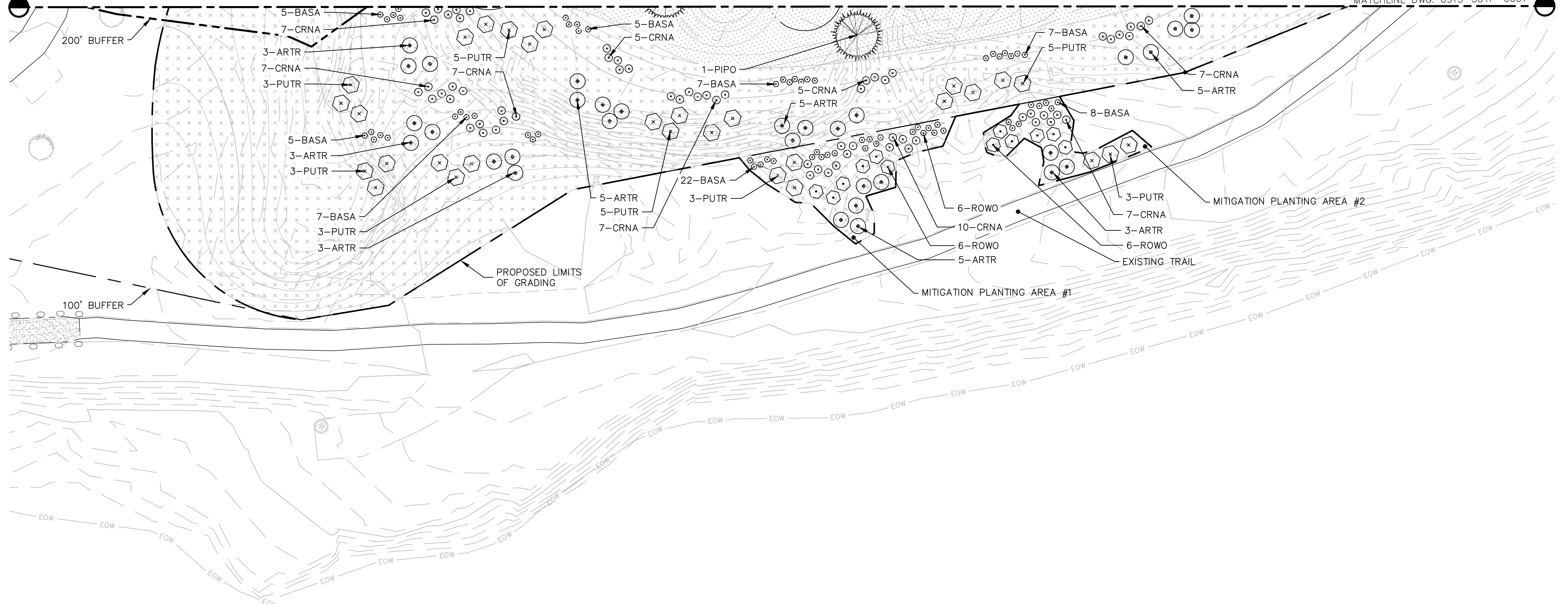
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CRH		REQ. BY	DRFT
REVISION			


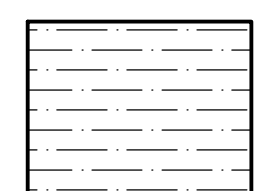
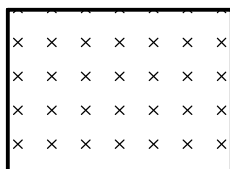
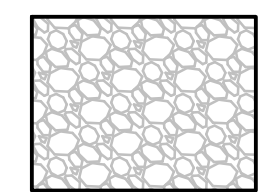
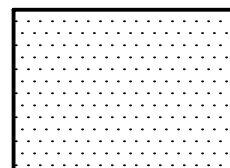
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WENATCHEE, WASHINGTON

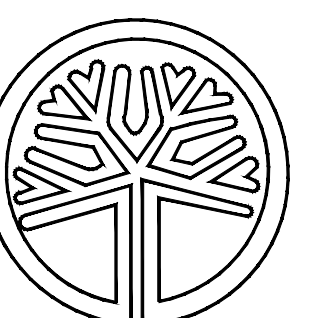
LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
CABIN LOOP PLANTING PLAN 3

BID NO. 14-31

SHEET P4 OF P6
REVISION 0
DATE 11/14/2014
DWG. 0913-50YP-0007



 LANDSCAPE EDGING	 IRRIGATED PLANTING AREAS
 NON-IRRIGATED UPLAND SEED AREAS	 COBBLE SWALE AREA SEE ARMORED SWALE DETAIL 3 ON DWG. 0913-50SU-0009
 IRRIGATED TURF AREAS	



STATE OF WASHINGTON
LICENSED
LANDSCAPE ARCHITECT

DAVID LEE STIPE
LICENSE NO. 917
EXPIRES ON 12/15/2015

Project
GROUNDWORK
AN SCJ ALLIANCE STUDIO

CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG.
	DESIGNER	DLS/MSG 2ND ENG.
	APPROVAL	DLS PROJ. MGR. C. HILL

SCALE	1"=20'	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
BAR IS ONE INCH ON ORIGINAL DRAWING.	0	1"	
REV	DATE	REVISION	CRH REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
WENATCHEE, WASHINGTON

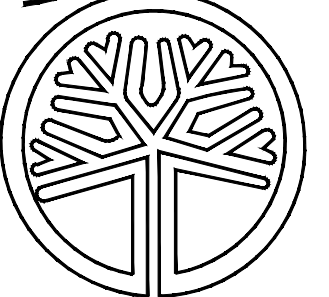
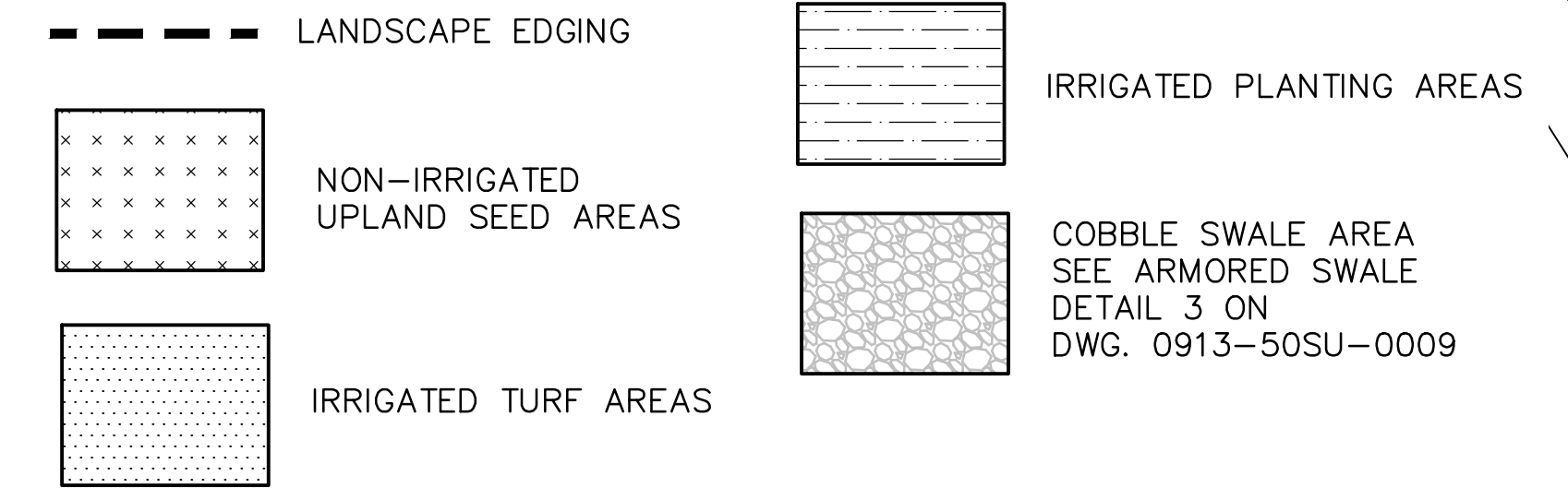
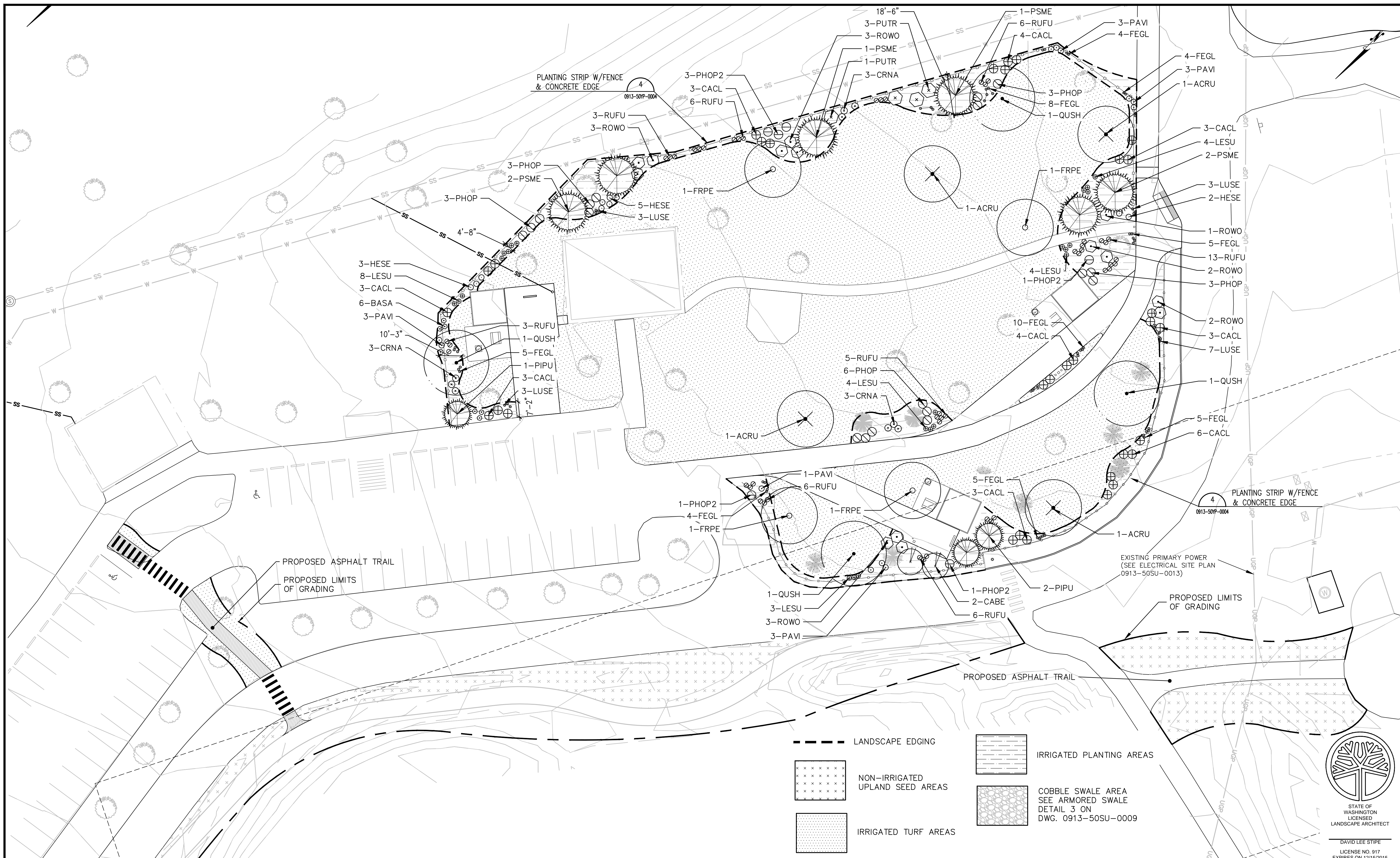


LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
CABIN LOOP PLANTING PLAN 4

BID NO. 14-31

SHEET P5 OF P6
REVISION 0
DATE 11/14/2014
DWG. 0913-50YP-0008

ORIG. DATE 12/23/13 ORG. DRAWN DLS/KLR



STATE OF WASHINGTON
 LICENSED LANDSCAPE ARCHITECT
 DAVID LEE STIPE
 LICENSE NO. 917
 EXPIRES ON 12/15/2015

Project GROUNDWORK
 AN SCJ ALLIANCE STUDIO

CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG.
DESIGNER	DLS/MSG	2ND ENG.
APPROVAL	DLS	PROJ. MGR. C. HILL

SCALE	1"=20'	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
BAR IS ONE INCH ON ORIGINAL DRAWING.	0	1"	
REV	DATE	REVISION	CRH
			REQ. BY
			DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
 CABIN LOOP & GROUP CAMP
 GROUP CAMP PLANTING PLAN

BID NO. 14-31

SHEET P6 OF P6
REVISION 0
DATE 11/14/2014
DWG. 0913-50YP-0009

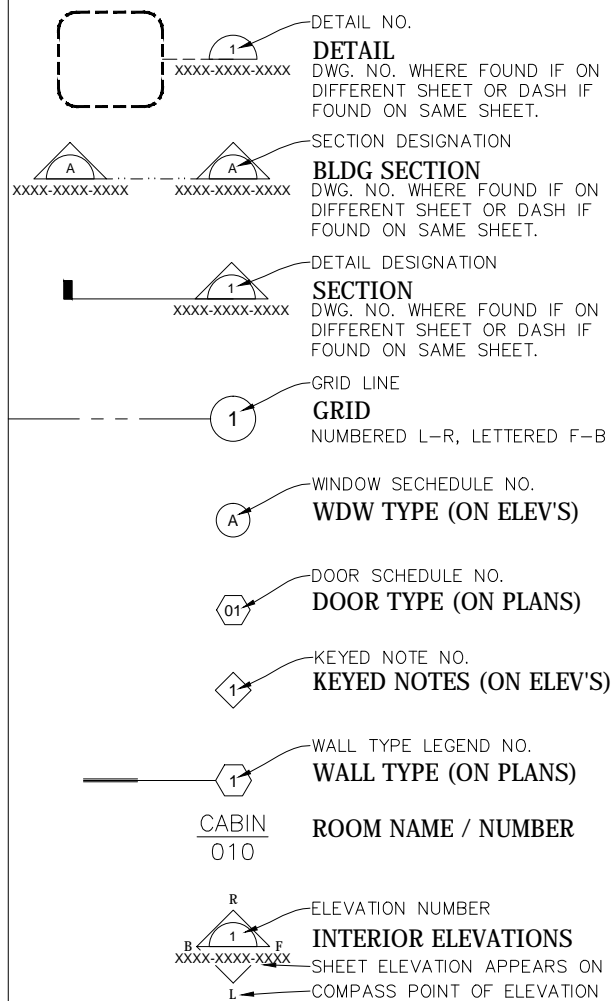
GENERAL NOTES

1. ALL DIMENSIONS SHOWN ARE FROM FACE OF STUD / FACE OF CONCRETE OR CENTERLINE UNLESS OTHERWISE SHOWN.
2. PROVIDE BLOCKING AS SHOWN OR REQUIRED FOR ALL EQUIPMENT, ACCESSORIES, FIXTURES AND MILLWORK REQUIRED BY THE CONTRACT DOCUMENTS.
3. VERIFY IN PLACE DIMENSIONS AND REQUIREMENTS FOR ALL EQUIPMENT AND FURNISHINGS SHOWN WHETHER PROVIDED BY THE CONTRACTOR OR THE OWNER.
4. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND EACH SUBCONTRACTOR TO COORDINATE THE REQUIREMENTS OF THE PRODUCT BEING INSTALLED AND THE CONTRACT DOCUMENTS BEFORE BEGINNING ANY INSTALLATION WORK. NOTIFY THE DISTRICT OF ANY CONFLICTING REQUIREMENTS.
5. CONTRACTOR SHALL VERIFY SIZE AND LOCATIONS OF ALL OPENINGS FOR MECHANICAL, ELECTRICAL AND OWNER SUPPLIED EQUIPMENT BEFORE PROCEEDING WITH THE WORK.

ABBREVIATIONS

AL/GL	ALUMINUM / GLAZING
ACT	ACOUSTICAL CEILING TILE
AGG	AGGREGATE
ALUM	ALUMINUM
ASPH	ASPHALT
BD	BOARD
BLKG	BLOCKING
BRK	BRICK
BRZ	BRONZE
B.O.D	BASIS OF DESIGN
CB	CEMENT BOARD
CIPC	CAST IN PLACE CONCRETE
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CPR	COPPER
CPT	CARPET
CS	CONCRETE SEALANT
CT	CERAMIC TILE
DF	DOUGLAS FIR
E	EAST
EXIST	EXISTING
EXP	EXPOSED
EXP STR	EXPOSED STRUCTURE
F	FRONT
FACT	FACTORY
FIN	FINISH
FOIC	FURNISH OWNER, INSTALL CONTRACTOR
FOIO	FURNISH OWNER, INSTALL OWNER
FP	FIRE PROOF
FRP	FIBER REINFORCED PLASTIC
FUT	FUTURE
GALV	GALVANIZED
GL	GLASS / GLAZING
GLB	GLU-LAMINATED BEAM
GRN	GRANITE
GRVL	GRAVEL
GWB	GYPSUM WALLBOARD
HB	HOSE BIB
HBD	HARDBOARD
HC	HOLLOW CORE
HF	HEM-FIR
HM	HOLLOW METAL
L	LEFT
LAM	LAMINATE
LWC	LIGHTWEIGHT CONCRETE
MAS	MASONRY
MDO	MEDIUM DENSITY OVERLAY
MTL	METAL
MWK	MILLWORK
N	NORTH
NA	NOT APPLICABLE
OC	ON CENTER
PBD	PARTICLE BOARD
PFN	PREFINISHED
PGW	PAINT GRADE WOOD
PLAM	PLASTIC LAMINATE
PLYWD	PLYWOOD
PT	PRESSURE TREATED
PVG	PAVING
QT	QUARRY TILE
R	RIGHT
RB	RUBBER / RESILIENT BASE
RBT	RUBBER TILE
RT	RESILIENT TILE
S	SOUTH
SF GL	SAFETY GLASS
SHT	SHEET
SS	STAINLESS STEEL
STL	PRIMED OR GALVANIZED STEEL
SV	STAIN / VARNISH
TBB	TILE BACKER BOARD
TZ	TERAZZO
UFN	UNFINISHED
VIN	VINYL
VB	VAPOR BARRIER
VCT	VINYL COMPOSITE TILE
VG	VERTICAL GRAIN
VW	VINYL WALL COVERING
W	WEST
WP	WALL PAPER
WD	WOOD
WDW	WINDOW
WP	WATERPROOFING
WRC	WESTERN RED CEDAR
WRG	WATER RESISTANT GYPSUM WALL BOARD
WSCT	WAINSCOT
@	AT
&	AND

DRAWING SYMBOLS



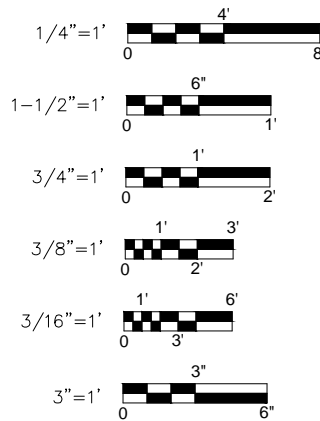
MATERIALS LEGEND

	WOOD FINISH
	PLYWOOD
	GYPSUM WALLBOARD
	BATT INSULATION
	UNFACED BATT INSULATION
	RIGID INSULATION
	GROUT
	CONCRETE

PROJECT INFORMATION

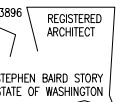
APPLICABLE CODES	2012 IBC 2012 WASH STATE ENERGY CODE 2009 ICC / ANSI 117.1
OCCUPANCY	310.3 RESIDENTIAL GROUP R-1
CONSTRUCTION TYPE	TYPE V-B NON SPRINKLERED
BUILDING AREA	400 SQ. FT. (EACH BLDG)
ROOF AREA	735 SQ. FT. (EACH BLDG)
BUILDING HEIGHT	15'-1 1/4" (SLAB TO PEAK)

GRAPHIC SCALES



ARCHITECT SHEET INDEX

A1.1 0913-05AR-0002	ABBRV., GEN. NOTES, DRAWING SYMBOLS, MATERIALS LEGEND, PROJECT INFO.
A1.2 0913-05AR-0003	FLOOR PLAN TYPE "B"
A1.3 0913-05AR-0004	FLOOR PLAN TYPE "A"
A1.4 0913-05AR-0005	FRONT ELEVATION, BACK ELEVATION, LEFT ELEVATION, RIGHT ELEVATION
A1.5 0913-05AR-0006	SECTION A-A
A1.6 0913-05AR-0007	INTERIOR ELEVATION - TYPE "A", INTERIOR ELEVATION - TYPE "B"
A1.7 0913-05AR-0008	DETAILS
A1.8 0913-05AR-0011	KIOSK PLAN, ELEVATIONS, DETAILS

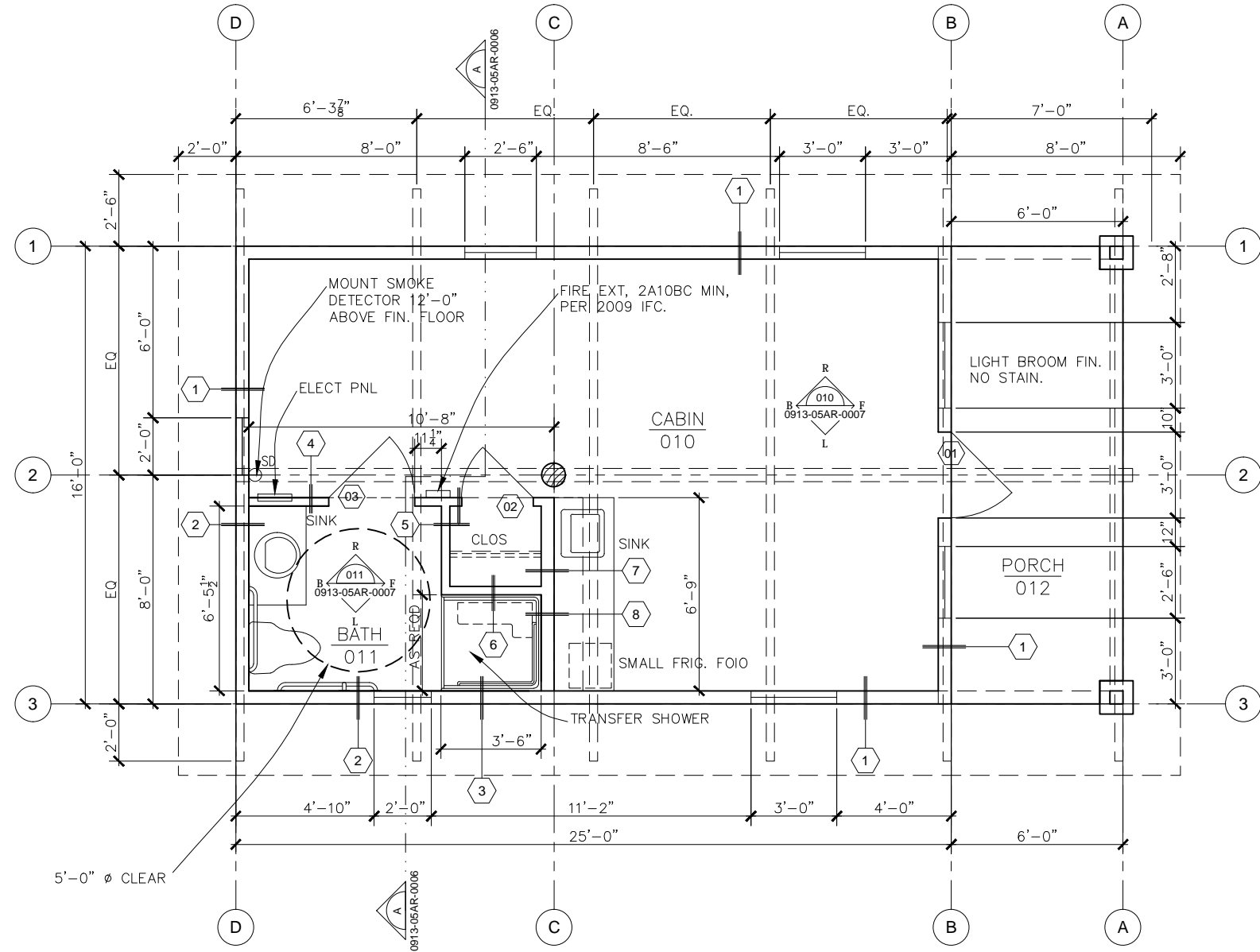
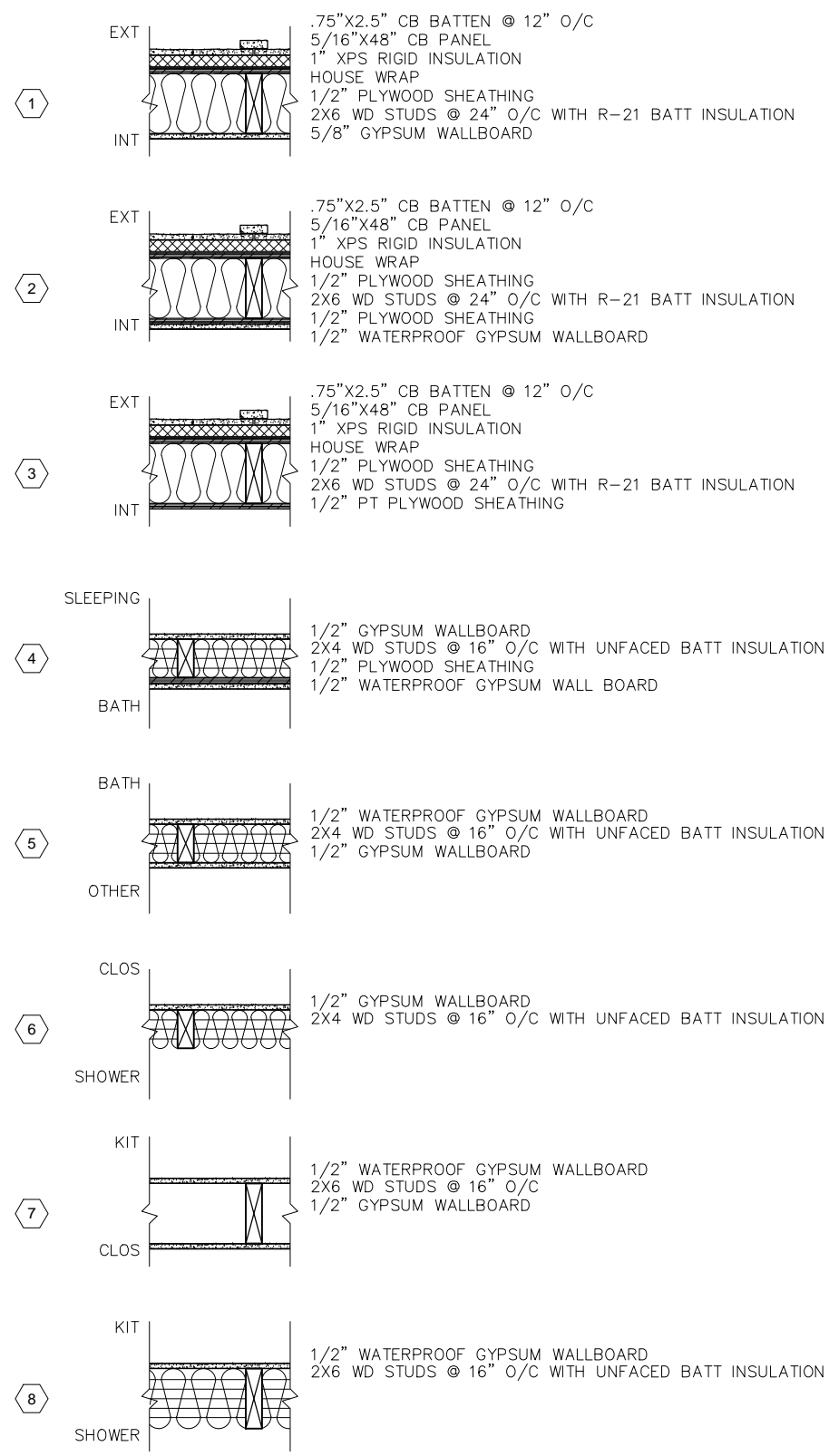


	CONSULTANT		CHELAN PUD NO.1		SCALE NTS		VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.		PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		LINCOLN ROCK STATE PARK CABIN LOOP		SHEET A1.1 OF A1.8
	PRIN. ARCH. SBS	PRIM. ENG.	2ND ARCH.	2ND ENG.	0	11/14/2014	BID SET REVISION				ABBREVIATIONS, GENERAL NOTES, DRAWING SYMBOLS MATERIALS LEGEND, PROJECT INFORMATION	REVISION 0 DATE 11/14/2014	
	PRIN ARCH. Stephen Story	PROJ. MGR. Court Hill	REV	DATE	REQ. BY	DRFT	BID NO. 14-31				DWG. 0913-05AR-0002		

ROOM FINISH SCHEDULE

ROOM NO.	NAME	SUBSTRATE				CEIL.	CEIL. HT.	FINISHES							NOTES
		WALLS						FLOOR	BASE	WALLS					
		F	B	L	R					F	B	L	R		
010	CABIN - TYPE B	GWB	GWB	GWB	GWB	T&G	VARIABLES	S/T CONC	WD	PAINT	PAINT	PAINT	PAINT	STAIN ALL WOOD	
011	BATH - TYPE B	GWB/PLYWD	GWG/PLYWD	GWG/PLYWD	GWG/PLYWD	GWB	8'-0"	S/T CONC	4" RB	PAINT	PAINT	PAINT	PAINT	STAIN ALL WOOD	
020	CABIN - TYPE A	GWB	GWB	GWB	GWB	T&G	VARIABLES	S/T CONC	WD	PAINT	PAINT	PAINT	PAINT	STAIN ALL WOOD	
021	BATH - TYPE A	GWB/PLYWD	GWG/PLYWD	GWG/PLYWD	GWG/PLYWD	GWB	8'-0"	S/T CONC	4" RB	PAINT	PAINT	PAINT	PAINT	STAIN ALL WOOD	

WALL TYPES:

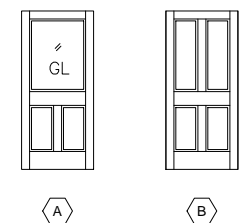


FLOOR PLAN - TYPE "B"
SCALE: 3/8"=1'-0"
NOTE: TYPE "B" FLOOR PLAN IS FOR ALL CABINS (7 TOTAL) EXCEPT C7 WHICH IS TYPE "A"

DOOR SCHEDULE

NO.	TYPE	DOOR SIZE (WxH)	FRAME		GL	HDWR GROUP	UL RATING	DETAIL	REMARKS
			MAT'L	FINISH					
01	A	3'-0" x 6'-8"	MTL	PAINT	INSUL	ENTRY	6,7,8	0913-05AR-0008	N/R W/ WEATHERSTRIPPING
02	B	2'-4" x 6'-8"	WD	STAIN	N/A	PASS	9,10	0913-05AR-0008	N/R W/ STOPS
03	B	3'-0" x 6'-8"	WD	STAIN	N/A	BATH	9,10	0913-05AR-0008	N/R W/ STOPS

DOOR TYPES



CONSULTANT		CHELAN PUD NO.1	
PRIN. ARCH. SBS	PRIM. ENG.	PRIN. ARCH. Stephen Story	PROJ. MGR. Court Hill

SCALE	
3/8"=1'-0"	0 11/14/2014

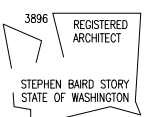
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0 1"	REQ. DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY	
WENATCHEE, WASHINGTON	REVISION



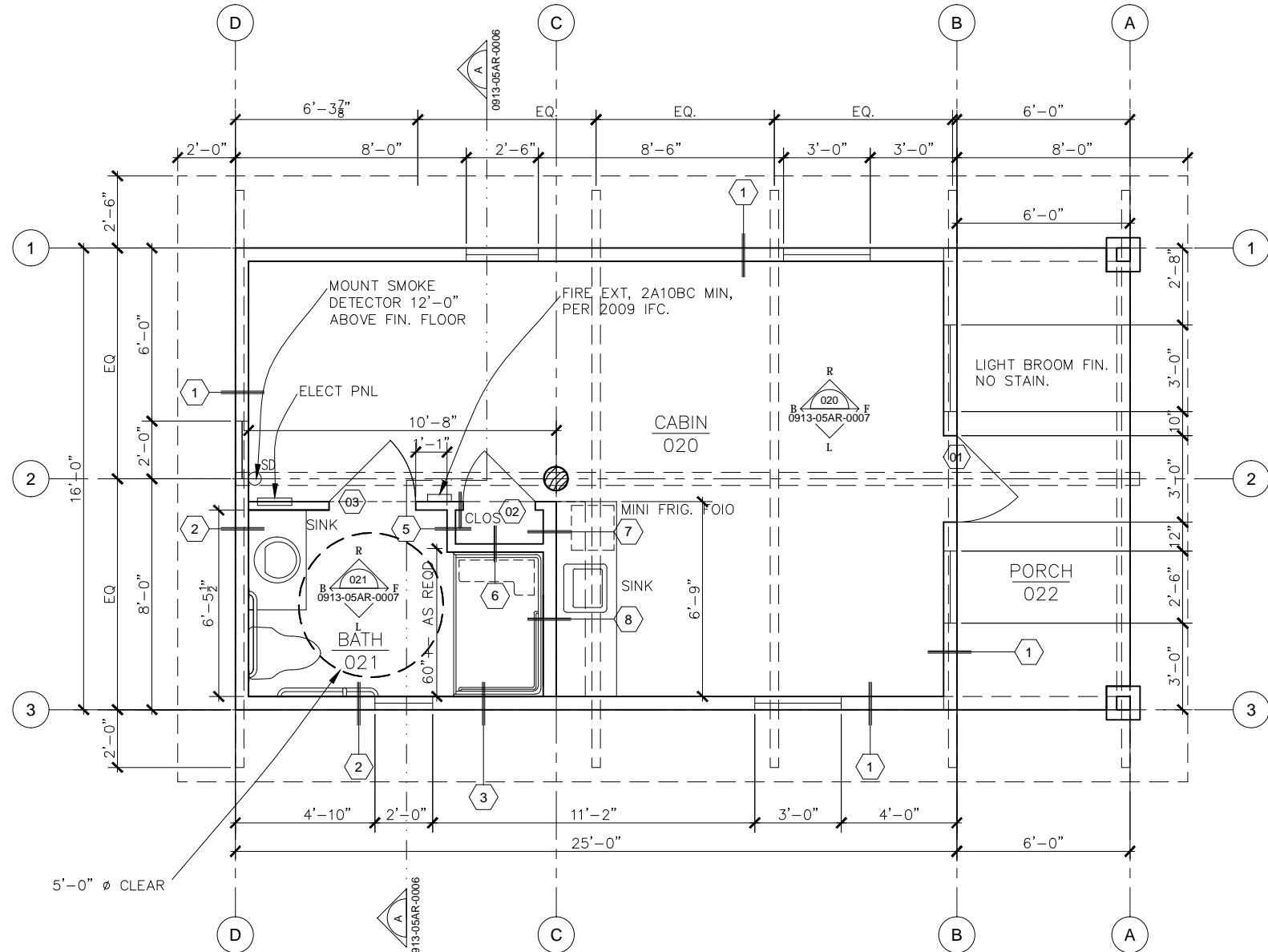
LINCOLN ROCK STATE PARK CABIN LOOP FLOOR PLAN - TYPE "B"	
BID NO. 14-31	SHEET A1.2 OF A1.8
REVISION 0	DATE 11/14/2014
DWG. 0913-05AR-0003	ORIGINAL DWG. # ?

ORIG. DRAWN SBS



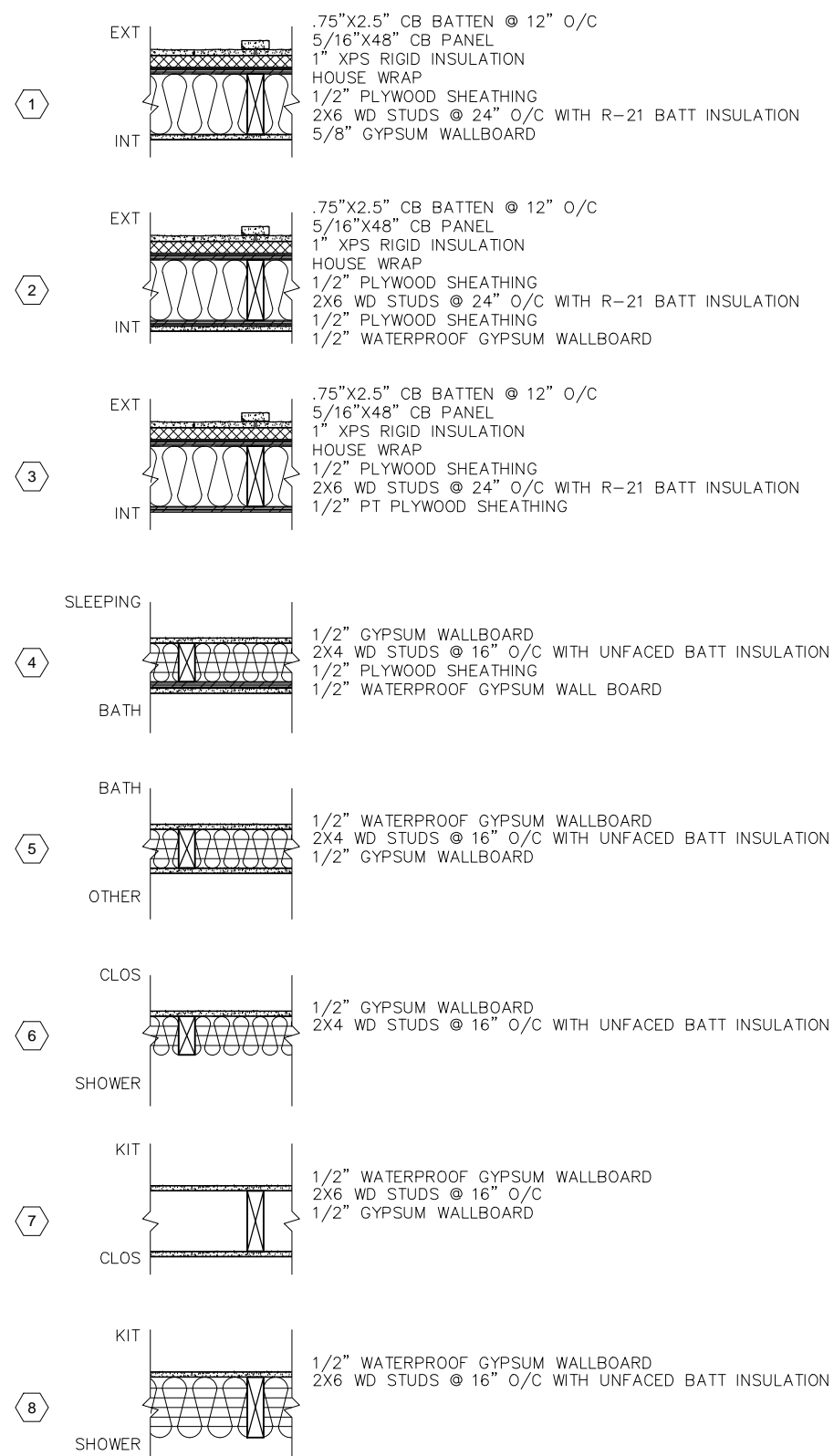
ROOM FINISH SCHEDULE

ROOM NO.	NAME	SUBSTRATE				CEIL.	HT.	FINISHES							NOTES
		WALLS						FLOOR	BASE	WALLS					
		F	B	L	R					F	B	L	R		
010	CABIN - TYPE B	GWB	GWB	GWB	GWB	T&G	VARIABLES	S/T CONC	WD	PAINT	PAINT	PAINT	PAINT	STAIN ALL WOOD	
011	BATH - TYPE B	GWB/PLYWD	GWG/PLYWD	GWG/PLYWD	GWG/PLYWD	GWB	8'-0"	S/T CONC	4" RB	PAINT	PAINT	PAINT	PAINT	STAIN ALL WOOD	
020	CABIN - TYPE A	GWB	GWB	GWB	GWB	T&G	VARIABLES	S/T CONC	WD	PAINT	PAINT	PAINT	PAINT	STAIN ALL WOOD	
021	BATH - TYPE A	GWB/PLYWD	GWG/PLYWD	GWG/PLYWD	GWG/PLYWD	GWB	8'-0"	S/T CONC	4" RB	PAINT	PAINT	PAINT	PAINT	STAIN ALL WOOD	



FLOOR PLAN - TYPE "A"
SCALE: 3/8"=1'-0"
NOTE: TYPE "A" FLOOR PLAN IS FOR CABIN C7 ONLY

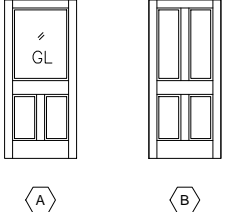
WALL TYPES:



DOOR SCHEDULE

NO.	TYPE	DOOR SIZE (WxH)	FRAME		GL		HDWR GROUP	DETAIL	UL RATING	REMARKS
			MAT'L	FINISH	MAT'L	FINISH				
01	A	3'-0" x 6'-8"	MTL	PAINT	WD	STAIN	INSUL	ENTRY	6,7,8 / 0913-05AR-0008	N/R W/ WEATHERSTRIPPING
02	B	2'-4" x 6'-8"	WD	STAIN	WD	STAIN	N/A	PASS	9,10 / 0913-05AR-0008	N/R W/ STOPS
03	B	3'-0" x 6'-8"	WD	STAIN	WD	STAIN	N/A	BATH	9,10 / 0913-05AR-0008	N/R W/ STOPS

DOOR TYPES



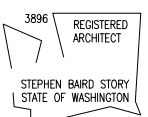
CONSULTANT		CHELAN PUD NO.1	
PRIN. ARCH. SBS	PRIM. ENG.	PRIN. ARCH. Stephen Story	PROJ. MGR. Court Hill

SCALE		VERIFY SCALE	
3/8"=1'-0"	0 1"	BAR IS ONE INCH ON ORIGINAL DRAWING.	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY	
WENATCHEE, WASHINGTON	P.U.D. CHELAN COUNTY

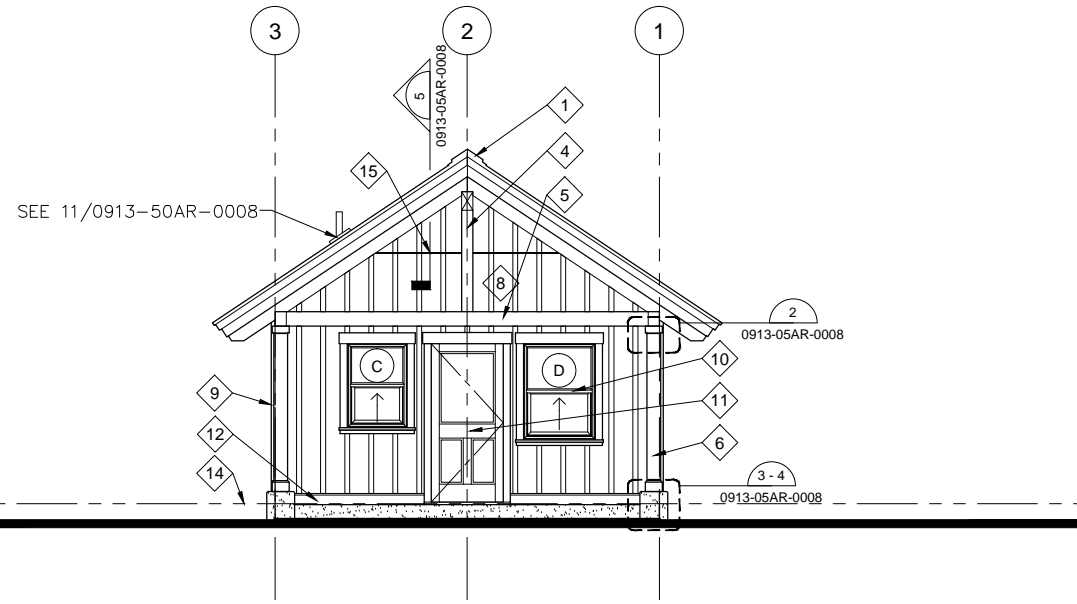
LINCOLN ROCK STATE PARK CABIN LOOP FLOOR PLAN - TYPE "A"	
BID NO. 14-31	REVISION 0
DATE 11/14/2014	DWG. 0913-05AR-0004

SHEET A1.3 OF A1.8	
REVISION 0	DATE 11/14/2014
DWG. 0913-05AR-0004	ORIGINAL DWG. #: ?

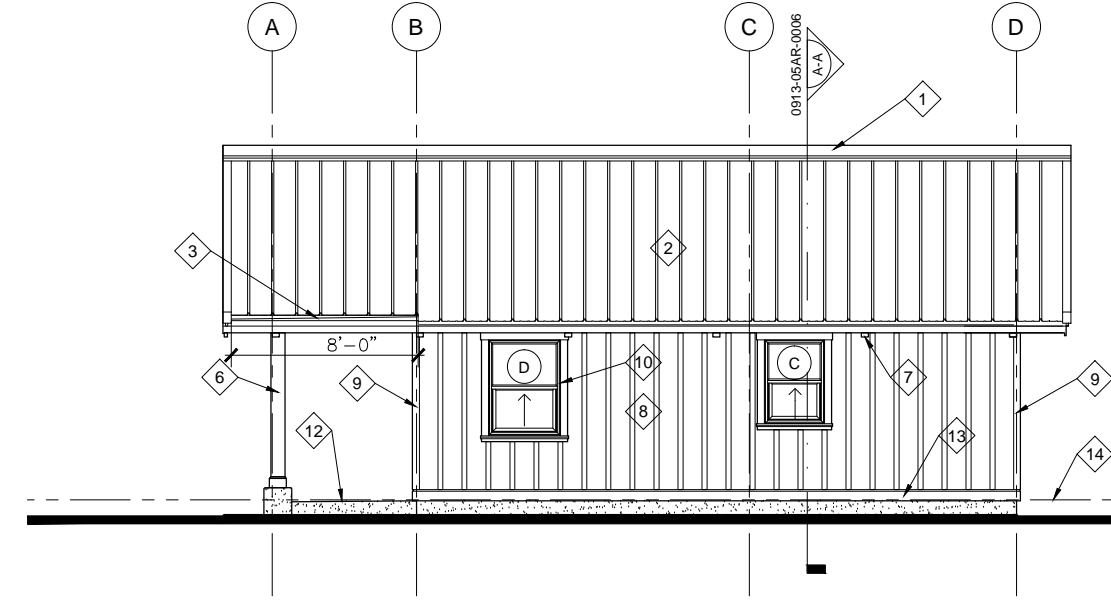


WINDOW SCHEDULE

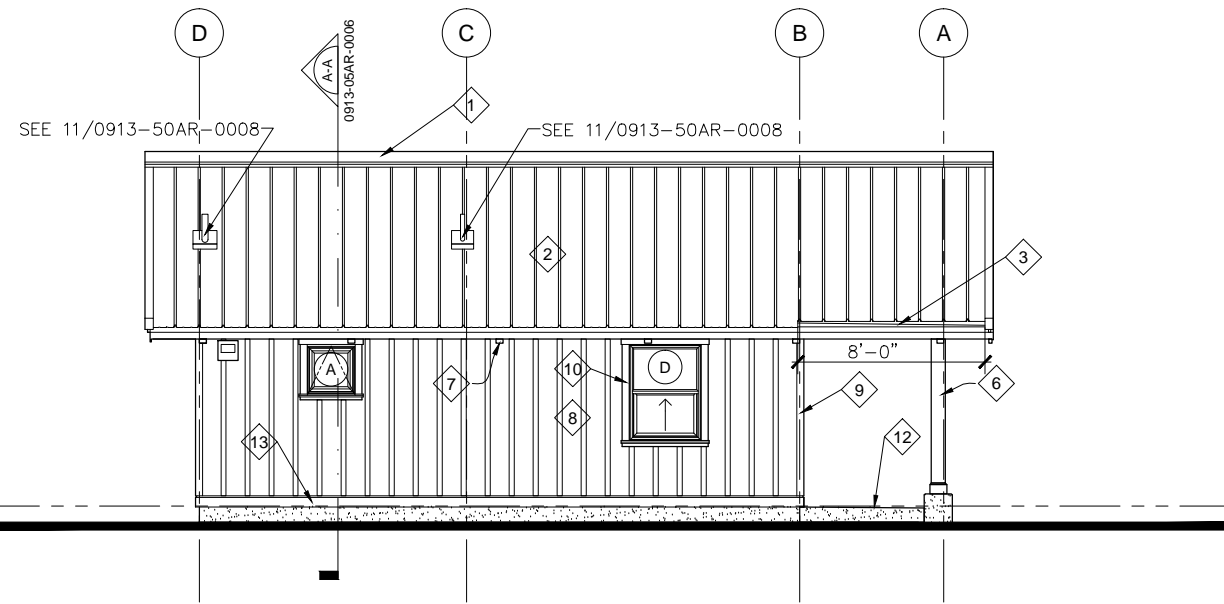
MARK	TYPE	MATERIAL	R.O. SIZE (SITE VERIFY)			GLAZING	"U"	REMARKS
			WIDTH	HEIGHT	AREA / SF.			
A	AWNING	VINYL	24"	24"	2.0x1 = 2.0 SF	0.5" INSUL	u0.28	B.O.D - JELD WEN, #BAWN2424, *, OBSCURE GL.
B	SINGLE HUNG	VINYL	24"	42"	7.0x1 = 7.0 SF	0.5" INSUL	u0.29	B.O.D - JELD WEN, #8SH2442, *
C	SINGLE HUNG	VINYL	30"	42"	8.75x2 = 17.5 SF	0.5" INSUL	u0.29	B.O.D - JELD WEN, #8SH3042, *
D	SINGLE HUNG	VINYL	36"	48"	12.0x3 = 36.0 SF	0.5" INSUL	u0.29	B.O.D - JELD WEN, #8SH3648, *
TOTAL AREA					62.5 SF	* = BRONZE EXT, DESERT SAND INT		



F ELEVATION - FRONT
SCALE: 1/4"=1'-0"

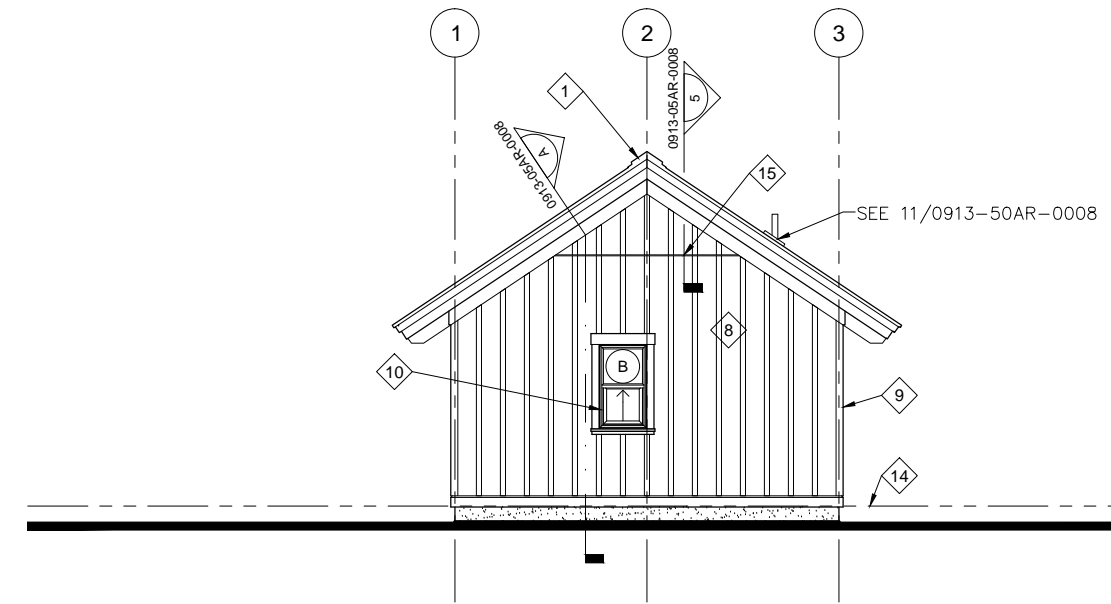


R ELEVATION - RIGHT
SCALE: 1/4"=1'-0"



L ELEVATION - LEFT
SCALE: 1/4"=1'-0"

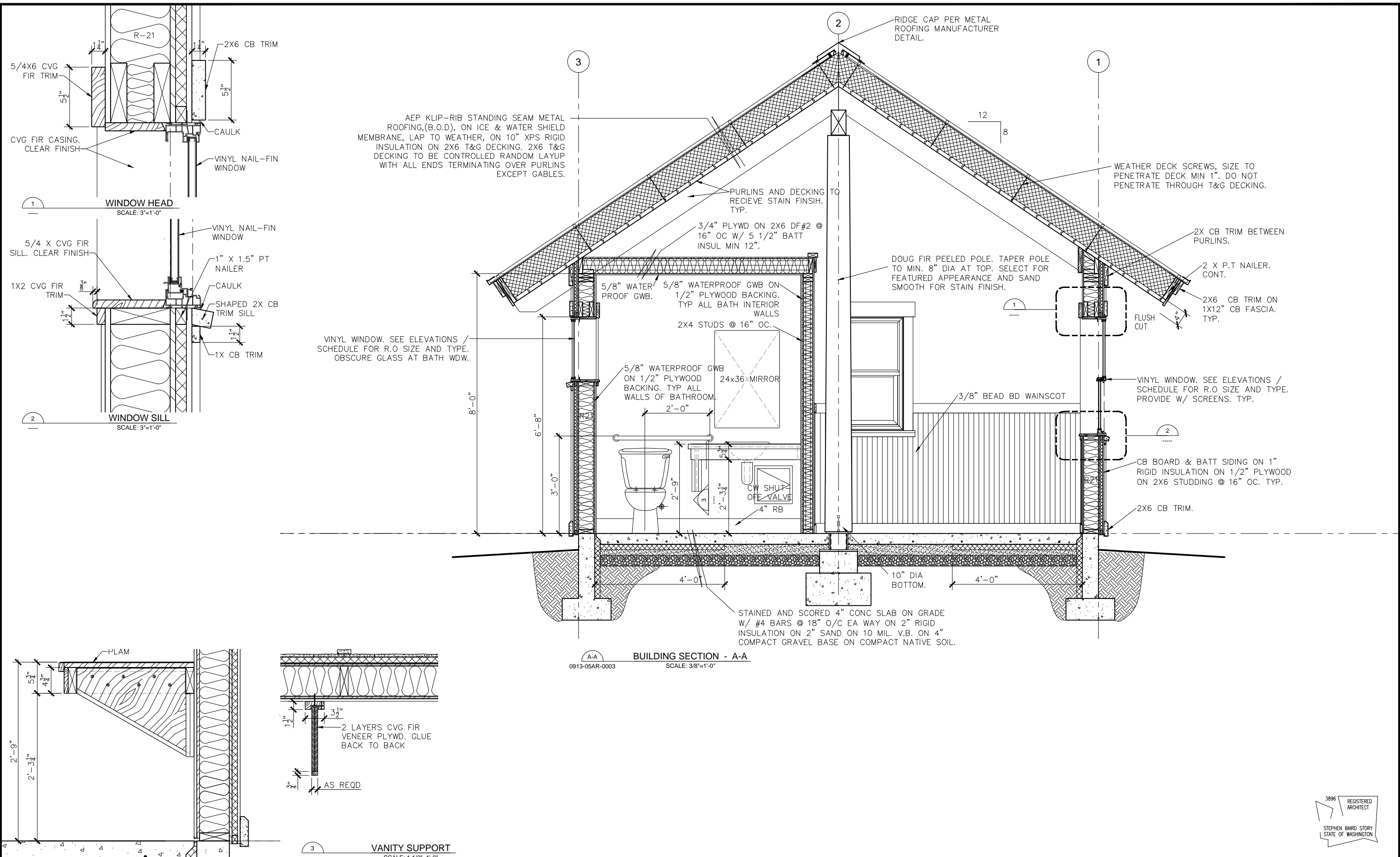
- ELEVATION KEY NOTES:
- 1 CONTINUOUS METAL RIDGE CAP
 - 2 STANDING SEAM METAL ROOF ON 10" E.P.S RIGID INSULATION, ON ICE & WATER SHIELD MEMBRANE ON 2X6 T&G DECKING
 - 3 "L" STYLE METAL WATER DIVERTER
 - 4 4 X 4 KING POST
 - 5 6 X 8 BEAM
 - 6 6 X 6 POST FRAME. WRAP WITH CB TRIM
 - 7 PURLIN TAIL.
 - 8 CB BOARD & BATT SIDING
 - 9 1"x3.5" - 1"x2.5" CB CORNER TRIM
 - 10 WINDOW. SEE SCHEDULE
 - 11 INSULATED MTL DOOR. SEE SCHEDULE
 - 12 CONCRETE PORCH
 - 13 2X6 SHAPED CB TRIM
 - 14 FINISH FLOOR ELEVATION
 - 15 PANEL FLASHING



B ELEVATION - BACK
SCALE: 1/4"=1'-0"

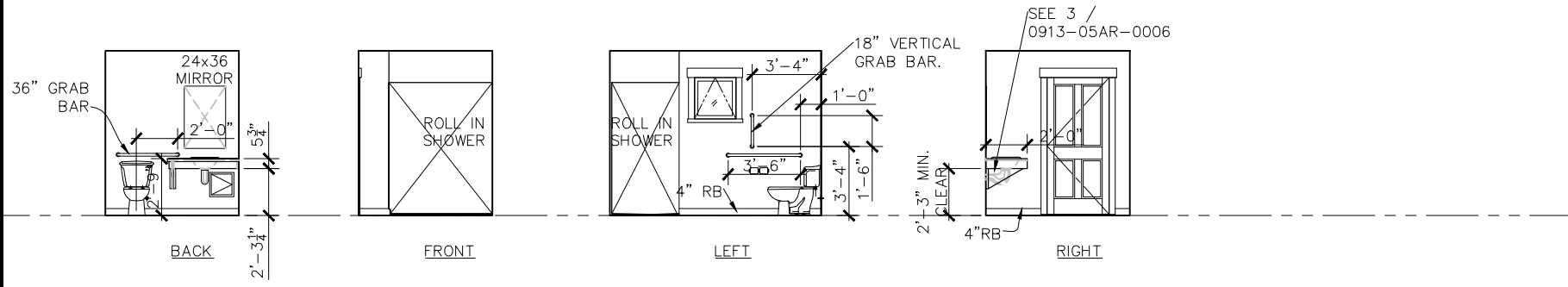
3896 REGISTERED ARCHITECT
STEPHEN BAIRD STORY
STATE OF WASHINGTON

STORY ARCHITECTS 	CONSULTANT PRIN. ARCH. SBS 2ND ARCH. PRIN ARCH. Stephen Story		CHELAN PUD NO.1 PRIM. ENG. 2ND ENG. PROJ. MGR. Court Hill		SCALE 1/4"=1'-0"	VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON 	LINCOLN ROCK STATE PARK CABIN LOOP FRONT ELEVATION, BACK ELEVATION LEFT ELEVATION, RIGHT ELEVATION BID NO. 14-31	SHEET A1.4 OF A1.8 REVISION 0 DATE 11/14/2014 DWG. 0913-05AR-0005
	REV. DATE REVISION REQ. BY DRFT	ID: ? ORIGINAL DWG. #: ?		DOCUMENT CLASS: ?						
	ORG. DATE ORG. DRAWN SBS									

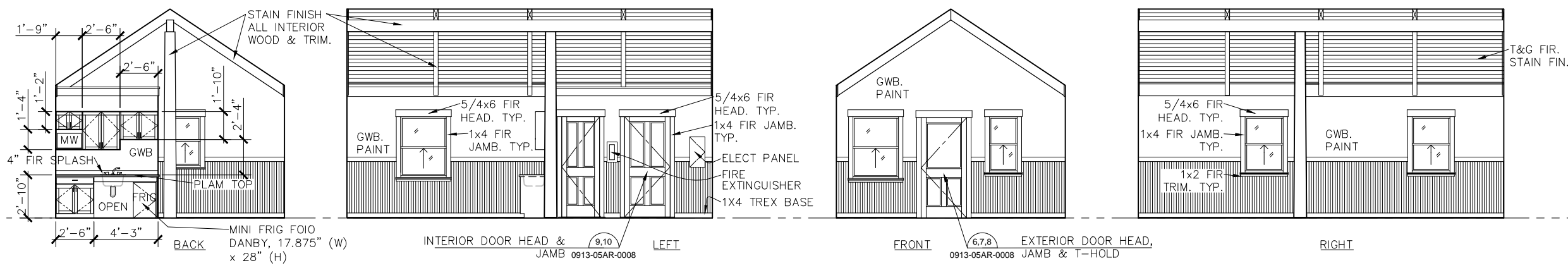


3896 REGISTERED ARCHITECT
 STEPHEN BAIRD STORY
 STATE OF WASHINGTON

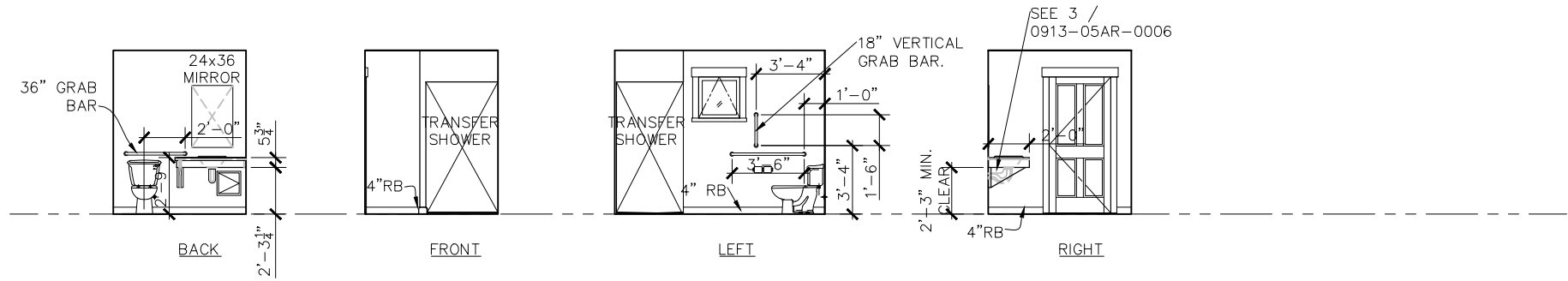
STORY ARCHITECTS 	CONSULTANT PRIN. ARCH. SBS 2ND ARCH. PRIN ARCH. Stephen Story		CHELAN PUD NO.1 PRIM. ENG. 2ND ENG. PROJ. MGR. Court Hill		SCALE 3/8"=1'-0"	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON 	LINCOLN ROCK STATE PARK CABIN LOOP SECTION A-A BID NO. 14-31	SHEET A1.5 OF A1.8 REVISION 0 DATE 11/14/2014 DWG. 0913-05AR-0006
	PRIN. ARCH. SBS 2ND ARCH. PRIN ARCH. Stephen Story	PRIM. ENG. 2ND ENG. PROJ. MGR. Court Hill	SCALE 3/8"=1'-0"	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON 	LINCOLN ROCK STATE PARK CABIN LOOP SECTION A-A BID NO. 14-31	SHEET A1.5 OF A1.8 REVISION 0 DATE 11/14/2014 DWG. 0913-05AR-0006		



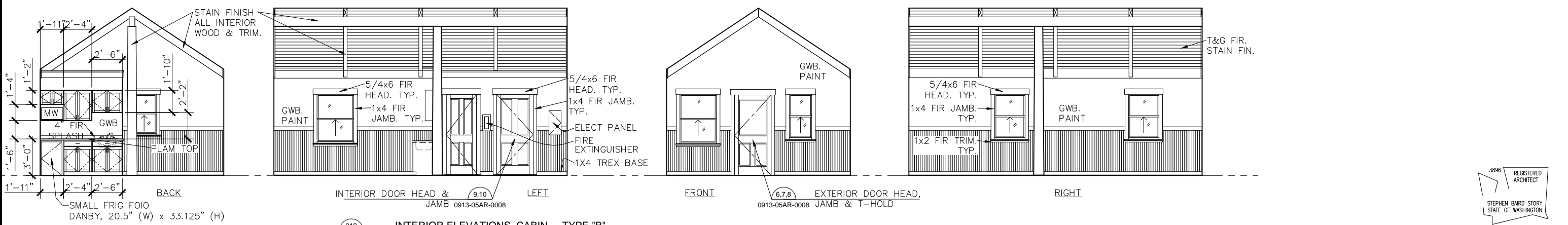
021 INTERIOR ELEVATIONS, BATH - TYPE "A"
0913-05AR-0004 SCALE: 1/4"=1'-0"



020 INTERIOR ELEVATIONS, CABIN - TYPE "A"
0913-05AR-0004 SCALE: 1/4"=1'-0"



011 INTERIOR ELEVATIONS, BATH - TYPE "B"
0913-05AR-0003 SCALE: 1/4"=1'-0"



010 INTERIOR ELEVATIONS, CABIN - TYPE "B"
0913-05AR-0003 SCALE: 1/4"=1'-0"

STORY ARCHITECTS

CONSULTANT		CHELAN PUD NO.1	
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2ND ARCH.	2ND ENG.		

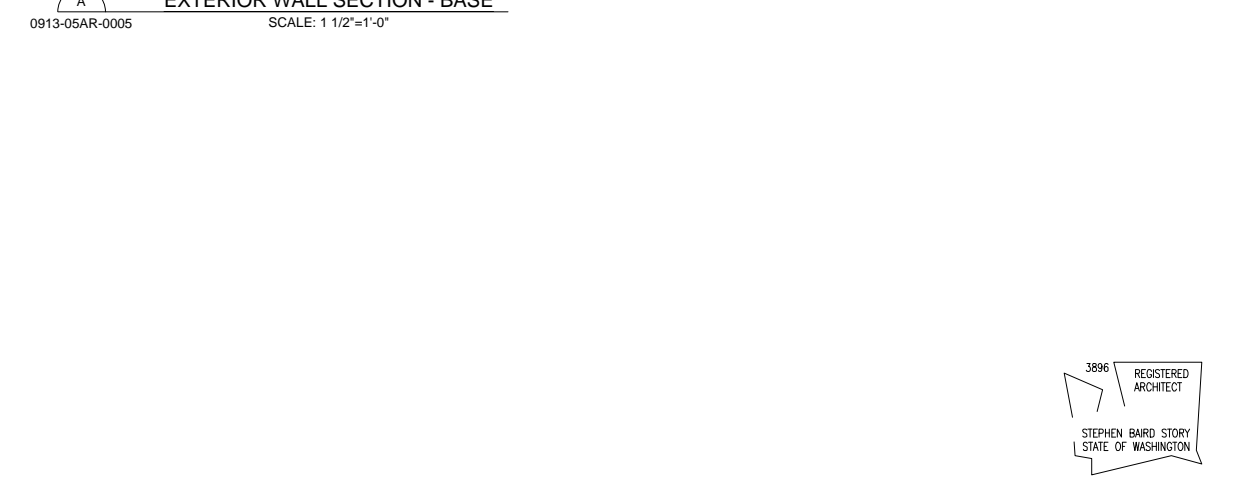
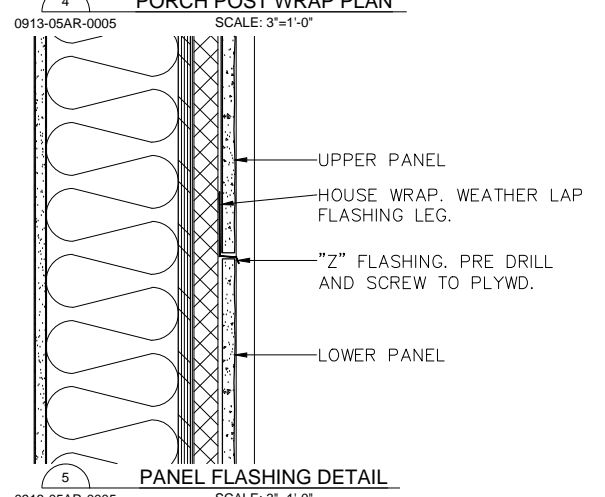
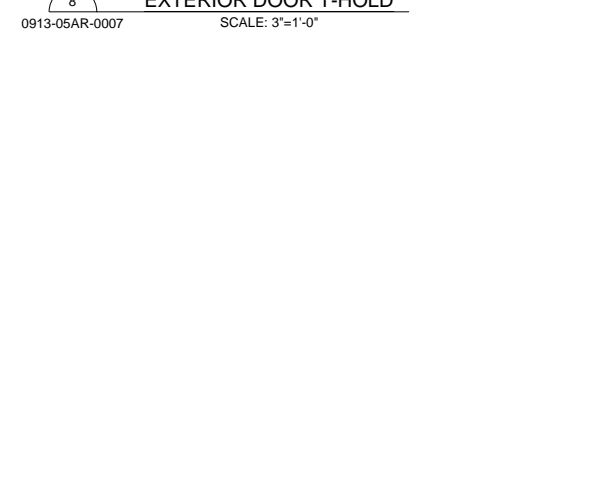
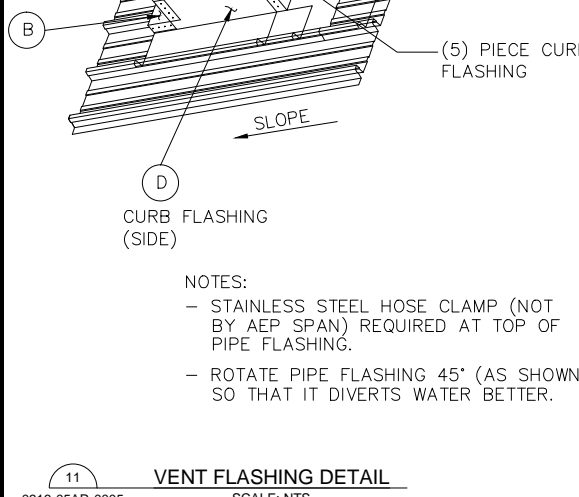
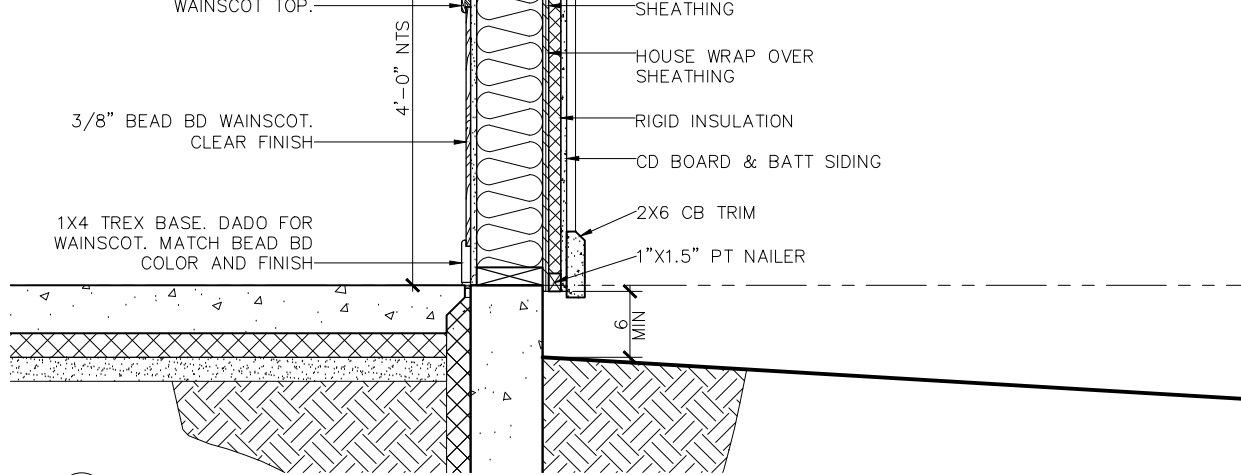
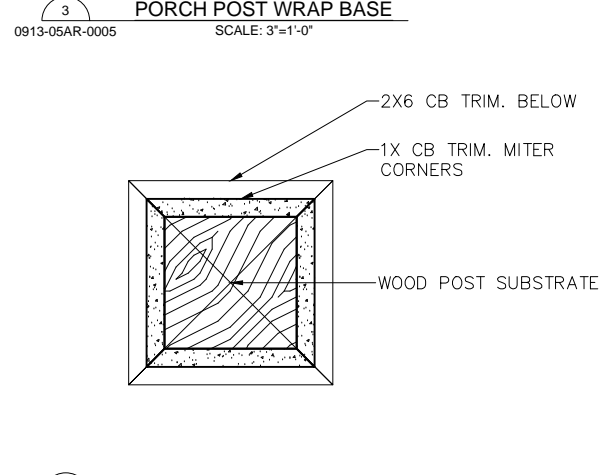
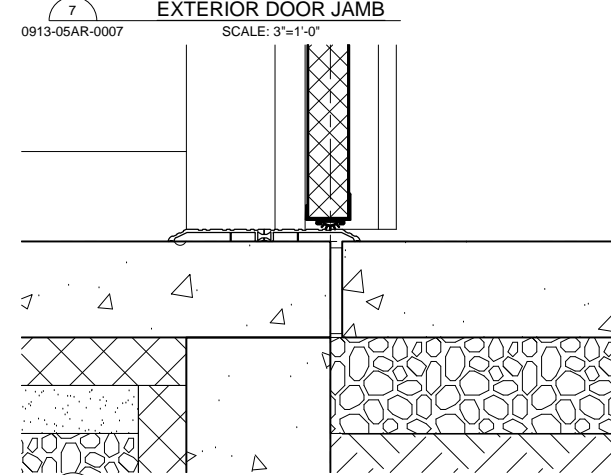
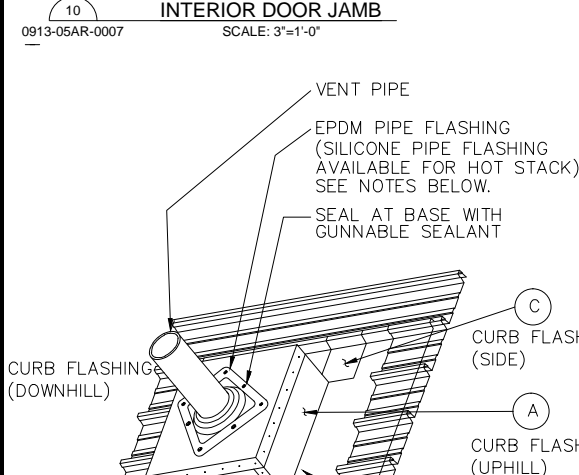
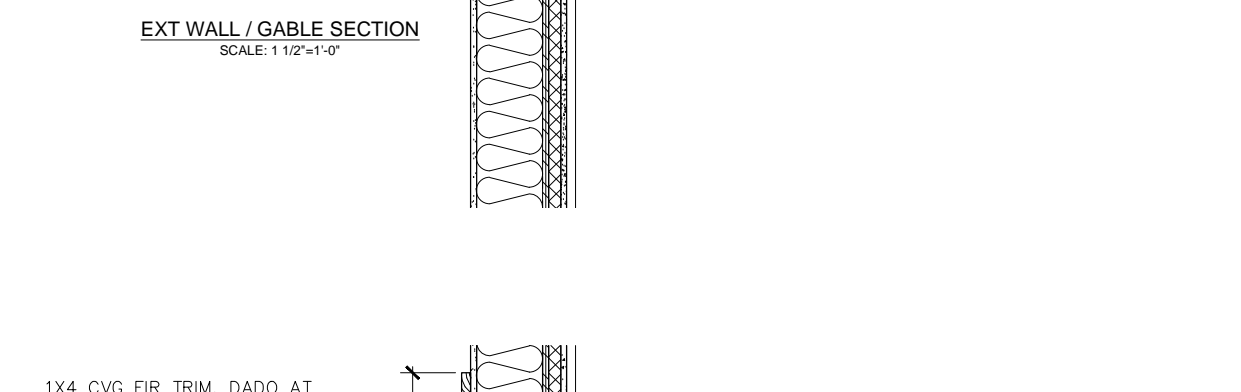
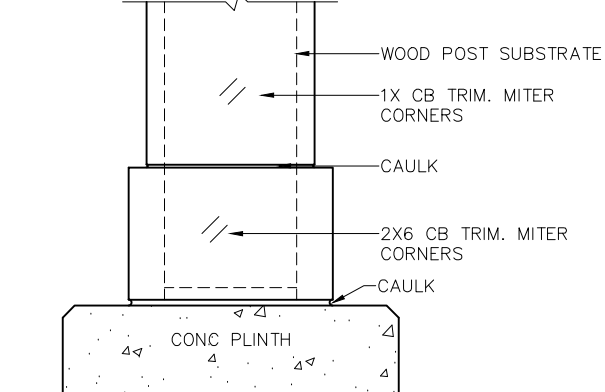
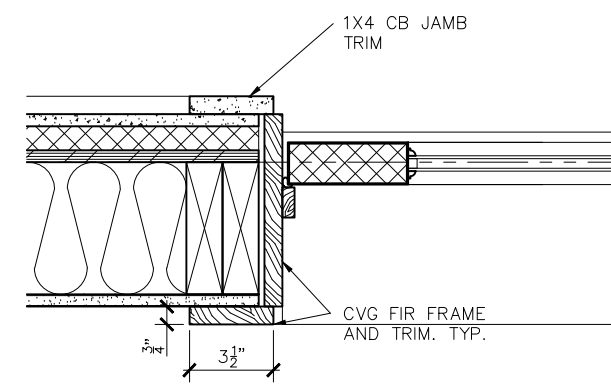
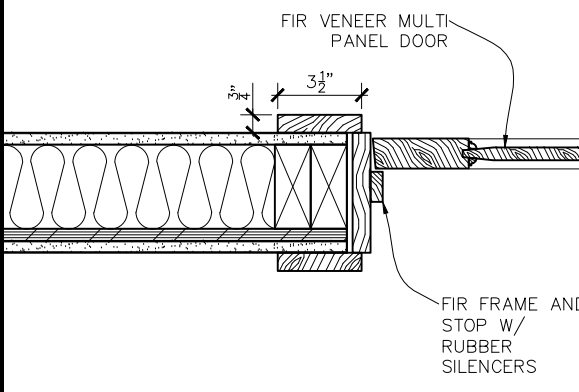
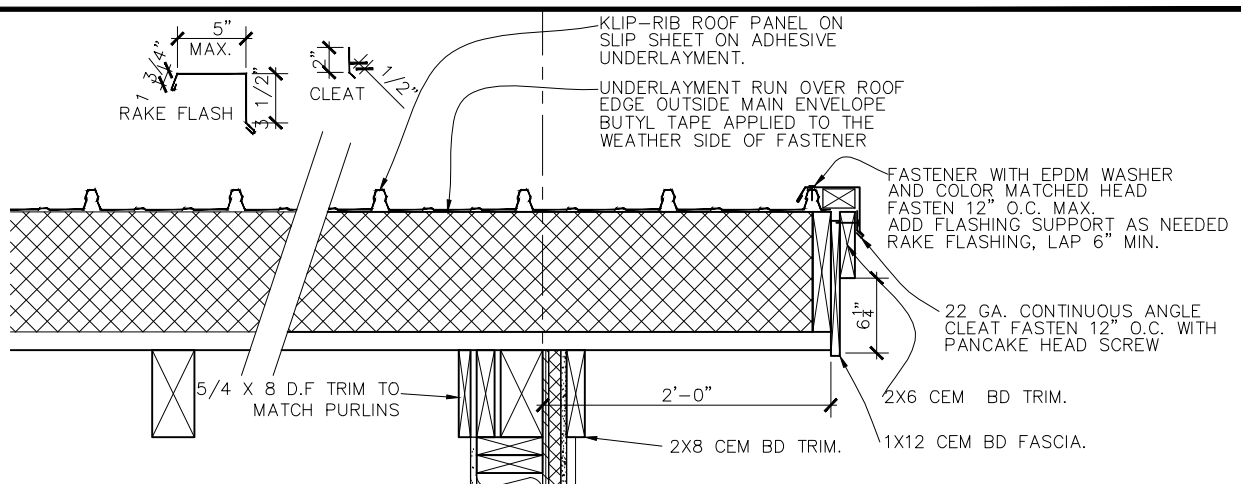
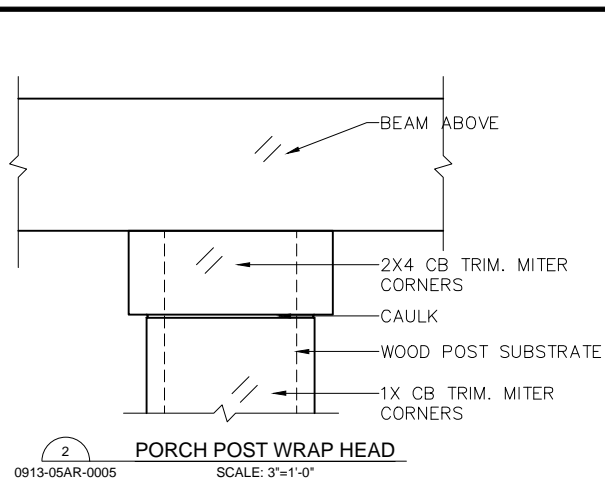
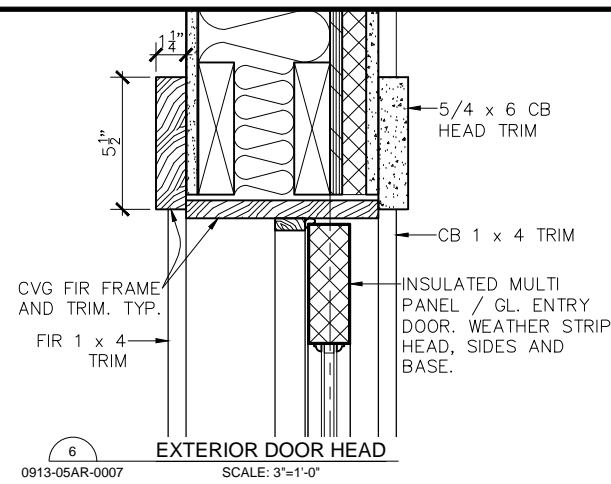
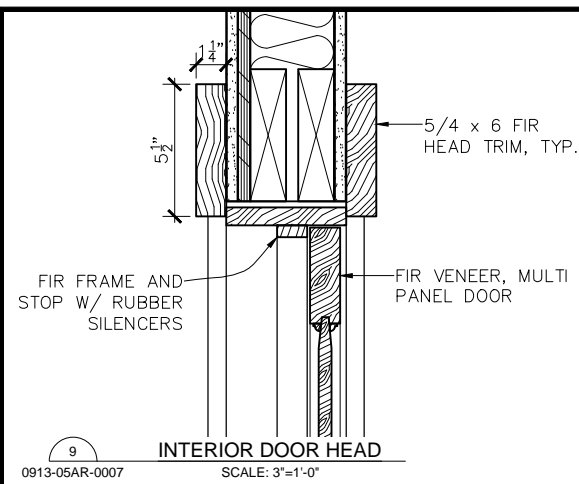
SCALE		VERIFY SCALE	
1/4"=1'-0"	0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
0	11/14/2014	BID SET	
REV	DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN LOOP
INTERIOR ELEVATIONS - TYPE "A"
INTERIOR ELEVATIONS - TYPE "B"
BID NO. 14-31

SHEET A1.6 OF A1.8
REVISION 0
DATE 11/14/2014
DWG. 0913-05AR-0007

3996 REGISTERED ARCHITECT
STEPHEN BAIRD STORY
STATE OF WASHINGTON



NOTES:
- STAINLESS STEEL HOSE CLAMP (NOT BY AEP SPAN) REQUIRED AT TOP OF PIPE FLASHING.
- ROTATE PIPE FLASHING 45° (AS SHOWN) SO THAT IT DIVERTS WATER BETTER.

3896 REGISTERED ARCHITECT
STEPHEN BAIRD STORY
STATE OF WASHINGTON

STORY ARCHITECTS

CONSULTANT		CHELAN PUD NO.1	
PRIN. ARCH. SBS	PRIM. ENG.		
2ND ARCH.	2ND ENG.		
PRIN ARCH. Stephen Story	PROJ. MGR. Court Hill		

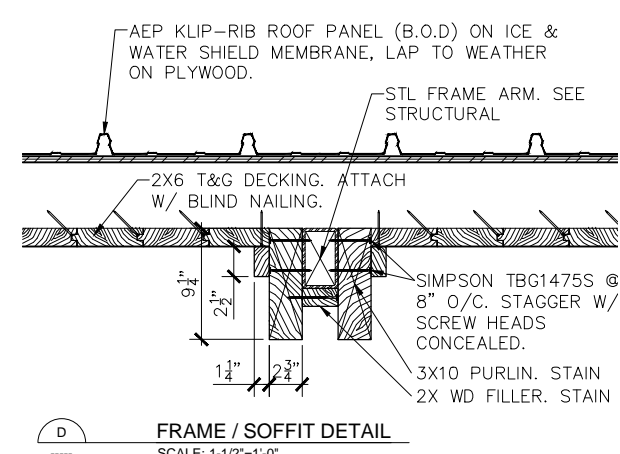
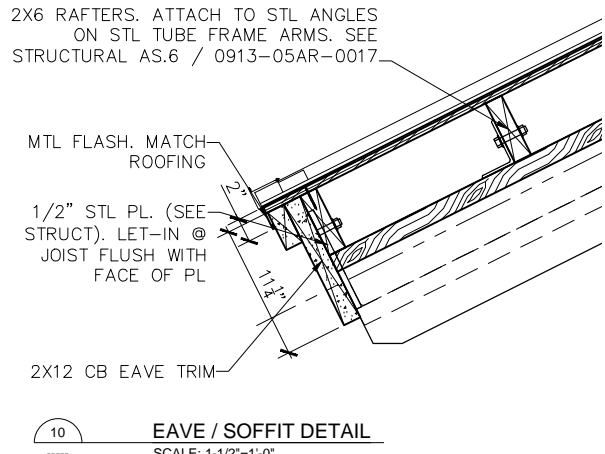
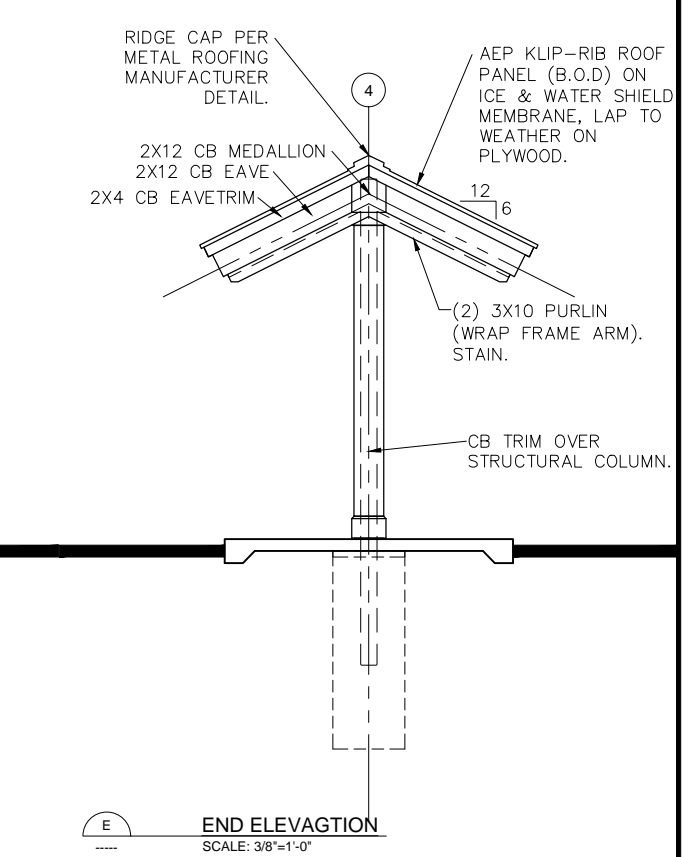
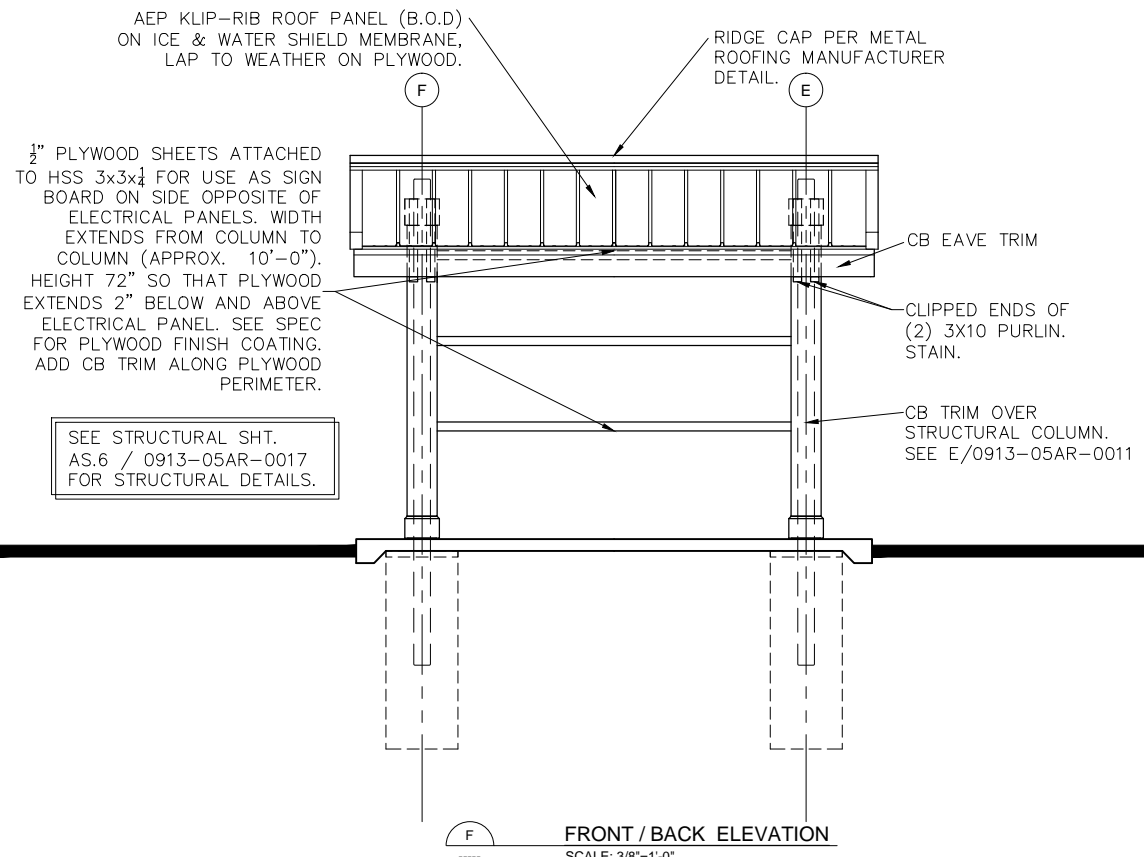
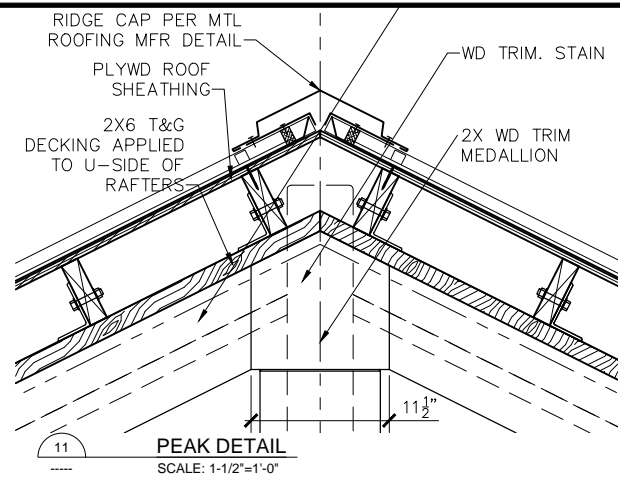
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REVISION	REQ. BY	DRFT
BID SET		

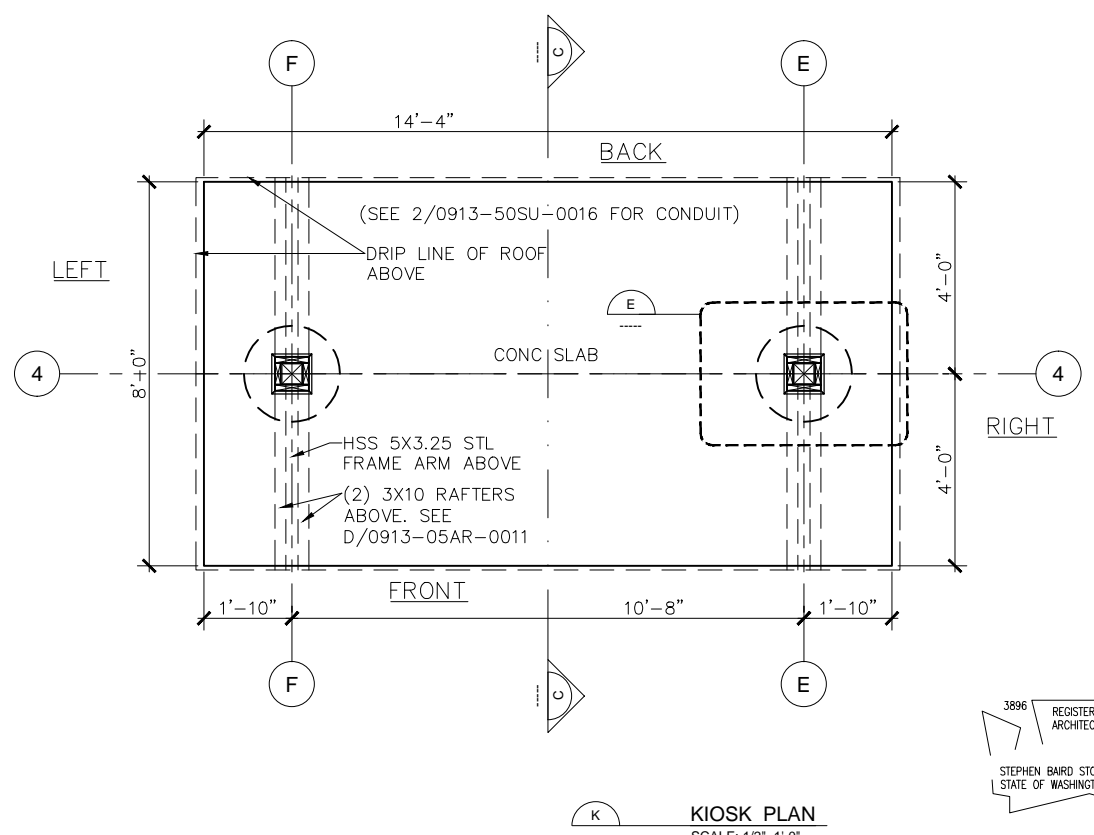
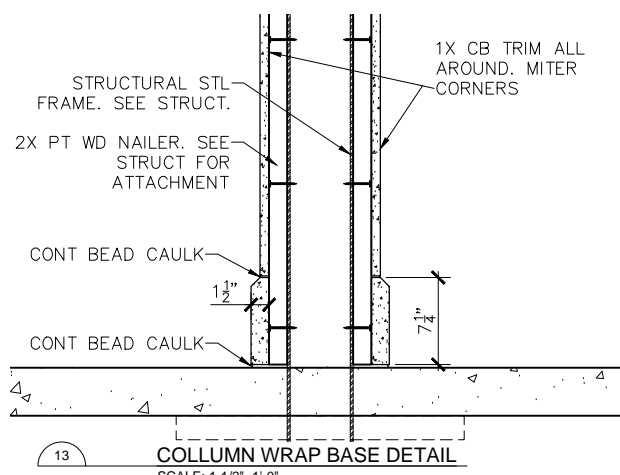
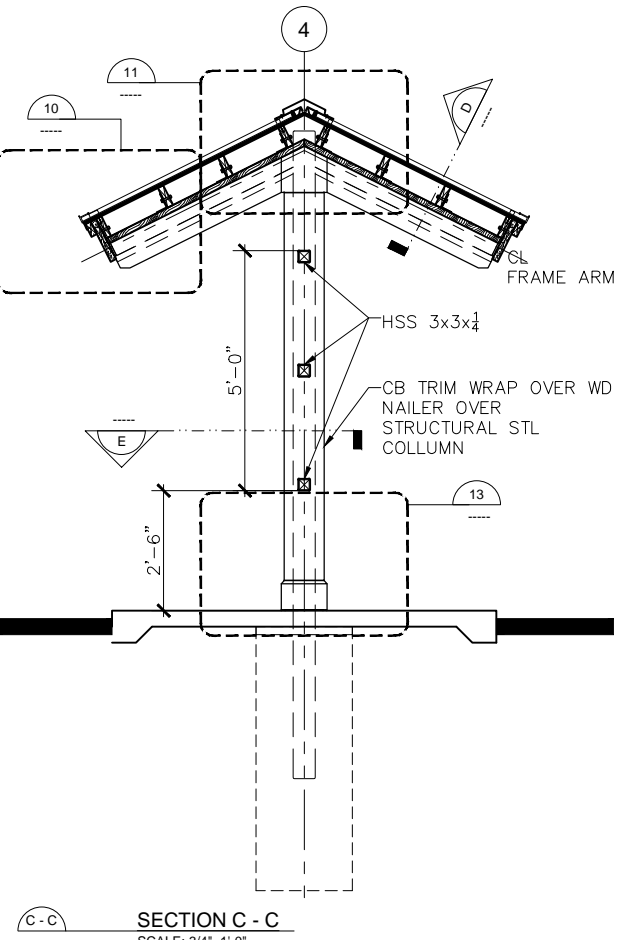
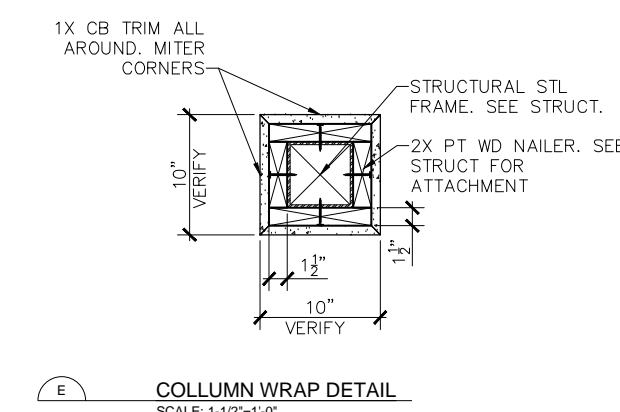
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN LOOP
DETAILS
BID NO. 14-31

SHEET A1.7 OF A1.8
REVISION 0
DATE 11/14/2014
DWG. 0913-05AR-0008



SEE STRUCTURAL SHT.
AS.6 / 0913-05AR-0017
FOR STRUCTURAL DETAILS.



2X6 RAFTERS. ATTACH TO STL ANGLES ON STL TUBE FRAME ARMS. SEE STRUCTURAL AS.6 / 0913-05AR-0017

1/2" PLYWOOD SHEETS ATTACHED TO HSS 3x3x1/4 FOR USE AS SIGN BOARD ON SIDE OPPOSITE OF ELECTRICAL PANELS. WIDTH EXTENDS FROM COLUMN TO COLUMN (APPROX. 10'-0"). HEIGHT 72" SO THAT PLYWOOD EXTENDS 2" BELOW AND ABOVE ELECTRICAL PANEL. SEE SPEC FOR PLYWOOD FINISH COATING. ADD CB TRIM ALONG PLYWOOD PERIMETER.

AEP KLIP-RIB ROOF PANEL (B.O.D) ON ICE & WATER SHIELD MEMBRANE, LAP TO WEATHER ON PLYWOOD.

CLIPPED ENDS OF (2) 3X10 PURLIN. STAIN.

CB TRIM OVER STRUCTURAL COLUMN. SEE E/0913-05AR-0011

STRUCTURAL STL FRAME. SEE STRUCT.

2X PT WD NAILER. SEE STRUCT FOR ATTACHMENT

CONT BEAD CAULK

CONT BEAD CAULK

STORY ARCHITECTS

CONSULTANT		CHELAN PUD NO.1	
PRIN. ARCH. SBS	PRIM. ENG.	REV	DATE
2ND ARCH.	2ND ENG.	0	11/14/2014
PRIN ARCH. Stephen Story	PROJ. MGR. Court Hill		

SCALE	3/8"=1'-0"	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
BID SET		REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN LOOP
KIOSK PLAN, ELEVATIONS, DETAILS
BID NO. 14-31

SHEET A1.8 OF A1.8
REVISION 0
DATE 11/14/2014
DWG. 0913-05AR-0011

STRUCTURAL NOTES:

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 SNOW LOAD : 35 PSF
ROOF DEAD LOAD : 15 PSF
TOTAL : 50 PSF

MEZZANINE LOADS: MEZZANINE FLOOR LIVE LOAD : 40 PSF
MEZZANINE FLOOR DEAD LOAD : 15 PSF
TOTAL : 55 PSF

WIND DESIGN DATA: WIND DESIGN DATA : MWFRS 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 : SS = 0.51
S1 = 0.17

SITE CLASS : D
SPECTRAL RESPONSE COEFFICIENTS : SDS = 0.47
S01 = 0.24

SEISMIC DESIGN CATEGORY : D
BASIC SEISMIC-FORCE -RESISTING SYSTEM : LIGHT FRAMED WALLS WITH WOOD PANELS
DESIGN BASE SHEAR : 2 KIPS
SEISMIC RESPONSE COEFFICIENT(S), CS : 0.07
RESPONSE MODIFICATION FACTOR(S), R : 6.5
ANALYSIS PROCEDURE USED : EQUIVALENT LATERAL FORCE

SPECIAL LOADS: NONE

STRUCTURAL TESTS AND INSPECTIONS:

STRUCTURAL TESTS AND INSPECTIONS SHALL BE PERFORMED AS REQUIRED BY CHAPTER 17, INTERNATIONAL BUILDING CODE, AS REQUIRED BY THE LOCAL BUILDING OFFICIAL AND AS SPECIFICALLY REQUIRED IN THE CONSTRUCTION DOCUMENTS.

FOUNDATIONS:

MAXIMUM ALLOWABLE SOIL BEARING PRESSURE IS 1500 PSF AS RECOMMENDED BY THE GEOTECHNICAL REPORT DATED OCTOBER 17, 2013 PREPARED BY NELSON GEOTECHNICAL ASSOCIATES, INC. REFER TO GEOTECHNICAL REPORT FOR ALL SOIL PREPARATION RECOMMENDATIONS. SEE SOIL PREPARATION NOTES (THIS SHEET) FOR ADDITIONAL INFORMATION.

EXTERIOR FOOTINGS SHALL BEAR 2'-0" MINIMUM (U.N.O.) BELOW NEAREST EXTERIOR FINISH GRADE ON MATERIAL PREPARED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT. MATERIAL SUPPORTING SLABS ON GRADE AND STRUCTURAL FILL MATERIAL SHALL BE AS SPECIFIED, PLACED, AND COMPACTED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT. SEE FOUNDATION SOIL PREPARATION NOTES THIS SHEET. DO NOT BACKFILL RETAINING WALLS FOR 21 DAYS OR UNTIL CONCRETE REACHES DESIGN STRENGTH PER CYLINDER TESTS.

EPOXY GROUTING:

THE CONTRACTOR SHALL EPOXY GROUT BARS (REBAR, DOWELS, AND THREADED RODS) TO THE DEPTH IN EXISTING CONCRETE AS INDICATED IN THE PLANS. HOLE DIAMETER SHALL BE PER MANUFACTURER'S WRITTEN INSTRUCTIONS. EPOXY GROUT SHALL BE SIMPSON "SET-XP", HILTI "HY150 MAX-SD", OR EQUAL. DUST AND DEBRIS FROM THE DRILLING OPERATION SHALL BE CLEANED AND BLOWN FREE FROM THE HOLE PRIOR TO THE PLACEMENT OF THE EPOXY. EPOXY GROUT SHALL BE MIXED AND PLACED AS PER MANUFACTURER'S WRITTEN INSTRUCTIONS. BARS SHALL BE INSERTED INTO THE HOLE WITHIN THE MANUFACTURER'S RECOMMENDED TIME PERIOD. ANY BARS WHICH ARE NOT SECURELY GROUTED SHALL BE REPLACED WITH PROPERLY GROUTED BARS.

STRUCTURAL STEEL:

STRUCTURAL STEEL SHALL BE GRADE ASTM A36, FY = 36,000 PSI. SQUARE AND RECTANGULAR HSS COLUMNS, BEAMS, AND STRUTS SHALL BE GRADE ASTM A500, GRADE B, FY=46,000 PSI. HEADED STUD CONNECTORS SHALL BE ASTM A108 GRADE 1010 THROUGH 1020 COLD DRAWN LOW CARBON STEEL, HEADED, UNFINISHED WITH MINIMUM FY = 50,000 PSI AND TENSILE STRENGTH OF 55,000 PSI. DEFORMED BAR ANCHORS SHALL BE TYPE D2L AS MANUFACTURED BY "NELSON" OR APPROVED EQUAL AND SHALL CONFORM TO ASTM A108. 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 STEEL EXCEPT STEEL EMBEDDED IN CONCRETE SHALL BE GIVEN ONE SHOP COAT OF APPROVED PRIMER PAINT AND ONE SHOP COAT OF APPROVED FINISH PAINT. FINISH COAT IS NOT REQUIRED AT KIOSK FRAMES. CONTRACTOR SHALL TOUCH UP PAINT ALL AREAS EITHER NOT SHOP PAINTED OR DAMAGED BY FIELD WELDING OR OTHERWISE DAMAGED. DURING ERECTION, STRUCTURAL STEEL SHALL BE SECURED FROM COLLAPSING WITH TEMPORARY BRACING. SHOP DRAWINGS SHALL BE SUBMITTED (IF REQUESTED) FOR ALL STRUCTURAL STEEL FOR REVIEW PRIOR TO FABRICATION.

ALL WELDING 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). WELDS SHALL BE 3/16" MINIMUM CONTINUOUS FILLET USING LOW HYDROGEN E70 ELECTRODES UNLESS OTHERWISE NOTED. SLAG SHALL BE REMOVED FROM ALL WELDS. WELDING OF HEADED STUDS AND DEFORMED BAR ANCHORS TO BASE MATERIAL SHALL BE BY USE OF STUD WELDING GUN AS RECOMMENDED BY STUD MANUFACTURER.

STEEL TO STEEL BOLTED CONNECTIONS ARE SHOWN TO BE BEARING-TYPE CONNECTIONS USING A325 BOLTS WITH THREADS INCLUDED IN THE SHEAR PLANE. ALL OTHER 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. ASTM A325 BOLT INSTALLATION SHALL BE INSPECTED WHILE THE WORK IS IN PROGRESS PER INTERNATIONAL BUILDING CODE CHAPTER 17. ASTM A325 BOLTS, NUTS, AND WASHERS AND THEIR INSTALLATION AND FASTENING REQUIREMENTS SHALL CONFORM TO ROSS SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS, LATEST EDITION. PROVIDE HARDENED WASHERS AT OVERSIZE AND SLOTTED HOLES AND WHERE SPECIFIED ON THE CONSTRUCTION DOCUMENTS. PROVIDE A HARDENED, BEVELED WASHER WHERE BOLT HEAD OR NUT BEARS ON A SLOPING SURFACE SUCH AS AT CHANNEL FLANGES. BOLTS, NUTS & WASHERS SHALL BE PAINTED TO MATCH BRACKETS.

ANCHOR BOLTS SHALL BE ASTM F1554 GR. 36 OR A307 (MIN.) HEADED TYPE AND SHALL HAVE A STANDARD BOLT HEAD. ALL EXPANSION ANCHORS AND EPOXY ANCHOR BOLTS SHALL BE OF MINIMUM A307 QUALITY. INSTALLATION AND HOLE SIZE SHALL CONFORM TO MANUFACTURER'S SPECIFICATIONS.

TIMBER FRAMING:

STRUCTURAL TIMBER AND LUMBER SHALL BE SURFACED KILN DRIED STRESS GRADE DOUGLAS FIR - LARCH AS FOLLOWS:

Table with 2 columns: USE, GRADE. Rows include 6x, 4x AND 3x, EXTERIOR AND BEARING STUD WALLS, MEZZANINE FLOOR JOISTS, INTERIOR STUDS @ NON-BEARING WALLS, TOP & BOTTOM PLATES @ BEARING WALLS, ALL OTHER LUMBER.

NO END SPLITS SHALL BE ALLOWED IN STRUCTURAL MEMBERS. SOLID BLOCKING OF NOT LESS THAN 2" NOMINAL THICKNESS SHALL BE PROVIDED AT ENDS AND AT ALL SUPPORTS OF JOISTS AND RAFTERS. ALL NAILS SHALL BE COMMON UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DOCUMENTS AND NAILING SHALL BE AS PER 2304.9.1 OF THE LATEST EDITION OF THE "INTERNATIONAL BUILDING CODE." ALL BOLT HEADS AND NUTS BEARING ON WOOD SHALL BE PROVIDED WITH A WASHER.

WOOD PERMANENTLY EXPOSED TO WEATHER AND WOOD BEARING ON OR INSTALLED WITHIN 1" OF CONCRETE OR MASONRY SHALL BE TREATED WITH AN APPROVED PRESERVATIVE AND SHALL BE SEPARATED FROM THE CONCRETE BY 30# (MINIMUM) BUILDING PAPER. IF PRESSURE TREATED LUMBER MUST BE USED, THEN CONTRACTOR SHALL ENSURE THAT ALL STEEL IN CONTACT WITH PRESSURE TREATED WOOD IS CORROSION PROTECTED. PRESSURE TREATED LUMBER SHALL MATCH THE SPECIES AND GRADE IN THE TABLE ABOVE. HEMFIR BOTTOM PLATES WILL BE REJECTED. FASTENERS FOR PRESERVATIVE-TREATED AND FIRE-RETARDANT-TREATED WOOD SHALL BE OF HOT-DIPPED ZINC-COATED GALVANIZED STEEL, STAINLESS STEEL, SILICON BRONZE OR COPPER. FASTENINGS FOR WOOD FOUNDATIONS SHALL BE AS REQUIRED IN AF&PA TECHNICAL REPORT NO. 7.

TYPICAL SILL BOLTS AT NON SHEAR WALLS SHALL BE 5/8" DIAMETER AT 6'-0" O.C.; EMBED 7". PLATE WASHERS A MINIMUM OF 3" BY 3" BY 0.229 THICK SHALL BE USED ON EACH SILL BOLT AT SHEAR WALLS. EXTERIOR WALLS SHALL BE SW6 UNLESS NOTED OTHERWISE. ALL LAG SCREWS SHALL BE PLACED IN PRE-DRILLED HOLES. HOLE FOR UNTHREADED SHANK SHALL BE SAME DIAMETER AS SHANK WITH DEPTH EQUAL TO SHANK PENETRATION. LEAD HOLE FOR THREADED PORTION SHALL BE ONE HALF THE DIAMETER OF THE SHANK DIAMETER. USE WOOD ADHESIVE AS LUBRICANT.

CUTTING AND NOTCHING OF STRUCTURAL MEMBERS IS NOT ALLOWED. A MAXIMUM 1" DIAMETER HOLE MAY BE DRILLED IN THE CENTER THIRD OF THE MEMBER DEPTH WITHIN THE CENTER THIRD OF THE MEMBER SPAN. ALL OTHER HOLES SHALL BE APPROVED BY THE ENGINEER. MAKE ALL BEARINGS FULL, UNLESS OTHERWISE INDICATED ON THE CONSTRUCTION DOCUMENTS. 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. POST BUNDLES, ENDS AND BASES SHALL BE INSTALLED FLUSH AGAINST WOOD PLATES. ALL FRAMING SHALL BE DONE BY QUALIFIED INDIVIDUALS IN ACCORDANCE WITH GOOD CONSTRUCTION STANDARDS AND PRACTICE.

WOOD FRAMING HARDWARE:

ALL WOOD FRAMING HARDWARE AND ACCESSORIES SHALL BE SIMPSON OR EQUAL UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DOCUMENTS. HARDWARE AND ACCESSORIES SHALL BE INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS. 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.

PLYWOOD:

PLYWOOD WALL SHEATHING SHALL BE APA C-D EXPOSURE 1 PER IBC SECTION 2304 UNLESS NOTED OTHERWISE. WOOD STRUCTURAL PANELS OTHER THAN PLYWOOD AND CONFORMING TO IBC SECTION 2304 MAY BE SUBSTITUTED WHERE PLYWOOD IS SPECIFIED. WOOD STRUCTURAL PANELS SHALL CONFORM TO UNITED STATES VOLUNTARY PRODUCT STANDARD PS2-92. PLYWOOD FLOOR SHEATHING SHALL BE 7/8" & 6 APA STURD-I-FLOOR EXPOSURE 1 PER IBC STANDARD NO. 23-2.

MAXIMUM NAIL SPACING SHALL BE 6" O.C. AT ALL SUPPORTED PANEL EDGES AND 12" O.C. AT INTERMEDIATE SUPPORTS. NAILS SHALL BE AS FOLLOWS: 8d COMMON FOR 1/2" PLYWOOD; 10d COMMON FOR 5/8" AND 3/4" PLYWOOD. STAGGER END LAPS AT ROOF AND FLOOR SHEATHING. ALL PANEL EDGES SHALL BE BLOCKED AT PLYWOOD SHEATHED WALLS AND AS INDICATED ON PLANS FOR ROOF AND FLOOR SHEATHING. SUPPORT SHALL BE SUPPLIED TO ALL PLYWOOD EDGES WITH PLYCLIPS, BLOCKING, TONGUE AND GROOVE PLYWOOD JOINTS OR OTHER APPROVED METHODS PER APA RECOMMENDATION. PLYCLIPS ARE NOT ALLOWED FOR FLOOR SHEATHING.

MISCELLANEOUS:

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.

CONTRACTORS SHALL BE RESPONSIBLE FOR ALL THE REQUIRED SAFETY PRECAUTIONS AND PROGRAMS AND THE MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES REQUIRED TO PERFORM THE WORK.

THE CONSTRUCTION DOCUMENTS MAY NOT SHOW SOME OBSTRUCTIONS. CONTRACTOR SHALL CAREFULLY INSPECT THE EXISTING FACILITIES BEFORE PREPARING THEIR PROPOSAL AND BEFORE PROCEEDING WITH THE WORK. EVEN THOUGH NOT SHOWN OR SPECIFICALLY MENTIONED THE REMOVAL AND REPLACEMENT OF MINOR OBSTRUCTIONS SHOULD BE ANTICIPATED AND ACCOMPLISHED.

CONSTRUCTION DOCUMENTS 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 CONSTRUCTION DOCUMENTS, WHICH MAY AFFECT INTENT OF DESIGN, SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION PROMPTLY AND RESOLUTION OBTAINED BEFORE PROCEEDING.

CONSTRUCTION DOCUMENTS INDICATE GENERAL AND TYPICAL DETAILS OF CONSTRUCTION AND ARE NOT INTENDED TO SHOW EVERY DETAIL OR CONDITION OF CONSTRUCTION. WHERE CONDITIONS ARE NOT SPECIFICALLY AS INDICATED BUT ARE OF SIMILAR CHARACTER TO THE DETAILS SHOWN, SIMILAR DETAILS OF CONSTRUCTION SHALL BE USED, SUBJECT TO REVIEW AND APPROVAL.

REBAR CAGES SHOWN ARE OUTSIDE CLEAR DIMENSIONS. ANCHOR BOLTS SHOWN SHALL BE CONFINED WITHIN CAGE.

REINFORCING SHALL BE WITHIN 1/2" TOLERANCE OF CLEAR DISTANCE SHOWN ON CONSTRUCTION DOCUMENTS. WET-SETTING OF REINFORCING STEEL IS NOT ACCEPTABLE.

SHOP DRAWINGS OR OTHER SUBMITTALS REVIEWED BY THE ENGINEER DO NOT BECOME CONTRACT DOCUMENTS AND DO NOT CONSTITUTE CHANGE ORDERS.

SHEAR WALL SCHEDULE

Table with 5 columns: TYPE, WALL SHEATHING, FASTENERS @ WALL SHEATHING, A. BOLT SPACING, BLOCKING REQD.?. Rows include SWP44 and SWP6.

NOTES:

- 1. SEE 3/- FOR ADDITIONAL INFORMATION.
2. PROVIDE DOUBLE STUD (MINIMUM) AT HOLDOWN LOCATIONS AND INSTALL PER MANUFACTURER RECOMMENDATIONS. EMBED ANCHOR BOLTS WITHIN 3" CLEAR OF BOTTOM OF THICKENED SLABS AND 12" (MINIMUM) AT FOUNDATION WALLS.
3. EXPANSION BOLTS OF SAME SIZE AND SPACING AS SPECIFIED ANCHOR BOLTS MAY BE INSTALLED IN LIEU OF ANCHOR BOLTS AT CONTRACTOR'S OPTION EXCEPT AT HOLDOWN LOCATIONS. EMBEDMENT SHALL BE THE SAME AS SPECIFIED FOR A. BOLTS.
4. BOLTS SHALL BE EMBEDDED AT LEAST 7 INCHES INTO THE CONCRETE AND SHALL BE SPACED NOT MORE THAN 6 FEET APART. THERE SHALL BE A MINIMUM OF TWO BOLTS PER PIECE WITH ONE BOLT LOCATED NOT MORE THAN 12 INCHES OR LESS THAN SEVEN BOLT DIAMETERS FROM EACH END OF THE PIECE. A PROPERLY SIZED NUT AND WASHER SHALL BE TIGHTENED ON EACH BOLT TO THE PLATE.
5. PLATE WASHERS A MINIMUM OF 3 INCH BY 3 INCH BY 0.229 INCH THICK SHALL BE USED ON EACH BOLT @ SHEAR WALLS.
6. FRAMING AT ADJOINING PANEL EDGES SHALL BE 3-INCH NOMINAL OR WIDER OR SHALL BE (2)2x FRAMING AND NAILS SHALL BE STAGGERED WHERE NAIL SPACING IS LESS THAN 6" O.C.
7. WHERE PANELS ARE APPLIED ON BOTH FACES OF A WALL AND NAIL SPACING IS LESS THAN 6 INCHES ON CENTER, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS. ALTERNATIVELY, THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS SHALL BE 3" NOMINAL OR GREATER OR SHALL BE (2)2x FRAMING FASTENED TOGETHER AS SCHEDULED AT ADJOINING PANEL EDGES AND NAILS AT ALL PANEL EDGES SHALL BE STAGGERED.

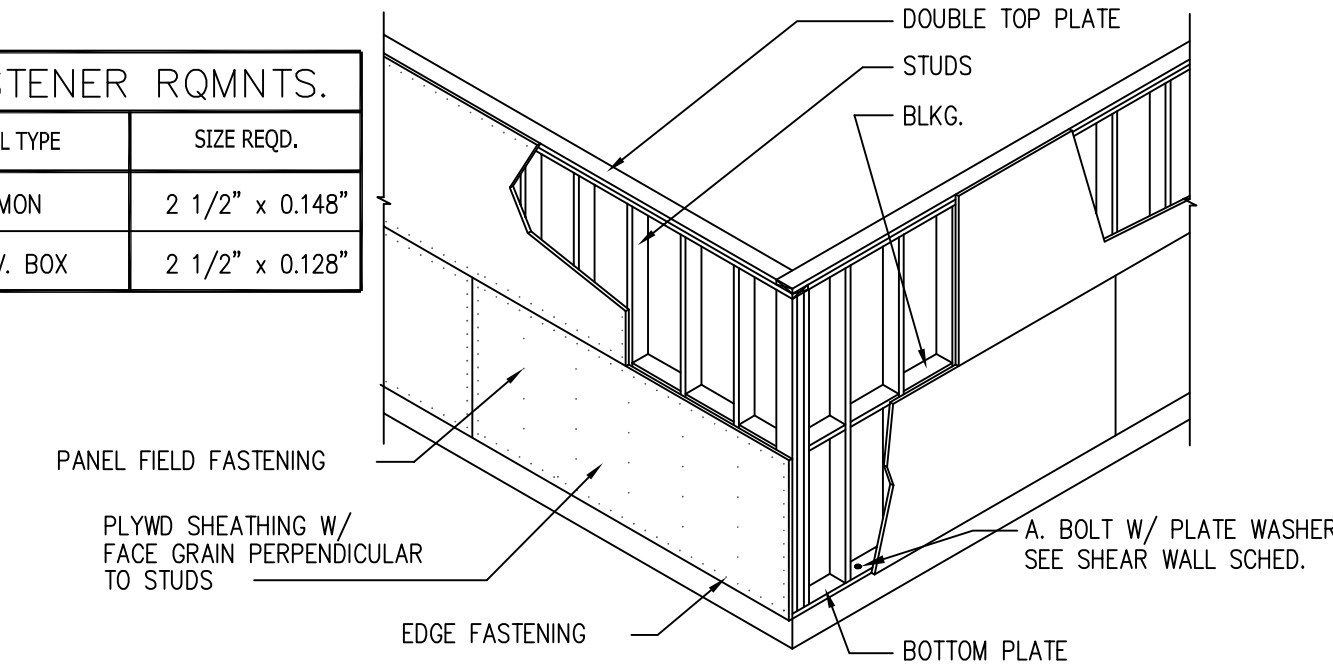
2 SECTION
0913-05AR-0013 N.T.S.

NOTES:

- 1. ALL PANEL EDGES SHALL BE BACKED W/ 2" NOMINAL OR WIDER BLOCKING @ PLYWOOD SHEATHED WALLS.
2. PLYWOOD WALL SHEATHING SHALL BE 1/2" APA C-D EXPOSURE 1 W/ PANEL SPAN RATING OF 24/0.
3. NAILS SHALL BE DRIVEN FLUSH BUT SHALL NOT FRACTURE SURFACE OF PLYWOOD SHEATHING.
4. NAILS FOR PLYWOOD WALL SHEATHING SHALL BE COMMON OR GALVANIZED BOX. SPECIFIED NAILING APPLIES TO NAILS AT ALL TOP & BOTTOM PLATES & BLOCKING. PANEL FIELD NAILS SHALL BE SPACED @ 12" O.C. (MAX.). NAILS SHALL BE STAGGERED AT ALL PLYWOOD PANEL JOINTS.
5. ALL FRAMING MEMBERS AT ADJOINING PANEL EDGES SHALL BE 3" NOMINAL OR WIDER AND NAILS SHALL BE STAGGERED AT SHEAR WALL TYPE SWP44.

FASTENER RQMNTS.

Table with 2 columns: NAIL TYPE, SIZE REQD. Rows include 8d COMMON and 8d GALV. BOX.

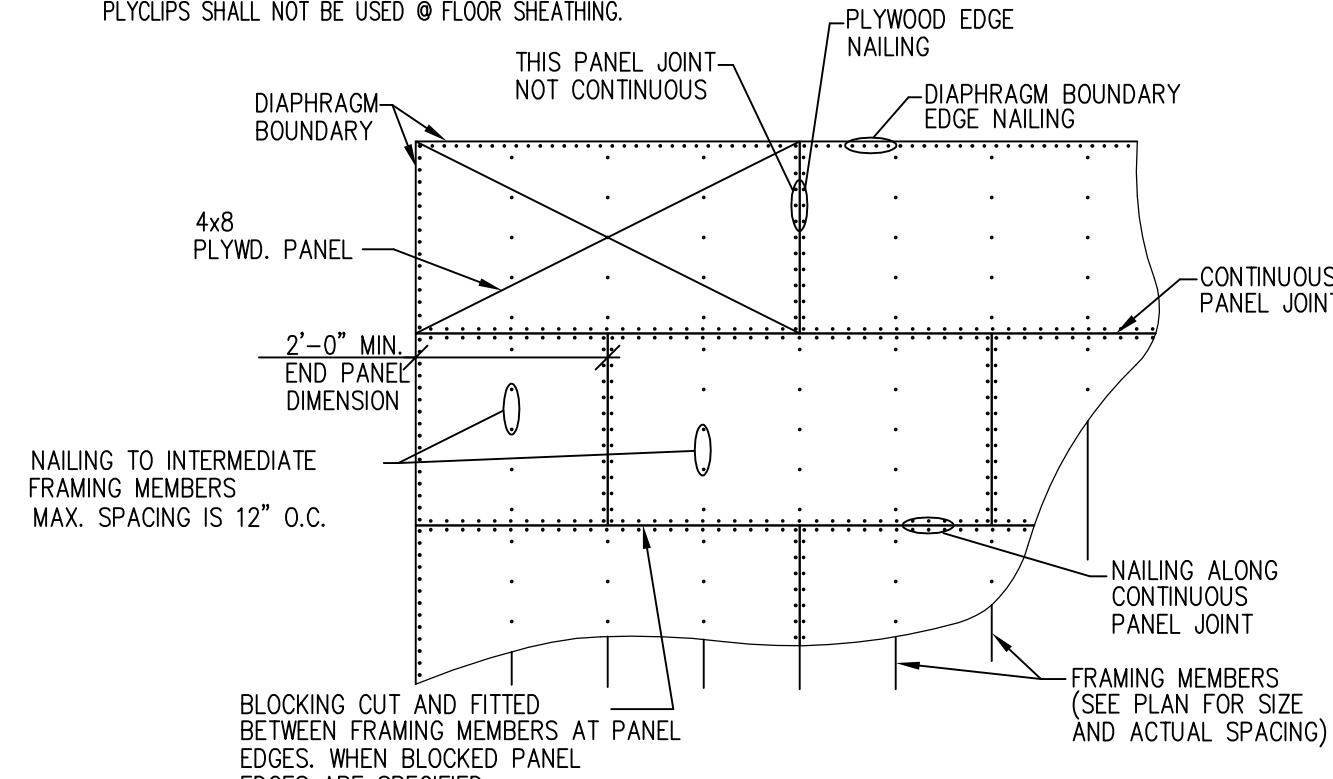


WALL PANEL LAYOUT & NAILING DETAIL

3 SECTION
0913-05AR-0013 N.T.S.

NOTES:

- 1. PLYWOOD ROOF SHEATHING SHALL BE 5/8" APA C-D EXPOSURE 1 WITH PANEL SPAN RATING 32/16.
2. PLYWD. FLOOR SHEATHING TO BE 3/4" PLYWD APA RATED
STURD-I-FLOOR EXPOSURE 1 W/ PANEL SPAN RATING OF 24. USE T&G PLYWOOD OR BLOCK PANEL EDGES. GLUE TO ALL SUPPORTS.
3. NAILS FOR SHEATHING ATTACHMENT SHALL BE 10d COMMON
MINIMUM SHEATHING NAILING SHALL BE:
6" O.C. AT DIAPHRAGM BOUNDARIES
6" O.C. AT ALL SUPPORTED PANEL EDGES
12" O.C. AT INTERMEDIATE SUPPORTS
4. NAILS SHALL BE DRIVEN FLUSH BUT SHALL NOT FRACTURE THE SURFACE OF PLYWOOD SHEATHING.
5. SUPPORT SHALL BE SUPPLIED TO ALL PLYWD EDGES W/ BLKG, T & G PLYWD JOINTS OR OTHER APPROVED METHOD PER APA RECOMMENDATION. PROVIDE BLKG. WHERE INDICATED ON PLANS & DETAILS. PLYCLIPS SHALL NOT BE USED @ FLOOR SHEATHING.



PLYWOOD LAYOUT & NAILING PLAN

4 SECTION
0913-05AR-0013 N.T.S.

Technical diagrams for reinforcement details including 90° HOOK, 180° HOOK, 135° HOOK, 45° BEND, and OFFSET SECTION. Includes tables for MINIMUM DIAMETER OF BEND PRIMARY REINFORCEMENT and TIES AND STIRRUPS.

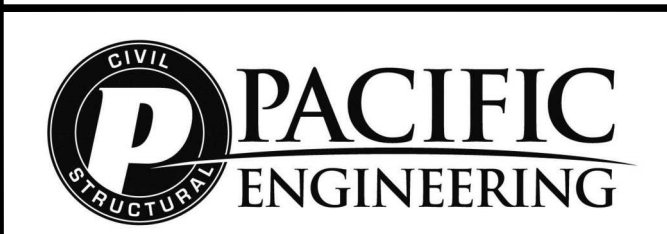


Table with 2 columns: CONSULTANT, PROJECT INFO. Rows include PRIM. ENG. MIKE ROLFS, 2ND ENG. C. HILL, DESIGNER, APPROVAL, PROJ. MGR. C. HILL.

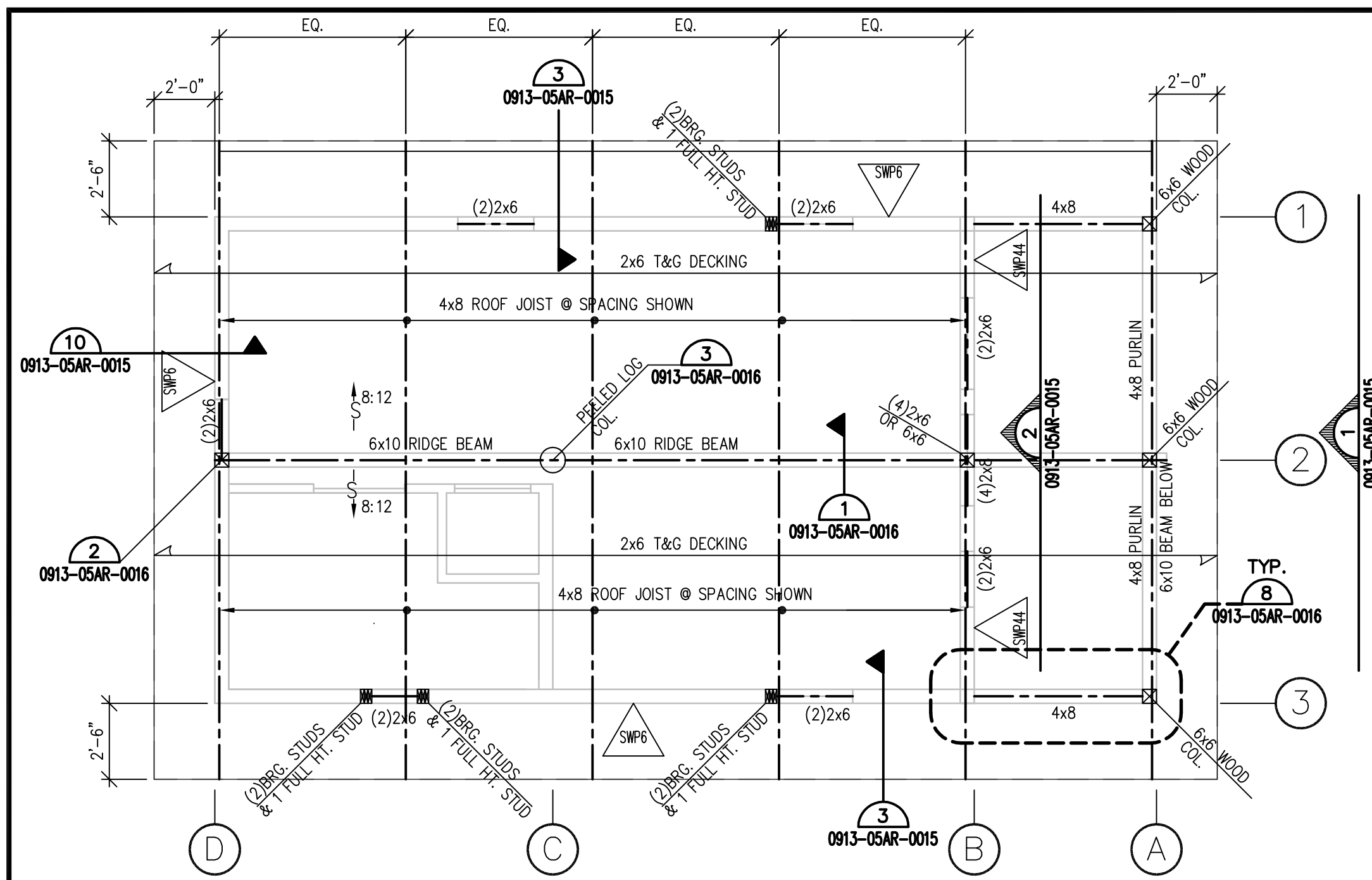
Table with 4 columns: SCALE, BAR SIZE, REVISION, DATE. Includes VERIFY SCALE and a graphical scale bar.

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY, WENATCHEE, WASHINGTON. Includes logo for P.U.D. CHELAN COUNTY.

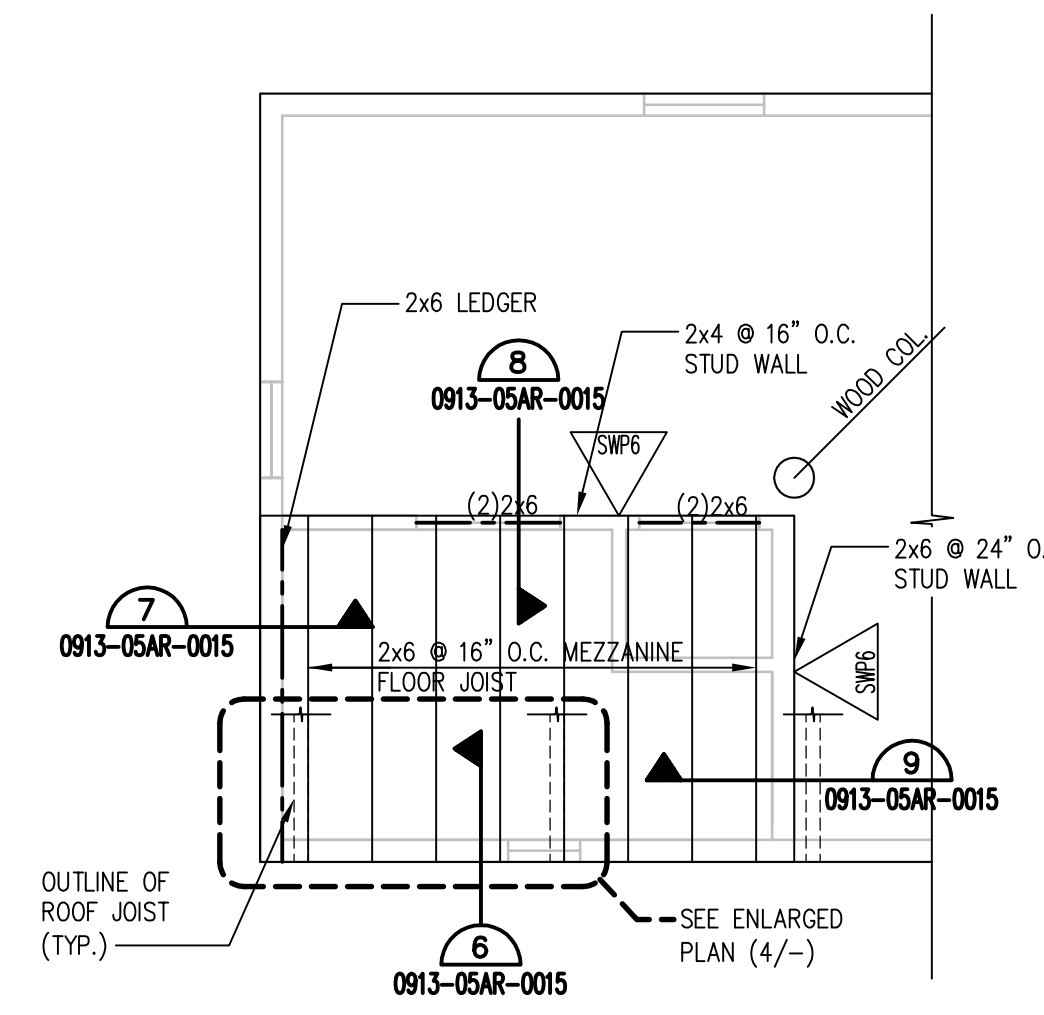
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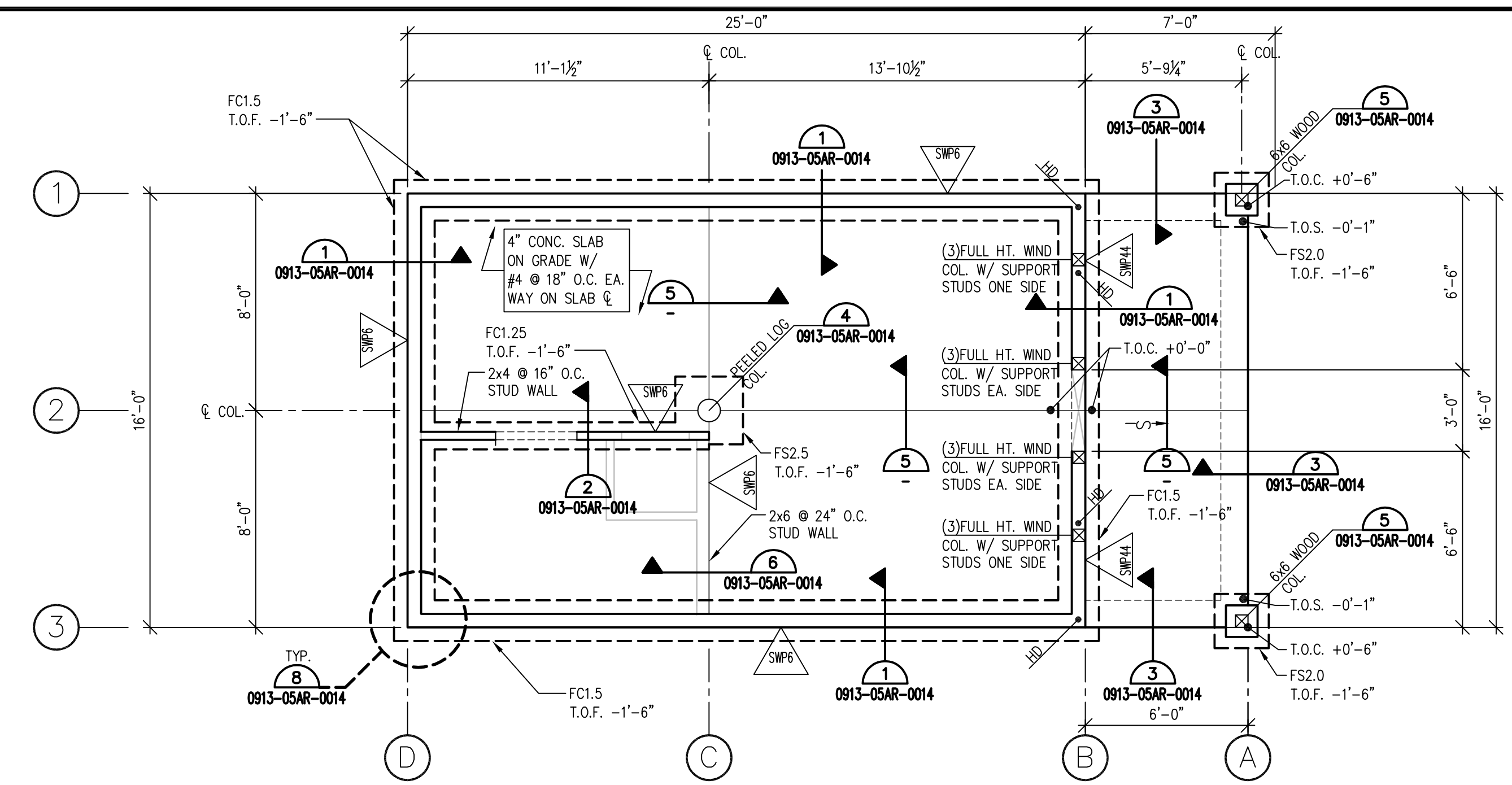
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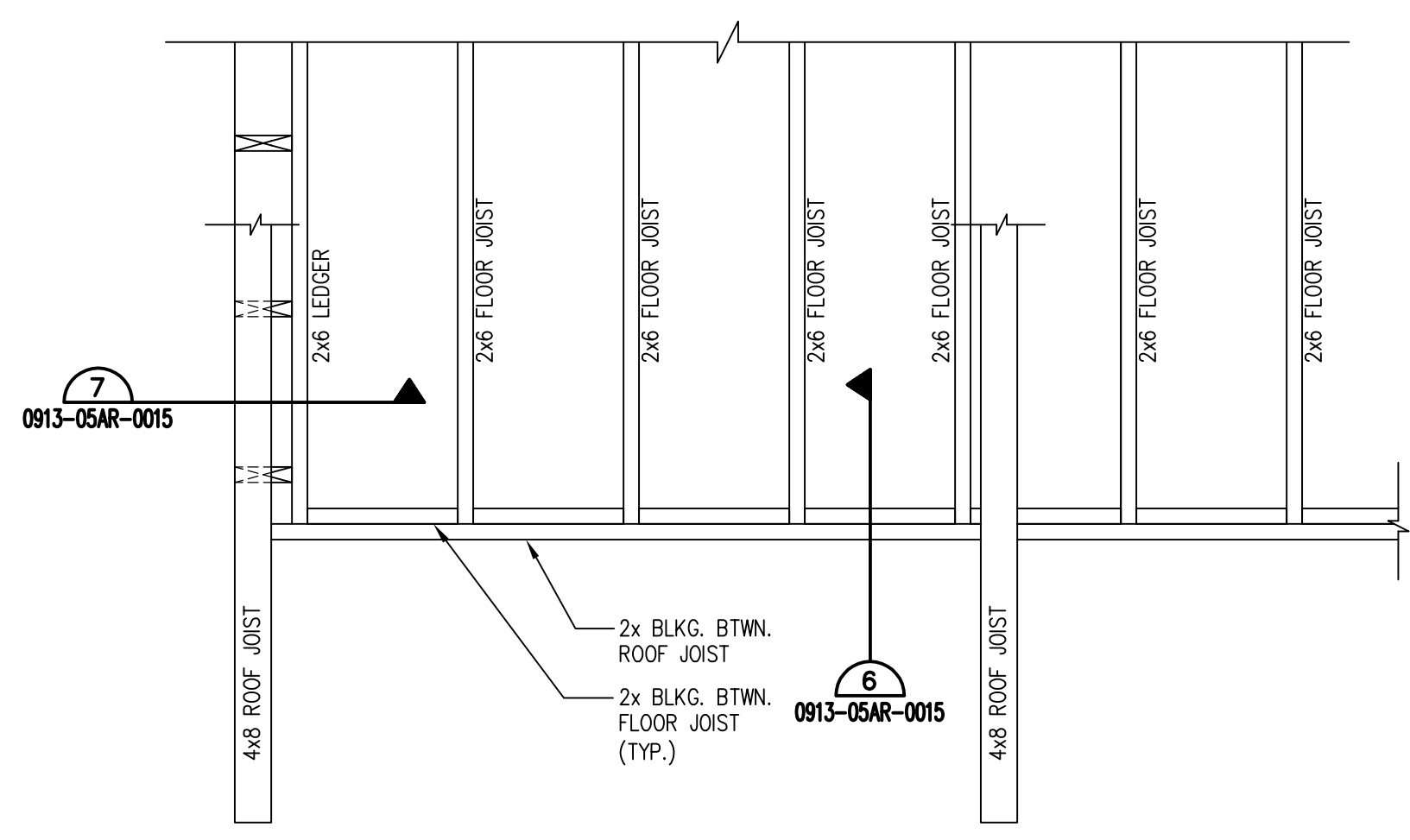
1 ROOF FRAMING PLAN
1/4" = 1'-0"



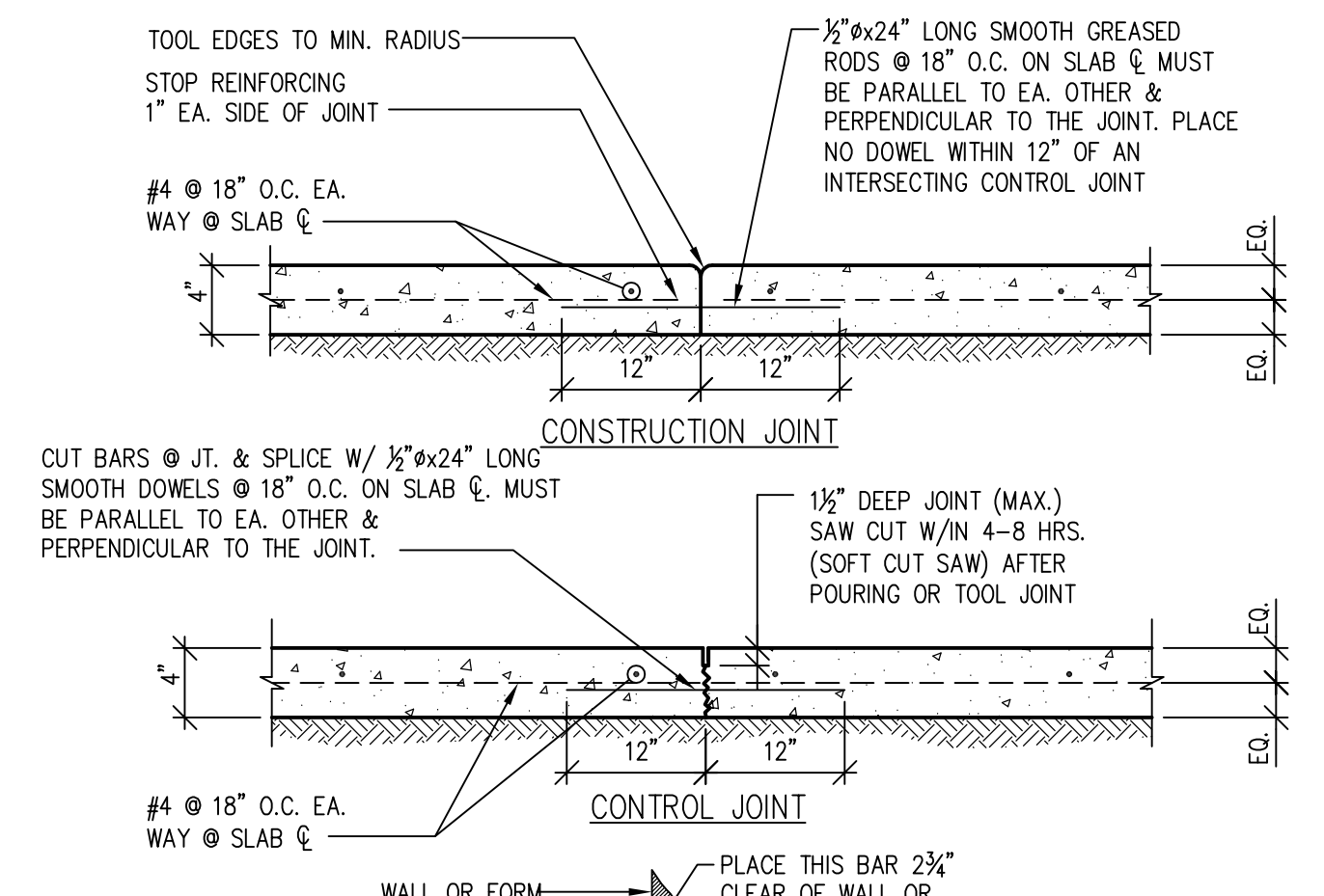
2 MEZZANINE FRAMING PLAN
1/4" = 1'-0"



3 FOUNDATION PLAN
1/4" = 1'-0"



4 ENLARGED PARTIAL MEZZANINE FRAMING PLAN
3/4" = 1'-0"



- NOTES:
- SEE ARCH. FOR FOUNDATION INSULATION & SLAB BASE PREPARATION REQUIREMENTS.
 - CONTRACTOR SHALL DETERMINE DIRECTION OF CONSTRUCTION AND CONTROL JOINTS INDICATED ON THE FOUNDATION PLANS TO FACILITATE THE CONSTRUCTION PROCESS.
 - DOWELS MUST BE PARALLEL TO EA. OTHER & PERPENDICULAR TO THE JOINT.
 - PLACE NO DOWEL WITHIN 12" OF AN INTERSECTING JOINT.
 - PROVIDE 2x4" CLEAR BTWN. REINFORCING BARS AND FORMS.

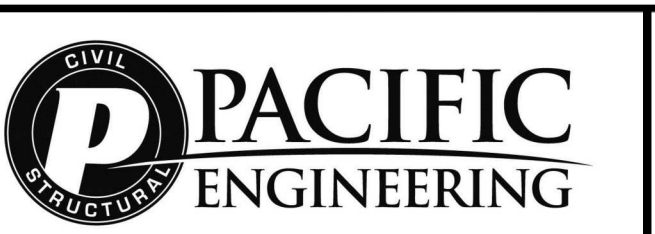
PLAN NOTES:

- REFER TO ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS, WALLS, AND OTHER INFORMATION NOT SHOWN OR NOTED.
- CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS BEFORE PROCEEDING WITH THE WORK. ALL CONSTRUCTION DOCUMENTS SHOWING EXISTING CONSTRUCTION ARE INTENDED AS GUIDELINES ONLY. ALL DIMENSIONS MUST BE VERIFIED AND/OR DETERMINED IN THE FIELD.
- 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.
- SILL BOLTS SHALL BE SPACED NO FARTHER APART THAN SPECIFIED. THERE SHALL BE A MINIMUM OF TWO BOLTS PER BOTTOM PLATE WITH ONE BOLT LOCATED NOT MORE THAN 12" OR LESS THAN 7 BOLT DIAMETERS FROM EACH END OF EACH BOTTOM PLATE. A PROPERLY SIZED NUT AND WASHER SHALL BE TIGHTENED ON EACH BOLT TO THE PLATE. FASTENERS FOR PRESERVATIVE-TREATED AND FIRE-RETARDANT-TREATED WOOD SHALL BE OF HOT-DIPPED ZINC-COATED GALVANIZED STEEL, STAINLESS STEEL, SILICON BRONZE OR COPPER. FASTENINGS FOR WOOD FOUNDATIONS SHALL BE AS REQUIRED IN AF&PA TECHNICAL REPORT NO. 7.
- 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 10/0913-05AR-0014 WHERE PIPING OCCURS PERPENDICULAR TO FOUNDATION WALL.
- THICKEN INTERIOR FOOTING TO EXTERIOR WALL TOP OF FOOTING DEPTH AT ALL INTERIOR AND EXTERIOR WALLS.
- 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 PLANS.
- PLYWOOD FLOOR SHEATHING TO BE 3/4" APA RATED STURD-I-FLOOR EXPOSURE 1 WITH PANEL SPAN RATING 24. USE TONGUE AND GROOVE PLYWOOD OR BLOCK PANEL EDGES. GLUE TO ALL SUPPORTS.
- GLU-NAIL FLOOR PLYWOOD TO FRAMING MEMBER WITH THE FOLLOWING:
10d @ 6" O.C. AT DIAPHRAGM BOUNDARIES.
10d @ 6" O.C. AT SUPPORTED PANEL EDGES.
10d @ 12" O.C. AT INTERMEDIATE SUPPORTS.
SEE PLYWOOD LAYOUT AND NAILING PLAN (4/0913-05AR-0012) FOR NAILING AND TYPICAL PLYWOOD PANEL LAYOUT.
STAGGER SPLICES ON CONTINUOUS TOP PLATE AND NAIL WITH 12d AT 6" O.C. STAGGERED. MINIMUM OF SIXTEEN (16) NAILS BETWEEN ADJACENT SPLICES.
- EXTERIOR WALLS ARE 2X6 AT 24" O.C.
- MINIMUM BEAM AND HEADER SIZE SHALL BE (2) 2X6 AT 2X6 STUD WALLS AND (2) 2X4 AT 2X4 STUD WALLS.
- ALL HEADERS TO HAVE SINGLE STUD SUPPORTS (MINIMUM) EXCEPT WHERE OTHERWISE NOTED. SUPPORT STUDS SHALL MATCH STUD WALL STUD TYPE AND SIZE. SEE 5/0913-05AR-0016 FOR ADDITIONAL INFO.
- BLOCK ALL JOINTS ON WALLS SHEATHED WITH PLYWOOD. SEE WALL PANEL LAYOUT AND NAILING DETAIL (3/0913-05AR-0012) FOR ADDITIONAL INFORMATION.
- SEE STRUCTURAL NOTES (SHEET S1.0) FOR ADDITIONAL INFORMATION.

LEGEND:

- FS# - DENOTES SPREAD FOOTING. SEE FOOTING SCHEDULE (THIS SHEET) FOR ADDITIONAL INFORMATION.
- FC# - DENOTES CONTINUOUS FOOTING. SEE FOOTING SCHEDULE (THIS SHEET) FOR ADDITIONAL INFORMATION.
- S-S - DENOTES FOOTING STEP. SEE 11/0913-05AR-0014 FOR ADDITIONAL INFORMATION.
- A.O.F. - DENOTES TOP OF FOOTING ELEVATION.
- A.O.S. - DENOTES TOP OF SLAB ELEVATION.
- F.F. - DENOTES TOP OF FINISHED FLOOR ELEVATION.
- SW# - DENOTES SHEAR WALL. SEE SHEAR WALL SCHEDULE (2/0913-05AR-0012) FOR ADDITIONAL INFORMATION.
- HD - DENOTES SIMPSON HDU4 HOLDOWN LOCATION. PROVIDE DOUBLE STUD (MINIMUM) AT HOLD DOWN LOCATIONS AND INSTALL PER MANUFACTURER RECOMMENDATIONS. EMBED ANCHOR BOLTS WITHIN 3" CLEAR OF BOTTOM OF THICKENED SLABS AND 12" (MINIMUM) AT FOUNDATION WALLS.
- CTJ - DENOTES CONTROL JOINT. SEE SECTION 5/- FOR ADDITIONAL INFORMATION.
- CNJ - DENOTES CONSTRUCTION JOINT. SEE SECTION 5/- FOR ADDITIONAL INFORMATION.
- EQ - DENOTES COLUMN LOCATIONS, WHERE COLUMN OCCURS IN STUD WALL, CENTER COLUMN ON CENTERLINE OF STUD WALL TYPICAL UNLESS NOTED OTHERWISE.

ID	WIDTH	LENGTH	DEPTH	REINF. CROSSWISE				REINF. LENGTHWISE				REMARKS
				NO	SIZE	LENGTH	SPACING	NO	SIZE	LENGTH	SPACING	
FC1.25	1'-3"	CONT.	12"	--	#4	0'-9"	48" O.C.	2	#4	--	EQ.	CONT. FTG.
FC1.5	1'-6"	CONT.	12"	--	#4	1'-2"	48" O.C.	2	#4	--	EQ.	CONT. FTG.
FS2.0	2'-0"	2'-0"	12"	3	#4	1'-8"	EQ.	3	#4	1'-8"	EQ.	SPREAD FTG.
FS2.5	2'-6"	2'-6"	12"	3	#4	2'-2"	EQ.	3	#4	2'-2"	EQ.	SPREAD FTG.



PRIM. ENG. MIKE ROLFS	CHELAN PUD NO.1	SCALE VARIES	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
2ND ENG. PRIM. ENG. C. HILL	DESIGNER 2ND ENG. C. HILL	0	11/14/2014	BID SET	- ABE
APPROVAL PROJ. MGR. C. HILL	REV DATE	REVISION	REQ. BY	DRFT	

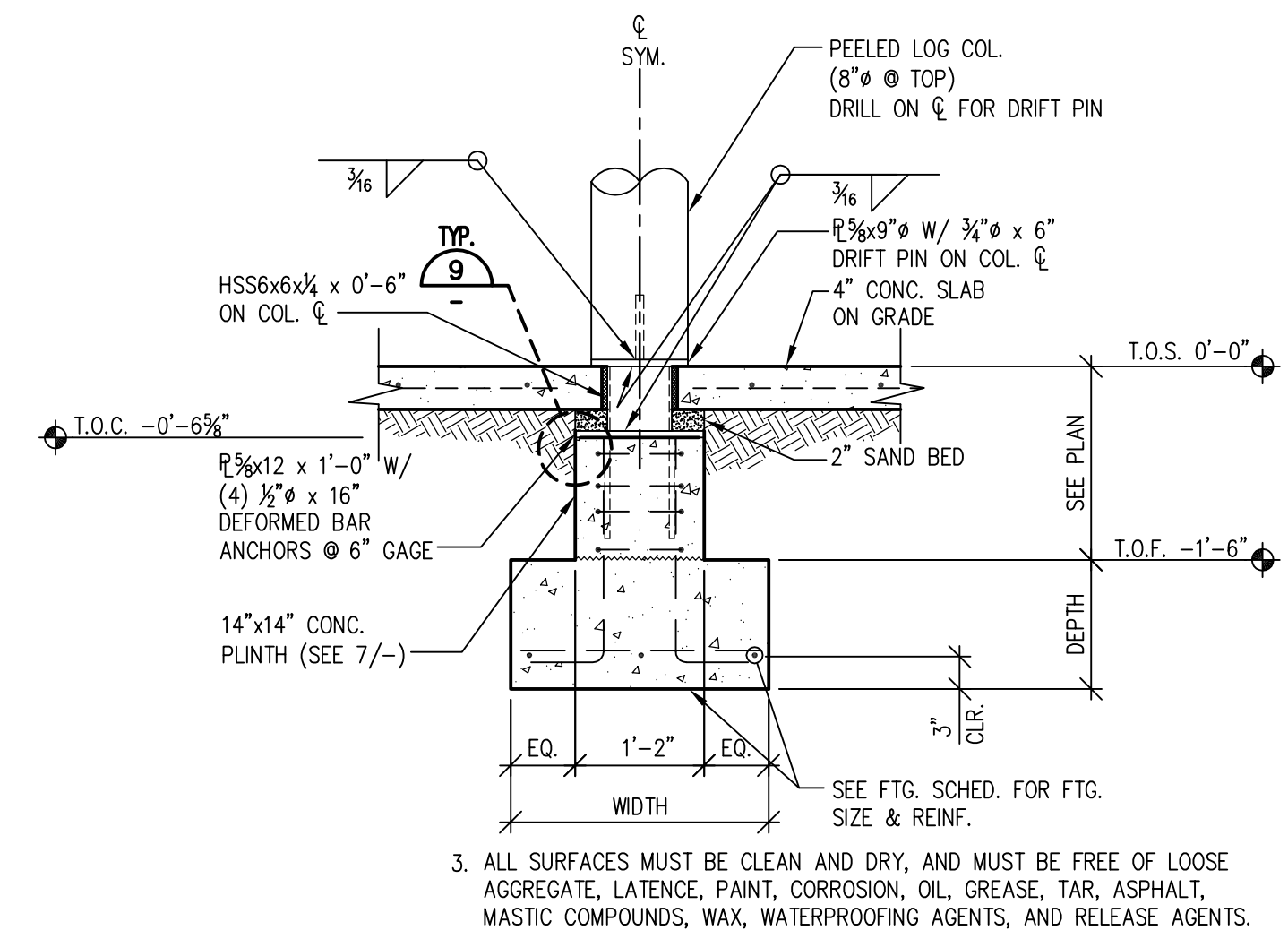
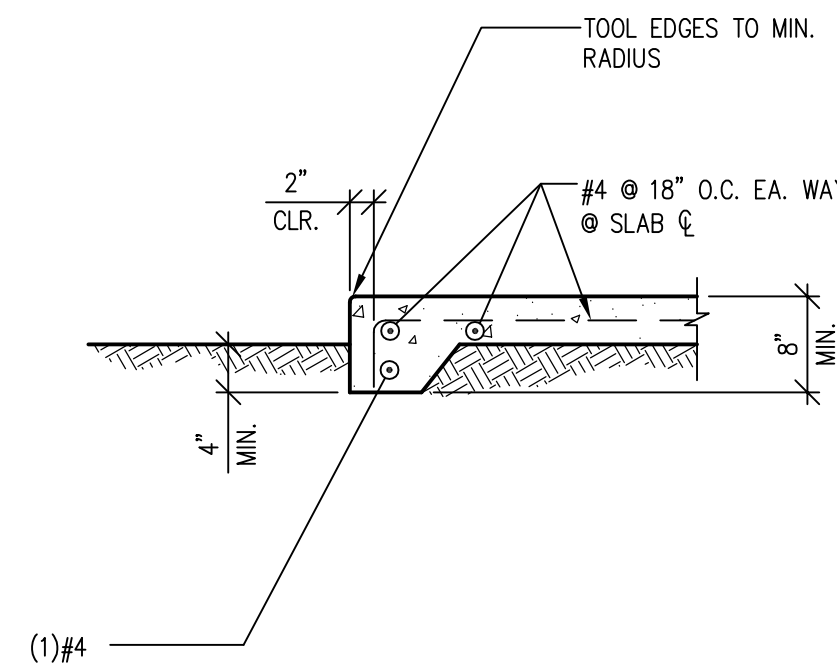
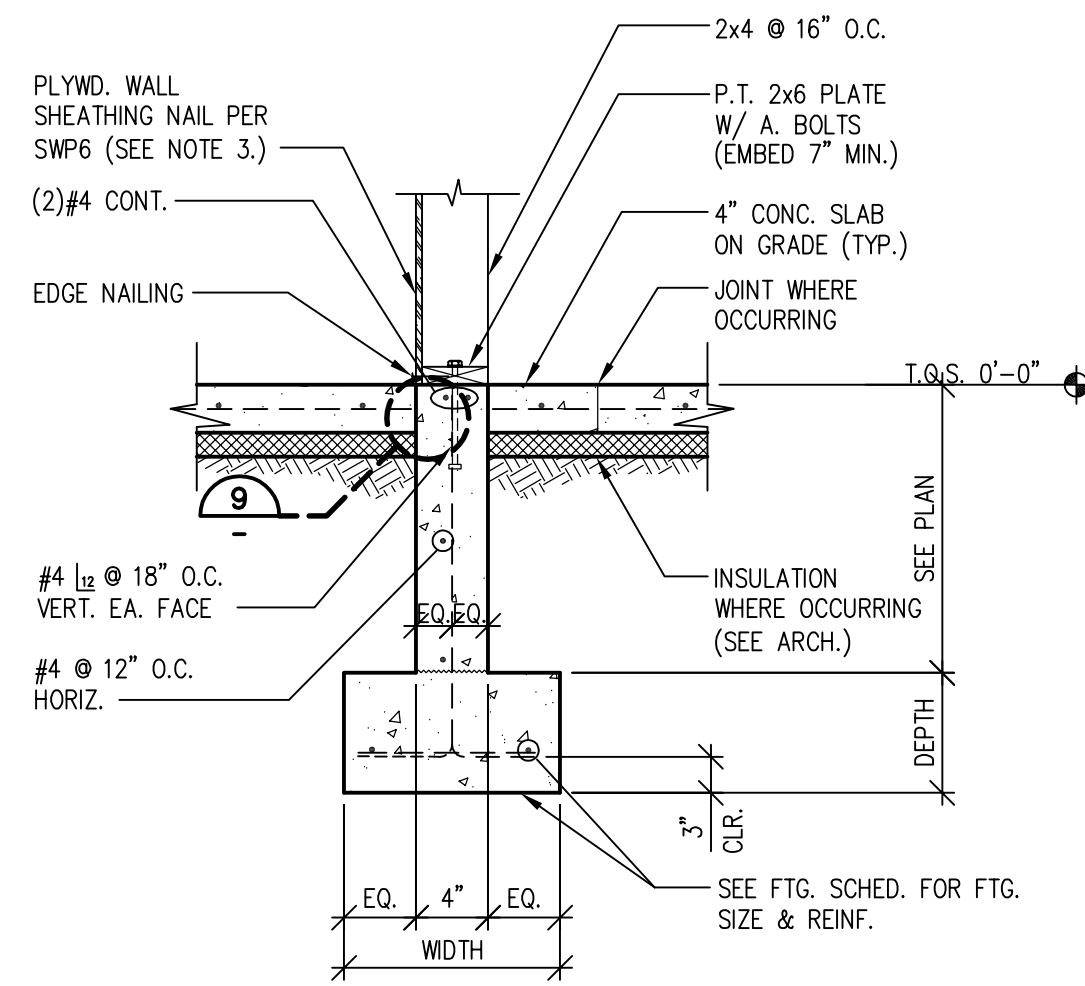
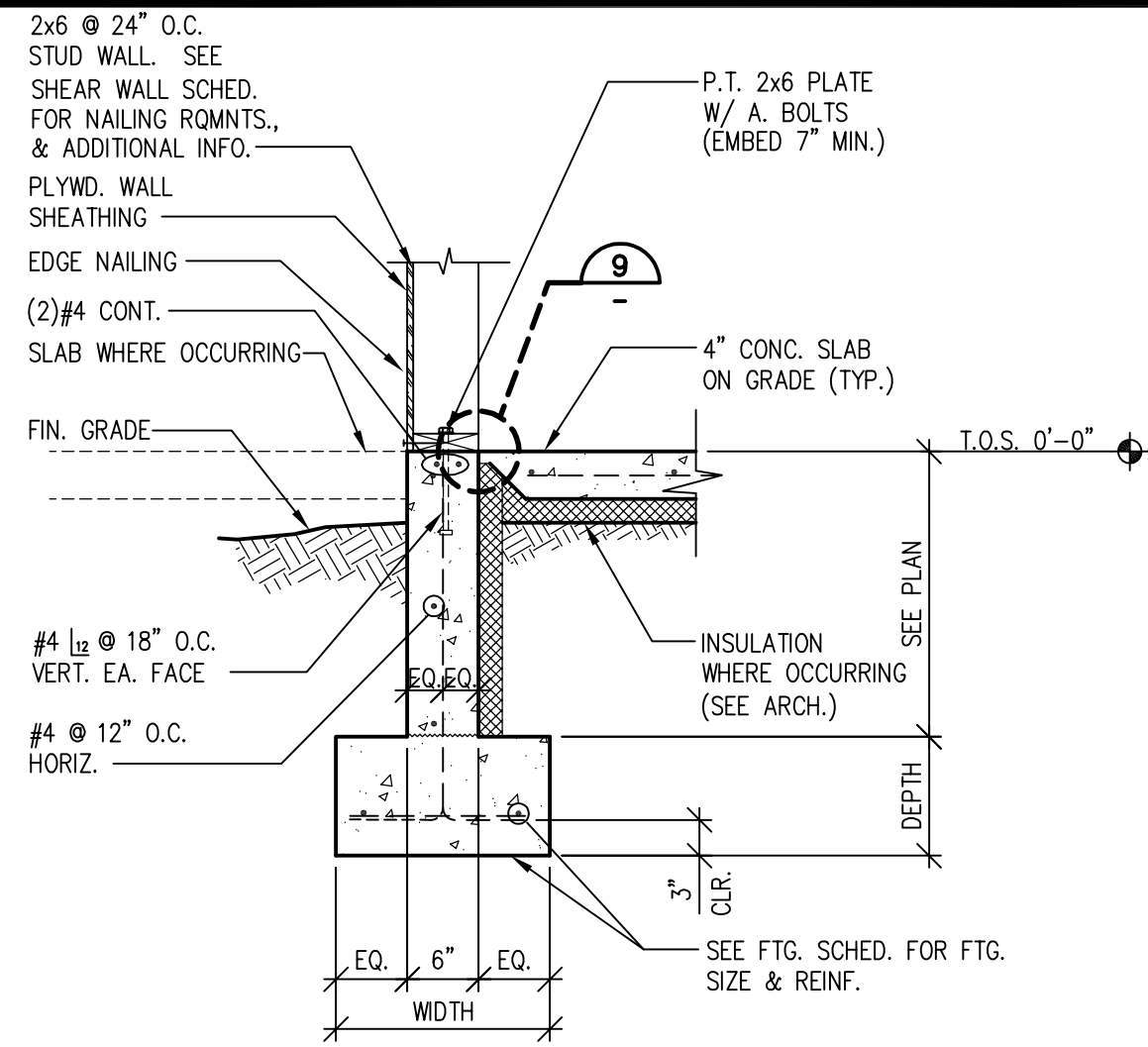
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN STRUCTURAL
PLANS, NOTES & DETAILS

BID NO. 14-31

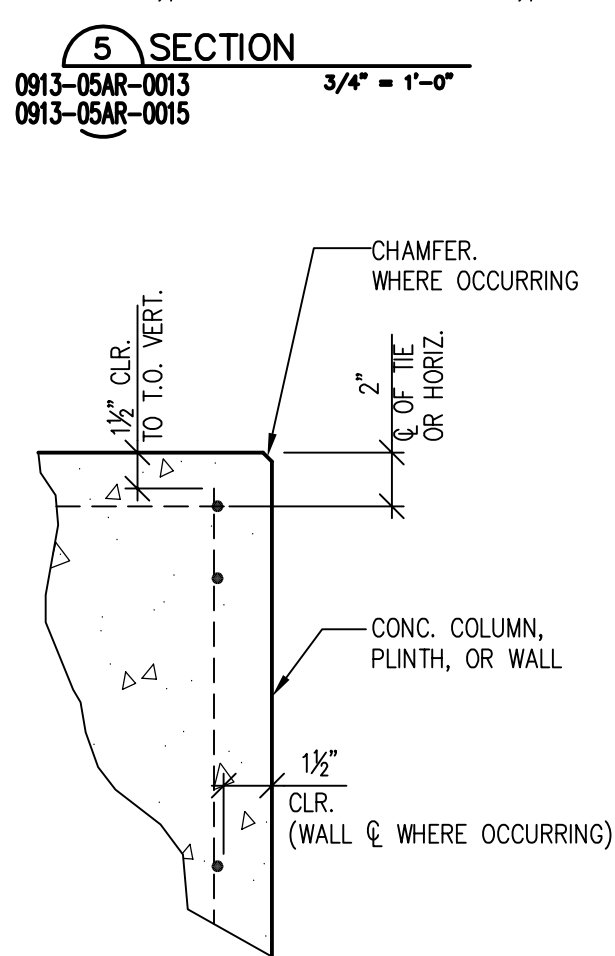
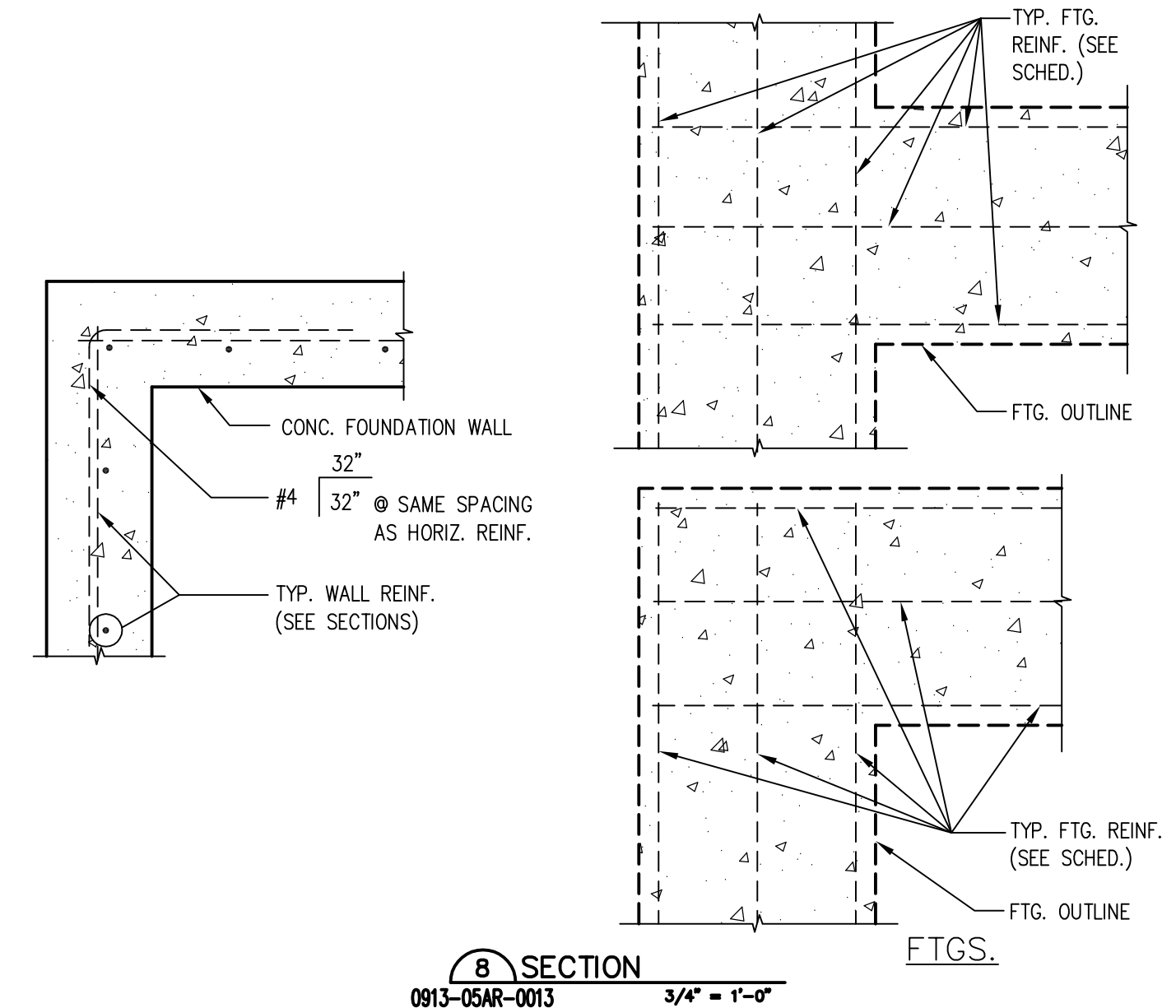
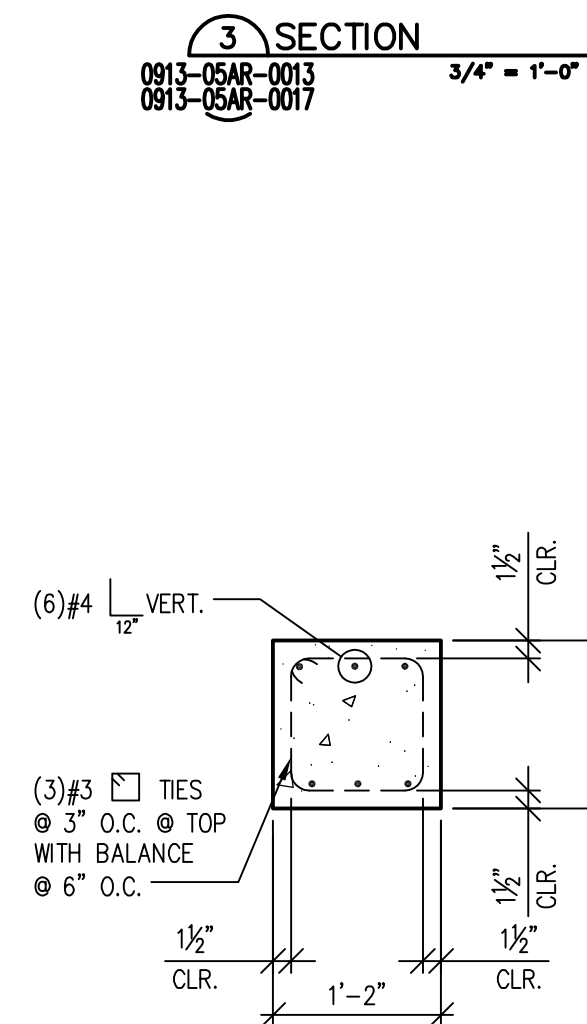
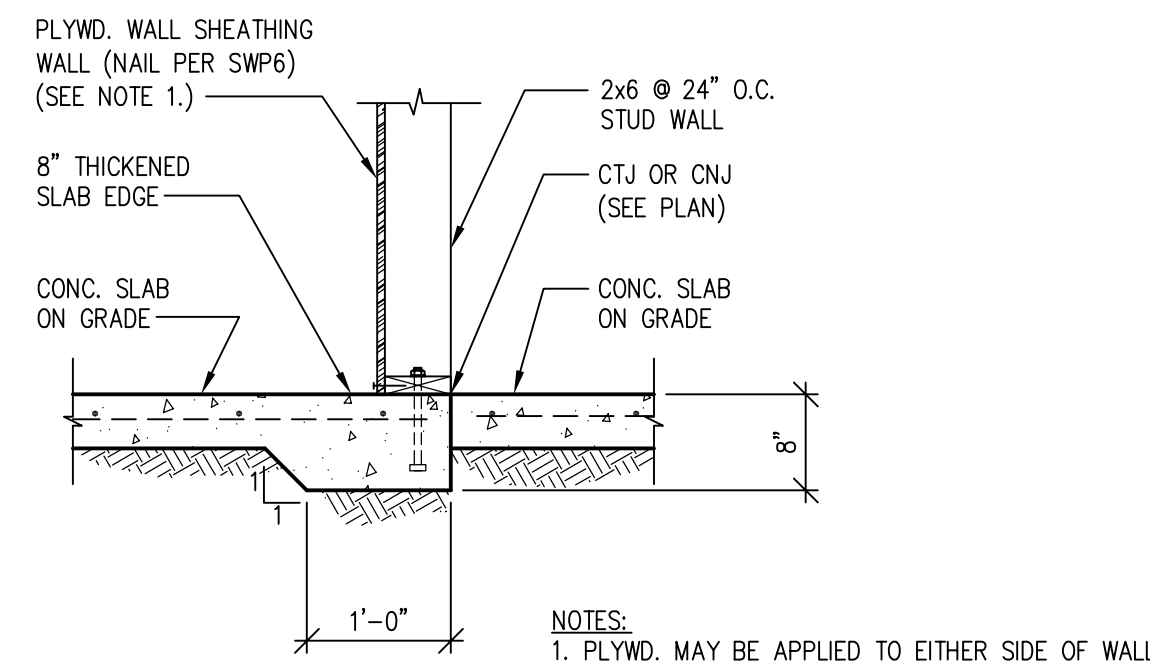
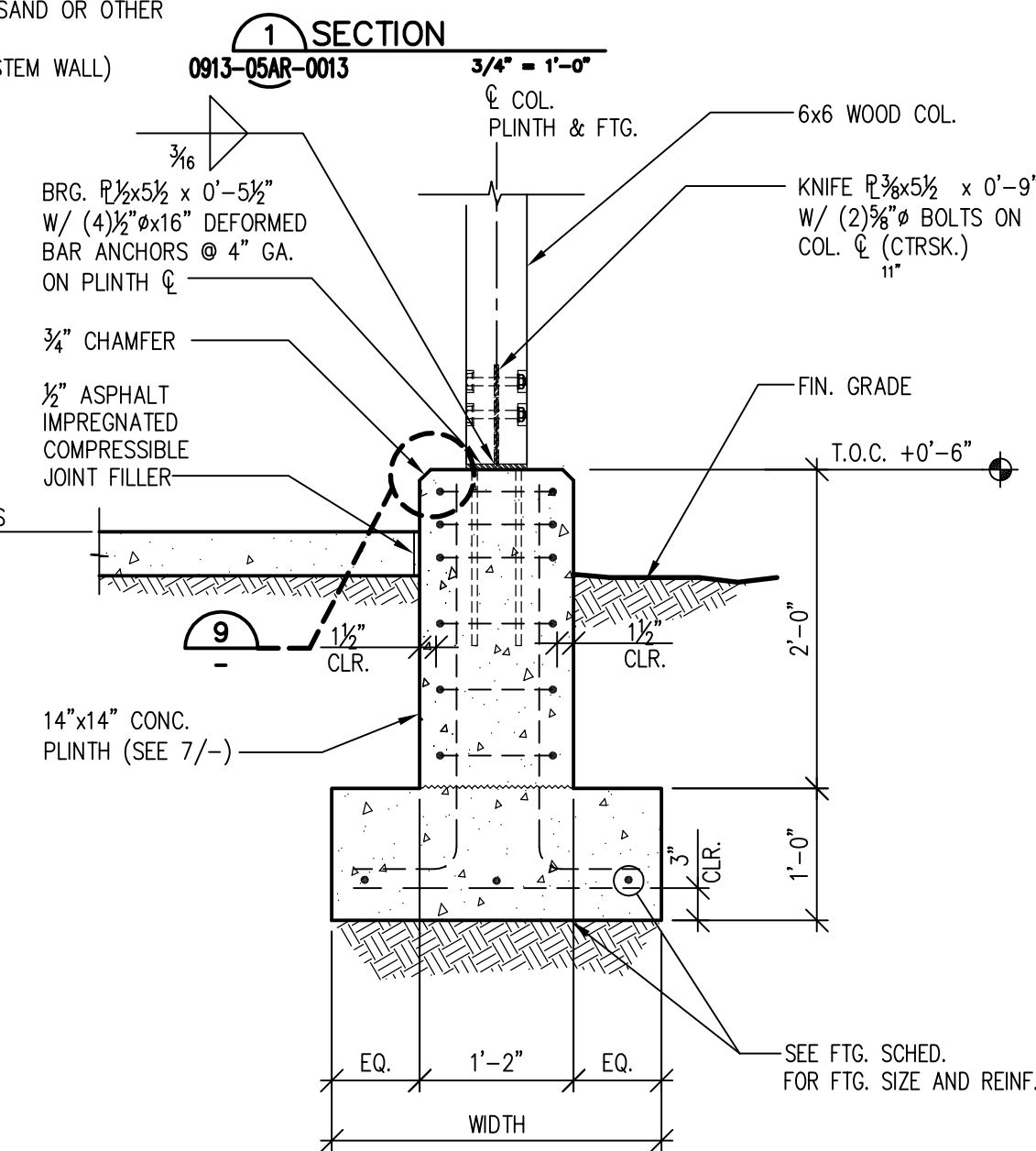
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REVISION 0	ORIG. DRAWN PED
DATE 11/14/2014	
DWG. 0913-05AR-0013	



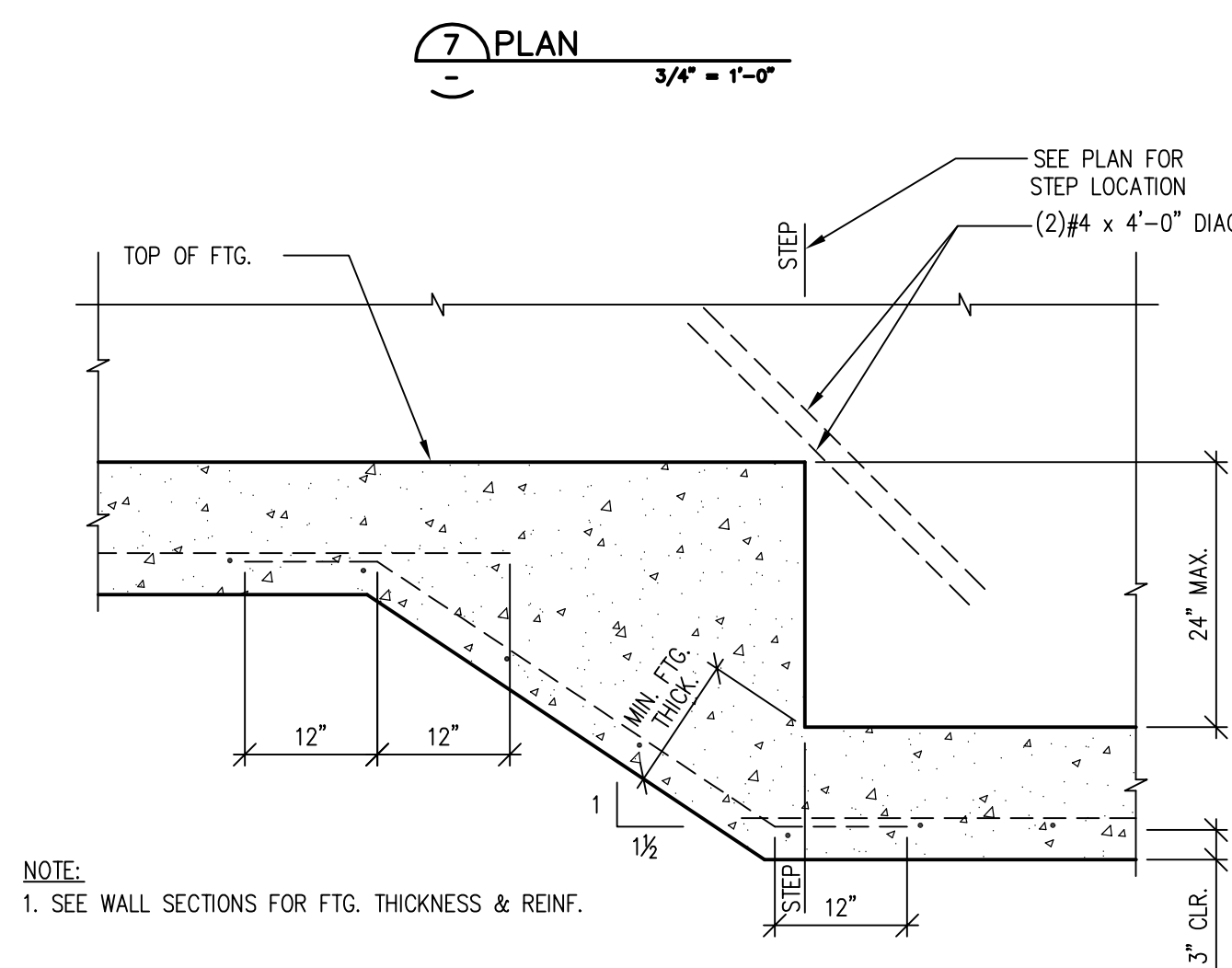
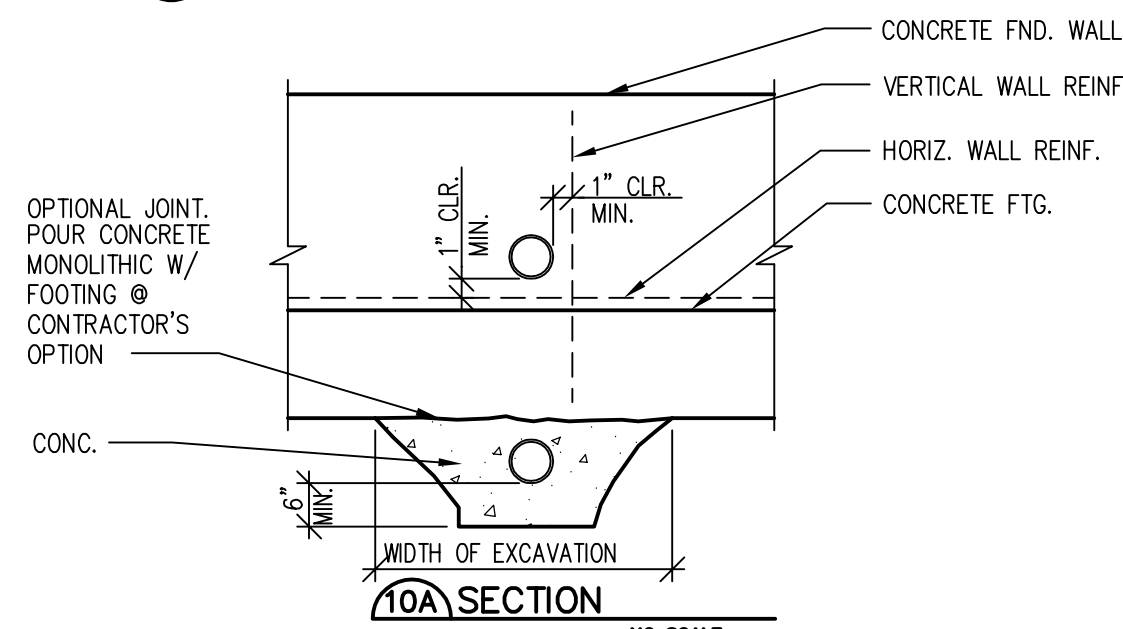


- NOTES:
1. SEE ARCH. FOR FOUNDATION INSULATION REQUIREMENTS.
2. AT DOOR LOCATIONS DEPRESS TOP OF WALL & POUR SLAB THROUGH. PROVIDE SAND OR OTHER BOND BREAKER. (BETWEEN SLAB & STEM WALL)

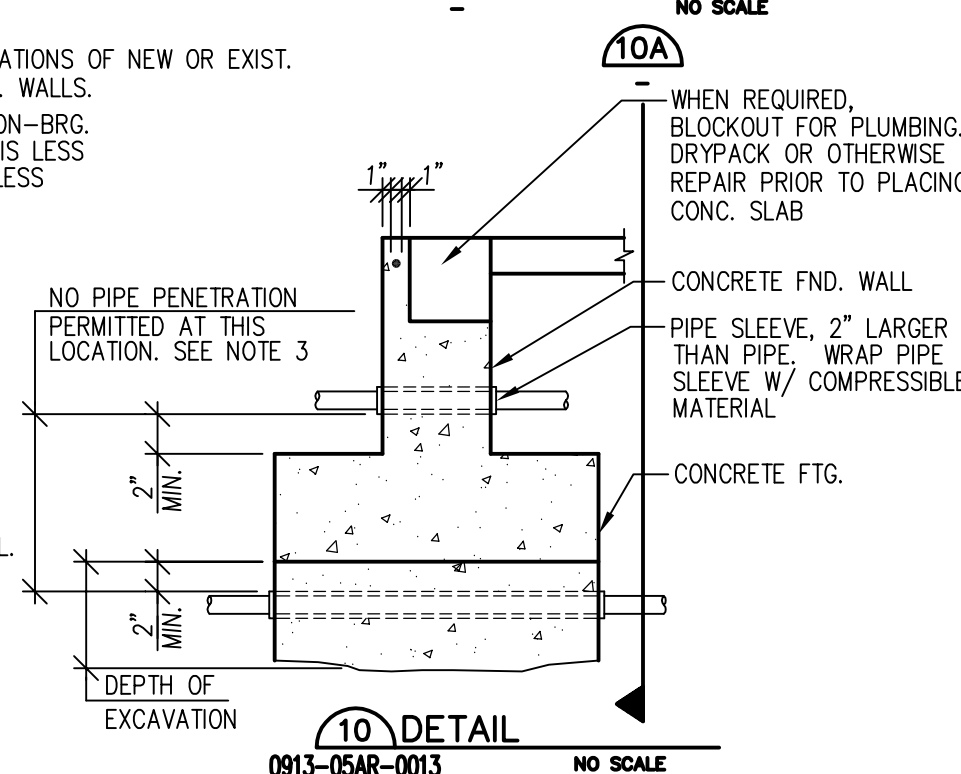
- NOTES:
1. SEE ARCH. FOR FOUNDATION INSULATION & SLAB BASE PREPARATION REQUIREMENTS.
2. AT DOOR LOCATIONS DEPRESS TOP OF WALL & POUR SLAB THROUGH. PROVIDE SAND OR OTHER BOND BREAKER. (BETWEEN SLAB & STEM WALL)
3. PLYWD. MAY BE APPLIED TO EITHER SIDE OF WALL.



SECTION 6
0913-05AR-0013 3/4" = 1'-0"



- 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 REQ'D. SEE 11/- FOR ADDN'L. INFO. WALL ABOVE AND ADDITIONAL INFO. NOT SHOWN.
4. PENETRATION MUST BE WITHIN 10' OF PERPENDICULAR TO FOUNDATION WALL.



SECTION 11
0913-05AR-0013 3/4" = 1'-0"

SECTION 12
0913-05AR-0013 3/4" = 1'-0"



PRIM. ENG. MIKE ROLFS	CHELAN PUD NO.1
2ND ENG.	PRIM. ENG. C. HILL
DESIGNER	2ND ENG.
APPROVAL	PROJ. MGR. C. HILL

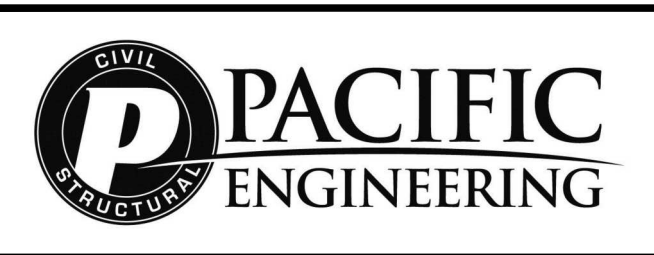
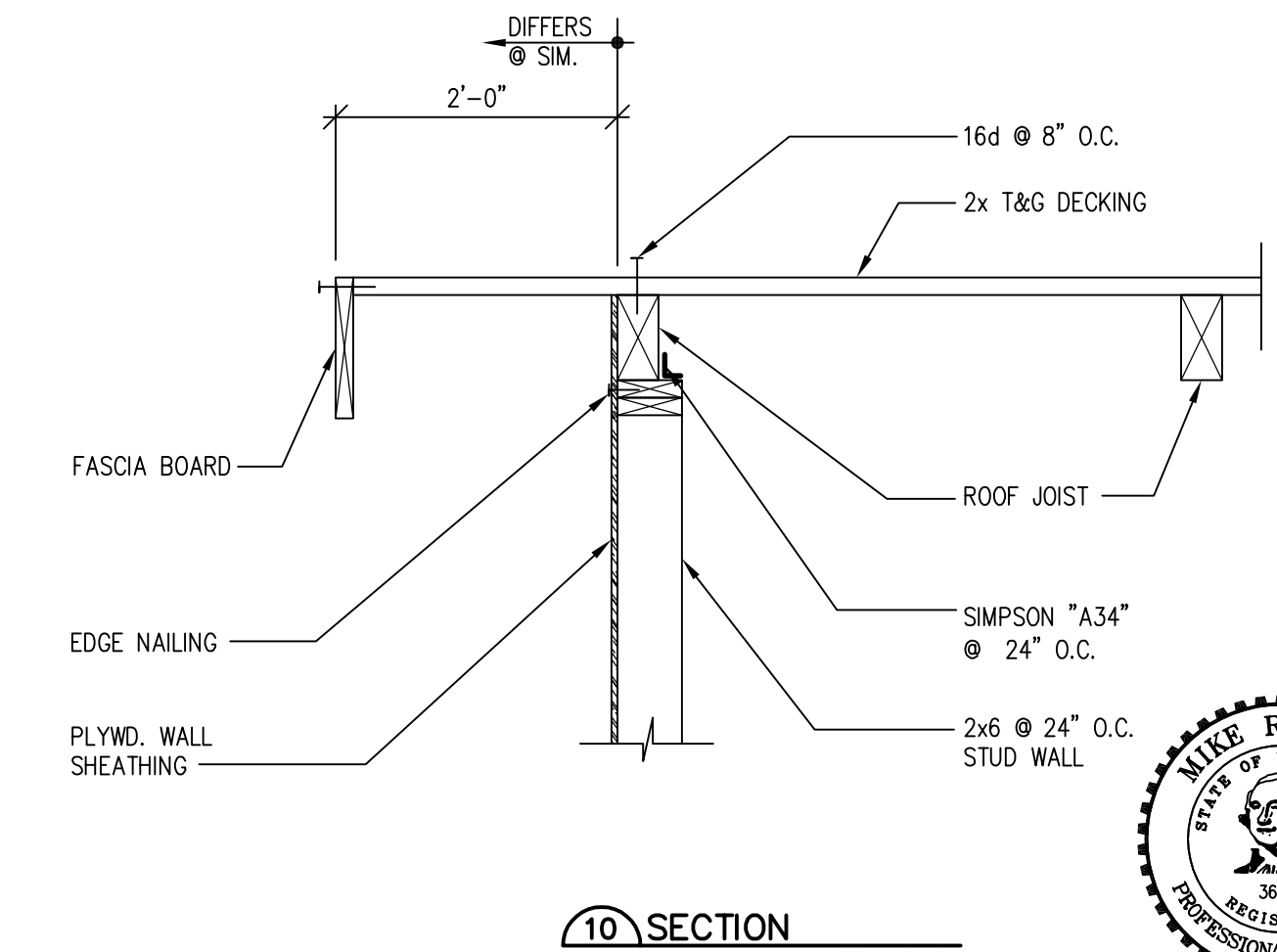
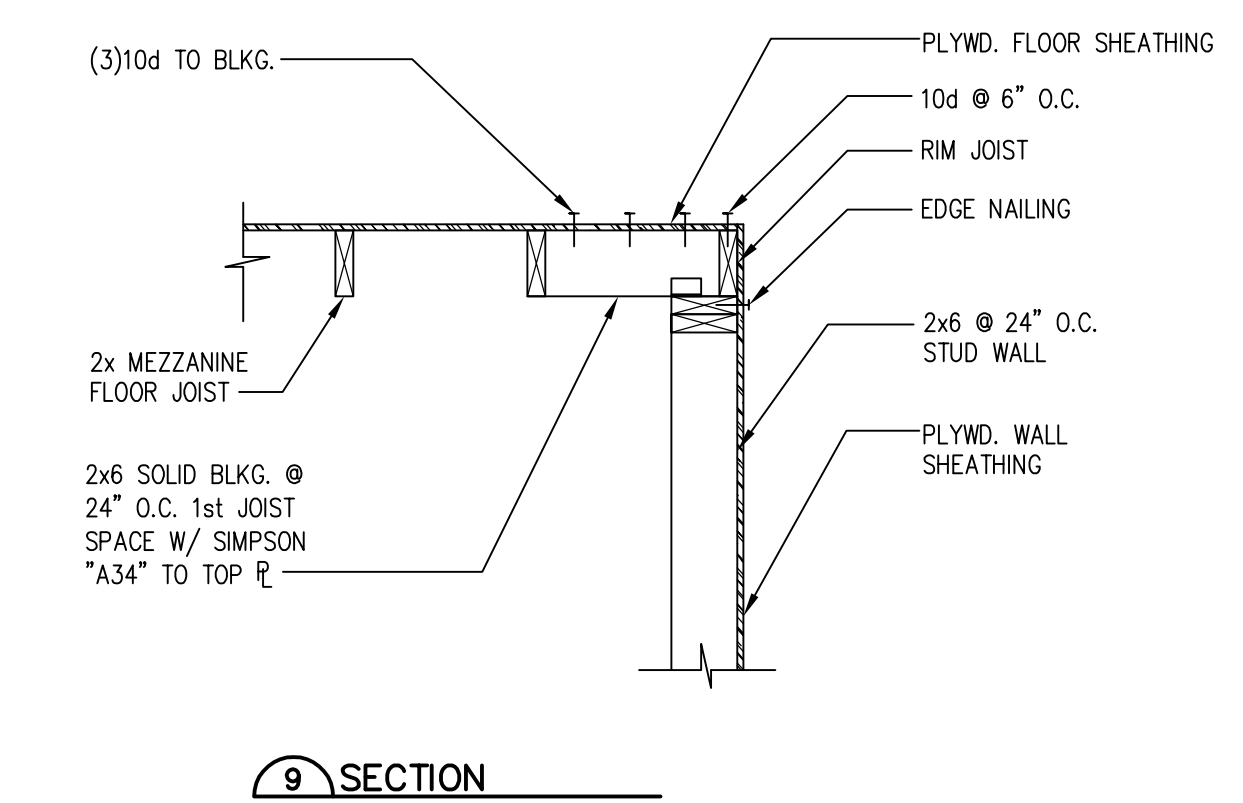
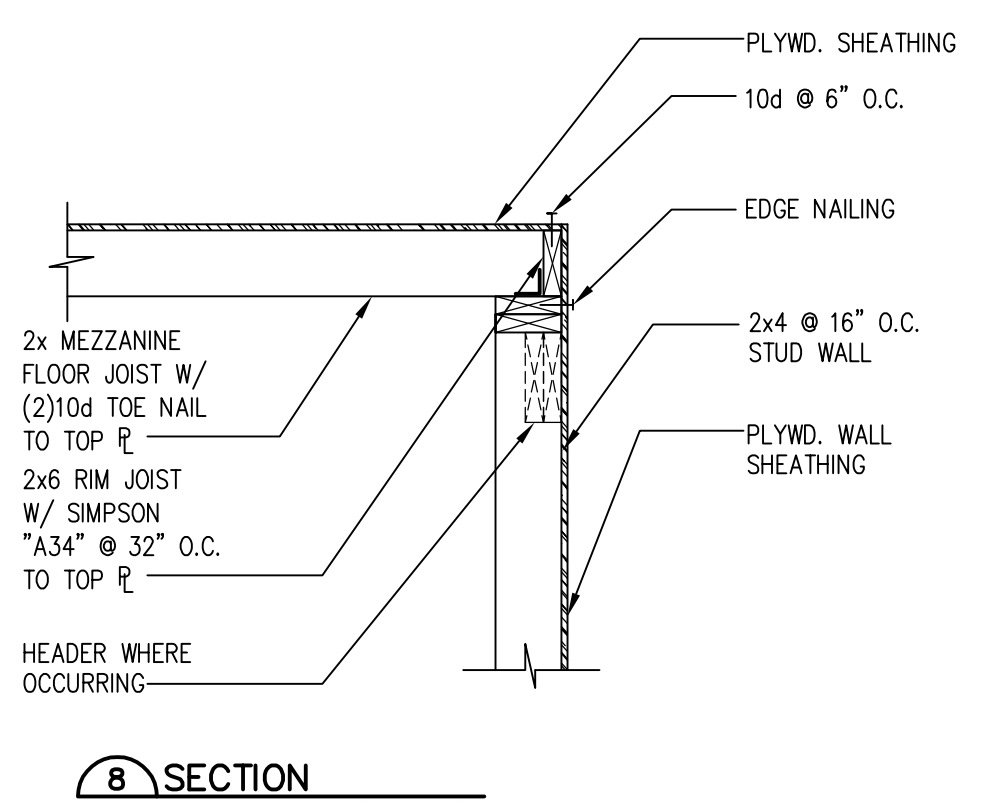
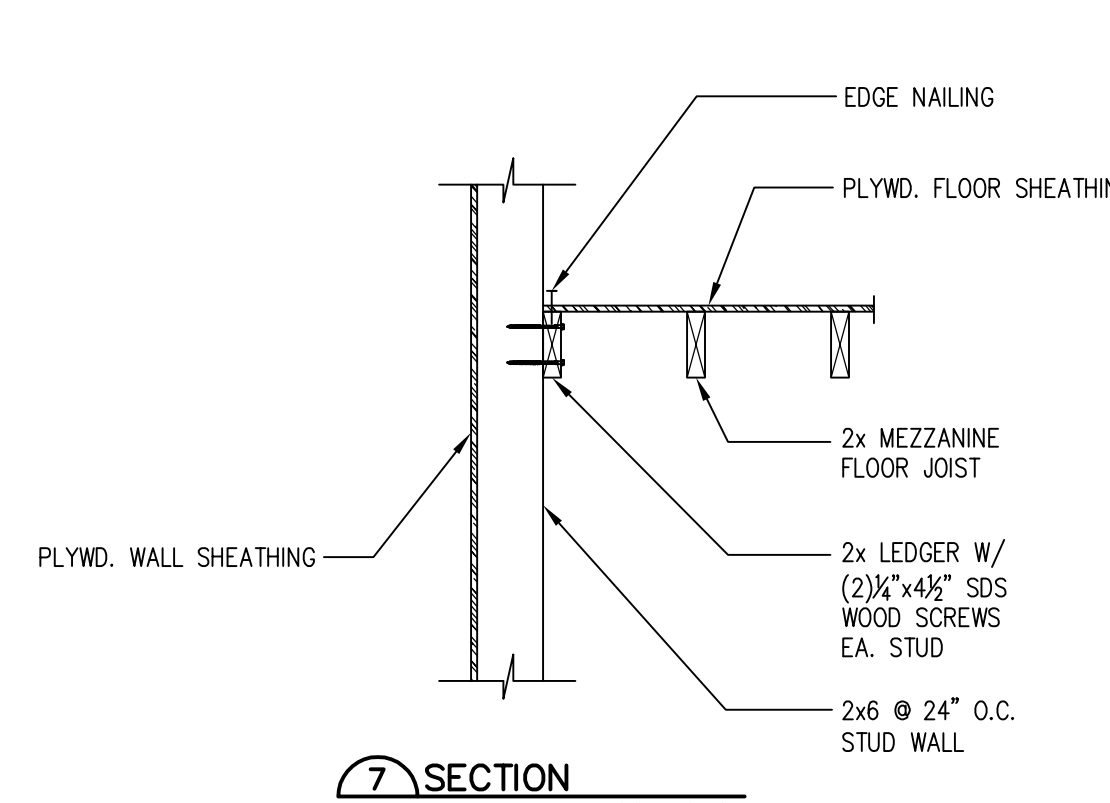
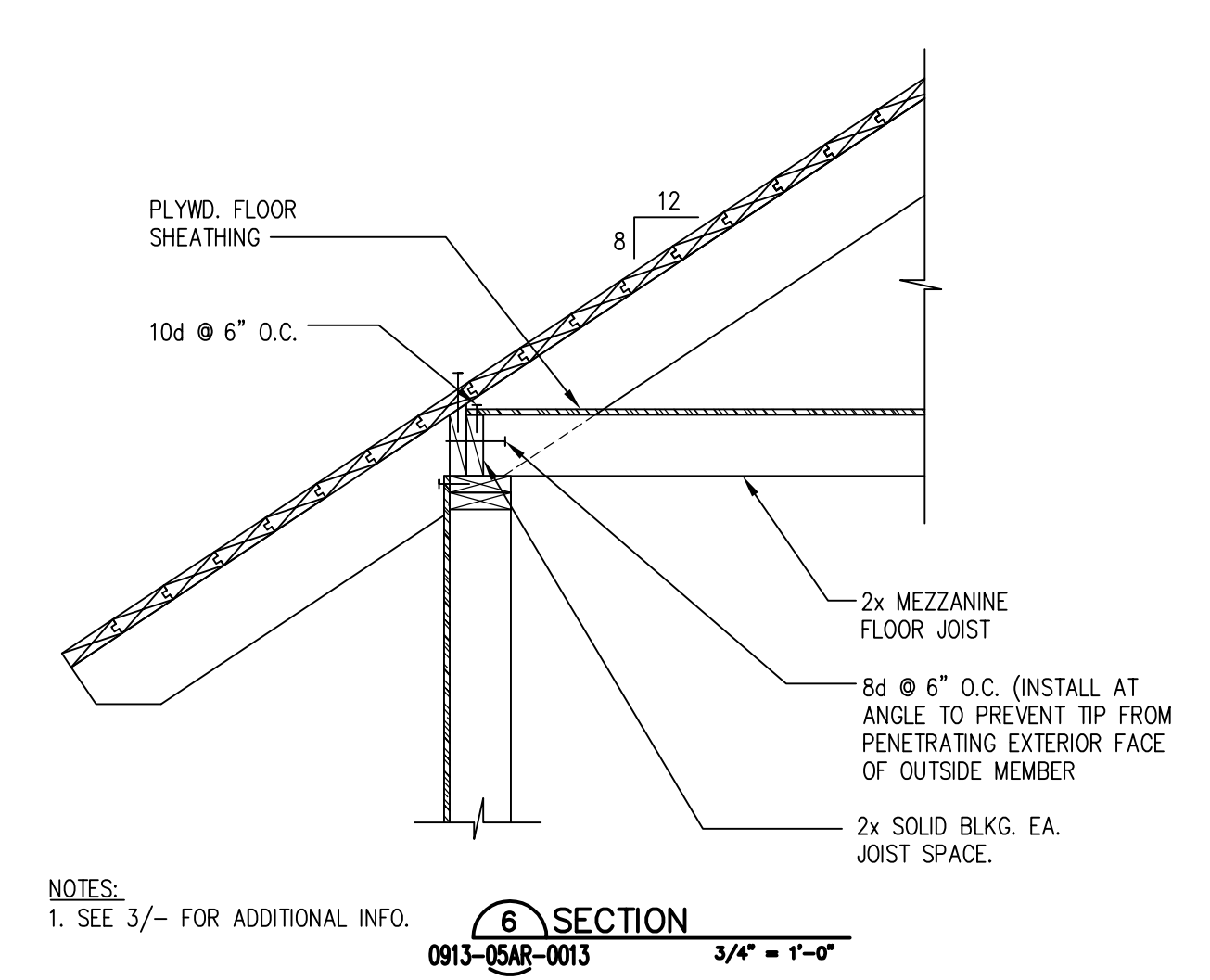
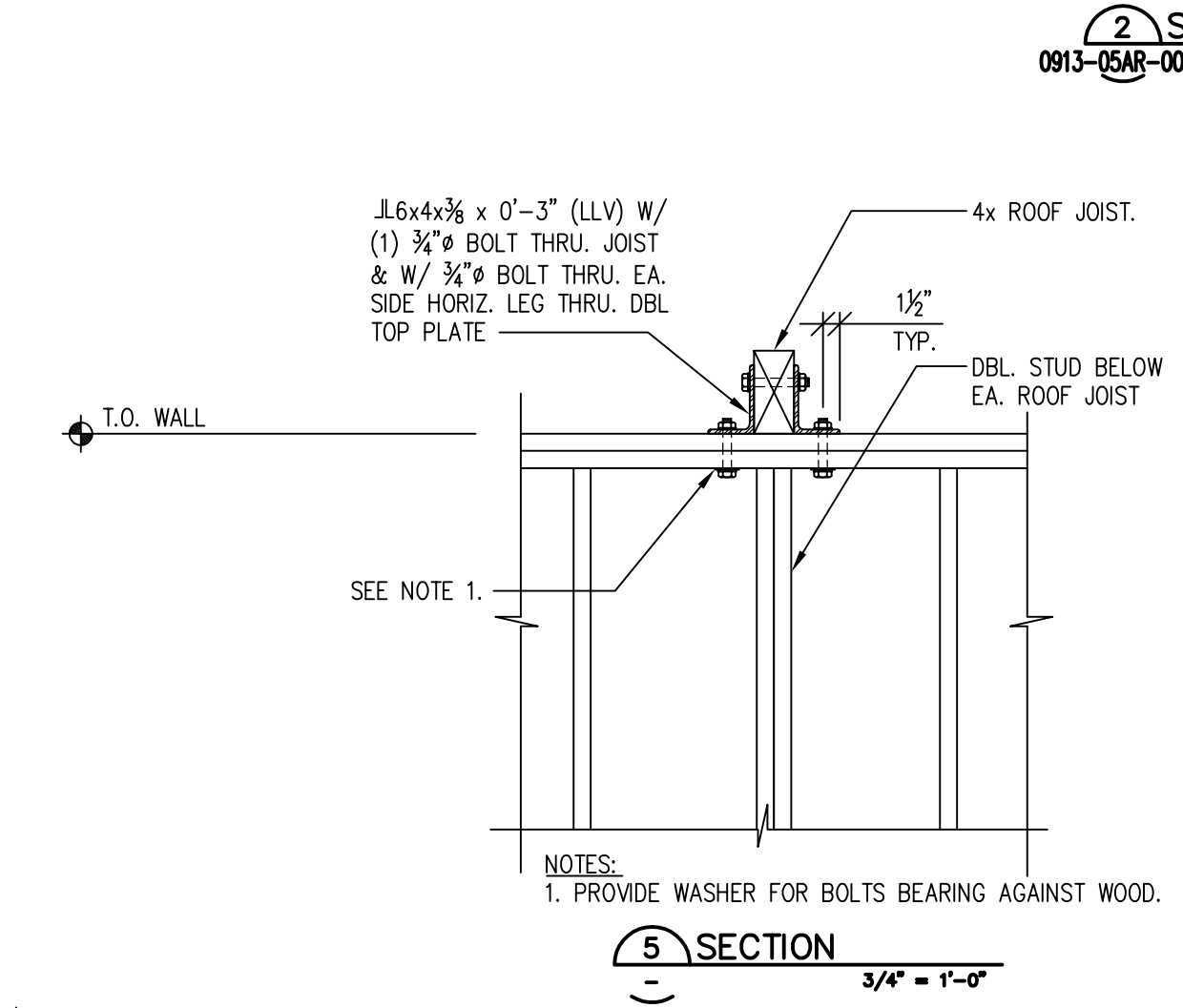
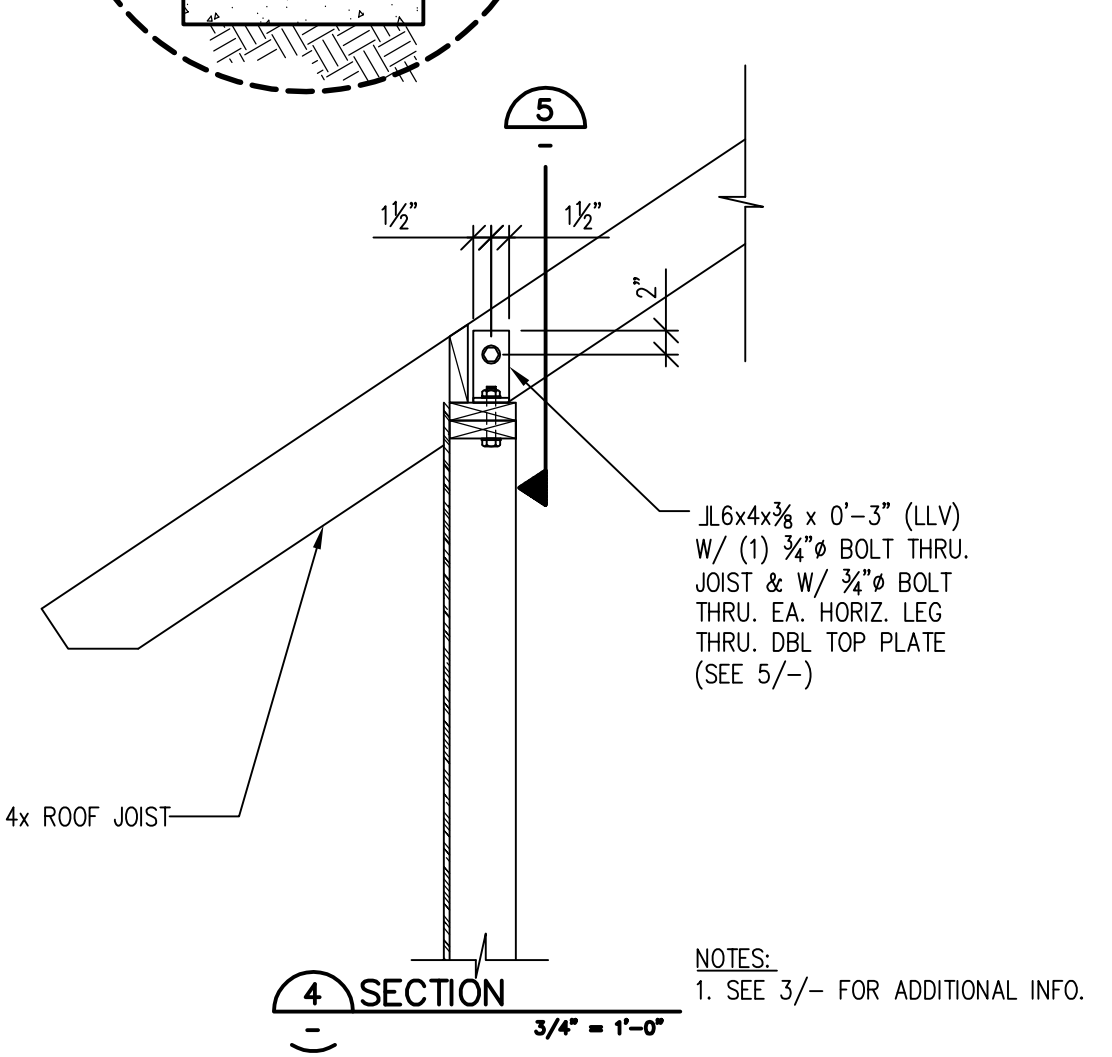
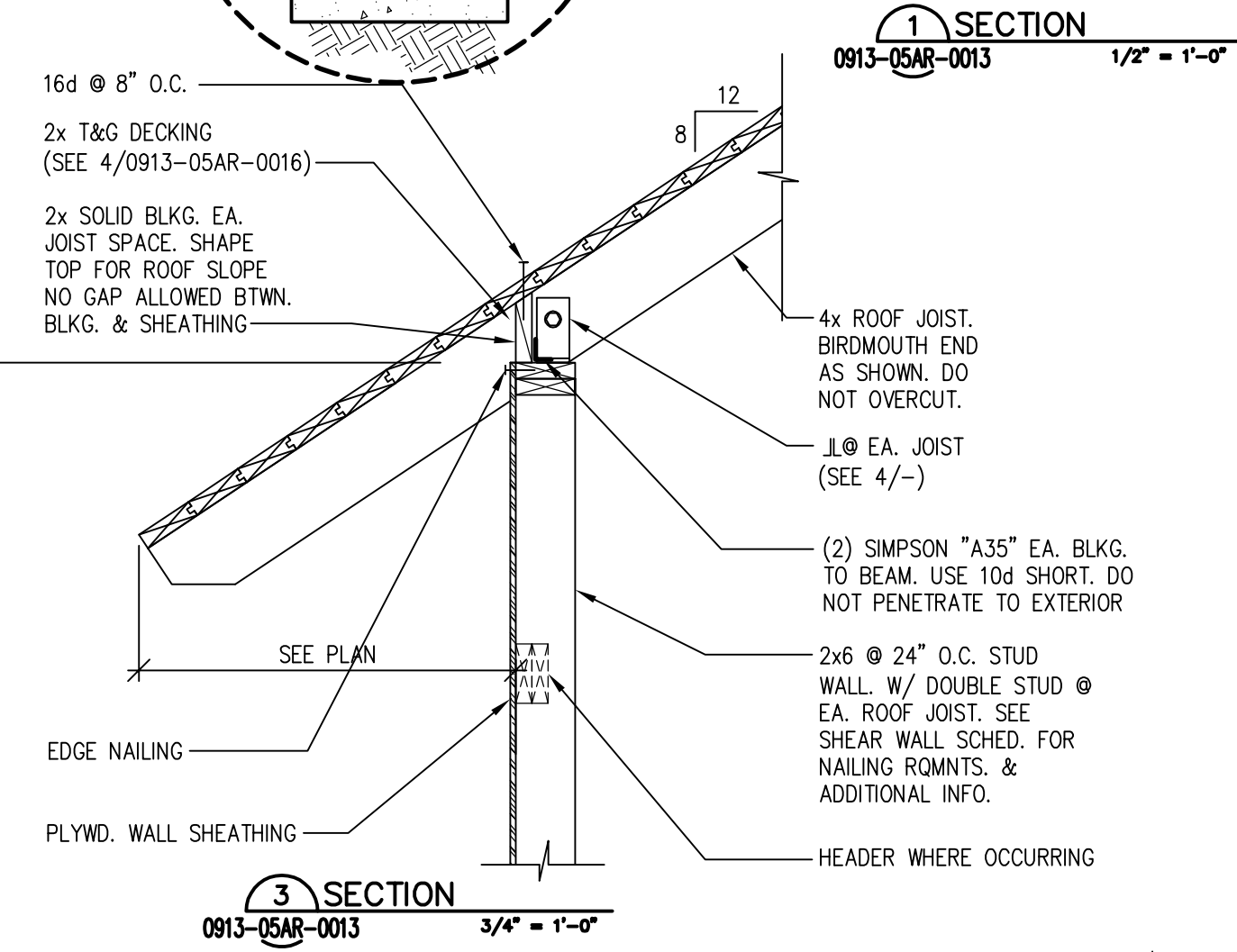
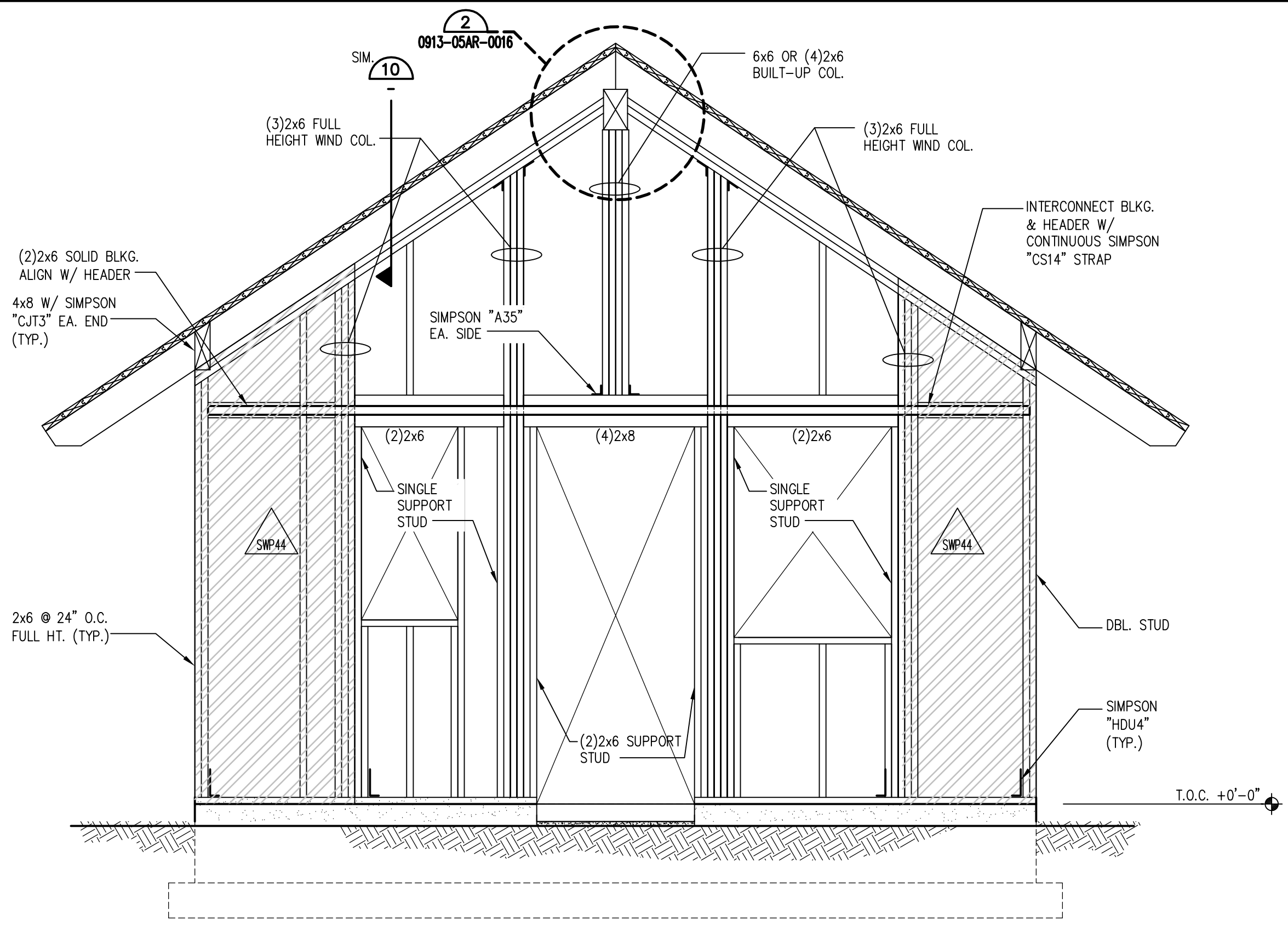
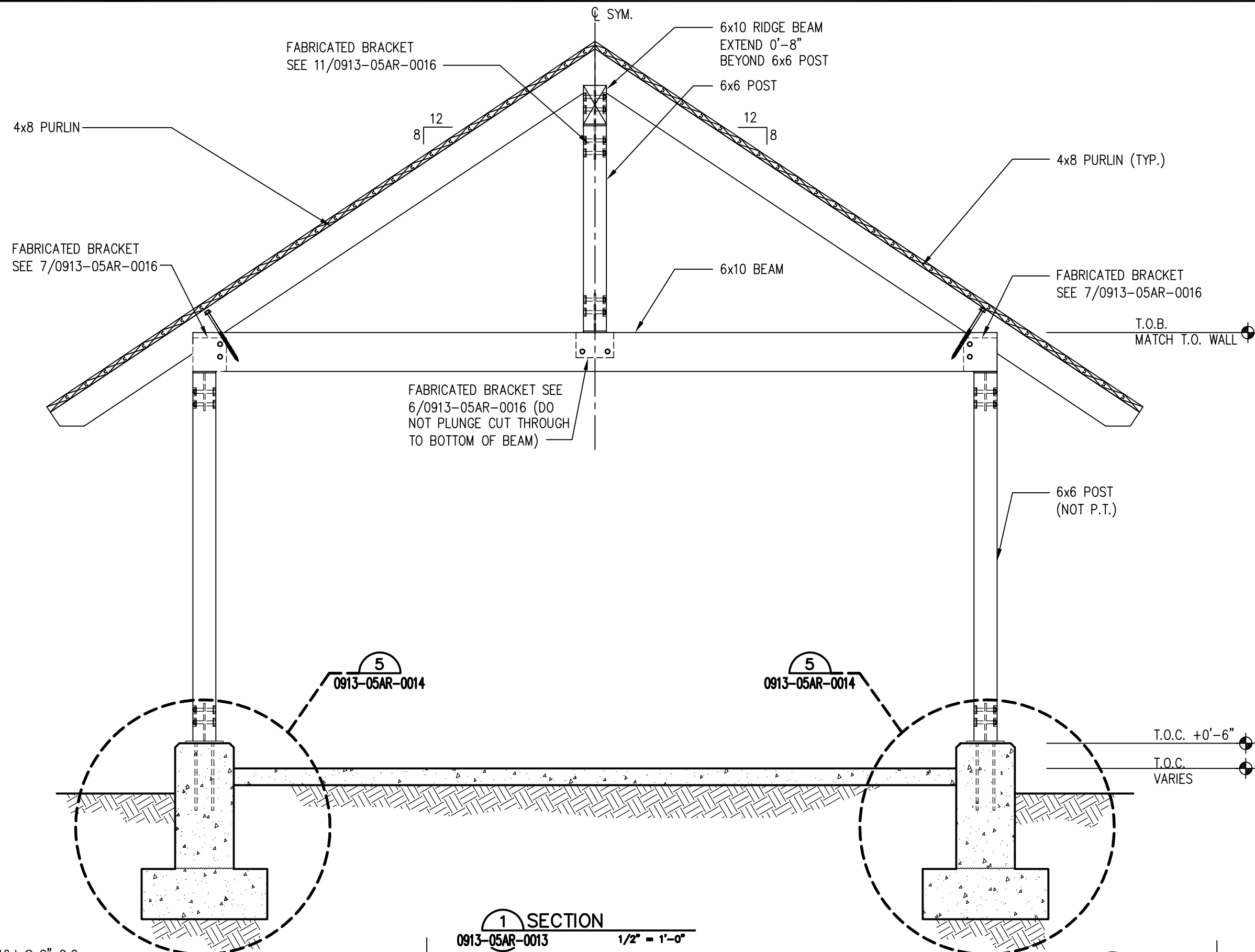
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0	11/14/2014	BID SET	- ABE
REV	DATE	REVISION	REQ. BY DRFT



LINCOLN ROCK STATE PARK CABIN STRUCTURAL FOUNDATION DETAILS
BID NO. 14-31



SHEET AS.3 OF AS.6
REVISION 0
DATE 11/14/2014
DWG. 0913-05AR-0014



CONSULTANT	PRIM. ENG. MIKE ROLFS	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG. C. HILL
DESIGNER	2ND ENG.	
APPROVAL	PROJ. MGR. C. HILL	

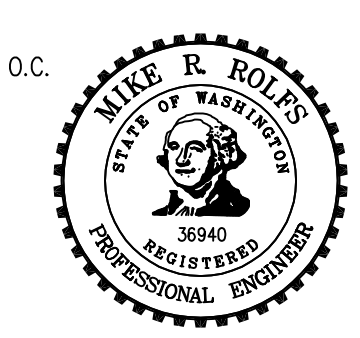
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REV	DATE		REVISION	REQ. BY	DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

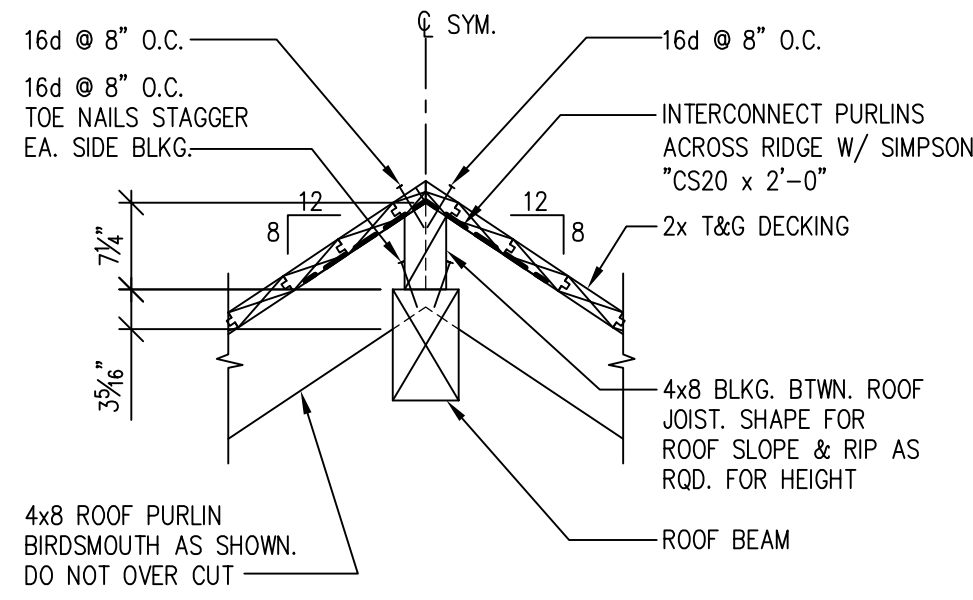
 CHELAN COUNTY

LINCOLN ROCK STATE PARK
 CABIN STRUCTURAL
 FRAMING DETAILS
 BID NO. 14-31

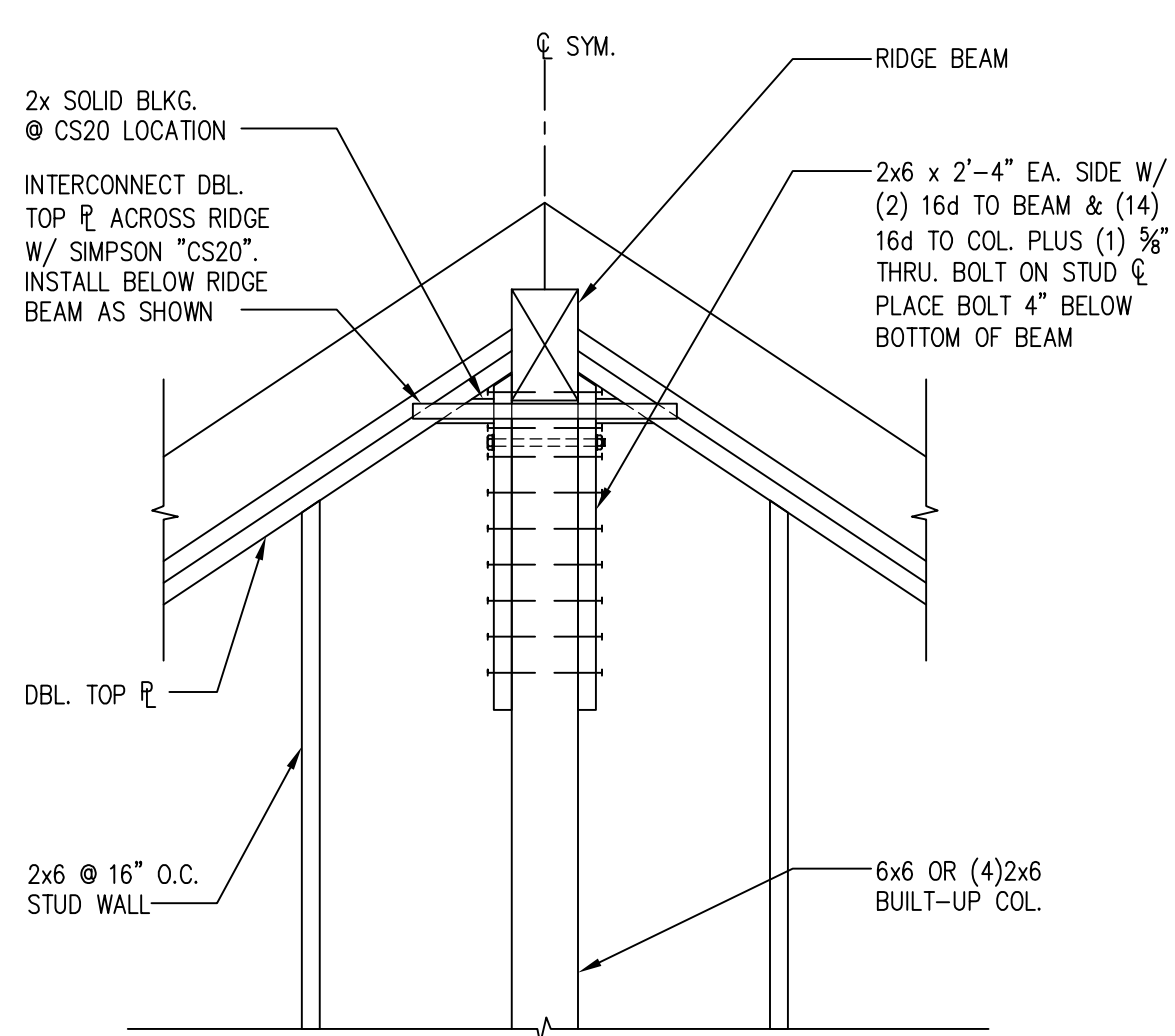
SHEET AS. 4 OF AS. 6
REVISION 0
DATE 11/14/2014
DWG. 0913-05AR-0015



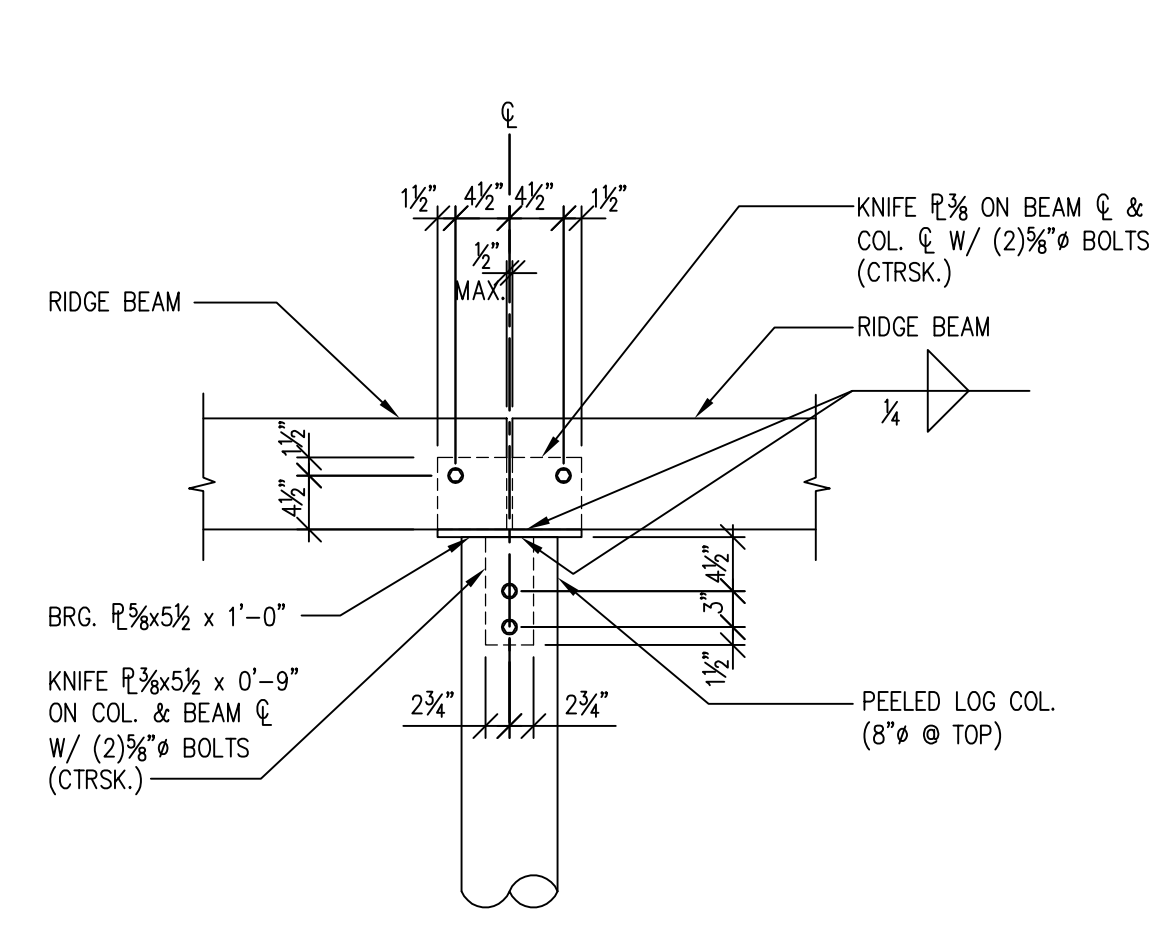
ORIG. DATE 6/1/2014 ORG. DRAWN PED



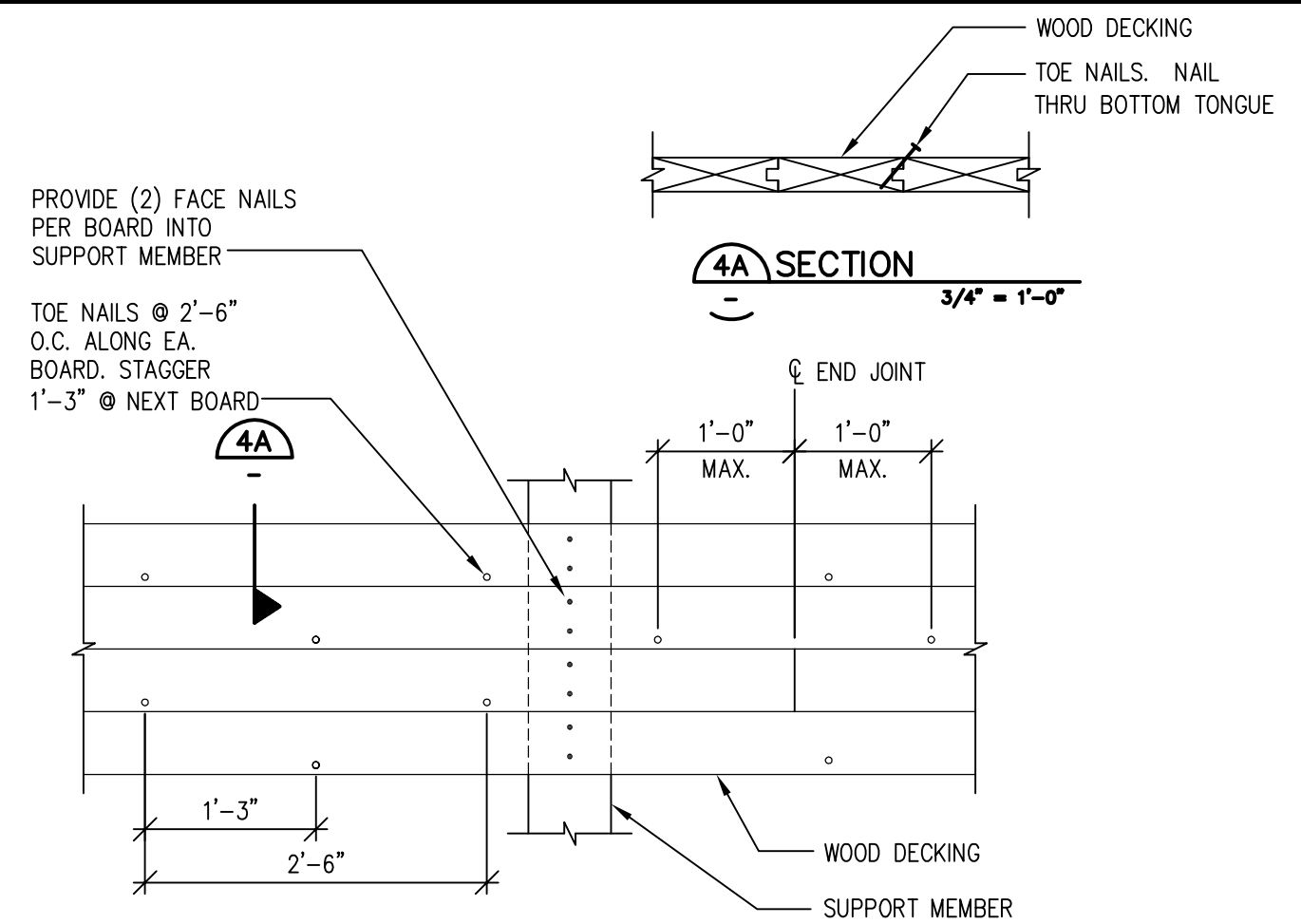
1 SECTION
0913-05AR-0013 3/4" = 1'-0"



2 SECTION
0913-05AR-0013 3/4" = 1'-0"



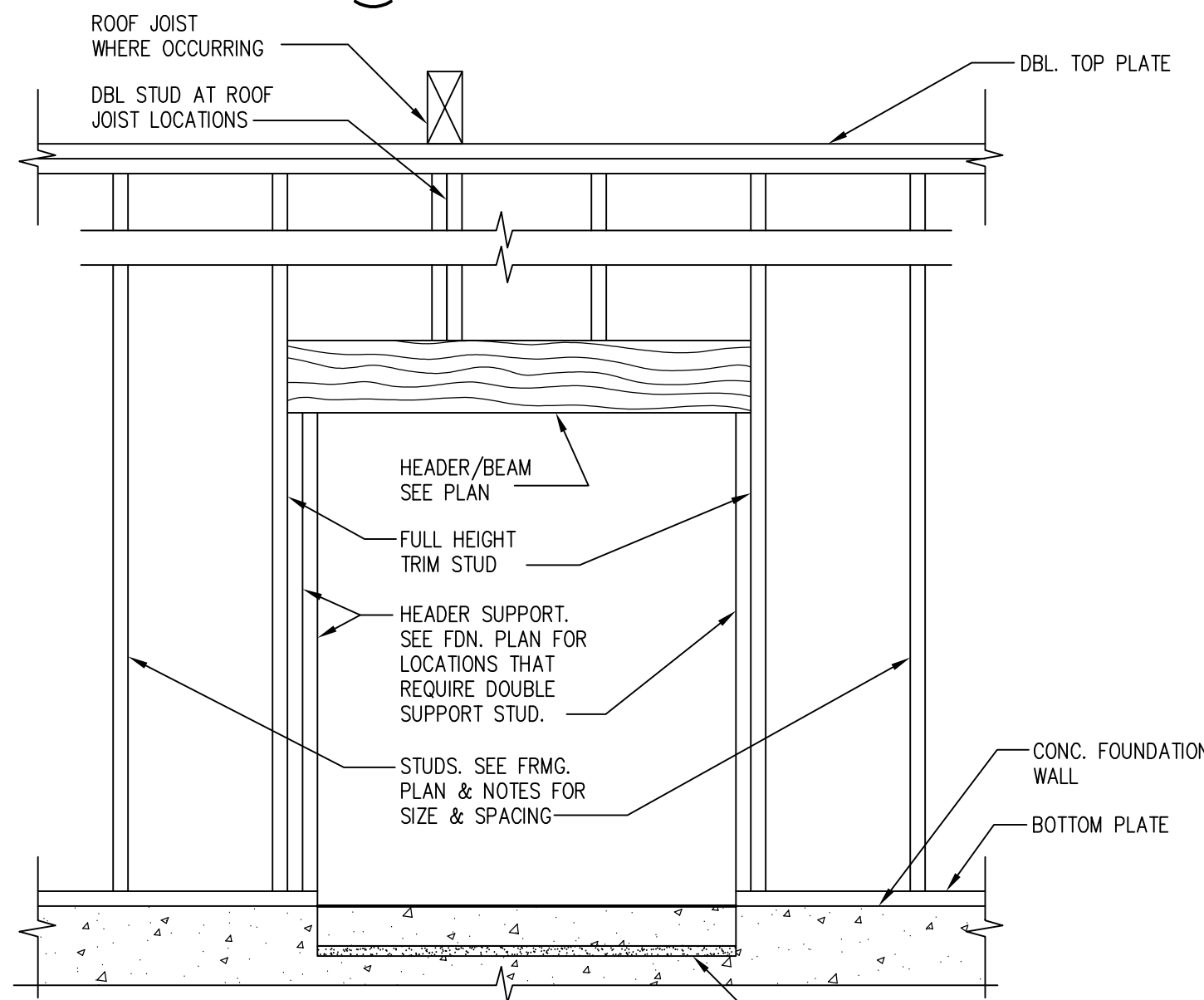
3 SECTION
0913-05AR-0013 3/4" = 1'-0"



NOTES:
1. PRE-DRILL HOLES FOR FACE NAILS.

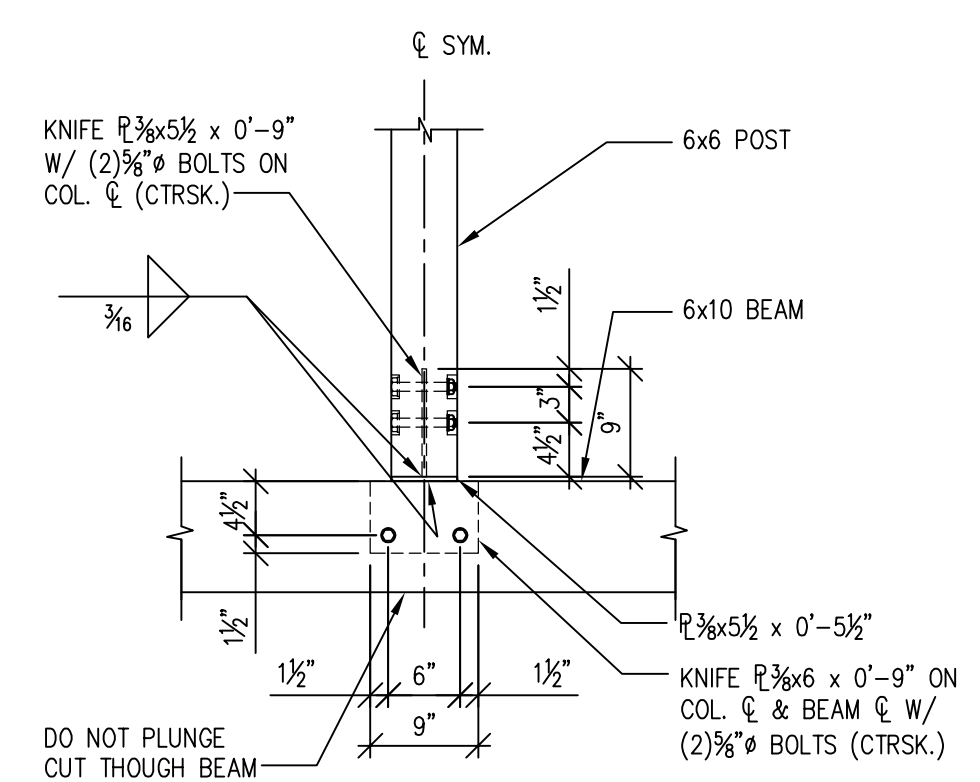
NAILING SCHEDULE		
DECKING	TOE NAIL	FACE NAIL
2x	8d @ 30" O.C.	12d

4 SECTION
0913-05AR-0015

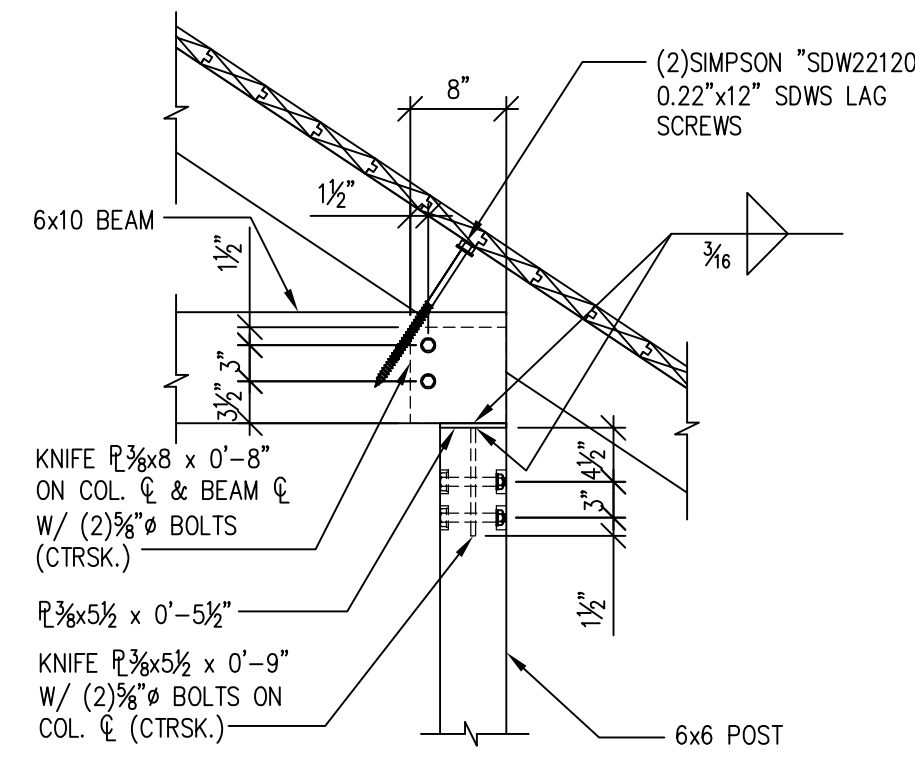


TYPICAL HEADER SUPPORT

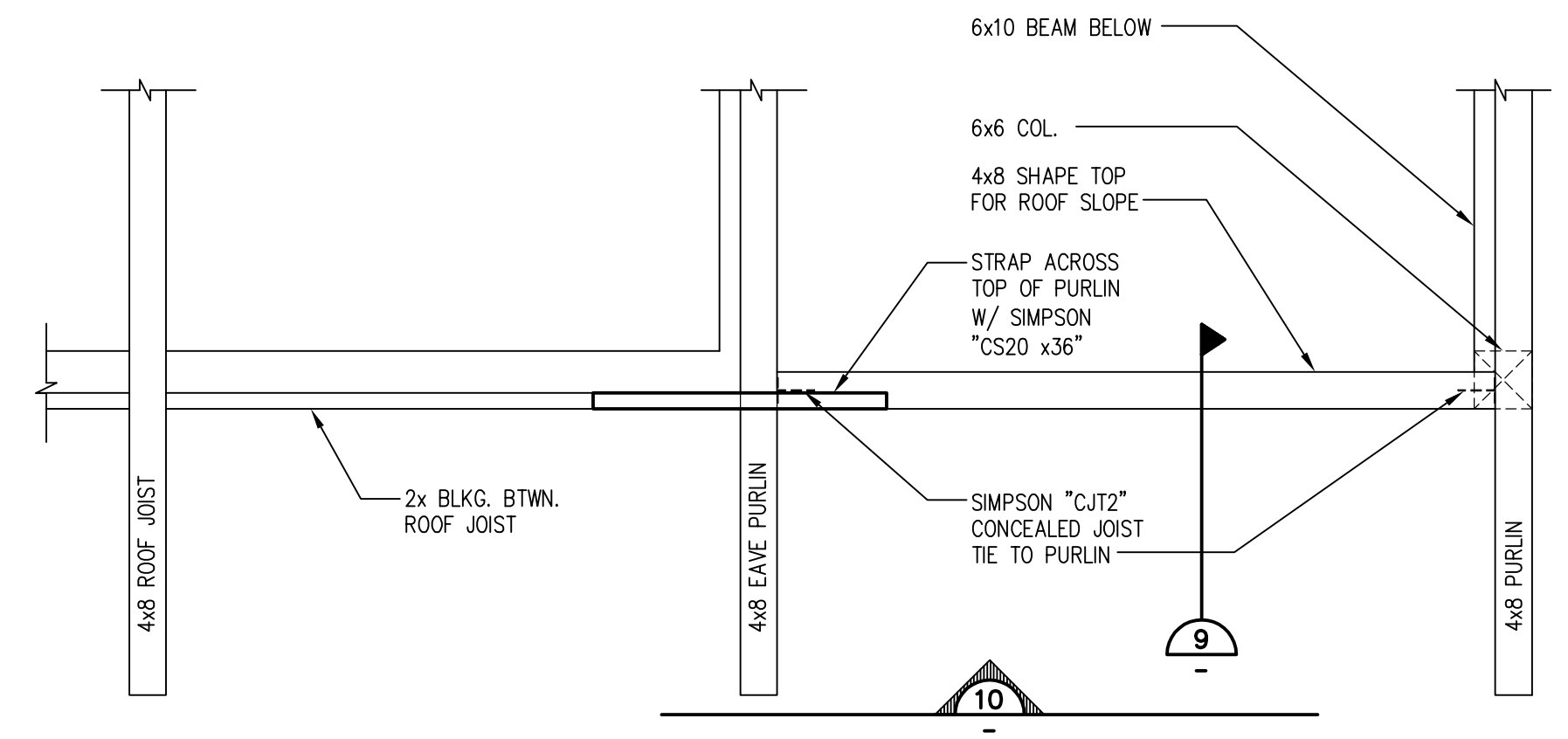
5 SECTION
0913-05AR-0013 3/4" = 1'-0"



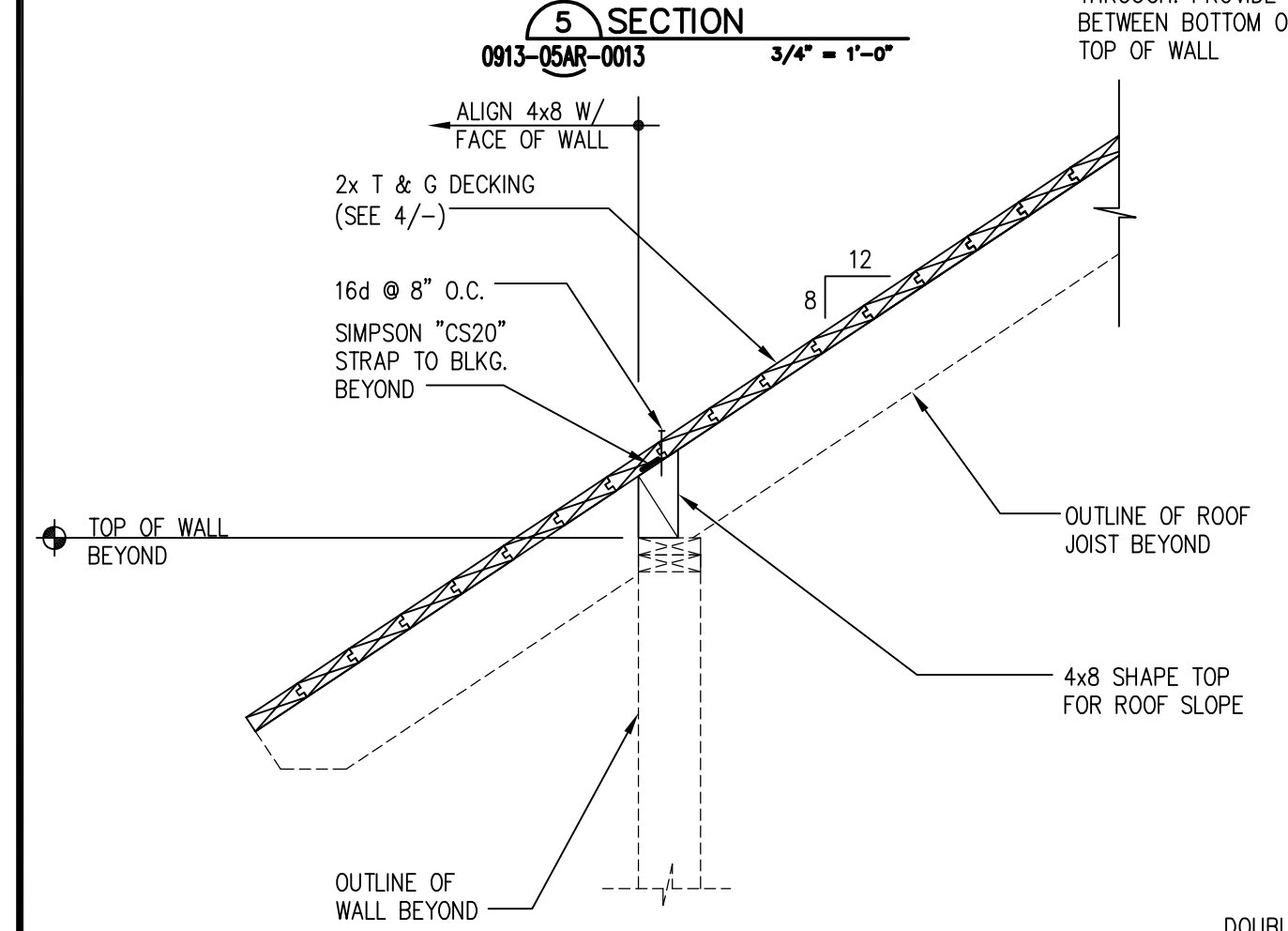
6 SECTION
0913-05AR-0015 3/4" = 1'-0"



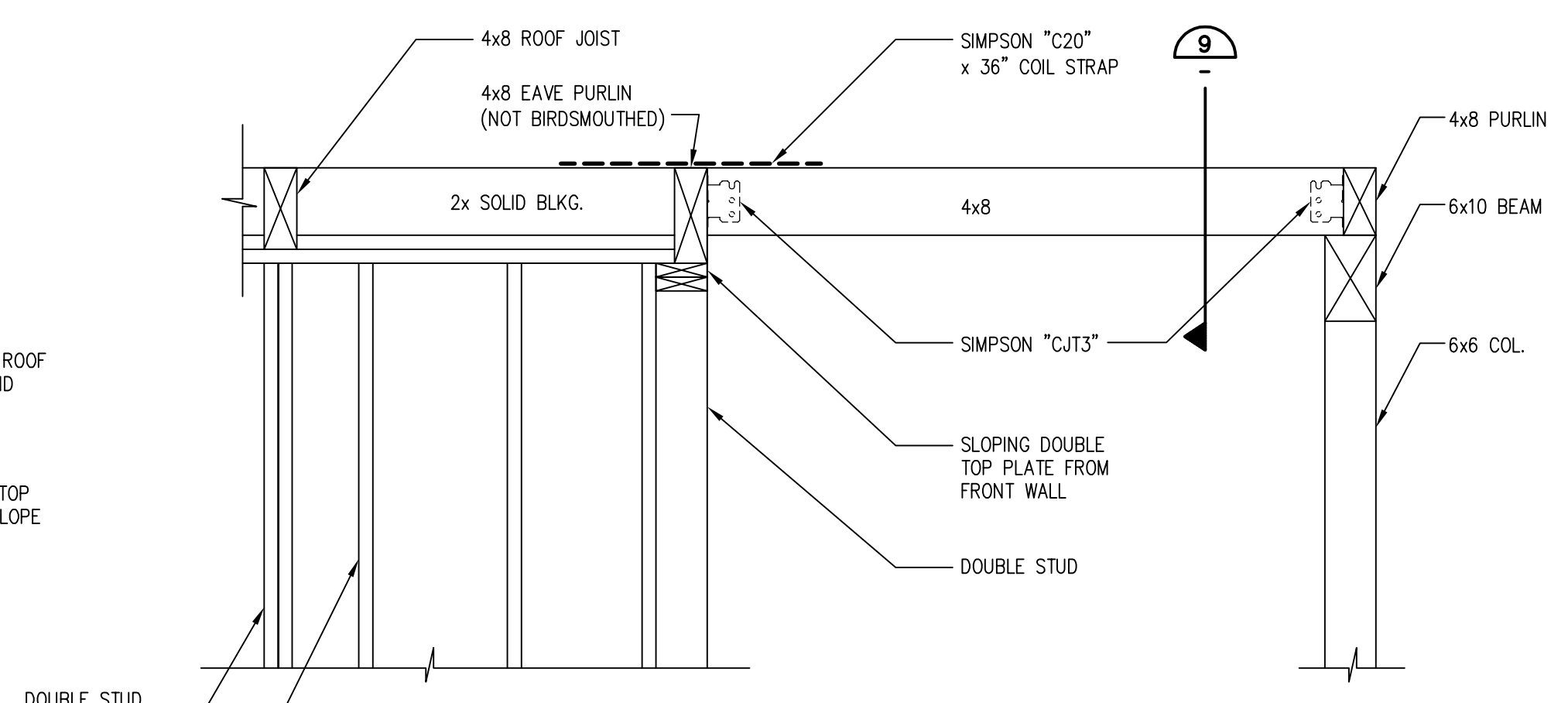
7 PLAN
0913-05AR-0015 3/4" = 1'-0"



8 ENLARGED PARTIAL ROOF FRAMING PLAN
0913-05AR-0013 3/4" = 1'-0"

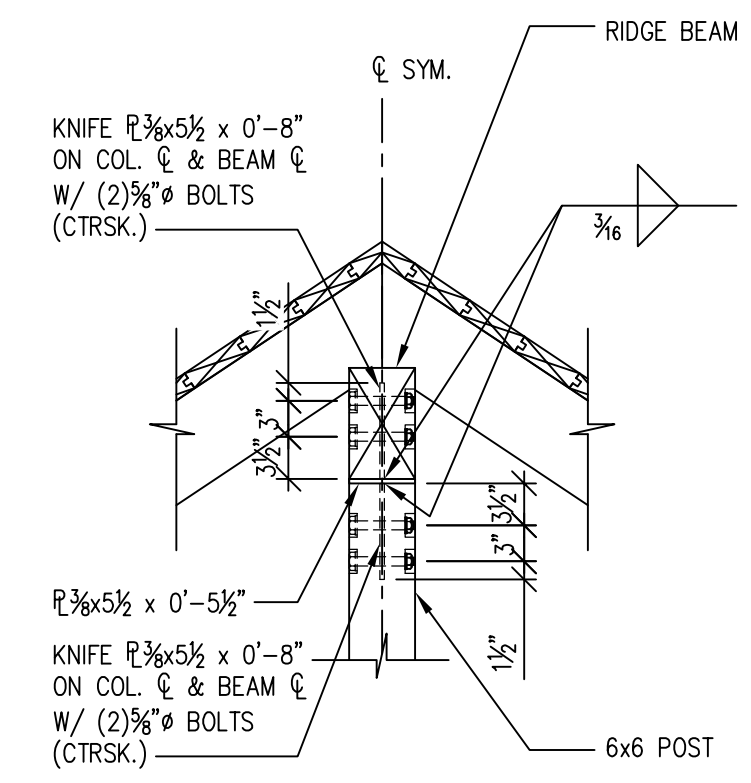


9 SECTION
0913-05AR-0013 3/4" = 1'-0"

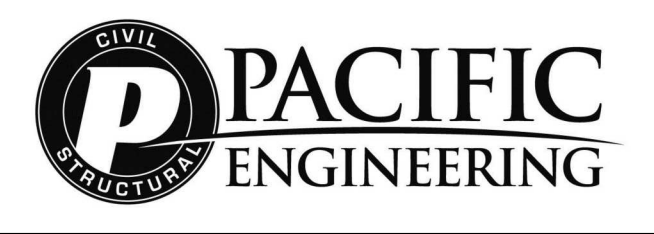


NOTES:
1. ADDITIONAL FRAMING NOT SHOWN.

10 SECTION
0913-05AR-0015 3/4" = 1'-0"



11 SECTION
0913-05AR-0015 3/4" = 1'-0"



PRIM. ENG. MIKE ROLFS	CHELAN PUD NO. 1
2ND ENG.	PRIM. ENG. C. HILL
DESIGNER	2ND ENG.
APPROVAL	PROJ. MGR. C. HILL

SCALE VARIES	11/14/2014	BID SET	0	1"
REV	DATE	REVISION	REQ. BY	DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

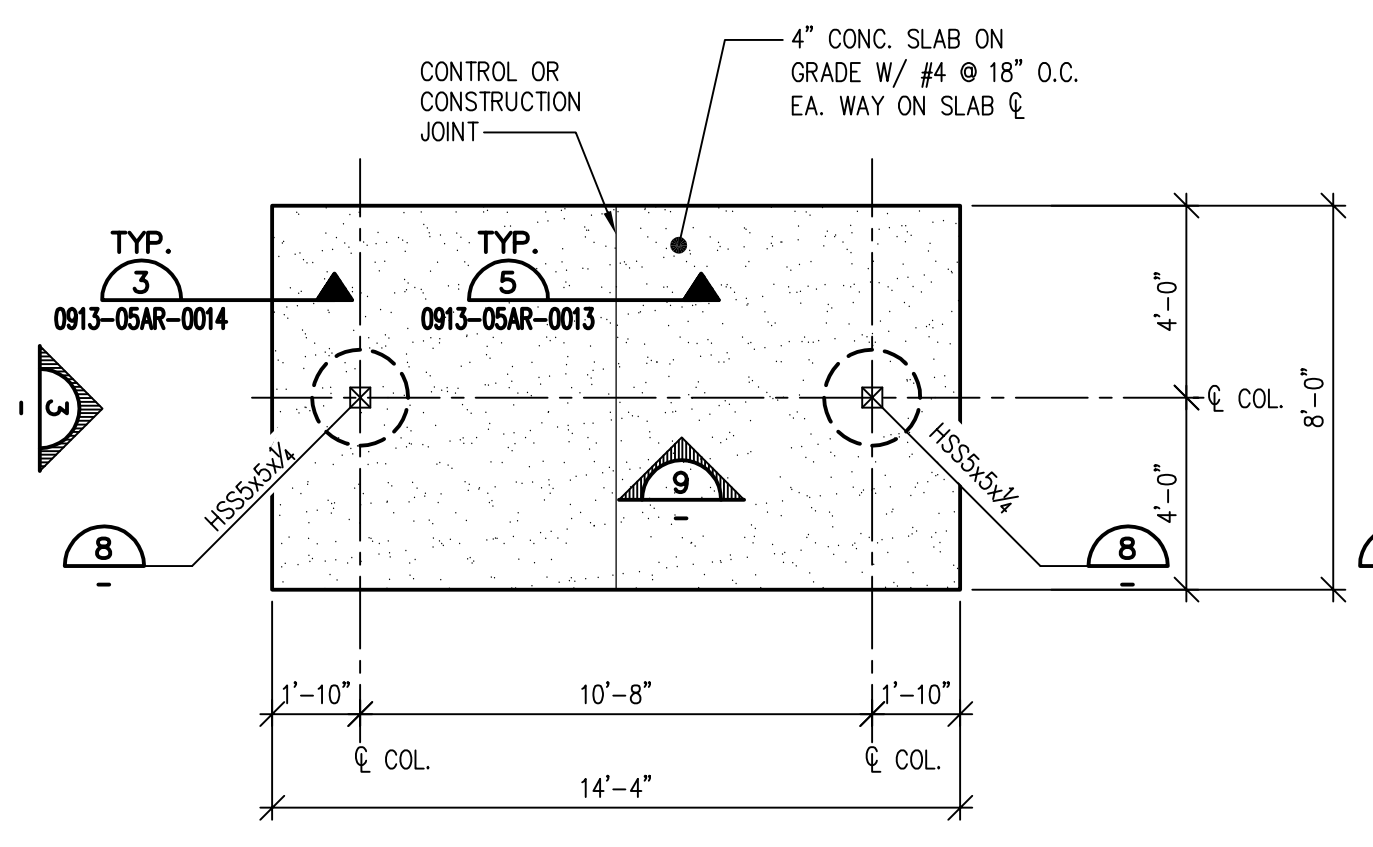
LINCOLN ROCK STATE PARK
CABIN STRUCTURAL
ROOF FRAMING DETAILS

SHEET AS.5 OF AS.6
REVISION 0
DATE 11/14/2014
DWG. 0913-05AR-0016

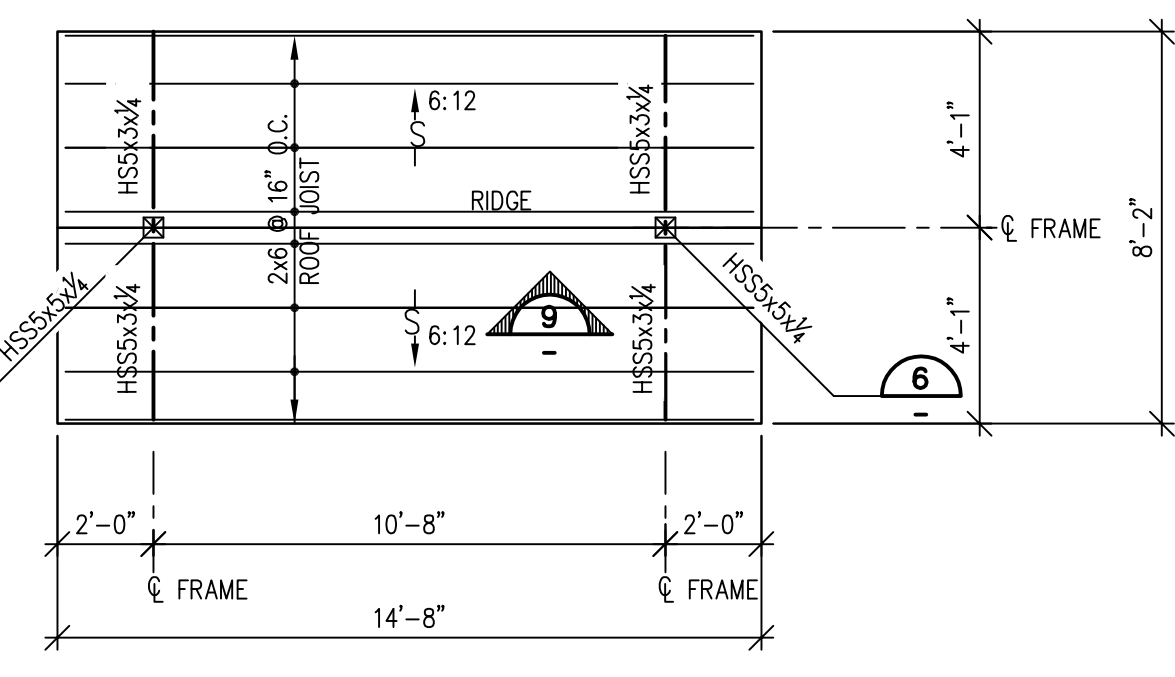
BID NO. 14-31



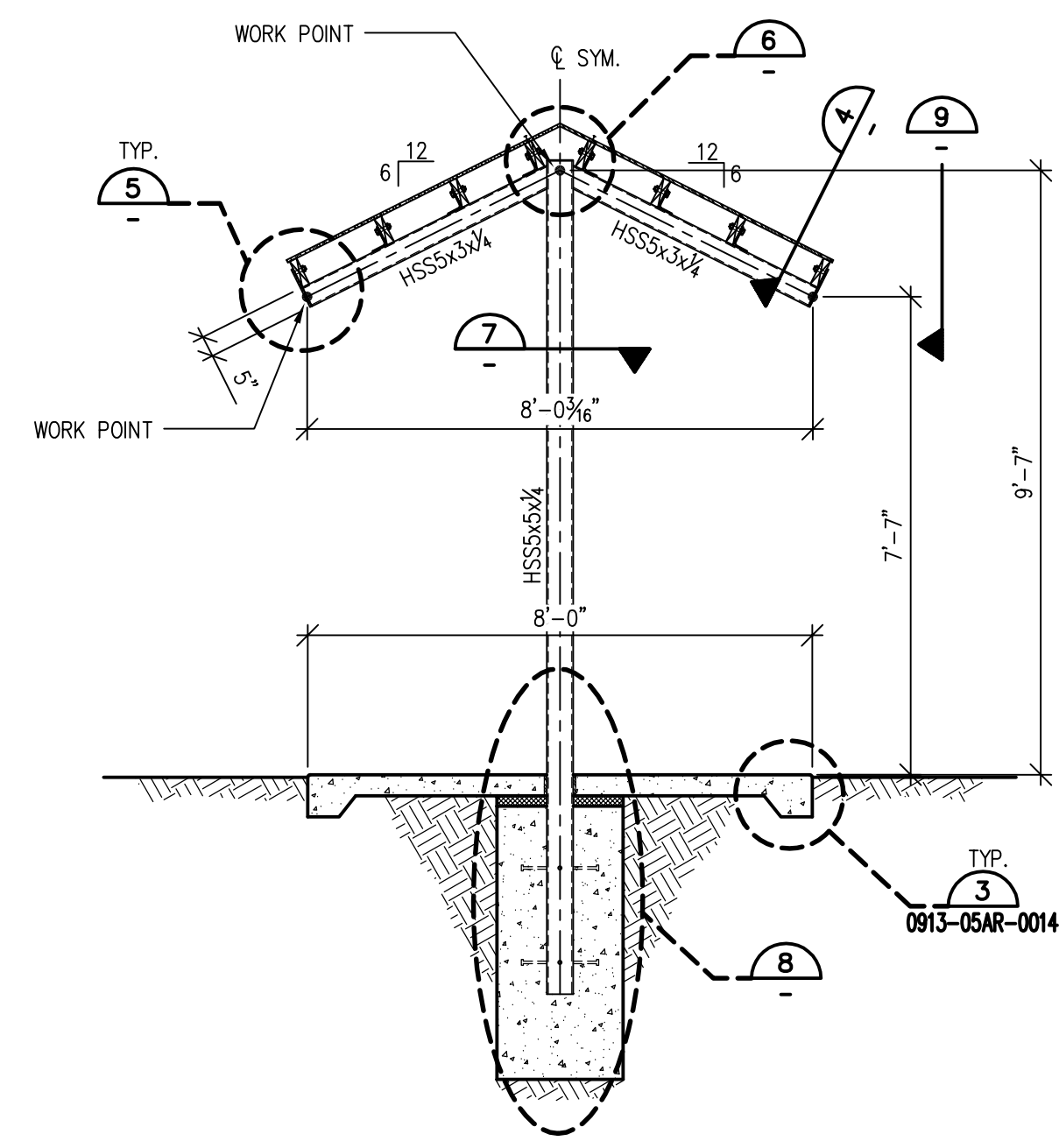
ORIG. DATE 6/1/2014
ORIG. DRAWN PED



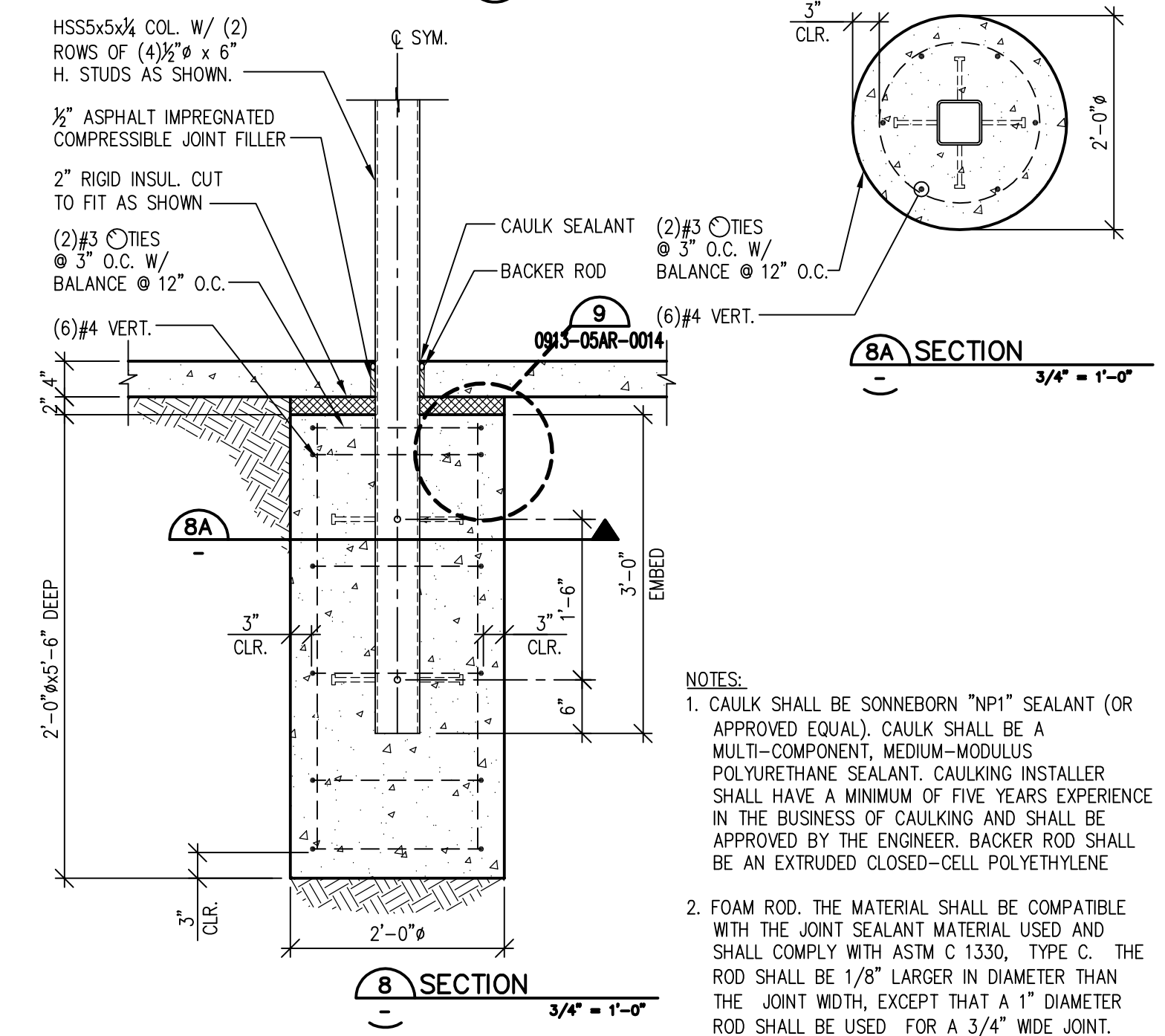
1 FOUNDATION PLAN
1/4" = 1'-0"



2 ROOF FRAMING PLAN
1/4" = 1'-0"



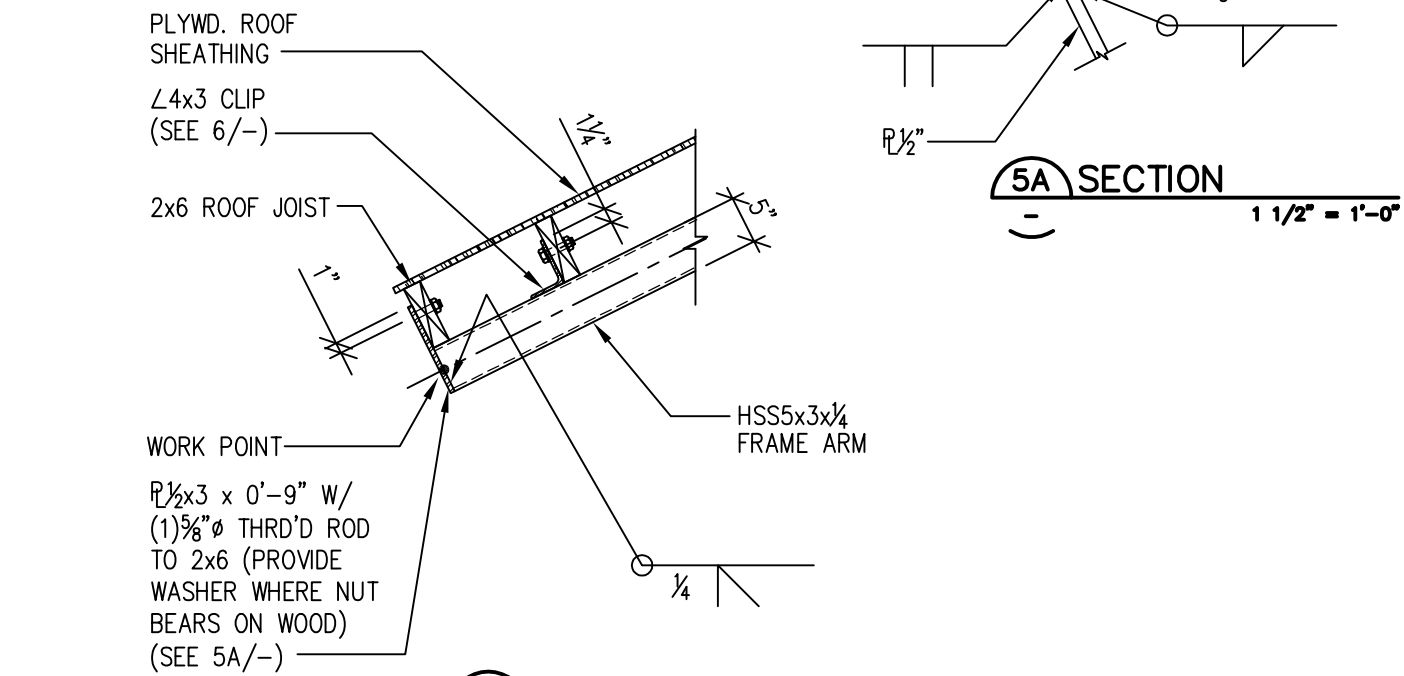
3 SECTION
3/8" = 1'-0"



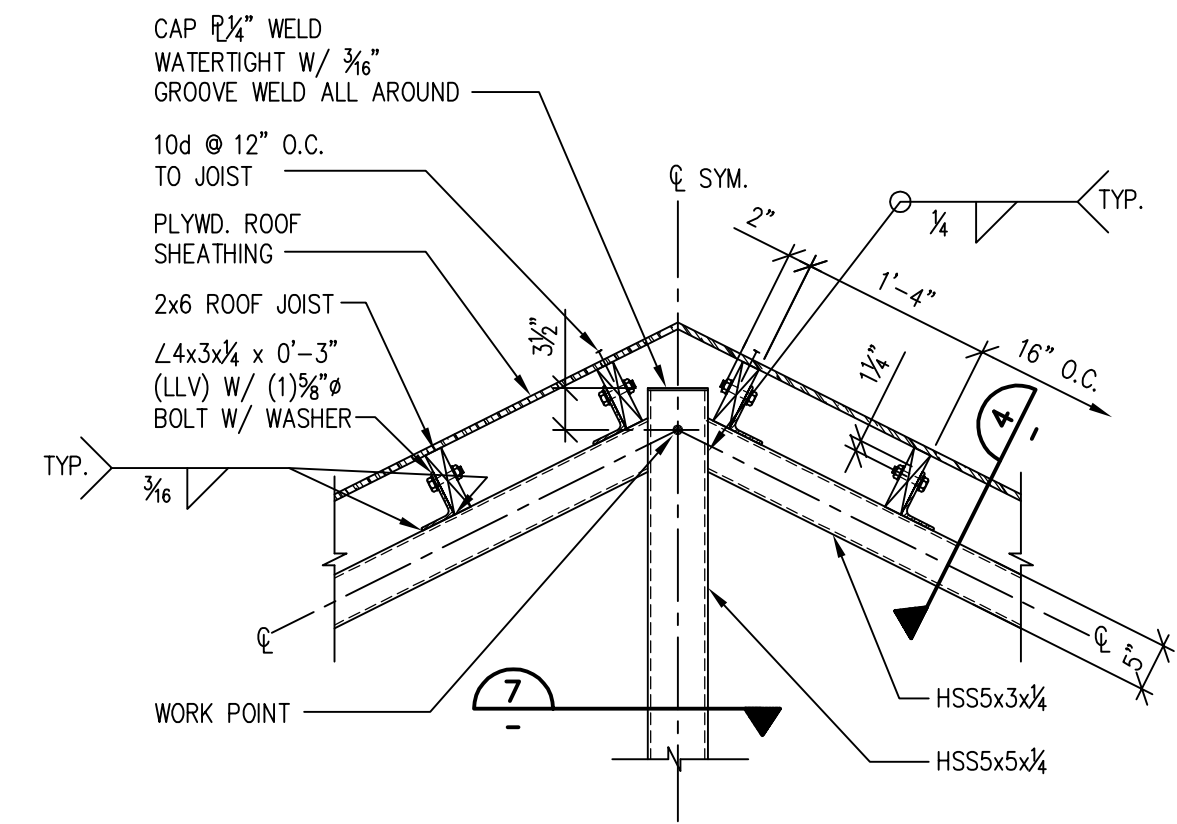
4 SECTION
3/4" = 1'-0"

8A SECTION
3/4" = 1'-0"

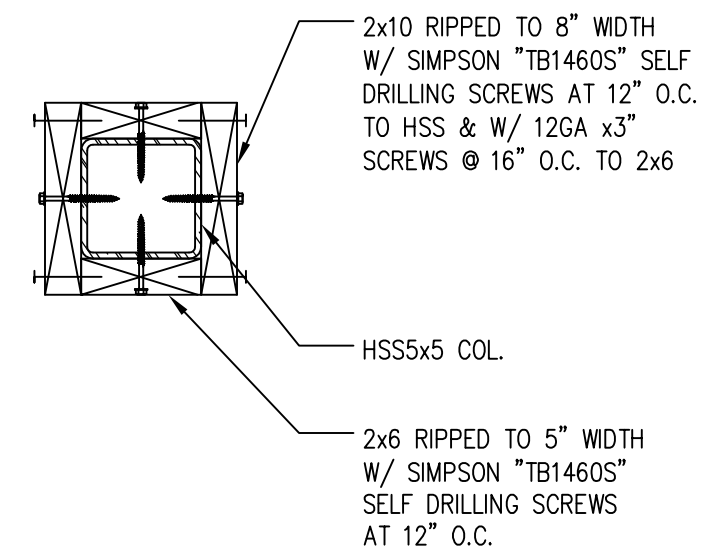
NOTES:
1. CAULK SHALL BE SONNEBORN "NP1" SEALANT (OR APPROVED EQUAL). CAULK SHALL BE A MULTI-COMPONENT, MEDIUM-MODULUS POLYURETHANE SEALANT. CAULKING INSTALLER SHALL HAVE A MINIMUM OF FIVE YEARS EXPERIENCE IN THE BUSINESS OF CAULKING AND SHALL BE APPROVED BY THE ENGINEER. BACKER ROD SHALL BE AN EXTRUDED CLOSED-CELL POLYETHYLENE
2. FOAM ROD. THE MATERIAL SHALL BE COMPATIBLE WITH THE JOINT SEALANT MATERIAL USED AND SHALL COMPLY WITH ASTM C 1330, TYPE C. THE ROD SHALL BE 1/8" LARGER IN DIAMETER THAN THE JOINT WIDTH, EXCEPT THAT A 1" DIAMETER ROD SHALL BE USED FOR A 3/4" WIDE JOINT.



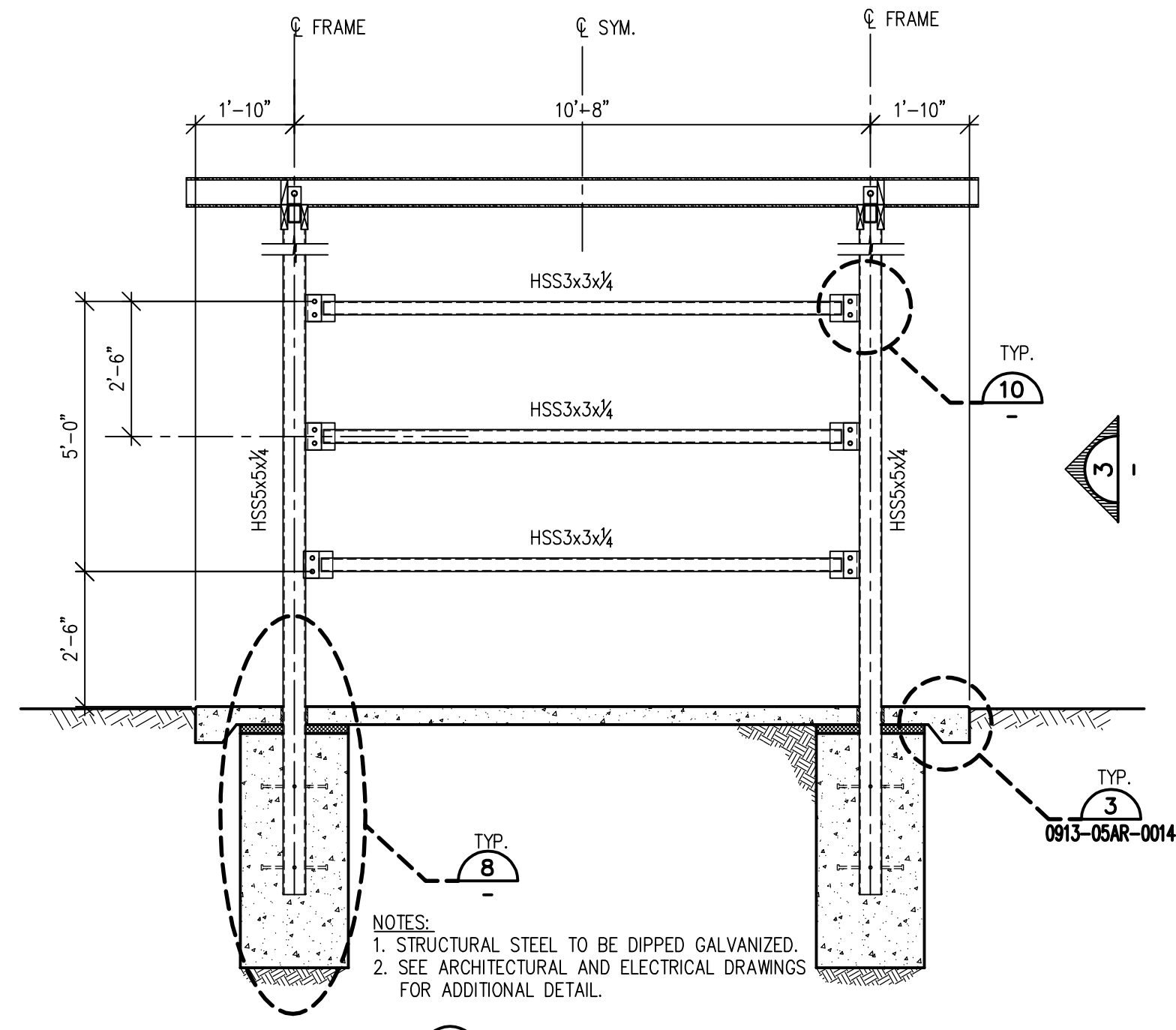
5 SECTION
3/4" = 1'-0"



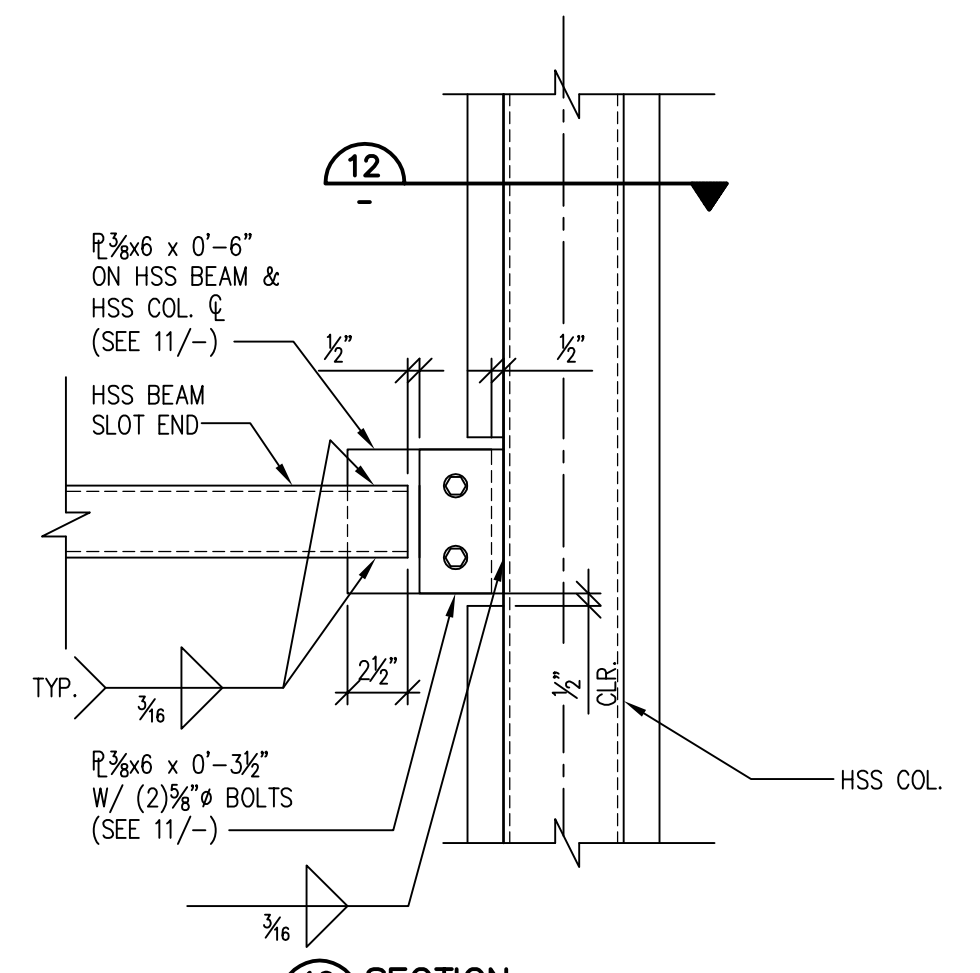
6 SECTION
3/4" = 1'-0"



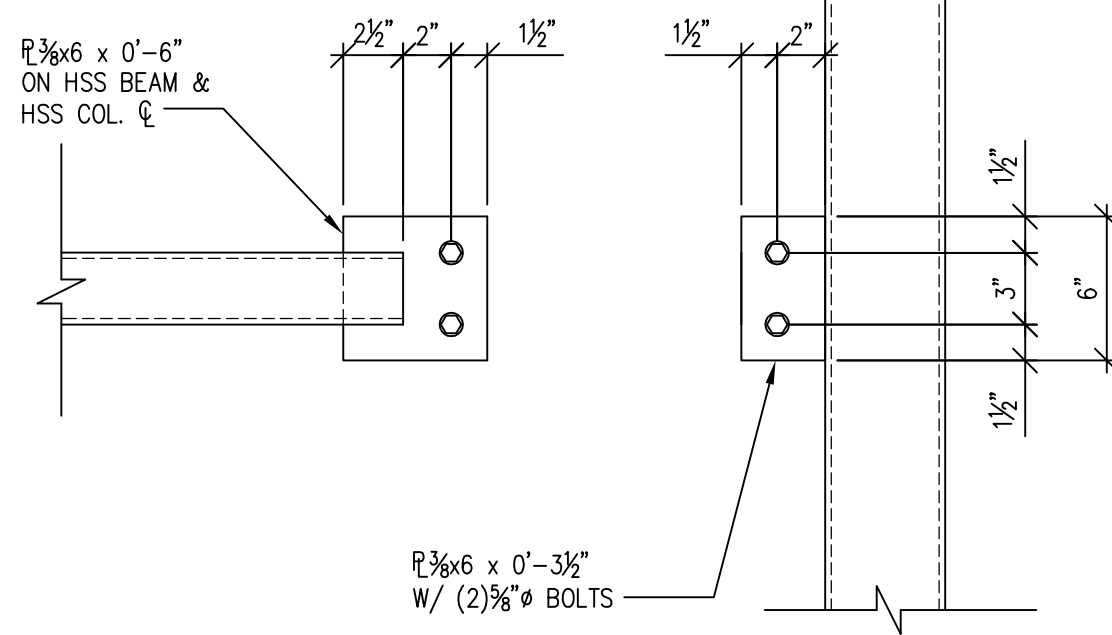
7 SECTION
1 1/2" = 1'-0"



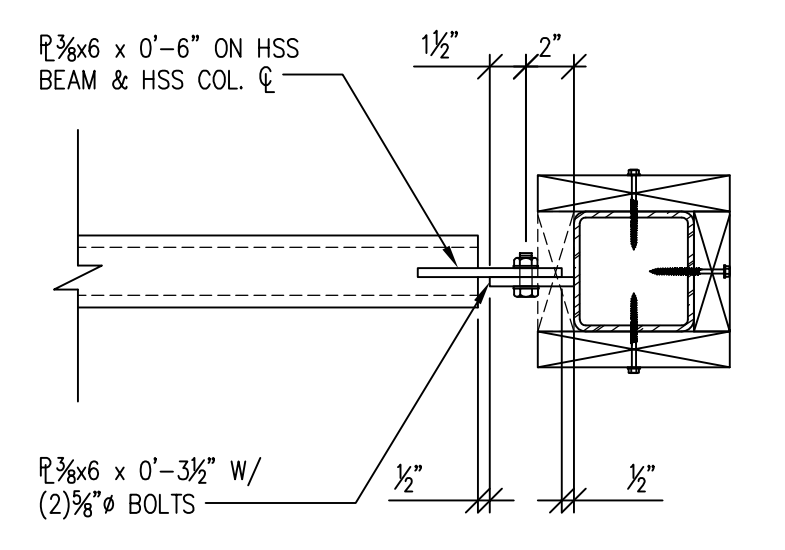
9 SECTION
3/8" = 1'-0"



10 SECTION
1 1/2" = 1'-0"



11 SECTION
1 1/2" = 1'-0"



12 SECTION
1 1/2" = 1'-0"

NOTES:
1. STRUCTURAL STEEL TO BE DIPPED GALVANIZED.
2. SEE ARCHITECTURAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL DETAIL.

NOTES:
1. SEE 7/- FOR ADDITIONAL INFO.



PRIM. ENG. MIKE ROLFS	CHELAN PUD NO.1
2ND ENG. PRIM. ENG. C. HILL	
DESIGNER 2ND ENG.	
APPROVAL PROJ. MGR. C. HILL	

SCALE VARIES	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0	11/14/2014	BID SET
REV	DATE	REVISION
		REQ. BY
		DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK CABIN LOOP KIOSK STRUCTURAL DETAILS	SHEET AS.6 OF AS.6
BID NO. 14-31	REVISION 0
	DATE 11/14/2014
	DWG. 0913-05AR-0017



ORIG. DATE 6/1/2014
ORIG. DRAWN PED

ABBREVIATIONS

ABBR	ABBREVIATIONS
ABV	ABOVE
AD	ACCESS DOOR
APF	ABOVE FINISHED FLOOR
APPROX	APPROXIMATE
ARCH	ARCHITECT
ASHRAE	AMERICAN SOCIETY OF HEATING, AND AIR CONDITIONING
BDD	BACKDRAFT DAMPER
BFC	BELOW FINISHED CEILING
BOD	BOTTOM OF DUCT
BTU	BRITISH THERMAL UNITS
BTUH	BRITISH THERMAL UNITS PER HOUR
CFM	CUBIC FEET PER MINUTE
CIRC	CIRCULATING
CO	CLEAN OUT
COND	CONDENSATE
CONT	CONTINUATION
CV	CONSTANT VOLUME
CW	COLD WATER
DB	DRY BULB TEMPERATURE
DEG	DEGREE
DIA	DIAMETER
DIM	DIMENSION
DN	DOWN
DWG	DRAWING
EA	EACH, EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EG	EXHAUST GRILLE
ELEC	ELECTRIC
ELEV, EL	ELEVATION
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPANSION
FA	FRESH AIR
FCO	FLOOR CLEANOUT
FD	FIRE DAMPER, FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FLA	FULL LOAD AMPS
FLR	FLOOR
FT	FOOT, FEET
G	GAS
GA	GAUGE
GAL	GALLONS
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
HP	HORSEPOWER
HR	HOUR
HVAC	HEATING, VENTILATION AND AIR CONDITIONING
HW	HOT WATER
HWC	HOT WATER CIRCULATING
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
ID	INDIRECT DRAIN, INSIDE DIAMETER
IN	INCH
KW	KILOWATT, (1000 WATTS)
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	1000 BTU PER HOUR
MCA	MINIMUM CIRCUIT AMPS
MFG	MANUFACTURER
MIN	MINIMUM
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
NIC	NOT IN CONTRACT
OAT	OUTSIDE AIR TEMPERATURE
OC	ON CENTER
OA	OUTSIDE AIR
OSA	OUTSIDE AIR
PH	PHASE
POC	POINT OF CONNECTION
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
RA	RETURN AIR
RD	ROOF DRAIN
REF	REFERENCE
RG	RETURN GRILLE
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SHT	SHEET
SI	INTERNALLY SPRING ISOLATED
SM	SHEET METAL
SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTOR'S NATIONAL ASSOCIATION
SP	STATIC PRESSURE
SPD	STATIC PRESSURE DROP
SPEC	SPECIFICATIONS
SWT	SWITCH
TOD	TOP OF DUCT
TPD	TOTAL PRESSURE DROP
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
V	VOLT, VENT
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VTR	VENT THROUGH ROOF
W	WASTE
WB	WET BULB TEMPERATURE
WCO	WALL CLEAN OUT
WG	WATER GAUGE
WH	WALL HYDRANT
WSEC	WASHINGTON STATE ENERGY CODE
WSVIAQ	WASHINGTON STATE VENTILATION AND INDOOR AIR QUALITY CODE

NOTE: DRAWINGS MAY NOT CONTAIN ALL ABBREVIATIONS LISTED

LEGEND

SYMBOL	ABBR	DESCRIPTION
		ALIGNMENT GUIDE
		ANCHOR
		PIPE ELBOW DOWN
		PIPE ELBOW UP
		FLANGE
		FLEX CONNECTION
		TEE OUTLET UP
		TEE OUTLET DOWN
		AIR VENT
	AAV	AUTOMATIC AIR VENT
		BALANCING VALVE
		BALL VALVE
		BUTTERFLY VALVE
		CHECK VALVE
	FCO	CLEAN OUT
		CLEAN OUT - FLOOR
	WCO	CLEAN OUT - WALL
		GATE VALVE
		GLOBE VALVE
	HB OR WH	HOSE BIBB OR WALL
		INDIRECT DRAIN
		INSTRUMENT TEST
		MODULATING VALVE
		PETE'S PLUG (TEST CONNECTION)
		PLUG VALVE
		PRESSURE GAGE
		PUMP (DIRECTION SHOWN BY ARROW)
		PRESSURE REDUCING VALVE
		PRESSURE RELIEF VALVE
		SITE GLASS
		SOLENOID VALVE
		THERMOMETER
		THREE WAY VALVE
		TWO WAY VALVE
		UNION
		VENTURI FLOW VALVE
		WYE STRAINER WITH VALVE
		WYE STRAINER
	RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
	DCVA	DOUBLE CHECK VALVE ASSEMBLY
	DDCVA	DOUBLE DETECTOR CHECK VALVE
	RPBP	REDUCED PRESSURE BACKFLOW PREVENTER WITH FUNNEL DRAIN
	FD	FLOOR DRAIN
	FS	FLOOR SINK
	CW	COLD WATER
	HW	HOT WATER
	HWC	HOT WATER CIRCULATION
	W	WASTE
	V	VENT
	VTR	VENT THROUGH ROOF

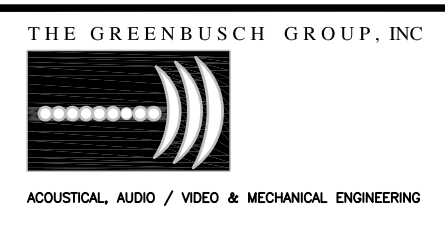
SYMBOL	ABBR	DESCRIPTION
	CWS	CWS CHILLED WATER SUPPLY
	CWR	CWR CHILLED WATER RETURN
	HWS	HWS HEATING WATER SUPPLY
	HWR	HWR HEATING WATER RETURN
	LPG	LPG LIQUID PETROLEUM GAS
	MWS	MWS MIXED WATER SUPPLY
	MWR	MWR MIXED WATER RETURN
	RWL	RWL RAINWATER LEADER
	ORL	ORL OVERFLOW RAINWATER LEADER
	LPS	LPS LOW PRESSURE STEAM (0-25 PSIG)
	MPS	MPS MED. PRESSURE STEAM (26-60 PSIG)
	HPS	HPS HIGH PRESSURE STEAM (61-125 PSIG)
	RS	RS REFRIGERANT SUCTION
	RL	RL REFRIGERANT LIQUID
	C	C CONDENSATE DRAIN
	G	G NATURAL GAS
	SS	SS SANITARY SEWER
	F	F FIRE PROTECTION WATER
		PIPE SIZE REDUCTION
	DN	PIPE SLOPE DOWN
		PIPE CAP

	DETAIL NO.	DETAIL
	SECTION DESIGNATION	SECTION
	GRID	GRID
	DIFFUSER OR GRILLE TYPE	DIFFUSER OR GRILLE TYPE
	DIRECTION OF FLOW	DIRECTION OF FLOW
	EQUIPMENT ITEM XX	EQUIPMENT ITEM XX
	LINE, ARCHITECTURAL BACKGROUND	LINE, ARCHITECTURAL BACKGROUND
	LIGHT LINE, EXISTING	LIGHT LINE, EXISTING
	HEAVY LINE, NEW WORK	HEAVY LINE, NEW WORK
	ROUND DUCT DIAMETER	ROUND DUCT DIAMETER
	X PLAN OR HORIZONTAL DIMENSION	X PLAN OR HORIZONTAL DIMENSION
	Y ELEVATION OR VERTICAL DIMENSION	Y ELEVATION OR VERTICAL DIMENSION

SYMBOL	ABBR	DESCRIPTION
		EXISTING WORK TO BE REMOVED
		BREAK IN PIPE OR DUCTWORK
		FLAG NOTE
		REVISION NOTE
		AREA CLOUDED CONTAINS CHANGES TO DRAWINGS SUBSEQUENT TO PREVIOUS ISSUE
	DN	DUCT OFFSET DOWN IN FLOW DIRECTION
	UP	DUCT OFFSET UP IN FLOW DIRECTION
		DUCT WITHOUT SOUNDLINING
		SINGLE LINE DUCT W/ INTERNAL LINING
		DUCT WITH INTERNAL LINING ACOUSTICAL LINING
		FLEXIBLE CONNECTION OR FLEXIBLE DUCT
	FLEX	FLEXIBLE DUCT
	RA/EA	RETURN AIR DUCT/RETURN DUCT UP
	RG	RETURN AIR GRILLE
	SA	SUPPLY AIR OUTLET, SIDEWALL
	SA	SUPPLY AIR DUCT/SUPPLY DUCT UP
	RA/EA	RETURN AIR OR EXHAUST AIR DUCT
	SD	SUPPLY GRILLE OR DIFFUSER OPEN AREA INDICATED ACTIVE ELEMENTS (4 WAY IF HATCH IS NOT SHOWN)
	EA	EXHAUST AIR DUCT/EXHAUST DUCT UP
	EG	EXHAUST AIR GRILLE
		TRANSITION - RECTANGULAR TO ROUND
		RECTANGULAR ELBOW WITH TURNING VANES
		90° (R/D OR R/W=1.5)
		90° ELBOW TAKE-OFF WITH 45° TAPER
		90° CONICAL TAKE-OFF
		SWITCH
		THERMOSTAT TO EQUIPMENT LOCATION
	BDD	BACK DRAFT DAMPER
	FD	FIRE DAMPER WALL OR CEILING
	FSD	FIRE AND SMOKE DAMPER
	VD	VOLUME DAMPER
	MOD	MOTOR OPERATED DAMPER
		CLEARANCE REQUIREMENT

DRAWING INDEX

M1.1	CABIN LOOP MECHANICAL - LEGEND, ABB. & DRAWING INDEX
M1.2	CABIN LOOP MECHANICAL - 2012 SEC & GENERAL NOTES
M1.3	CABIN LOOP MECHANICAL - SCHEDULES
M1.4	CABIN LOOP MECHANICAL - PLANS
M1.5	CABIN LOOP MECHANICAL - HVAC
M1.6	CABIN LOOP MECHANICAL - DETAILS



CONSULTANT		CHELAN PUD NO.1	
PRIM. ENG. JWG		PRIM. ENG.	
2ND ENG.		2ND ENG.	
PRIN ENG. J. GREENLAW		PROJ. MGR. Court Hill	

SCALE	DATE
NTS	11/24/2014
0	REV

VERIFY SCALE	
BAR IS ONE INCH ON ORIGINAL DRAWING.	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0	1"
BID SET	REVISION
REQ. BY	DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
 CABIN LOOP MECHANICAL
 LEGEND, ABB. & DRAWING DETAILS

BID NO. 14-31

SHEET M1.1 OF M1.6
REVISION 0
DATE 11/24/2014
DWG. 0913-05BS-0001

ORIG. DRAWN: SBS

2012 WASHINGTON STATE ENERGY CODE

- HVAC EQUIPMENT SHALL HAVE MINIMUM PERFORMANCE AT SPECIFIED RATING CONDITIONS NOT LESS THAN THE VALUES INDICATED IN TABLE C403.2.3(1)A,(1)B,(1)C,(1)D,(2),(3),(4),(5),(7),(8),(9) OF THE WSEC AND AS INDICATED ON THE CONTRACT DOCUMENTS.
- PROVIDE DEADBAND BETWEEN HEATING/COOLING SPACE SENSOR SETPOINTS OF 5 DEGREES AS REQUIRED BY SECTION C403.2.4.2 OF THE WSEC OR AS DESCRIBED IN THE TEMPERATURE CONTROL SEQUENCES.
- PROVIDE BALANCING DEVICES IN ALL BRANCH DUCTS AND PIPE RUNS TO TERMINAL DEVICES AS REQUIRED BY SECTION C408.2.2.1 OF THE WSEC AND AS INDICATED ON THE CONTRACT DOCUMENTS.
- ALL DUCTWORK SHALL COMPLY WITH SMACNA STANDARDS FOR CONSTRUCTION OF GALVANIZED DUCTWORK. ALL DUCTWORK SHALL BE SEALED AS REQUIRED BY SECTION C403.2.7 OF THE WSEC. DUCT TAPE NOT ALLOWED.

DUCTWORK STATIC PRESSURE AND SEAL CLASS:

<u>WATER COLUMN</u>	<u>SEAL CLASS</u>
½ TO 3 INCHES	SEAL TRANSVERSE JOINTS AND LONGITUDINAL SEAMS
ABOVE 3 INCHES	SEAL TRANSVERSE JOINTS, LONGITUDINAL SEAMS AND DUCT WALL PENETRATIONS

- ALL DUCTWORK SHALL BE INSULATED AS REQUIRED BY SECTION C403.2.7 OF THE WSEC AND AS DESCRIBED IN SECTION 230700 OF THE PROJECT MANUAL.

DUCT TYPE	LOCATION	R-VALUE
SUPPLY/RETURN	NOT WITHIN CONDITIONED SPACE	R-7 (INCLUDE APPROVED WEATHERPROOF BARRIER)
SUPPLY/RETURN/OUTSIDE AIR	IN GROUND OR CONCRETE	R-5.3
OUTSIDE AIR	WITHIN CONDITIONED SPACE (NOT CONSIDERED PART OF THE BUILDING ENVELOPE)	R-7 (DAMPER AT ENVELOPE PENETRATION)
SUPPLY	WITHIN CONDITIONED SPACE	R-3.3

- ALL PIPING SHALL BE INSULATED AS REQUIRED BY SECTION C403.2.8 OF THE WSEC AND AS DESCRIBED IN SECTION 220700 AND 230700 OF THE PROJECT MANUAL:

MINIMUM PIPE INSULATION THICKNESS

SYSTEM/TEMP (°F)	INSULATION CONDUCTIVITY			NOMINAL PIPE DIAMETER				
	CONDUCTIVITY BTU·in./(h·ft ² ·F)	MEAN RATING TEMPERATURE, °F	< 1"	1" to < 1-1/2"	1-1/2" to < 4"	4" to < 8"	≥ 8"	
HEATING	> 350	0.32-0.34	250	4.5	5.0	5.0	5.0	5.0
	251-350	0.29-0.32	200	3.0	4.0	4.5	4.5	4.5
	201-250	0.27-0.30	150	2.5	2.5	3.0	3.0	3.0
	141-200	0.25-0.29	125	1.5	1.5	2.0	2.0	2.0
COOLING	105-140	0.21-0.28	100	1.0	1.0	1.5	1.5	1.5
	40-60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0
	< 40	0.20-0.26	75	0.5	1.0	1.0	1.0	1.5

- SIMULTANEOUS HEATING AND COOLING TO INDIVIDUAL ZONES SHALL BE PROHIBITED AS DESCRIBED IN THE TEMPERATURE CONTROL SEQUENCES EXCEPT WHERE PERMITTED IN SECTION C403.3 AND C403.4 OF THE WSEC.
- VARIABLE FREQUENCY DRIVES SHALL BE PROVIDED FOR VARIABLE FLOW HEATING, AIR HANDLING SYSTEMS, AND WATER SOURCE HEAT PUMP LOOPS SUBJECT TO THE REQUIREMENTS OF SECTION C403.2.12 AND AS DESCRIBED BY SECTION C403.4 OF THE WSEC AND AS DESCRIBED IN THE CONTRACT DOCUMENTS INCLUDING TEMPERATURE CONTROL SEQUENCES.
- MOTOR EFFICIENCY SHALL NOT BE LESS THAN THE MINIMUM AS REQUIRED BY SECTION C403.2.10.3 AND C403.2.13 OF THE WSEC FOR FULL LOAD EFFICIENCIES.
- RECORD DRAWINGS SHALL BE PROVIDED TO THE OWNER AS REQUIRED BY SECTION C408.1.3.1 OF THE WSEC. THE DRAWINGS SHALL INDICATE THE LOCATION AND PERFORMANCE DATA OF EQUIPMENT, GENERAL CONFIGURATION OF DUCTWORK AND PIPING DISTRIBUTION SYSTEMS, INCLUDING FLOW RATES AS A MINIMUM.
- OPERATION AND MAINTENANCE MANUALS SHALL BE PROVIDED TO THE OWNER AS SPECIFIED AND PER SECTION C408.1.3.2.
- HVAC SYSTEMS SHALL BE BALANCED AS REQUIRED BY SECTION C408.2.2 OF THE WSEC.
- COMMISSIONING SHALL BE PROVIDED AND REPORT OF COMMISSIONING SHALL BE SUBMITTED TO THE OWNER AS REQUIRED BY SECTION C408 OF THE WSEC. COMMISSIONING SHALL CONSIST OF A COMMISSIONING PLAN, BALANCING, FUNCTIONAL PERFORMANCE TESTING, POST CONSTRUCTION COMMISSIONING, TRAINING, REPORTS AND ACCEPTANCE. SUBMIT COMMISSIONING COMPLIANCE CHECKLIST TO BUILDING OFFICIAL UPON COMPLETION.
- CONTROL SYSTEM SHALL PROVIDE 7 DAY PROGRAMMING AND SETBACK CAPABILITY, OPTIMUM START, THERMOSTAT INTERLOCK AND TEMPERATURE RESET.
- PROVIDE ELECTRIC HOT WATER HEATERS WITH MINIMUM R-10 INSULATION PAD UNDER THE TANK.
- PROVIDE AUTOMATIC SHUTOFF FOR ALL DOMESTIC WATER CIRCULATION PUMPS. SEE ALSO SPECIFICATION SECTION 230900.
- RESET HEATING AND COOLING TEMPERATURES AUTOMATICALLY. SEE ALSO SPECIFICATION SECTION 230900.
- PROVIDE ISOLATION VALVES FOR ALL EQUIPMENT CONNECTED TO FLUID PIPING.
- MECHANICAL SYSTEM EQUIPMENT SIZING COMPLIES WITH ENERGY CODE COMPLIANCE LIMITS SECTION C403.2.1 AND C403.2.2.
- DAMPERS SHALL COMPLY WITH WSEC 1412.4.1, INCLUDING DAMPERS INTEGRAL TO HVAC EQUIPMENT, AND SHALL HAVE A MAXIMUM LEAKAGE RATE WHEN TESTED IN ACCORDANCE WITH AMCA STANDARD 500 OF:
 - MOTORIZED DAMPERS: 10 CFM/FT² OF DAMPER AREA AT 1.0 INCH W.G.
 - NON-MOTORIZED DAMPERS: 20 CFM/FT² OF DAMPER AREA AT 1.0 INCH W.G., EXCEPT THAT FOR NON MOTORIZED DAMPERS SMALLER THAN 24 INCHES IN EITHER DIMENSION: 40 CFM/FT².
- THE HVAC SYSTEM AND ITS CONTROLS SHALL ALLOW ECONOMIZER OPERATION WHEN MECHANICAL COOLING IS REQUIRED SIMULTANEOUSLY. AIR AND WATER ECONOMIZERS SHALL BE CAPABLE OF PROVIDING PARTIAL COOLING EVEN WHEN ADDITIONAL MECHANICAL COOLING IS REQUIRED TO MEET THE REMAINDER OF THE COOLING LOAD.
- TEST DUCTWORK FOR LEAKAGE IN ACCORDANCE WITH CITY OF BURIEN REQUIREMENTS, DUCT TESTING STANDARD RS-33. IDENTIFY AND RECTIFY ALL LEAKS DISCLOSED BY TESTING, AND PROVIDE REPORT OF TEST PROCEDURE, RESULTS AND CORRECTIVE MEASURES REQUIRED TO SECURE A SUCCESSFUL TEST.

GENERAL NOTES

- THE MECHANICAL SYSTEM SHALL CONSIST OF ALL WORK SHOWN ON THE DRAWINGS, INCLUDING PLANS, DIAGRAMS, DETAILS, ETC., AND ALL WORK AS IDENTIFIED IN THE SPECIFICATIONS. WORK INCLUDES FURNISHING, INSTALLING SYSTEM, INTEGRATION, TESTING, TRAINING AND WARRANTY OF THE MECHANICAL SYSTEMS AS SHOWN AND SPECIFIED. PROVIDE A COMPLETE AND WORKABLE MECHANICAL SYSTEM COMPLETE WITH ALL MECHANICAL WORK AS REQUIRED FOR SYSTEM OPERATION.
- THE DESIGN OF MECHANICAL SYSTEMS HAS BEEN BASED UPON THE EQUIPMENT AS MANUFACTURED BY THE MANUFACTURERS LISTED ON THE EQUIPMENT SCHEDULE. EQUIPMENT NAMED IN THE SPECIFICATIONS MAY BE SUBSTITUTED PROVIDED THAT THE EQUIPMENT MEETS OR EXCEEDS ALL SCHEDULED AND SPECIFIED CRITERIA, AND HAS THE WRITTEN APPROVAL OF THE DISTRICT. COORDINATE THE INSTALLATION WITH ALL TRADES AND GUARANTEE IN WRITING THAT NO ADDITIONAL COST WILL BE INCURRED DUE TO PRODUCT SUBSTITUTION.
- CONTRACTOR SHALL FIELD VERIFY ALL BUILDING AND SITE DIMENSIONS BEFORE BEGINNING CONSTRUCTION OR ORDERING EQUIPMENT. DO NOT SCALE FROM PLANS.
- PIPING OR DUCTWORK PENETRATIONS THROUGH WALLS, PARTITIONS, CEILINGS AND ROOFING SYSTEMS SHALL BE SEALED AIRTIGHT. PIPING, DUCTWORK, OR STRUCTURAL COLUMN PENETRATION THROUGH PLENUMS, DUCTS OR RETURN SHAFTS SHALL BE SEALED AIRTIGHT. PIPING PENETRATIONS THROUGH SLAB SHALL BE SLEEVED AND SEALED WATERTIGHT.
- FLEXIBLE DUCTWORK IS PROHIBITED.
- PROVIDE ALL REQUIRED ELECTRICAL POWER, MOTOR STARTERS AND CONTROL INTERFACE AND CONNECTIONS AS REQUIRED FOR SYSTEM OPERATION. COORDINATE REQUIREMENTS WITH THE ELECTRICAL CONTRACTOR.
- PROVIDE ALL REQUIRED EQUIPMENT GUARDS AND STRUCTURAL SUPPORT AS RECOMMENDED BY EQUIPMENT MANUFACTURERS TO SUPPORT EQUIPMENT AND TO ASSURE SYSTEM PERFORMANCE AND SAFE OPERATION. COORDINATE PRIOR TO INSTALLATION. PROVIDE ACCESS PANELS AS REQUIRED TO MAINTAIN EQUIPMENT, ACCESS VALVES AND DAMPER OPERATORS. COORDINATE FIRE RATING WITH THE ARCHITECTURAL DOCUMENTS.
- COORDINATE LOCATION OF ALL THERMOSTATS AND ALL WALL MOUNTED EQUIPMENT, WITH THE ARCHITECT. LOCATIONS AS SHOWN ON THE DRAWINGS ARE FOR REFERENCE ONLY. LOCATE THERMOSTATS 4'-0" AFF. UNLESS NOTED OTHERWISE.
- PROVIDE UNIT SUPPORT PER MANUFACTURERS RECOMMENDATIONS. BUILDING AND STRUCTURE IS DESIGNED TO SUPPORT EQUIPMENT, BUT NOT DETAILED TO ACCOMMODATE EACH AVAILABLE EQUIPMENT CONFIGURATION OR MANUFACTURER. CONTRACTOR SHALL PROVIDE MATERIALS AND SERVICES INCLUDING BUT NOT LIMITED TO, ADDITIONAL STEEL, SUPPORT BRACKETS, HANGERS, ACCESSORIES, AND STRUCTURAL ENGINEERING AS REQUIRED TO SUPPORT EQUIPMENT.
- MAINTAIN 10'-0" CLEARANCE BETWEEN OUTSIDE AIR INTAKE AND EXHAUST OUTLET.
- PROVIDE FRAMING, CUTTING, BLOCKING AND PATCHING AS REQUIRED.
- PROVIDE MINIMUM OUTSIDE AIR PER WASHINGTON ADMINISTRATIVE CODE REQUIREMENTS.



THE GREENBUSCH GROUP, INC.

 ACUSTICAL, AUDIO / VIDEO & MECHANICAL ENGINEERING

CONSULTANT		CHELAN PUD NO.1	
PRIM. ENG. JWG	PRIM. ENG.	PRIN. ENG. J. GREENLAW	PROJ. MGR. Court Hill
2ND ENG.	2ND ENG.		

SCALE		VERIFY SCALE	
NTS	0 1"	0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0	11/24/2014	BID SET	
REV	DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
 CABIN LOOP MECHANICAL
 2012 WSEC & GENERAL NOTES
 BID NO. 14-31

SHEET M1.2 OF M1.6
REVISION 0
DATE 11/24/2014
DWG. 0913-05BS-0002

ORIG. DATE

2012 WSEC COMPLIANCE

CONTRACTOR SHALL FURNISH MECHANICAL SYSTEM IN ACCORDANCE WITH THE MECHANICAL REQUIREMENTS SET FORTH IN THE WASHINGTON STATE NONRESIDENTIAL ENERGY CODE. REQUIREMENTS INCLUDE BUT ARE NOT LIMITED TO:

APPLICABILITY (IC,NIC)	CODE SECTION	COMPONENT	DESCRIPTION	LOCATION
HVAC REQUIREMENTS				
A. C403.2.3 EQUIPMENT PERFORMANCE				
NIC	C403.2.3.3	PACKAGED ELECTRIC HEATING & COOLING	HEAT PUMP SCHEDULE	-
IC	C403.2.3(1)A	MINIMUM EFFICIENCY	EQUIPMENT TYPE, CAPACITY, EFFICIENCY	M0.2
IC	C403.2.3(1)A	COMBUSTION HEATING	INTERMITTENT IGNITION, FLUE/DRAFT DAMPER & JACKET LOSS	M0.2
B. C403.2.4 HVAC CONTROLS				
IC	C403.2.4.1	TEMPERATURE ZONES	AS SHOWN ON PLANS	M2.1
NIC	C403.2.4.2	DEADBAND CONTROL	5 DEGREE F DEADBAND MINIMUM	-
NIC	C403.2.4.1	HUMIDITY CONTROL	HUMIDISTAT	-
NIC	C403.2.4.3.2	AUTOMATIC SETBACK	THERMOSTAT WITH NIGHT SETBACK & 7 DIFFERENT DAY TYPES	-
NIC	C403.2.4.4	DAMPERS	DAMPER LOCATION AND AUTOMATIC CONTROLS & MAXIMUM LEAKAGE	-
NIC	C403.2.4.1.1	OPTIMUM START	OPTIMUM START CONTROLS	-
NIC	C403.2.4.1.1	HEAT PUMP CONTROL	MICROPROCESSOR ON THERMOSTAT SCHEDULE	-
NIC	C403.2.4.6	COMBUSTION HEATING	MODULATING OR STAGED CONTROL	-
IC	C408.2.2	BALANCING	BALANCING FEATURES ON PLANS	M2.1
NIC	C403.2.4.1	THERMOSTAT INTERLOCK	THERMOSTAT INTERLOCK ON PLANS	-
NIC	C403.3.1	ECONOMIZERS	EQUIPMENT SCHEDULE	-
C. C403.3.11.1 AIR ECONOMIZERS				
NIC	C403.3.1.1.3(1)	AIR ECONOMIZER OPERATION	100% CAPABILITY ON SCHEDULE	-
NIC	C403.3.4.1.1	WATER ECONOMIZER OPERATION	100% CAPACITY AT 45 DEGREES F DB & 40 DEGREES F WB	-
NIC		WATER ECONOMIZER DOCUMENTATION	COOLING LOAD & WATER ECONOMIZER & COOLING TOWER PERFORMANCE	-
NIC	C403.3	INTEGRATED OPERATION	CAPABILITY FOR PARTIAL COOLING	-
NIC	C403.2.3.4	HUMIDIFICATION	DIRECT EVAPORATIVE OR FOG ATOMIZATION WITH AIR ECONOMIZER	-
D. DUCTING SYSTEMS				
NIC	C403.2.7	DUCT SEALING	DUCT SEALANT	-
NIC		DUCT INSULATION (ACOUSTICAL)	R-VALUE OF INSULATION OF DUCT (ACOUSTICAL)	-
NIC	C403.2.8	PIPING INSULATION	R-VALUE OF INSULATION OF PIPING	-
E. C408 COMPLETION REQUIREMENTS				
IC	C408.1	DRAWINGS & MANUALS	REQUIREMENT FOR RECORD DRAWINGS & OPERATION DOCUMENTS	230500
NIC	C408.2.2.1	AIR BALANCING	AIR SYSTEM BALANCE REQUIREMENTS	-
NIC	C408.2.2.2	HYDRONIC BALANCING	HYDRONIC SYSTEM BALANCE REQUIREMENTS	-
NIC	C408.4	COMMISSIONING SUPPORT	REQUIREMENTS FOR COMMISSIONING SUPPORT	-
NIC	C403.2.12.2	SEPARATE AIR SYSTEM	SEPARATE SYSTEM ON PLANS	-
SYSTEM TYPE				
A. C403.4 COMPLEX SYSTEM				
IC	C403.4.1.2	CONTROLS	SETBACK & SHUT-OFF	230913
NIC	C403.4.1.2	ECONOMIZERS	AIR ECONOMIZER ON SCHEDULE	-
NIC	C403.4.5	SEPARATE AIR DISTRIBUTION SYSTEMS	SPECIAL PROCESS COOLING	-
NIC	C403.4.1.2	SIMULTANEOUS HEATING AND COOLING	SIMULTANEOUS OPERATION	-
NIC	C403.2.6	HEAT RECOVERY	SCHEDULE TO REUTILIZE RECOVERED EXHAUSTED AIR	-
IC	C403.2.13	ELECTRIC MOTOR EFFICIENCY	MOTOR PERFORMANCE	230500
NIC	C403.4.2	VARIABLE FLOW SYSTEMS	VARIABLE SPEED MOTOR CONTROLS	-
NIC	C403.2.5.4.1	EXHAUST HOODS	KITCHEN HOOD UTILIZATION	-
SERVICE WATER HEATING				
NIC	C405.5	ELECTRIC WATER HEATER	R-10 INSULATION UNDER TANK	-
NIC	C404.8	SHUT-OFF CONTROLS	AUTOMATIC SHUT-OFF	-
IC	C404.6	PIPE INSULATION	R-VALUE OF INSULATION ON PIPING	230700
NIC	C404.10.1	HEAT PUMP COP	MINIMUM COP OF 4.0	-
NIC	C403.2.3(1)D	HEATER EFFICIENCY	POOL HEATER EFFICIENCY	-
NIC	C404.10.1	POOL HEATER CONTROLS	SWITCH AND 65 DEGREE CONTROL	-
NIC	C404.10.3	POOL COVERS	VAPOR RETARDANT COVER	-
NIC	C404.10.3	POOLS 90+ DEGREES	R-12 POOL COVER	-

IC = INCLUDED IN CONTRACT
NIC = NOT INCLUDED IN CONTRACT

PLUMBING CONNECTION SCHEDULE

FIXTURE	MARK	SYMBOL	SERVICE CONNECTION				BASIS OF DESIGN
			WASTE	VENT	CW	HW	
FLOOR CLEAN OUT	FCO	∞	4"	-	-	-	ZURN Z-1400-2
LAVATORY	L-1	⊙	1"	2"	1/2"	1/2"	KOHLER CAXTON 2210 WITH CHICAGO 802 FAUCET
SINK	S-1	□	2"	2"	1/2"	1/2"	ELKAY LR 2522 WITH CHICAGO 200 FAUCET
SINK	S-2	□	2"	2"	1/2"	1/2"	ELKAY LRADQ 2522 WITH CHICAGO 200 FAUCET-ADA COMPLIANT
WATER CLOSET	WC-1	⊐	3"	2"	1/2"	-	TANK TYPE AMERICAN STANDARD CADET ADA. BEMIS 1955C SEAT
WATER CLOSET	WC-2	⊐	3"	2"	1/2"	-	TANK TYPE AMERICAN STANDARD CADET
SHOWER	SH-1	⊐	2"	2"	1/2"	1/2"	FIBERFAB 60 H1 WITH PREINSTALLED SEAT, GRAB BAR, MIXING SHOWER VALVE, SLIDEBAR, AND SPRAY HEAD OPTIONS
SHOWER	SH-2	⊐	2"	2"	1/2"	1/2"	FIBERFAB 40 H1KD WITH PREINSTALLED SEAT, GRAB BAR, MIXING SHOWER VALVE, SLIDEBAR, AND SPRAY HEAD OPTIONS
HOSE BIB	HB	↔	-	-	3/4"	-	ZURN Z-1300 FROST FREE

NOTES:
1. EXTEND AND CONNECT PIPING TO ALL PLUMBING FIXTURES. FURNISH COMPLETE, FUNCTIONAL SYSTEM.
2. ALL BASIS OF DESIGN PRODUCTS MAY BE SUBSTITUTED FOR AN APPROVED EQUAL.

HEATPUMP UNIT SCHEDULE

MARK	CFM	COOLING NOMINAL BTUH	HEATING NOMINAL BTUH	SEER	WEIGHT LBS	MCA	MOCF	VOLT	PHASE	DESCRIPTION
HP -1	360	12,000	13,000	20	80	12	15	230	1	SPLIT SYSTEM HEATPUMP SYSTEM INDOOR AND OUTDOOR UNIT, MITSUBISHI MSZ-FH12NA/MUZ-FH12NA

NOTES:
1. COOLING RATING AT INDOOR 80 DEG F DB, 67 DEG F WB, OUTDOOR 95 DEG F DB, 75 DEG F WB
2. HEATING RATED AT 5F DEGREE OUTSIDE AIR TEMPERATURE.
3. DISCONNECT WIRED AND INSTALLED BY DIVISION 26.
4. PROVIDE EXTERNAL HEAT RELAY KIT, PERMANENT WALL MOUNTED THERMOSTAT, CONDENSATE DETECTOR AND LINE SET.

MECHANICAL / ELECTRICAL COORDINATION

ITEM NO.	EQUIPMENT DESCRIPTION	VOLTS	PH	CONTROL EQUIPMENT						REMARKS	
				PROVIDED UNDER DIVISION		FURNISHED/MOUNTED UNDER DIVISION		WIRED UNDER DIVISION			
				22/23	26	22/23	26	N/A	22/23		26
IWH-1	DOMESTIC WATER HEATER	230	1	X		X			X		1,2
EF-1	EXHAUST FAN	120	1	X		X			X		1,3
HP-1	HEAT PUMP INDOOR/OUTDOOR UNIT	230	1	X		X			X		1,2
UH-1	UNIT HEATER	120	1	X		X			X		1,2
-	HEAT TRACE TAPE	120	1	X		X			X		1,2

REMARKS:
1. VERIFY QUANTITY FROM PLANS (TYPICAL ALL)
2. DISCONNECT SWITCH
3. DISCONNECT/TIMER SWITCH COMBO

DOMESTIC HOT WATER HEATER

MARK	REMARKS
IWH-1	ELECTRIC INSTANT HOT WATER HEATER. 13 KW, 230V, 60 AMP BREAKER, 1 PHASE 1.75 GPM AT 50F DELTA T. PROVIDE WITH 100W FREEZE PROTECTION, RHEEM RTE 13 OR ACCEPTED EQUAL.

EXHAUST FAN SCHEDULE

MARK	CFM	TSP, "W.G	ELECTRICAL			WEIGHT LBS	REMARKS
			HP/WATTS	VOLTS	PHASE		
EF-1	70	0.25	18 W	120	1	3.1	1,2,3

REMARKS:
1. BASIS FOR DESIGN: PANASONIC FV-08WQ1 SP OR APPROVED EQUAL
2. WALL MOUNTED
3. PROVIDE WITH BACKDRAFT DAMPER
4. SERVES AS WHOLE HOUSE FAN. OPERATE 8 HOURS OF EACH 24 HOUR PERIOD PER WSEC.

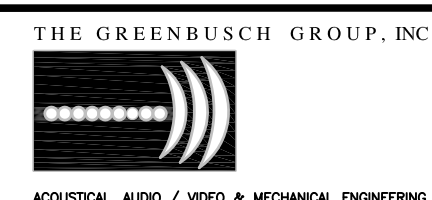
WALL CAP SCHEDULE

MARK	LOCATION	CFM	AIR VELOCITY FPM	STATIC PRESSURE	SIZE	LOCATION	REMARKS
WC-1	EXTERIOR	75	382	<.08"WG	6"ø	EXTERIOR	1,2

REMARKS:
1. PROVIDE ALL WALL CAPS WITH INSECT SCREEN
2. BASIS FOR DESIGN: FAMCO HOODED WALL VENT
A. OR APPROVED EQUAL

UNIT HEATER SCHEDULE

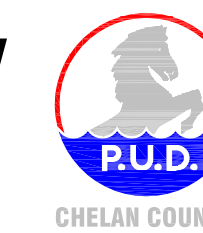
MARK	TYPE	ELECTRICAL DATA			ACCESSORIES
		WATTS	VOLTS	PHASE	
UH-1	FAN POWERED	500	120	1	FAN POWERED ELECTRIC UNIT HEATER, WALL MOUNTED, PROVIDE WITH MOUNTING ACCESSORIES, INTEGRAL THERMOSTAT. KING PAW OR ACCEPTED EQUAL.
UH-2	FAN POWERED	1000	240	1	FAN POWERED ELECTRIC UNIT HEATER, WALL MOUNTED, PROVIDE WITH MOUNTING ACCESSORIES, AND CONTROL RELAY FOR ACTIVATION BY HEAT PUMP. KING PAW OR ACCEPTED EQUAL.



CONSULTANT		CHELAN PUD NO.1	
PRIM. ENG. JWG		PRIM. ENG.	
2ND ENG.		2ND ENG.	
PRIN. ENG. J. GREENLAW		PROJ. MGR. Court Hill	

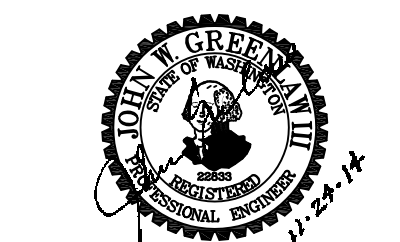
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NTS	0 1"	
0 11/24/2014	BID SET	
REV DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON



LINCOLN ROCK STATE PARK
CABIN LOOP MECHANICAL SCHEDULES

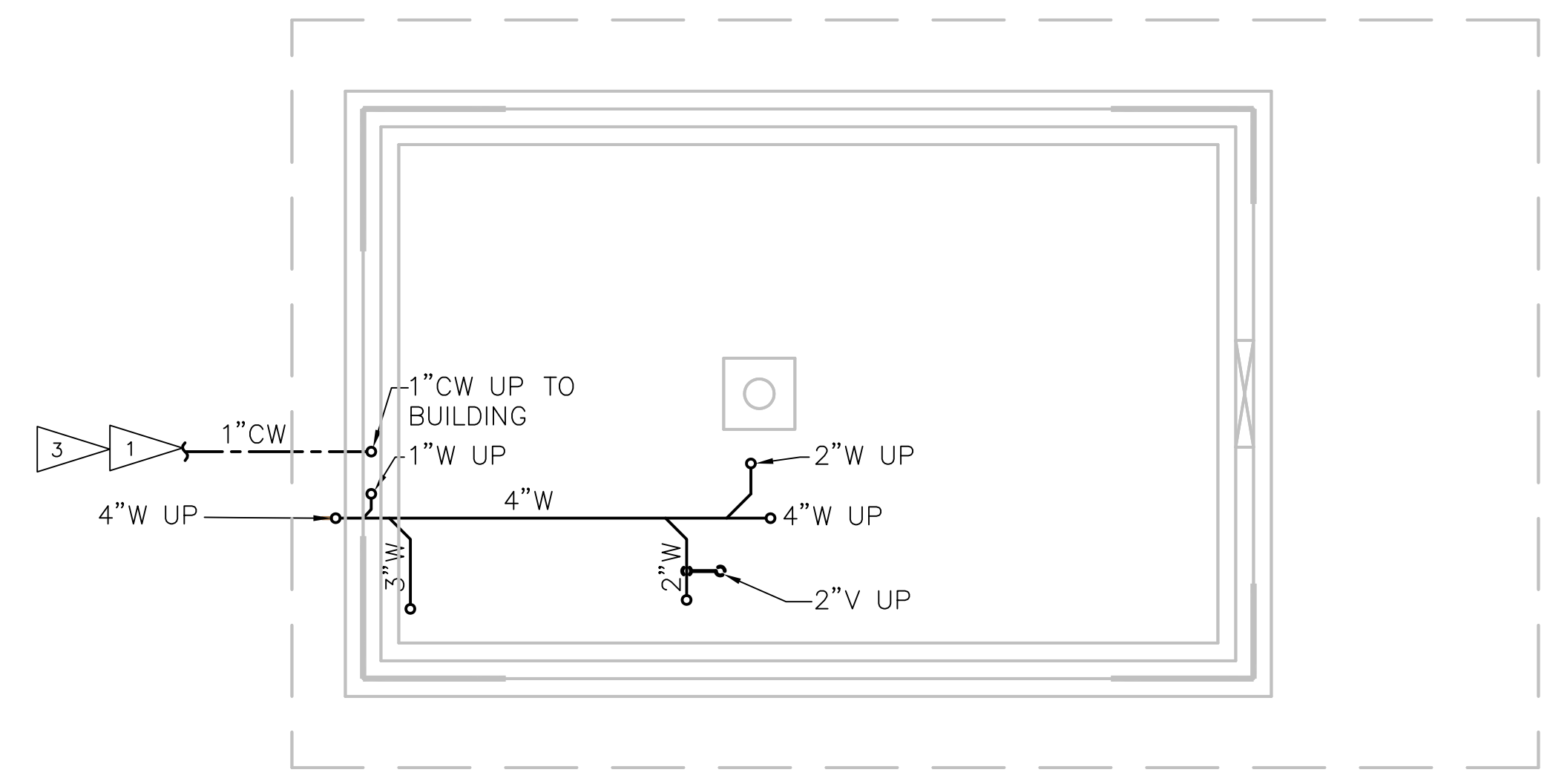
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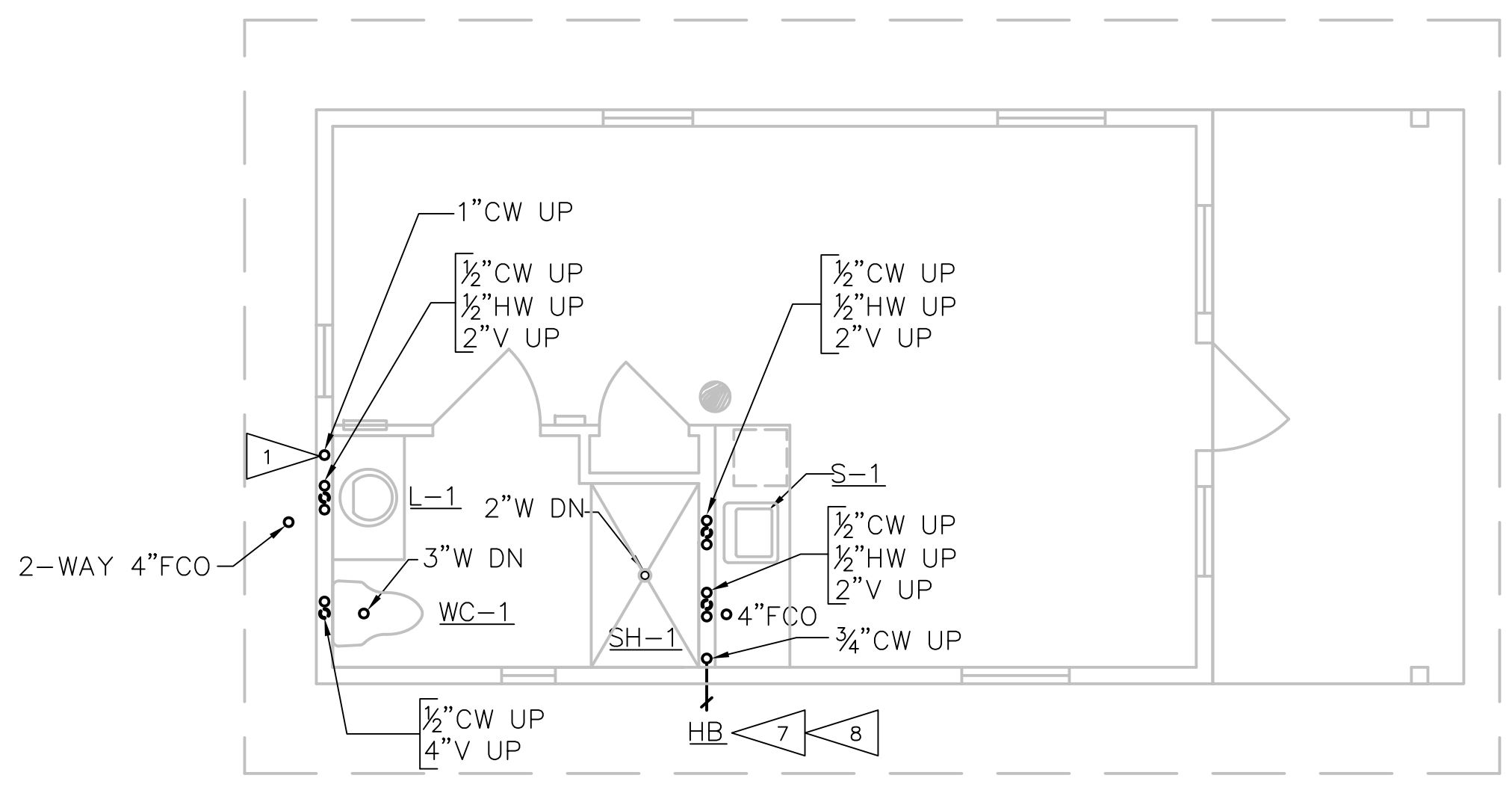
SHEET M1.3 OF M1.6
REVISION 0
DATE 11/24/2014
DWG. 0913-05BS-0003

FLAG NOTES:

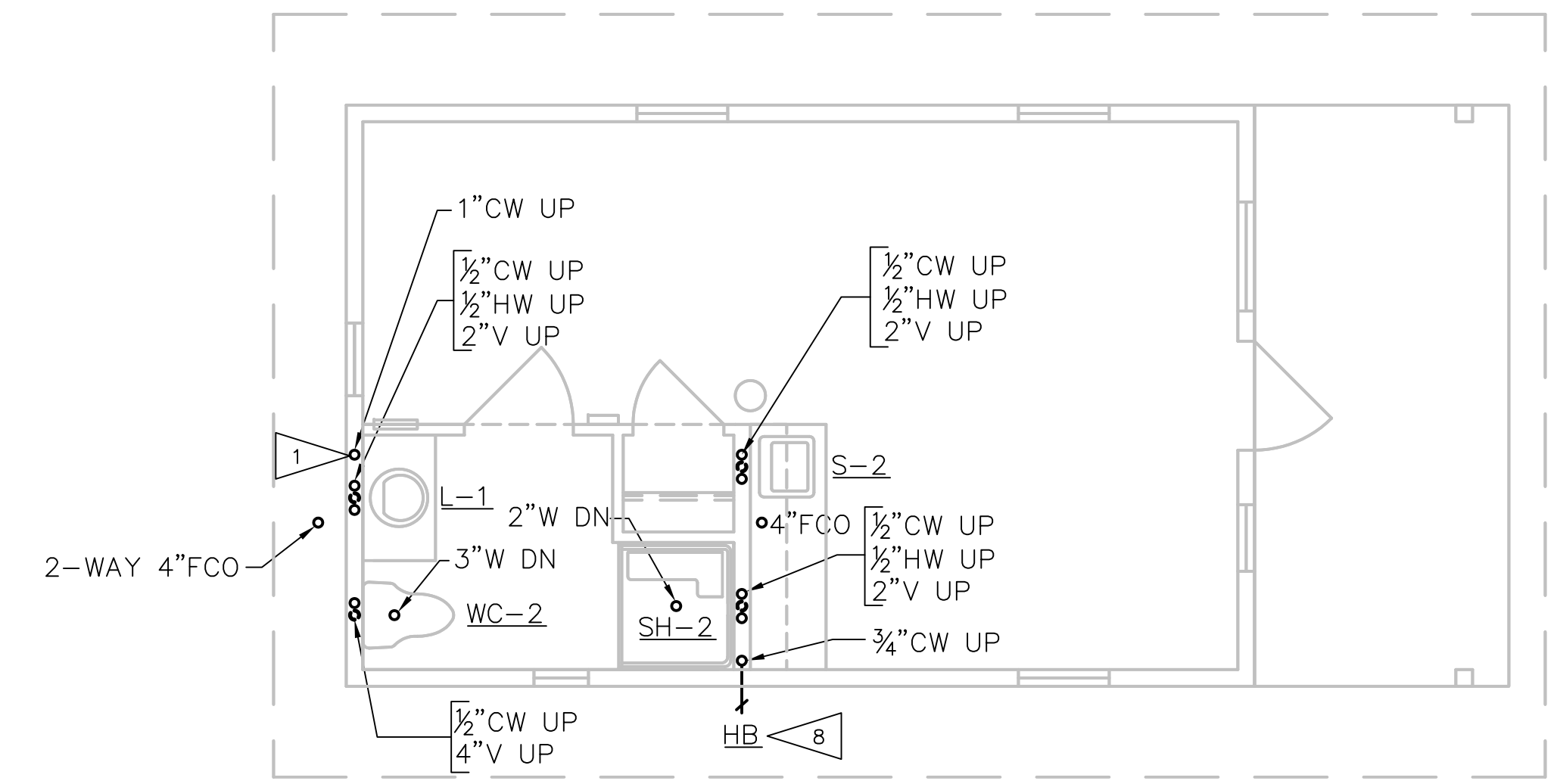
- 1 PROVIDE MAIN DOMESTIC WATER SHUT OFF VALVE IN SECTION OF VERTICAL CW PIPE BELOW VANITY. PROVIDE 12"X12" HINGED ACCESS PANEL.
- 2 NOT USED.
- 3 SEE DWG. 0913-50SU-0004 FOR PIPING CONTINUATION.
- 4 INSTALL IWH-1 IN LOFT SPACE WITH UNIT CLEARANCES PER MANUFACTURERS WRITTEN INSTRUCTIONS.
- 5 PROVIDE SHUTOFF VALVES ON THE BUILDING MAIN CW SUPPLY AND ON THE CW AND HW PIPING AFTER IWH-1.
- 6 NOT USED.
- 7 FROST FREE HOSE BIBS REQUIRED AT CABINS C6, C8, C10 AND C12.
- 8 COORDINATE FINAL HEIGHT WITH ARCHITECT.



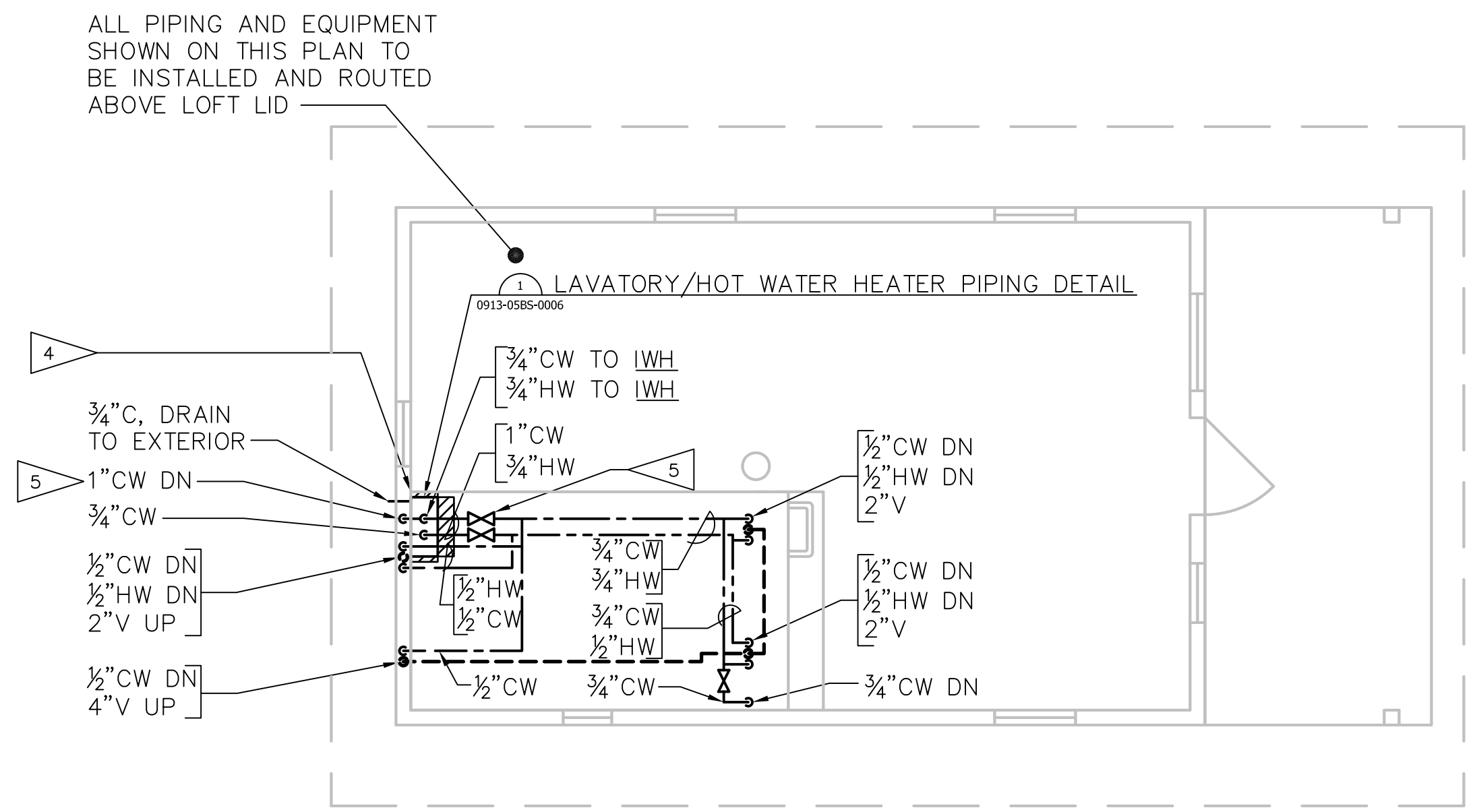
1 FOUNTAIN PLUMBING PLAN - TYPE "A" AND "B"
0913-05BS-0004 SCALE: 1/4"=1'-0"



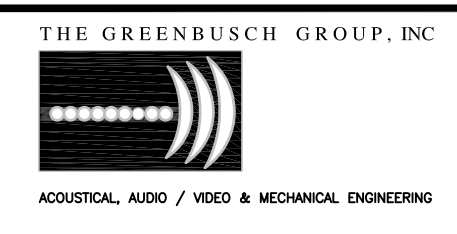
2 FIRST FLOOR PLUMBING - TYPE "A"
0913-05BS-0004 SCALE: 1/4"=1'-0"



3 FIRST FLOOR PLUMBING - TYPE "B"
0913-05BS-0004 SCALE: 1/4"=1'-0"



3 LOFT PLUMBING - TYPE "A" AND "B"
0913-05BS-0004 SCALE: 1/4"=1'-0"



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PRIM. ENG. JWG	PRIM. ENG.	PRIM. ENG.	PRIM. ENG.
2ND ENG.	2ND ENG.	2ND ENG.	2ND ENG.
PRIN ENG. J. GREENLAW	PROJ. MGR. Court Hill		

SCALE NTS	0 1"	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
REV	DATE	REVISION	REQ. BY DRFT
0	11/24/2014	BID SET	

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

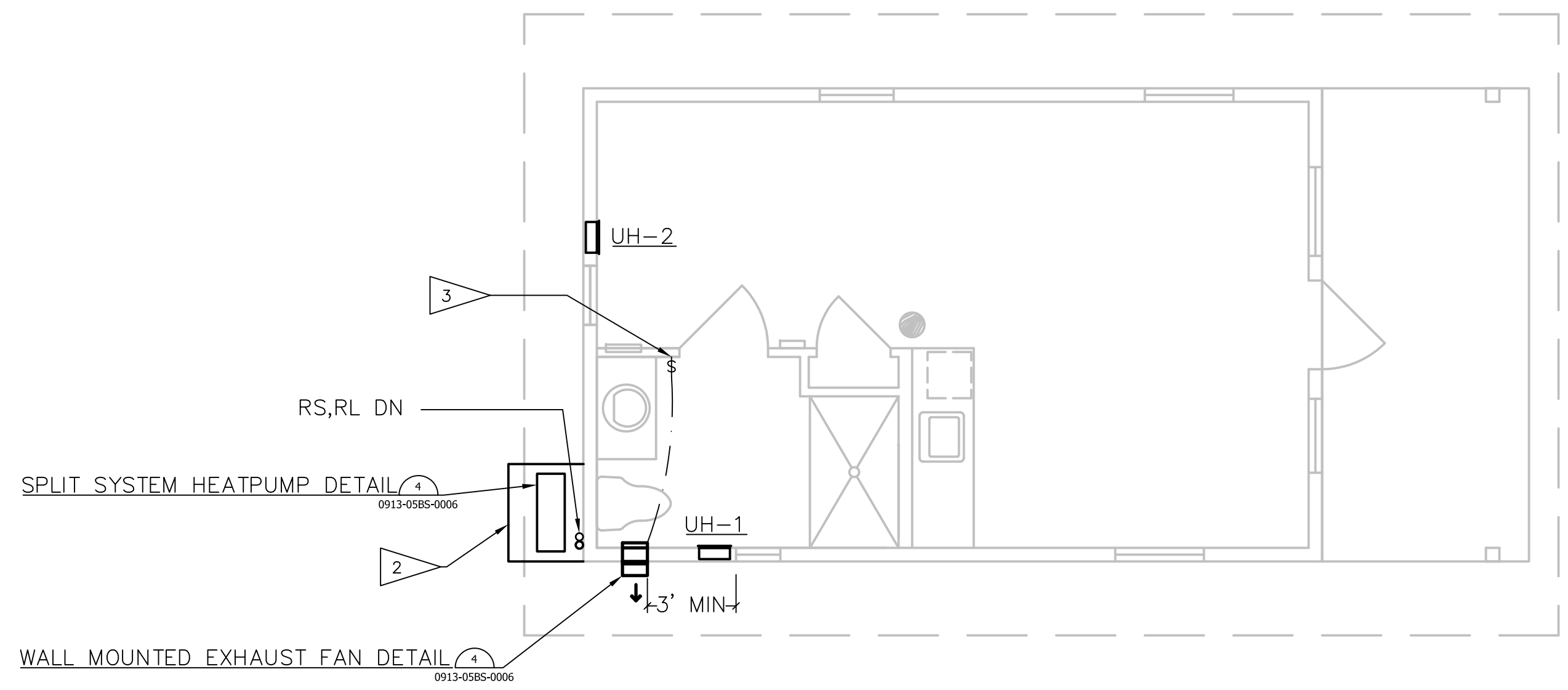
LINCOLN ROCK STATE PARK
CABIN LOOP MECHANICAL PLANS

BID NO. 14-31

SHEET M1.4 OF M1.6
REVISION 0
DATE 11/24/2014
DWG. 0913-05BS-0004

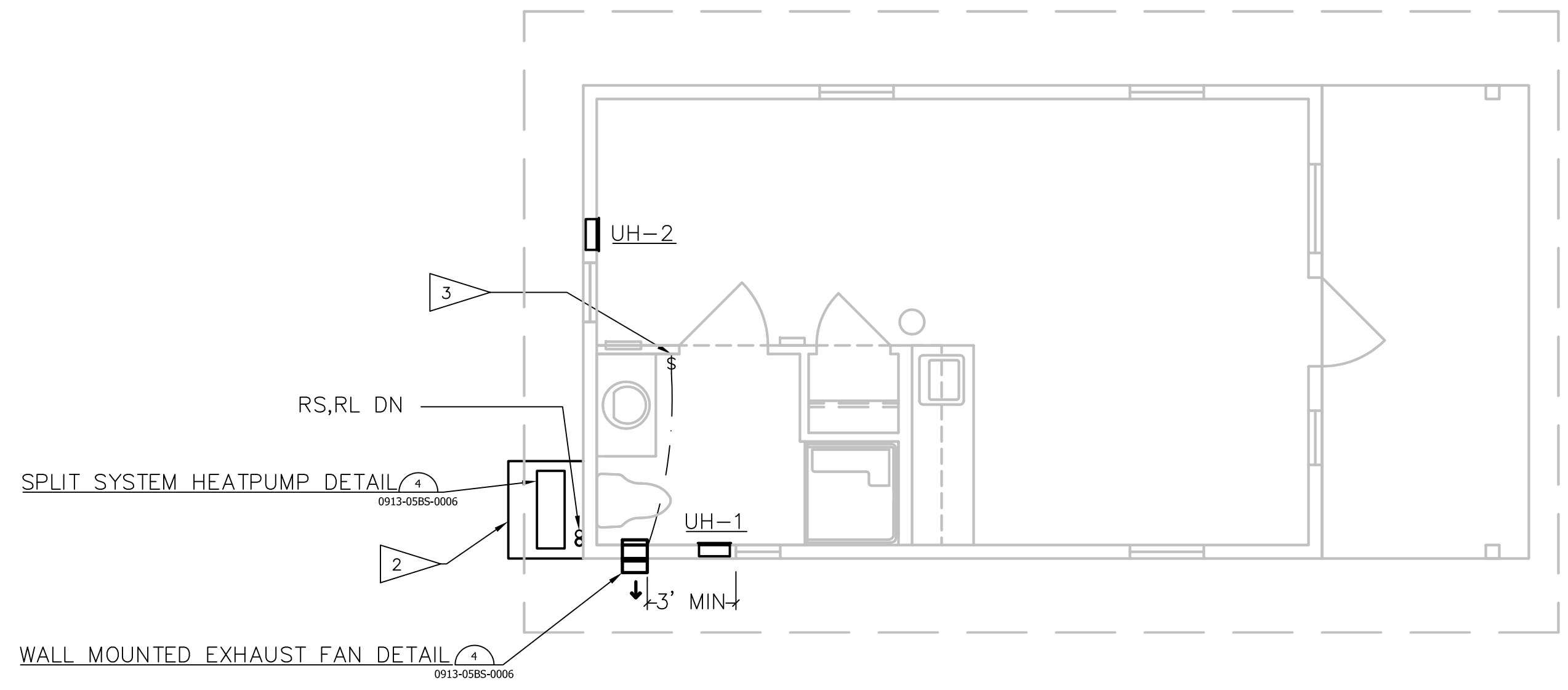


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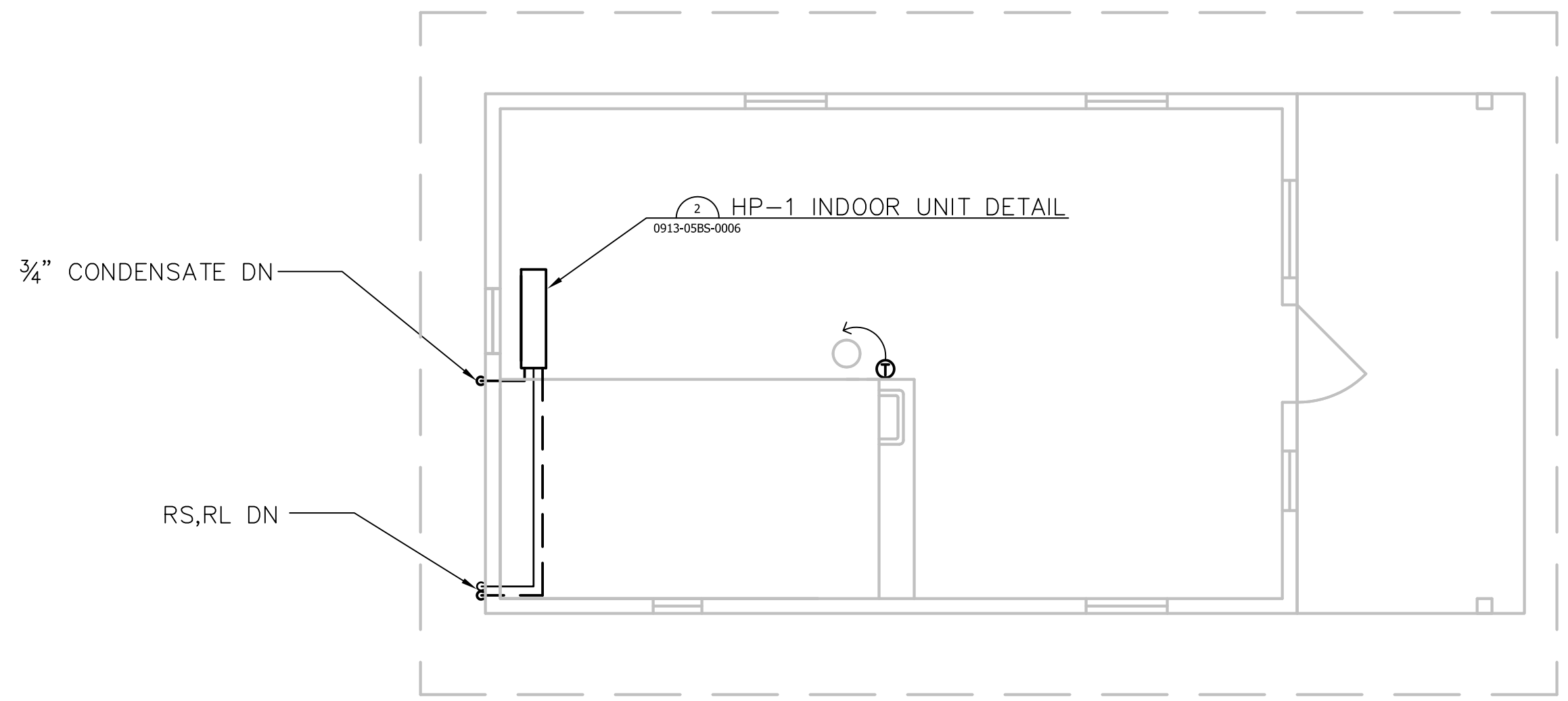


1 FIRST FLOOR HVAC PLAN - TYPE - "A"
0913-05BS-0005 SCALE: 1/4"=1'-0"

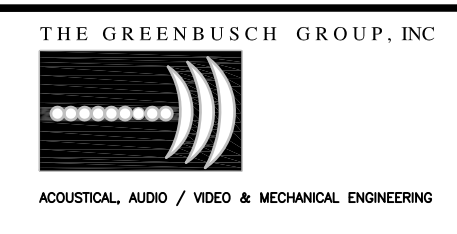
- FLAG NOTES:
- 1 NOT USED.
 - 2 PROVIDE 4" HOUSEKEEPING PAD.
 - 3 VENTILATION FAN TIMER BY ELECTRICAL TO OPERATE EXHAUST/WHOLE HOUSE FAN 8 HOURS OF EACH 24 HOURS OF BUILDING OCCUPATION AND AFFIXED WITH A LABEL TO THE CONTROLLER THAT READS "WHOLE HOUSE VENTILATION (SEE OPERATING INSTRUCTIONS)" PER WSVIAQ 303.4.2.2. SEE 3/0913-05BS-006.



2 FIRST FLOOR HVAC PLAN - TYPE "B"
0913-05BS-0005 SCALE: 1/4"=1'-0"



3 LOFT HVAC PLAN - TYPE "A" AND "B"
0913-05BS-0005 SCALE: 1/4"=1'-0"



CONSULTANT		CHELAN PUD NO.1	
PRIM. ENG. JWG	PRIM. ENG.		
2ND ENG.	2ND ENG.		
PRIN ENG. J. GREENLAW	PROJ. MGR. Court Hill		

SCALE NTS	0 1"	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
REV	DATE	BID SET	REQ. BY DRFT

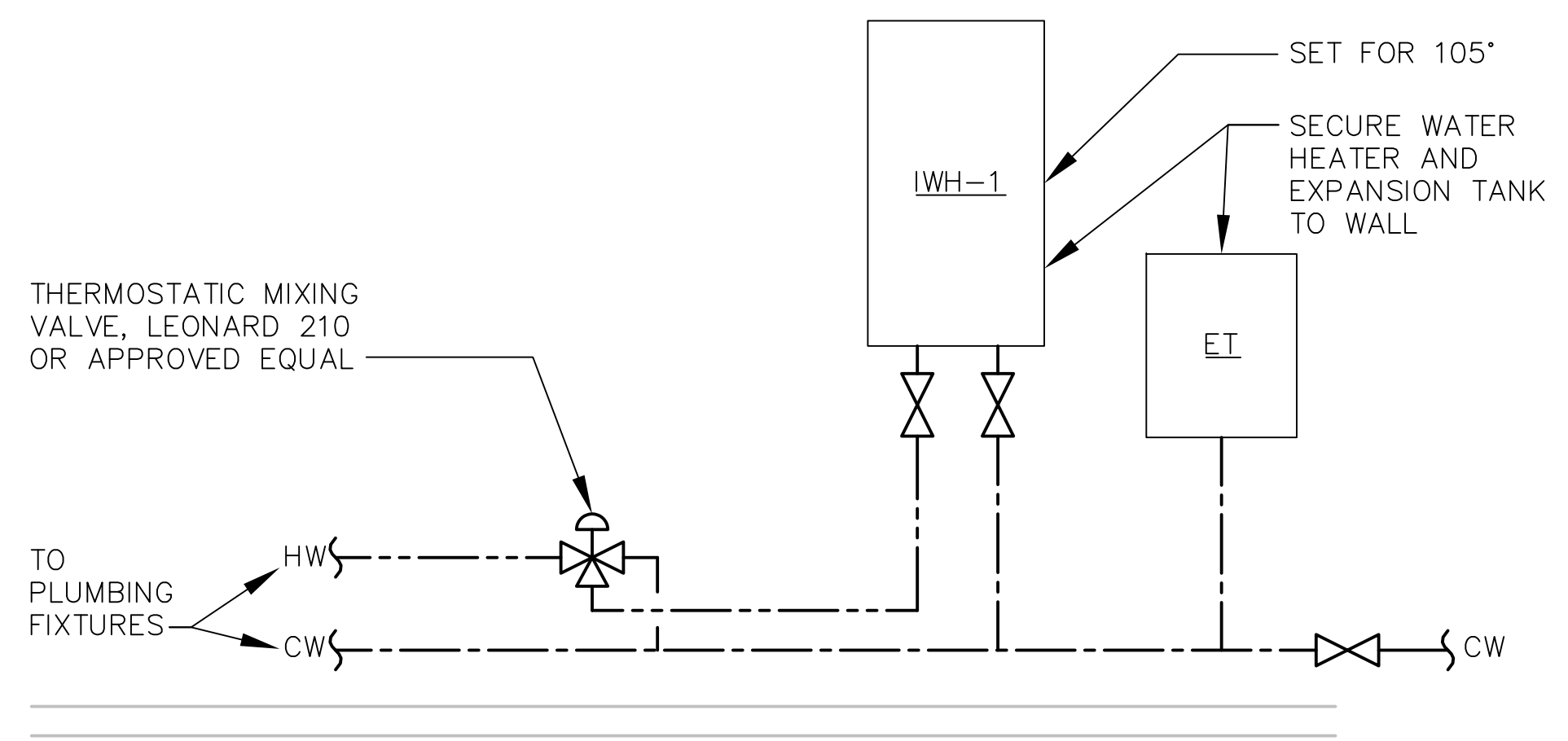
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN LOOP MECHANICAL HVAC

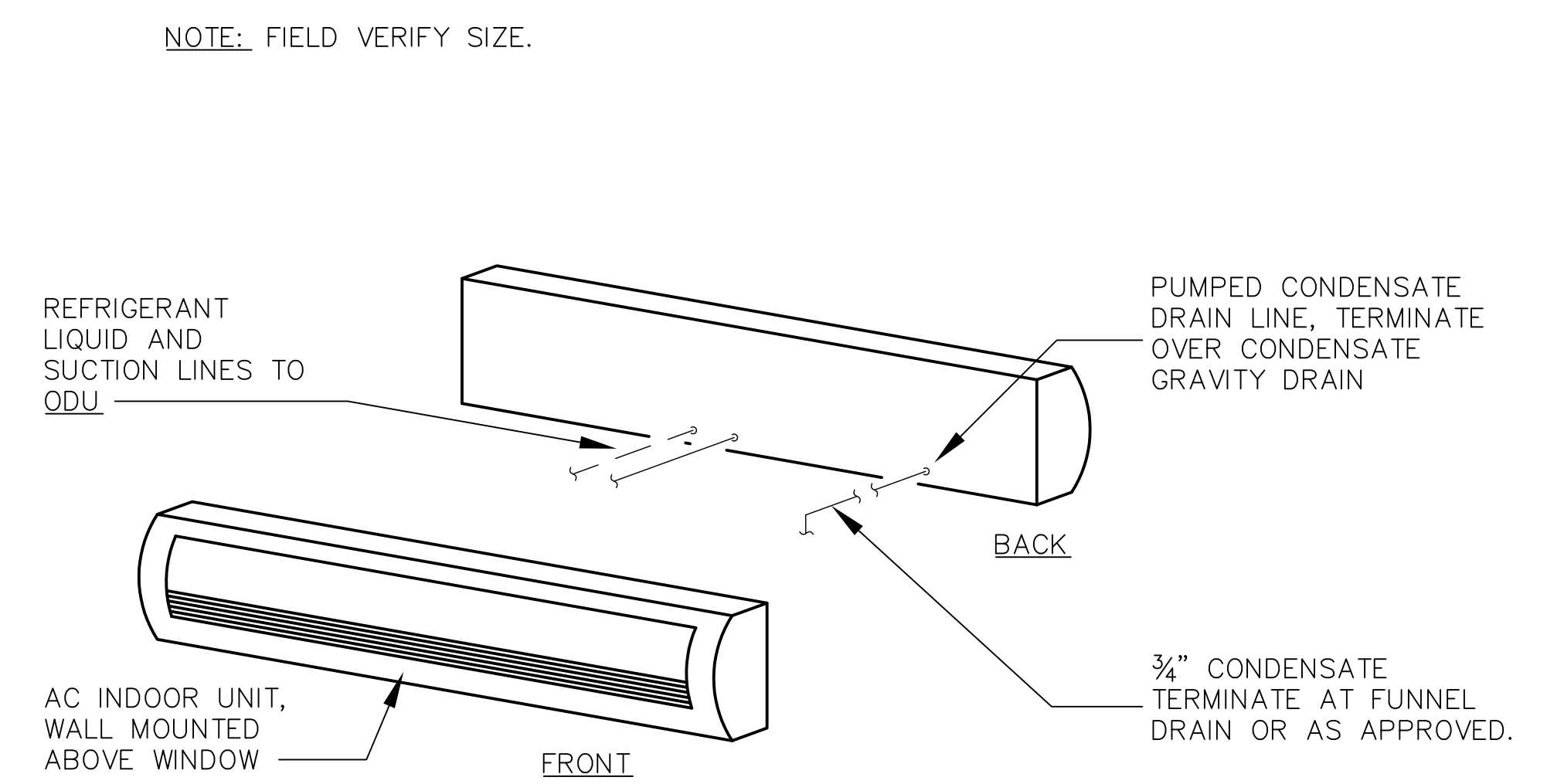
BID NO. 14-31

SHEET M1.5 OF M1.6
REVISION 0
DATE 11/24/2014
DWG. 0913-05BS-0005

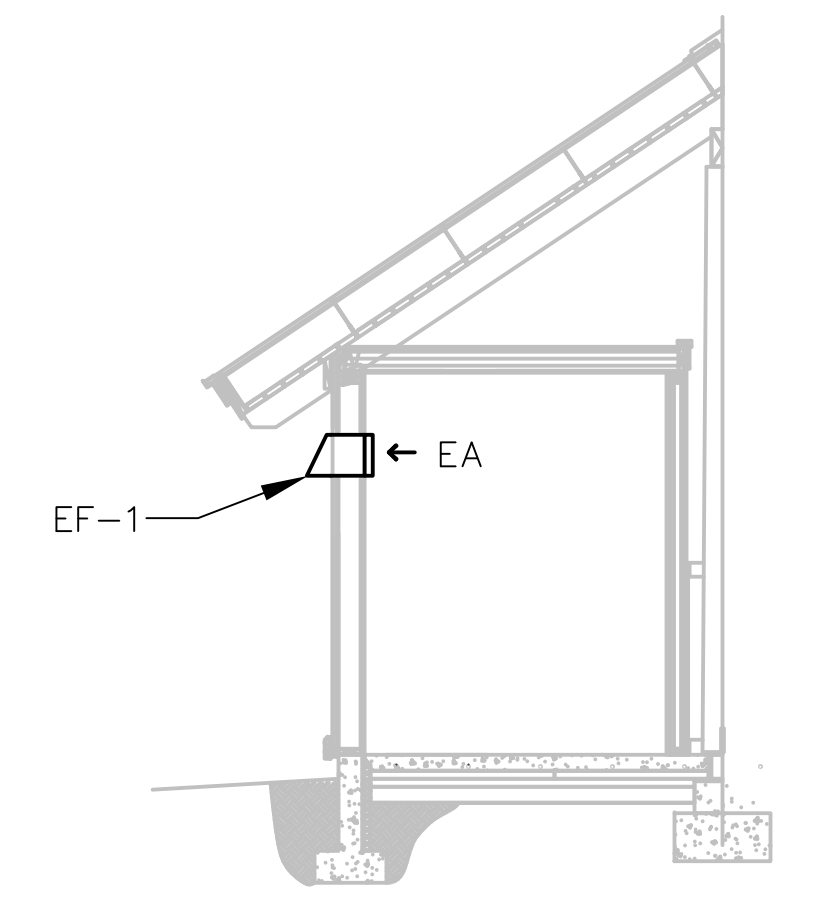
ORIG. DRAWN: SBS



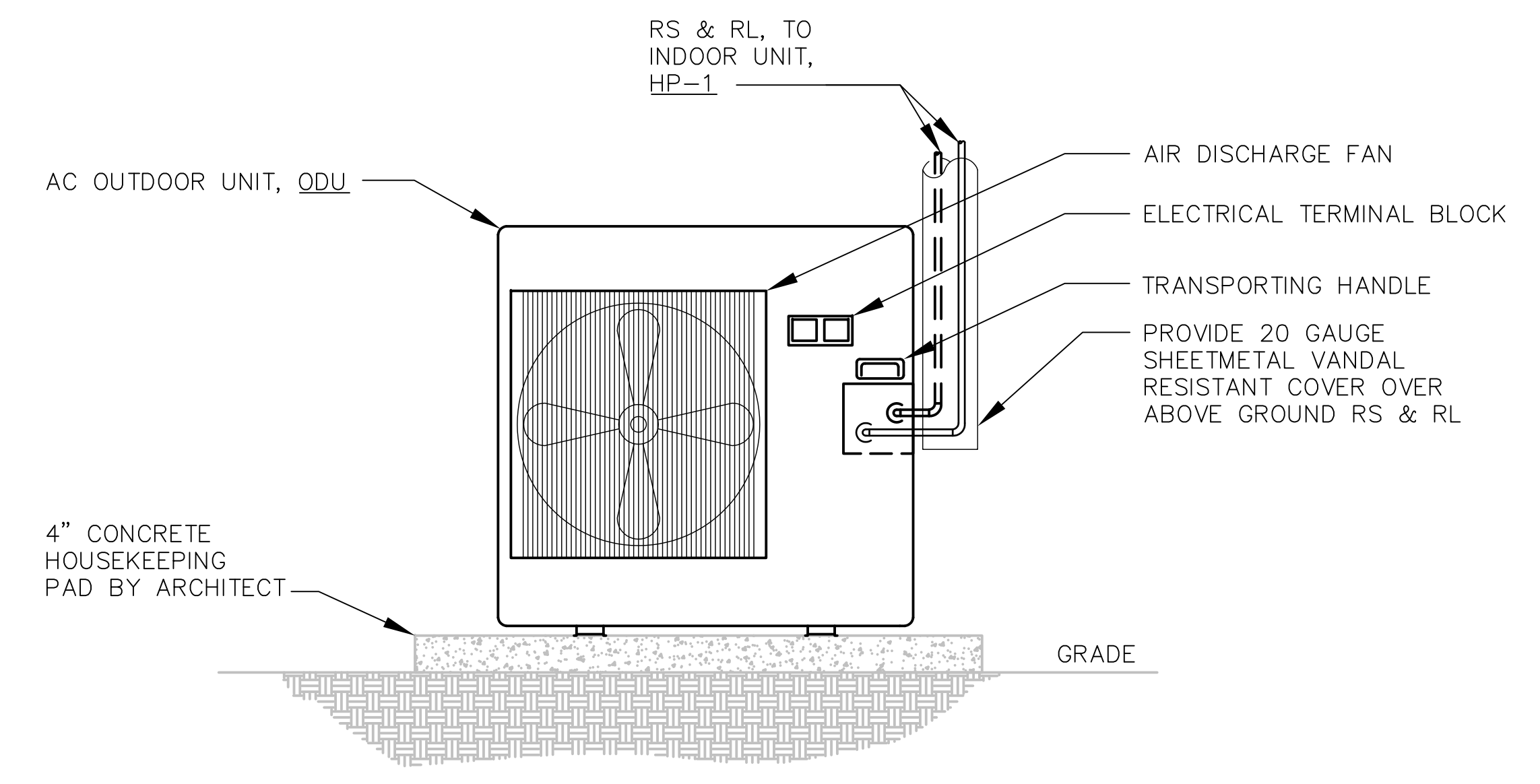
1 LAVATORY/HOTWATER HEATER PIPING DETAIL
0913-05BS-0004 SCALE: NTS



2 HP-1 INDOOR UNIT DETAIL
0913-05BS-0005 SCALE: NTS

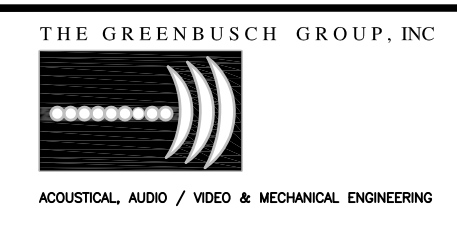


3 WALL MOUNTED EXHAUST FAN DETAIL
0913-05BS-0005 SCALE: NTS



NOTES:
1. PROVIDE UNIT CLEARANCES PER THE MANUFACTURER'S WRITTEN INSTRUCTIONS

4 SPLIT SYSTEM HEATPUMP DETAIL
0913-05BS-0005 SCALE: NTS



CONSULTANT		CHELAN PUD NO.1		SCALE NTS		BAR IS ONE INCH ON ORIGINAL DRAWING. <u>VERIFY SCALE</u> 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
PRIM. ENG. JWG	PRIM. ENG.			0	11/24/2014	BID SET	
2ND ENG.	2ND ENG.			REV	DATE	REVISION	REQ. BY DRFT
PRIN. ENG. J. GREENLAW	PROJ. MGR. Court Hill						

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN LOOP MECHANICAL DETAILS
BID NO. 14-31

SHEET M1.6 OF M1.6
REVISION 0
DATE 11/24/2014
DWG. 0913-05BS-0006

ORIG. DRAWN: SBS
ORIG. DATE: ?

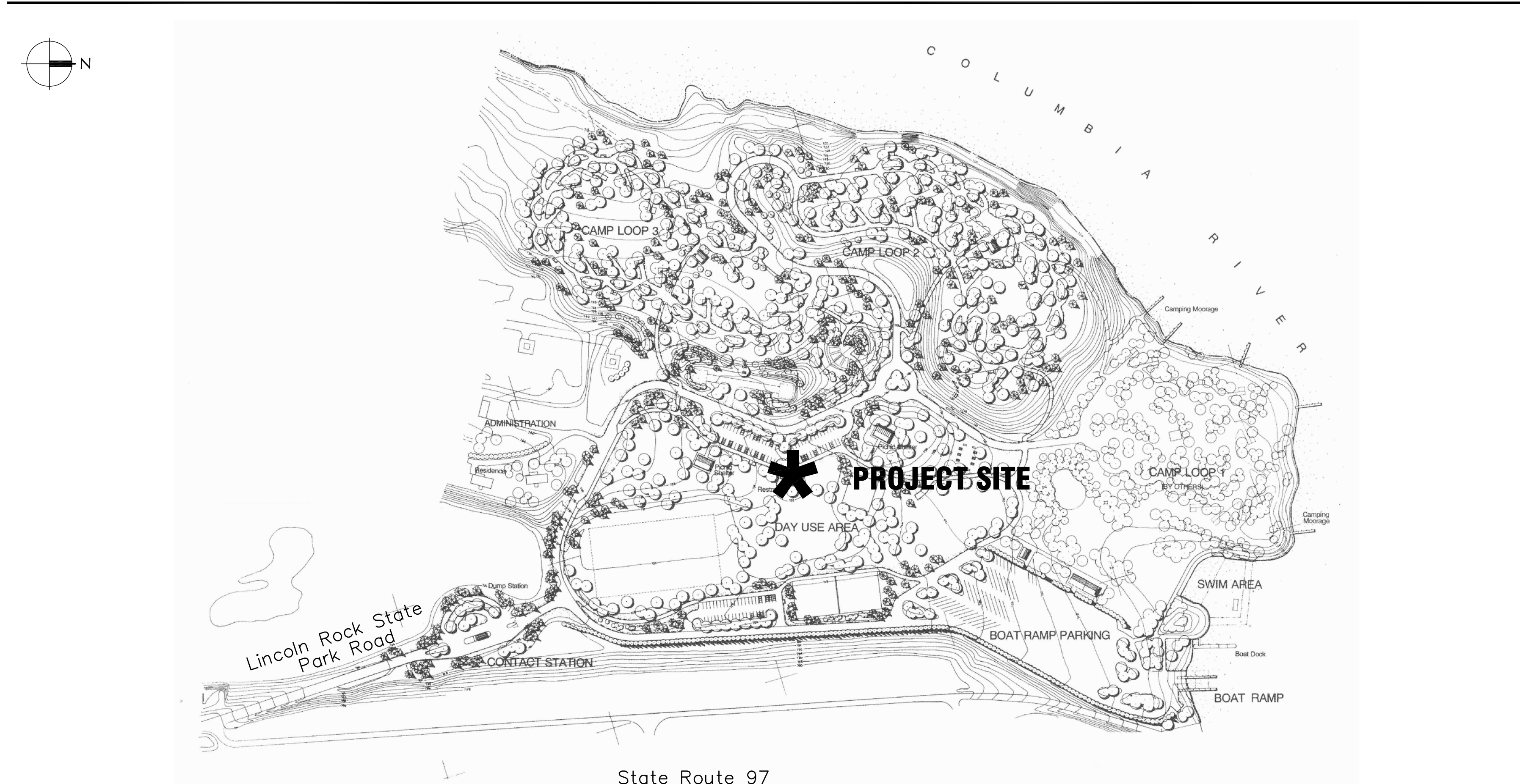
ABBREVIATIONS

∠	Angle	LAM.	Laminate
⊕	Centerline	LAV.	Lavatory
∅	Diameter or Round	LT.	Light
⊕	Square	MAS.	Masonry
(E)	Existing	MATL.	Material
⊕	Property Line	MAX.	Maximum
A.B.	Anchor Bolt	MECH.	Mechanical
A.C.P.	Asphaltic Conc. Paving	MFR.	Manufacturer
A.D.	Area Drain	MH.	Manhole
ADJ.	Adjustable	MIN.	Minimum
AL.	Aluminum	MISC.	Miscellaneous
ALT.	Alternate	M.O.	Mas. Opening
APPROX.	Approximate	M.R.	Mirror
ARCH.	Architectural	MTD.	Mounted
A.T.	Acoustical Tile	MTL.	Metal
A.W.P.	Acoustical Wall Panel	N.	North
BD.	Board	N.I.C.	Not in Contract
BLDG.	Building	NOM.	Nominal
BLKG.	Blocking	N.T.S.	Not to Scale
B.M.	Bench Mark	O.C.	On Center
C.A.B.	Cement Asbestos Board	O.D.	Outside Dia.
		OFCI	Owner Furn.
			Contr. Install
C.B.	Catch Basin	OFOI	Owner Furn.
C.H.	Coat Hook		Owner Install
C.I.P.	Cast in Place	OPNG.	Opening
C.J.	Const. Joint	OPP.	Opposite
CLG.	Ceiling	P.B.	Particle Board
CLR.	Clear	P.C.	Precast
CMU	Conc. Masonry Unit	PIP.	Poured in Place
C.O.	Clean out	PL.	Plate
COL.	Column	P. LAM.	Plastic Laminate
CONC.	Concrete	PLAS.	Plaster
CONN.	Connection	PLYWD.	Plywood
CONST.	Construct(ion)	PR.	Pair
CONT.	Continuous	P.T.	Pressure Treated
DBL.	Double	P.T.D.	Paper Towel Disp.
D.F.	Drinking Fountain	R.D.	Roof Drain
DIA.	Diameter	REF.	Reference
DIM.	Dimension	REINF.	Reinforced
DISP.	Dispenser	REQ'D.	Required
DN.	Down	RESIL.	Resilient
DR.	Door	RH.	Robe Hook
D.S.	Down spout	RM.	Room
DTL.	Detail	R.O.	Rough Opening
DW	Drywell	R.W.L.	Rain Water Leader
DWG.	Drawing	S.	South
DWR.	Drawer	S.C.	Solid Core
E.	East	SCHED.	Schedule
EA.	Each	S.D.	Soap Dispenser
E.J.	Expansion Joint	SECT.	Section
ELECT.	Electrical	SHT.	Sheet
ELEV.	Elevator	S.J.	Slab Joint
EQ.	Equal	SIM.	Similar
EQUIP.	Equipment	S.N.D.	Sanitary Napkin Dispenser
EXIST.	Existing	S.N.R.	Sanitary Napkin Receptacle
EXP.	Expansion	SPEC.	Specification
EXT.	Exterior	SQ.	Square
F.A.	Fire Alarm	STD.	Standard
F.D.	Floor Drain	STL.	Steel
F.E.	Fire Extinguisher	STOR.	Storage
F.E.C.	Fire Exting.Cab	STRCT.	Structural
FIN.	Finish	SUSP.	Suspended
FLASH.	Flashing	SYM.	Symmetrical
FLR.	Floor	S.S.	Sanitary Sewer
FRP.	Fiberglass Reinf. Panel	T.B.	Towel Bar
FLUOR.	Fluorescent	T.C.	Top of Curb
FND.	Foundation	TEL.	Telephone
F.O.C.	Face of Conc.	T.O.C.	Top of Concrete
F.O.S.	Face of Studs	T.P.D.	Toilet Paper Dispenser
FT.	Foot or Feet	T.P.D.	Toilet Seat Cover Disp.
FTG.	Footing	TYP.	Typical
GA.	Gauge	U.O.N.	Unless Otherwise Noted
GALV.	Galvanized	V.	Vent
G.B.	Grab Bar	V.B.	Vapor Barrier
GND.	Ground	VERT.	Vertical
G.W.B.	Gypsum Wallboard	VTR	Vent Through Roof
HB.	Hose Bibb	W.	Waste Vent
HCP.	Handicapped	W/	With
H.C.	Hollow Core	W.C.	Water Closet
HDW.	Hardware	W.H.	Water Heater
HGT.	Height	W/O	Without
H.M.	Hollow Metal	W.W.F.	Welded Wire Fabric
HORIZ.	Horizontal		
I.D.	Inside Diameter		
INSUL.	Insulation		
INT.	Interior		

ARCHITECTURAL SYMBOLS

	PROPERTY LINE / CORNER
	EXISTING POINT ELEVATION (To Remain)
	FINISH POINT ELEVATION
UTILITY LINES:	
	NATURAL GAS
	WATER
	UNDERGROUND ELECTRICAL
	OVERHEAD ELECTRICAL/COMMUNICATIONS
	SANITARY SEWER
	STORM DRAIN
	UNDERGROUND TELEPHONE/COMMUNICATIONS
	FENCE
	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 Detail No. Where Found if on Different Sheet or Dash if found on Same Sheet
	DETAIL NUMBER/TITLE
	BUILDING SECTION KEY Detail No. Where Found if on Different Sheet or Dash if found on Same Sheet
	WALL SECTION KEY Detail No. Where Found if on Different Sheet or Dash if found on Same Sheet
	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
	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 - LINCOLN ROCK STATE PARK
 13253 LINCOLN ROCK STATE PARK ROAD
 EAST WENATCHEE, WA 98802

OWNER:
 P.U.D. No.1 OF CHELAN COUNTY
 327 N. WENATCHEE AVE.
 WENATCHEE, WA 98801

ASSESSOR'S PARCEL NO.
 24203510001

SHEET INDEX

A2.1	0913-05AR-0018	COMFORT STATION LEGEND, ABB. & NOTES
A2.2	0913-05AR-0019	COMFORT STATION - DEMOLITION PLAN, SCHEDULES, INTERIOR ELEVATIONS
A2.3	0913-05AR-0020	COMFORT STATION - FLOOR PLAN
A2.4	0913-05AR-0021	COMFORT STATION - FOUNDATION & FRAMING PLAN
A2.5	0913-05AR-0022	COMFORT STATION - EXTERIOR ELEVATIONS
A2.6	0913-05AR-0023	COMFORT STATION - EXTERIOR ELEVATIONS, DETAILS
A2.7	0913-05AR-0024	COMFORT STATION - SECTION, DETAILS
A2.8	0913-05AR-0025	COMFORT STATION - DETAILS



CONSULTANT	PRIM. ENG.	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.	NOT TO SCALE	0	1"	
	DESIGNER DOH	2ND ENG.	0	11-14-14	Bid No.	JSC
	APPROVAL	PROJ. MGR. Court Hill	REV	DATE	REVISION	REQ. BY DRFT

SCALE	NOT TO SCALE	0	1"
REV	DATE	REVISION	REQ. BY DRFT

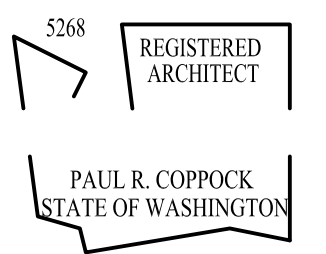
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 WENATCHEE, WASHINGTON

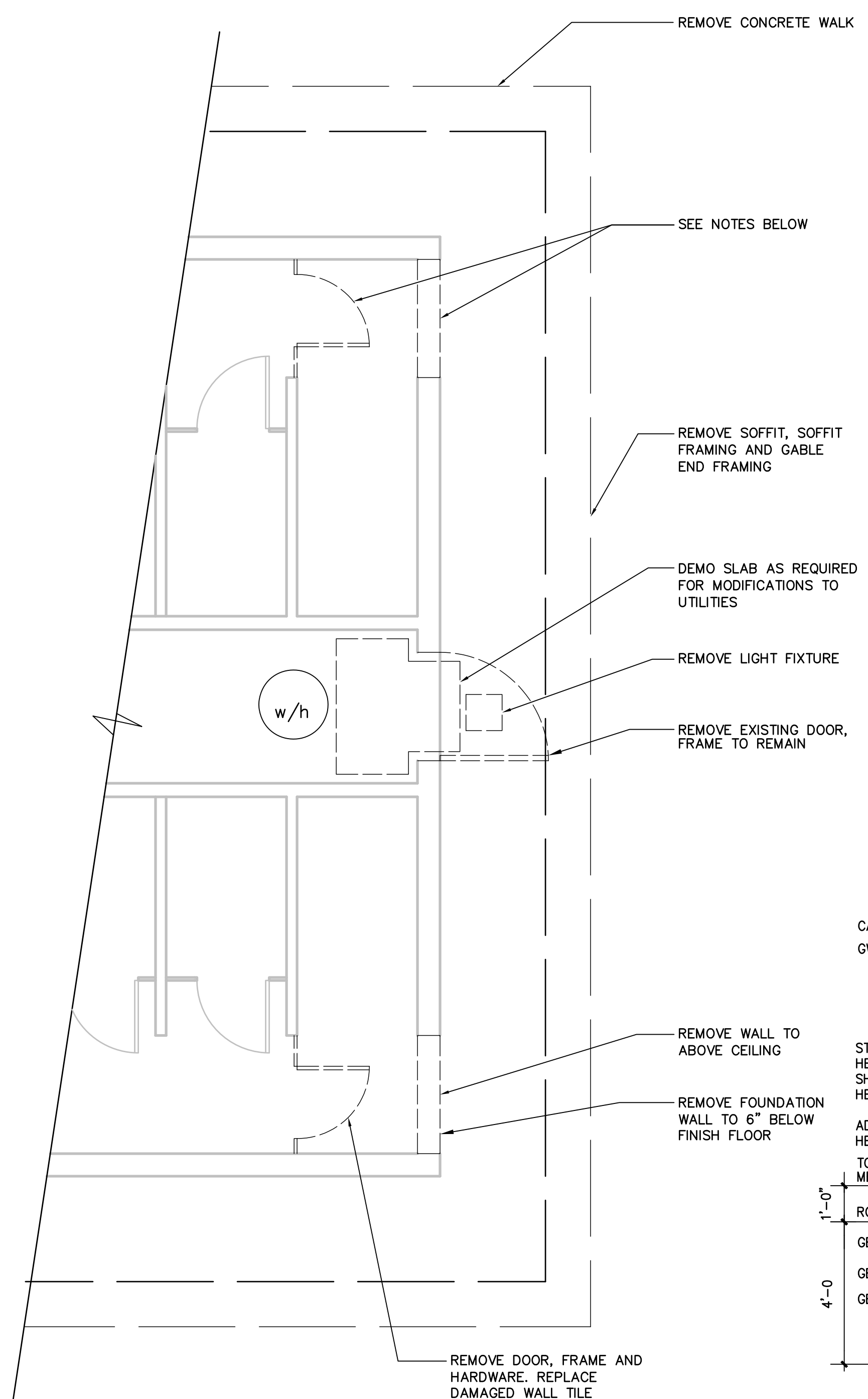
Lincoln Rock State Park
COMFORT STATION ADDITION
 LEGEND, ABBREVIATIONS. & NOTES

BID NO. 14-31

SHEET A2.1 OF A2.8
REVISION 0
DATE 11/14/14
DWG. 0913-05AR-0018

ORIG. DATE 6/1/14





Demolition Plan
 0 1' 4'
 0913-05AR-0019

ROOM FINISH SCHEDULE

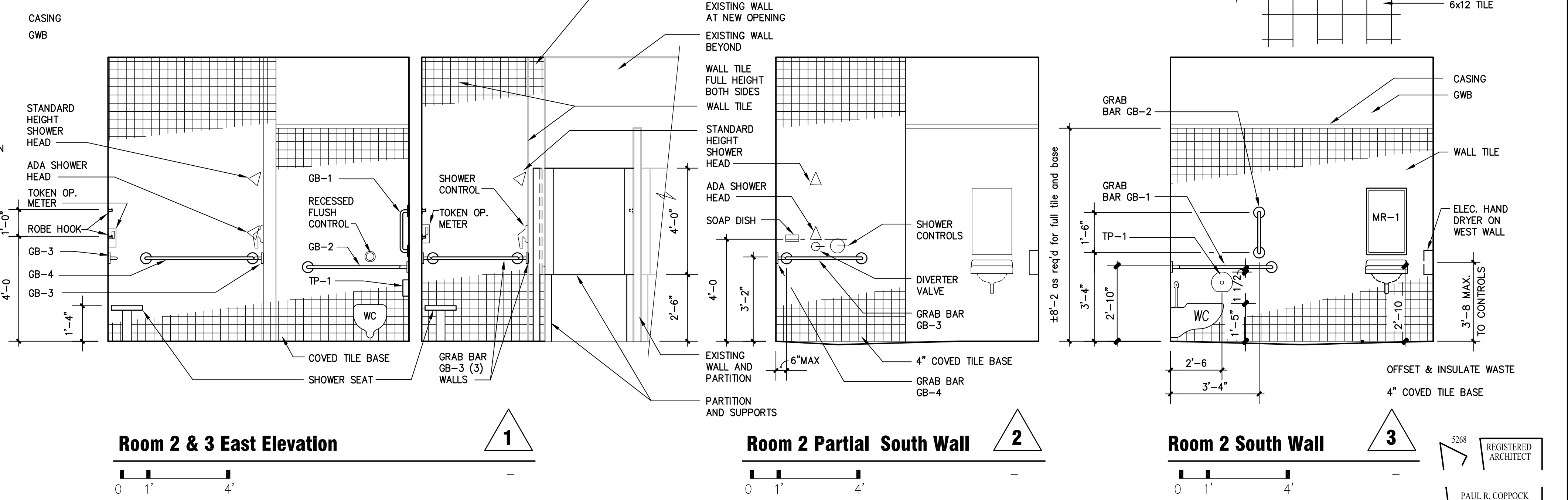
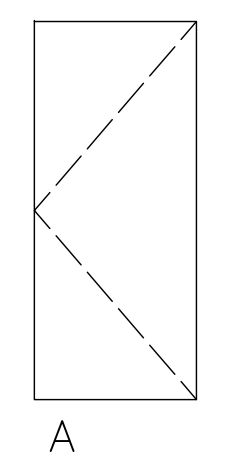
ROOM NO.	FLOOR	FINISH	BASE	FINISH	NORTH WALL	FINISH	EAST WALL	FINISH	SOUTH WALL	FINISH	WEST WALL	FINISH	CEILING	FINISH	WINDOW TRTMT.	REMARKS
1	CONC	SEAL	--	--	GWB	TAPE ONLY	GWB	TAPE ONLY	--	--	GWB	TAPE ONLY	GWB	TAPE ONLY	---	
2	TILE 3	SEAL	TILE 4/	GWB	FACTORY/PAINT	TILE 4/	GWB	FACTORY/PAINT	TILE 4/	GWB	FACTORY/PAINT	TILE 4/	GWB	PAINT	---	
3	TILE 1	SEAL	TILE 2/	GWB	FACTORY/PAINT	TILE 2/	GWB	FACTORY/PAINT	TILE 2/	GWB	FACTORY/PAINT	TILE 2/	GWB	PAINT	---	
4	EXISTING	PATCH TILE	EXISTING	PATCH &	PAINT	EXISTING	PATCH &	PAINT	EXISTING	PATCH &	PAINT	EXISTING	PATCH &	PAINT	---	PATCH TILE AT WALL AND FLOOR AT DEMO AREAS AND PATCH/PROVIDE TILE AND GWB AT NEW OPENINGS
5	TILE 3	SEAL	TILE 4/	GWB	FACTORY/PAINT	TILE 4/	GWB	FACTORY/PAINT	TILE 4/	GWB	FACTORY/PAINT	TILE 4/	GWB	PAINT	---	
6	TILE 1	SEAL	TILE 2/	GWB	FACTORY/PAINT	TILE 2/	GWB	FACTORY/PAINT	TILE 2/	GWB	FACTORY/PAINT	TILE 2/	GWB	PAINT	---	
7	EXISTING	PATCH TILE	EXISTING	PATCH &	PAINT	EXISTING	PATCH &	PAINT	EXISTING	PATCH &	PAINT	EXISTING	PATCH &	PAINT	---	PATCH TILE AT WALL AND FLOOR AT DEMO AREAS AND PATCH/PROVIDE TILE AND GWB AT NEW OPENINGS

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	--	--	1
2	3'-0" x 7'-0"	1 3/4"	A	1	--	--	P	P	--	--	2
3	3'-0" x 7'-0"	1 3/4"	A	1	--	--	P	P	--	--	1

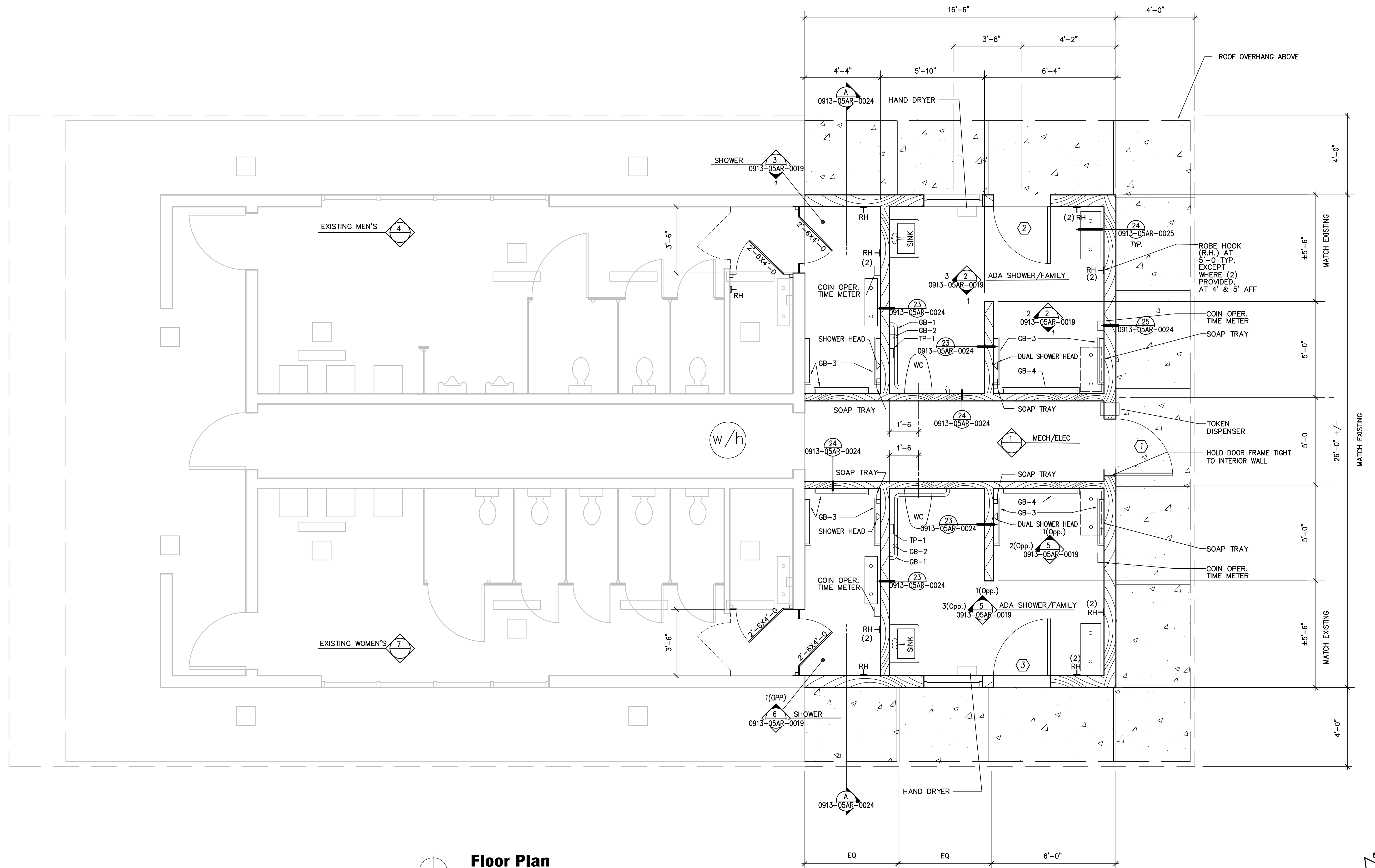
DOOR ELEVATIONS



Room 2 & 3 East Elevation

Room 2 Partial South Wall

Room 2 South Wall



Floor Plan
 0 1' 4' 0913-05AR-0020

5288 REGISTERED ARCHITECT
 PAUL R. COPPOCK
 STATE OF WASHINGTON

The DOH Associates
 ARCHITECTS & PLANNERS
 A PROFESSIONAL SERVICE CORPORATION

CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG.
DESIGNER	DOH	2ND ENG.
APPROVAL	PROJ. MGR.	Court Hill

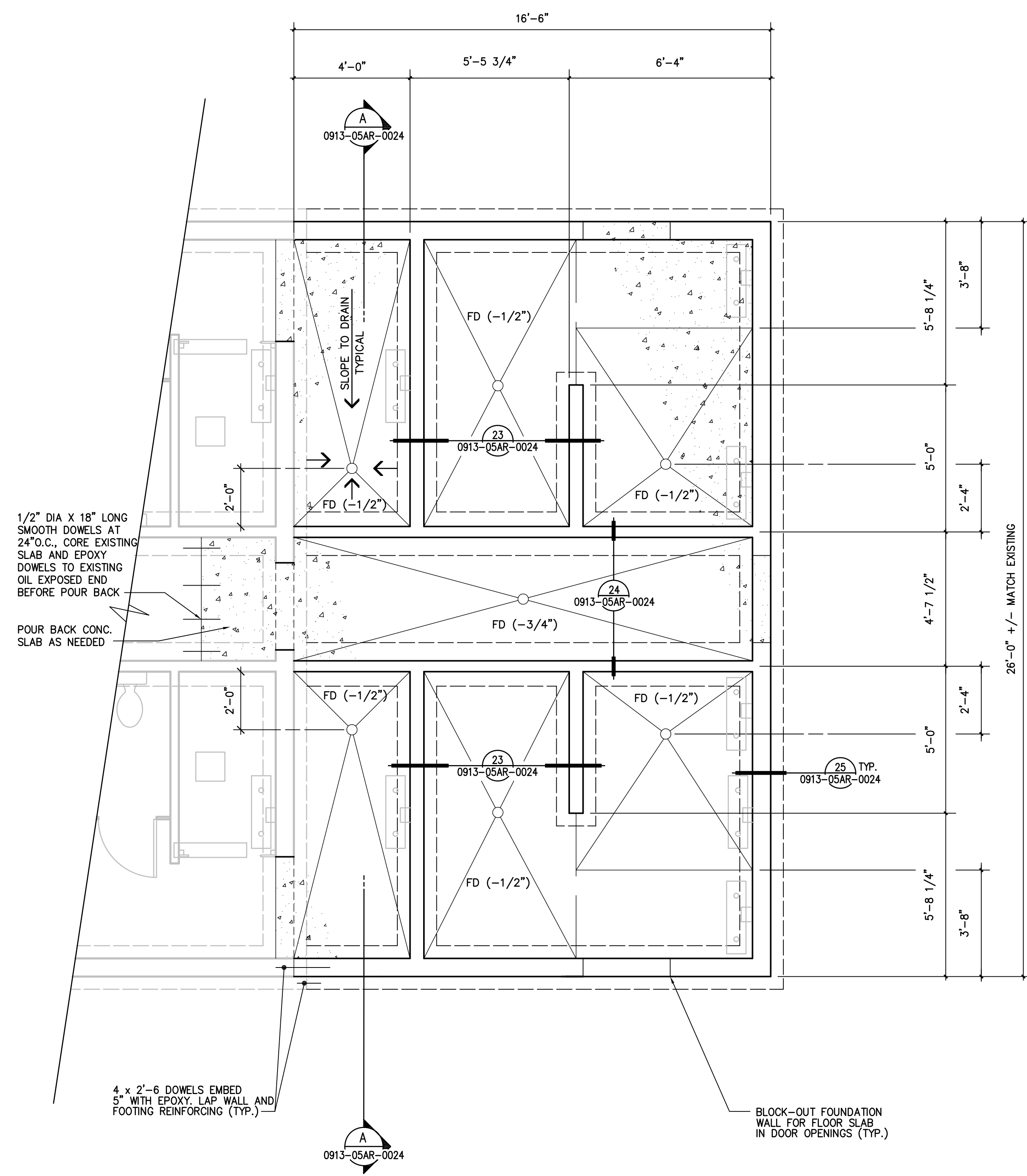
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REV	DATE	REVISION
0	11/14/14	Bid Set

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

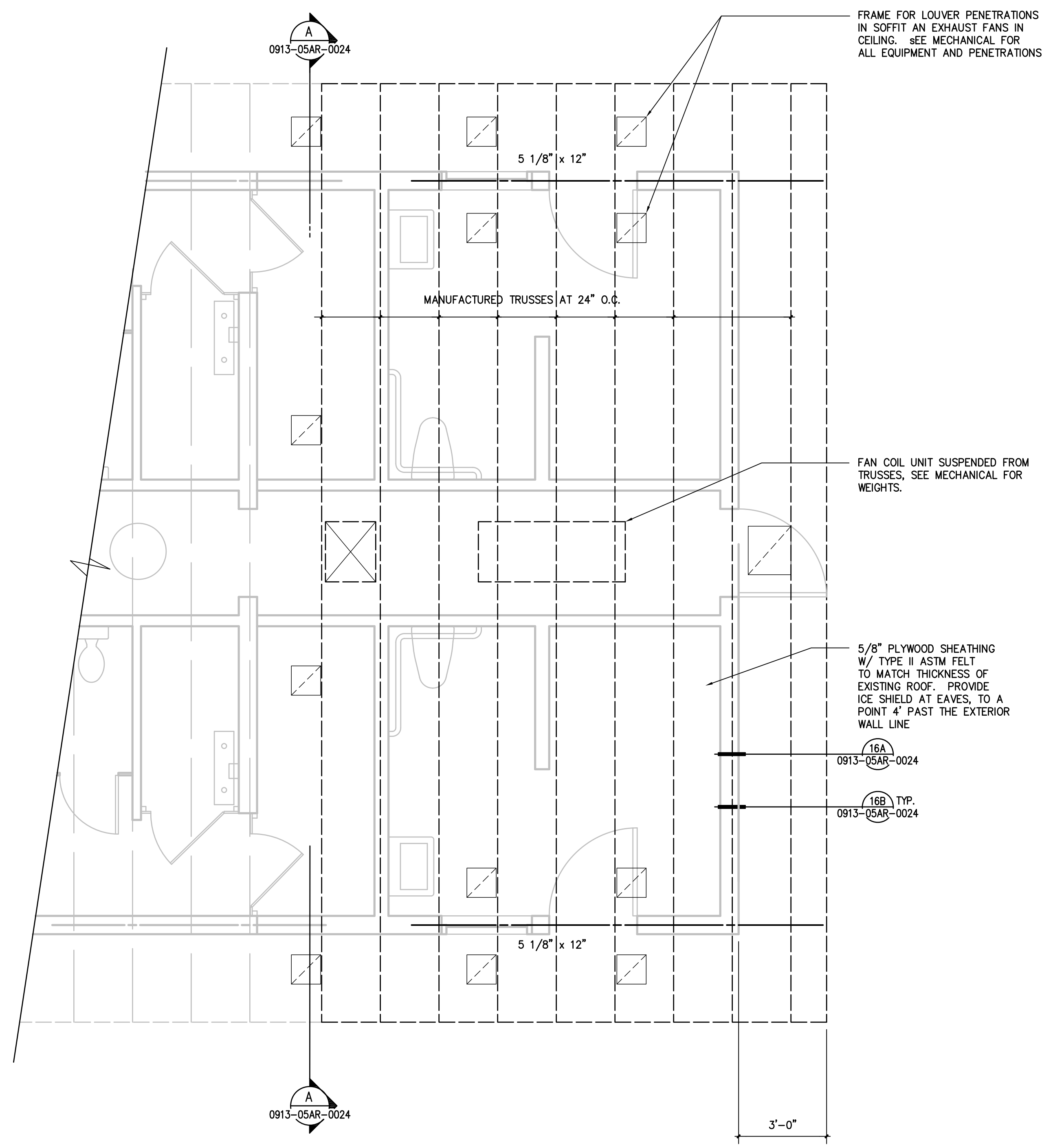


Lincoln Rock State Park
COMFORT STATION ADDITION
FLOOR PLAN
 BID NO. 14-31

SHEET	A2.3 OF A2.8
REVISION	0
DATE	11/14/14
DWG.	0913-05AR-0020



Foundation Plan
 0 1' 4'
 0913-05AR-0021



Roof Framing Plan
 0 1' 4'
 0913-05AR-0021



CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG.
DESIGNER DOH	2ND ENG.	
APPROVAL	PROJ. MGR.	Court Hill

SCALE	3/8" = 1'-0"	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
REV	DATE	REVISION	REQ. BY DRFT
0	6/1/14	Bid Set	JSC

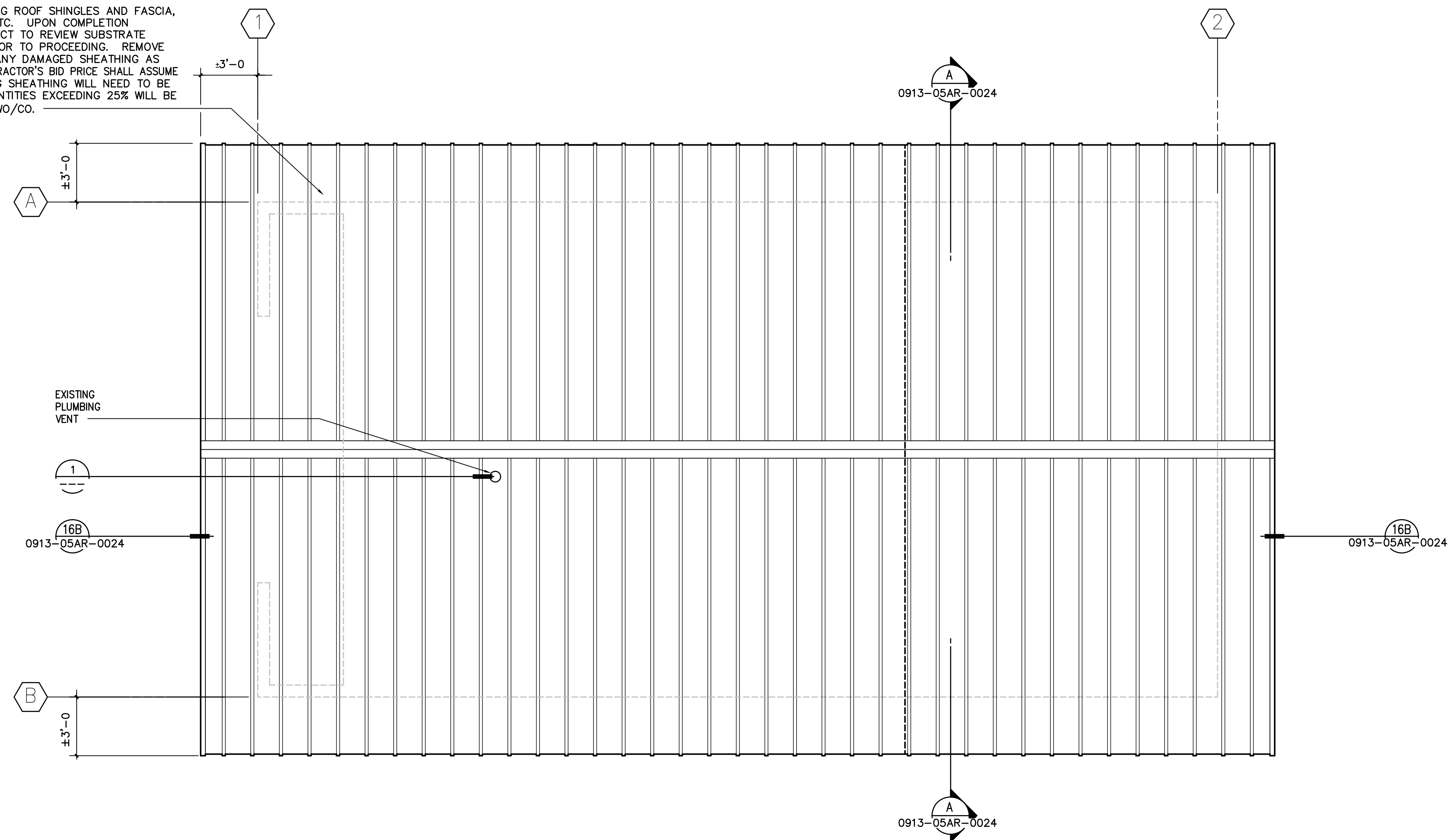
PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

Lincoln Rock State Park
COMFORT STATION ADDITION
FOUNDATION & FRAMING PLANS
 BID NO. 14-31

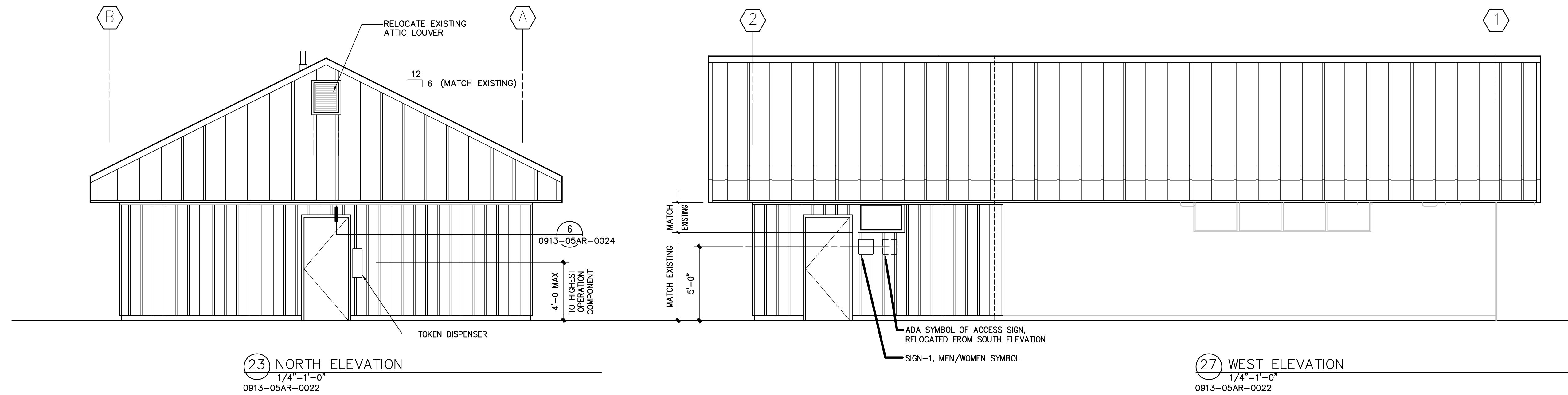
SHEET A2.4 OF A2.8
REVISION 0
DATE 11/14/14
DWG. 0913-05AR-0021

5268 REGISTERED ARCHITECT
 PAUL R. COPPOCK
 STATE OF WASHINGTON
 ORIG. DATE 6/1/14
 ORIG. DRAWN DOH

REMOVE EXISTING ROOF SHINGLES AND FASCIA, BLDG PAPER, ETC. UPON COMPLETION CONTACT DISTRICT TO REVIEW SUBSTRATE CONDITIONS PRIOR TO PROCEEDING. REMOVE AND REPLACE ANY DAMAGED SHEATHING AS DIRECTED. CONTRACTOR'S BID PRICE SHALL ASSUME 25% OF EXISTING SHEATHING WILL NEED TO BE REPLACED, QUANTITIES EXCEEDING 25% WILL BE PAID FOR BY FWO/CO.



11 LINCOLN ROCK COMFORT STATION ROOF PLAN
1/4"=1'-0"
0913-05AR-0022



23 NORTH ELEVATION
1/4"=1'-0"
0913-05AR-0022

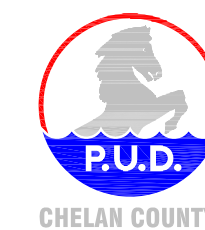
27 WEST ELEVATION
1/4"=1'-0"
0913-05AR-0022



CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG.
	DESIGNER DOH	2ND ENG.
	APPROVAL	PROJ. MGR. Court Hill

SCALE		BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
1/4" = 1'-0"				
0	11/14/14	Bid Set	JSC	
REV	DATE	REVISION	REQ. BY	DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON



Lincoln Rock State Park
COMFORT STATION ADDITION
ROOF PLAN, EXTERIOR ELEVATIONS

BID NO. 14-31

SHEET A2.5 OF A2.8
REVISION 0
DATE 11/14/14
DWG. 0913-05AR-0022

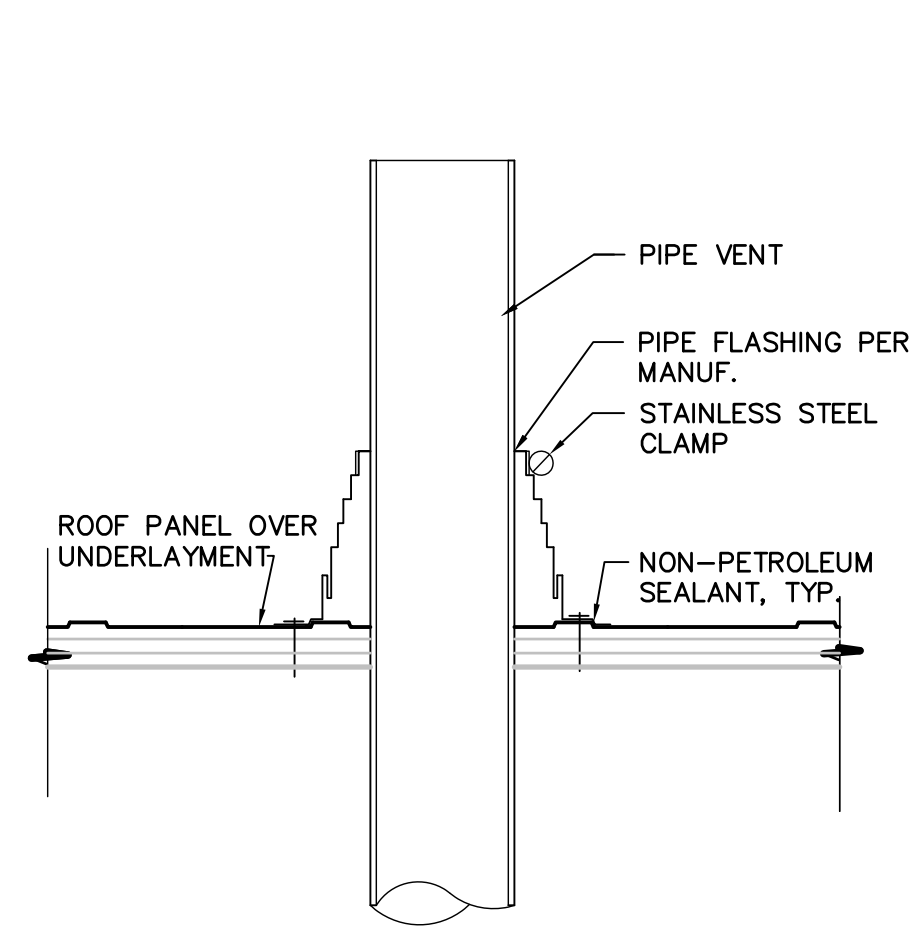
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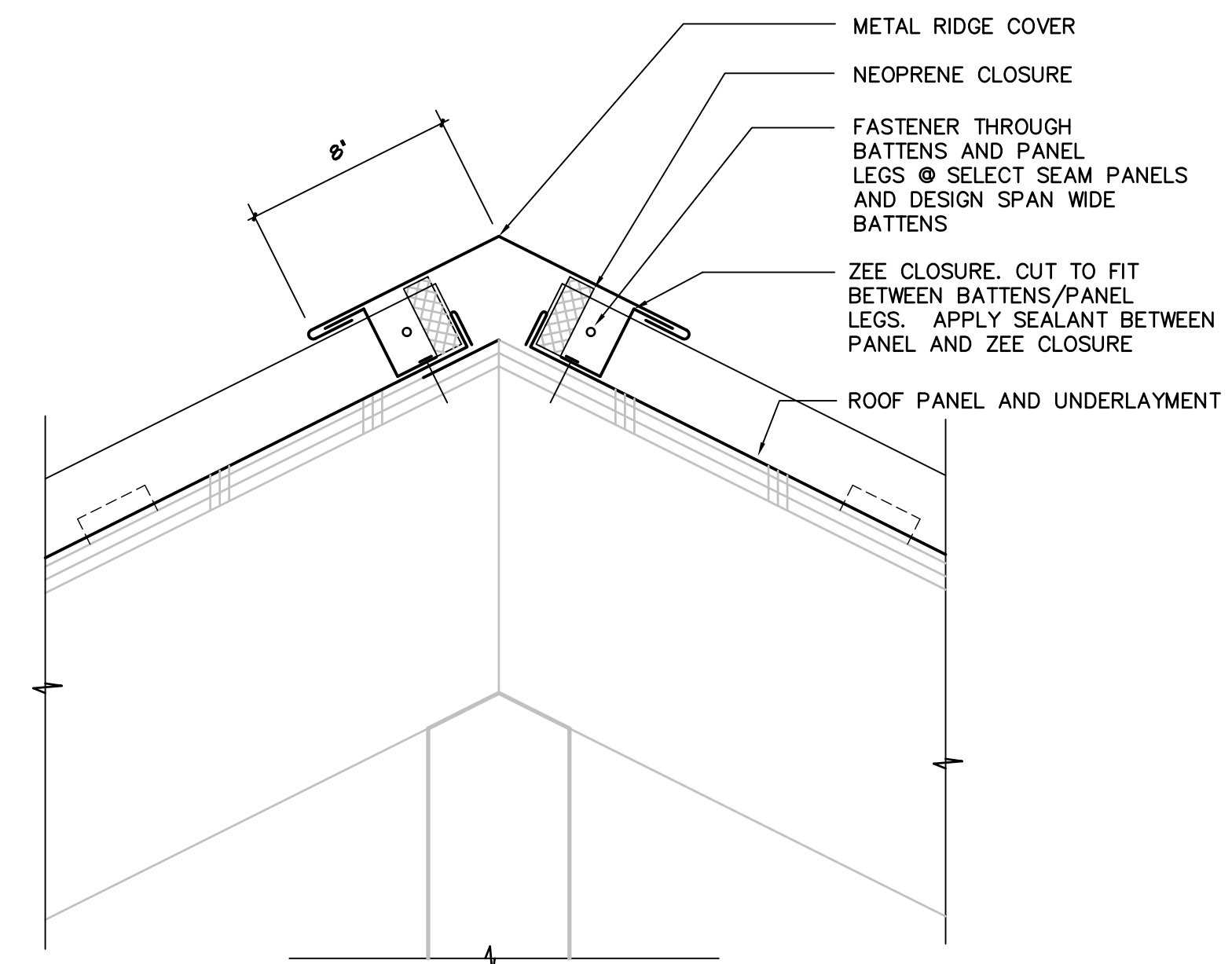
ORIGINAL DWG. #:

ORIG. DATE 6/1/14

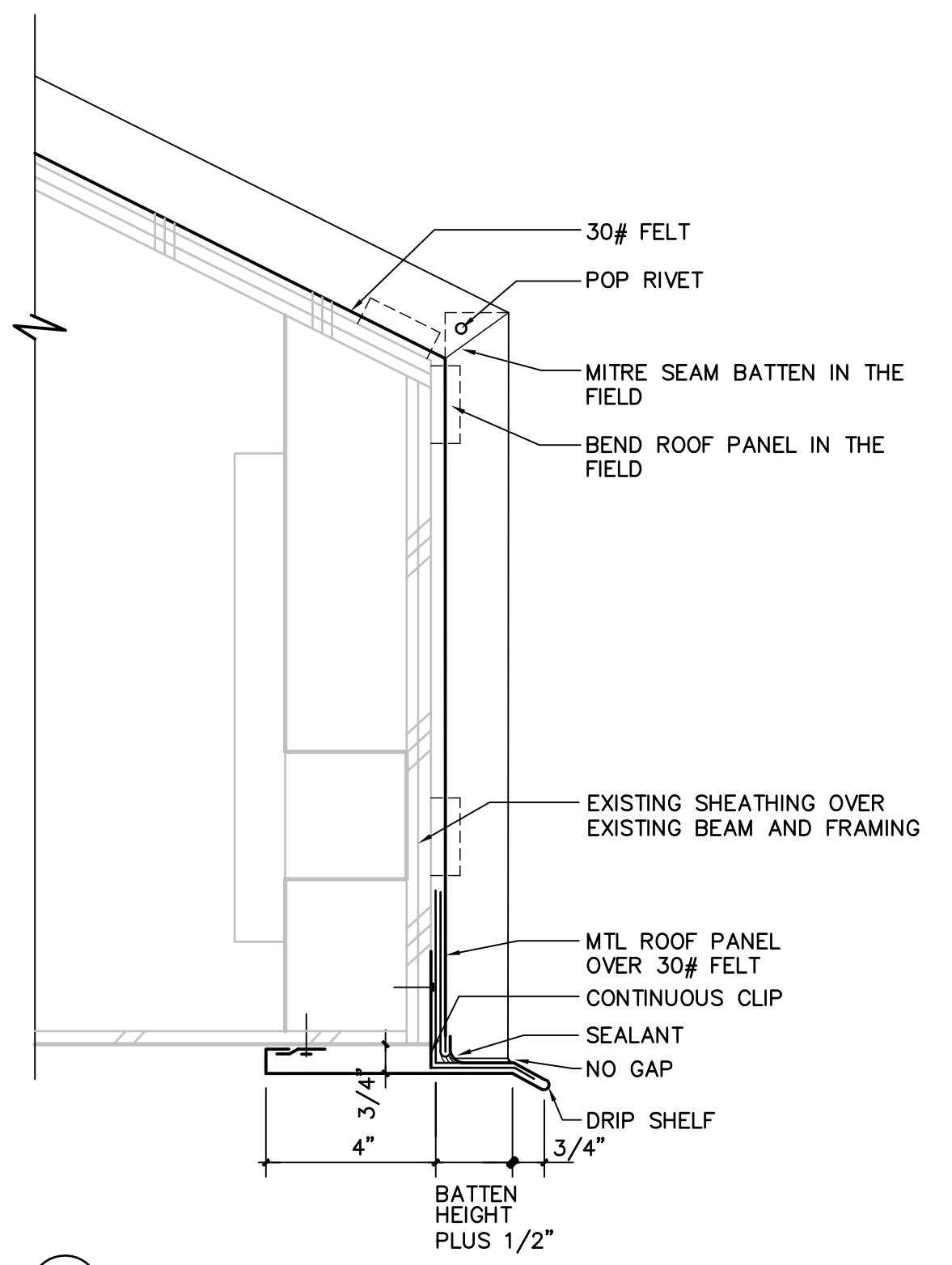
ORIG. DRAWN DOH



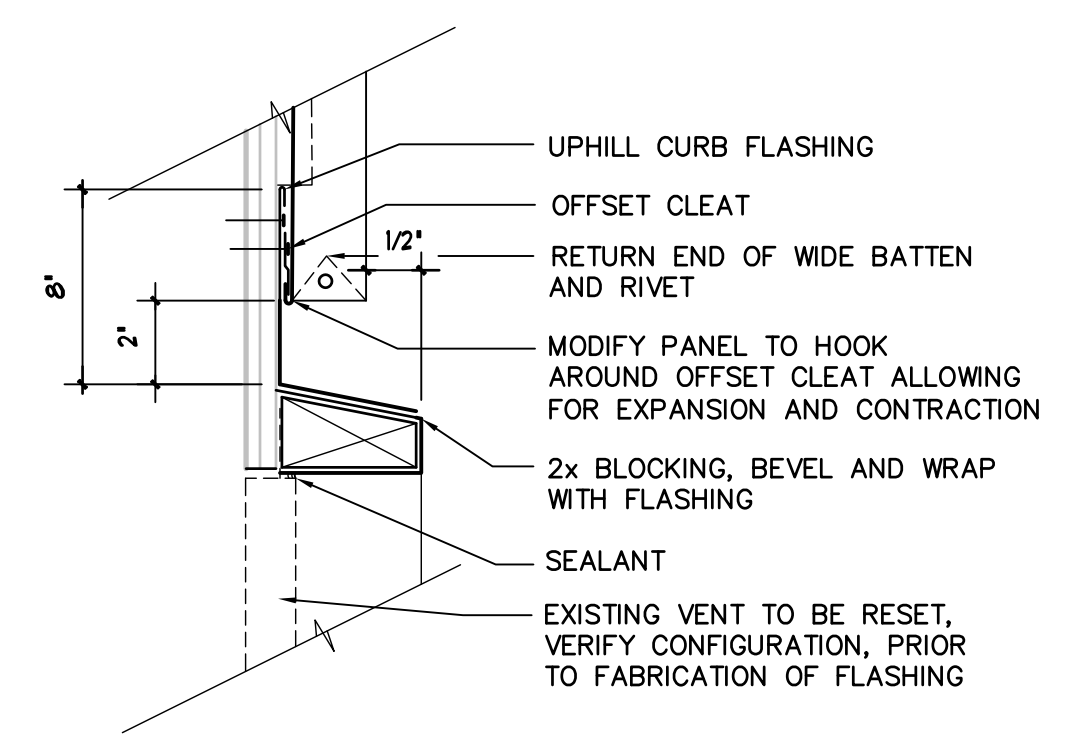
1 PIPE FLASHING
3"=1'-0"
0913-05AR-0023



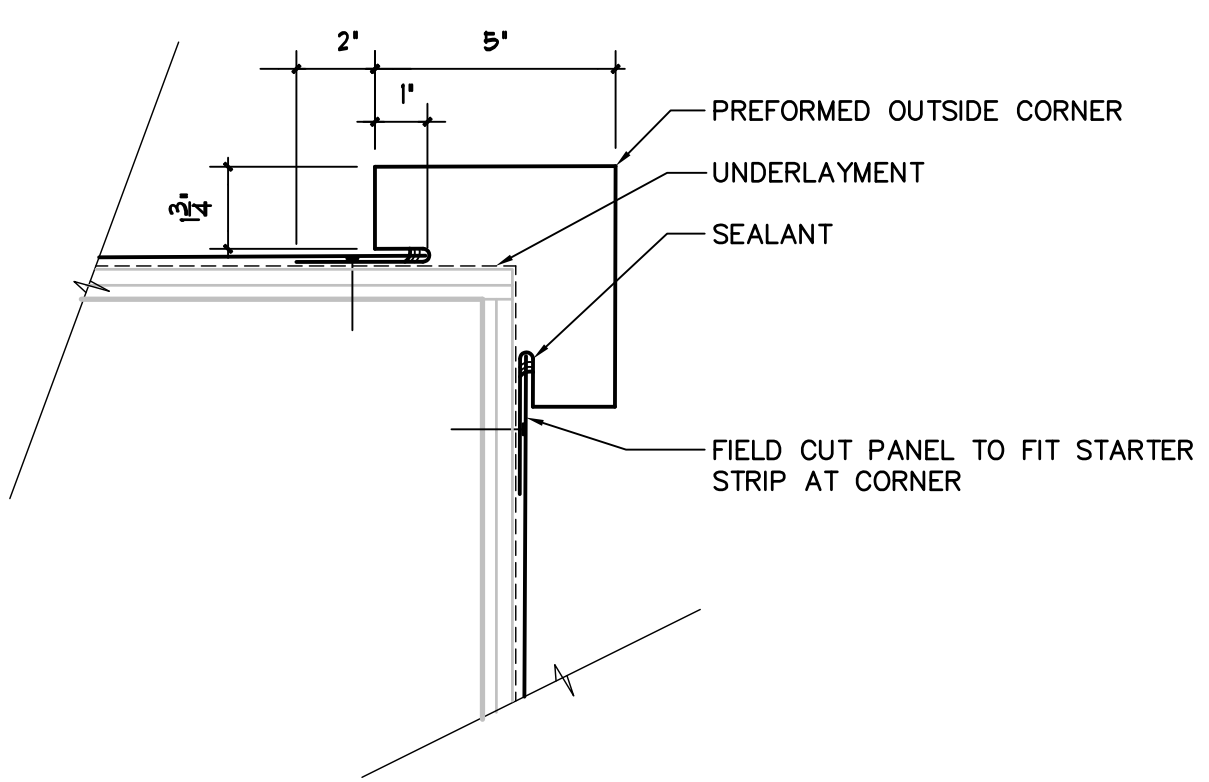
2 RIDGE
1 1/2"=1'-0"
0913-05AR-0023



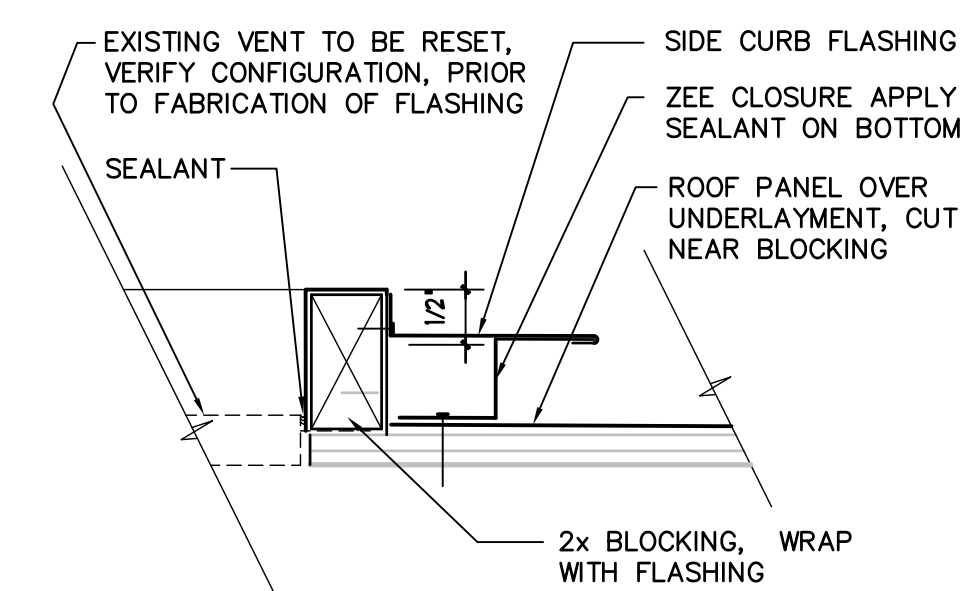
10 EAVE
1 1/2"=1'-0"
0913-05AR-0023



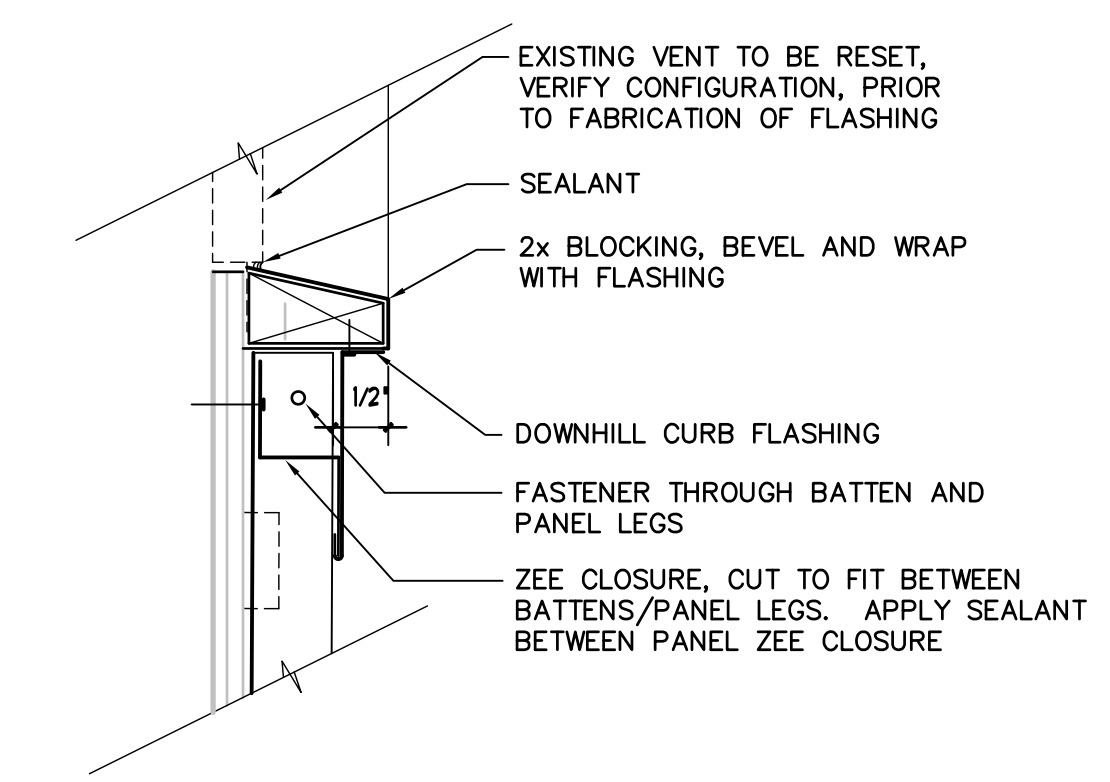
3 VENT FLASHING, HEAD
0913-05AR-0023



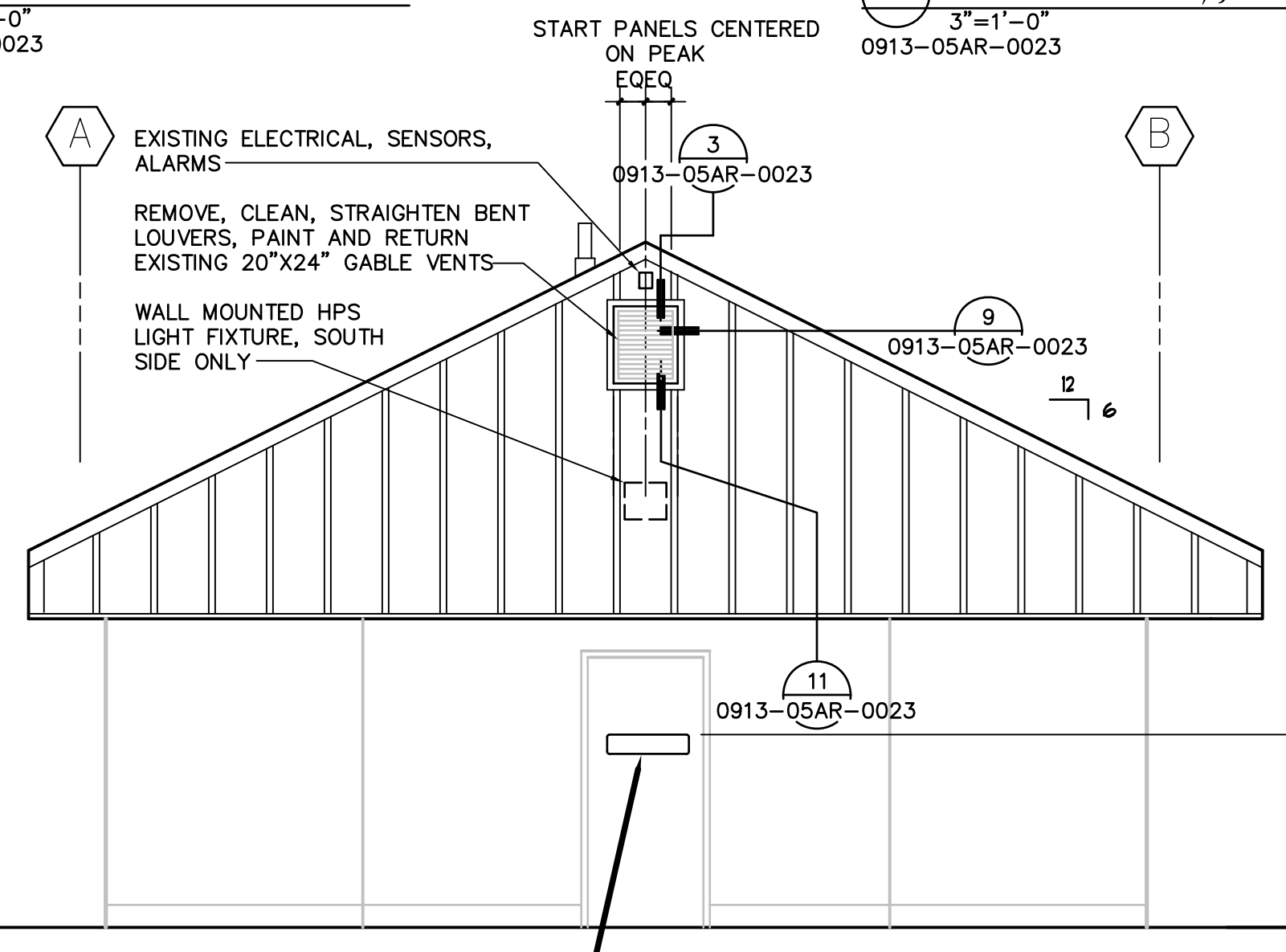
8 OUTSIDE CORNER
3"=1'-0"
0913-05AR-0023



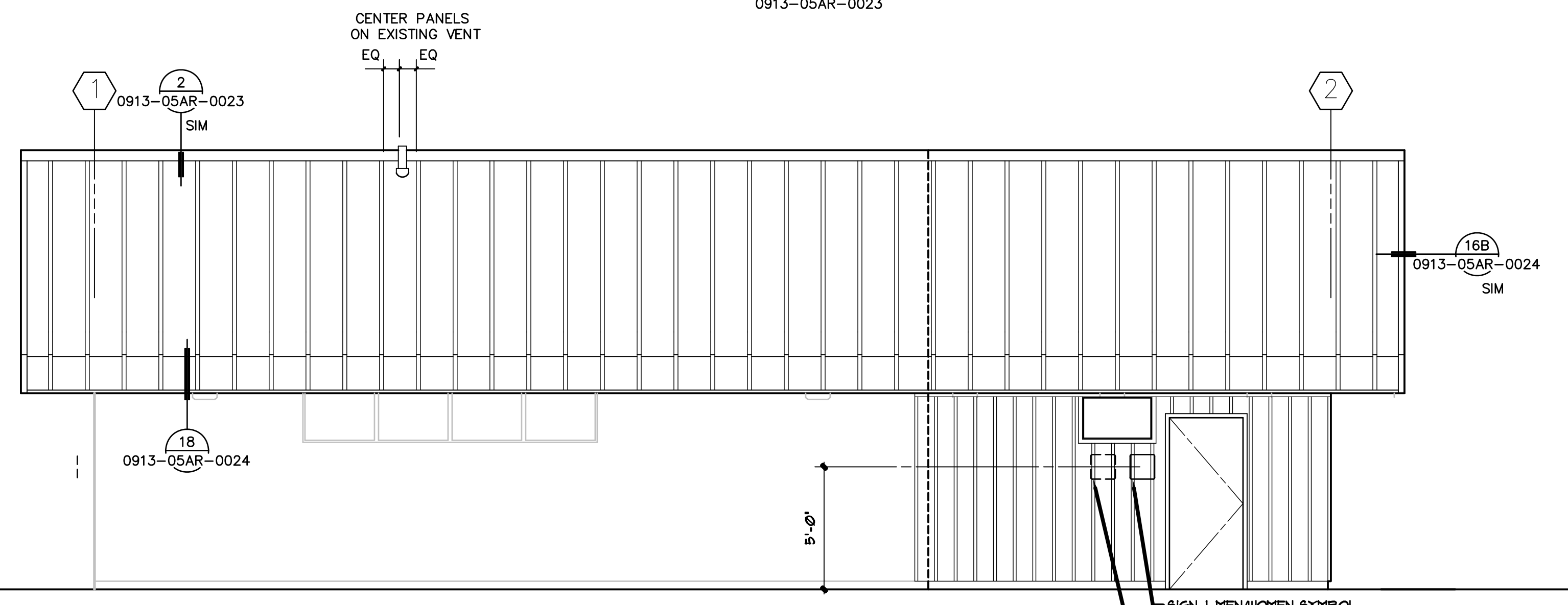
9 VENT FLASHING, JAMB
3"=1'-0"
0913-05AR-0023



11 VENT FLASHING, SILL
3"=1'-0"
0913-05AR-0023



23 SOUTH ELEVATION
1/4"=1'-0"
0913-05AR-0023



27 EAST ELEVATION
1/4"=1'-0"
0913-05AR-0023



CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1	SCALE VARIES	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
	2ND ENG.	PRIM. ENG.		0	1"	
	DESIGNER DOH	2ND ENG.	0	11/14/14	Bid Set	JSC
	APPROVAL	PROJ. MGR. Court Hill	REV	DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY		WENATCHEE, WASHINGTON	
Lincoln Rock State Park		COMFORT STATION ADDITION ELEVATIONS, DETAILS	
BID NO. 14-31		SHEET A2.6 OF A2.8	
DATE 11/14/14		REVISION 0	
DWG. 0913-05AR-0023		DATE 11/14/14	

Lincoln Rock State Park
COMFORT STATION ADDITION
ELEVATIONS, DETAILS

BID NO. 14-31

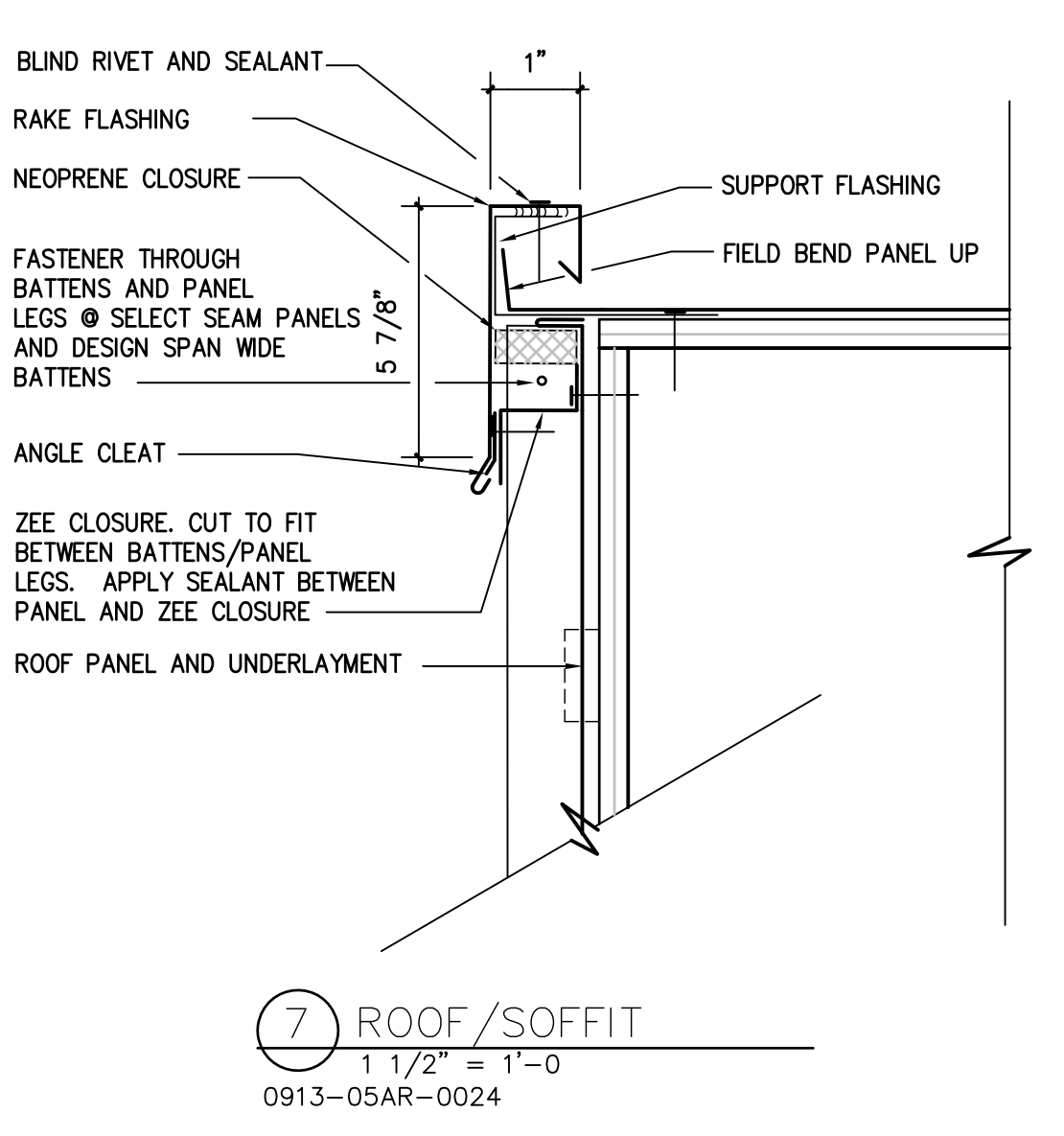
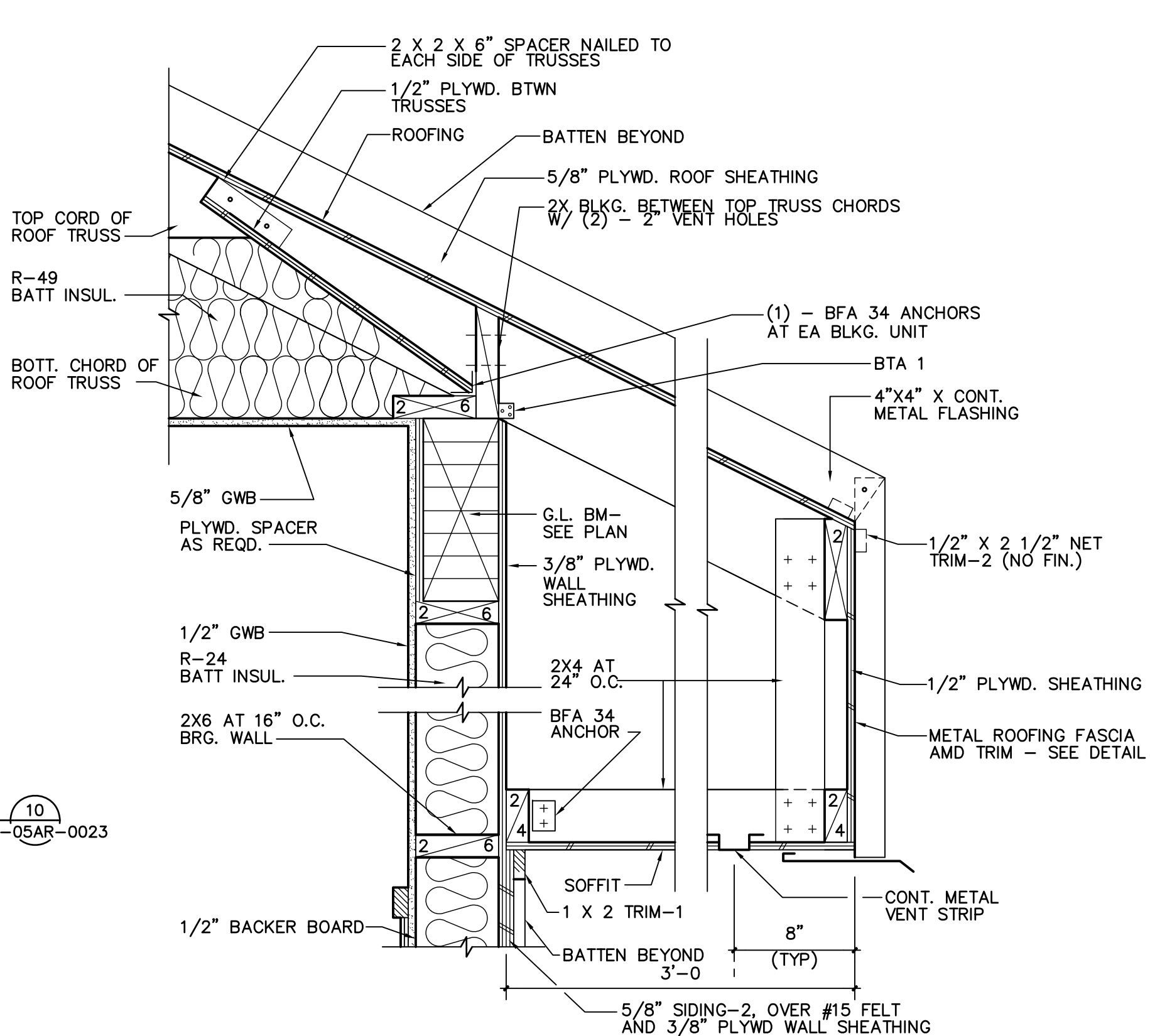
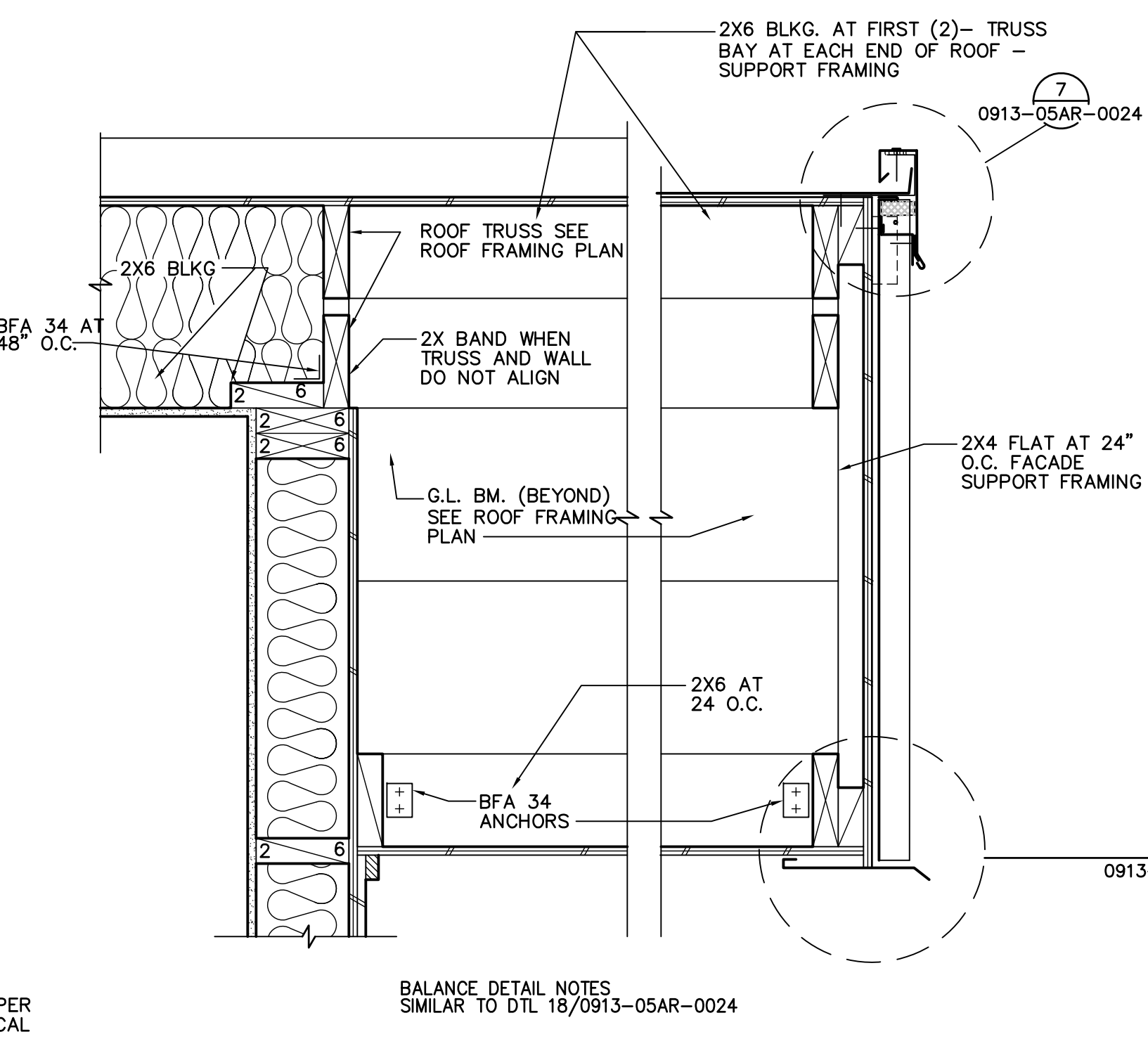
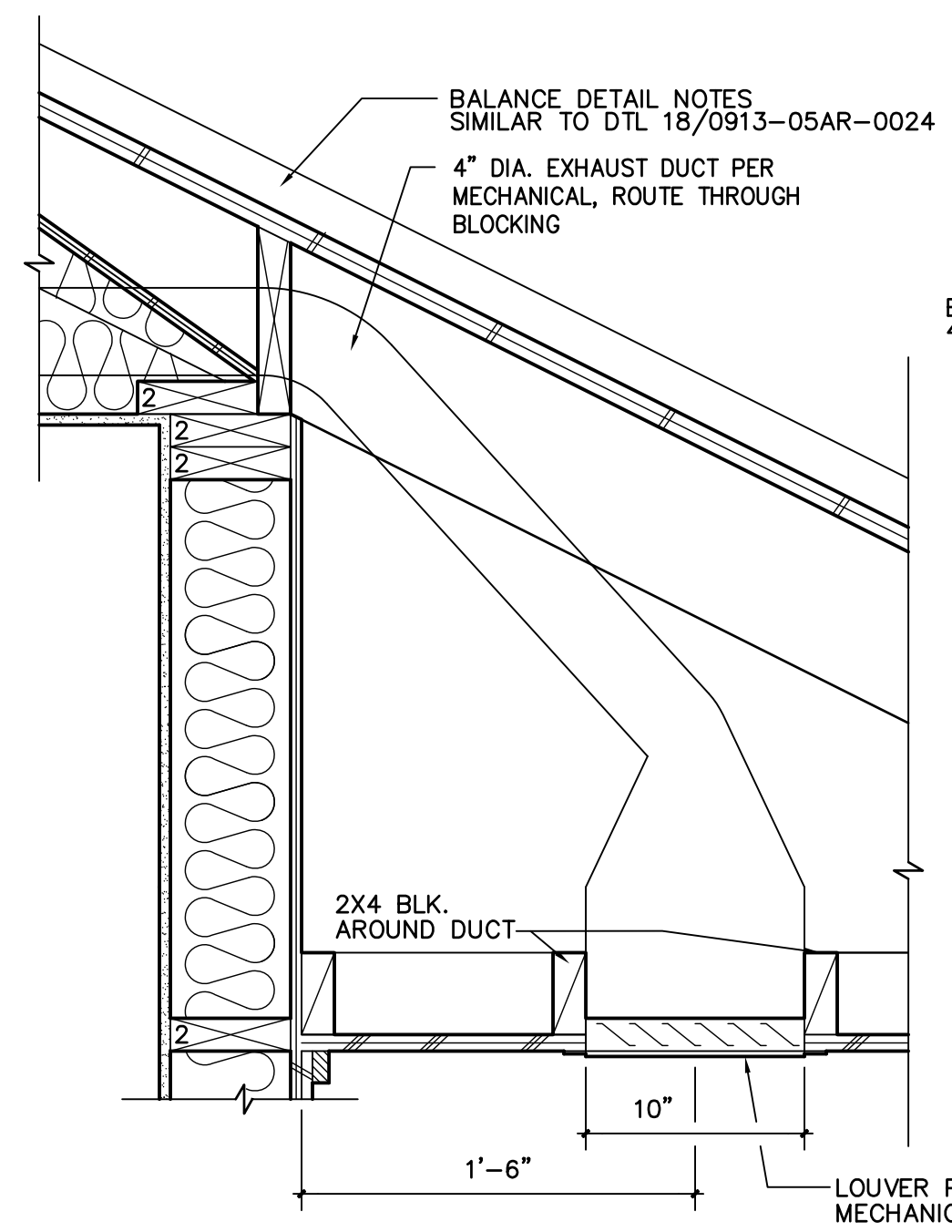
DATE 11/14/14

DWG. 0913-05AR-0023

REGISTERED ARCHITECT
PAUL R. COPPOCK
STATE OF WASHINGTON

CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1	SCALE VARIES	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
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	DESIGNER DOH	2ND ENG.	0	11/14/14	Bid Set	JSC
	APPROVAL	PROJ. MGR. Court Hill	REV	DATE	REVISION	REQ. BY DRFT

ORIG. DATE 6/1/14
ORIG. DRAWN DOH

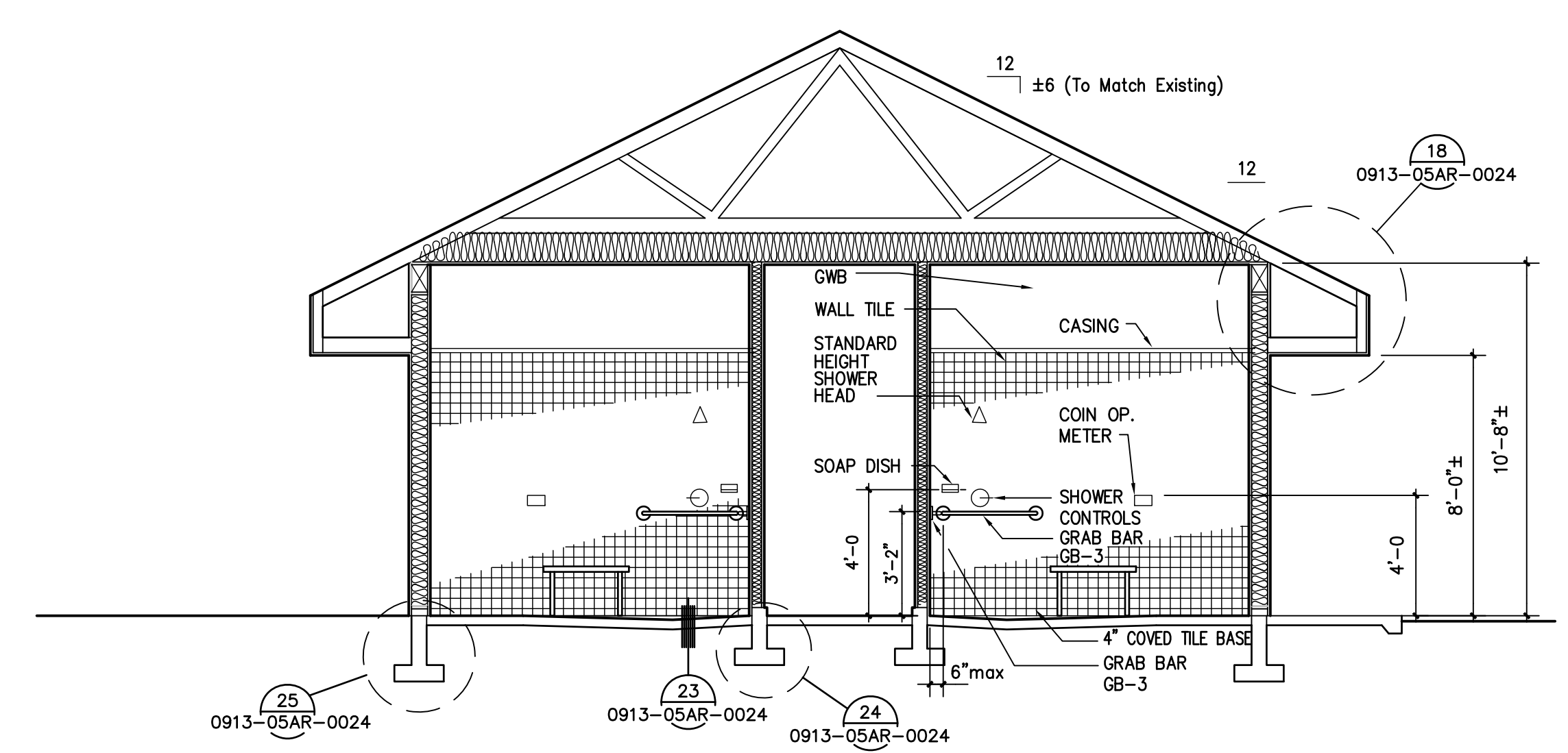
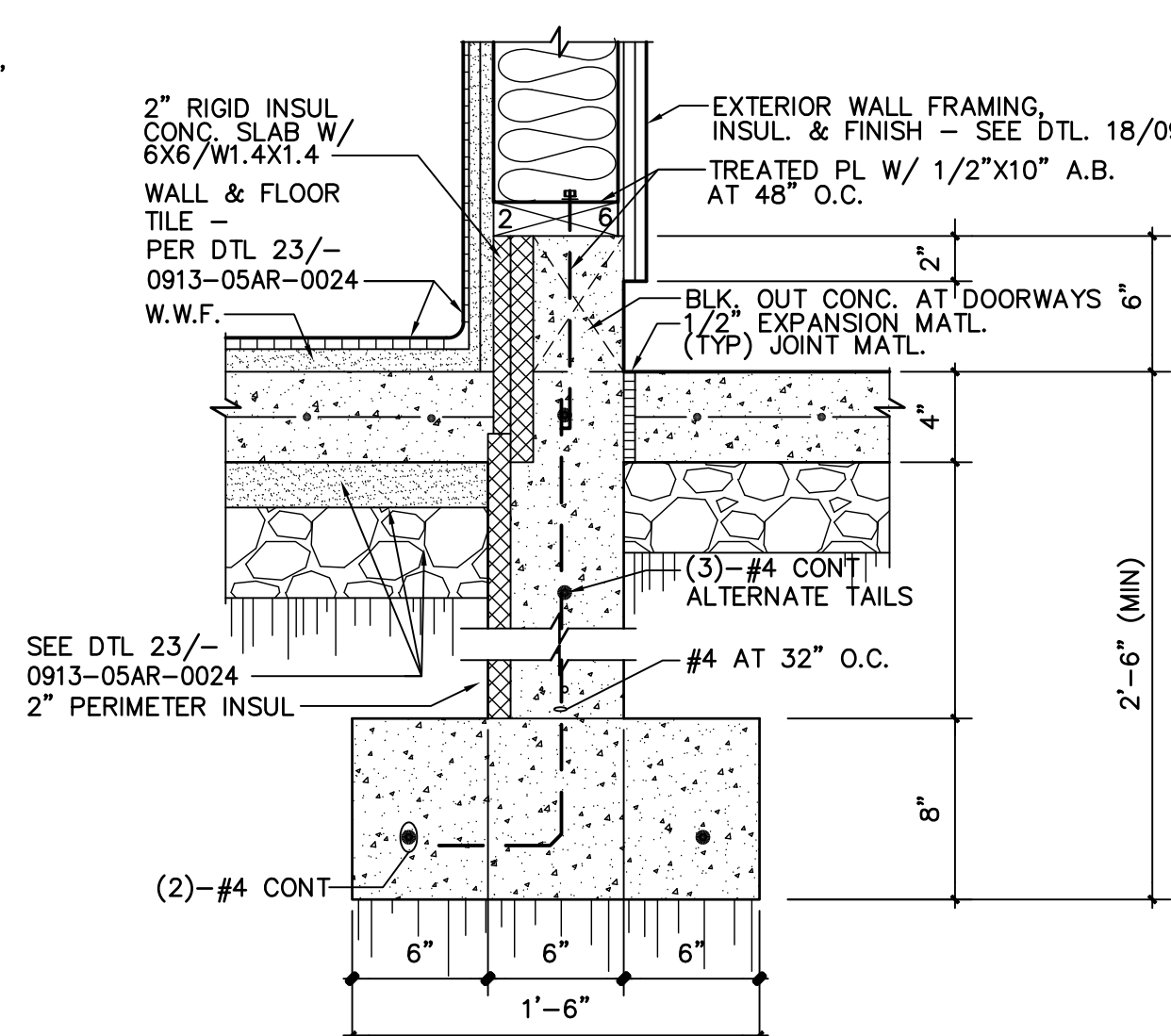
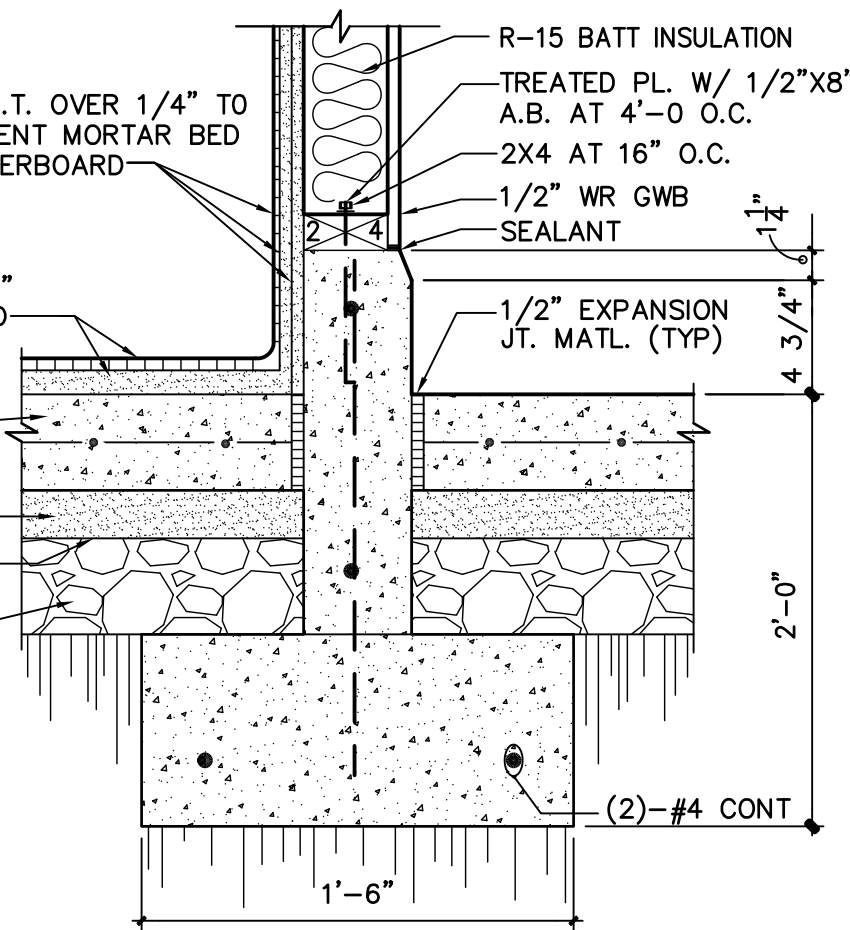
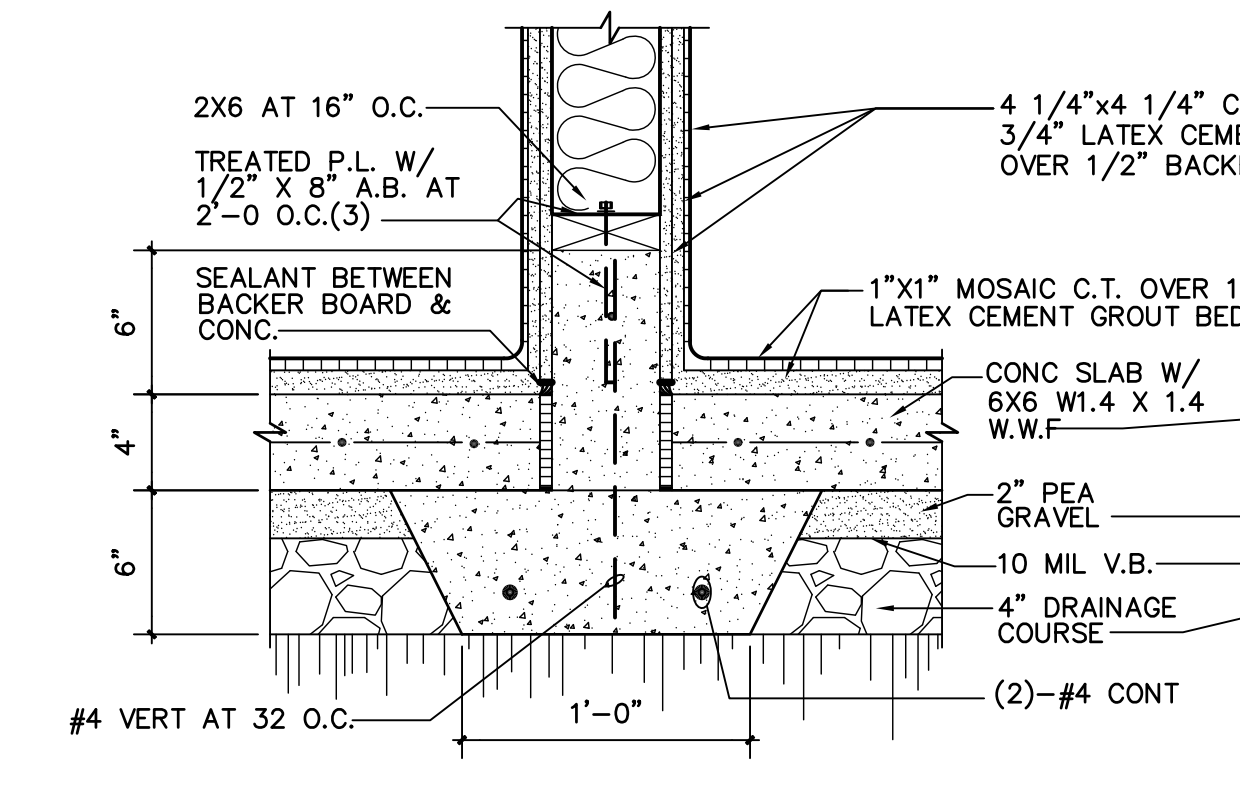


15 RELIEF AIR DAMPER
1 1/2" = 1'-0"
0913-05AR-0024

16A ROOF/SOFFIT DTL
1 1/2" = 1'-0"
0913-05AR-0024

16B ROOF/SOFFIT
1 1/2" = 1'-0"
0913-05AR-0024

18 ROOF/SOFFIT
1 1/2" = 1'-0"
0913-05AR-0024



23 INTERIOR WALL & THKND SLAB
1 1/2" = 1'-0"
0913-05AR-0024

24 INTERIOR WALL & FOUND
1 1/2" = 1'-0"
0913-05AR-0024

25 EXTERIOR WALL & FOUND
1 1/2" = 1'-0"
0913-05AR-0024

A SECTION A-A
0913-05AR-0020,21 1/4" = 1'-0"



PRIM. ENG.	CHELAN PUD NO.1
2ND ENG.	PRIM. ENG.
DESIGNER DOH	2ND ENG.
APPROVAL	PROJ. MGR. Court Hill

SCALE VARIES	0 11/14/14 Bid Set	JSC
REV	DATE	REVISION
REQ. BY	DRFT	

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY

WENATCHEE, WASHINGTON

Lincoln Rock State Park
COMFORT STATION ADDITION
SECTION, DETAILS

BID NO. 14-31

SHEET A2.7 OF A2.8

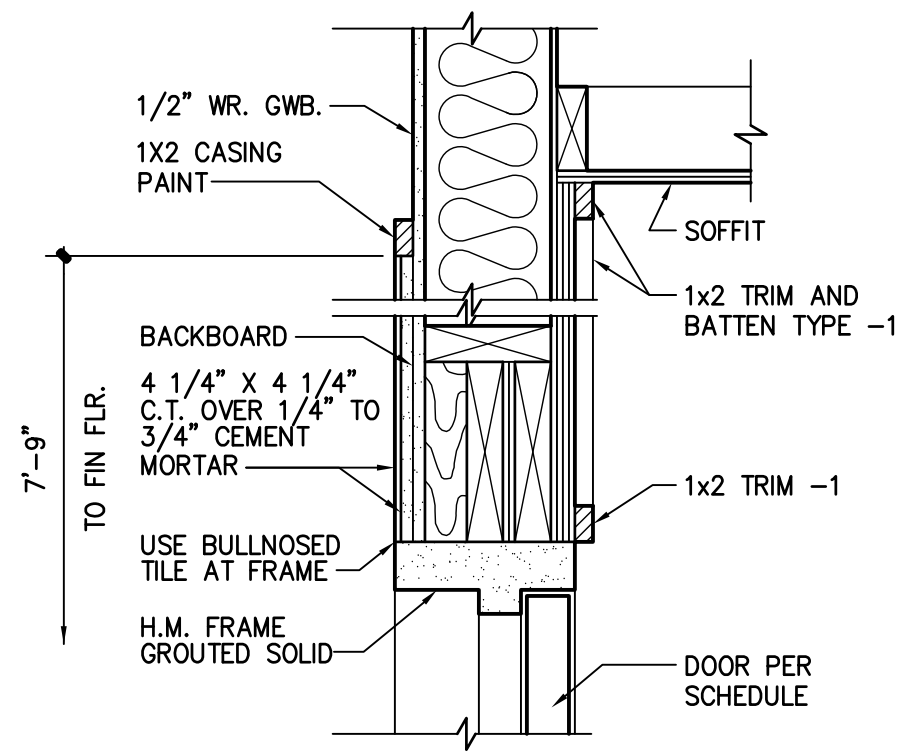
REVISION 0

DATE 11/14/14

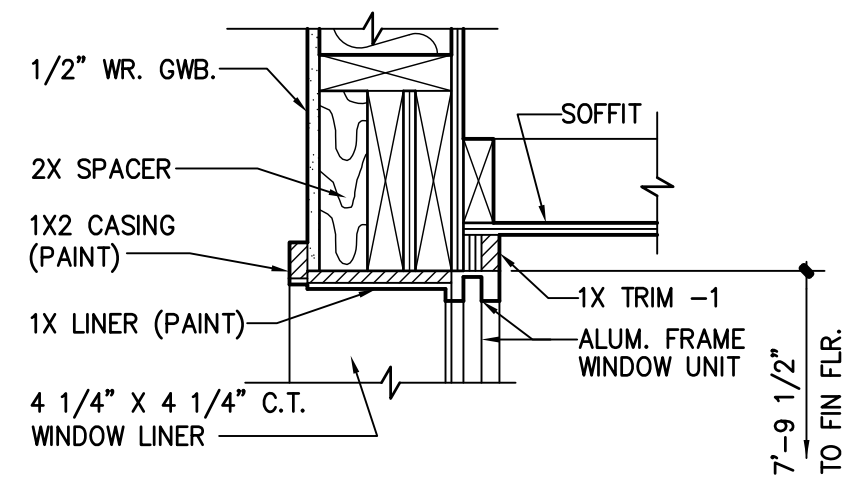
DWG. 0913-05AR-0024

5268 REGISTERED ARCHITECT
PAUL R. COPPOCK
STATE OF WASHINGTON

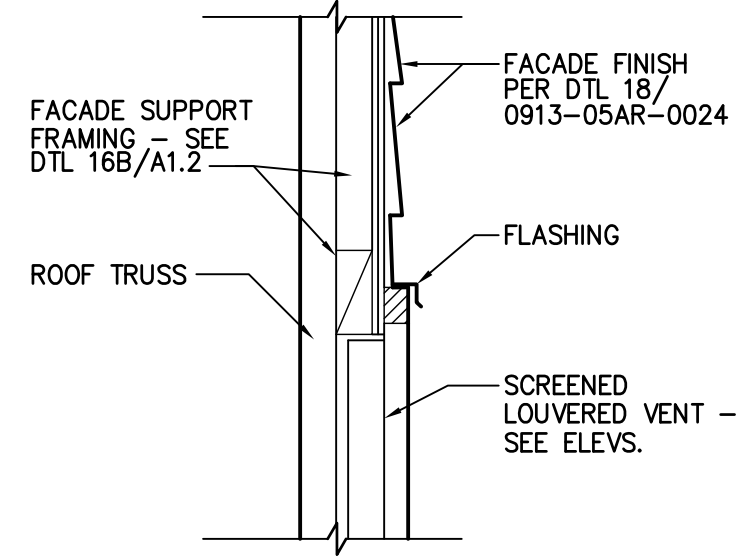
ORIG. DATE 6/1/14
ORIG. DRAWN DOH



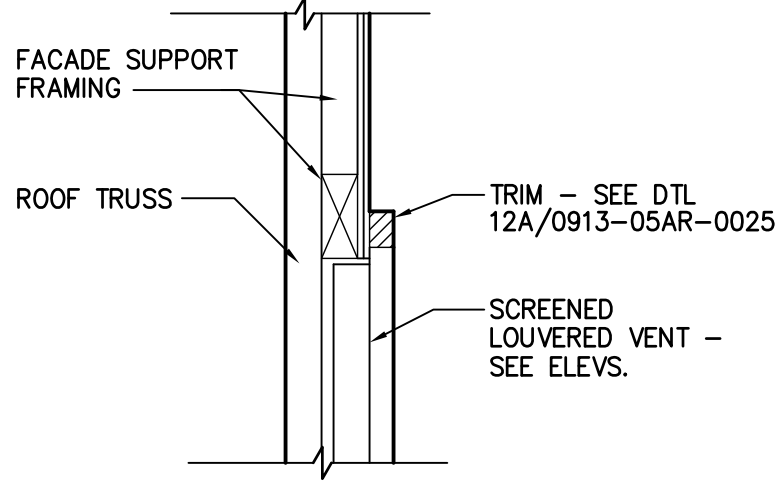
6 DOOR HDR. DTL.
1 1/2" - 1' - 0"
0913-05AR-0025



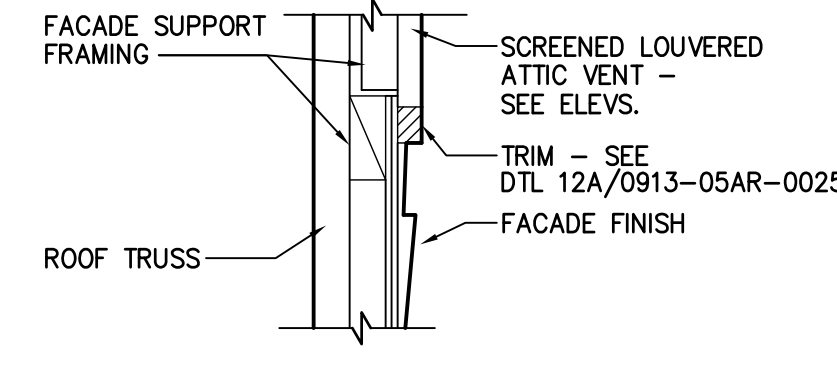
7 WINDOW HDR. DTL.
1 1/2" - 1' - 0"
0913-05AR-0025



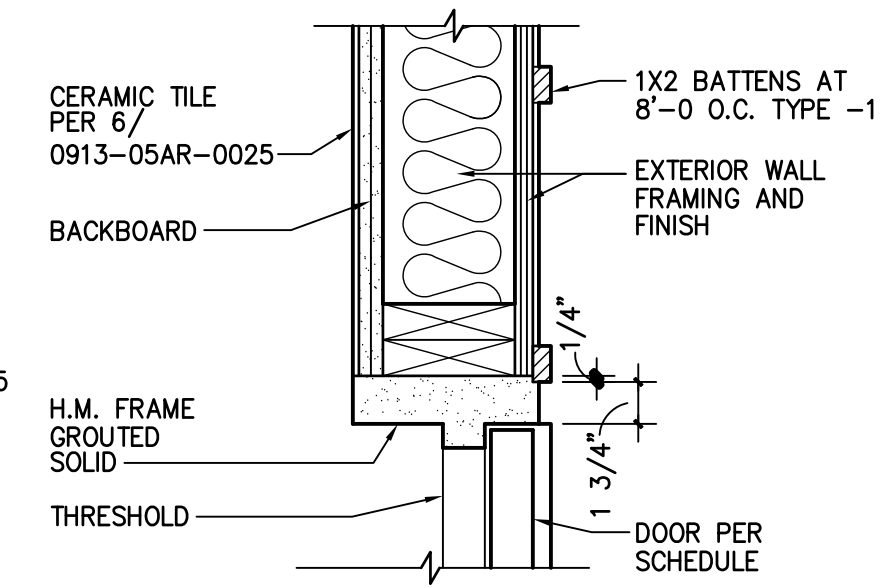
12A ATTIC VENT HEAD DTL.
1 1/2" - 1' - 0"
0913-05AR-0025



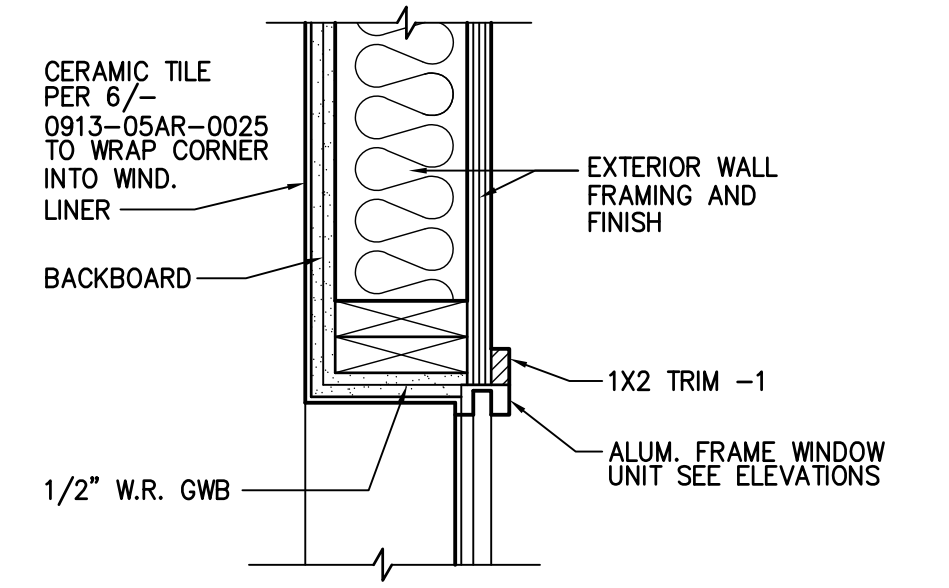
12B ATTIC VENT JAMB
1 1/2" - 1' - 0"
0913-05AR-0025



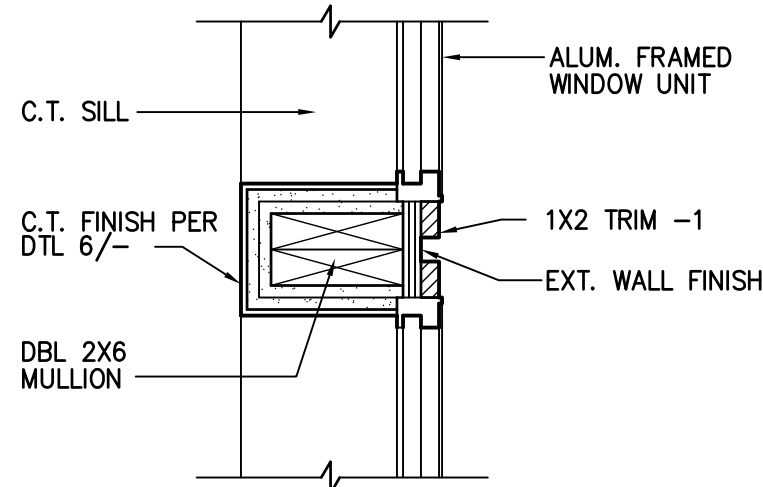
12C ATTIC VENT SILL
1 1/2" - 1' - 0"
0913-05AR-0025



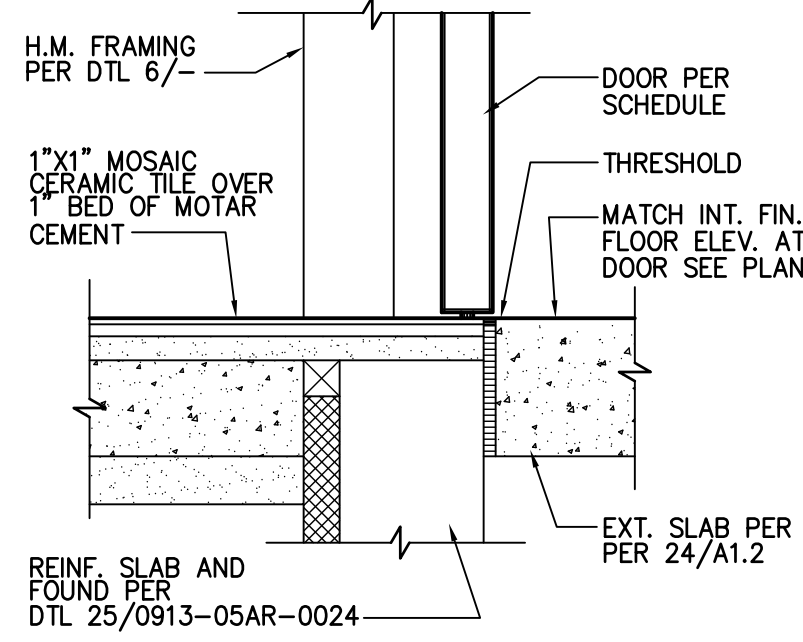
13 JAMB DTL.
1 1/2" - 1' - 0"
0913-05AR-0025



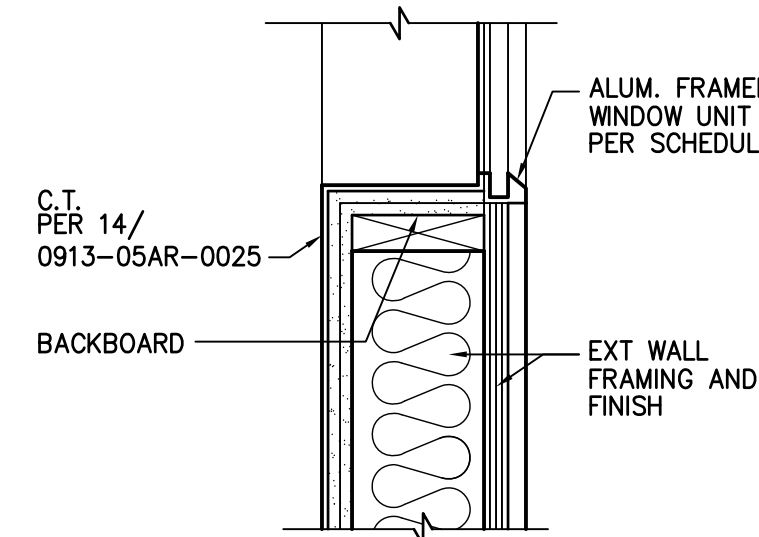
14 JAMB DTL.
1 1/2" - 1' - 0"
0913-05AR-0025



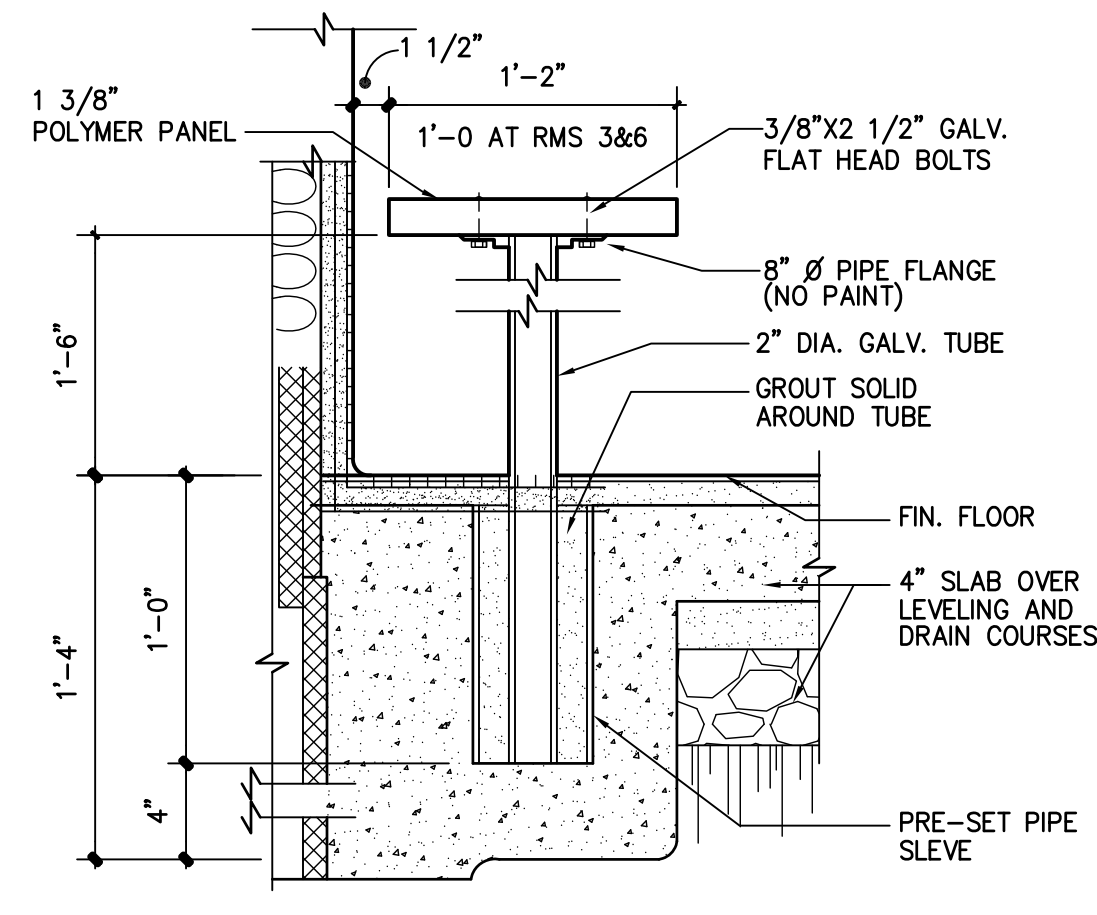
19 MULLION DTL AT WINDOW
1 1/2" - 1' - 0"
0913-05AR-0025



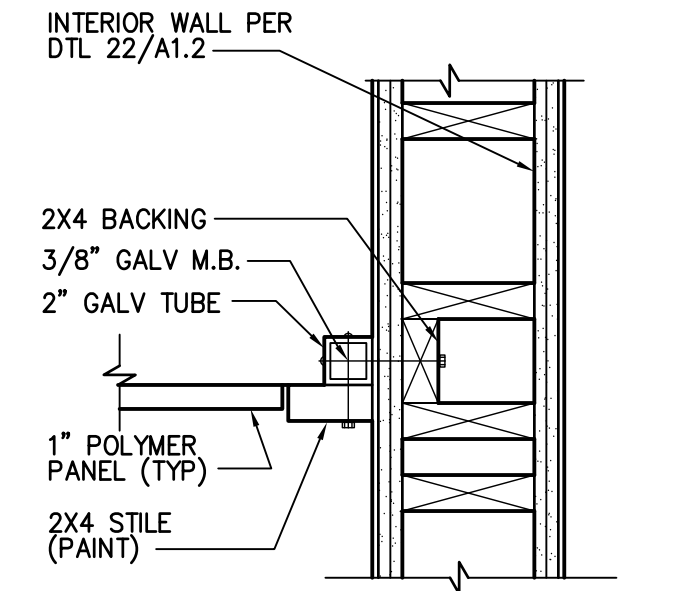
20 THRESHOLD DTL.
1 1/2" - 1' - 0"
0913-05AR-0025



21 SILL DTL.
1 1/2" - 1' - 0"
0913-05AR-0025



24 TUBE AT SLAB
1 1/2" - 1' - 0"
0913-05AR-0025



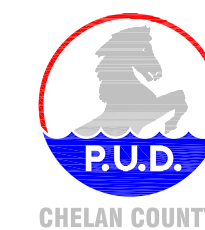
28 FACE FRAME AT WALL
1 1/2" - 1' - 0"
0913-05AR-0025



CONSULTANT	PRIM. ENG.	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG.
DESIGNER DOH	2ND ENG.	
APPROVAL	PROJ. MGR.	Court Hill

SCALE	1 1/2" = 1' - 0"				
BAR IS ONE INCH ON ORIGINAL DRAWING.	0 1" 0				
VERIFY SCALE					
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.					
REV	DATE	REVISION	REQ. BY	JSC	DRFT
0	11/14/14	Bid Set			

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON



Lincoln Rock State Park
COMFORT STATION ADDITION
DETAILS

BID NO. 14-31

SHEET A2.8 OF A2.8
REVISION 0
DATE 11/11/14
DWG. 0913-05AR-0025

DOCUMENT CLASS:

ID:

ORIGINAL DWG. #:

ORIG. DATE 6/1/14 ORIG. DRAWN DOH

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	COTF	CLEANOUT THRU FLOOR
—V—	VENT PIPING		PRESSURE REDUCING VALVE	COTG	CLEANOUT TO GRADE
----	DOMESTIC COLD WATER		PRESSURE REGULATING VALVE (GAS)	COTW	CLEANOUT THRU WALL
----	DOMESTIC HOT WATER		GAS COCK	FD	FLOOR DRAIN
----	DOMESTIC HOT WATER RECIRC.		FLEXIBLE PIPE CONNECTOR	HB	HOSE BIBB
—D—	DRAIN LINE		PRESSURE GAUGE	IE	INVERT ELEVATION
—G—	NATURAL GAS		THERMOMETER	RD	ROOF DRAIN
—GV—	GAS VENT		THERMOMETER WELL	TYP	TYPICAL
—ID—	INDIRECT WASTE		GATE VALVE WITH HOSE END CONN.	VTR	VENT THRU ROOF
	CONTINUATION OF PIPING		SOLENOID VALVE	WH	WALL HYDRANT
	TEE DOWN		SAFETY VALVE	SF	SUPPLY FAN
	TEE UP		EXHAUST FAN	EF	EXHAUST FAN
	ELBOW DOWN		ELECTRIC DUCT COIL	EDC	ELECTRIC DUCT COIL
	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

ITEM NO.	EDC-1
LOCATION SERVED	ADA BATHROOM
CAPACITY (kW)	12
VOLTAGE	240
PHASE	1
DUCT DIMENSIONS (WXH)	12x12
NUMBER OF HEATING STAGES	3
CONTROL TYPE	THERMOSTAT
MANUFACTURER	INDEECO
MODEL	QUA
NOTES	1
NOTES:	1. PROVIDE WITH DOOR INTERLOCKED DISCONNECT SWITCH

ITEM NO.	F-1
CAPACITY	
CFM	350
STATIC PRESSURE (IN WG)	0.375
RPM	1233
SONES	5.6
POWER	
HP	0.25
VOLTS	115
PHASE	1
MANUFACTURER	COOK
MODEL	100SQN17DEC
NOTES	1,2,3
NOTES:	1. MOTOR TO BE ECM TYPE 2. PROVIDE WITH FACTORY DISCONNECT SWITCH 3. PROVIDE WITH VARIABLE SPEED CONTROLLER

NOTE:						
1. THE FOLLOWING FIXTURES/EQUIP. LISTED ARE SELECTED AS THE BASIS OF DESIGN						
2. NOTE: ALL FAUCETS & DRINKING FOUNTAIN SPOUTS TO BE OF NO LEAD-CONTAINING BRASS PARTS ACCORDING TO THE NSF STANDARD 61. SELF-CLOSING FAUCETS REQUIRED BY PLUMBING CODE IN NEW CONSTRUCTION AND WHEN FAUCETS REPLACED. WHEN INSTALLED, SHALL PROVIDE TEN SECONDS OF RUNNING WATER. FLUSH VALVES TO WATER CLOSETS TO BE ON WIDE SIDE OF FIXTURE AND NOT MORE THAN 44" FROM FLOOR.						
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"	1/2"
F-3	SHOWER: TWO(2) CHICAGO #621-CP, TAMPERPROOF SHOWER HEAD, 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: KOHLER # K-11748-KS, PRESSURE-BALANCING DIAPHRAM DESIGN WITH SCREWDRIVER STOPS TRIM: KOHLER # K-T45112-4, MIXING VALVE TRIM WITH DIVERTER BUTTON FLOOR DRAIN: J.R. SMITH #2005-B06PBU CONTROL VALVE: WATER CONSERVATION SERVICES, #CMSV-221, SOLENOID ACTUATED CONTROL VALVE	2"	1-1/2"		1/2"	1/2"
F-4	SHOWER: ONE(1) CHICAGO #621-CP, TAMPERPROOF SHOWER HEAD, WITH 2.0 GPM MAX FLOW MOUNTED AT 6'-6" A.F.F. MIXING VALVE: KOHLER # K-11748-KS, PRESSURE-BALANCING DIAPHRAM DESIGN WITH SCREWDRIVER STOPS TRIM: KOHLER # K-T45112-4, MIXING VALVE TRIM WITH DIVERTER BUTTON FLOOR DRAIN: J.R. SMITH #2005-B06PBU CONTROL VALVE: WATER CONSERVATION SERVICES, #CMSV-221, SOLENOID ACTUATED CONTROL VALVE	2"	1-1/2"		1/2"	1/2"

- SCHEDULE KEY NOTES:**
- 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

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	1,2,3,5
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 0913-05BS-0008. 3. PROVIDE WITH FACTORY OR FIELD FUSED DISCONNECT. 4. PROVIDE WITH ALUMINUM CEILING GRILLE 5. PROVIDE W/FACORY, LOW LEAK BACKDRAFT DAMPER

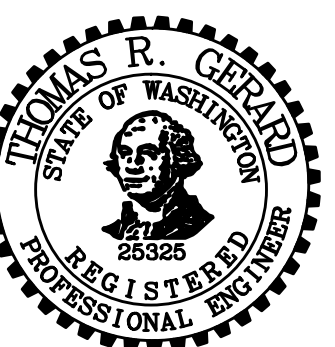
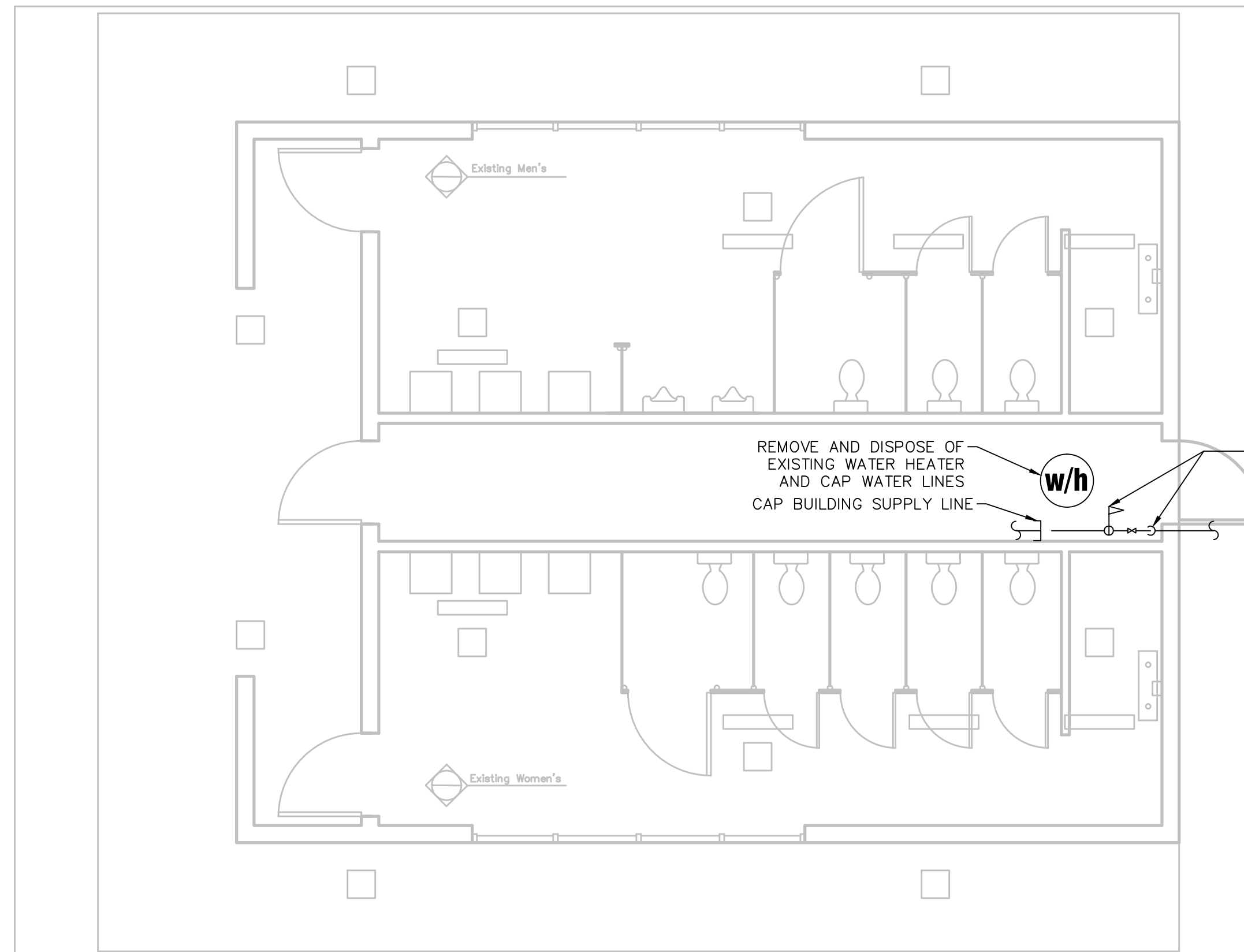
ITEM NO.	G-1	G-2	G-3
CAPACITY			
CFM	75	150	150
NC LEVEL	20>	19	12
SIZE	12"x12"	8"x6"	8"x6"
MANUFACTURER	TITUS	TITUS	TITUS
MODEL	355FL	355FL	272FL
NOTES		1	1
NOTES:	1. PROVIDE WITH INTEGRAL, OPPOSED BLADE BALANCING DAMPER		

ITEM NO.	WH-1
LOCATION	CHASE
CAPACITY	
GALLONS	120
INPUT KW	54
RECOVERY	248
VOLTAGE/PHASE	240/1Ø
MANUFACTURER	RHEEM
MODEL	E120-54-G
SHIPPING WEIGHT	430 LBS
NOTES:	1. RECOVERY IS GALLONS PER HOUR AT 90°F RISE. 2. PROVIDE ASME TEMP./PRESS. RELIEF VALVE AND EXPANSION TANK 3. CONTRACTOR SHALL PROVIDE WITH PROTECTION PLUS, THE 8-YEAR LIMITED TANK WARRANTY BECOMES 12 YEAR 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

DRAWING INDEX

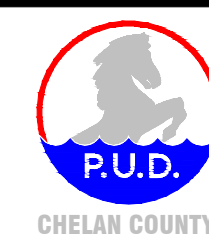
- M2.1 0913-05BS-0007 - COMFORT STATION SCHEDULE AND SHEET INDEX
- M2.2 0913-05BS-0008 - COMFORT STATION DEMOLITION
- M2.3 0913-05BS-0009 - COMFORT STATION PLUMBING FOUNDATION PLAN
- M2.4 0913-05BS-0010 - COMFORT STATION PLUMBING FLOOR PLAN
- M2.5 0913-05BS-0011 - COMFORT STATION HVAC PLAN
- M2.6 0913-05BS-0012 - COMFORT STATION DETAILS

	PRIM. ENG. R.F.T. 2ND ENG. T.R.G. DESIGNER APPROVAL	CHELAN PUD NO.1 PRIM. ENG. 2ND ENG. PROJ. MGR. COURT HILL	SCALE NOT TO SCALE 0 11-14-14 BID SET	BAR IS ONE INCH ON ORIGINAL DRAWING. VERIFY SCALE 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY WENATCHEE, WASHINGTON		Lincoln Rock State Park COMFORT STATION ADDITION SCHEDULE AND SHEET INDEX BID NO. 14-31	SHEET M2.1 OF M2.6 REVISION 0 DATE 11-14-14 DWG. 0913-05BS-0007
	CONSULTANT	REV DATE REVISION	REQ. BY DRFT	DOCUMENT CLASS:	ID:	ORIGINAL DWG. #:	THOMAS R. GERRARD STATE OF WASHINGTON 28326 PROFESSIONAL ENGINEER	ORIG. DRAWN ORIG. DATE	



CONSULTANT	PRIM. ENG.	R.F.T.	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.	T.R.G.	PRIM. ENG.	1/4"=1'	0			
	DESIGNER		2ND ENG.	0	11-14-14	BID SET		
	APPROVAL		PROJ. MGR.	COURT HILL	REV	DATE	REVISION	REQ. BY

PUBLIC UTILITY DISTRICT NO. 1
OF CHELAN COUNTY
WENATCHEE, WASHINGTON



Lincoln Rock State Park
COMFORT STATION ADDITION
PLUMBING DEMOLITION

BID NO.14-31

SHEET	M2.2 OF M2.6
REVISION	0
DATE	11-14-14
DWG.	0913-05BS-0008

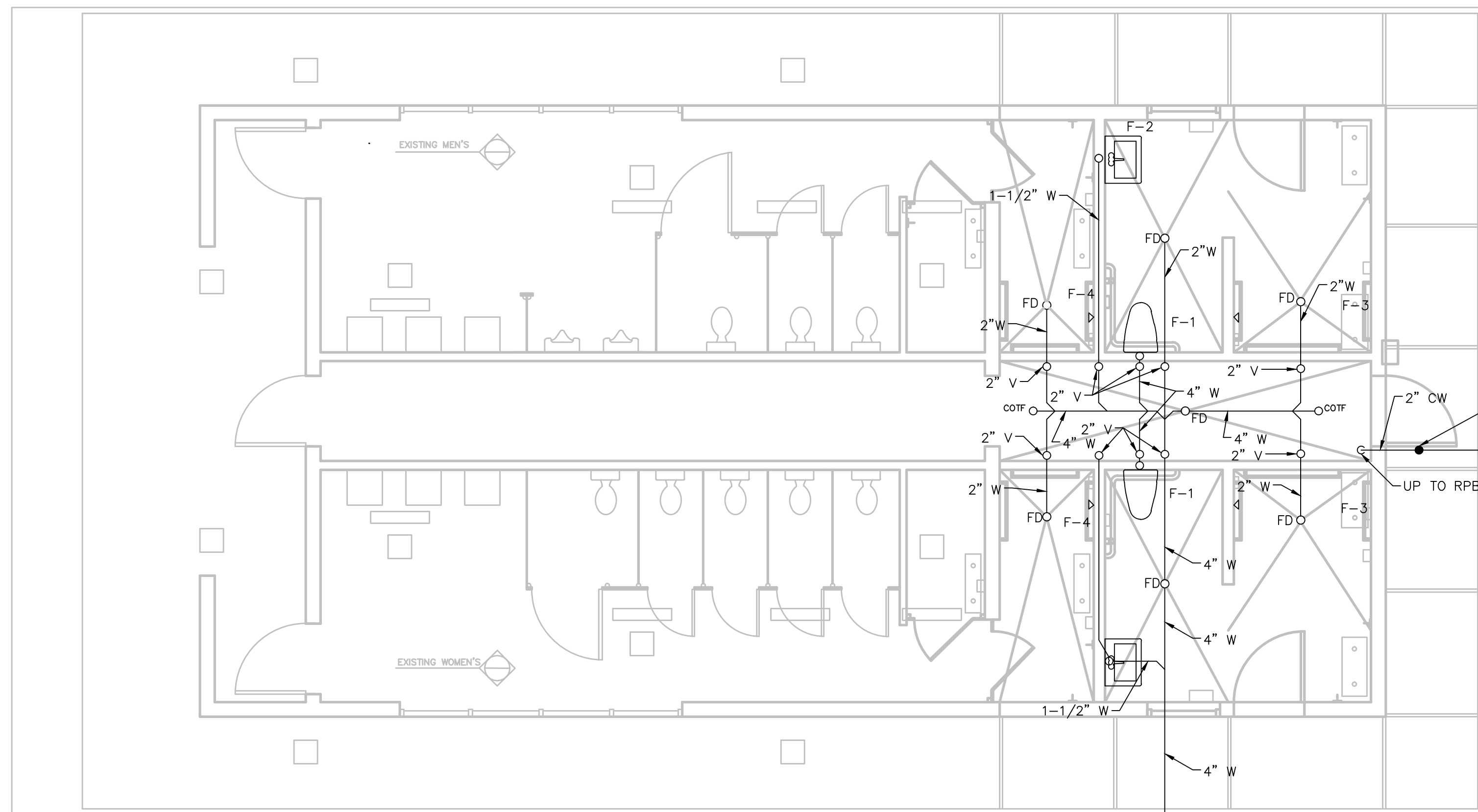
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ORIGINAL DWG. #:

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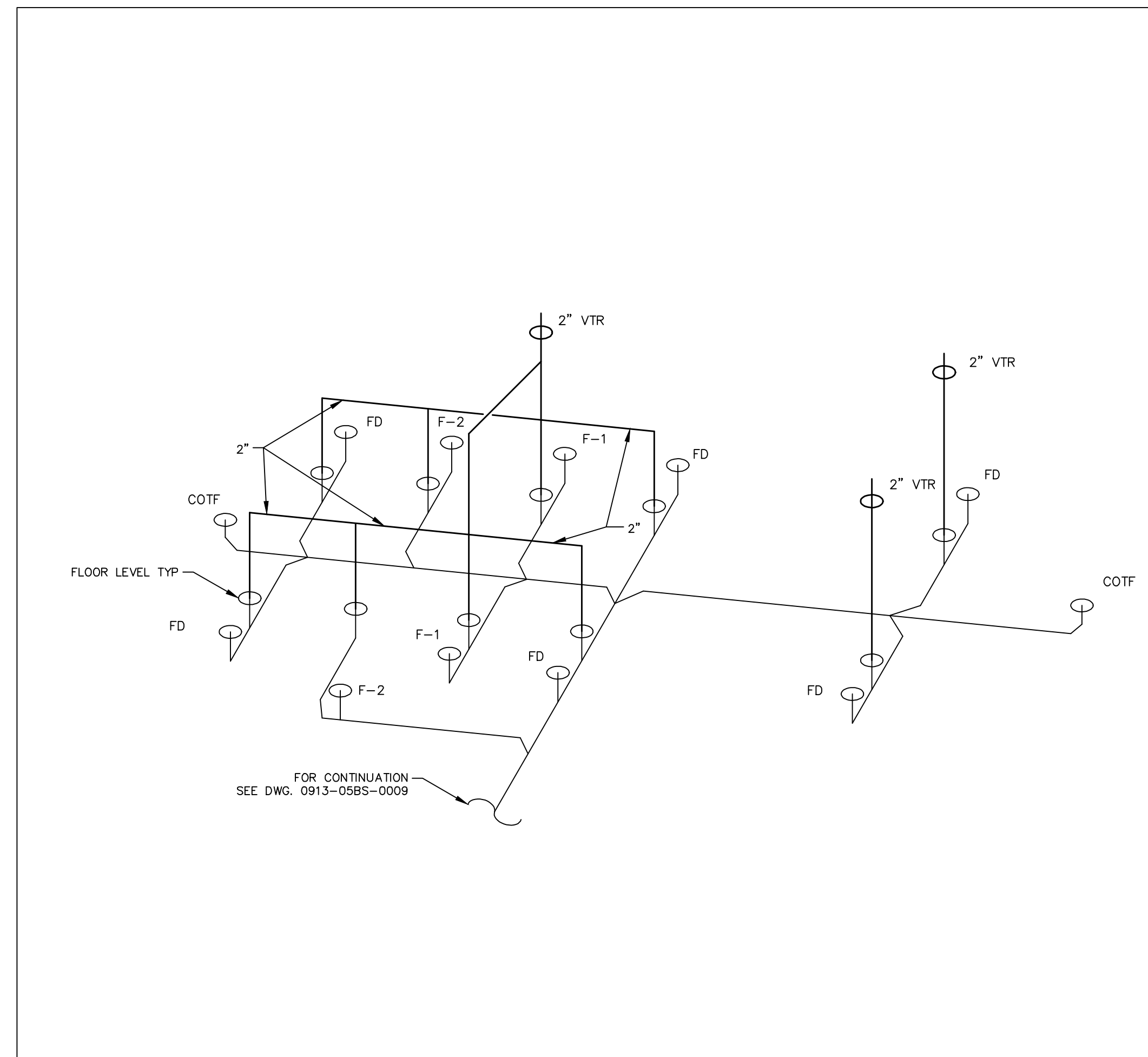
ORIG. DATE



CONNECT TO EXISTING WATER SERVICE
 UP TO RPB
 FOR CONTINUATION SEE CAMP LOOP UTILITY PLAN (DWG. 0913-50SU-0002)

FOR CONTINUATION SEE CAMP LOOP UTILITY PLAN (DWG. 0913-50SU-0002)

Plumbing Foundation Plan
 0 1' 4'



Waste and Vent Riser Diagram
 NOT TO SCALE



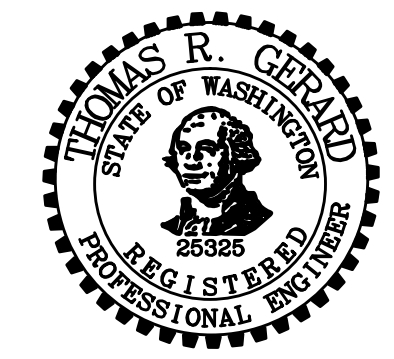
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	2ND ENG. T.R.G.	PRIM. ENG.
	DESIGNER	2ND ENG.
	APPROVAL	PROJ. MGR. COURT HILL

SCALE	1/4"=1'	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
BAR IS ONE INCH ON ORIGINAL DRAWING.	0 1"		
REV	DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

Lincoln Rock State Park
COMFORT STATION ADDITION
PLUMBING FOUNDATION PLAN
 BID NO.14-31

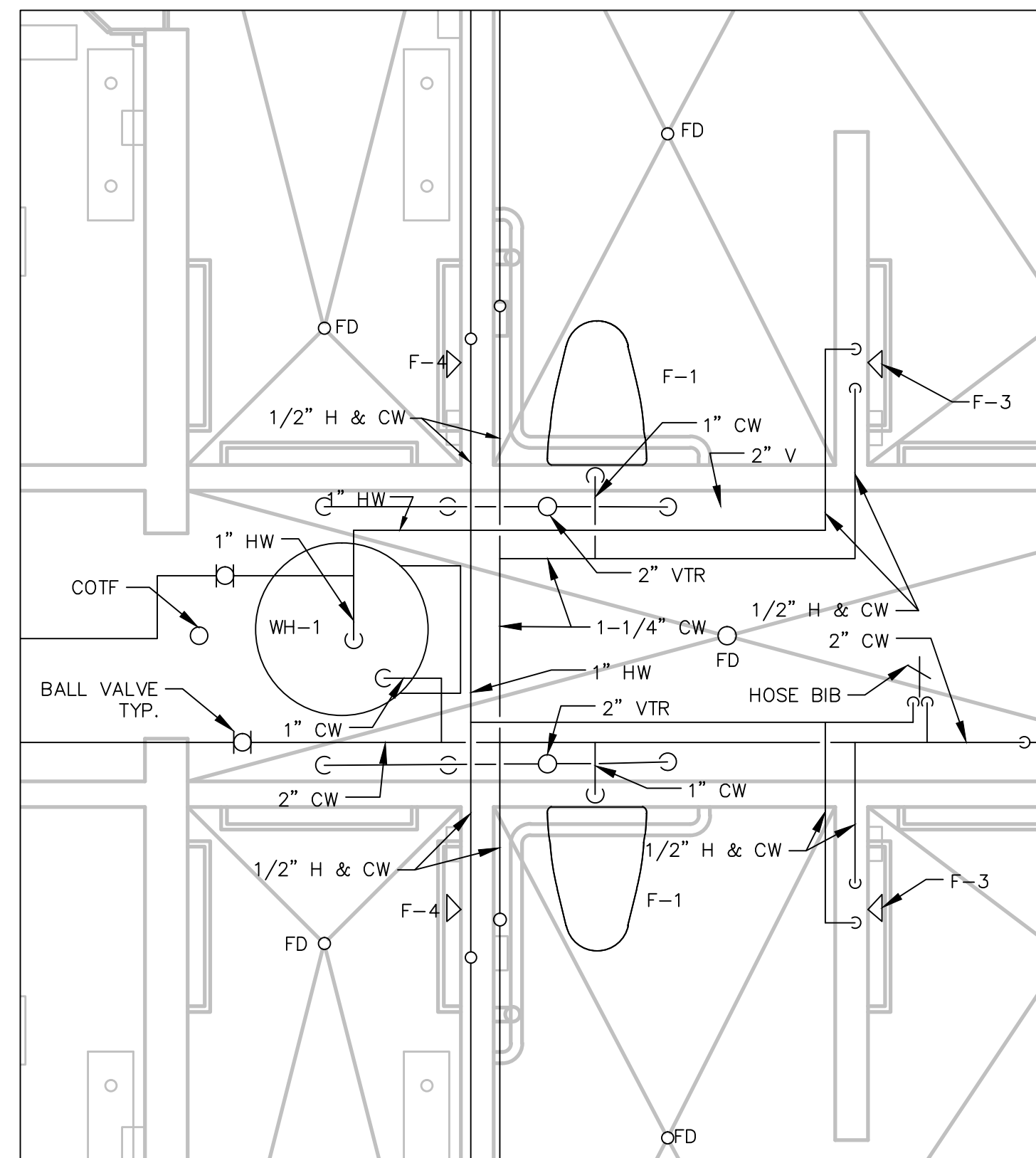
SHEET	M2.3 OF M2.6
REVISION	0
DATE	11-14-14
DWG.	0913-05BS-0009



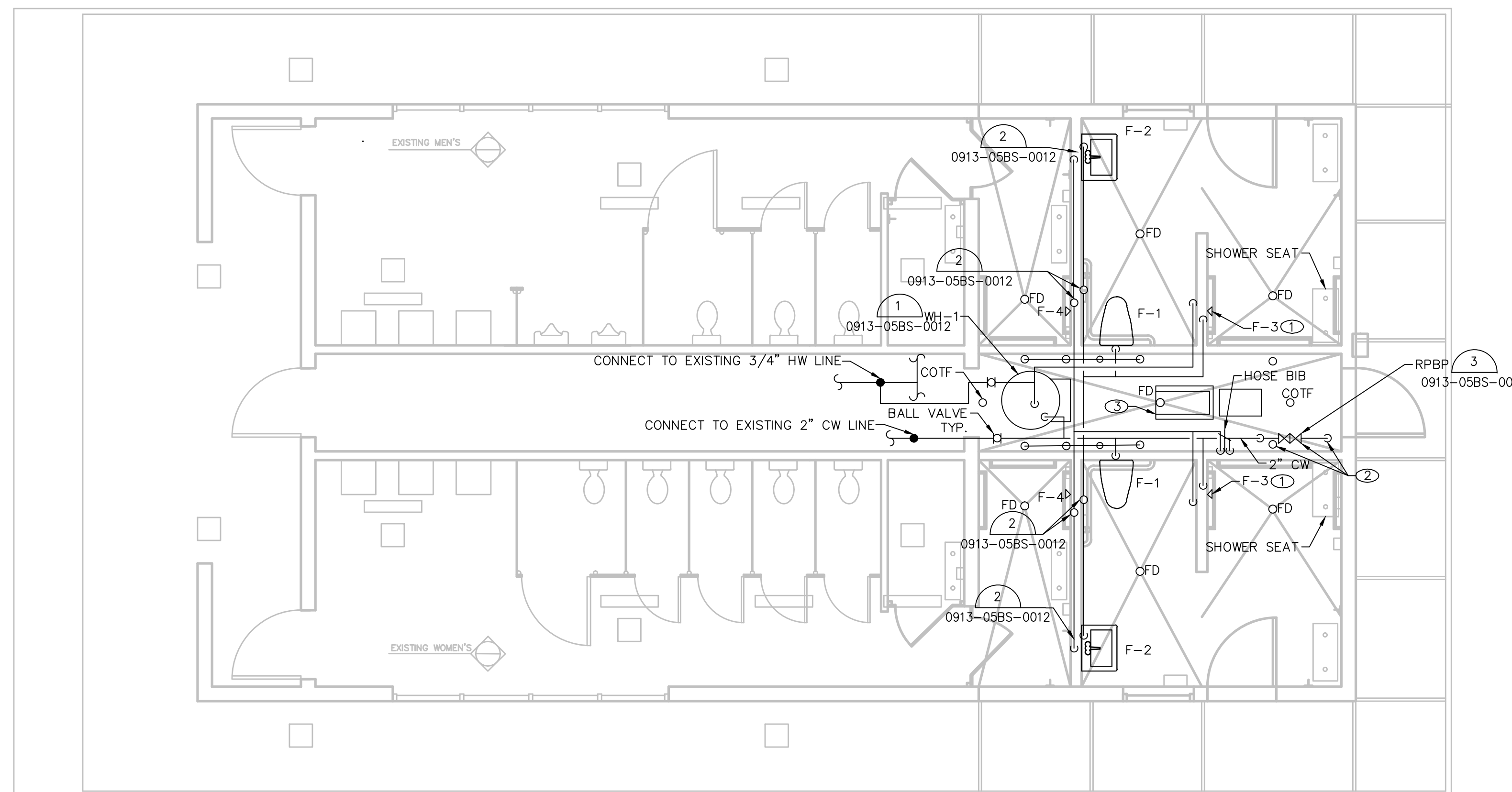
ORIG. DRAWN
 ORIG. DATE

PLAN NOTES

- ① TWO(2) SHOWER HEADS. SEE DETAIL 5 ON DWG, 0913-05BS-0012
- ② LOCATE AS CLOSE TO WALL AS POSSIBLE.
- ③ HVAC EQUIPMENT ABOVE. INSTALL NO PIPING IN THIS AREA.



Enlarged Floor Plan
NOT TO SCALE

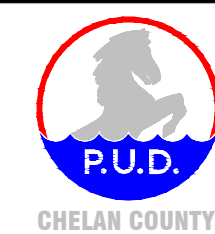


Plumbing Floor Plan



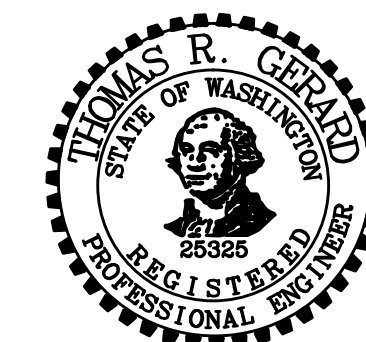
CONSULTANT	PRIM. ENG. R.F.T.	CHELAN PUD NO.1	SCALE	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
	2ND ENG. T.R.G.	PRIM. ENG.	1/4"=1'	0	1"	
	DESIGNER	2ND ENG.	0	11-14-14	BID SET	
	APPROVAL	PROJ. MGR. COURT HILL	REV	DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON



Lincoln Rock State Park
COMFORT STATION ADDITION
PLUMBING FLOOR PLAN

BID NO. 14-31



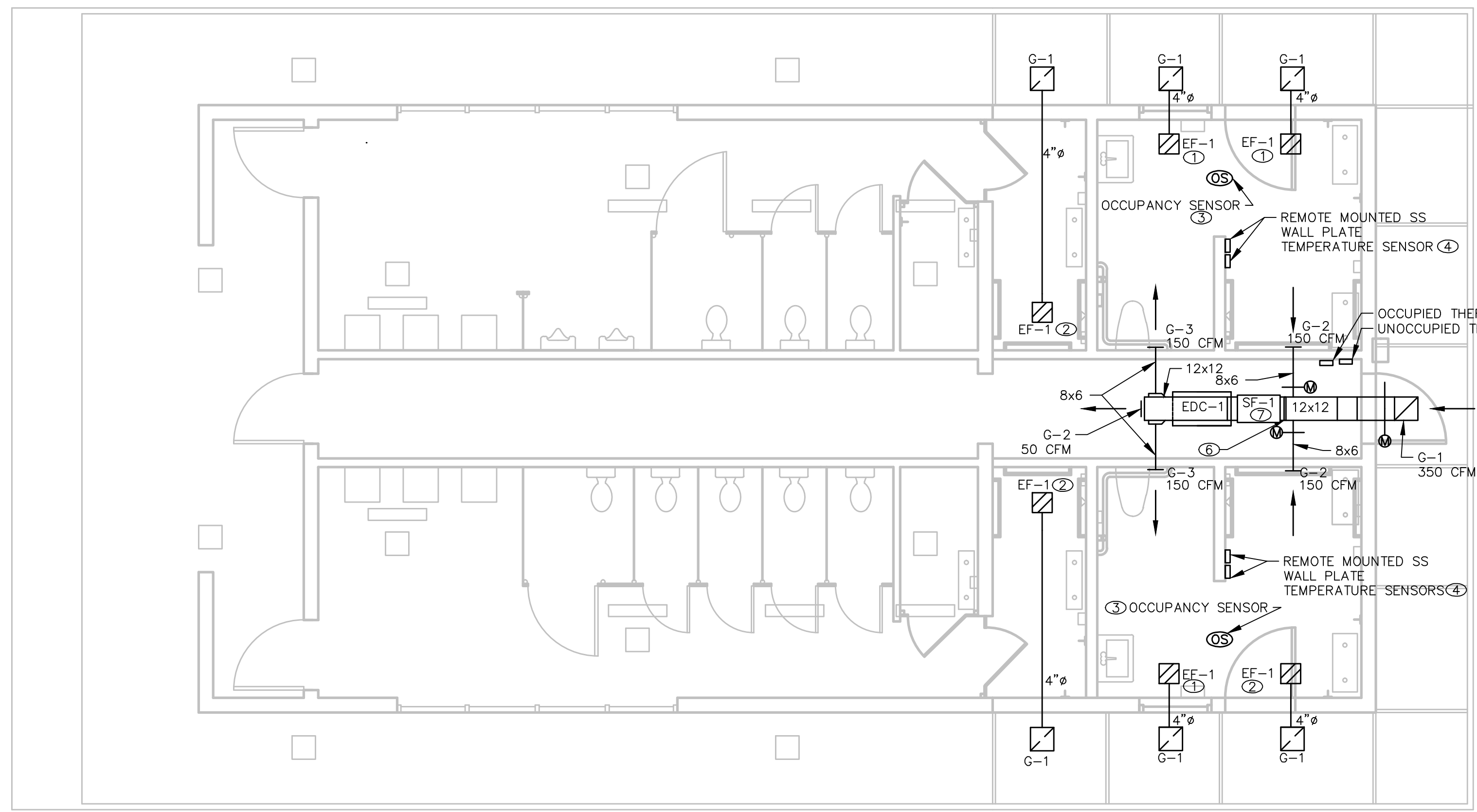
SHEET	M2.4 OF M2.6
REVISION	0
DATE	11-14-14
DWG.	0913-05BS-0010

DOCUMENT CLASS:

ID:

ORIGINAL DWG. #:

ORIG. DRAWN
ORIG. DATE



PLAN NOTES

- ① NEW EXHAUST FAN – CONTROL FROM OCCUPANCY SENSOR – SEE CONTROL SEQUENCE ON THIS SHEET.
- ② NEW EXHAUST FAN – CONTROL FROM EXISTING EXHAUST FAN TIME CLOCK
- ③ NEW OCCUPANCY SENSOR PROVIDED AND INSTALLED BY DIVISION 26. SEE ELECTRICAL DRAWINGS FOR EXACT LOCATION OF OCCUPANCY SENSORS
- ④ REMOTE MOUNTED, STAINLESS STEEL, WALL PLATE TEMPERATURE SENSORS: ONE(1) FOR THE OCCUPIED THERMOSTAT & ONE(1) FOR THE UNOCCUPIED THERMOSTAT.
- ⑤ HEATING ONLY THERMOSTAT SHALL BE CAPABLE OF CONTROLLING 3-STAGES OF ELECTRIC HEAT.
- ⑥ 1" FIELD FABRICATED FILTER RACK WITH BOTTOM ACCESS. PROVIDE TWO(2) SETS OF DISPOSABLE 1" THICK, EXTENDED COVERAGE, PLEATED FILTERS.
- ⑦ SEE DETAIL NO. 4 ON DWG. 0913-05BS-0012 – MOUNTING DETAIL

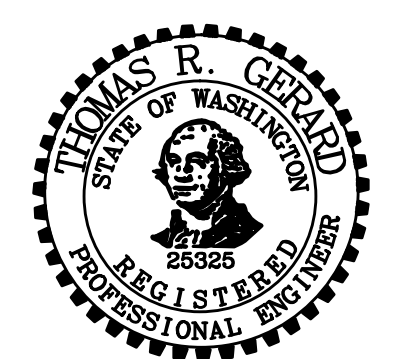
CONTROL SEQUENCE

OCCUPIED CYCLE
 WHEN THE OCCUPANCY SENSOR DETECTS OCCUPANCY
 1. LIGHTS COME ON & EXHAUST FANS WILL START.
 2. RETURN DAMPERS ON FAN COIL WILL CLOSE, OUTSIDE AIR DAMPER WILL OPEN, AND FAN COIL WILL START AND RUN CONTINUOUSLY
 3. OCCUPIED THERMOSTAT (T_{occ}) WILL BECOME ACTIVE.
 4. OCCUPIED THERMOSTAT WILL MODULATE HEATING COIL ON FAN COIL UNIT TO MAINTAIN SETPOINT (70° F 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 THE OCCUPANCY SENSOR DOES NOT DETECT 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. UNOCCUPIED THERMOSTAT (T_{unocc}) WILL BECOME ACTIVE.
 4. UNOCCUPIED THERMOSTAT WILL MODULATE THE HEATING COIL ON THE FAN COIL UNIT TO MAINTAIN THE SETPOINT. (50° F OR AS SET)



HVAC Floor Plan



CONSULTANT	PRIM. ENG. R.F.T.	CHELAN PUD NO.1
	2ND ENG. T.R.G.	PRIM. ENG.
	DESIGNER	2ND ENG.
	APPROVAL	PROJ. MGR. COURT HILL

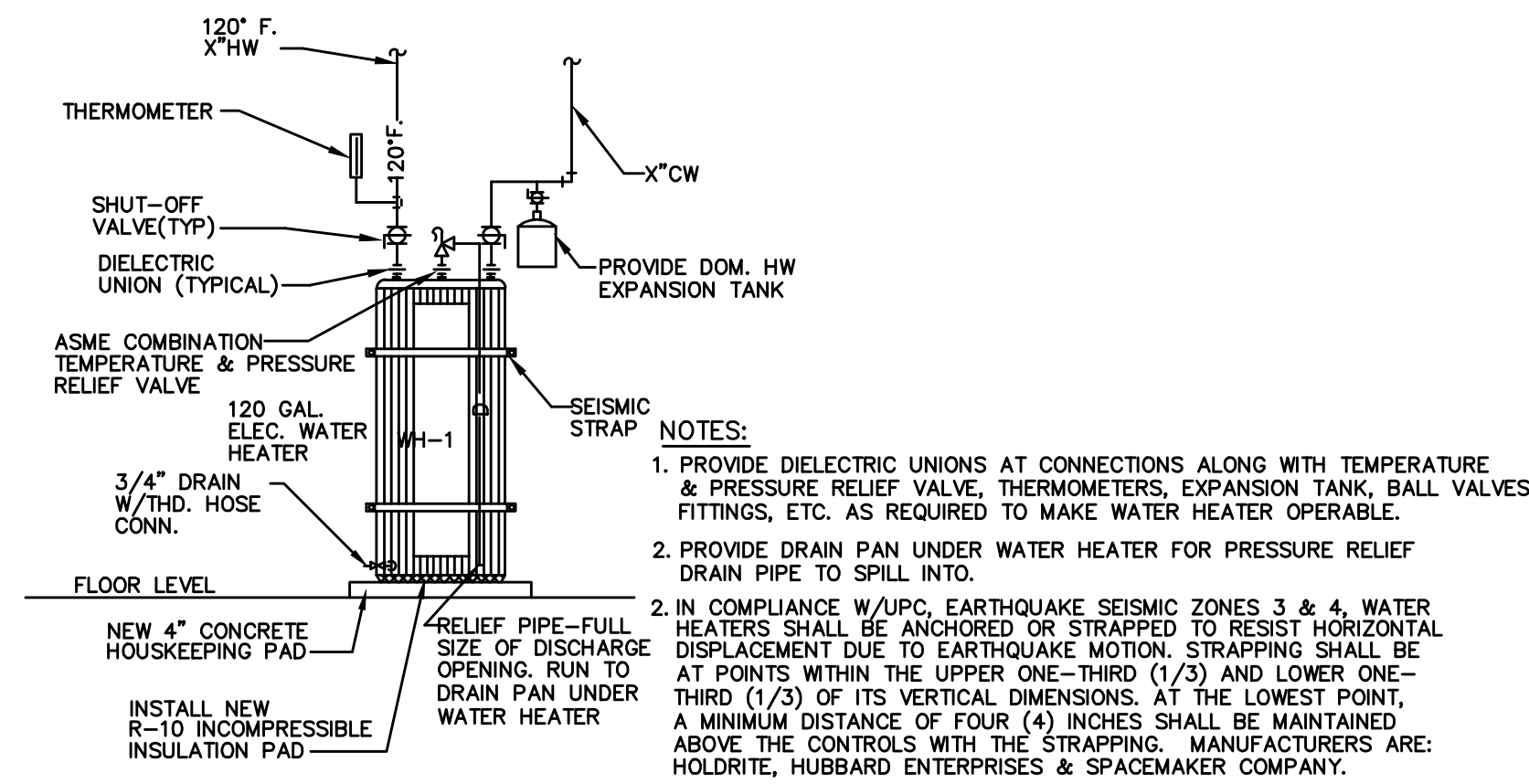
SCALE	1/4"=1'
BAR IS ONE INCH ON ORIGINAL DRAWING.	0 1' 4'
VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0	1"
11-14-14	BID SET
REV	DATE
REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

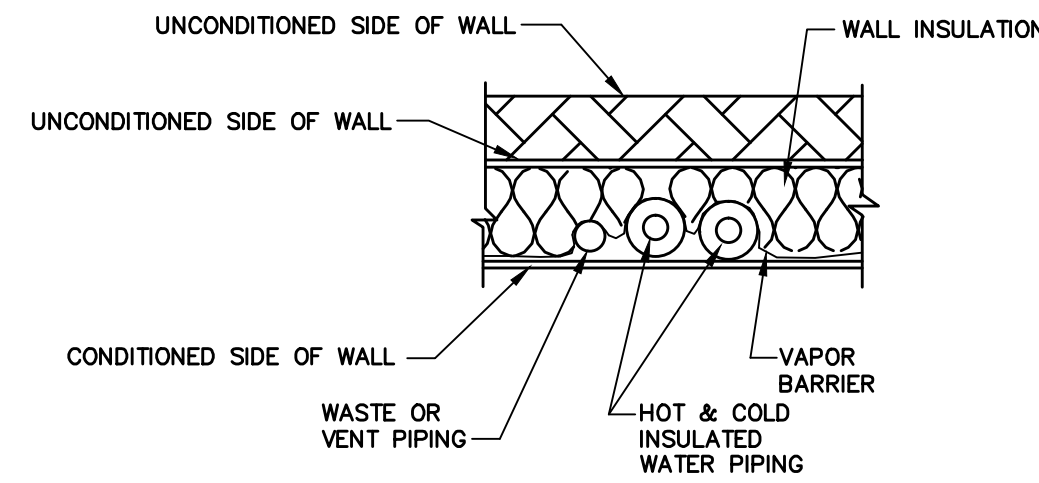
Lincoln Rock State Park
 COMFORT STATION ADDITION
 HVAC
 BID NO. 14-31

SHEET	M2.5 OF M2.6
REVISION	0
DATE	11-14-14
DWG.	0913-05BS-0011

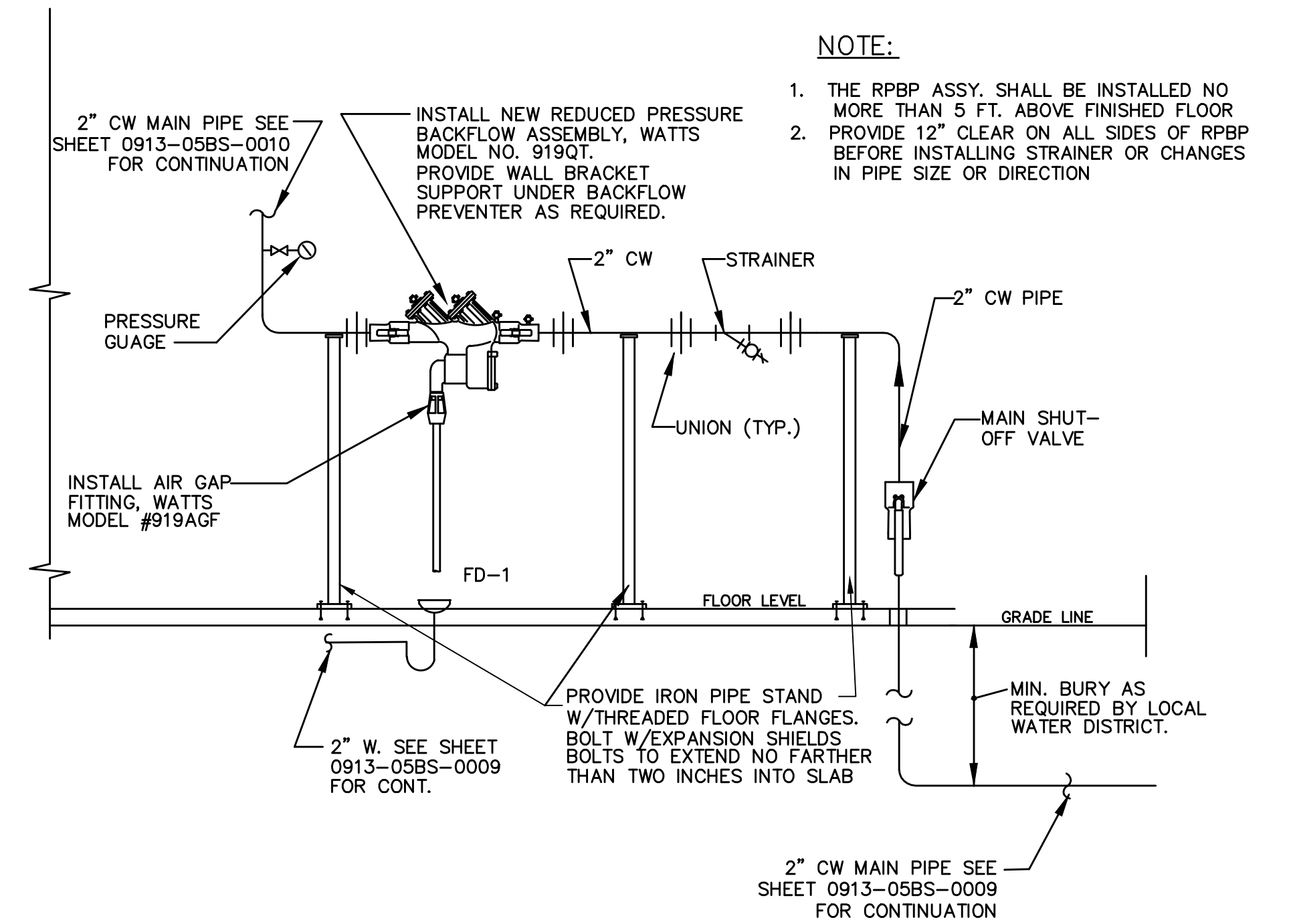
ORIG. DRAWN
ORIG. DATE



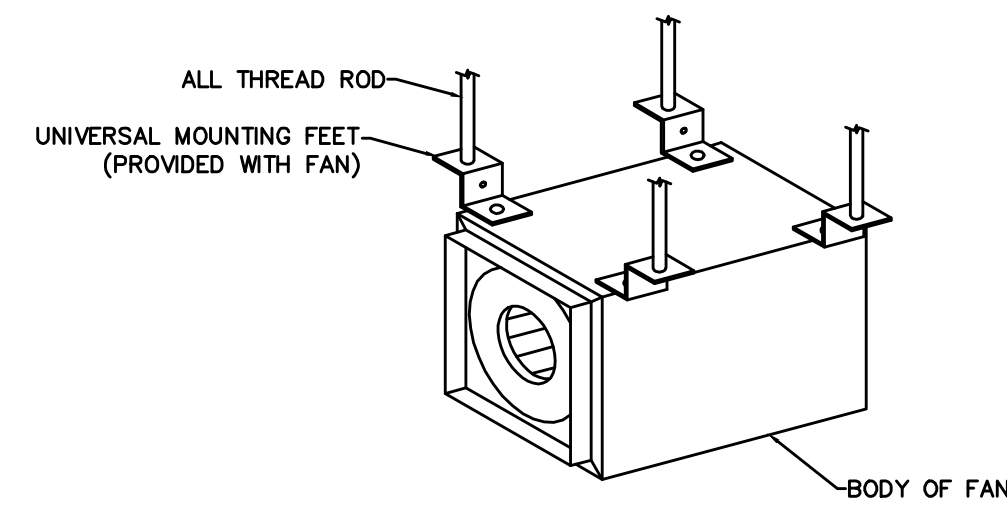
120 GALLON ELECTRIC HOT WATER HEATER DIAGRAM
 0913-05BS-0010 NOT TO SCALE



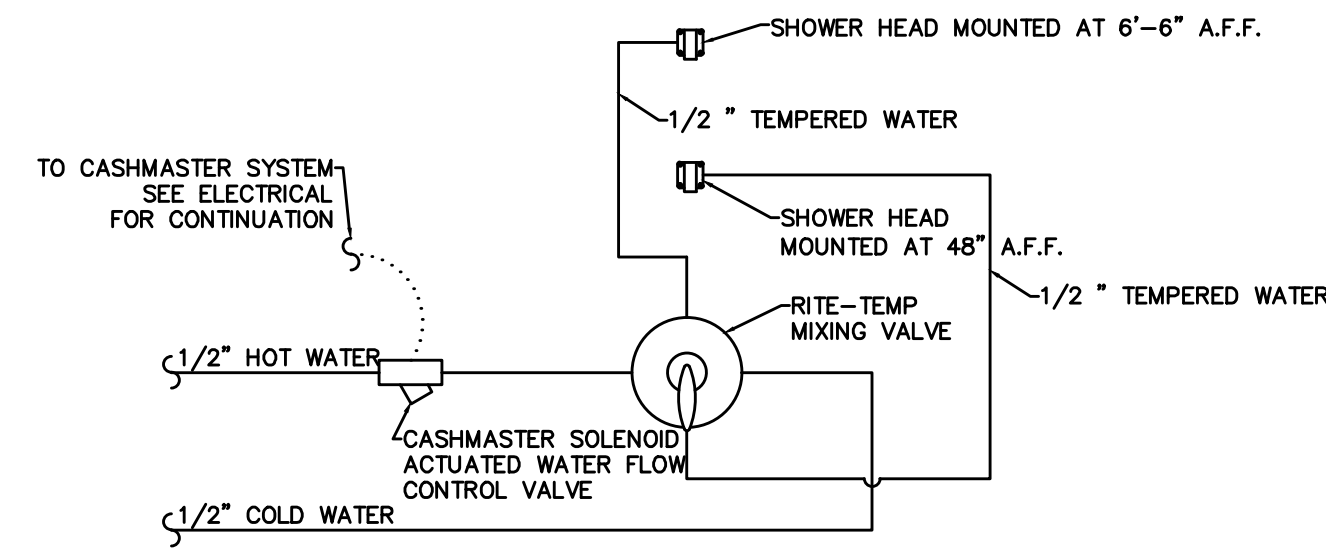
PIPING IN SEPERATION WALL
 0913-05BS-0010 NOT TO SCALE



REDUCED PRESSURE BACKFLOW PREVENTER
 0913-05BS-0010 NOT TO SCALE



SUPPLY FAN MOUNTING DETAIL
 0913-05BS-0011 NOT TO SCALE

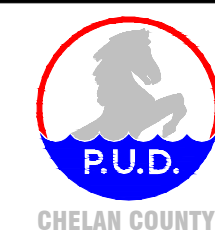


SHOWER PIPING DETAIL
 0913-05BS-0010 NOT TO SCALE



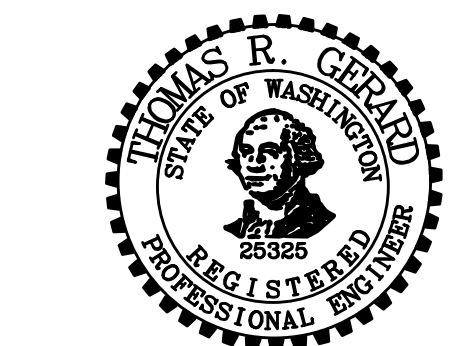
CONSULTANT	PRIM. ENG. R.F.T.	CHELAN PUD NO.1	SCALE	BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
	2ND ENG. T.R.G.	PRIM. ENG.	0 11-14-14	BID SET		
	DESIGNER	2ND ENG.	REV	DATE	REVISION	REQ. BY DRFT
	APPROVAL	PROJ. MGR. COURT HILL				

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON



Lincoln Rock State Park
 COMFORT STATION ADDITION
 DETAILS

BID NO. 14-31



SHEET	M2.6 OF M2.6
REVISION	0
DATE	11-14-14
DWG.	0913-05BS-0012

RACEWAYS AND CONDUCTORS	CALLOUTS AND DESIGNATIONS	CONTROLS AND INSTRUMENTATION	STANDARD ABBREVIATIONS	PROJECT GENERAL NOTES:
<p>MANUFACTURERS CORD/CABLE</p> <p>HEAT TAPE ON PIPING</p> <p>FLEXIBLE CONDUIT</p> <p>TWISTED SHIELDED PAIR</p> <p>SEWER LINE</p> <p>OVERHEAD ELECTRICAL</p> <p>EXISTING CONDUIT UNDERGROUND</p> <p>CONDUIT EXPOSED</p> <p>CONDUIT BELOW GRADE OR CONCEALED</p> <p>CONDUIT CAPPED</p> <p>CONDUIT BENT UP OR TOWARD</p> <p>CONDUIT BENT DOWN OR AWAY</p> <p>GROUNDING CAD WELD CONNECTION</p> <p>CONDUCTORS NOT CONNECTED</p> <p>CONDUCTORS CONNECTED</p> <p>CONDUIT SEALS CLASS 1, DIV. 1 EXPLOSION PROOF</p> <p>NEW EQUIPMENT (STANDARD LINEWEIGHT)</p> <p>EXISTING EQUIPMENT (E) (LIGHT LINEWEIGHT)</p> <p>EQUIPMENT TO BE REMOVED</p>	<p>CONDUIT CALLOUT</p> <p>TRENCH CALLOUT</p> <p>EQUIPMENT CALLOUT</p> <p>LIGHTING FIXTURE CALLOUT: SEE SCHEDULE</p> <p>DRAWING KEY NOTE CALLOUT</p> <p>DETAIL NUMBER</p> <p>DETAIL IDENTIFIER</p> <p>REFERENCE DRAWING NUMBER</p> <p>PANEL AND CIRCUIT (EXAMPLE: PANEL LPA, CIRCUITS 1 AND 3)</p> <p>PHASE/SWITCHLEG CONDUCTOR</p> <p>HOMERUN/CONDUIT</p> <p>GROUND CONDUCTOR</p> <p>NEUTRAL CONDUCTOR</p>	<p>NORMALLY CLOSED NORMALLY OPEN</p> <p>TEMPERATURE SWITCH - TS</p> <p>LEVEL SWITCH - LS</p> <p>PRESSURE SWITCH - PS</p> <p>LIMIT SWITCH - LS</p> <p>CONTACT - CR = CONTROL RELAY, MS-MOTOR STARTER, OR AS INDICATED</p> <p>SWITCH - SW</p> <p>FLOW SWITCH - FS</p> <p>PUSHBUTTON - PB</p> <p>TIME DELAY - TD</p> <p>SELECTOR SWITCH. HAND-OFF-AUTO SHOWN. X'S INDICATE CONTACT SWITCHING CONVENTION.</p>	<p>A, AMP</p> <p>AC AFF</p> <p>AI</p> <p>AIC</p> <p>AL</p> <p>ALT</p> <p>AO</p> <p>ATS</p> <p>BAT</p> <p>BC</p> <p>BH</p> <p>BP</p> <p>C</p> <p>CAP</p> <p>CB</p> <p>CBT</p> <p>CNT</p> <p>CP</p> <p>CPT</p> <p>CR</p> <p>CT</p> <p>CV</p> <p>DEM</p> <p>DI</p> <p>DO</p> <p>DWG</p> <p>E OR (E)</p> <p>EF</p> <p>E.O.D.O.</p> <p>FE</p> <p>FS</p> <p>FT</p> <p>FU</p> <p>FVNR</p> <p>G, GND</p> <p>GEN</p> <p>GFCI/GFI</p> <p>H</p> <p>HH</p> <p>HID</p> <p>HOA</p> <p>HTR</p> <p>IC</p> <p>ISR</p> <p>KW</p> <p>KWH</p> <p>KWD</p> <p>LC</p> <p>LCP</p> <p>LE</p> <p>LS</p> <p>LT</p> <p>LTG</p> <p>M</p> <p>MCC</p> <p>MCP</p> <p>MFR</p> <p>MOV</p> <p>MS</p> <p>MTS</p> <p>N</p> <p>NC</p> <p>NO</p> <p>OI</p> <p>OIT</p> <p>OL</p> <p>OT</p> <p>P</p> <p>PB</p> <p>PE</p> <p>PFR</p> <p>PLC</p> <p>PNL</p> <p>POT</p> <p>PS</p> <p>PT</p> <p>PVC</p> <p>RGS</p> <p>RTM</p> <p>RV</p> <p>S</p> <p>SA</p> <p>SE</p> <p>SHT</p> <p>SS</p> <p>SSS</p> <p>SV</p> <p>T</p> <p>TC</p> <p>TDR</p> <p>TST</p> <p>TYP</p> <p>UH</p> <p>UPS</p> <p>VS</p> <p>VT</p> <p>VFD</p> <p>VSD</p> <p>W</p> <p>WHM</p> <p>WP</p> <p>XFMR</p> <p>XP</p> <p>XMTR</p> <p>AMPERE</p> <p>AIR COMPRESSOR</p> <p>ABOVE FINISHED FLOOR</p> <p>ANALOG INPUT POINT (PLC)</p> <p>AMPERES INTERRUPTING CAPACITY</p> <p>ALARM</p> <p>ALTERNATOR</p> <p>ANALOG OUTPUT POINT (PLC)</p> <p>AUTOMATIC TRANSFER SWITCH</p> <p>BATTERY</p> <p>BATTERY CHARGER</p> <p>BLOCK HEATER</p> <p>BYPASS CONTACTOR</p> <p>CONDUIT (RGS)</p> <p>CAPACITOR</p> <p>CIRCUIT BREAKER</p> <p>CIRCUIT</p> <p>COUNTER</p> <p>CONTROL PANEL</p> <p>CONTROL POWER TRANSFORMER</p> <p>CONTROL RELAY</p> <p>CURRENT TRANSFORMER</p> <p>CHECK VALVE</p> <p>DEMAND</p> <p>DIGITAL INPUT POINT (PLC)</p> <p>DIGITAL OUTPUT POINT (PLC)</p> <p>DRAWING</p> <p>EXISTING DEVICE</p> <p>EXHAUST FAN</p> <p>ELECTRICAL OPERATED DRAW OUT</p> <p>FLOW ELEMENT</p> <p>FLOW SWITCH</p> <p>FLOW TRANSMITTER</p> <p>FUSED</p> <p>FULL VOLTAGE NON-REVERSING</p> <p>GROUND</p> <p>GENERATOR</p> <p>GROUND FAULT CIRCUIT INTERRUPTER</p> <p>HOT, HIGH</p> <p>HAND HOLE</p> <p>HIGH INTENSITY DISCHARGE</p> <p>HAND-OFF-AUTO</p> <p>HEATER</p> <p>ISOLATION CONTACTOR</p> <p>INTRINSICALLY SAFE RELAY</p> <p>KILOWATT</p> <p>KILOWATT HOUR</p> <p>LIGHTING DEMAND</p> <p>LIGHTING CONTACTOR</p> <p>LOCAL CONTROL PANEL</p> <p>LEVEL ELEMENT</p> <p>LIMIT SWITCH</p> <p>LEVEL TRANSMITTER</p> <p>LIGHTING</p> <p>METER</p> <p>MOTOR CONTROL CENTER</p> <p>MAIN CONTROL PANEL</p> <p>MANUFACTURER</p> <p>MOTOR OPERATED VALVE OR METAL OXIDE VARISTOR</p> <p>MOTOR STARTER</p> <p>MANUAL TRANSFER SWITCH</p> <p>NEUTRAL</p> <p>NORMALLY CLOSED</p> <p>NORMALLY OPEN</p> <p>OPERATOR INTERFACE</p> <p>OPERATOR IN TROUBLE</p> <p>OVERLOAD RELAY</p> <p>OVER TEMP</p> <p>POWER</p> <p>PUSH BUTTON</p> <p>PHOTO ELECTRIC RELAY</p> <p>PHASE FAILURE RELAY</p> <p>PROGRAMMABLE LOGIC CONTROLLER</p> <p>PANEL</p> <p>POTENTIOMETER</p> <p>PRESSURE SWITCH</p> <p>POTENTIAL TRANSFORMER</p> <p>POLY VINYL CHLORIDE (CONDUIT)</p> <p>RIGID GALVANIZED STEEL (CONDUIT)</p> <p>RUN TIME METER</p> <p>REDUCED VOLTAGE</p> <p>SIGNAL</p> <p>SURGE ARRESTOR</p> <p>SERVICE ENTRANCE</p> <p>SHEET</p> <p>STAINLESS STEEL</p> <p>SOLID STATE STARTER</p> <p>SOLENOID VALVE</p> <p>THERMOSTAT</p> <p>TIME CLOCK</p> <p>TIME DELAY</p> <p>TWISTED SHIELDED THREE CONDUCTOR (TRIAD)</p> <p>TYPICAL</p> <p>UNIT HEATER</p> <p>UNINTERRUPTIBLE POWER SUPPLY</p> <p>VIBRATION SWITCH</p> <p>VIBRATION TRANSMITTER</p> <p>VARIABLE FREQUENCY DRIVE</p> <p>VARIABLE SPEED DRIVE</p> <p>WATT</p> <p>WATT HOUR METER</p> <p>WEATHER PROOF</p> <p>TRANSFORMER</p> <p>EXPLOSION PROOF</p> <p>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. IT IS THE INTENT OF THESE DRAWINGS TO DESCRIBE AND PROVIDE FOR THE FURNISHING, INSTALLING, TESTING AND PLACING IN FULLY OPERATIONAL CONDITION ALL EQUIPMENT, MATERIALS, DEVICES AND NECESSARY APPURTENANCES TO PROVIDE A COMPLETE ELECTRICAL SYSTEM, TOGETHER WITH SUCH OTHER MISCELLANEOUS INSTALLATIONS AND EQUIPMENT SHOWN ON THE DRAWINGS. THE WORK SHALL INCLUDE ALL MATERIALS, APPLIANCES AND APPARATUS NOT SPECIFICALLY MENTIONED HEREIN OR SHOWN ON THE DRAWINGS, BUT WHICH ARE NECESSARY TO MAKE A COMPLETE, FULLY OPERATIONAL INSTALLATION OF ALL ELECTRICAL SYSTEMS SHOWN ON THE DRAWINGS. THIS PROJECT INCLUDES THE INSTALLATION OF PACKAGED EQUIPMENT SYSTEM(S) OR SUB-SYSTEM(S) THAT WILL REQUIRE COORDINATION BETWEEN THE CONTRACTOR AND THE MANUFACTURER TO DETERMINE THE DETAILED INSTALLATION REQUIREMENTS. THE ENGINEER HAS SHOWN GENERAL INSTALLATION INFORMATION FOR THESE SYSTEMS BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF DESIGN. WHERE INDICATED ON THE DRAWINGS TO 'PROVIDE A COMPLETE AND OPERATIONAL SYSTEM' THE CONTRACTOR SHALL PROVIDE ALL MATERIALS, INSTALLATION, AND COORDINATION WITH THE MANUFACTURER REQUIRED SO THE EQUIPMENT IS INSTALLED AND OPERATES IN A SATISFACTORY MANNER. MINOR CHANGES IN EQUIPMENT LOCATIONS (LESS THAN 20 FEET), QUANTITY OF TERMINATIONS OR WIRES, JUNCTION BOXES, CONDUIT, ETC SHALL BE INCLUDED IN THE CONTRACT PRICE. CONTRACTOR SHALL COORDINATE WITH DISTRICT FOR REMOVAL OF EXISTING EQUIPMENT AND ANY REQUIRED PHASING TO MAINTAIN ALL REQUIRED POWER AND CONNECTIONS. DISPOSE OF ALL DEMO MATERIALS NOT WANTED BY DISTRICT. COORDINATE WITH DISTRICT FOR DETAILED EQUIPMENT CONNECTION REQUIREMENTS. GENERAL POWER DISTRIBUTION AND CIRCUIT DESIGNATIONS ARE SHOWN ON THE DRAWINGS. ALL CONDUIT IN NEW WALLS OR CEILINGS SHALL BE CONCEALED WHERE POSSIBLE. ALL ELECTRICAL SERVICE REQUIREMENTS FOR NEW UTILITY SERVICE, TRANSFORMER, METERING, TRENCHING, ETC SHALL BE COORDINATED AND INSTALLED IN STRICT ACCORDANCE WITH CHELAN COUNTY PUD REQUIREMENTS. ALL UTILITY INFORMATION MUST BE VERIFIED PRIOR TO BID. THE NUMBER OF CONDUCTORS AND CONDUIT ROUTING WILL VARY BASED ON HOW THE CONTRACTOR ELECTS TO ROUTE AND COMBINE CIRCUITING. THE CONTRACTOR SHALL PROVIDE DETAILED REDLINE MARKUPS ON A DEDICATED SET OF CONSTRUCTION DRAWINGS TO THE DISTRICT UPON COMPLETION OF THE PROJECT FOR PREPARATION OF RECORD DRAWINGS. THIS INCLUDES ACTUAL RACEWAY ROUTING, SIZE, CONDUCTOR QUANTITIES, PANEL SCHEDULES, RECEPTACLE CONFIGURATIONS AND MOUNTING ELEVATIONS, ETC. 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.
<p>LIGHTING AND RECEPTACLES</p> <p>FLUORESCENT LIGHTING FIXTURE. FIXTURE IDENTIFIER AND SWITCHED CIRCUIT INDICATED. REFER TO LIGHTING SCHEDULE FOR FIXTURE AND LAMP TYPE.</p> <p>FLUORESCENT LIGHTING FIXTURE WITH EMERGENCY BATTERY PACK</p> <p>LIGHTING FIXTURE, EMERGENCY DUAL HEAD WITH INTEGRAL BATTERY PACK. EXIT SIGN WHERE INDICATED.</p> <p>LED EXIT SIGN</p> <p>INCANDESCENT, COMPACT FLUORESCENT OR H.I.D. LIGHTING FIXTURE, CEILING MOUNTED</p> <p>PHOTOELECTRIC CONTROL UNIT. WALL MOUNTED</p> <p>LIGHTING FIXTURE, POLE MOUNT</p> <p>LIGHTING FIXTURE, WALL MOUNT</p> <p>DUPLEX RECEPTACLE, NUMBER INDICATES CIRCUIT. GFCI WHERE INDICATED</p> <p>FOURPLEX RECEPTACLE, NUMBER INDICATES CIRCUIT.</p> <p>DUPLEX RECEPTACLE MOUNTED 6" ABOVE COUNTER</p> <p>DUPLEX RECEPTACLE FLOOR MOUNTED, NUMBER INDICATES CIRCUIT.</p> <p>SPECIAL PURPOSE RECEPTACLE OR DEDICATED EQUIPMENT CONNECTION, AS NOTED.</p> <p>TELEPHONE OUTLET</p> <p>DATA OUTLET</p> <p>SPLIT TELEPHONE DATA OUTLET</p> <p>INTERCOM</p> <p>SWITCH, NUMBERS REFER TO SWITCH TYPE AND SWITCHED CIRCUIT.</p> <p>DUAL TECHNOLOGY WALL SWITCH OCCUPANCY SENSOR</p> <p>TIMER</p> <p>JUNCTION BOX</p> <p>JUNCTION BOX, EXPLOSION PROOF</p> <p>THERMOSTAT</p> <p>HUMIDISTAT</p> <p>HAND HOLE</p>	<p>ELECTRICAL AND POWER DISTRIBUTION</p> <p>PANELBOARD 208Y/120V OR 120/240V</p> <p>PANELBOARD 480Y/277V</p> <p>UTILITY METER</p> <p>MOTOR CONNECTION NUMBER INDICATES HORSEPOWER</p> <p>EQUIPMENT CONNECTION</p> <p>THERMAL OVERLOAD RELAY</p> <p>FULL VOLTAGE NON REVERSING MOTOR STARTER NUMBER INDICATES NEMA SIZE</p> <p>REDUCED VOLTAGE SOLID STATE STARTER</p> <p>VARIABLE FREQUENCY DRIVE</p> <p>LINE REACTOR</p> <p>BUS CONNECTION (N=NEUTRAL, G=GROUND)</p> <p>HEATER, NUMBER INDICATES KW</p> <p>DISCONNECT SWITCH - HP RATED, AS INDICATED</p> <p>DISCONNECT SWITCH (FUSED)</p> <p>TRANSFORMER</p> <p>CARTRIDGE FUSE AND FUSEHOLDER</p> <p>ATS - AUTOMATIC TRANSFER SWITCH MTS - MANUAL TRANSFER SWITCH</p> <p>THERMAL MAG CIRCUIT BREAKER, RATING/NO. POLES</p> <p>MOTOR CIRCUIT PROTECTOR, RATING/NO. POLES</p> <p>GROUND ROD AND WELL</p> <p>GROUNDING ELECTRODE</p>	<p>AMMETER</p> <p>VOLTMETER</p> <p>GENERATOR</p> <p>MOTOR STARTER</p> <p>PHASE FAIL RELAY</p> <p>ELAPSED TIME METER</p> <p>STARTS COUNTER</p> <p>CONTROL RELAY</p> <p>TIME DELAY RELAY</p> <p>SV-SOLENOID VALVE</p> <p>INSTRUMENT (L=LEVEL, F=FLOW P=PRESSURE)</p> <p>INDICATING LIGHT, LETTER INDICATES: R-RED, G-GREEN, A-AMBER, W-WHITE, B-BLUE</p> <p>D.C. TERMINAL</p> <p>A.C. TERMINAL</p> <p>FIELD INSTRUMENT</p> <p>HORN</p> <p>SPEED POTENTIOMETER</p>	<p>ELECTRICAL SHEET INDEX</p> <p>E1 0913-50SU-0012 ELECTRICAL SYMBOLS AND ABBREVIATIONS</p> <p>E2 0913-50SU-0013 ELECTRICAL SITE PLAN</p> <p>E3 0913-50SU-0014 CABIN LOOP ELECTRICAL SITE PLAN</p> <p>E4 0913-50SU-0015 CABIN LOOP ELECTRICAL TYPICAL CABIN PLAN</p> <p>E5 0913-50SU-0016 CABIN LOOP ELECTRICAL ONE-LINE DIAGRAM & DETAILS</p> <p>E6 0913-50SU-0017 CABIN LOOP ELECTRICAL PANEL SCHEDULES</p> <p>E7 0913-50SU-0018 GROUP CAMP ELECTRICAL SITE PLAN</p> <p>E8 0913-50SU-0019 GROUP CAMP ELECTRICAL COMFORT STATION POWER DEMOLITION PLAN</p> <p>E9 0913-50SU-0020 GROUP CAMP ELECTRICAL COMFORT STATION LIGHTING DEMOLITION PLAN</p> <p>E10 0913-50SU-0021 GROUP CAMP ELECTRICAL COMFORT STATION POWER PLAN</p> <p>E11 0913-50SU-0022 GROUP CAMP ELECTRICAL COMFORT STATION LIGHTING PLAN</p> <p>E12 0913-50SU-0023 GROUP CAMP ELECTRICAL ONE-LINE DIAGRAM AND DETAILS</p> <p>E13 0913-50SU-0024 GROUP CAMP ELECTRICAL PANEL SCHEDULE</p>	

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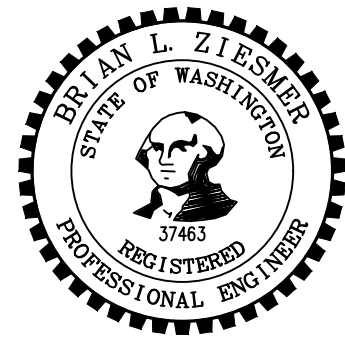
PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1	SCALE AS NOTED	BAR IS ONE INCH ON ORIGINAL DRAWING.	<u>VERIFY SCALE</u>	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
2ND ENG. WESLEY WARD	PRIM. ENG. C. HILL	0 11/14/14	BID SET	- AB	
DESIGNER	2ND ENG.			REQ. BY	DRFT
APPROVAL BRIAN ZIESMER	PROJ. MGR. C. HILL	REV	DATE	REVISION	

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
 WENATCHEE, WASHINGTON

Lincoln Rock State Park
 CABIN LOOP & GROUP CAMP ELECTRICAL
 SYMBOLS & ABBREVIATIONS
 BID NO.14-31

SHEET E1 OF E13
 REVISION 0
 DATE 11/14/2014
 DWG. 0913-50SU-0012



DRG. DRAWN
DATE



ELECTRICAL SITE PLAN—OVERALL PROJECT
SCALE: 1" = 100'



ORIG. DRAWN

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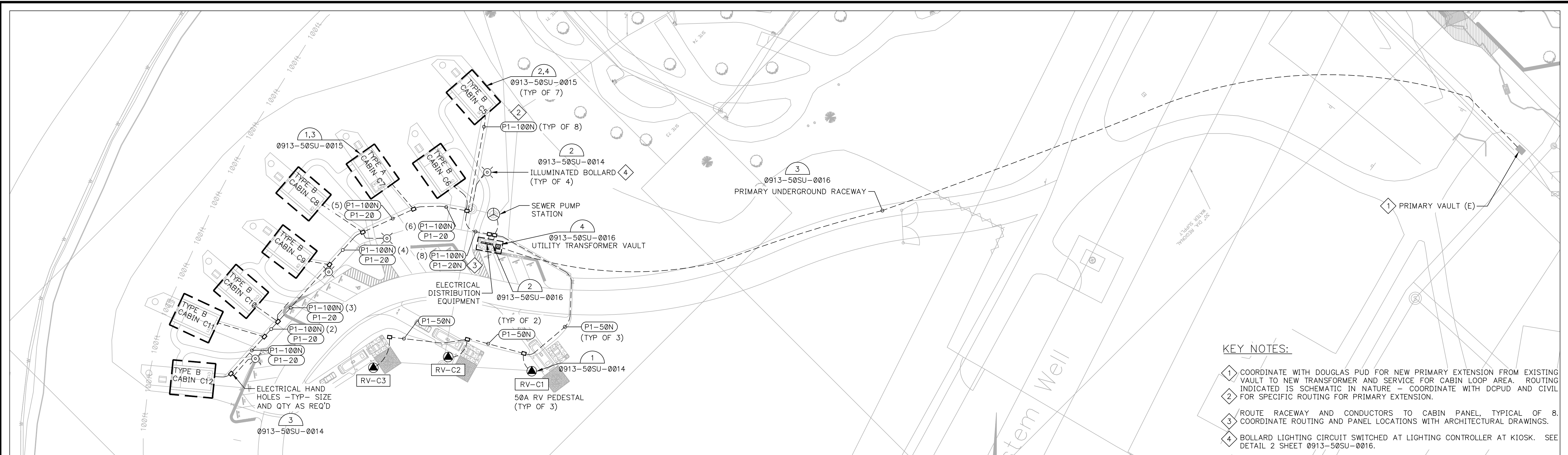
CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1
	2ND ENG.	PRIM. ENG. C. HILL
	DESIGNER WESLEY WARD	2ND ENG.
	APPROVAL BRIAN ZIESMER	PROJ. MGR. C. HILL

SCALE AS NOTED	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0 1" 0	1"	
0 11/14/14	BID SET	- AB
REV DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

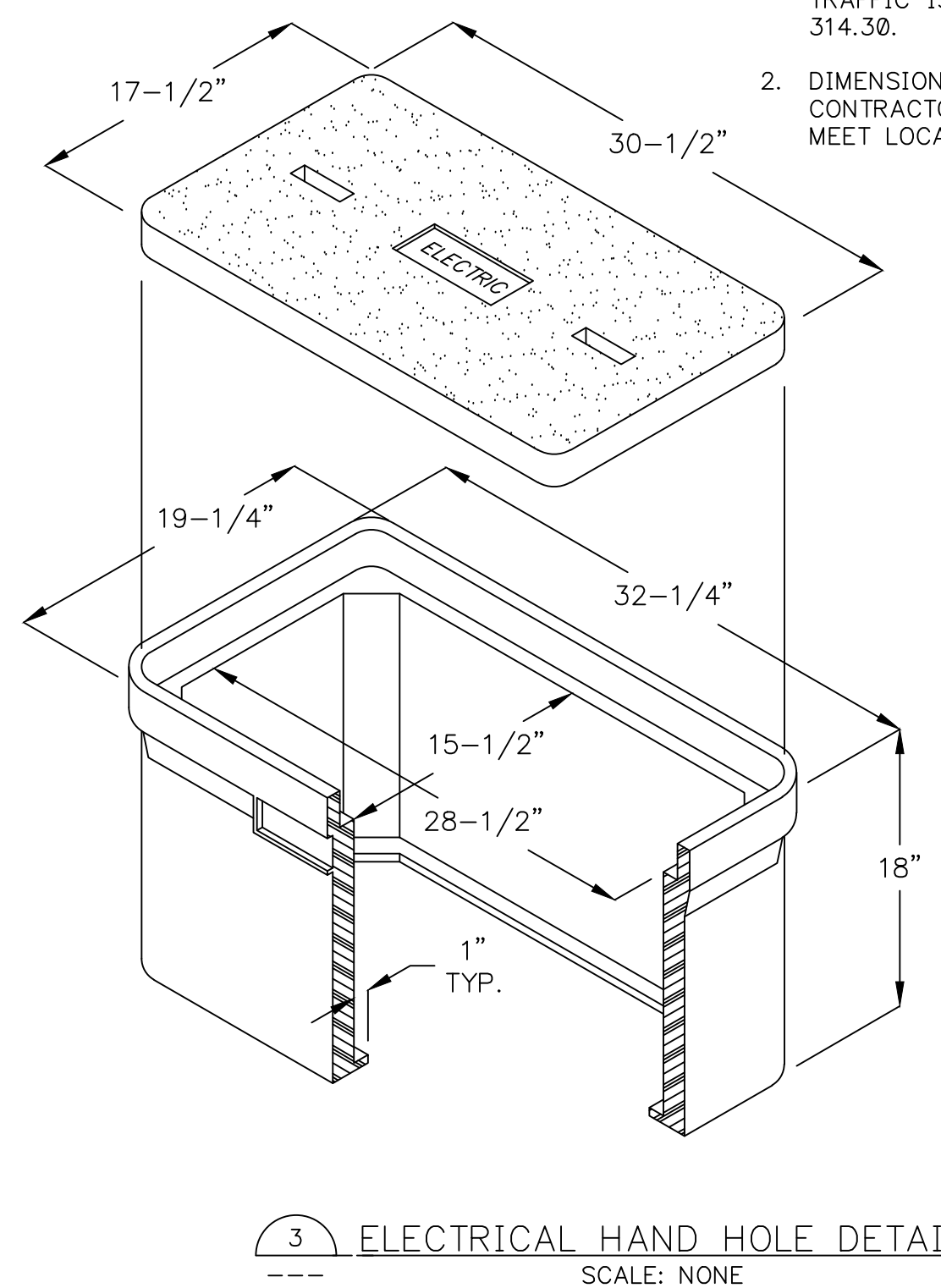
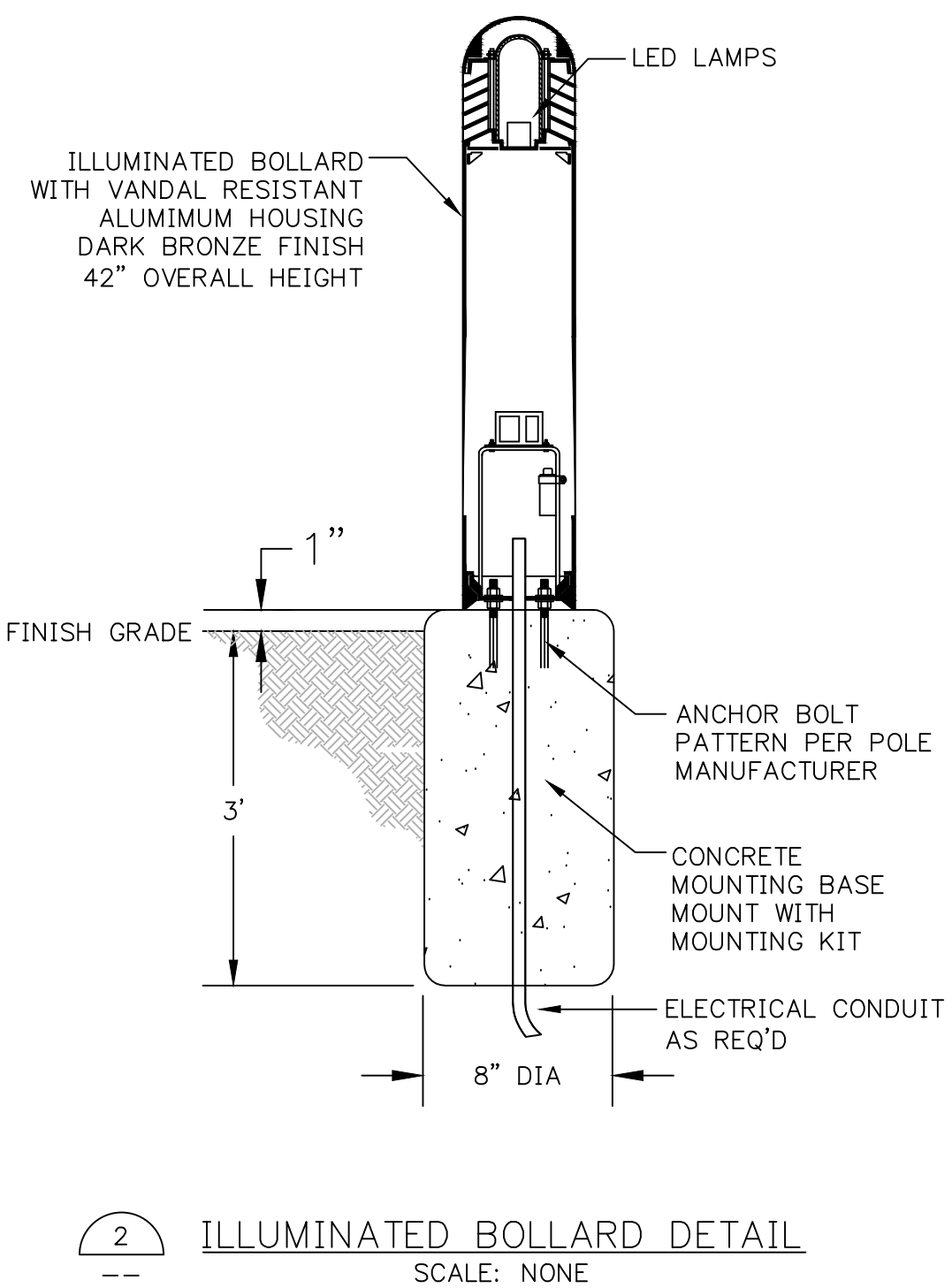
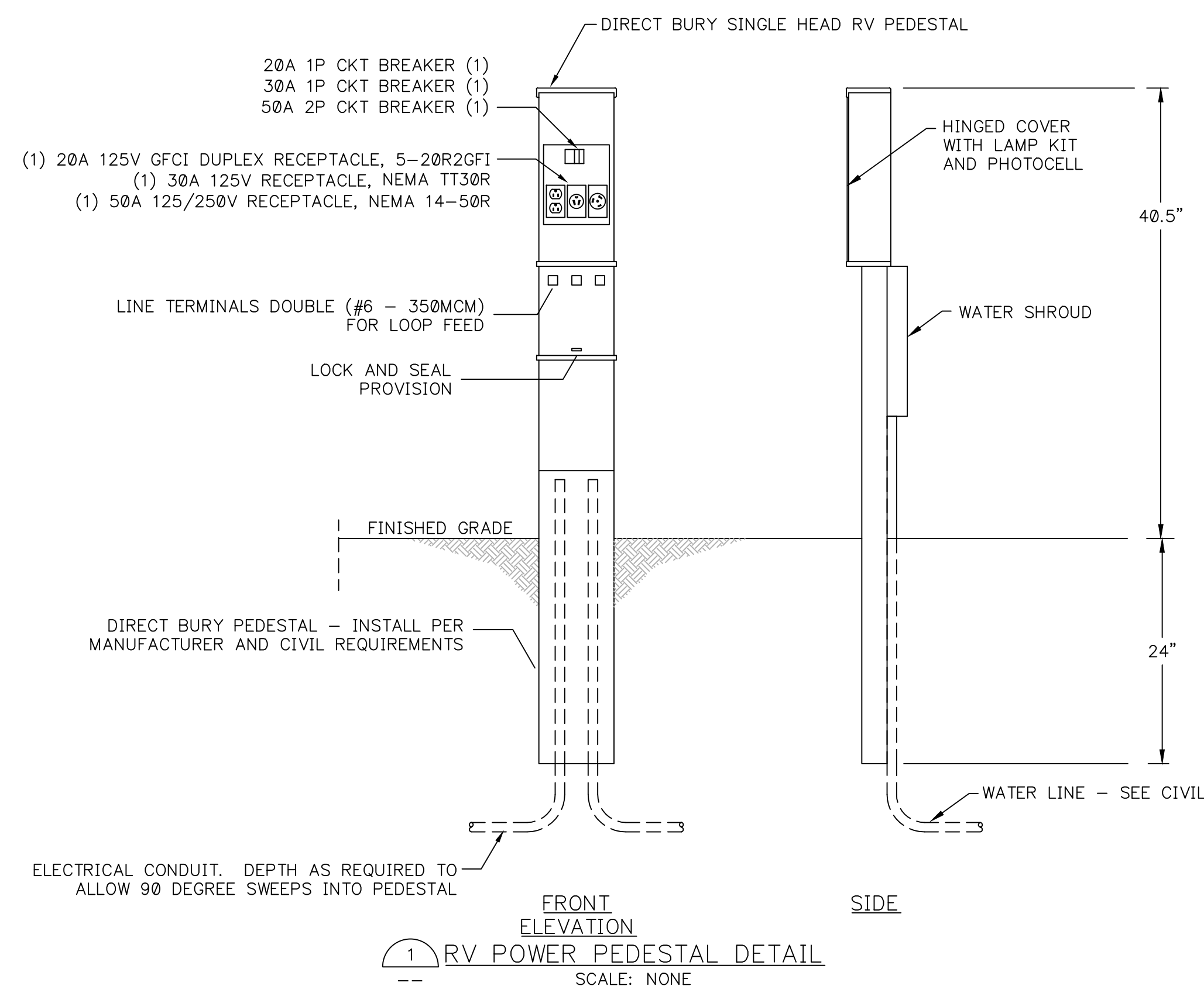
LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
ELECTRICAL
SITE PLAN
BID NO.14-31

SHEET E2 OF E13
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0013

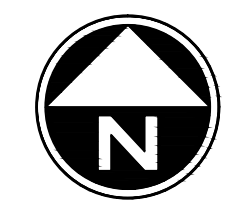


- KEY NOTES:**
- 1 COORDINATE WITH DOUGLAS PUD FOR NEW PRIMARY EXTENSION FROM EXISTING VAULT TO NEW TRANSFORMER AND SERVICE FOR CABIN LOOP AREA. ROUTING INDICATED IS SCHEMATIC IN NATURE - COORDINATE WITH DCPUD AND CIVIL FOR SPECIFIC ROUTING FOR PRIMARY EXTENSION.
 - 2 ROUTE RACEWAY AND CONDUCTORS TO CABIN PANEL, TYPICAL OF 8.
 - 3 COORDINATE ROUTING AND PANEL LOCATIONS WITH ARCHITECTURAL DRAWINGS.
 - 4 BOLLARD LIGHTING CIRCUIT SWITCHED AT LIGHTING CONTROLLER AT KIOSK. SEE DETAIL 2 SHEET 0913-50SU-0016.

CABIN LOOP - ELECTRICAL SITE PLAN
SCALE: 1" = 40'



- NOTES**
- 1. 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.
 - 2. DIMENSIONS ARE APPROXIMATE MINIMUM DIMENSIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL SELECTION TO MEET LOCAL CODES AND INSTALLATION REQUIREMENTS.



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PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1
2ND ENG. WESLEY WARD	PRIM. ENG. C. HILL
DESIGNER WESLEY WARD	2ND ENG. C. HILL
APPROVAL BRIAN ZIESMER	PROJ. MGR. C. HILL

SCALE AS NOTED	0 11/14/14 BID SET	REVISION	REQ. BY	DRFT
BAR IS ONE INCH ON ORIGINAL DRAWING.	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.		

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
CABIN LOOP ELECTRICAL
SITE PLAN
BID NO.14-31

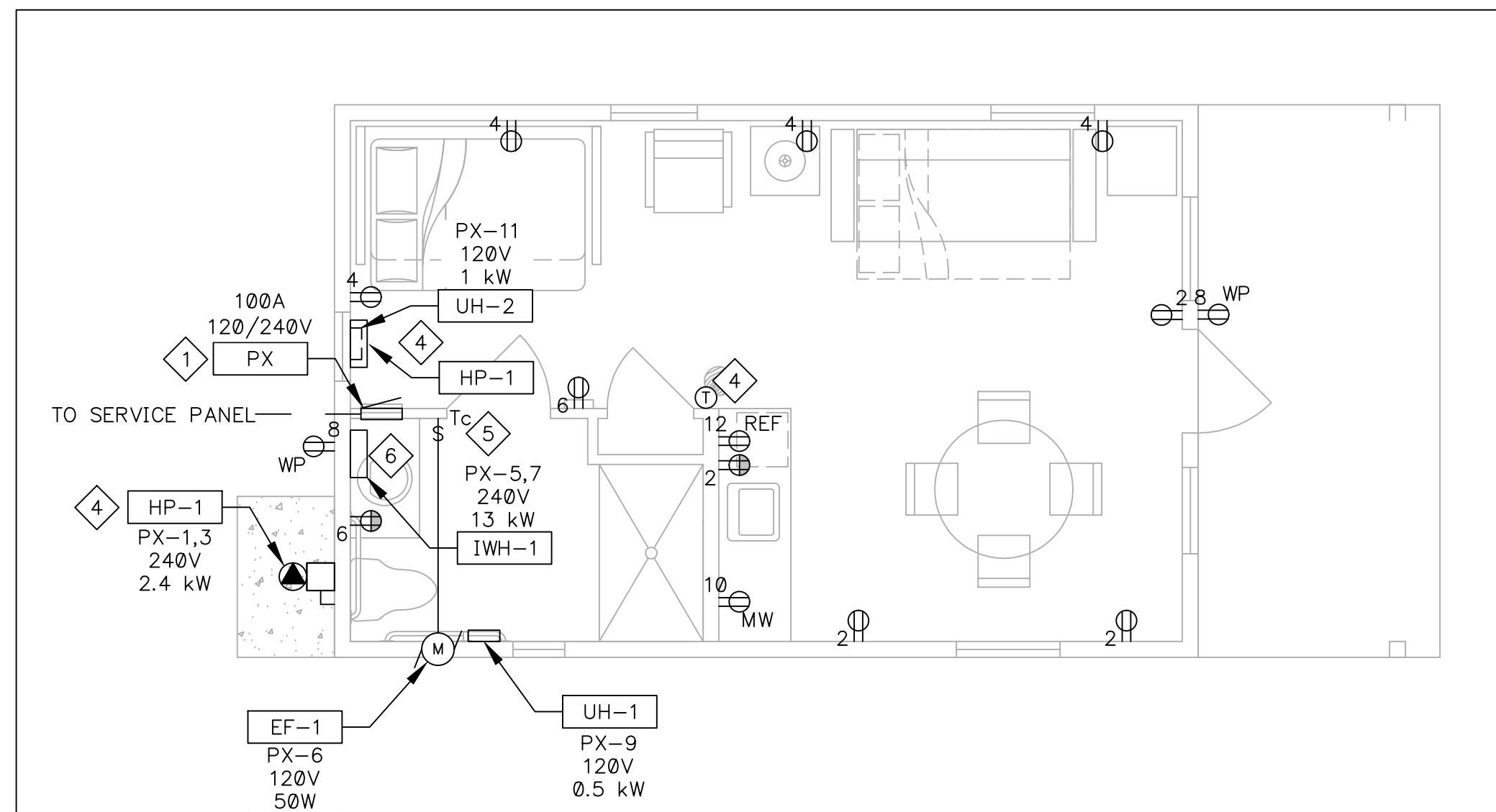
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REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0014

GENERAL NOTES:

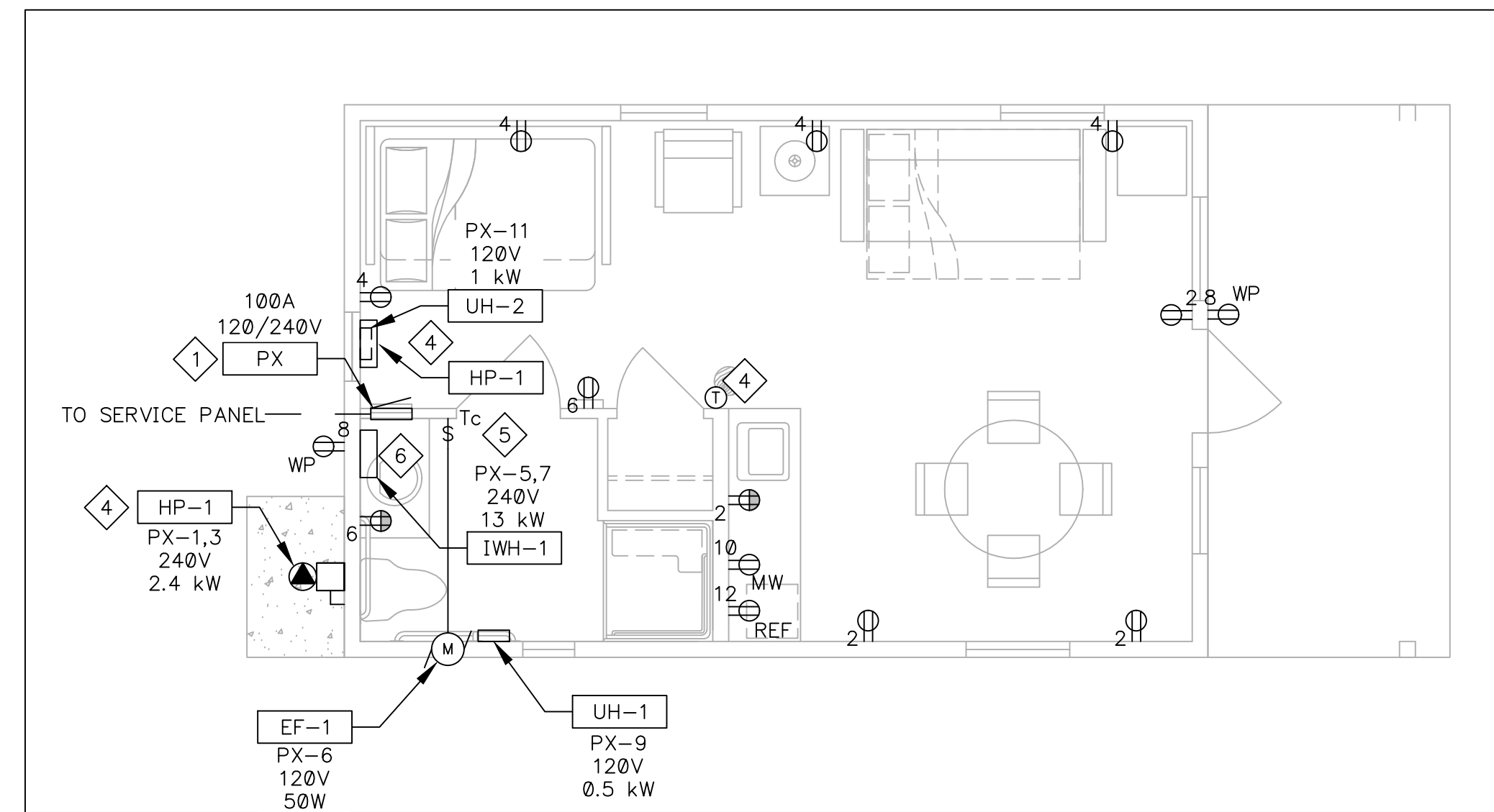
- RECEPTACLE LAYOUT IS SCHEMATIC. RECEPTACLES SHALL BE INSTALLED SUCH THAT NO POINT MEASURED HORIZONTALLY ALONG THE FLOOR LINE OF ANY WALL SPACE IS MORE THAN 6' FROM A RECEPTACLE.
- RACEWAY ROUTING SHOWN IS SCHEMATIC. CONTRACTOR SHALL COORDINATE BRANCH CIRCUIT RACEWAY ROUTING FROM PANEL TO FIELD DEVICES BASED ON CIRCUIT DESIGNATIONS SHOWN IN PANEL SCHEDULES.
- RECEPTACLES AND BREAKERS SHALL BE GCFI AND OR AFCI AS REQUIRED BY NEC, RESIDENTIAL APPLICATION. SEE PANEL SCHEDULES.
- CONTRACTOR SHALL INSTALL ALL ELECTRICAL EQUIPMENT PROVIDED BY MECHANICAL AND PROVIDE ALL ELECTRICAL CONNECTIONS. SEE MECHANICAL SCHEDULES SHEET 0913-05BS-0003.

KEY NOTES:

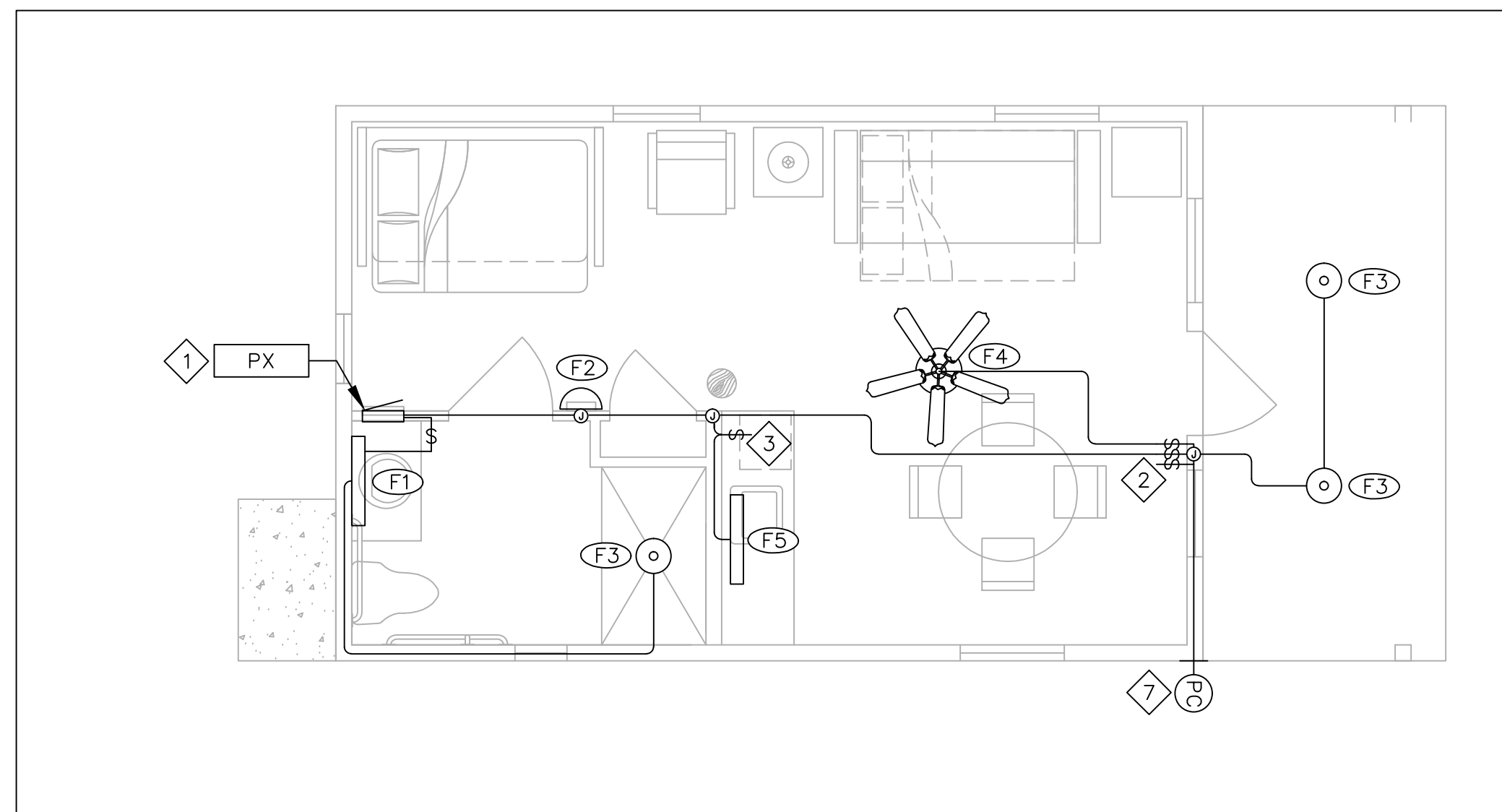
- 'X' INDICATES CABIN IDENTIFIER. LABEL CABIN PANELS AS INDICATED ON ONE LINE DIAGRAM AND SITE PLAN.
- PROVIDE INDIVIDUAL SWITCHES FOR FAN, FAN AND AREA LIGHT, AND EXTERIOR LIGHTING. EXTERIOR LIGHTING SHALL ROUTE THROUGH SWITCH AND PHOTOCELL.
- WALL MOUNT LIGHT SWITCH FOR UNDER CABINET LIGHT FIXTURE 6" ABOVE COUNTER TOP.
- HP-1 INDOOR UNIT LOCATED IN LOFT. PROVIDE POWER AND CONTROL CONNECTIONS FROM OUTDOOR UNIT AND INDOOR THERMOSTAT AS REQUIRED BY MANUFACTURER AND MECHANICAL. UNIT HEATER SHALL BE SWITCHED BY HP-1 FOR BACKUP HEAT SOURCE.
- PROVIDE FAN TIMER CONTROLS TO OPERATE FAN 8 HOURS PER DAY. SEE MECHANICAL REQUIREMENTS SHEET 0913-05BS-005 NOTE 3. KELE MODEL 93000 SERIES, MARK TIME SPRING WOUND, 0-60 MINUTE TIMER.
- INSTANTANEOUS HOT WATER HEATER IN LOFT. INSTALL PER MECHANICAL DRAWINGS.
- CONTRACTOR SHALL LOCATE PHOTOCELL TO AVOID EXTERNAL LIGHT SOURCES AND FACE NORTH, WHERE POSSIBLE.



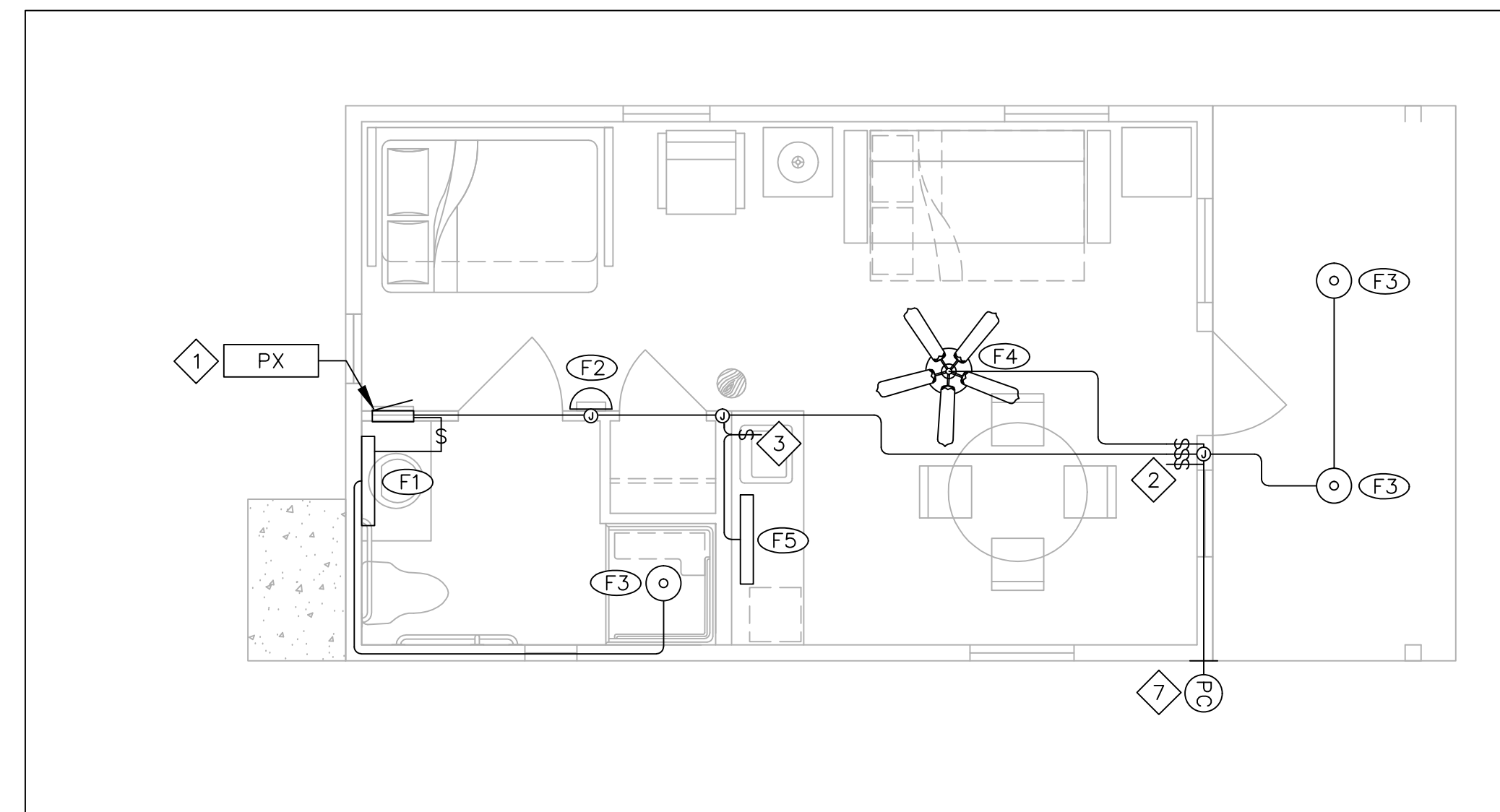
1 FLOOR PLAN TYPE A - POWER
SCALE: 1/4" = 1'-0"



2 FLOOR PLAN TYPE B - POWER
SCALE: 1/4" = 1'-0"



3 FLOOR PLAN TYPE A - LIGHTING
SCALE: 1/4" = 1'-0"



4 FLOOR PLAN TYPE B - LIGHTING
SCALE: 1/4" = 1'-0"

CABIN LIGHTING SCHEDULE

ID	DESCRIPTION	MOUNTING	LAMPS	VOLTAGE	VA	MANUFACTURER	CATALOG NUMBER
F1	BATHROOM VANITY FIXTURE	WALL	LED	120V	9	YLIGHTING	OXY-APOLLO-LED-VANITY-LIGHT-3-5104-24, OR EQUAL
F2	DECORATIVE WALL SCNCE	WALL	LED	120V	26	AVALANCHE RANCH LIGHTING	NORTHTRIDGE SCNCE DECEPTION PASS A56202-27, OR EQUAL
F3	RECESSED LED CAN LIGHT	RECESSED	LED	120V	29	JUNO	6" RECESSED LED CAN WITH WET LOCATION DIFFUSER LENS, OR EQUAL
F4	FAN AND LIGHT ASSEMBLY	PENDANT	CFL	120V	36 LIGHT, 66 FAN	SEA GULL LIGHTING	1535-07 52" 5 BLADE CHERRY FINISH FAN WITH LIGHT, OR EQUAL
F5	UNDER CABINET LED STRIP	SURFACE	LED	120V	20	KENALL LIGHTING	AUCLED-I-MW-20L40K-48-120, OR EQUAL
F6	BOLLARD	POST	LED	120V	13	KIM LIGHTING	VANDAL RESISTANT BOLLARD, DK BRONZE #VRB1-10L-4K-UV-DB, OR EQUAL



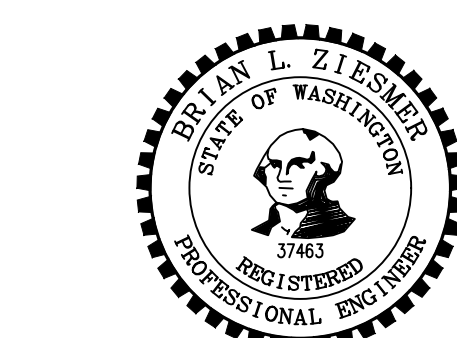
CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1
	2ND ENG. WESLEY WARD	PRIM. ENG. C. HILL
	DESIGNER WESLEY WARD	2ND ENG. C. HILL
	APPROVAL BRIAN ZIESMER	PROJ. MGR. C. HILL

SCALE	AS NOTED	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
BAR IS ONE INCH ON ORIGINAL DRAWING.	0	1"	
DATE	11/14/14	BID SET	
REV		REVISION	

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

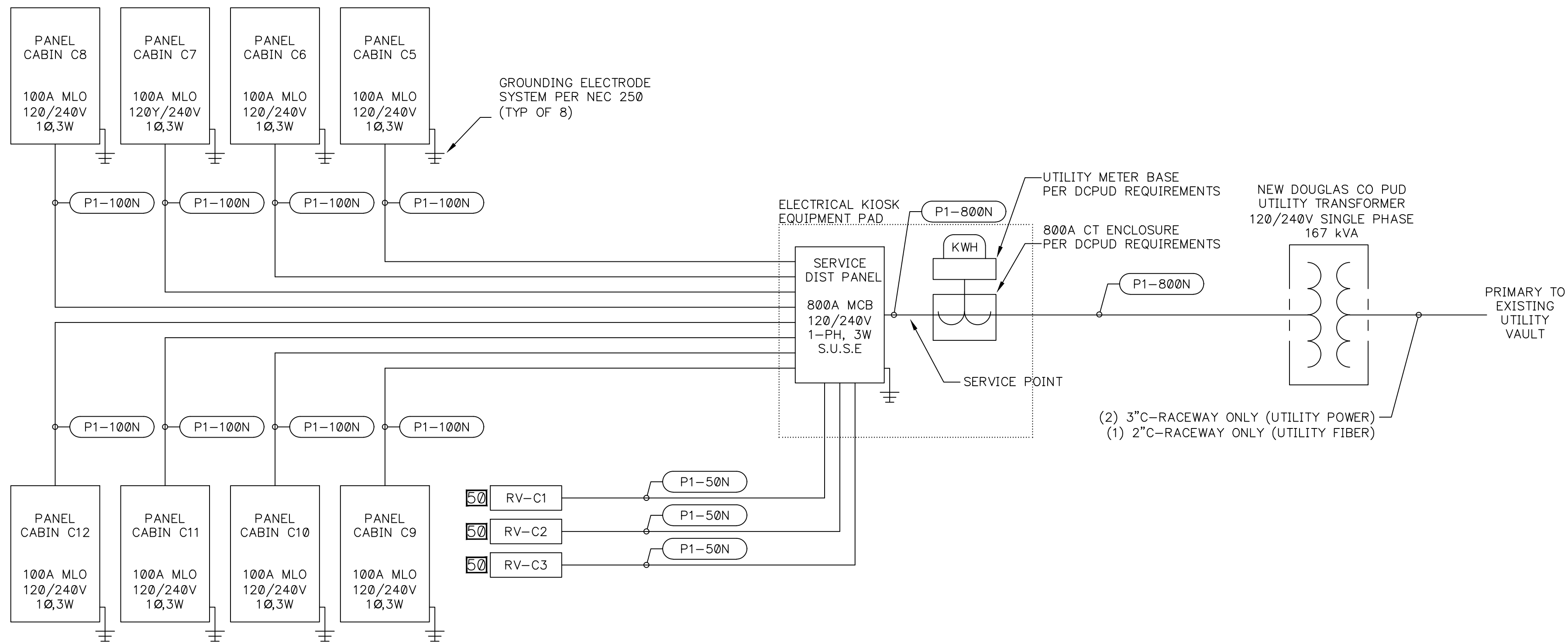


LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
CABIN LOOP ELECTRICAL
TYPICAL CABIN PLAN
BID NO.14-31



SHEET	E4 OF E13
REVISION	0
DATE	11/14/2014
DWG.	0913-50SU-0015

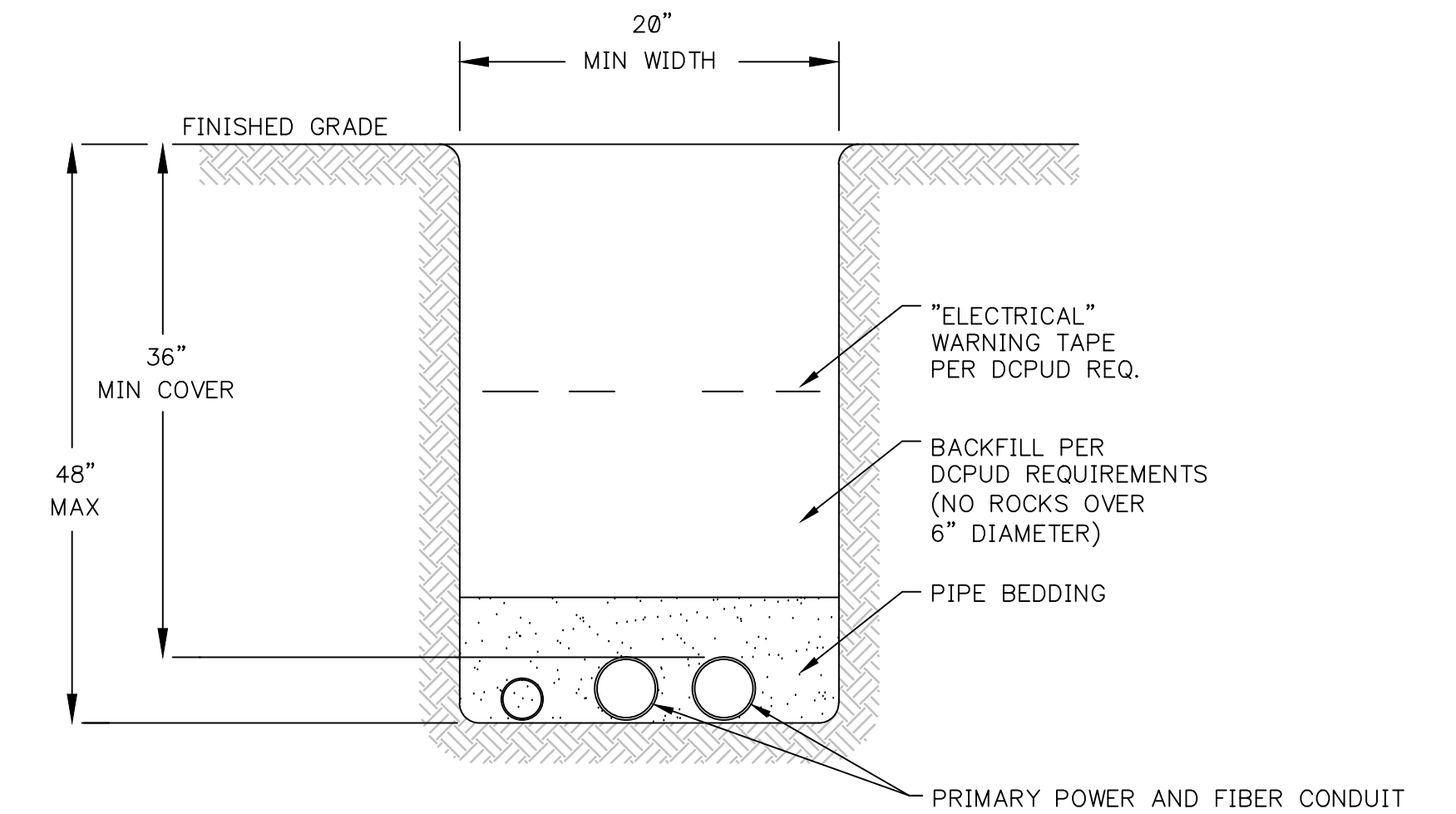
ORIG. DRAWN



1 ONE-LINE DIAGRAM - CABIN LOOP
SCALE: NONE

GENERAL NOTES:

1. ALL PRIMARY WORK SHALL BE IN ACCORDANCE WITH DCPUD REQUIREMENTS. CONFIRM INSTALLATION REQUIREMENTS PRIOR TO BID.
2. THE CONTRACTOR IS TO PROVIDE, ON PRIVATE PROPERTY, ALL TRENCHING, BACKFILL, VAULT EXCAVATIONS, COMPACTION AND RESTORATION PER DCPUD STANDARDS.
3. SEE DWG. 0913-50SU-0008 FOR COMBINING ELECTRICAL CONDUIT IN SAME TRENCH AS SITE WATER UTILITY.



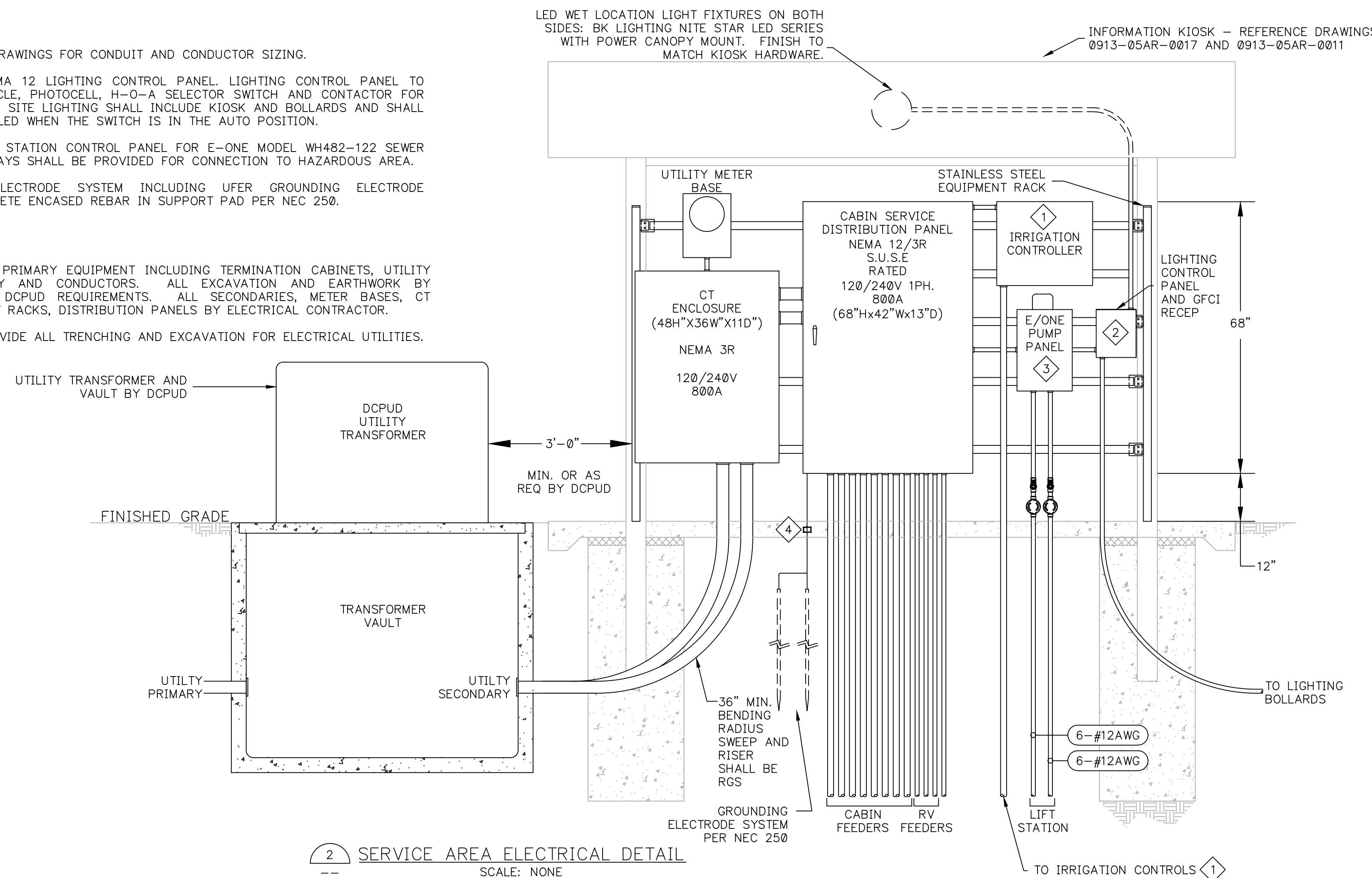
3 PRIMARY TRENCHING DETAIL
SCALE: NONE

KEY NOTES:

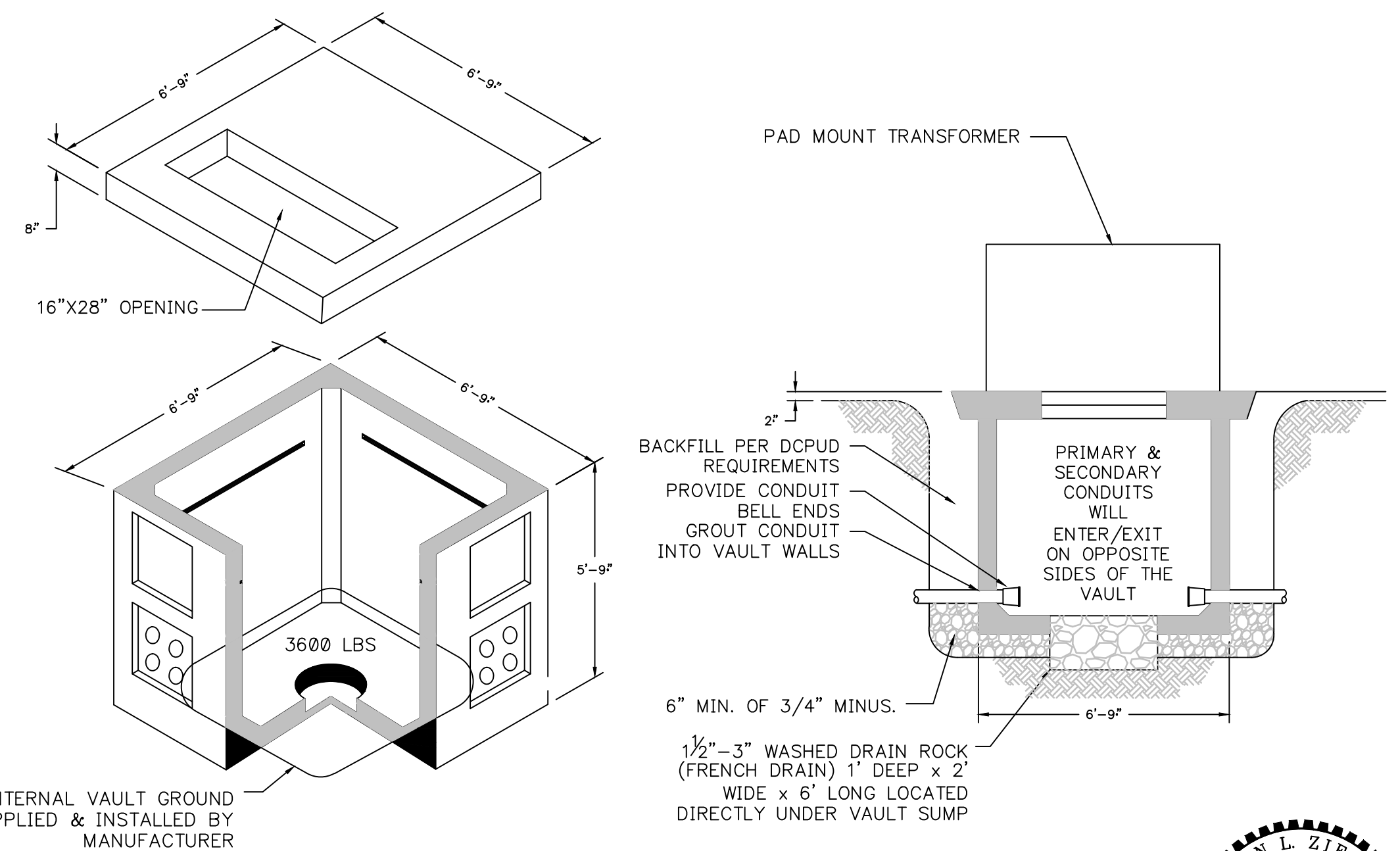
- 1 REFER TO IRRIGATION DRAWINGS FOR CONDUIT AND CONDUCTOR SIZING.
- 2 PROVIDE LOCKABLE NEMA 12 LIGHTING CONTROL PANEL. LIGHTING CONTROL PANEL TO INCLUDE GFCI RECEPTACLE, PHOTOCELL, H-0-A SELECTOR SWITCH AND CONTACTOR FOR SITE LIGHTING CONTROL. SITE LIGHTING SHALL INCLUDE KIOSK AND BOLLARDS AND SHALL BE PHOTOCELL CONTROLLED WHEN THE SWITCH IS IN THE AUTO POSITION.
- 3 INSTALL GRINDER PUMP STATION CONTROL PANEL FOR E-ONE MODEL WH482-122 SEWER PUMP STATION. RACEWAYS SHALL BE PROVIDED FOR CONNECTION TO HAZARDOUS AREA.
- 4 PROVIDE GROUNDING ELECTRODE SYSTEM INCLUDING UFER GROUNDING ELECTRODE CONNECTIONS TO CONCRETE ENCASED REBAR IN SUPPORT PAD PER NEC 250.

UTILITY NOTES:

1. DCPUD SHALL PROVIDE PRIMARY EQUIPMENT INCLUDING TERMINATION CABINETS, UTILITY TRANSFORMER, RACEWAY AND CONDUCTORS. ALL EXCAVATION AND EARTHWORK BY CONTRACTOR TO MEET DCPUD REQUIREMENTS. ALL SECONDARIES, METER BASES, CT ENCLOSURES, EQUIPMENT RACKS, DISTRIBUTION PANELS BY ELECTRICAL CONTRACTOR.
2. CONTRACTOR SHALL PROVIDE ALL TRENCHING AND EXCAVATION FOR ELECTRICAL UTILITIES.



2 SERVICE AREA ELECTRICAL DETAIL
SCALE: NONE



4 TRANSFORMER VAULT INSTALLATION DETAIL
SCALE: NONE

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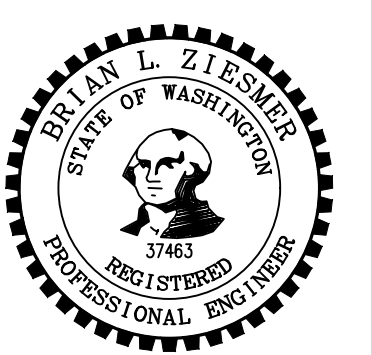
PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1
2ND ENG. WESLEY WARD	PRIM. ENG. C. HILL
DESIGNER WESLEY WARD	2ND ENG. C. HILL
APPROVAL BRIAN ZIESMER	PROJ. MGR. C. HILL

SCALE AS NOTED	VERIFY SCALE
0 1" = 1'	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0 11/14/14	BID SET
REV DATE	REVISION
	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENACHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
CABIN LOOP ELECTRICAL
ONE-LINE DIAGRAM & DETAILS
BID NO.14-31

SHEET E5 OF E13
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0016



CABIN SERVICE DISTRIBUTION PANEL				PANEL SCHEDULE						PROJECT: LINCOLN ROCK CABIN LOOP			
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	CABIN 1		S	100	2	A	2	100	S		CABIN 5	2	
3	---		S	---	---	B	---	---	S		---	4	
5	CABIN 2		S	100	2	A	2	100	S		CABIN 6	6	
7	---		S	---	---	B	---	---	S		---	8	
9	CABIN 3		S	100	2	A	2	100	S		CABIN 7	10	
11	---		S	---	---	B	---	---	S		---	12	
13	CABIN 4		S	100	2	A	2	100	S		CABIN 8	14	
15	---		S	---	---	B	---	---	S		---	16	
17	SEWER LIFT STATION	1,008	M	30	2	A	1	20	L	52	BOLLARD LIGHTING	18	
19	---	1,008	M	---	---	B	1	20	G	500	IRRIGATION CONTROLLER	20	
21	RV-C1	4,800	RV	50	2	A	1	20	L	209	KIOSK LIGHT AND RECEPTACLE	22	
23	---	4,800	RV	---	---	B	1	20			SPARE	24	
25	RV-C2	4,800	RV	50	2	A	1	20			SPARE	26	
27	---	4,800	RV	---	---	B	1	20			SPARE	28	
29	RV-C3	4,800	RV	50	2	A	1	20			SPARE	30	
31	---	4,800	RV	---	---	B					SPACE	32	
33	SPACE					A					SPACE	34	
35	SPACE					B					SPACE	36	
37	SPACE					A					SPACE	38	
39	SPACE PROTECTION			20	2	B					SPACE	40	
41	---			---	---	A					SPACE	42	

TOTAL CONNECTED LOAD:	PH A	15,669 VA	130.6 AMPS	DATE: November 19, 2014
TOTAL CONNECTED LOAD:	PH B	15,908 VA	132.6 AMPS	NEMA 12 ENCLOSURE SERVICE RATED
MAX PHASE CONNECTED LOAD:	PH B	15,908 VA		PANEL RATING: 42,000 AIC
TOTAL CONNECTED LOAD (2 x MAX):		31.8 kVA	132.6 AMPS	TOTAL DEMAND LOAD: 177.9 kVA 741.2 AMPS

	CONNECTED LOADS	SUBFD LOADS [S]	TOTAL LOADS	DEMAND FACTOR	DEMAND LOAD
G GENERAL (NON-CONTINUOUS)	500 VA	0 VA	500 VA	100%	500 VA
L LIGHTING	261 VA	2,056 VA	2,317 VA	125%	2,896 VA
R RECEPTACLES - UP TO 10 kVA	0 VA	17,680 VA	10,000 VA	100%	10,000 VA
OVER 10 kVA	0 VA	0 VA	7,680 VA	50%	3,840 VA
K KITCHEN	0 VA	12,000 VA	12,000 VA	100%	12,000 VA
H HEATING	0 VA	108,000 VA	108,000 VA	100%	108,000 VA
M MOTORS	2,016 VA	15,600 VA	17,616 VA	100%	17,616 VA
LM LARGEST MOTOR	0 VA	0 VA	0 VA	125%	0 VA
WH WATER HEATER	0 VA	0 VA	0 VA	100%	0 VA
C CONTINUOUS (GENERAL LOAD)	0 VA	0 VA	0 VA	125%	0 VA
N NON-COINCIDENT	0 VA	8,000 VA	8,000 VA	0%	0 VA
RV RECREATIONAL VEHICLE [2]	28,800 VA	0 VA	28,800 VA	80%	23,040 VA
TOTAL:	31,577 VA	163,336 VA	166,113 VA		177,892 VA

NOTES:

1. PROVIDE SURGE PROTECTIVE DEVICE FOR SERVICE PANEL
2. DEMAND FACTOR PER NEC TABLE 551.73
3. 100% RATED MAIN BREAKER
- 4.
- 5.
- 6.

CABIN SERVICE DISTRIBUTION PANEL SCHEDULE
SCALE: NONE

CABIN PANEL (TYPICAL)				PANEL SCHEDULE						PROJECT: LINCOLN ROCK CABIN LOOP			
120/240V, 1Ph, 3W.				125A Bus			100A M.C.B.			FLUSH 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	HP-1 SPLIT SYSTEM HEAT PUMP	975	M	15	2	A	1	15	R	720	RECEP - KITCHEN, DINING, LIVING (1) (2)	2	
3	---	975	M	---	---	B	1	15	R	720	RECEP - 'BEDROOM (1) (2)	4	
5	IWH-1 INSTANTANEOUS WATER HEATER	6,500	H	60	2	A	1	15	R	410	RECEP - BATHROOM, EF-1 (1)	6	
7	---	6,500	H	---	---	B	1	15	R	360	RECEP - EXTERIOR (1)	8	
9	UH-1 UNIT HEATER BATHROOM	500	H	15	1	A	1	15	K	1,000	RECEP - MICROWAVE	10	
11	UH-2 UNIT HEATER MAIN BEDROOM	1,000	N	15	1	B	1	15	K	500	RECEP - FRIDGE	12	
13	---			15	1	A	1	15	L	257	LIGHTING AND FAN	14	
15	SPARE			15	1	B					SPACE	16	
17	SPACE					A					SPACE	18	

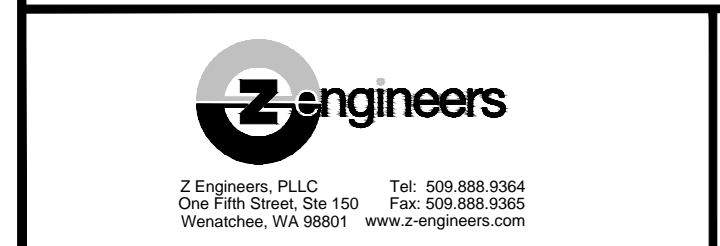
TOTAL CONNECTED LOAD:	PH A	10,362 VA	86.4 AMPS	DATE: November 19, 2014
TOTAL CONNECTED LOAD:	PH B	10,055 VA	83.8 AMPS	NEMA 1 ENCLOSURE SERVICE RATED
MAX PHASE CONNECTED LOAD:	PH A	10,362 VA		PANEL RATING: 22,000 AIC
TOTAL CONNECTED LOAD (2 x MAX):		20.7 kVA	86.4 AMPS	TOTAL DEMAND LOAD: 19.5 kVA 81.2 AMPS

	CONNECTED LOADS	SUBFD LOADS [S]	TOTAL LOADS	DEMAND FACTOR	DEMAND LOAD
G GENERAL (NON-CONTINUOUS)	0 VA	0 VA	0 VA	100%	0 VA
L LIGHTING	257 VA	0 VA	257 VA	125%	321 VA
R RECEPTACLES - UP TO 10 kVA	2,210 VA	0 VA	2,210 VA	100%	2,210 VA
OVER 10 kVA	0 VA	0 VA	0 VA	50%	0 VA
K KITCHEN	1,500 VA	0 VA	1,500 VA	100%	1,500 VA
H HEATING	13,500 VA	0 VA	13,500 VA	100%	13,500 VA
M MOTORS	1,950 VA	0 VA	1,950 VA	100%	1,950 VA
LM LARGEST MOTOR	0 VA	0 VA	0 VA	125%	0 VA
WH WATER HEATER	0 VA	0 VA	0 VA	100%	0 VA
C CONTINUOUS (GENERAL LOAD)	0 VA	0 VA	0 VA	125%	0 VA
N NON-COINCIDENT	1,000 VA	0 VA	1,000 VA	0%	0 VA
RV RECREATIONAL VEHICLE	0 VA	0 VA	0 VA	75%	0 VA
TOTAL:	20,417 VA	0 VA	20,417 VA		19,481 VA

NOTES:

1. PROVIDE GFCI RECEPTACLES AS REQUIRED BY NEC 210.8
2. PROVIDE AFCI RECEPTACLES AS REQUIRED BY NEC 210.12
3. PROVIDE GFEP PROTECTION FOR HEAT TRACE AS REQUIRED BY NEC 426.28
4. UH-2 IS BACK UP HEAT FOR HEAT PUMP, NON-COINCIDENT LOAD.
- 5.
- 6.

CABIN PANEL SCHEDULE (TYPICAL)
SCALE: NONE



CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1
	2ND ENG. WESLEY WARD	PRIM. ENG. C. HILL
	APPROVAL BRIAN ZIESMER	PROJ. MGR. C. HILL

SCALE AS NOTED	0 1 1"	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
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LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP CABIN LOOP ELECTRICAL PANEL SCHEDULES BID NO.14-31
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SHEET E6 OF E13
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0017

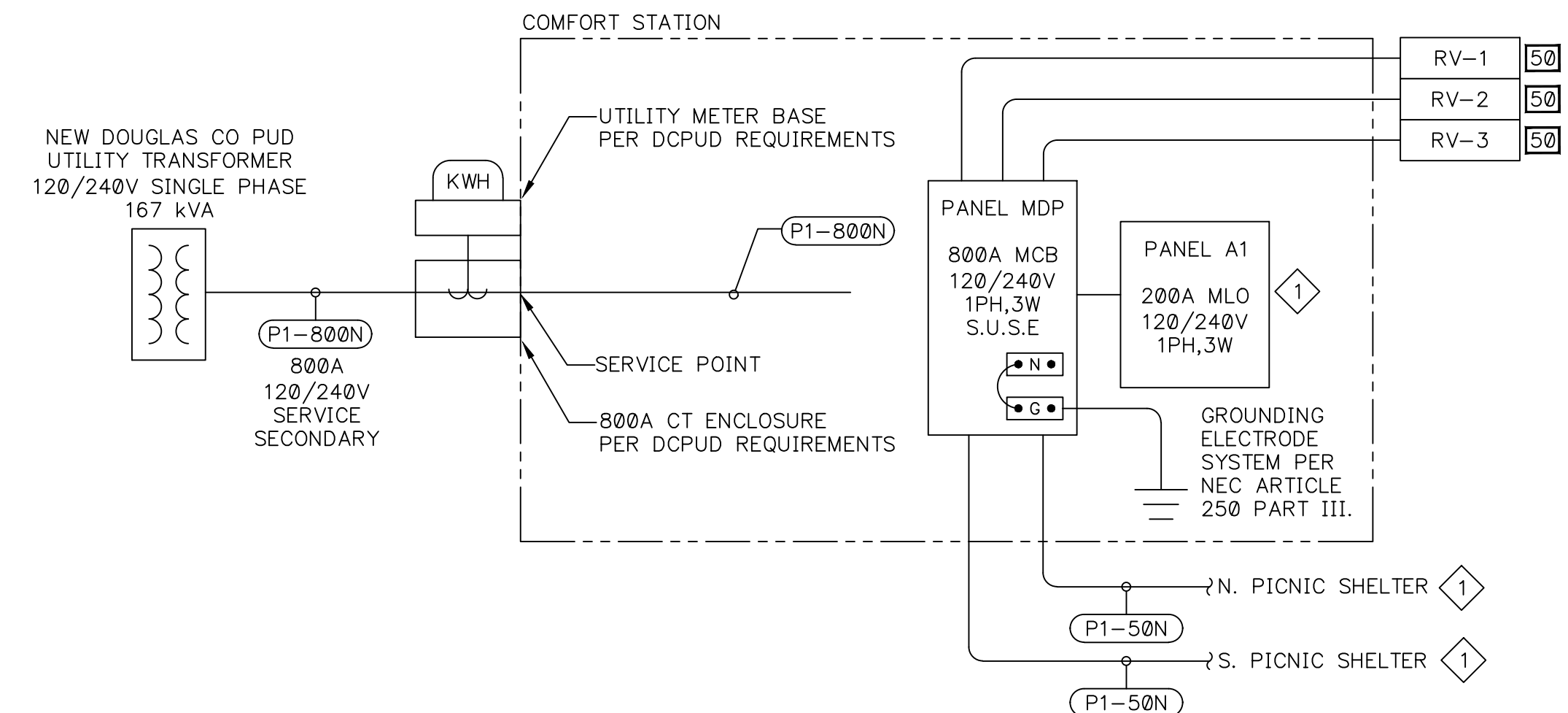


KEY NOTES:

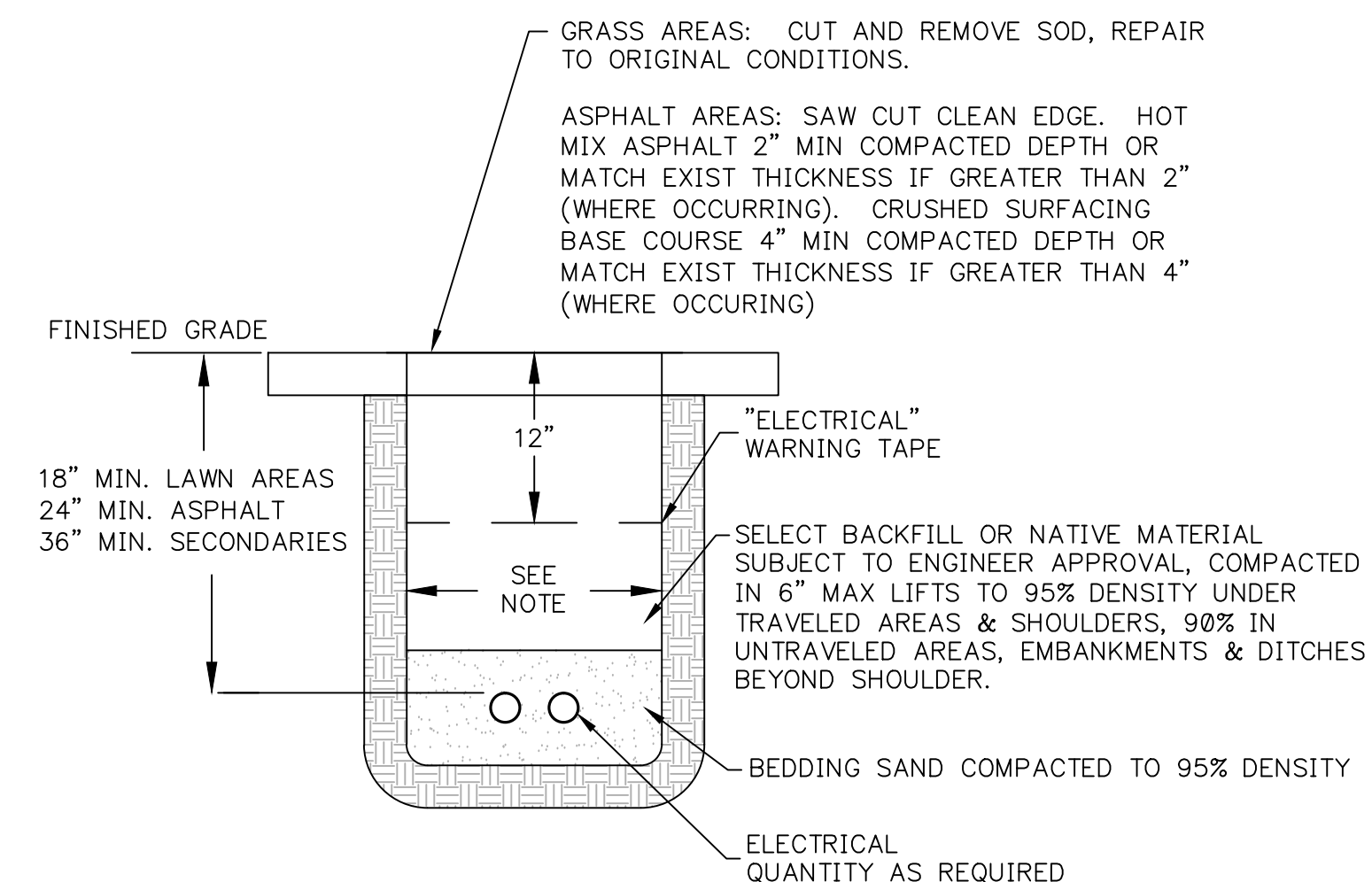
- 1 EXISTING DOUGLAS COUNTY PUD UTILITY (DCPUD) TRANSFORMER. TRANSFORMER SHALL BE UPGRADED BY DCPUD IN EXISTING LOCATION TO ACCOMMODATE NEW ELECTRICAL SERVICE. CONTRACTOR SHALL PROVIDE NEW SECONDARY TO COMFORT STATION PER DCPUD REQUIREMENTS AND ALL COORDINATION FOR UPGRADED SERVICE.
- 2 SEE SHEETS 0913-50SU-0019 - 0913-50SU-0022 FOR COMFORT STATION ELECTRICAL.
- 3 MAINTAIN EXISTING POWER FEEDERS TO PICNIC SHELTER. RE-CONNECT TO NEW COMFORT STATION PANEL - SEE PANEL SCHEDULES.
- 4 LED WET LOCATION LIGHT FIXTURES ON BOTH SIDES OF KIOSK; BK LIGHTING NITE STAR LED SERIES WITH POWER CANOPY MOUNT. FINISH TO MATCH KIOSK HARDWARE.
- 5 BOLLARD AND KIOSK LIGHTING CIRCUITS SHALL BE TIED INTO EXISTING EXTERIOR LIGHTING CONTROLS AT COMFORT STATION BY CONTRACTOR FOR PHOTOCELL AND TIMER CONTROL.
- 6 FEEDER UPSIZED FOR VOLTAGE DROP; SEE SCHEDULES.



GROUP CAMP - ELECTRICAL SITE PLAN
SCALE: 1" = 40'



ONE-LINE DIAGRAM - GROUP CAMP
SCALE: NONE



GENERAL NOTES:

- 1. MAINTAIN 12" MIN. HORIZONTAL AND VERTICAL SEPARATION BETWEEN ELECTRICAL AND WATER UTILITIES.
- 2. PROVIDE 2" SEPARATION BETWEEN MULTIPLE CONDUITS AND NEAREST SIDEWALL.
- 3. TRENCH WIDTH TO ACCOMMODATE ALL CONDUITS AND SERVICES.
- 4. BACKFILL IN ACCORDANCE WITH UTILITY AND CIVIL STANDARDS.
- 5. CONDUIT SHALL BE BEDDED W/SAND (3" BASE & 3" COVER MIN).

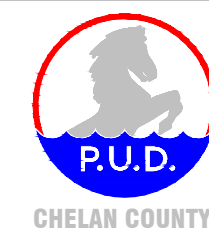
ELECTRICAL RACEWAY AND TRENCHING DETAIL
SCALE: NONE



CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1
	2ND ENG. WESLEY WARD	PRIM. ENG. C. HILL
	APPROVAL BRIAN ZIESMER	2ND ENG. C. HILL
		PROJ. MGR. C. HILL

SCALE AS NOTED	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0 11/14/14	BID SET	- AB
REV	DATE	REVISION
		REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON



LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
GROUP CAMP ELECTRICAL
SITE PLAN
BID NO.14-31

SHEET E7 OF E13
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0018

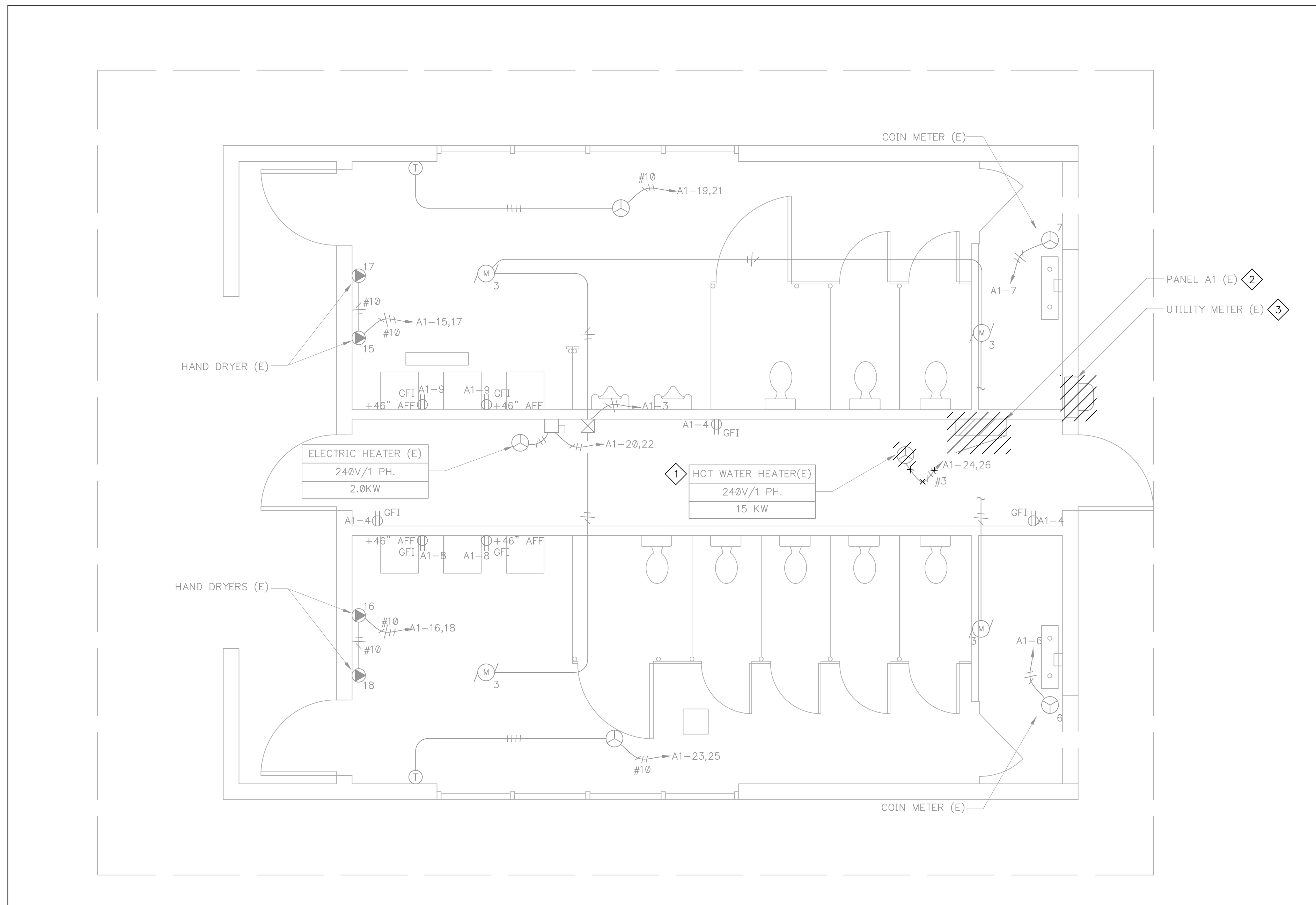


GENERAL NOTES:

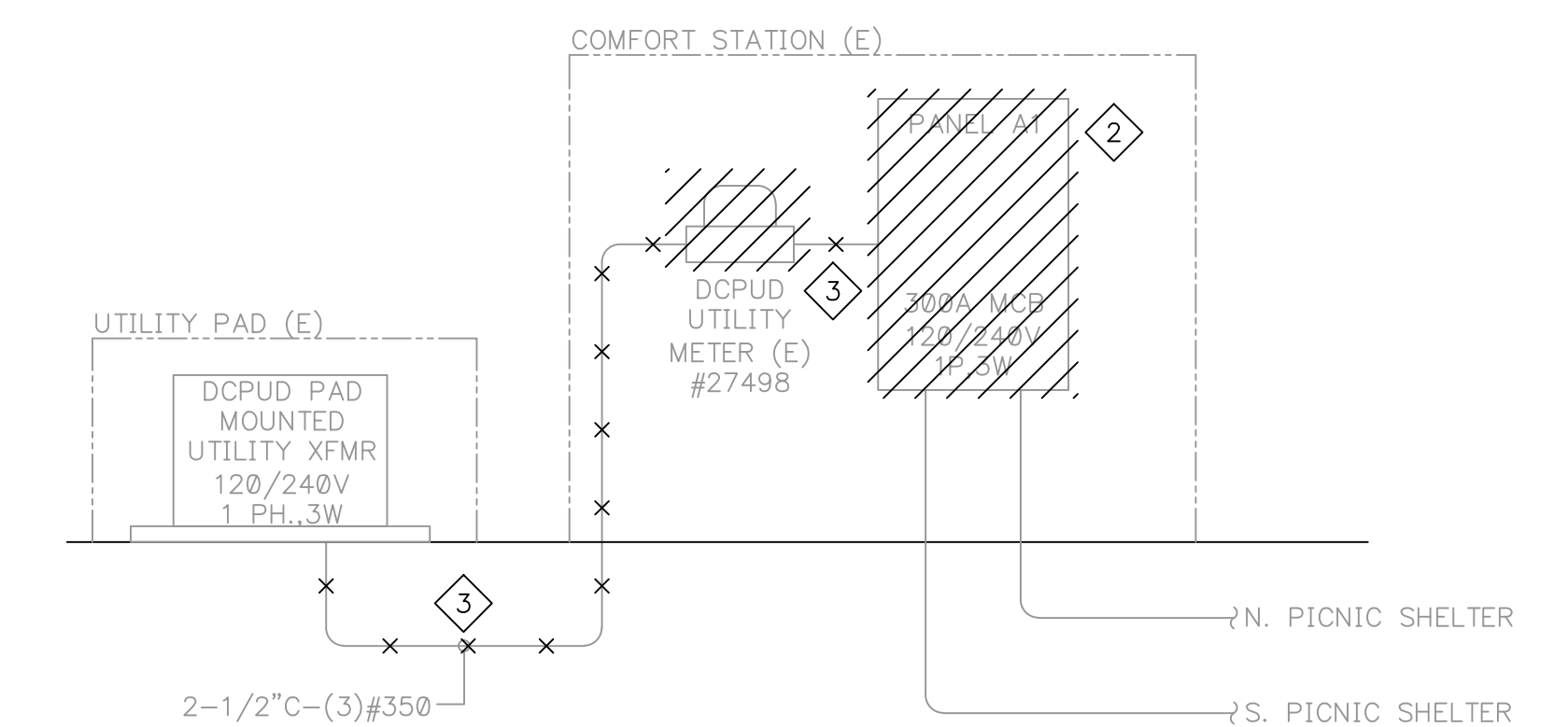
- EXISTING CIRCUITING DERIVED FROM AS-BUILT DOCUMENTATION. CONTRACTOR SHALL CONFIRM ALL RACEWAY AND CONDUCTOR SIZING PRIOR TO CONSTRUCTION.

DEMOLITION KEY NOTES:

- DEMOLISH EXISTING HOT WATER HEATER AND ASSOCIATED RACEWAY AND CONDUCTORS.
- DEMOLISH EXISTING PANEL A1. MAINTAIN AND PROTECT EXISTING RACEWAY AND CONDUCTORS FOR BRANCH CIRCUITS AS INDICATED IN PANEL SCHEDULE..
- DEMOLISH EXISTING RACEWAY AND CONDUCTORS FROM UTILITY METER TO UTILITY TRANSFORMER. RACEWAY LOCATED UNDER EXISTING SLAB SHALL BE CUT AND CAPPED AT FLOOR AND EDGE OF SLAB AND ABANDONED IN PLACE.



COMFORT STATION - POWER DEMOLITION PLAN
SCALE: 3/8" = 1'-0"



ONE-LINE DIAGRAM - DEMOLITION
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. WESLEY WARD	PRIM. ENG. C. HILL	0	11/14/14	BID SET	- AB
	DESIGNER WESLEY WARD	2ND ENG. C. HILL	0	11/14/14	BID SET	- AB
	APPROVAL BRIAN ZIESMER	PROJ. MGR. C. HILL	REV	DATE	REVISION	REQ. BY

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
GROUP CAMP ELECTRICAL
COMFORT STATION POWER DEMOLITION PLAN
BID NO.14-31

SHEET E8 OF E13
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0019

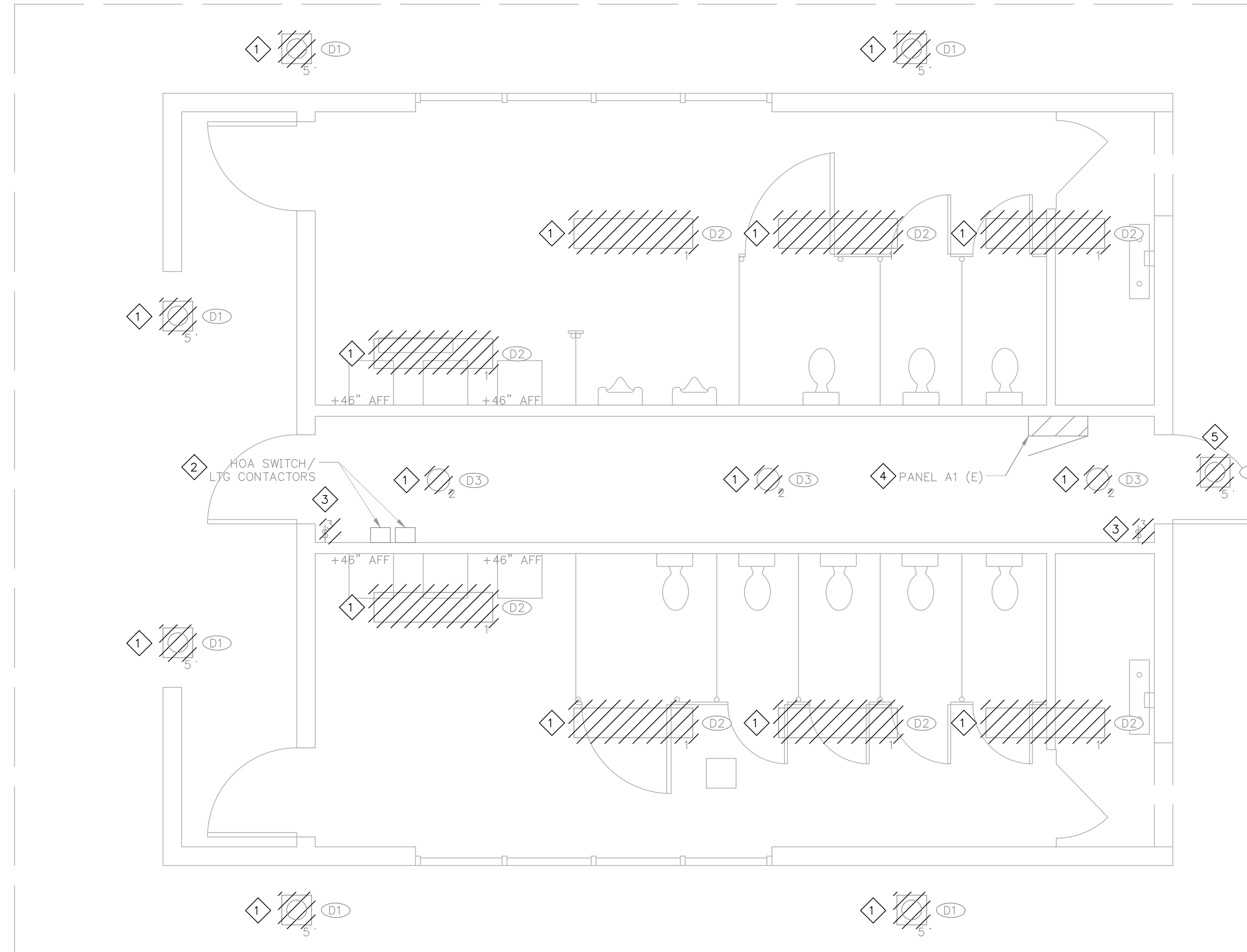
ORIG. DRAWN

GENERAL NOTES:

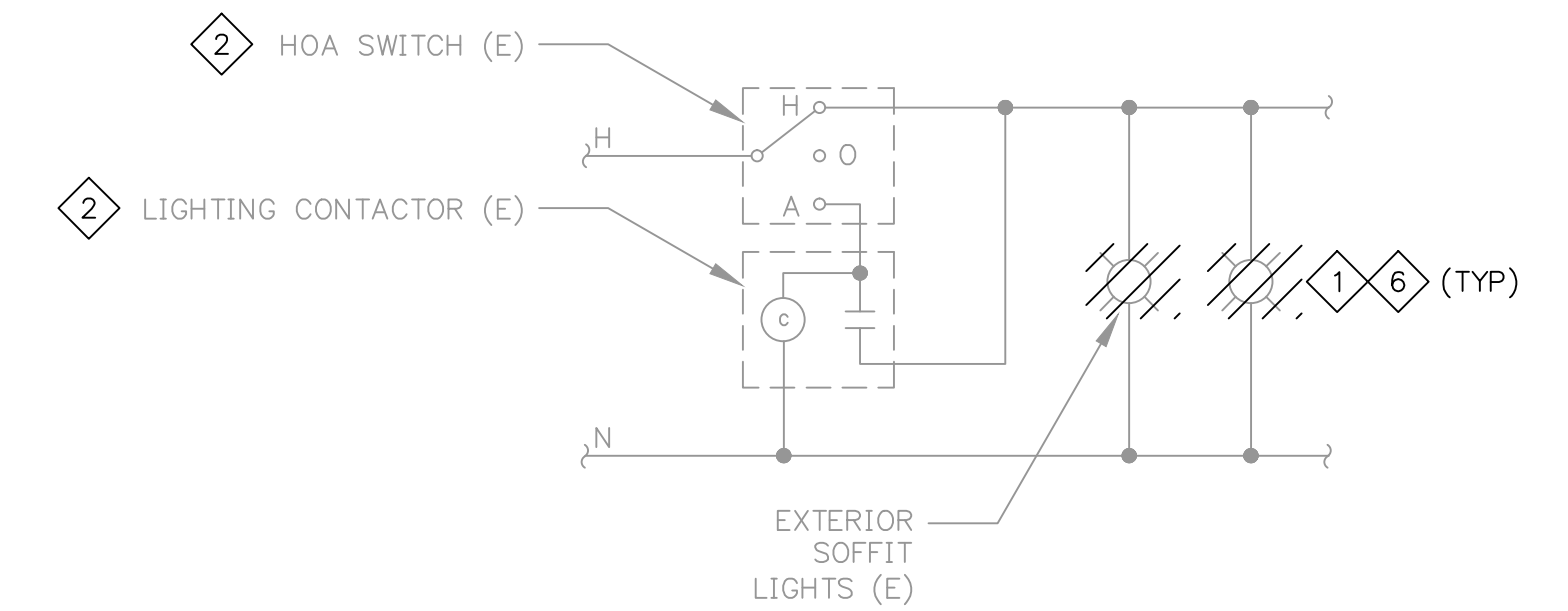
- EXISTING CIRCUITING DERIVED FROM AS-BUILT DOCUMENTATION. CONTRACTOR SHALL CONFIRM ALL AFFECTED RACEWAY AND CONDUCTOR SIZING PRIOR TO CONSTRUCTION.

DEMOLITION KEY NOTES:

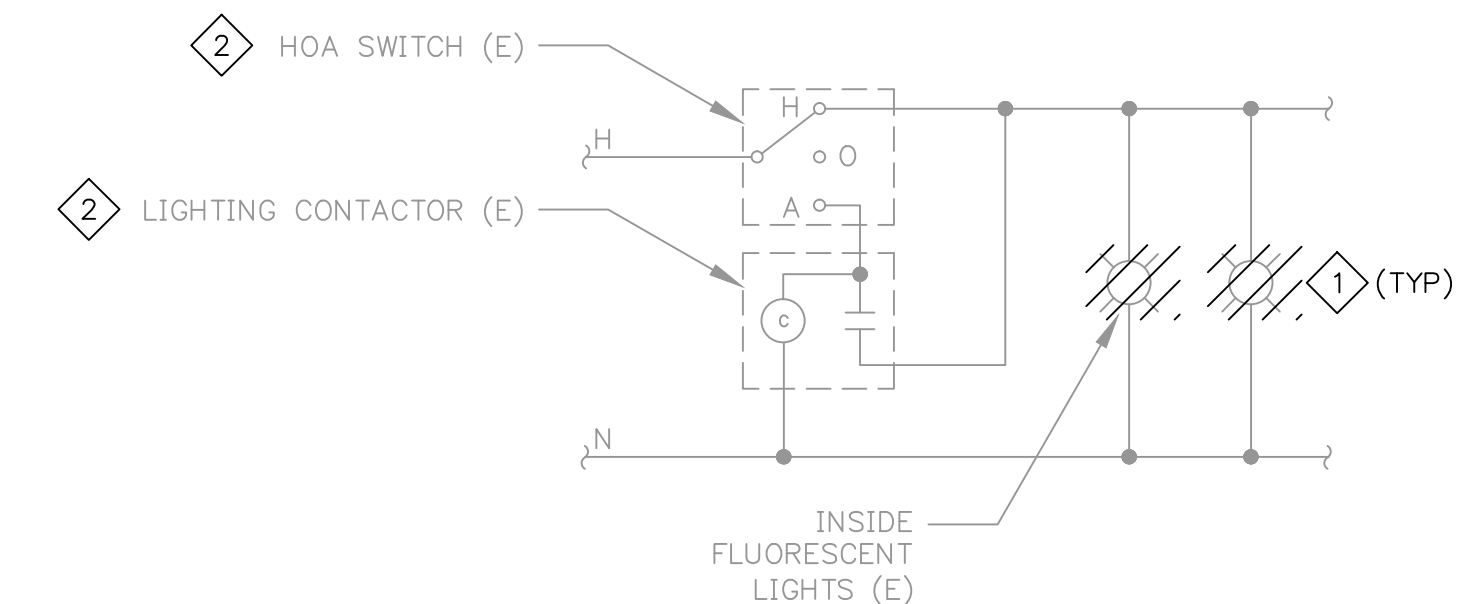
- DEMOLISH EXISTING LIGHT FIXTURES. MAINTAIN CONDUCTORS IN PLACE FOR RE-USE.
- MAINTAIN AND PROTECT EXISTING HOA SWITCH, LIGHTING CONTACTOR, PHOTOCELL, AND ASSOCIATED CONDUCTORS.
- DEMOLISH EXISTING 3-WAY LIGHT SWITCHES, MAINTAIN CONDUCTORS IN PLACE FOR RE-USE.
- PANEL DEMOLISHED UNDER THIS SCOPE OF WORK. SEE SHEET 0913-50SU-0018 FOR DETAILS.
- DEMOLISH LIGHT FIXTURE AND ASSOCIATED RACEWAY AND CONDUCTORS BACK TO NEAREST DEVICE OR JUNCTION TO REMAIN IN SERVICE.
- TIE NEW BOLLARD AND KIOSK LIGHTS INTO LIGHTING CONTROL CIRCUIT.



COMFORT STATION – LIGHTING DEMOLITION PLAN
SCALE: 3/8"= 1'-0"



EXISTING EXTERIOR SOFFIT LIGHTING CONTROL SCHEMATIC
SCALE: NONE



EXISTING INTERIOR LIGHTING CONTROL SCHEMATIC
SCALE: NONE

EXISTING FIXTURE SCHEDULE				
ID	DESCRIPTION	MOUNTING	LAMPS	VA MANUFACTURER / PART NO.
D1	RECESSED HPS CANOPY	RECESSED IN SOFFIT	(1) 70W HPS	70 FAIL SAFE #HDR 705-120-27
D2	INDESTRUCTIBLE FLUORESCENT	SURFACE MOUNTED ON CEILING	(2) F40 T12	80 KENALL #7240
D3	PORCELAIN LAMP HOLDER	SURFACE MOUNTED	(1) 150W A21	150 BRYANT #5228

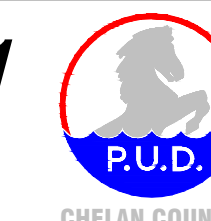
EXISTING LIGHTING FIXTURE SCHEDULE
SCALE: NONE



CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1
	2ND ENG. WESLEY WARD	PRIM. ENG. C. HILL
	APPROVAL BRIAN ZIESMER	2ND ENG. C. HILL
		PROJ. MGR. C. HILL

SCALE AS NOTED	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
0 1"		
REV	DATE	REVISION

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON



LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
GROUP CAMP ELECTRICAL
COMFORT STATION LIGHTING DEMOLITION PLAN
BID NO.14-31



SHEET E9 OF E13
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0020

EQUIPMENT SCHEDULE - SEE MECHANICAL SH 0913-05BS-007						
EQUIPMENT ID	DESCRIPTION	VOLTAGE	PHASE	HP	LOAD	RACEWAY CONDUCTOR
EF-1	EXHAUST FAN	120V	1-PH	1/15	29 W	3/4" (2)#12, (1)#12G
SF-1	SUPPLY FAN	120V	1-PH	1/4	667 W	3/4" (2)#12, (1)#12G
EDC-1	ELECTRIC DUCT HEATER	240V	1-PH		12 KW	1" (2)#4, (1)#8G
WH-1	ELECTRIC WATER HEATER	240V	1-PH		54 KW	2-1/2" (2)#350, (1)#4G
HD-1	HAND DRYER	240V	1-PH		1.1 KW	3/4" (2)#12, (1)#12G
BC-1	TOKEN DISPENSER	120V	1-PH		0.5KW	3/4" (2)#12, (1)#12G

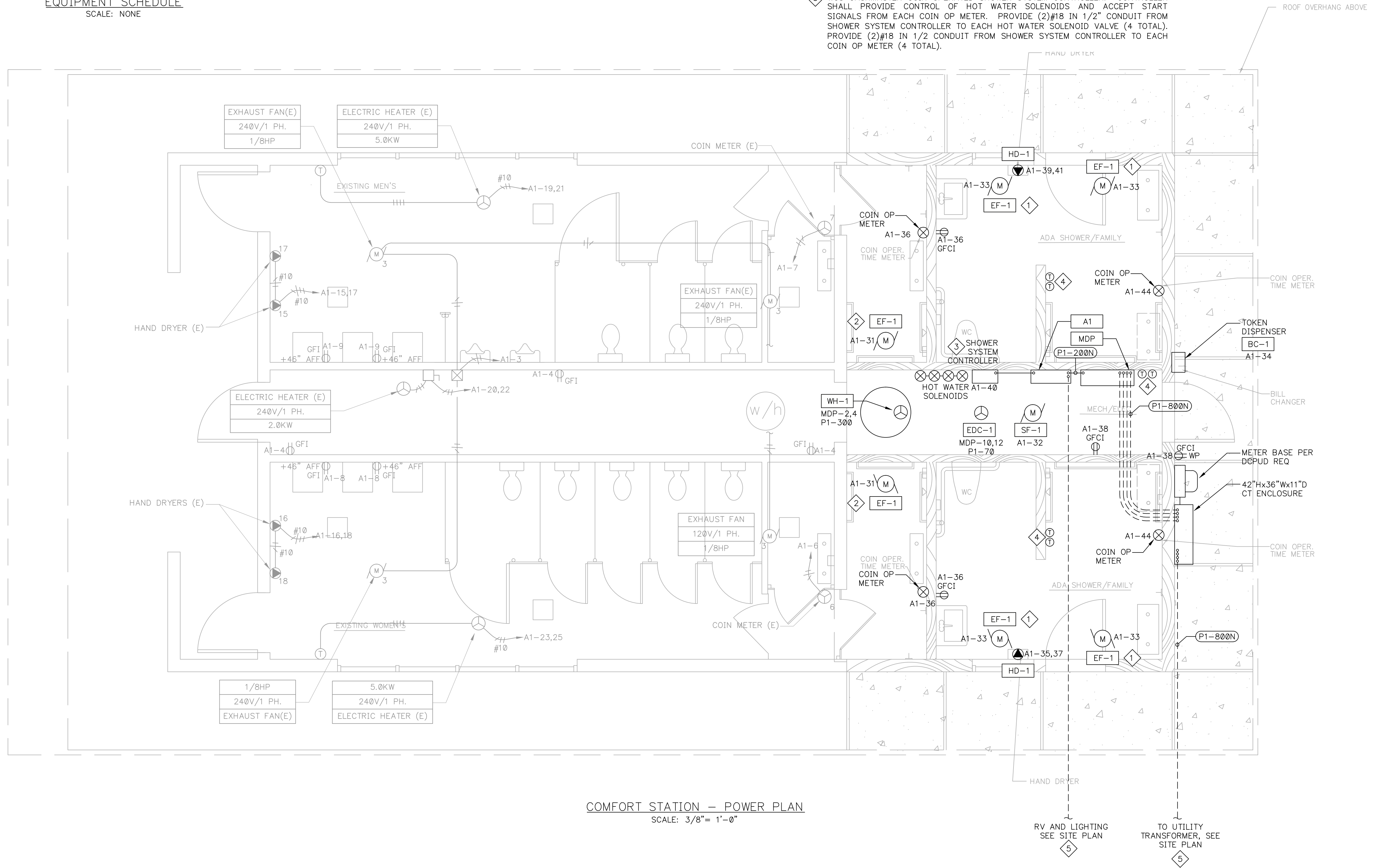
EQUIPMENT SCHEDULE
SCALE: NONE

GENERAL NOTES:

- EXISTING CIRCUITING DERIVED FROM AS-BUILT DOCUMENTATION. CONTRACTOR SHALL CONFIRM ALL RACEWAY AND CONDUCTOR SIZING PRIOR TO CONSTRUCTION.
- CONTRACTOR SHALL COORDINATE BRANCH CIRCUIT RACEWAY ROUTING FROM PANELS MDP AND A1 TO FIELD DEVICES BASED ON CIRCUIT DESIGNATIONS SHOWN IN PANEL SCHEDULES.
- ELECTRICAL CONTRACTOR SHALL PROVIDE ELECTRICAL POWER AND LOW VOLTAGE CONTROLS FOR ALL MECHANICAL EQUIPMENT AND CONTROLS PER MECHANICAL SCHEDULES. SEE SHEET 0913-05BS-007.

KEY NOTES:

- TERMINATE CONDUCTORS IN INTEGRAL FUSED DISCONNECTING MEANS. 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 0913-05BS-0011.
- CONDUCTORS SHALL BE ROUTED TO PANEL A1 VIA EXISTING EXHAUST FAN TIME CLOCK. CONTRACTOR SHALL MAKE ALL NECESSARY REVISIONS TO INCORPORATE NEW EXHAUST FANS INTO EXISTING TIME CLOCK CONTROL.
- WCS CASHMASTER 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).
- INSTALL MECHANICAL EQUIPMENT, SENSORS, AND THERMOSTATS PER MECHANICAL REQUIREMENTS. SEE SHEET 0913-05B2-0011.
- 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.



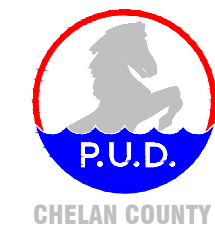
COMFORT STATION - POWER PLAN
SCALE: 3/8" = 1'-0"



CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1
	2ND ENG. WESLEY WARD	PRIM. ENG. C. HILL
	DESIGNER WESLEY WARD	2ND ENG. C. HILL
	APPROVAL BRIAN ZIESMER	PROJ. MGR. C. HILL

SCALE	AS NOTED	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
BAR IS ONE INCH ON ORIGINAL DRAWING.	0	1"	
REV	DATE	REVISION	REQ. BY DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON



LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
GROUP CAMP ELECTRICAL
COMFORT STATION POWER PLAN
BID NO.14-31



SHEET	E10 OF E13
REVISION	0
DATE	11/14/2014
DWG.	0913-50SU-0021

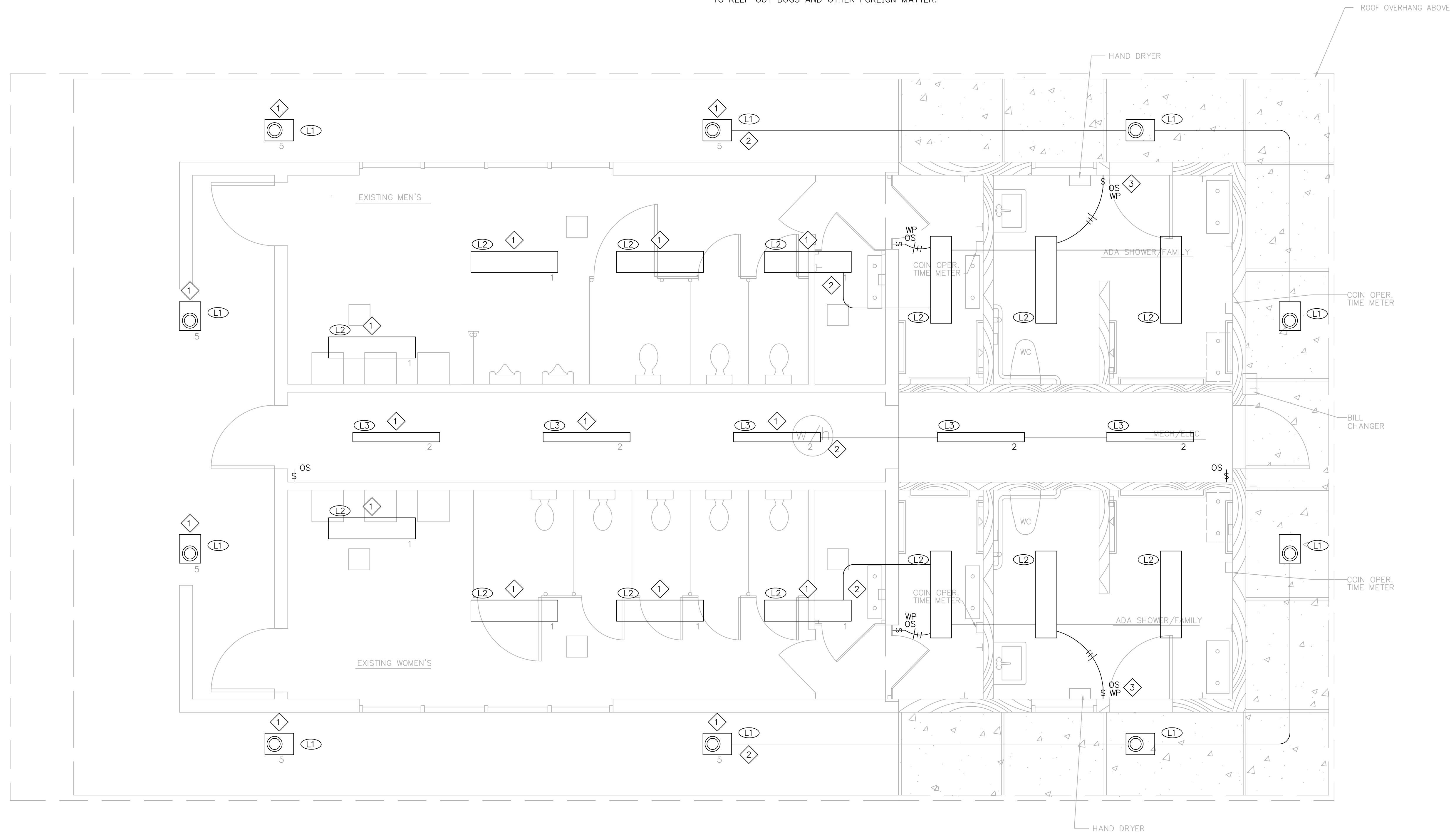
FIXTURE SCHEDULE					
ID	DESCRIPTION	MOUNTING	LAMPS	VA	MANUFACTURER / PART NO.
L1	RECESSED LED CANOPY FIXTURE	RECESSED IN SOFFIT	LED	26	KENALL HRDL61CL-26L40K-DV-SCC-FW-CSS-G, OR EQUAL
L2	SURFACE LED 4' FIXTURE	SURFACE MOUNTED ON CEILING	LED	50	KENALL MLHA12-48-F-MW-CP-1-50L40K-DCC-1-DV, OR EQUAL
L3	PENDANT LED 4' FIXTURE	PENDANT MOUNT	LED	50	KENALL MLHA5-48-F-MW-CP-1-50L40K-DCC-1-DV, OR EQUAL

GENERAL NOTES:

- EXISTING CIRCUITING DERIVED FROM AS-BUILT DOCUMENTATION. CONTRACTOR SHALL CONFIRM ALL RACEWAY AND CONDUCTOR SIZING PRIOR TO CONSTRUCTION.
- EXTERIOR SOFFIT LIGHTING SHALL BE CONTROLLED FROM EXISTING LIGHTING CONTACTOR AND PHOTOCELL. EXTEND NEW CIRCUITS TO BOLLARD AND KIOSK.
- EXISTING BATHROOM LIGHTING SHALL BE CONTROLLED FROM EXISTING TIME CLOCK.
- ALL EXTERIOR LIGHTS SHALL BE WET LOCATION RATED AND INCLUDE SEALED LENSES TO KEEP OUT BUGS AND OTHER FOREIGN MATTER.

KEY NOTES:

- EXTEND MAINTAINED CONDUCTORS TO NEW LIGHT FIXTURES AND TERMINATE.
- EXTEND EXISTING CIRCUIT TO NEW LIGHT FIXTURE LOCATIONS AS SHOWN.
- PROVIDE DUAL RELAY OCCUPANCY SENSOR FOR CONTROL OF LIGHTING AND EXHAUST FANS. SEE MECHANICAL.



COMFORT STATION -- LIGHTING PLAN
SCALE: 3/8" = 1'-0"



Z-engineers
Z Engineers, PLLC
One Fifth Street, Ste 100
Wenatchee, WA 98801
Tel: 509.888.9364
Fax: 509.888.0265
www.z-engineers.com

CONSULTANT	PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO. 1
	2ND ENG. WESLEY WARD	PRIM. ENG. C. HILL
	APPROVAL BRIAN ZIESMER	2ND ENG. C. HILL
		PROJ. MGR. C. HILL

SCALE	AS NOTED	VERIFY SCALE	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
BAR IS ONE INCH ON ORIGINAL DRAWING.	0	1"	
REV	DATE	REVISION	REQ. BY DRFT
0	11/14/14	BID SET	- AB

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK
CABIN LOOP & GROUP CAMP
GROUP CAMP ELECTRICAL
COMFORT STATION LIGHTING PLAN
BID NO. 14-31

SHEET E11 OF E13
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0022

DOCUMENT CLASS:

ID:

ORIGINAL DWG. #:

ORIG. DRAWN

GENERAL NOTES:

- EXISTING CIRCUITING DERIVED FROM AS-BUILT DOCUMENTATION. CONTRACTOR SHALL CONFIRM ALL RACEWAY AND CONDUCTOR SIZING PRIOR TO CONSTRUCTION.
- SEE ONE LINE DIAGRAM, SHEET 0913-50SU-0018.

KEY NOTES:

- EXTEND MAINTAINED CIRCUITS TO NEW PANEL AND TERMINATE. CONTRACTOR SHALL MATCH EXISTING RACEWAY AND CONDUCTOR SIZE.
- ALL RV FEEDERS SHALL BE 2" SCH 40 PVC CONDUIT.

PANEL A1 (E)			PANEL SCHEDULE								PROJECT: LRSP GROUP CAMP		
120/240V, 1Ph, 3W.			400A Bus				300A 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	RESTROOM LIGHTS	1,250	L	20	1	A	1	20	L	450	MECH RM LIGHTS	2	
3	EXHAUST FANS	720	LM	20	1	B	1	20	R	360	MECH RM OUTLETS	4	
5	OUTSIDE LIGHTS	750	L	20	1	A	1	20	G	500	SHOWER METER	6	
7	SHOWER METER	500	G	20	1	B	1	20	R	360	WOMEN'S OUTLETS	8	
9	MEN'S OUTLETS	360	R	20	1	A	1	20	G	500	IRRIGATION CONTROL	10	
11	SPARE		---	20	1	B	1	20	G	500	PUBLIC TELEPHONE	12	
13	SPARE		---	20	1	A	1	20	G	500	IRRIGATION CONTROL	14	
15	HAND DRYER	2,400	G	30	1	B	1	30	G	2,400	HAND DRYER	16	
17	HAND DRYER	2,400	G	30	1	A	1	30	G	2,400	HAND DRYER	18	
19	MEN'S HEATER	2,500	H	30	2	B	2	15	H	1,000	MECH RM HEATER	20	
21	---	2,500	H	---	---	A	---	---	H	1,000	---	22	
23	WOMEN'S HEATER	2,500	H	30	2	B	2	80	WH	7,500	HOT WATER HEATER	24	
25	---	2,500	H	---	---	A	---	---	WH	7,500	---	26	
27	PICNIC SHELTER NORTH	1,550	G	50	2	B	2	50	G	1,550	PICNIC SHELTER SOUTH	28	
29	---	1,550	G	---	---	A	---	---	G	1,550	---	30	
31	SPARE			20	1	B					SPACE ONLY	32	
33	SPARE			20	1	A					SPACE ONLY	34	
35	SPACE ONLY					B					SPACE ONLY	36	
37	SPACE ONLY					A					SPACE ONLY	38	
39	SPACE ONLY					B					SPACE ONLY	40	
41	SPACE ONLY					A					SPACE ONLY	42	

TOTAL CONNECTED LOAD:	PH A	25,710 VA	214.3 AMPS	DATE: May 28, 2014
TOTAL CONNECTED LOAD:	PH B	23,840 VA	198.7 AMPS	NEMA 1 ENCLOSURE SERVICE RATED
MAX PHASE CONNECTED LOAD:	PH A	25,710 VA	PANEL RATING: 42,000 AIC	
TOTAL CONNECTED LOAD (2 x MAX):		51.4 kVA	214.3 AMPS	TOTAL DEMAND LOAD: 50.3 kVA 209.8 AMPS

EXISTING PANEL SCHEDULE A1 - DEMOLITION
SCALE: NONE

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:

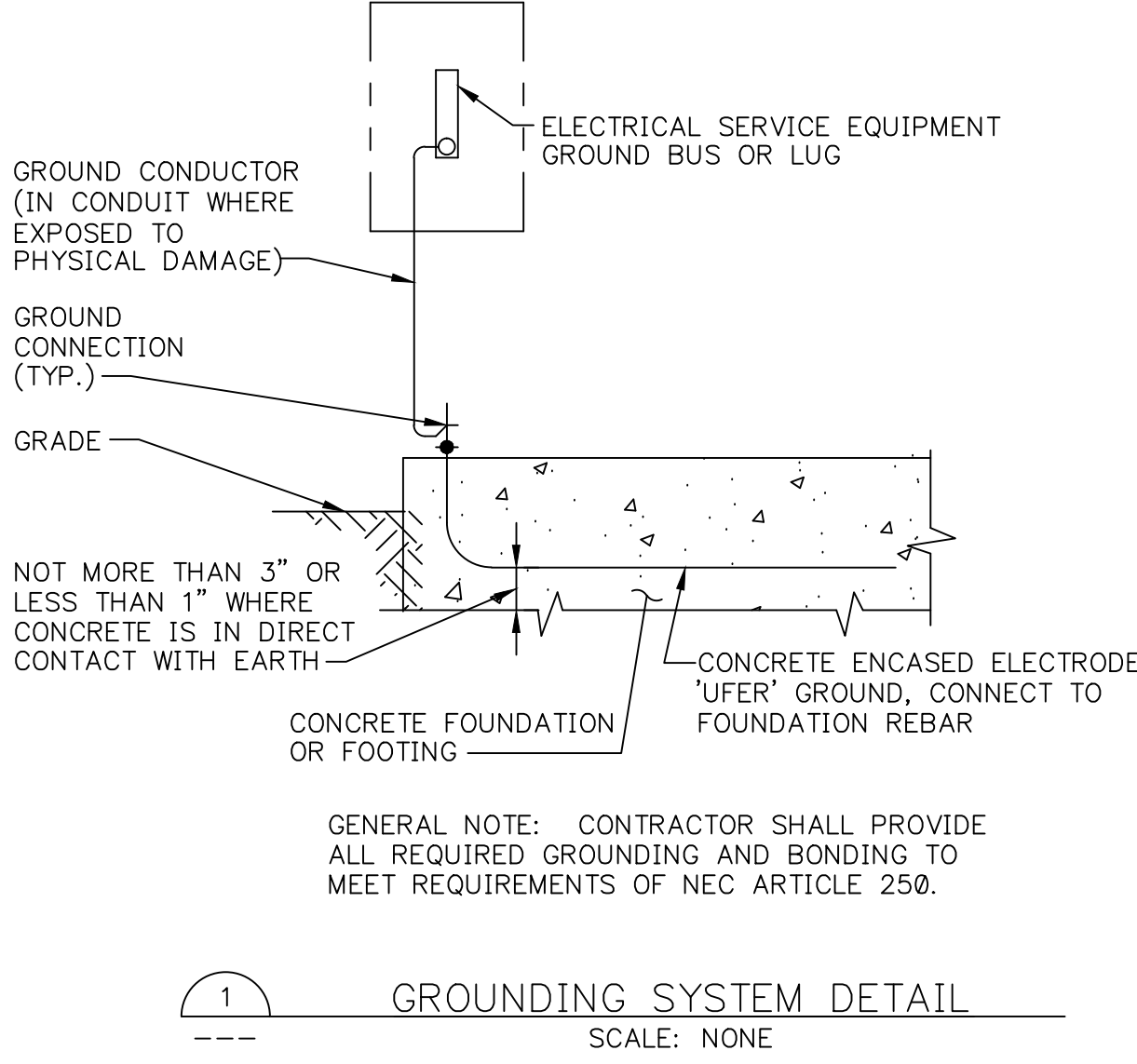
- FEEDER ID FOLLOWED BY THE SUFFIX "N" INDICATES NEUTRAL CONDUCTOR. PROVIDE ADDITIONAL NEUTRAL CONDUCTOR SIZED TO MATCH PHASE CONDUCTORS.
- CONDUCTOR AMPACITY BASED ON NEC TABLE 310.16.
- CONDUIT FILL BASED ON NEC ANNEX C, TABLE C.1 FOR THHN/THWN TYPE CONDUCTORS. CONTRACTOR SHALL PROVIDE ADJUSTMENTS 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)(c).
- MINIMUM CONDUIT SIZE FOR UNDERGROUND RACEWAY IS 1 INCH, RV FEEDERS 2"

RACEWAY AND CONDUCTOR SCHEDULE
SCALE: NONE

RV PEDESTAL AND CABINS - VOLTAGE DROP CALCULATIONS (240V, 1Ph.)												
Description	Ckt Amps	Load Amperes	Segment Distance Feet	Multiplier	Ckt Brkr Amp Rating	Segment number	Circular Mils	Copper Wire Size	Segment Voltage Drop (V)	Segment Drop (%)	Cumul. Drop (%)	Segment
LINCOLN ROCK STATE PARK - CABIN LOOP- RV PEDESTALS												
RV-C1	40	0.8	32	190	25.8	50	1	26240	6	5.98	2.49	2.49
RV-C2	40	0.8	32	240	25.8	50	1	26240	6	7.55	3.15	3.15
RV-C3	40	0.8	32	320	25.8	50	1	26240	6	10.07	4.20	4.20
LINCOLN ROCK STATE PARK - CABIN LOOP- CABIN FEEDERS												
CABIN C5	100	0.81	81	130	25.8	50	1	83690	1	3.25	1.35	1.35
CABIN C6	100	0.81	81	80	25.8	50	1	83690	1	2.00	0.83	0.83
CABIN C7	100	0.81	81	135	25.8	50	1	83690	1	3.37	1.40	1.40
CABIN C8	100	0.81	81	190	25.8	50	1	83690	1	4.74	1.98	1.98
CABIN C9	100	0.81	81	200	25.8	50	1	83690	1	4.99	2.08	2.08
CABIN C10	100	0.81	81	270	25.8	50	1	83690	1	6.74	2.81	2.81
CABIN C11	100	0.81	81	315	25.8	50	1	83690	1	7.87	3.28	3.28
CABIN C12	100	0.81	81	330	25.8	50	1	83690	1	8.24	3.43	3.43
LINCOLN ROCK STATE PARK - GROUP CAMP- RV PEDESTALS												
RV-G1	40	0.8	32	280	25.8	50	1	26240	6	8.81	3.67	3.67
RV-G2	40	0.8	32	390	25.8	50	1	41740	4	7.71	3.21	3.21
RV-G3	40	0.8	32	630	25.8	50	1	66360	2	7.84	3.27	3.27

GENERAL NOTE: SEGMENT DISTANCES FOR CALCULATION PURPOSES ONLY, NOT TO BE USED BY CONTRACTOR FOR COST ESTIMATING.

VOLTAGE DROP SCHEDULE
SCALE: NONE



PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1	SCALE AS NOTED
2ND ENG. WESLEY WARD	PRIM. ENG. C. HILL	BAR IS ONE INCH ON ORIGINAL DRAWING.
DESIGNER WESLEY WARD	2ND ENG. C. HILL	VERIFY SCALE 0 1"
APPROVAL BRIAN ZIESMER	PROJ. MGR. C. HILL	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

0	11/14/14	BID SET	-	AB
REV	DATE	REVISION	REQ. BY	DRFT

PUBLIC UTILITY DISTRICT NO. 1 OF CHELAN COUNTY
WENATCHEE, WASHINGTON

LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP GROUP CAMP ELECTRICAL ONE-LINE DIAGRAM & DETAILS BID NO.14-31	SHEET E12 OF E13
	REVISION 0
	DATE 11/14/2014
	DWG. 0913-50SU-0023



ORIG. DRAWN
DATE

GENERAL NOTES:

- 1. PANEL SCHEDULE BASED ON EXISTING AS-BUILT DRAWINGS. CONTRACTOR SHALL CONFIRM ALL CIRCUITING IN FIELD PRIOR TO DEMOLITION.

DEMOLITION KEY NOTES:

- 1. EXTEND MAINTAINED CIRCUITS TO NEW PANEL AND TERMINATE. CONTRACTOR SHALL MATCH EXISTING RACEWAY AND CONDUCTOR SIZE.

PANEL: A1		PANEL SCHEDULE								PROJECT: LINCOLN ROCK 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 - MAIN	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	6	
7	SHOWER METER	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	PUBLIC TELEPHONE	12	
13	SPARE	---	---	20	1	A	1	20	R	500	IRRIGATION CONTROL	14	
15	HAND DRYER - MENS MAIN	2,400	H	30	1	B	1	30	H	2,400	HAND DRYER - WOMENS MAIN	16	
17	HAND DRYER - MENS MAIN	2,400	H	30	1	A	1	30	H	2,400	HAND DRYER - WOMENS MAIN	18	
19	MEN'S HEATER	2,500	H	30	2	B	2	15	H	1,000	MECH RM HEATER	20	
21	---	2,500	H	---	---	A	---	---	H	1,000	---	22	
23	WOMEN'S HEATER	2,500	H	30	2	B					SPACE	24	
25	---	2,500	H	---	---	A					SPACE	26	
27	SPACE					B					SPACE	28	
29	SPACE					A					SPACE	30	
31	EF-1 - MAIN SHOWERS	100	M	20	1	B	1	20	M	696	SF-1	32	
33	EF-1 - FAMILY SHOWERS	150	M	20	1	A	1	20	R	500	TOKEN DISPENSER BC-1	34	
35	HAND DRYER - FAMILY 1	550	H	20	2	B	1	20	R	360	SHOWER RM RECEPTACLES	36	
37	---	550	H	---	---	A	1	20	R	180	UTILITY RECEPTACLE	38	
39	HAND DRYER - FAMILY 2	550	H	20	2	B	1	20	R	1,200	SHOWER SYSTEM CONTROLLER	40	
41	---	550	H	---	---	A	1	20	L	100	SITE LIGHTING - BOLLARD, KIOSK	42	

TOTAL CONNECTED LOAD:	PH A	15,900 VA	132.5 AMPS	DATE: November 19, 2014
TOTAL CONNECTED LOAD:	PH B	16,696 VA	139.1 AMPS	
MAX PHASE CONNECTED LOAD:	PH B	16,696 VA		PANEL RATING: 22,000 AIC
TOTAL CONNECTED LOAD (2 x MAX):		33.4 kVA	139.1 AMPS	TOTAL DEMAND LOAD: 32.8 kVA 136.7 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	1,310 VA	0 VA	1,310 VA	125%	1,638 VA
R RECEPTACLES	5,320 VA	0 VA	5,320 VA	100%	5,320 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	23,800 VA	0 VA	23,800 VA	100%	23,800 VA
M MOTORS	946 VA	0 VA	946 VA	100%	946 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)	0 VA	0 VA	0 VA	125%	0 VA
N NON-COINCIDENT	0 VA	0 VA	0 VA	0%	0 VA
TOTAL:	32,596 VA	0 VA	32,596 VA		32,814 VA

- NOTES:
1. NEMA 1G ENCLOSURE
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.

NEW PANEL SCHEDULE A1
SCALE: NONE

PANEL: MDP		PANEL SCHEDULE								PROJECT: LINCOLN ROCK 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	SURGE PROTECTION					2	A	2	300	WH	27,000	WATER HEATER WH-1	2
3	---					---	B	---	---	WH	27,000	---	4
5	RV-G1	4,800	G	50	2	A	2	200	S	15,900	SUB FEED PANEL A1	6	
7	---	4,800	G	---	---	B	---	---	S	16,696	---	8	
9	RV-G2	4,800	G	50	2	A	2	70	H	6,000	EDC-1	10	
11	---	4,800	G	---	---	B	---	---	H	6,000	---	12	
13	RV-G3	4,800	G	50	2	A					SPACE	14	
15	---	4,800	G	---	---	B					SPACE	16	
17	SPARE - FUTURE RV			50	2	A					SPACE	18	
19	---			---	---	B					SPACE	20	
21	PICNIC SHELTER NORTH	2,400	R	50	2	A					SPACE	22	
23	---	2,400	R	---	---	B					SPACE	24	
25	PICNIC SHELTER SOUTH	2,400	R	50	2	A					SPACE	26	
27	---	2,400	R	---	---	B					SPACE	28	
29	SPACE					A					SPACE	30	

TOTAL CONNECTED LOAD:	PH A	68,100 VA	567.5 AMPS	DATE: November 19, 2014
TOTAL CONNECTED LOAD:	PH B	68,896 VA	574.1 AMPS	
MAX PHASE CONNECTED LOAD:	PH B	68,896 VA		PANEL RATING: 42,000 AIC
TOTAL CONNECTED LOAD (2 x MAX):		137.8 kVA	574.1 AMPS	TOTAL DEMAND LOAD: 134.1 kVA 558.8 AMPS

	CONNECTED LOADS	SUBFED LOADS [S]	TOTAL LOADS	DEMAND FACTOR	DEMAND LOAD
G GENERAL (RV PEDESTALS)	28,800 VA	500 VA	29,300 VA	80%	23,440 VA
L LIGHTING	0 VA	1,310 VA	1,310 VA	125%	1,638 VA
R RECEPTACLES	9,600 VA	5,320 VA	14,920 VA	100%	14,920 VA
RECEPTACLES OVER 10 kVA	0 VA	0 VA	4,920 VA	50%	2,460 VA
K KITCHEN	0 VA	0 VA	0 VA	100%	0 VA
H HEATING	12,000 VA	23,800 VA	35,800 VA	100%	35,800 VA
M MOTORS	0 VA	946 VA	946 VA	100%	946 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	0 VA	0 VA	125%	0 VA
N NON-COINCIDENT	0 VA	0 VA	0 VA	0%	0 VA
TOTAL:	104,400 VA	32,596 VA	141,916 VA		134,104 VA

- NOTES:
1. PROVIDE SURGE PROTECTIVE DEVICE FOR SERVICE PANEL
 2. RV DEMAND FACTOR PER NEC TABLE 551.73
 3. NEMA 1G ENCLOSURE
 4. SERVICE RATED
 - 5.
 - 6.

NEW PANEL SCHEDULE MDP
SCALE: NONE



CONSULTANT

PRIM. ENG. BRIAN ZIESMER	CHELAN PUD NO.1
2ND ENG. WESLEY WARD	PRIM. ENG. C. HILL
DESIGNER WESLEY WARD	2ND ENG. C. HILL
APPROVAL BRIAN ZIESMER	PROJ. MGR. C. HILL

SCALE AS NOTED	0 1" = 1'
REV	DATE

BID SET	11/14/14
REVISION	
REQ. BY	DRFT



LINCOLN ROCK STATE PARK CABIN LOOP & GROUP CAMP GROUP CAMP ELECTRICAL PANEL SCHEDULES BID NO.14-31
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SHEET E13 OF E13
REVISION 0
DATE 11/14/2014
DWG. 0913-50SU-0024

