

Project Manual

for

Chehalis Pump Station

Project Numbers:

WO 11.1003

January 2020

Prepared By



SCJ ALLIANCE

CONSULTING SERVICES

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Project Manual

Chehalis Pump Station

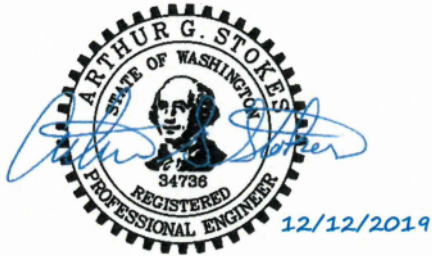
January 2020

Client Agency:
City of Chehalis

Contracting Agency:
City of Chehalis
Public Works

Approved by Dave Vasilauskas, P.E., Project Manager

The project electrical design, water analyzer and pump relay engineering material and data contained in this project manual were prepared under the supervision and direction of the undersigned, whose seal as registered professional engineer is affixed below.



Art Stokes, P.E

Site Electrical, Water Analyzer and Controls

12/12/2019

Project Manual

Chehalis Pump Station

January 2020

Client Agency:
City of Chehalis

Contracting Agency:
City of Chehalis
Public Works

Approved by Dave Vasilauskas, P.E., Project Manager

The structural design engineering material and data contained in this project manual were prepared under the supervision and direction of the undersigned, whose seal as registered professional engineer is affixed below.



Mark Leingang, P.E., S.E.



Structural Engineering

12/10/2019

Project Manual

Chehalis Pump Station

January 2020

Client Agency:
City of Chehalis

Contracting Agency:
City of Chehalis
Public Works

Approved by Dave Vasilauskas, P.E., Project Manager

The engineering material and data contained in this project manual were prepared under the supervision and direction of the undersigned, whose seals as registered professional engineers are affixed below.



Robert G. Connolly, P.E



1/03/2020

Site Civil, Piping and Pumps

1/03/2020

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City of Chehalis

Booster Pump Station

January 2020

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END OF SECTION



Notice to Bidders-Request for Proposals
City of Chehalis
Chehalis Pump Station Project
Bid Due Date: February 11, 2020; 2:00 PM

Sealed bids for furnishing all materials, labor and equipment for the following described work will be received by the City Clerk of the City of Chehalis, 350 North Market Blvd., Rm 101, Chehalis, WA 98532, until **2:00 pm, February 11, 2020**. Proposals received after this time will not be considered. At this time the sealed bids will be publicly opened and read aloud. Bids must be sealed and clearly marked with the project title, bid opening date, and the name and address of the bidder.

The project involves building a proposed pump station to replace an existing pump station located 405 Parkhill Dr, Chehalis, WA. The proposed pump station will be located approximately 50 feet west of the existing pump station, adjacent to a dead-end, gravel-surfaced access road. Steep slopes are present above and below the project site and cut-construction and a retaining wall will be required.

Bid documents may be obtained at no cost in pdf format only at <http://www.ci.chehalis.wa.us/rfps>, or by contacting the city clerk at cfoley@ci.chehalis.wa.us or 360-345-1042. Please contact SCJ Alliance for a paper copy. A \$35 non-refundable fee will be required.

It is the sole responsibility of each Bidder to learn of Addenda, if any. Such information may be obtained from the city's website. Bidders are encouraged to "Register as Bidder" with the City Clerk to receive automatic email notification of future addenda and be placed on the "Bidders List." The City of Chehalis accepts no responsibility or liability and will provide no accommodation to Bidders who fail to check for addenda and submit inadequate or incorrect responses.

All bidders are required to use the forms furnished by the City and to bid each item in the manner shown on the bid form.

Upon award of the contract a performance and payment bond, meeting the requirements of the bid documents, will be required.

This project involves public work and as such is subject to prevailing wages. The current list of Washington State Prevailing Wages is included as part of the bid document.

Retainage of five percent (5%) will be held until releases are received from the State Departments of Employment Security, Labor & Industries, and Revenue.

Any technical questions regarding the contract documents should be directed to the City's Property/Facilities Dave Vasilauskas at 360-354-1226.

A pre-bid walk-through will be held for all prospective bidders on at the existing pump station located at 405 Parkhill Dr in Chehalis at **10:00 am on January 28, 2020**. Attendance is encouraged but not required in order to submit a bid.

Each bid must be accompanied by a cashier's check, postal money order, or surety bond by a bonding company licensed to do business in the State of Washington, made payable to the City of Chehalis in an amount not less than five percent (5%) of the total bid.

No bidder may withdraw their proposal after the time set for the opening thereof, or before award of contract without approval of the City of Chehalis.

The City of Chehalis hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in response to this invitation, and will not be discriminated against on the grounds of age, race, creed, color, sex, national origin, sexual orientation, marital status, or the presence of any physical, mental, or sensory disability in consideration for an award. The City of Chehalis encourages contracting procedures which provide MWBE's equal opportunity to participate as subcontractors on City contracts.

All contracts with a value greater than \$1,000 and lasting 60 days shall require that the awarded contractor register with the Department of Homeland Security E-Verify program. Contractors shall have 30 calendar days after the execution of the contract to register and enter into a Memorandum of Understanding (MOU) with the Department of Homeland Security (DHS) E-Verify program. After completing the MOU the contractor shall have up to 90 calendar days to begin using E-Verify and provide a written record on the authorized employment status of their employees and those of any subcontractor(s) currently assigned to the contract.

The City reserves the right to award the bid to the lowest responsible bidder, waive informalities, or reject any or all bids.

By: Caryn Foley, City Clerk

Dates of publication:

The Chronicle – Tuesday, January 14 & 21, 2020

Seattle Daily Journal of Commerce – Tuesday, January 14 & 21, 2020

Portland Daily Journal of Commerce – Wednesday, January 15 & 22, 2020



**City of Chehalis
Pump Station Project
Instructions to Bidders, General Conditions**

PLEASE READ FULLY AND CAREFULLY. BIDS SHALL BE COMPLETE UPON SUBMISSION, INCLUDING ALL FORMS AND ATTACHMENTS REQUIRED HEREIN. FAILURE TO STRICTLY COMPLY WITH THESE STATED TERMS OF SUBMISSION MAY RESULT IN REJECTION OF THE BID.

General Conditions

Bid documents shall be on file at the City Clerk's Office, Chehalis City Hall, 350 N. Market Blvd., Chehalis, WA 98532, from 8:00 am to 5:00 pm, Monday through Friday, and available to interested individuals and entities ("Bidders") from the date issued until the due date and time.

Bidders are expected to examine all documents that comprise this invitation to Bid. Bidders shall promptly notify the City of any omission, ambiguity, inconsistency, or error that they may discover upon examination of the Bid documents. The City assumes no responsibility for errors or misrepresentations that result from the use of incomplete Bids.

All Bids shall be submitted on the attached response forms. Faxed or emailed Bids and/or late submissions will not be accepted. Bids must be received by the City Clerk at or before **2:00 pm on February 11, 2019**. Each Bid must be submitted in a sealed envelope clearly identified as "Chehalis Pump Station" and delivered to:

City of Chehalis
Caryn Foley, City Clerk
350 N. Market Blvd., Rm. 101
Chehalis, WA 98532

Each Bid must be accompanied by a cashier's check, postal money order, or surety bond by a bonding company licensed to do business in the State of Washington, made payable to the City of Chehalis in an amount not less than five percent (5%) of the total bid.

During the pendency of this Invitation to Bid, Bidder shall not contact any City staff except those designated in this Bid document or subsequent addendums or correspondence. Any questions or concerns should be addressed in writing to the City's Property/Facilities Manager, Dave Vasilauskas at 350-345-1226 at least five (5) business days prior to the due date outlined herein. Non-compliance with this provision may result in rejection of the Bid.

Addenda will be issued if necessary and posted on the City's website at www.ci.chehalis.wa.us.

All information required, unless otherwise specified, must be completed on the forms provided by the City. Failure to manually sign the Bid Response Acknowledgment Form of this Bid document will disqualify Bidder. Persons signing the Bid shall have the authority to sign the Bid on Bidder's behalf and shall be an officer or person authorized to bind the entity they represent to this Bid.

Each and every deviation from the terms, conditions, specifications, or performance requirements of this Bid shall be listed on the Deviation Acknowledgment Form of this Bid document upon submission of the Bid. Listing of deviations is an integral and required part of the Bid. Any deviations not listed on the Deviation Acknowledgment Form of this Bid document upon submission of the Bid will not become part of the contract awarded by the City pursuant to this Bid.

Bids shall be submitted by **2:00 pm on February 11, 2020**. Bids cannot be altered or amended after the deadline. Alterations made before opening must be signed by the Bidder or Bidder's agent. No Bid may be withdrawn after the date and time of opening without approval of the City.

The City reserves the right to accept and/or reject any and all submitted Bids or any part thereof, waive immaterial errors, and award the contract in the best interest of the City.

The City shall be sole interpreter of the terms, conditions, specifications, and performance requirements of this Bid.

An opened Bid may not be changed for the purpose of correcting any error by the Bidder or Bidder's agent.

If, at any time, the successful Bidder fails to fulfill or abide by the terms, conditions, specifications, or performance requirements of this Bid, or any contract awarded and entered pursuant thereto, the City reserves the right to:

- Deduct charges from successful Bidder's invoice at the time it is due; or
- Cancel the contract at the City's convenience, without penalty, by furnishing written notice of termination to Bidder, and select another Bid and award a contract to its Bidder pursuant to the terms thereof.

At the City's sole discretion and convenience, the City may terminate any awarded contract without regard to cause, without prior notice, and without penalty, and pay for authorized services provided to the date of termination.

If it is determined that any benefit to secure favorable treatment was offered, elicited, or provided by Bidder or Bidder's employee, affiliate, representative, partner, subcontractor, or agent, to any officer or employee of the City, Bidder will be disqualified from consideration and/or the awarded contract will be terminated.

All goods, raw materials, and products provided pursuant to the awarded contract must be new and not used, shop worn, or reconditioned.

All work must be in compliance with and conform to any and all applicable state or local laws, ordinances,

regulations, codes, rules, policies, and interpretations thereof.

Once a Bid has been selected, items or processes may be substituted only by furnishing an equal or superior quality and/or grade product or process than originally specified at no additional cost to the City. Any such substitution shall be pre-approved by the City, and the acceptance of any such substitution shall be at the City's sole discretion.

Any contract awarded pursuant to this Bid is not assignable.

Contractor must include appropriate Washington State Sales Tax (8.2% for contract).

Include any Material Safety Data Sheets (MSDS), if applicable.

Undisputed payments will be submitted to Bidder within thirty (30) days from receipt of original invoice.

Trade secrets and confidential information contained in a Bid may be open to public inspection. Pricing is not confidential information. Bidders who include information in a Bid that is legally protected as a trade secret or confidential information must clearly indicate the specific protected information by highlighting that information and marking it "Trade Secret" or "Confidential" at the appropriate place. The City will not be responsible for any public disclosure of the trade secret or confidential information if it is not marked as provided above. An awarded Bid in its entirety is not confidential.

Any contract awarded under this Bid shall be governed by the laws of the State of Washington.

Bidder agrees not to discriminate against any employee or applicant for employment because of race, religion, color, sex, age, disability, or national origin. Bidder agrees to comply with the Immigration Reform and Control Act of 1986 and the Americans with Disabilities Act of 1990, and Bidder will indemnify and hold City harmless for any failure to so comply and any discrimination for which Bidder may be charged.

Special Conditions

SCOPE OF WORK

Bidder shall provide pump station construction for the City of Chehalis, as per the specifications listed in this document.

Bidder shall be solely responsible for scheduling and coordinating the work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of the work under a direct or indirect contract with Bidder.

Bidder shall submit a list of subcontractors and/or suppliers performing work on this project for acceptance by City.

All potential bidders are encouraged to attend a non-mandatory pre-bid walk through at the Existing Pump Station located at 405 Parkhill Dr, Chehalis, WA 98532 on at **10:00 am on January 28, 2020**.

Bidder shall start work within 10 days of the Notice to Proceed and will complete work within 155 calendar days.

The successful Bidder shall be and shall remain an independent contractor throughout the term of any contract awarded pursuant to this Bid.

The successful Bidder shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the work.

Contractor Training

Beginning July 1, 2019, businesses not listed on the WA State Department of Labor & Industries "*Public Works Training Exemption List*" are required to have training before submitting a bid and/or performing work on public works projects. Awarding agencies are required to verify all contractors submitting bids meet this new requirement before awarding the contract. Businesses that have been in business with an active Unified Business Identifier (UBI) number for three (3) or more years, AND have performed work on three (3) or more public works projects, are exempt from these training requirements. Training options are available at <https://www.lni.wa.gov/TradesLicensing/PrevWage/Contractors/Training.asp>.

INSURANCE

The Contractor shall, at Contractor's expense, obtain and keep in force at all times during the term of this contract, Comprehensive General Liability, Employer's Liability, Workmen's Compensation, Public Liability and Property Damage insurance with an insurance carrier acceptable to the city, including broad from general liability endorsement and contractual liability on an occurrence basis and comprehensive auto liability, including owned, non-owned and hired vehicles with the limits of not less than ONE MILLION (\$1,000,000) DOLLARS combined single limit insuring City and Contractor against any liability arising out of the use occupancy or maintenance of contract site. The limit of said insurance shall not, however, limit the liability of the Contractor hereunder. The Contractor agrees to furnish the City certificates of insurance or other evidence satisfactory to the City to the effect that such insurance has been procured and is in force.

PERFORMANCE AND PAYMENT BONDS

If awarded the contract, Bidder shall provide a performance bond and payment bond, or Letter of Credit, and each shall be issued in an amount equal to the contract amount as security for the faithful performance and/or payment of all obligations. Performance and payment bonds shall be issued by a solvent company authorized to do business in the State of Washington and shall meet any other requirements established by law or by City pursuant to applicable law.

E-VERIFICATION

All contracts with a value greater than \$1,000 and lasting 60 days shall require that the awarded contractor register with the Department of Homeland Security E-Verify program. Contractors shall have 30 calendar days after the execution of the contract to register and enter into a Memorandum of Understanding (MOU) with the Department of Homeland Security (DHS) E-Verify program. After completing the MOU the contractor shall have up to 90 calendar days to begin using E-Verify and provide a written record on the authorized employment status of their employees and those of any subcontractor(s) currently assigned to the contract.

DAMAGE PROVISION

If in performance pursuant to an awarded contract, successful Bidder, or Bidder's employee, affiliate, representative, partner, subcontractor, or agent, damages the City's real or personal property, including but not limited to tile and concrete, Bidder shall compensate the City for the cost of repair or replacement, whichever the City determines is appropriate under the circumstances. In such event, the City will provide to successful Bidder an invoice stating the actual cost of repairing or replacing the damaged property. Successful Bidder shall provide payment of the invoiced amount within thirty (30) days of its receipt of said invoice. Should successful Bidder refuse to compensate the City for the damage incurred, said invoiced amount shall be withheld from the amount payable to successful Bidder for services rendered pursuant to the awarded contract. This provision does not waive or diminish the City's right to pursue any and all legal remedies to collect for damages caused by Bidder, or Bidder's employee, affiliate, representative, partner, subcontractor, or agent.

BID TERMS

By signing and submitting this Bid, Bidder agrees:

- To furnish goods and services in strict compliance with the terms, conditions, Specifications, and performance requirements of this Bid.
- That payment(s) will only be made from an original invoice, not from any statement, and invoices for payment shall be submitted via mail, courier, or personal delivery to the Property/Facilities Manager.
- The City shall notify the successful Bidder of any contested invoice(s) in writing, and the City and successful Bidder shall mutually resolve such disputed invoice(s) within sixty (60) days of successful Bidder's receipt of said notice of dispute.

The Contractor shall be licensed to perform all services in the state of Washington, and selected Contractor shall submit, prior to contract award, project relevant certifications, licenses, and proof of insurance. The Contractor keep in force all licenses, business permits and other permits required to

perform the services of this contract in accordance with the requirements of said permits.

EXAMINATION OF THE CONTRACT DOCUMENTS AND PROJECT SITES

Each potential Contractor shall inform themselves fully of the nature of the conditions and peculiarities of the site. Failure to do so will not relieve the Contractor submitting a successful Bid from carrying out any of the provisions and obligations of any subsequent contract. It is the responsibility of the Bidder to:

- Thoroughly examine the Contract Documents.
- Visit the site and become familiar with the existing conditions and the scope of the project work; and become familiar with the surrounding conditions that may affect the cost, progress, performance or furnishing of the work. If Bidder is unable to attend the **January 28, 2020** pre-bid walk-through, tours of the site may be scheduled by appointment by calling Property/Facilities Manager Dave Vasilauskas at 360-345-1226.
- Consider all federal, state and/or local laws and regulations that may affect the cost, progress, performance or furnishing of the work.
- Study and carefully correlate the Bidders observations with the Contract Documents.
- Notify the City of all conflicts, errors or discrepancies found in the Contract Documents.

INDEMNITY

The contractor will indemnify and save harmless the City, its officers, agents, servants, and employees from and against any and all suits, actions, legal proceedings, claims, demands, damages, costs, expenses, and attorneys' fees to the extent resulting from a willful or negligent act or omission of the Contractor, its officers, agents, servants, and employees in the performance of this Contract; provided, however, that the Contractor shall not be liable for any suits, actions, legal proceedings, claims, demands, damages, costs, expenses and attorneys' fees arising out of the award of this Contract or a willful or negligent act or omission of the City, its officers, agents, servants and employees.

INVOICES

The Contractor may submit monthly invoices.

RETAINAGE

Retainage of five percent (5%) will be held by the City of Chehalis until releases are received from the State Departments of Employment Security, Labor & Industries, and Revenue.

PREVAILING WAGES

All Bids are subject to Washington State prevailing wages. The current list of Washington State prevailing wages is included as part of these Bid Plans and Specifications.

BASIS FOR SELECTION

Bids received by the City shall be evaluated based on the following criteria:

1. Bid amount
2. Contractor's qualifications
3. Understanding and responsiveness to the City's objectives
4. Materials and method(s) for conducting the project

The decision of the City to award a contract shall not be subject to legal challenge or appeal in any form. Whenever it is deemed to be in the best interest of the City, the City Council shall waive informalities in any and all Bids. The right is reserved to reject any Bid or any part of any Bid when such action is deemed to be in the best interest of the City of Chehalis. Bids must be submitted complete in every detail and, when requested, supporting or supplemental information shall be provided. If a Bid involves any exception from stated requirements, they must be clearly noted as exceptions and listed in the Bid. The reason for any exception shall also be stated.

SIGNING OF THE AGREEMENT

When the City submits to the Successful Bidder the "Notice of Award" and Agreement for execution, it will be in the number of copies necessary, all of which shall be signed and shall constitute an original Agreement. Within five days thereafter, the Successful Bidder shall sign and deliver all copies of the Agreement to the City, accompanied by a certificate of insurance. The City, within three days thereafter, shall return to the Successful Bidder a fully executed copy of the agreement.

The City of Chehalis reserves the right to reject any and all Bids, to waive technical or legal deficiencies, to make such investigation as it deems necessary to evaluate Contractor's qualifications, to accept any Bid that may be deemed in the best interest of the City and to negotiate terms and conditions of any Bid leading to acceptance and final execution of a contract for services.

Bid Form

The City of Chehalis is seeking a contractor or contractors to build a pump station to replace the pump station located at 405 Parkhill Dr, Chehalis, WA. The Bidder further agrees to begin work within 10 calendar days after the date of the Notice to Proceed with Construction issued by the Owner, and to complete the construction, in all respects, within 150 calendar days from the effective date of the Notice to Proceed. The owner shall assess Liquidated Damages based upon the Standard Specification Rate, as defined in Section 1-08.9 of the WSDOT Standard Specifications.

Base Bid Chehalis Pump Station. Bidder shall:

- Be responsible for removal and proper disposal of all construction refuse from jobsite.
- Prepare site, grade, and build the proposed pump station per the Plans and Specifications herein.

Any alterations or deviation from above specifications must be noted on the Deviation Acknowledgment Form in this Bid document.

Base Bid	\$ _____ Lump Sum
Sales Tax (8.2%)	\$ _____ Lump Sum
Total Bid	\$ _____ Lump Sum

Bid Response Acknowledgement

By signing and submitting this Bid, Bidder acknowledges that they have inspected the specifications, are capable and willing to perform and/or provide the required services and/or products, and shall complete this project within the amount of time and dollar amount specified. The undersigned certifies that the prices contained in this Bid have been carefully checked and submitted as correct and final. All unit prices include the cost of delivery. The undersigned is authorized to bind themselves or the entity they represent to a contract.

_____ Individual Proprietorship

_____ Partnership

_____ Corporation chartered under the laws of the State acting by its officers pursuant to its bylaws or a resolution of its Board of Directors

Signature: _____

Printed Name: _____

Title: _____

Date: _____

References

Bidder shall submit a list of at least three (3) references for which Bidder has provided like products or services, including contact name and telephone number. Bids submitted without three references may be disqualified from consideration. Western Washington area references are preferred.

Company: _____

Contact name: _____

Phone number: _____

Company: _____

Contact name: _____

Phone number: _____

Company: _____

Contact name: _____

Phone number: _____

Deviation or Compliance Acknowledgement

DEVIATIONS: In the event the undersigned Bidder intends to deviate from the general terms, conditions, special conditions or specifications contrary to those listed herein and other information attached hereto, all such deviations must be LISTED ON THIS PAGE, with complete and detailed conditions and information. (Attach additional pages as necessary).

NO DEVIATIONS: In the absence of any deviation entry on this page, Bidder assures the City of Bidder's compliance with the terms, conditions, specified pumps and pump controls per Special Specifications Section 22 11 23, and information contained in this Bid.

List here:

All Bidders MUST COMPLETE this page.

This form must be returned with Bid or else the Bid will be considered as Non-responsive.

By initialing below, Bidder acknowledges:

_____ Bid is submitted according to deviations listed above.
Initial

_____ Bid is submitted with no deviations.
Initial

Suspension or Debarment Certificate

Non-federal entities are prohibited from contracting with or making subcontract awards under covered transactions to parties that are suspended or debarred or whose principals are suspended or debarred. Covered transactions include procurement for goods or services equal to or in excess of \$100,000.00. Contractors receiving individual awards for \$100,000.00 or more and all subcontract recipients must certify that the organization and its principals are not suspended or debarred.

By submitting this offer and signing this certificate, Bidder certifies that no suspension or disbarment is in place, which would preclude receiving a federally funded contract under the Federal OMB, A-102, Common Rule.

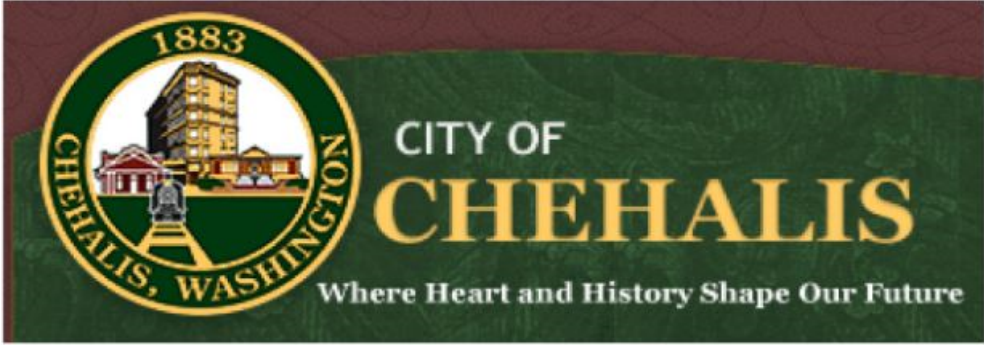
Company Name: _____

Signature of Company Officer: _____

Title: _____

Company Officer Printed Name: _____

E-mail Address: _____



CHEHALIS PUMP STATION

PROPOSAL SIGNATURE FORM

Date: _____

To: City of Chehalis

The bidder is hereby advised that by signature of this Project Proposal he/she is deemed to have acknowledged all requirements and signed all certificates contained herein.

** Receipt is hereby acknowledged of addendum(s) N_o _____, _____ & _____

SIGNATURE OF AUTHORIZED OFFICAL (S)

FIRM NAME _____

(ADDRESS) _____

DEPOSIT OR BID BOND FORM

DEPOSIT STATEMENT

Herewith find deposit in the form of certified check or cashier's check in the amount of \$ _____, which amount is not less than **five percent** of the Base Bid Amount.

Sign Here _____

BID BOND

KNOWN ALL MEN BY THESE PRESENTS:

That we, _____, as Principal, and _____, as Surety, are held firmly bound unto _____, Washington, as Oblige, in the penal sum of _____ Dollars, (**five percent** of the Base Bid Amount) for the payment of which the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally by these presents.

The condition of this obligation is such that if the Oblige shall make any award to the Principal for **TAXIWAY REALIGNMENT at CHEHALIS-CENTRALIA AIRPORT (AIP Project No. 3-53-0012-018-2018)** according to the terms of the bid made by the Principal therefore, and the Principal shall duly make and enter into a Contract with the Oblige in accordance with the terms of said bid and award and shall provide Certificate of Insurance And Contract Bond for the faithful performance of the Contract, with Surety or Sureties approved by the Oblige, or if the Principal shall, in case of failure to so do, pay and forfeit to the Oblige the penal amount of the deposit specified in the Call for Bids, then this obligation shall be null and void; otherwise it shall be and remain in full force and effect and the Surety shall forthwith pay and forfeit to the Oblige, as penalty and liquidated damages, the amount of this bond.

SIGNED, SEALED AND DATED THIS _____ DAY OF _____, 20 _____.

Principal

Surety

Received return of deposit in the sum of \$ _____.

Note: This Bid Form must be completed in its entirety and submitted to bid the work.

Local Agency Name
Local Agency Address

Local Agency Subcontractor List

Prepared in compliance with RCW 39.30.060 as amended

To Be Submitted with the Bid Proposal

Project Name _____

Failure to list subcontractors with whom the bidder, if awarded the contract, will directly subcontract for performance of the work of heating, ventilation and air conditioning, plumbing, as described in Chapter 18.106 RCW, and electrical, as described in Chapter 19.28 RCW or naming more than one subcontractor to perform the same work will result in your bid being non-responsive and therefore void.

Subcontractor(s) with whom the bidder will directly subcontract that are proposed to perform the work of heating, ventilation and air conditioning, plumbing, as described in Chapter 18.106 RCW, and electrical as described in Chapter 19.28 RCW **must** be listed below. The work to be performed is to be listed below the subcontractor(s) name.

To the extent the Project includes one or more categories of work referenced in RCW 39.30.060, and no subcontractor is listed below to perform such work, the bidder certifies that the work will either (i) be performed by the bidder itself, or (ii) be performed by a lower tier subcontractor who will not contract directly with the bidder.

Subcontractor Name _____
 Work to be Performed _____

Subcontractor Name _____
 Work to be Performed _____

Subcontractor Name _____
 Work to be Performed _____

Subcontractor Name _____
 Work to be Performed _____

Subcontractor Name _____
 Work to be Performed _____

* Bidder's are notified that is the opinion of the enforcement agency that PVC or metal conduit, junction boxes, etc, are considered electrical equipment and therefore considered part of electrical work, even if the installation is for future use and no wiring or electrical current is connected during the project.

SECTION 00 43 73
SCHEDULE OF VALUES

As part of the overall Base Bid, and any Bid Alternates, the Bidder shall assign lump costs to the line items listed in the following Schedule of Values.

At the end of each month of construction the Contractor will submit an estimated percentage complete for the budget of each line item shown in the Schedule of Values. The Contracting Agency will then review and confirm if the Contractor percentage complete listed on the schedule corresponds to the actual work performed, including materials on hand.

- | | |
|---|-------|
| 1. Mobilization | _____ |
| 2. Clearing, grubbing & Demolition | _____ |
| 3. Erosion Control | _____ |
| 4. Earthwork (cut & fill) | _____ |
| 5. Retaining wall | _____ |
| 6. Storm Drainage System | _____ |
| 7. Pump House | _____ |
| 8. Water main including taps and 23appurtenances | _____ |
| 9. Duplex Water Pump System & controller | _____ |
| 10. Pump House Electrical, including design | _____ |
| 11. Pump House plumbing, complete | _____ |
| 12. Chlorine injection system complete
w/pump, meter, tank, etc. | _____ |
| 13. Water analyzer for pH, NTU and Chlorine complete | _____ |
| 14. Electrical hardware and installation | _____ |
| 15. Telemetry, including design | _____ |

16. Cement Concrete slab including reinforcing	_____
17. HMA and gravel Paving	_____
18. Fencing including gates	_____
19. Topsoil, Seeding Fertilizing and Mulching	_____
20. Surveying	_____
21. Clean-Up	_____
22. System disinfection & testing	_____
23. System Start-up	_____
24. As-built drawings	_____
25. Operation & Maintenance Manual	_____
26. Incidentals ¹	_____
<hr/>	
Total Base Bid (must match total on Bid Form)	_____

End of Section

¹ Includes all work not specifically listed above, including all costs for L&I electrical permits & special inspections. Contractor to complete all necessary City applications. However, City will pay all City Application fees directly

CONTRACT

This Contract, made and entered into this _____ day of _____, 20____, by and between the **CITY OF CHEHALIS**, a municipal corporation, hereinafter called the "Owner," and _____ of _____ hereinafter called the "Contractor";

WITNESSETH:

The Contractor, in consideration of the sum to be paid him by the Owner and of the covenants and agreements herein contained, hereby agrees at his own proper cost and expense to do all the work and furnish all the materials, tools, labor, and all appliances, machinery, and appurtenances for construction of "**TAXIWAY REALIGNMENT**", to the extent of the Proposal made by the Contractor, dated the _____ day of _____, 20____, all in full compliance with the Contract Documents referred to herein.

The BIDDING REQUIREMENTS, including the signed copy of the Proposal, the CONTRACT FORMS, the CONDITIONS OF THE CONTRACT, the SPECIFICATIONS, and the DRAWINGS, which consist of 43 sheets entitled "**TAXIWAY REALIGNMENT**", dated _____, 20____, are hereby referred to and by reference made a part of this Contract as fully and completely as if the same were fully set forth herein and are mutually cooperative therewith.

In consideration of the performance of the work as set forth in these Contract Documents, the Owner agrees to pay to the Contractor the amount bid in the Proposal as adjusted in accordance with the Contract Documents, or as otherwise herein provided, and to make such payments in the manner and at the times provided in the Contract Documents.

The contractor, sub-recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of Department of Transportation assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

The Contractor agrees to complete the work within the time specified herein and to accept as full payment hereunder the amounts computed as determined by the Contract Documents and based on the said Proposal.

Effective June 21st, 2010, all contracts with a value of \geq \$100,000 shall require that the awarded contractor register with the Department of Homeland Security E-Verify program. Contractors shall have sixty days after the execution of the contract to register and enter into a Memorandum of Understanding (MOU) with the Department of Homeland Security (DHS) E-Verify program. After completing the MOU the contractor shall have an additional sixty days to provide a written record on the authorized employment status of their employees and those of any sub-contractor(s) currently assigned to the contract. Employees hired during the execution of the contract and after submission of the initial verification will be verified to the City within 30 days of hire, as reported from the E-Verify program. The contractor will continue to update the City on all corrective actions required and changes made during the performance of the contract.

The Contractor agrees to remedy all defects appearing in the work or developing in the materials furnished and the workmanship performed under this Contract for a period of 1 year after the date of acceptance of the work by the Owner, and further agrees to indemnify and save the Owner harmless from any costs encountered in remedying such defects.

It is agreed the time limit for completion of the Contract, based upon the Proposal, shall be 62 calendar days from the "Notice to Proceed" date.

In the event that the Contractor shall fail to complete the work within the time limit or the extended time limit agreed upon, as more particularly set forth in the Contract Documents, liquidated damages shall be paid at the rates shown in the General Provisions. Sundays and legal holidays shall be excluded in determining days in default.

Attorney Fees: In the event that any suit, action, or arbitration is brought by the parties arising out of this Agreement, the prevailing party shall recover such reasonable attorney fees as shall be set by the trial court and any court of appeal.

IN WITNESS WHEREOF:

We, the parties hereto, each herewith subscribe the same this ___ day of _____, A.D., 20__.

OWNER _____

CONTRACTOR

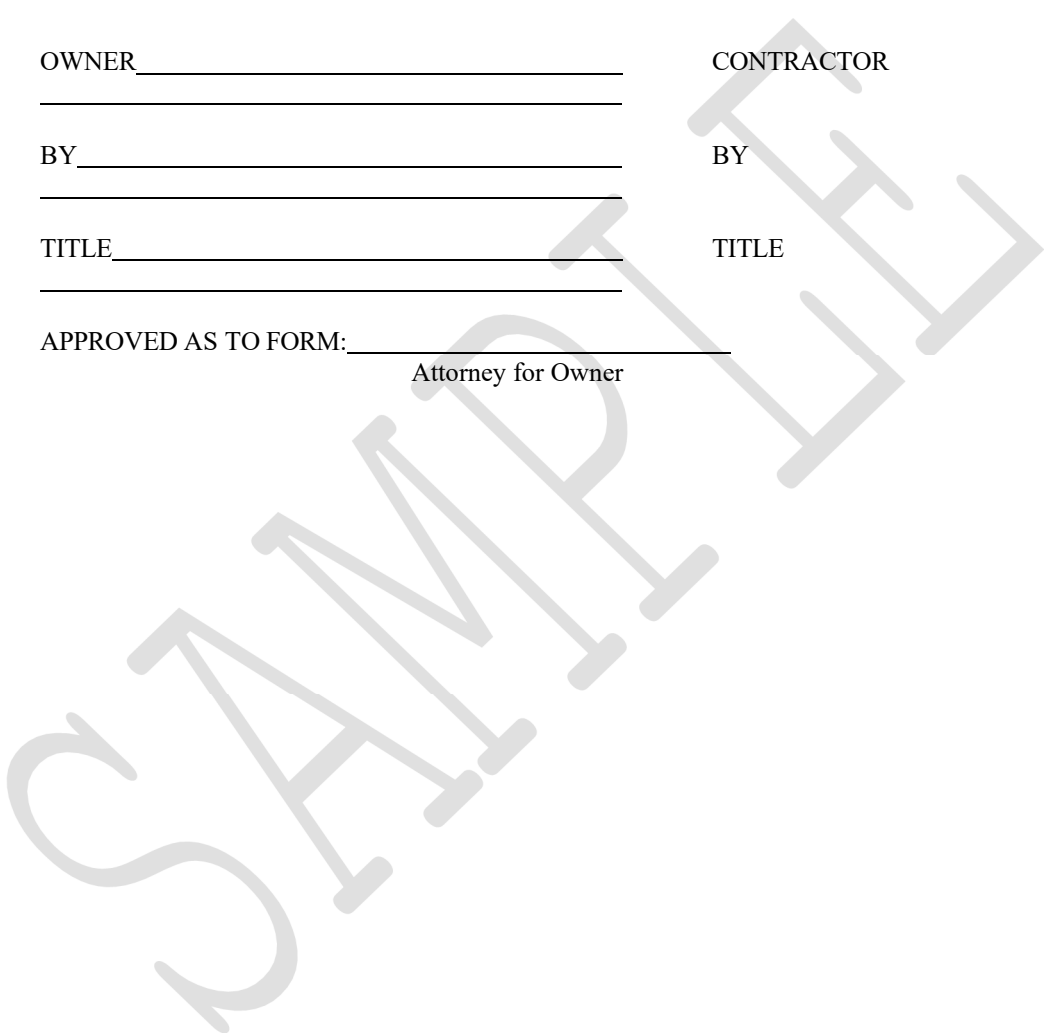
BY _____

BY

TITLE _____

TITLE

APPROVED AS TO FORM: _____
Attorney for Owner



PERFORMANCE BOND

BOND NO. _____

AMOUNT: \$ _____

KNOW ALL MEN BY THESE PRESENTS, that _____

Of _____,

hereinafter called the CONTRACTOR (Principal), and _____,

a corporation duly organized and existing under and by virtue of the laws of the State of _____,

hereinafter called the SURETY, and authorized to transact business within the State of _____ as

SURETY, are held and firmly bound unto _____

as OWNER (Obligee), in the sum of: _____

_____ DOLLARS (\$ _____),

lawful money of the United States of America, for the payment of which, well and truly be made to the OWNER, the CONTRACTOR, and the SURETY bind themselves and each of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents as follows:

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

WHEREAS, the CONTRACTOR has executed and entered into a certain Contract hereto attached, with the OWNER, dated _____,

20____, for **CHEHALIS PUMP STATION** at **CITY OF**

CHEHALIS.

NOW, THEREFORE, if the CONTRACTOR shall in all things perform all the terms and conditions of the within and foregoing Contract as provided in the Contract Documents to be by such CONTRACTOR performed, and shall honor all claims for defective work made within 1 year after the completion and acceptance of the foregoing Contract, and shall pay over, make good, and reimburse to the OWNER, all loss or damage which the OWNER may sustain by reason of failure or default on the part of CONTRACTOR, then this obligation shall be void; otherwise it shall be and remain in full force and effect.

PROVIDED, HOWEVER, that the SURETY, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract Documents or to the work to be performed thereunder, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract Documents.

IN WITNESS WHEREOF, the above parties bounded together have executed this instrument this _____ day of _____, 20____, the

name and corporate seal of each corporate party being hereto affixed and those presents duly signed by its undersigned representative, pursuant to authority of its governing body.

CONTRACTOR: _____

By: _____ (Seal)

Attest

SURETY: _____

By: _____ (Seal)

Attest

APPROVED AS TO FORM: _____
OWNER

Date

NOTE: The SURETY named on this bond shall be one who is licensed to conduct business in the state where the project is located. All bonds signed by an agent must be accompanied by a certified copy of the authority to act for the SURETY at the time of the signing of this bond.

PAYMENT BOND

BOND NO. _____

AMOUNT: \$ _____

KNOW ALL MEN BY THESE PRESENTS, that _____

Of _____

hereinafter called the CONTRACTOR (Principal), and, _____

a corporation duly organized and existing under and by virtue of the laws of the State of _____,

hereinafter called the SURETY, and authorized to transact business within the State of _____

as SURETY, are held and firmly bound unto _____

as OWNER (Obligee), in the sum of: _____

_____ DOLLARS (\$ _____),

lawful money of the United States of America, for the payment of which, well and truly be made to the OWNER, the CONTRACTOR, and the SURETY bind themselves and each of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents as follows:

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

WHEREAS, the CONTRACTOR has executed and entered into a certain Contract hereto attached, with the OWNER, dated

_____, 20___, for **CHEHALIS PUMP STATION at CITY OF CHEHALIS.**

If CONTRACTOR shall make all payments as required by the terms and conditions of the within and foregoing Contract, as well as all other payments for goods and services rendered in connection with the performance of said Contract for which any common law or statutory mechanics lien is available, then this obligation shall be void; otherwise it shall be and remain in full force and effect.

PROVIDED, HOWEVER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

PROVIDED, FURTHER, that the SURETY, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract Documents or to the work to be performed thereunder, shall in any way affect its obligation on this bond, and it does hereby waive notice of any change, extension of time, alteration, or addition to the terms of the Contract Documents.

IN WITNESS WHEREOF, the above parties bounded together have executed this instrument this ___ day of _____, 20___, the name and corporate seal of each corporate party being hereto affixed and those presents duly signed by its undersigned representative, pursuant to authority of its governing body.

CONTRACTOR: _____

By: _____ (Seal)

_____ Attest

SURETY: _____

By: _____ (Seal)

_____ Attest

APPROVED AS TO FORM: _____

OWNER

_____ Date

NOTE: The SURETY named on this bond shall be one who is licensed to conduct business in the state where the project is located, and named in the current list of Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies, as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All bonds signed by an agent must be accompanied by a certified copy of the authority to act for the SURETY at the time of the signing of this bond.

Certified Payrolls

Required Documents for the Chehalis Pump Station

On forms provided by the Industrial Statistician of State L&I, the Contractor shall submit to the Engineer the following for itself and for each firm covered under RCW 39.12 that provided Work and materials for the Contract:

1. A copy of an approved "Statement of Intent to Pay Prevailing Wages" State L&I's form number F700-029-000. The Contracting Agency will make no payment under this Contract for the Work performed until this statement has been approved by State L&I and a copy of the approved form has been submitted to the Engineer.
2. A copy of an approved "Affidavit of Prevailing Wages Paid", State L&I's form number F700-007-000. The Contracting Agency will not grant Completion until all approved Affidavit of Wages paid for Contractor and all Subcontractors have been received by the Engineer. The Contracting Agency will not release to the Contractor any funds retained under RCW 60.28.011 until all of the "Affidavit of Prevailing Wages Paid" 2020 Standard Specifications M 41-10 Page 1-75 Legal Relations and Responsibilities to the Public 1-07 forms have been approved by State L&I and a copy of all the approved forms have been submitted to the Engineer.

The Contractor shall be responsible for requesting these forms from State L&I and for paying any approval fees required by State L&I.

Certified payrolls are required to be submitted by the Contractor to the Engineer, for the Contractor and all Subcontractors or lower tier subcontractors, on all Federal-aid projects and, when requested in writing by the Engineer, on projects funded with only Contracting Agency funds. If these payrolls are not supplied within 10 calendar days of the end of the preceding weekly payroll period for Federal-aid projects or within 10 calendar days from the date of the written request on projects with only Contracting Agency funds, any or all payments may be withheld until compliance is achieved. Also, failure to provide these payrolls could result in other sanctions as provided by State laws (RCW 39.12.050) and/or Federal regulations (29 CFR 5.12). All certified payrolls shall be complete and explicit. Employee labor descriptions used on certified payrolls shall coincide exactly with the labor descriptions listed on the minimum wage schedule in the Contract unless the Engineer approves an alternate method to identify the labor used by the Contractor to compare with the labor listed in the Contract Provisions. When an apprentice is shown on the certified payroll at a rate less than the minimum prevailing journey wage rate, the apprenticeship registration number for that employee from the State Apprenticeship and Training Council shall be shown along with the correct employee classification code.

State of Washington
 Department of Labor & Industries
 Prevailing Wage Section - Telephone 360-902-5334
 PO Box 44540, Olympia, WA 98504-4540

Washington State Prevailing Wage

The PREVAILING WAGES listed here include both the hourly wage rate and the hourly rate of fringe benefits. On public works projects, worker's wage and benefit rates must add to not less than this total. A brief description of overtime calculation requirements are provided on the Benefit Code Key

Journey Level Prevailing Wage Rates for the Effective Date 2/11/2020

County	Trade	Job Classification	Wage	Holiday	Overtime	Notes
Lewis	Asbestos Abatement Workers	Journey Level	\$50.86	5D	1H	
Lewis	Boilermakers	Journey Level	\$69.04	5N	1C	
Lewis	Brick Mason	Journey Level	\$58.82	5A	1M	
Lewis	Brick Mason	Pointer-Caulker-Cleaner	\$58.82	5A	1M	
Lewis	Building Service Employees	Janitor	\$13.50			1
Lewis	Building Service Employees	Shampooer	\$13.50			1
Lewis	Building Service Employees	Waxer	\$13.50			1
Lewis	Building Service Employees	Window Cleaner	\$13.50			1
Lewis	Cabinet Makers (In Shop)	Journey Level	\$23.17			1
Lewis	Carpenters	Acoustical Worker	\$62.44	7A	4C	
Lewis	Carpenters	Carpenter	\$62.44	7A	4C	
Lewis	Carpenters	Carpenters on Stationary Tools	\$62.57	7A	4C	
Lewis	Carpenters	Creosoted Material	\$62.54	7A	4C	
Lewis	Carpenters	Floor Finisher	\$62.44	7A	4C	
Lewis	Carpenters	Floor Layer	\$62.44	7A	4C	
Lewis	Carpenters	Scaffold Erector	\$62.44	7A	4C	
Lewis	Cement Masons	Application of all Composition Mastic	\$62.97	7A	4U	
Lewis	Cement Masons	Application of all Epoxy Material	\$62.47	7A	4U	
Lewis	Cement Masons	Application of all Plastic Material	\$62.97	7A	4U	
Lewis	Cement Masons	Application of Sealing Compound	\$62.47	7A	4U	
Lewis	Cement Masons	Application of Underlayment	\$62.97	7A	4U	
Lewis	Cement Masons	Building General	\$62.47	7A	4U	
Lewis	Cement Masons	Composition or Kalman Floors	\$62.97	7A	4U	
Lewis	Cement Masons	Concrete Paving	\$62.47	7A	4U	
Lewis	Cement Masons	Curb & Gutter Machine	\$62.97	7A	4U	
Lewis	Cement Masons	Curb & Gutter, Sidewalks	\$62.47	7A	4U	
Lewis	Cement Masons	Curing Concrete	\$62.47	7A	4U	
Lewis	Cement Masons	Finish Colored Concrete	\$62.97	7A	4U	
Lewis	Cement Masons	Floor Grinding	\$62.97	7A	4U	
Lewis	Cement Masons	Floor Grinding/Polisher	\$62.47	7A	4U	
Lewis	Cement Masons	Green Concrete Saw, self-powered	\$62.97	7A	4U	
Lewis	Cement Masons	Grouting of all Plates	\$62.47	7A	4U	
Lewis	Cement Masons	Grouting of all Tilt-up Panels	\$62.47	7A	4U	
Lewis	Cement Masons	Gunite Nozzleman	\$62.97	7A	4U	
Lewis	Cement Masons	Hand Powered Grinder	\$62.97	7A	4U	
Lewis	Cement Masons	Journey Level	\$62.47	7A	4U	
Lewis	Cement Masons	Patching Concrete	\$62.47	7A	4U	
Lewis	Cement Masons	Pneumatic Power Tools	\$62.97	7A	4U	
Lewis	Cement Masons	Power Chipping & Brushing	\$62.97	7A	4U	
Lewis	Cement Masons	Sand Blasting Architectural Finish	\$62.97	7A	4U	
Lewis	Cement Masons	Screed & Rodding Machine	\$62.97	7A	4U	
Lewis	Cement Masons	Spackling or Skim Coat Concrete	\$62.47	7A	4U	
Lewis	Cement Masons	Troweling Machine Operator	\$62.97	7A	4U	
Lewis	Cement Masons	Troweling Machine Operator on Colored Slabs	\$62.97	7A	4U	
Lewis	Cement Masons	Tunnel Workers	\$62.97	7A	4U	
Lewis	Divers & Tenders	Bell/Vehicle or Submersible Operator (Not Under Pre	\$116.20	7A	4C	
Lewis	Divers & Tenders	Dive Supervisor/Master	\$79.23	7A	4C	
Lewis	Divers & Tenders	Diver	\$116.20	7A	4C	8V

Lewis	Divers & Tenders	Diver On Standby	\$74.23	7A	4C	
Lewis	Divers & Tenders	Diver Tender	\$67.31	7A	4C	
Lewis	Divers & Tenders	Manifold Operator	\$67.31	7A	4C	
Lewis	Divers & Tenders	Manifold Operator Mixed Gas	\$72.31	7A	4C	
Lewis	Divers & Tenders	Remote Operated Vehicle Operator/Technician	\$67.31	7A	4C	
Lewis	Divers & Tenders	Remote Operated Vehicle Tender	\$62.69	7A	4C	
Lewis	Dredge Workers	Assistant Engineer	\$56.44	5D	3F	
Lewis	Dredge Workers	Assistant Mate (Deckhand)	\$56.00	5D	3F	
Lewis	Dredge Workers	Boatmen	\$56.44	5D	3F	
Lewis	Dredge Workers	Engineer Welder	\$57.51	5D	3F	
Lewis	Dredge Workers	Leverman, Hydraulic	\$58.67	5D	3F	
Lewis	Dredge Workers	Mates	\$56.44	5D	3F	
Lewis	Dredge Workers	Oiler	\$56.00	5D	3F	
Lewis	Drywall Applicator	Journey Level	\$62.44	5D	1H	
Lewis	Drywall Tapers	Journey Level	\$62.94	5P	1E	
Lewis	Electrical Fixture Maintenance Workers	Journey Level	\$13.50			1
Lewis	Electricians - Inside	Cable Splicer	\$74.69	5C	1G	
Lewis	Electricians - Inside	Journey Level	\$69.96	5C	1G	
Lewis	Electricians - Inside	Lead Covered Cable Splicer	\$79.41	5C	1G	
Lewis	Electricians - Inside	Welder	\$74.69	5C	1G	
Lewis	Electricians - Motor Shop	Craftsman	\$15.37			1
Lewis	Electricians - Motor Shop	Journey Level	\$14.69			1
Lewis	Electricians - Powerline Construction	Cable Splicer	\$79.60	5A	4D	
Lewis	Electricians - Powerline Construction	Certified Line Welder	\$72.98	5A	4D	
Lewis	Electricians - Powerline Construction	Groundperson	\$47.94	5A	4D	
Lewis	Electricians - Powerline Construction	Heavy Line Equipment Operator	\$72.98	5A	4D	
Lewis	Electricians - Powerline Construction	Journey Level Lineperson	\$72.98	5A	4D	
Lewis	Electricians - Powerline Construction	Line Equipment Operator	\$62.06	5A	4D	
Lewis	Electricians - Powerline Construction	Meter Installer	\$47.94	5A	4D	8W
Lewis	Electricians - Powerline Construction	Pole Sprayer	\$72.98	5A	4D	
Lewis	Electricians - Powerline Construction	Powderperson	\$54.55	5A	4D	
Lewis	Electronic Technicians	Journey Level	\$44.70	6Z	1B	
Lewis	Elevator Constructors	Mechanic	\$94.22	7D	4A	
Lewis	Elevator Constructors	Mechanic In Charge	\$101.73	7D	4A	
Lewis	Fabricated Precast Concrete Products	Journey Level	\$13.50			1
Lewis	Fabricated Precast Concrete Products	Journey Level - In-Factory Work Only	\$13.50			1
Lewis	Fence Erectors	Fence Erector	\$43.11	7A	4V	8Y
Lewis	Fence Erectors	Fence Laborer	\$43.11	7A	4V	8Y
Lewis	Flaggers	Journey Level	\$43.11	7A	4V	8Y
Lewis	Glaziers	Journey Level	\$66.51	7L	1Y	
Lewis	Heat & Frost Insulators And Asbestos Wo	Journeyman	\$76.61	5J	4H	
Lewis	Heating Equipment Mechanics	Journey Level	\$85.88	7F	1E	
Lewis	Hod Carriers & Mason Tenders	Journey Level	\$52.44	7A	4V	8Y
Lewis	Industrial Power Vacuum Cleaner	Journey Level	\$13.50			1
Lewis	Inland Boatmen	Boat Operator	\$61.41	5B	1K	
Lewis	Inland Boatmen	Cook	\$56.48	5B	1K	
Lewis	Inland Boatmen	Deckhand	\$57.48	5B	1K	
Lewis	Inland Boatmen	Deckhand Engineer	\$58.81	5B	1K	
Lewis	Inland Boatmen	Launch Operator	\$58.89	5B	1K	
Lewis	Inland Boatmen	Mate	\$57.31	5B	1K	
Lewis	Inspection/Cleaning/Sealing Of Sewer & \	Cleaner Operator, Foamer Operator	\$13.50			1
Lewis	Inspection/Cleaning/Sealing Of Sewer & \	Grout Truck Operator	\$13.50			1
Lewis	Inspection/Cleaning/Sealing Of Sewer & \	Head Operator	\$13.50			1
Lewis	Inspection/Cleaning/Sealing Of Sewer & \	Technician	\$13.50			1
Lewis	Inspection/Cleaning/Sealing Of Sewer & \	Tv Truck Operator	\$13.50			1
Lewis	Insulation Applicators	Journey Level	\$62.44	7A	4C	
Lewis	Ironworkers	Journeyman	\$72.18	7N	1O	
Lewis	Laborers	Air, Gas Or Electric Vibrating Screed	\$50.86	7A	4V	8Y
Lewis	Laborers	Airtrac Drill Operator	\$52.44	7A	4V	8Y
Lewis	Laborers	Ballast Regular Machine	\$50.86	7A	4V	8Y
Lewis	Laborers	Batch Weighman	\$43.11	7A	4V	8Y

Lewis	Laborers	Brick Pavers	\$50.86	7A	4V	8Y
Lewis	Laborers	Brush Cutter	\$50.86	7A	4V	8Y
Lewis	Laborers	Brush Hog Feeder	\$50.86	7A	4V	8Y
Lewis	Laborers	Burner	\$50.86	7A	4V	8Y
Lewis	Laborers	Caisson Worker	\$52.44	7A	4V	8Y
Lewis	Laborers	Carpenter Tender	\$50.86	7A	4V	8Y
Lewis	Laborers	Cement Dumper-paving	\$51.80	7A	4V	8Y
Lewis	Laborers	Cement Finisher Tender	\$50.86	7A	4V	8Y
Lewis	Laborers	Change House Or Dry Shack	\$50.86	7A	4V	8Y
Lewis	Laborers	Chipping Gun (30 Lbs. And Over)	\$51.80	7A	4V	8Y
Lewis	Laborers	Chipping Gun (Under 30 Lbs.)	\$50.86	7A	4V	8Y
Lewis	Laborers	Choker Setter	\$50.86	7A	4V	8Y
Lewis	Laborers	Chuck Tender	\$50.86	7A	4V	8Y
Lewis	Laborers	Clary Power Spreader	\$51.80	7A	4V	8Y
Lewis	Laborers	Clean-up Laborer	\$50.86	7A	4V	8Y
Lewis	Laborers	Concrete Dumper/Chute Operator	\$51.80	7A	4V	8Y
Lewis	Laborers	Concrete Form Stripper	\$50.86	7A	4V	8Y
Lewis	Laborers	Concrete Placement Crew	\$51.80	7A	4V	8Y
Lewis	Laborers	Concrete Saw Operator/Core Driller	\$51.80	7A	4V	8Y
Lewis	Laborers	Crusher Feeder	\$43.11	7A	4V	8Y
Lewis	Laborers	Curing Laborer	\$50.86	7A	4V	8Y
Lewis	Laborers	Demolition: Wrecking & Moving (Incl. Charred Mater	\$50.86	7A	4V	8Y
Lewis	Laborers	Ditch Digger	\$50.86	7A	4V	8Y
Lewis	Laborers	Diver	\$52.44	7A	4V	8Y
Lewis	Laborers	Drill Operator (Hydraulic, Diamond)	\$51.80	7A	4V	8Y
Lewis	Laborers	Dry Stack Walls	\$50.86	7A	4V	8Y
Lewis	Laborers	Dump Person	\$50.86	7A	4V	8Y
Lewis	Laborers	Epoxy Technician	\$50.86	7A	4V	8Y
Lewis	Laborers	Erosion Control Worker	\$50.86	7A	4V	8Y
Lewis	Laborers	Faller & Bucker Chain Saw	\$51.80	7A	4V	8Y
Lewis	Laborers	Fine Graders	\$50.86	7A	4V	8Y
Lewis	Laborers	Firewatch	\$43.11	7A	4V	8Y
Lewis	Laborers	Form Setter	\$50.86	7A	4V	8Y
Lewis	Laborers	Gabian Basket Builders	\$50.86	7A	4V	8Y
Lewis	Laborers	General Laborer	\$50.86	7A	4V	8Y
Lewis	Laborers	Grade Checker & Transit Person	\$52.44	7A	4V	8Y
Lewis	Laborers	Grinders	\$50.86	7A	4V	8Y
Lewis	Laborers	Grout Machine Tender	\$50.86	7A	4V	8Y
Lewis	Laborers	Groutmen (Pressure) Including Post Tension Beams	\$51.80	7A	4V	8Y
Lewis	Laborers	Guardrail Erector	\$50.86	7A	4V	8Y
Lewis	Laborers	Hazardous Waste Worker (Level A)	\$52.44	7A	4V	8Y
Lewis	Laborers	Hazardous Waste Worker (Level B)	\$51.80	7A	4V	8Y
Lewis	Laborers	Hazardous Waste Worker (Level C)	\$50.86	7A	4V	8Y
Lewis	Laborers	High Scaler	\$52.44	7A	4V	8Y
Lewis	Laborers	Jackhammer	\$51.80	7A	4V	8Y
Lewis	Laborers	Laserbeam Operator	\$51.80	7A	4V	8Y
Lewis	Laborers	Maintenance Person	\$50.86	7A	4V	8Y
Lewis	Laborers	Manhole Builder-Mudman	\$51.80	7A	4V	8Y
Lewis	Laborers	Material Yard Person	\$50.86	7A	4V	8Y
Lewis	Laborers	Motorman-Dinky Locomotive	\$51.80	7A	4V	8Y
Lewis	Laborers	Nozzleman (Concrete Pump, Green Cutter When Usi	\$51.80	7A	4V	8Y
Lewis	Laborers	Pavement Breaker	\$51.80	7A	4V	8Y
Lewis	Laborers	Pilot Car	\$43.11	7A	4V	8Y
Lewis	Laborers	Pipe Layer Lead	\$52.44	7A	4V	8Y
Lewis	Laborers	Pipe Layer/Tailor	\$51.80	7A	4V	8Y
Lewis	Laborers	Pipe Pot Tender	\$51.80	7A	4V	8Y
Lewis	Laborers	Pipe Reliner	\$51.80	7A	4V	8Y
Lewis	Laborers	Pipe Wrapper	\$51.80	7A	4V	8Y
Lewis	Laborers	Pot Tender	\$50.86	7A	4V	8Y
Lewis	Laborers	Powderman	\$52.44	7A	4V	8Y
Lewis	Laborers	Powderman's Helper	\$50.86	7A	4V	8Y

Lewis	Laborers	Power Jacks	\$51.80	7A	4V	8Y
Lewis	Laborers	Railroad Spike Puller - Power	\$51.80	7A	4V	8Y
Lewis	Laborers	Raker - Asphalt	\$52.44	7A	4V	8Y
Lewis	Laborers	Re-timberman	\$52.44	7A	4V	8Y
Lewis	Laborers	Remote Equipment Operator	\$51.80	7A	4V	8Y
Lewis	Laborers	Rigger/Signal Person	\$51.80	7A	4V	8Y
Lewis	Laborers	Rip Rap Person	\$50.86	7A	4V	8Y
Lewis	Laborers	Rivet Buster	\$51.80	7A	4V	8Y
Lewis	Laborers	Rodder	\$51.80	7A	4V	8Y
Lewis	Laborers	Scaffold Erector	\$50.86	7A	4V	8Y
Lewis	Laborers	Scale Person	\$50.86	7A	4V	8Y
Lewis	Laborers	Sloper (Over 20)"	\$51.80	7A	4V	8Y
Lewis	Laborers	Sloper Sprayer	\$50.86	7A	4V	8Y
Lewis	Laborers	Spreader (Concrete)	\$51.80	7A	4V	8Y
Lewis	Laborers	Stake Hopper	\$50.86	7A	4V	8Y
Lewis	Laborers	Stock Piler	\$50.86	7A	4V	8Y
Lewis	Laborers	Swinging Stage/Boatswain Chair	\$43.11	7A	4V	8Y
Lewis	Laborers	Tamper & Similar Electric, Air & Gas Operated Tools	\$51.80	7A	4V	8Y
Lewis	Laborers	Tamper (Multiple & Self-propelled)	\$51.80	7A	4V	8Y
Lewis	Laborers	Timber Person - Sewer (Lagger, Shorer & Cribber)	\$51.80	7A	4V	8Y
Lewis	Laborers	Toolroom Person (at Jobsite)	\$50.86	7A	4V	8Y
Lewis	Laborers	Topper	\$50.86	7A	4V	8Y
Lewis	Laborers	Track Laborer	\$50.86	7A	4V	8Y
Lewis	Laborers	Track Liner (Power)	\$51.80	7A	4V	8Y
Lewis	Laborers	Traffic Control Laborer	\$46.10	7A	4V	9C
Lewis	Laborers	Traffic Control Supervisor	\$46.10	7A	4V	9C
Lewis	Laborers	Truck Spotter	\$50.86	7A	4V	8Y
Lewis	Laborers	Tugger Operator	\$51.80	7A	4V	8Y
Lewis	Laborers	Tunnel Work-Compressed Air Worker 0-30 psi	\$120.61	7A	4V	9B
Lewis	Laborers	Tunnel Work-Compressed Air Worker 30.01-44.00 ps	\$125.64	7A	4V	9B
Lewis	Laborers	Tunnel Work-Compressed Air Worker 44.01-54.00 ps	\$129.32	7A	4V	9B
Lewis	Laborers	Tunnel Work-Compressed Air Worker 54.01-60.00 ps	\$135.02	7A	4V	9B
Lewis	Laborers	Tunnel Work-Compressed Air Worker 60.01-64.00 ps	\$137.14	7A	4V	9B
Lewis	Laborers	Tunnel Work-Compressed Air Worker 64.01-68.00 ps	\$142.24	7A	4V	9B
Lewis	Laborers	Tunnel Work-Compressed Air Worker 68.01-70.00 ps	\$144.14	7A	4V	9B
Lewis	Laborers	Tunnel Work-Compressed Air Worker 70.01-72.00 ps	\$146.14	7A	4V	9B
Lewis	Laborers	Tunnel Work-Compressed Air Worker 72.01-74.00 ps	\$148.14	7A	4V	9B
Lewis	Laborers	Tunnel Work-Guage and Lock Tender	\$52.54	7A	4V	8Y
Lewis	Laborers	Tunnel Work-Miner	\$52.54	7A	4V	8Y
Lewis	Laborers	Vibrator	\$51.80	7A	4V	8Y
Lewis	Laborers	Vinyl Seamer	\$50.86	7A	4V	8Y
Lewis	Laborers	Watchman	\$39.18	7A	4V	8Y
Lewis	Laborers	Welder	\$51.80	7A	4V	8Y
Lewis	Laborers	Well Point Laborer	\$51.80	7A	4V	8Y
Lewis	Laborers	Window Washer/Cleaner	\$39.18	7A	4V	8Y
Lewis	Laborers - Underground Sewer & Water	General Laborer & Topman	\$50.86	7A	4V	8Y
Lewis	Laborers - Underground Sewer & Water	Pipe Layer	\$51.80	7A	4V	8Y
Lewis	Landscape Construction	Landscape Construction/Landscaping Or Planting Lab	\$39.18	7A	4V	8Y
Lewis	Landscape Construction	Landscape Operator	\$65.71	7A	3K	8X
Lewis	Landscape Maintenance	Groundskeeper	\$13.50			1
Lewis	Lathers	Journey Level	\$62.44	5D	1H	
Lewis	Marble Setters	Journey Level	\$58.82	5A	1M	
Lewis	Metal Fabrication (In Shop)	Fitter	\$15.16			1
Lewis	Metal Fabrication (In Shop)	Laborer	\$13.50			1
Lewis	Metal Fabrication (In Shop)	Machine Operator	\$13.50			1
Lewis	Metal Fabrication (In Shop)	Painter	\$13.50			1
Lewis	Metal Fabrication (In Shop)	Welder	\$15.16			1
Lewis	Millwright	Journey Level	\$63.94	7A	4C	
Lewis	Modular Buildings	Cabinet Assembly	\$13.50			1
Lewis	Modular Buildings	Electrician	\$13.50			1
Lewis	Modular Buildings	Equipment Maintenance	\$13.50			1

Lewis	Modular Buildings	Plumber	\$13.50			1
Lewis	Modular Buildings	Production Worker	\$13.50			1
Lewis	Modular Buildings	Tool Maintenance	\$13.50			1
Lewis	Modular Buildings	Utility Person	\$13.50			1
Lewis	Modular Buildings	Welder	\$13.50			1
Lewis	Painters	Journey Level	\$43.40	6Z		2B
Lewis	Pile Driver	Crew Tender	\$67.31	7A		4C
Lewis	Pile Driver	Crew Tender/Technician	\$67.31	7A		4C
Lewis	Pile Driver	Hyperbaric Worker - Compressed Air Worker 0-30.00	\$77.93	7A		4C
Lewis	Pile Driver	Hyperbaric Worker - Compressed Air Worker 30.01 -	\$82.93	7A		4C
Lewis	Pile Driver	Hyperbaric Worker - Compressed Air Worker 44.01 -	\$86.93	7A		4C
Lewis	Pile Driver	Hyperbaric Worker - Compressed Air Worker 54.01 -	\$91.93	7A		4C
Lewis	Pile Driver	Hyperbaric Worker - Compressed Air Worker 60.01 -	\$94.43	7A		4C
Lewis	Pile Driver	Hyperbaric Worker - Compressed Air Worker 64.01 -	\$99.43	7A		4C
Lewis	Pile Driver	Hyperbaric Worker - Compressed Air Worker 68.01 -	\$101.43	7A		4C
Lewis	Pile Driver	Hyperbaric Worker - Compressed Air Worker 70.01 -	\$103.43	7A		4C
Lewis	Pile Driver	Hyperbaric Worker - Compressed Air Worker 72.01 -	\$105.43	7A		4C
Lewis	Pile Driver	Journey Level	\$62.69	7A		4C
Lewis	Plasterers	Journey Level	\$59.42	7Q		1R
Lewis	Playground & Park Equipment Installers	Journey Level	\$13.50			1
Lewis	Plumbers & Pipefitters	Journey Level	\$74.72	5A		1G
Lewis	Power Equipment Operators	Asphalt Plant Operator	\$66.81	7A		3K 8X
Lewis	Power Equipment Operators	Assistant Engineers	\$62.85	7A		3K 8X
Lewis	Power Equipment Operators	Barrier Machine (zipper)	\$66.22	7A		3K 8X
Lewis	Power Equipment Operators	Batch Plant Operator: Concrete	\$66.22	7A		3K 8X
Lewis	Power Equipment Operators	Bobcat	\$62.85	7A		3K 8X
Lewis	Power Equipment Operators	Brokk - Remote Demolition Equipment	\$62.85	7A		3K 8X
Lewis	Power Equipment Operators	Brooms	\$62.85	7A		3K 8X
Lewis	Power Equipment Operators	Bump Cutter	\$66.22	7A		3K 8X
Lewis	Power Equipment Operators	Cableways	\$66.81	7A		3K 8X
Lewis	Power Equipment Operators	Chipper	\$66.22	7A		3K 8X
Lewis	Power Equipment Operators	Compressor	\$62.85	7A		3K 8X
Lewis	Power Equipment Operators	Concrete Pump: Truck Mount With Boom Attachmei	\$66.81	7A		3K 8X
Lewis	Power Equipment Operators	Concrete Finish Machine -laser Screed	\$62.85	7A		3K 8X
Lewis	Power Equipment Operators	Concrete Pump - Mounted Or Trailer High Pressure L	\$65.71	7A		3K 8X
Lewis	Power Equipment Operators	Concrete Pump: Truck Mount With Boom Attachmen	\$66.22	7A		3K 8X
Lewis	Power Equipment Operators	Conveyors	\$65.71	7A		3K 8X
Lewis	Power Equipment Operators	Cranes, 100 Tons - 199 Tons, Or 150 Ft Of Boom (incl	\$67.49	7A		3K 8X
Lewis	Power Equipment Operators	Cranes: 20 Tons Through 44 Tons With Attachments	\$66.22	7A		3K 8X
Lewis	Power Equipment Operators	Cranes: 200 tons to 299 tons, or 250' of boom (includ	\$68.17	7A		3K 8X
Lewis	Power Equipment Operators	Cranes: 300 tons and over, or 300' of boom (includi	\$68.84	7A		3K 8X
Lewis	Power Equipment Operators	Cranes: 45 Tons Through 99 Tons, Under 150' Of Boo	\$66.81	7A		3K 8X
Lewis	Power Equipment Operators	Cranes: A-frame - 10 Tons And Under	\$62.85	7A		3K 8X
Lewis	Power Equipment Operators	Cranes: Friction 200 tons and over. Tower Cranes: ov	\$68.84	7A		3K 8X
Lewis	Power Equipment Operators	Cranes: Friction cranes through 199 tons	\$68.17	7A		3K 8X
Lewis	Power Equipment Operators	Cranes: Through 19 Tons With Attachments A-frame	\$65.71	7A		3K 8X
Lewis	Power Equipment Operators	Crusher	\$66.22	7A		3K 8X
Lewis	Power Equipment Operators	Deck Engineer/deck Winches (power)	\$66.22	7A		3K 8X
Lewis	Power Equipment Operators	Derricks, On Building Work	\$66.81	7A		3K 8X
Lewis	Power Equipment Operators	Dozers D-9 & Under	\$65.71	7A		3K 8X
Lewis	Power Equipment Operators	Drill Oilers: Auger Type, Truck Or Crane Mount	\$65.71	7A		3K 8X
Lewis	Power Equipment Operators	Drilling Machine	\$67.49	7A		3K 8X
Lewis	Power Equipment Operators	Elevator And Man-lift: Permanent And Shaft Type	\$62.85	7A		3K 8X
Lewis	Power Equipment Operators	Finishing Machine, Bidwell And Gamaco & Similar Eq	\$66.22	7A		3K 8X
Lewis	Power Equipment Operators	Forklift: 3000 Lbs And Over With Attachments	\$65.71	7A		3K 8X
Lewis	Power Equipment Operators	Forklifts: Under 3000 Lbs. With Attachments	\$62.85	7A		3K 8X
Lewis	Power Equipment Operators	Grade Engineer: Using Blueprints, Cut Sheets,etc.	\$66.22	7A		3K 8X
Lewis	Power Equipment Operators	Gradechecker/stakeman	\$62.85	7A		3K 8X
Lewis	Power Equipment Operators	Guardrail punch/Auger	\$66.22	7A		3K 8X
Lewis	Power Equipment Operators	Hard Tail End Dump Articulating Off- Road Equipmen	\$66.81	7A		3K 8X
Lewis	Power Equipment Operators	Hard Tail End Dump Articulating Off-road Equipment	\$66.22	7A		3K 8X

Lewis	Power Equipment Operators	Horizontal/directional Drill Locator	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Horizontal/directional Drill Operator	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Hydralifts/Boom Trucks Over 10 Tons	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Hydralifts/boom Trucks, 10 Tons And Under	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators	Loader, Overhead 8 Yards. & Over	\$67.49	7A	3K	8X
Lewis	Power Equipment Operators	Loader, Overhead, 6 Yards. But Not Including 8 Yards	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Loaders, Overhead Under 6 Yards	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Loaders, Plant Feed	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Loaders: Elevating Type Belt	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Locomotives, All	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Material Transfer Device	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Mechanics, All (Leadmen - \$0.50 Per Hour Over Mecl	\$67.49	7A	3K	8X
Lewis	Power Equipment Operators	Motor patrol graders	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Mucking Machine, Mole, Tunnel Drill, Boring, Road H	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Oil Distributors, Blower Distribution & Mulch Seeding	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators	Outside Hoists (elevators And Manlifts), Air Tuggers,s	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Overhead, Bridge Type Crane: 20 Tons Through 44 Tc	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Overhead, Bridge Type: 100 Tons And Over	\$67.49	7A	3K	8X
Lewis	Power Equipment Operators	Overhead, Bridge Type: 45 Tons Through 99 Tons	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Pavement Breaker	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators	Pile Driver (other Than Crane Mount)	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Plant Oiler - Asphalt, Crusher	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Posthole Digger, Mechanical	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators	Power Plant	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators	Pumps - Water	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators	Quad 9, HD 41, D10 And Over	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Quick Tower - No Cab, Under 100 Feet In Height Base	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators	Remote Control Operator On Rubber Tired Earth Mo	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Rigger And Bellman	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators	Rigger/Signal Person, Bellman (Certified)	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Rollagon	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Roller, Other Than Plant Mix	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators	Roller, Plant Mix Or Multi-lift Materials	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Roto-mill, Roto-grinder	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Saws - Concrete	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Scraper, Self Propelled Under 45 Yards	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Scrapers - Concrete & Carry All	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Scrapers, Self-propelled: 45 Yards And Over	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Service Engineers - Equipment	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Shotcrete/gunite Equipment	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators	Shovel, Excavator, Backhoe, Tractors Under 15 Metri	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Shovel, Excavator, Backhoe: Over 30 Metric Tons To !	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metr	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Shovel, Excavator, Backhoes: Over 50 Metric Tons To	\$67.49	7A	3K	8X
Lewis	Power Equipment Operators	Shovel, Excavator, Backhoes: Over 90 Metric Tons	\$68.17	7A	3K	8X
Lewis	Power Equipment Operators	Slipform Pavers	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Spreader, Topsider & Screedman	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Subgrader Trimmer	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Tower Bucket Elevators	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Tower crane over 175' through 250' in height, base tr	\$68.17	7A	3K	8X
Lewis	Power Equipment Operators	Tower Crane Up: To 175' In Height, Base To Boom	\$67.49	7A	3K	8X
Lewis	Power Equipment Operators	Transporters, All Track Or Truck Type	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Trenching Machines	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Truck Crane Oiler/driver - 100 Tons And Over	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Truck Crane Oiler/driver Under 100 Tons	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators	Truck Mount Portable Conveyor	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators	Welder	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators	Wheel Tractors, Farmall Type	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators	Yo Yo Pay Dozer	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators-	Undergrou Asphalt Plant Operator	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators-	Undergrou Assistant Engineers	\$62.85	7A	3K	8X

Lewis	Power Equipment Operators- Undergrou Barrier Machine (zipper)	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Batch Plant Operator: Concrete	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Bobcat	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Brokk - Remote Demolition Equipment	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Brooms	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Bump Cutter	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Cableways	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Chipper	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Compressor	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Concrete Pump: Truck Mount With Boom Attachmen	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Concrete Finish Machine -laser Screed	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Concrete Pump - Mounted Or Trailer High Pressure L	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Concrete Pump: Truck Mount With Boom Attachmen	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Conveyors	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Cranes, 100 Tons - 199 Tons, Or 150 Ft Of Boom (incl	\$67.49	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Cranes, 200 tons to 299 tons, or 250' of boom (includ	\$68.17	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Cranes, Over 300 Tons, Or 300' Of Boom Including Jib	\$68.84	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Cranes: 20 Tons Through 44 Tons With Attachments	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou cranes: 300 tons and over, or 300' of boom (including	\$68.84	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Cranes: 45 Tons Through 99 Tons, Under 150' Of Boom	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Cranes: A-frame - 10 Tons And Under	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Cranes: Friction 200 tons and over. Tower Cranes: ov	\$68.84	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Cranes: Friction cranes through 199 tons	\$68.17	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Cranes: Through 19 Tons With Attachments A-frame	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Crusher	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Deck Engineer/deck Winches (power)	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Derricks, On Building Work	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Dozers D-9 & Under	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Drill Oilers: Auger Type, Truck Or Crane Mount	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Drilling Machine	\$67.49	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Elevator And Man-lift: Permanent And Shaft Type	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Finishing Machine, Bidwell And Gamaco & Similar Eq	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Forklift: 3000 Lbs And Over With Attachments	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Forklifts: Under 3000 Lbs. With Attachments	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Grade Engineer: Using Blueprints, Cut Sheets,etc.	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Gradechecker/stakeman	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Guardrail punch/Auger	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Hard Tail End Dump Articulating Off- Road Equipmen	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Hard Tail End Dump Articulating Off-road Equipment	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Horizontal/directional Drill Locator	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Horizontal/directional Drill Operator	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Hydralifts/Boom Trucks Over 10 Tons	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Hydralifts/boom Trucks, 10 Tons And Under	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Loader, Overhead 8 Yards. & Over	\$67.49	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Loader, Overhead, 6 Yards. But Not Including 8 Yards	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Loaders, Overhead Under 6 Yards	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Loaders, Plant Feed	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Loaders: Elevating Type Belt	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Locomotives, All	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Material Transfer Device	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Mechanics, All (Leadmen - \$0.50 Per Hour Over Mecl	\$67.49	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Motor patrol graders	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Mucking Machine, Mole, Tunnel Drill, Boring, Road H	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Oil Distributors, Blower Distribution & Mulch Seeding	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Outside Hoists (elevators And Manlifts), Air Tuggers,s	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Overhead, Bridge Type Crane: 20 Tons Through 44 Tc	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Overhead, Bridge Type: 100 Tons And Over	\$67.49	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Overhead, Bridge Type: 45 Tons Through 99 Tons	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Pavement Breaker	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Pile Driver (other Than Crane Mount)	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Plant Oiler - Asphalt, Crusher	\$65.71	7A	3K	8X

Lewis	Power Equipment Operators- Undergrou Posthole Digger, Mechanical	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Power Plant	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Pumps - Water	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Quad 9, HD 41, D10 And Over	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Quick Tower - No Cab, Under 100 Feet In Height Base	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Remote Control Operator On Rubber Tired Earth Mo	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Rigger And Bellman	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Rigger/Signal Person, Bellman (Certified)	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Rollagon	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Roller, Other Than Plant Mix	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Roller, Plant Mix Or Multi-lift Materials	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Roto-mill, Roto-grinder	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Saws - Concrete	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Scraper, Self Propelled Under 45 Yards	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Scrapers - Concrete & Carry All	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Scrapers, Self-propelled: 45 Yards And Over	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Service Engineers - Equipment	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Shotcrete/gunite Equipment	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Shovel, Excavator, Backhoe, Tractors Under 15 Metri	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Shovel, Excavator, Backhoe: Over 30 Metric Tons To !	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metr	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Shovel, Excavator, Backhoes: Over 50 Metric Tons To	\$67.49	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Shovel, Excavator, Backhoes: Over 90 Metric Tons	\$68.17	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Slipform Pavers	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Spreader, Topsider & Screedman	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Subgrader Trimmer	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Tower Bucket Elevators	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Tower crane over 175' through 250' in height, base to	\$68.17	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Tower Crane: Up To 175' In Height, Base To Boom	\$67.49	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Transporters, All Track Or Truck Type	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Trenching Machines	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Truck Crane Oiler/driver - 100 Tons And Over	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Truck Crane Oiler/driver Under 100 Tons	\$65.71	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Truck Mount Portable Conveyor	\$66.22	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Welder	\$66.81	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Wheel Tractors, Farmall Type	\$62.85	7A	3K	8X
Lewis	Power Equipment Operators- Undergrou Yo Yo Pay Dozer	\$66.22	7A	3K	8X
Lewis	Power Line Clearance Tree Trimmers Journey Level In Charge	\$50.96	5A	4A	
Lewis	Power Line Clearance Tree Trimmers Spray Person	\$48.35	5A	4A	
Lewis	Power Line Clearance Tree Trimmers Tree Equipment Operator	\$50.96	5A	4A	
Lewis	Power Line Clearance Tree Trimmers Tree Trimmer	\$45.54	5A	4A	
Lewis	Power Line Clearance Tree Trimmers Tree Trimmer Groundperson	\$34.51	5A	4A	
Lewis	Refrigeration & Air Conditioning Mechar Journey Level	\$74.71	5A	1G	
Lewis	Residential Brick Mason Journey Level	\$21.96			1
Lewis	Residential Carpenters Journey Level	\$24.89			1
Lewis	Residential Cement Masons Journey Level	\$16.79			1
Lewis	Residential Drywall Applicators Journey Level	\$36.07			1
Lewis	Residential Drywall Tapers Journey Level	\$24.48			1
Lewis	Residential Electricians Journey Level	\$34.53	5A	1B	
Lewis	Residential Glaziers Journey Level	\$25.40			1
Lewis	Residential Insulation Applicators Journey Level	\$17.05			1
Lewis	Residential Laborers Journey Level	\$23.10			1
Lewis	Residential Marble Setters Journey Level	\$21.96			1
Lewis	Residential Painters Journey Level	\$18.76			1
Lewis	Residential Plumbers & Pipefitters Journey Level	\$26.35			1
Lewis	Residential Refrigeration & Air Conditioni Journey Level	\$32.14			1
Lewis	Residential Sheet Metal Workers Journey Level	\$33.28			1
Lewis	Residential Soft Floor Layers Journey Level	\$14.86			1
Lewis	Residential Sprinkler Fitters (Fire Protecti Journey Level	\$20.28			1
Lewis	Residential Stone Masons Journey Level	\$21.96			1
Lewis	Residential Terrazzo Workers Journey Level	\$14.86			1

Lewis	Residential Terrazzo/Tile Finishers	Journey Level	\$14.86			1
Lewis	Residential Tile Setters	Journey Level	\$14.86			1
Lewis	Roofers	Journey Level	\$52.87	5A	20	
Lewis	Roofers	Using Irritable Bituminous Materials	\$55.87	5A	20	
Lewis	Sheet Metal Workers	Journey Level (Field or Shop)	\$85.88	7F	1E	
Lewis	Sign Makers & Installers (Electrical)	Journey Level	\$18.04			1
Lewis	Sign Makers & Installers (Non-Electrical)	Journey Level	\$50.86	7A	4V	8Y
Lewis	Soft Floor Layers	Journey Level	\$51.07	5A	3J	
Lewis	Solar Controls For Windows	Journey Level	\$13.50			1
Lewis	Sprinkler Fitters (Fire Protection)	Journey Level	\$61.68	7J	1R	
Lewis	Stage Rigging Mechanics (Non Structural)	Journey Level	\$13.50			1
Lewis	Stone Masons	Journey Level	\$58.82	5A	1M	
Lewis	Street And Parking Lot Sweeper Workers	Journey Level	\$16.00			1
Lewis	Surveyors	Chain Person	\$65.11	7A	3K	
Lewis	Surveyors	Instrument Persion	\$65.71	7A	3K	
Lewis	Surveyors	Party Chief	\$66.81	7A	3K	
Lewis	Telecommunication Technicians	Journey Level	\$44.70	6Z	1B	
Lewis	Telephone Line Construction - Outside	Cable Splicer	\$41.81	5A	2B	
Lewis	Telephone Line Construction - Outside	Hole Digger/Ground Person	\$23.53	5A	2B	
Lewis	Telephone Line Construction - Outside	Installer (Repairer)	\$40.09	5A	2B	
Lewis	Telephone Line Construction - Outside	Special Aparatus Installer I	\$41.81	5A	2B	
Lewis	Telephone Line Construction - Outside	Special Apparatus Installer II	\$40.99	5A	2B	
Lewis	Telephone Line Construction - Outside	Telephone Equipment Operator (Heavy)	\$41.81	5A	2B	
Lewis	Telephone Line Construction - Outside	Telephone Equipment Operator (Light)	\$38.92	5A	2B	
Lewis	Telephone Line Construction - Outside	Telephone Lineperson	\$38.92	5A	2B	
Lewis	Telephone Line Construction - Outside	Television Groundperson	\$22.32	5A	2B	
Lewis	Telephone Line Construction - Outside	Television Lineperson/Installer	\$29.60	5A	2B	
Lewis	Telephone Line Construction - Outside	Television System Technician	\$35.20	5A	2B	
Lewis	Telephone Line Construction - Outside	Television Technician	\$31.67	5A	2B	
Lewis	Telephone Line Construction - Outside	Tree Trimmer	\$38.92	5A	2B	
Lewis	Terrazzo Workers	Journey Level	\$54.06	5A	1M	
Lewis	Tile Setters	Journey Level	\$54.06	5A	1M	
Lewis	Tile, Marble & Terrazzo Finishers	Finisher	\$44.89	5A	1B	
Lewis	Traffic Control Stripers	Journey Level	\$47.68	7A	1K	
Lewis	Truck Drivers	Asphalt Mix Over 16 Yards	\$60.84	5D	4Y	8L
Lewis	Truck Drivers	Asphalt Mix To 16 Yards	\$60.00	5D	4Y	8L
Lewis	Truck Drivers	Dump Truck	\$60.00	5D	4Y	8L
Lewis	Truck Drivers	Dump Truck & Trailer	\$60.84	5D	4Y	8L
Lewis	Truck Drivers	Other Trucks	\$60.84	5D	4Y	8L
Lewis	Truck Drivers - Ready Mix	Transit Mix	\$60.84	5D	4Y	8L
Lewis	Well Drillers & Irrigation Pump Installers	Irrigation Pump Installer	\$18.18			1
Lewis	Well Drillers & Irrigation Pump Installers	Oiler	\$13.50			1
Lewis	Well Drillers & Irrigation Pump Installers	Well Driller	\$18.00			1

Draft Geotechnical Engineering Report Chehalis Pump Station Chehalis, Washington

July 24, 2019

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Draft Geotechnical Engineering Report Chehalis Pump Station Chehalis, Washington

This document was prepared by, or under the direct supervision of, the undersigned, whose seal is affixed below.

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File path: \\olympia1\PROJECTS\1174\035.010\R\Signature Page.docx
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APPENDICES

<u>Appendix</u>	<u>Title</u>
A	Field Explorations
B	Laboratory Testing

LIST OF ABBREVIATIONS AND ACRONYMS

ASTM.....	ASTM International
bgs.....	below ground surface
City.....	City of Chehalis
CMC.....	Chehalis Municipal Code
CSBC.....	Crushed Surfacing Base Course
cy.....	cubic yards
EHA	erosion hazard area
ft.....	foot/feet
H:V	horizontal to vertical
LAI	Landau Associates, Inc.
LHA.....	landslide hazard area
MSR.....	marine sedimentary rock
pcf	pounds per cubic foot
psf	pounds per square foot
SCJ.....	SCJ Alliance
WAC	Washington Administrative Code
WSDOT.....	Washington State Department of Transportation

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1.0 INTRODUCTION

This report summarizes the results of geotechnical engineering services provided by Landau Associates, Inc. (LAI) in support of the Chehalis Pump Station project. The City of Chehalis (City; project owner) proposes to replace a pump station at its water treatment plant, located at 405 Parkhill Drive in Chehalis, Washington; the replacement pump station will be adjacent to the existing pump station (site; Figure 1).

This report has been prepared based on information provided by representatives of SCJ Alliance (SCJ; project civil engineer) and the City, data collected during the field investigation and laboratory testing programs, and LAI's experience with similar projects.

1.1 Project Understanding

The replacement pump station will be located approximately 50 feet (ft) west of the existing pump station, adjacent to a gravel-surfaced access road.

The replacement pump station will measure approximately 12 ft deep by 16 ft wide, and will be built into the steep slope present above and below the site. The rear wall of the pump station will act as a retaining wall and support the slope. New duplex pumps will be installed in the pump house, and new conveyance pipes will tie into the existing pipe network. The approximate locations of the proposed improvements are shown on Figure 2.

1.2 Scope of Services

SCJ retained LAI's services to support design of the project. Geotechnical services were provided in general accordance with the scope outlined in the Subconsultant Agreement for Professional Services, dated May 22, 2019.

2.0 SITE CONDITIONS

The following sections describe the geologic setting of the site and the surface and subsurface conditions observed during LAI's field investigation. Interpretations of site conditions are based on LAI's review of available geologic and geotechnical information, and on the results of the site reconnaissance, subsurface explorations, and laboratory testing.

2.1 Geologic Setting

Geologic information for the site was obtained from the *Geologic Map of the Centralia 1:100,000 Quadrangle, Washington* (Schasse 1987). Near-surface deposits in the vicinity of the site are mapped as Lincoln Creek Formation [OEm(lc)]. At the site, this geologic formation generally consisted of marine sedimentary rock (MSR; tuffaceous siltstone and fine-grained sandstone) and non-marine volcanoclastic rock (basaltic sandstone with interbedded pyroclastic rock).

The subsurface conditions observed in LAI's June 2019 explorations were generally consistent with the mapped geologic conditions for the site, with the exception of undocumented fill encountered in one boring.

2.2 Surface Conditions

The site consists of a gravel-paved access road, pump house, and generator pad, built into a 30 to 50 percent slope. The pump station is located at an elevation 25 ft lower than the nearby water treatment plant. The access road to the plant spans the slope and terminates at the existing pump house.

The site features coniferous and deciduous trees with an understory of vegetation common to the area. Existing site features and topography are shown on Figure 2.

2.3 Subsurface Explorations

On June 18, 2019, LAI explored site subsurface conditions by advancing two hollow-stem auger borings (B-1 and B-2) 31.5 to 40.3 ft below ground surface (bgs). The borings were advanced at the approximate locations shown on Figure 2. LAI personnel collected representative soil samples from the explorations. The samples were transported to LAI's soils laboratory for examination and testing.

The following sections summarize the subsurface soil and groundwater conditions observed in the explorations. More detailed information, including summary exploration logs, is provided in Appendix A. A description of laboratory test procedures and the test results are presented in Appendix B.

2.3.1 Soil Conditions

The soils observed underlying existing surface conditions (i.e., topsoil, gravel surfacing) can be categorized into two general units:

- **Fill:** Observed in boring B-2, this unit consisted of brown silt with gravel in a medium stiff, moist condition. The fill extended 4 ft bgs.
- **Lincoln Creek Formation:** Observed underlying the gravel surfacing in boring B-1 and the fill in boring B-2, this unit consisted of MSR and non-MSR (siltstone). The MSR was weathered and generally consisted of very silty to silty sand (weathered sandstone) or elastic silt with varying sand and gravel content (weathered siltstone) in a medium dense to very dense or stiff to hard condition. The MSR extended 40 ft bgs in boring B-1, and 31.5 ft bgs (the full depth explored) in boring B-2. Medium hard, gray siltstone was observed beneath the MSR in boring B-1. Boring B-1 terminated in the siltstone at 40.3 ft bgs.

2.3.2 Groundwater

During the June 2019 field investigation, groundwater was observed at 19 ft bgs in boring B-1. Groundwater was not observed in boring B-2. LAI interpreted the groundwater to be a perched layer at the contact between the MSR and siltstone. The groundwater conditions reported herein are for the specific locations and date indicated, and may not be indicative of other locations and/or times. Groundwater conditions will vary depending on local subsurface conditions, weather conditions, and other factors. Furthermore, groundwater conditions are expected to fluctuate seasonally, with maximum groundwater levels occurring during late winter and early spring.

3.0 GEOLOGICALLY HAZARDOUS AREA ASSESSMENT

The City proposes to construct the replacement pump station on a steep slope. LAI evaluated the proposed improvements in accordance with Title 17 of the Chehalis Municipal Code (CMC).

3.1 Landslide Hazard Areas

On June 11, 2019, LAI representatives evaluated slopes adjacent to the proposed location of the replacement pump station. LAI did not observe signs of historical or current slope instability or groundwater seepage. LAI discussed the site history with City personnel, who indicated there is no record of historical slope movement at the site. Based on LAI's review of topographic information, the site slope (slope between upper and lower portions of the access road) and the adjacent slope (slope below the lower access road) are inclined at 25 to 50 percent. The average overall slope inclination is approximately 30 to 35 percent.

Per Chapter 17.24.010 of the CMC, 30 percent or greater slopes with a vertical relief of more than 10 ft qualify as sensitive slope areas. Accordingly, the slopes at, and adjacent to, the site should be designated a sensitive slope area. No other landslide hazard characteristics were identified during LAI's slope evaluation. Because the site encompasses a sensitive slope area, the proposed improvements will be made within a landslide hazard area (LHA). Development within an LHA is permitted, provided it complies with the standards in Section 17.24.020(C) of the CMC.

LAI used the software program SLIDE Version 8 (RocScience 2018) to evaluate slope stability in pre- and post-construction static and dynamic conditions. LAI's slope stability analysis was based on the soil conditions encountered in LAI's June 2019 explorations, the proposed development plans, and the minimum seismic horizontal acceleration provided in the 2015 International Building Code (IBC; ICC 2014). The results of the analyses indicate a 5 percent increase in the factor of safety against landsliding for the site slope, and a negligible impact to the adjacent slope. Increased slope stability, post-construction, is attributed to the pump station wall acting as a retaining wall, stronger than the soils being replaced.

Given the negligible impacts indicated by the slope stability model, LAI does not recommend establishing LHA buffers at the site. However, stockpiled material should not be allowed within 10 ft of the top of slope, and all stockpiles should be limited to 10 cubic yards (cy) or less (one truck load). Stockpiles greater than 10 cy should be located within the area shown on Figure 2. All construction activities should be performed within established clearing limits along the existing access road. Encroachment of slopes outside of clearing limits should not be allowed.

Provided the design and construction recommendations within this report are followed, it is LAI's opinion that the proposed project meets the requirements for development within an LHA. The proposed project will not affect development on the subject property or other properties, and will not result in a greater risk or a need for increased buffers on neighboring properties.

3.2 Erosion Hazard Areas

A description of near-surface site soils was obtained from the Natural Resources Conservation Service's Web Soil Survey (NRCS 2018; accessed July 17, 2019). The survey shows two soil units at the site: Buckpeat silt loam 30 to 65 percent slopes and Melbourne loam 15 to 30 percent slopes. Given the severe erosion potential of these soil units, the site should be classified as an erosion hazard area (EHA), per the CMC. Development within an EHA must comply with the standards in Section 17.24.030 of the CMC.

3.3 Seismic Hazard Areas

Data from the Washington State Department of Natural Resources' Geologic Information Portal (2010; accessed July 18, 2019) indicate that the site is not susceptible to liquefaction. Additionally, LAI's slope stability analysis indicates that the site is not susceptible to seismic instability. Site conditions do not constitute a seismic hazard area.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of LAI's field investigation, laboratory testing, and engineering analyses, site subsurface conditions are suitable for the proposed improvements, provided the recommendations contained herein are incorporated into the project design:

- The site is located within an LHA and an EHA. Development plans should limit the project footprint, and all clearing limits should be marked in the field before beginning earthwork activities. Vegetation outside of the project footprint should not be disturbed.
- To mitigate potential impacts to the LHA, the proposed pump station will be built into the site slope, and the foundation walls/rear wall of the structure should be designed to resist earth pressures imparted by sloping ground.
- Moisture-sensitive soils (noted as ML, MH, or SM on the boring logs in Appendix A) will be exposed within excavations and at the subgrade elevation for shallow foundations. LAI recommends placing a 6-inch-thick bearing pad below shallow foundations and on-grade slabs to limit disturbance of moisture-sensitive soils and provide a firm working surface. Site soils are not considered suitable for reuse as structural fill.

4.1 Pump Station Design

Geotechnical design recommendations for the proposed pump station are provided in the following sections.

4.1.1 Seismic Conditions

LAI understands that seismic design will be performed in accordance with the 2015 IBC standards (ICC 2014). The parameters in Table 1 can be used to compute seismic base shear forces.

Table 1. 2015 International Building Code Seismic Design Parameters

Spectral response acceleration at short periods (S_s) = 1.15g
Spectral response acceleration at 1-second periods (S_1) = 0.499g
Site class = C
Site coefficient (F_a) = 1.000
Site coefficient (F_v) = 1.301

g = force of gravity

Geologic material at the site generally consists of medium stiff to hard sedimentary rock deposits. In LAI's opinion, the site has a low risk for seismically-induced soil liquefaction or lateral spreading. Considering the location of the site with respect to the nearest known active crustal faults and the presence of a thick layer of marine deposits, the risk of ground rupture due to surface faulting is low.

4.1.2 Foundation Support

The shallow foundation support parameters in Table 2 should be used in conjunction with the complete recommendations in this report.

Table 2. Summary of Design Parameters

Allowable soil bearing pressure = 3,000 psf
Minimum foundation width = 18 inches

psf = pounds per square foot

When calculating design parameters, LAI assumed foundations would be established on firm, unyielding subgrade or import structural fill extending to such soils. The allowable soil bearing pressure applies to long-term dead and live loads, exclusive of the weight of the footing and any overlying backfill. The allowable soil bearing pressure can be increased by one-third for total loads, including transient loads, such as those induced by wind and seismic forces.

LAI recommends a minimum width of 18 inches for footings. For frost protection, exterior footings should be embedded at least 12 inches below the nearest adjacent grade. Assuming construction is completed as recommended, LAI estimates that spread footings will settle 1 inch or less, with differential settlement between similarly loaded foundation elements limited to ½ inch or less.

4.1.3 Foundation Wall Design

The foundation wall design parameters in Table 3 should be used in conjunction with the complete recommendations provided in this report.

Table 3. Foundation Wall Design Parameters

Parameter	Value	
	2.5H:1V Backslope	Level Backslope
Passive earth pressure (pcf)	230	230
Active earth pressure (pcf)	60	40
Seismic earth pressure (psf)	25*H	11*H
Ultimate coefficient of sliding	0.35	

H = height of wall

pcf = pounds per cubic foot

psf = pounds per square foot

LAI has assumed that walls will be free to yield, and active earth pressures can be used for design. For seismic loading conditions, the rectangular earth pressure (dependent on the wall height) should be added to the active earth pressure. Foundation walls may be supported on shallow foundations designed in accordance with the parameters in Table 2. LAI has assumed that the rear wall will

support a 2.5 horizontal to 1 vertical (2.5H:1V) slope, and the sidewalls will have level backslope conditions.

An allowable coefficient of sliding resistance of 0.35, applied to the vertical dead loads only, can be used to compute the frictional resistance acting on the base of footings. The allowable coefficient of sliding resistance includes a factor of safety of 1.5 on the calculated ultimate value. The value for the foundation passive earth pressure has been reduced by a factor of 1.5 to limit deflections to less than 2 percent of the embedded depth. The passive earth pressure and friction components can be combined, provided the passive component does not exceed two-thirds of the total; the top foot of soil should be excluded from the calculation, unless the foundation perimeter is covered by a slab-on-grade or pavement.

4.1.3.1 Wall/Perimeter Drainage

Drainage systems should be constructed to collect water and prevent buildup of hydrostatic pressure against retaining walls. A zone of free-draining backfill, at least 18 inches wide, should be included against the back of all foundation walls. Free-draining backfill should meet the requirements for Gravel Backfill for Walls in Section 9-03.12(2) of the Washington State Department of Transportation's *2018 Standard Specifications for Roadway, Bridge, and Municipal Construction (2018 WSDOT Standard Specifications)*. The free-draining backfill zone should extend to within 1 ft of the top of the wall. A perforated, rigid, smooth-walled drain pipe with a minimum diameter of 4 inches should be placed along the base of foundation walls within the free-draining backfill, and should extend the length of the wall. The perforated pipe should be connected to a tightline conveyance pipe that discharges to an approved location (not on sloping ground). LAI is available to discuss pipe discharge or drywell locations during final design.

4.1.4 Slab-On-Grade

Slabs-on-grade should be established on a subgrade that consists of uniformly firm, unyielding native soil or structural fill extending to such soil. Subgrades should be prepared as described in Section 4.2.

A modulus of vertical subgrade reaction (subgrade modulus) can be used to design the slabs-on-grade. The subgrade modulus will vary depending on the dimensions of the slab and the magnitude of applied loads on the slab surface; slabs with larger dimensions and loads are influenced by soils at a greater depth. LAI recommends using a subgrade modulus of 175 pounds per cubic inch for design of on-grade floor slabs. This subgrade modulus is for a 1-ft by 1-ft square plate, and is not the overall modulus of a larger area.

Slabs-on-grade in interior spaces should be underlain by a minimum 4-inch-thick capillary break layer to reduce the potential for moisture migration into the slab. The capillary break material should consist of well-graded sand and gravel containing less than 5 percent fines based on the fraction passing the ¾-inch sieve.

4.2 Construction Considerations

The following construction considerations should be reviewed during design and development of project specifications:

- **Site soils:** The fine-grained site soils have an above-optimum moisture content and should not be considered for reuse as structural fill. Because site soils are highly moisture sensitive, earthwork should be avoided during heavy and/or extended precipitation events.
- **Clearing and stripping:** Clearing and stripping activities should be minimized to the extent possible. Clearing limits should be indicated on the plans and marked in the field before beginning earthwork activities.
- **Erosion control:** All temporary and permanent slopes should be stabilized using appropriate best management practices. All disturbed areas should be revegetated to provide long-term erosion control.
- **Subgrade preparation:** Following stripping and excavating to the proposed subgrade elevation for structures and utilities, the subgrade should be evaluated by a qualified civil or geotechnical engineer, who is familiar with the project. If subgrades are not in a firm, unyielding condition following excavation, unsuitable soils should be overexcavated and replaced with structural fill. Soil overexcavation and replacement should be performed under the supervision of a geotechnical engineer.
- **Foundation bearing pads:** Moisture-sensitive soils are anticipated at the base of shallow foundations and on-grade slabs. To provide a firm working surface, LAI recommends overexcavating at least 6 inches of soil and replacing it with Crushed Surfacing Base Course (CSBC; bearing pad). CSBC should conform to the requirements in Section 9-03.9(3) of the *2018 WSDOT Standard Specifications*. The bearing pad should extend within the limits of the excavation.
- **Utility trench excavation:** LAI anticipates utility trenches will be excavated primarily within stiff to hard silt or dense to very dense sand. A heavy-duty hydraulic excavator should be able to excavate trenches to the expected depths. Upon reaching the trench bottom, a smooth-bladed bucket should be used to remove any loose and/or disturbed soil. The final trench bottom should be firm and free of roots, topsoil, lumps of silt and clay, and organic and inorganic debris. Trench boxes should provide adequate support for shallow excavations, provided the trench is properly dewatered and settlement-sensitive structures or utilities are not adjacent to the excavation. Trench boxes should meet the requirements in Safety Standards for Construction Work, Part N (Washington Administrative Code [WAC] Chapter 296-155).
- **Construction dewatering:** The low-permeability site soil does not readily transmit groundwater. Significant groundwater occurrence is not anticipated during excavation. However, perched groundwater zones may be encountered where excavations cross existing utility trenches. If perched groundwater zones are encountered, conventional sumps and pumps within the excavations should provide a dry, stable work area. The contractor should be responsible for design and implementation of dewatering systems.
- **Permanent slopes:** Alteration of existing grades should be avoided. Where required, permanent cut-or-fill slopes should be no steeper than 2H:1V. Permanent slopes should be protected from erosion and reseeded or revegetated as soon as practical.

- **Structural fill:** Imported structural fill should meet the requirements for Gravel Borrow in Section 9-03.14(1) of the *2018 WSDOT Standard Specifications*. If wet weather construction is anticipated, the amount of fines should be less than 5 percent by weight, based on the minus ¾-inch fraction.
- **Fill placement and compaction:** Structural fill should be placed on an approved subgrade that consists of uniformly firm, unyielding, inorganic native soils or compacted structural fill extending to such soils. Structural fill should be placed and compacted in accordance with Section 2-03.3(14)C, Method C of the *2018 WSDOT Standard Specifications*. Method A of the *2018 WSDOT Standard Specifications* is appropriate for non-structural areas, such as landscaping. Each layer of structural fill should be compacted to at least 95 percent of the maximum dry density as determined by the compaction control tests described in Section 2-03.3(14)D of the *2018 WSDOT Standard Specifications* or by ASTM International standard test method D1557.
- **Temporary excavations:** To limit the project footprint within the LHA, LAI recommends using a trench shoring system to install utilities where excavation depth exceeds 4 ft. Open-cut excavations may be allowed for construction of structures, but they should not extend beyond the clearing limits.

LAI recommends that temporary excavations be completed in accordance with the guidelines set forth in Section 2-09 of the *2018 WSDOT Standard Specifications*. Actual excavation trench configurations and the maintenance of safe working conditions, including temporary excavation stability, are the responsibility of the contractor. Temporary excavations in excess of 4 ft should be shored in accordance with the requirements outlined in Safety Standards for Construction Work, Part N (Washington State Department of Labor and Industries, WAC Chapter 296-155). The material likely to be exposed in the structural excavations should be considered Type C soil with a maximum allowable excavation inclination of 1.5H:1V. The parameters provided in Table 4 should be used to design engineered shoring systems.

Table 4. Recommended Soil Parameters for Design of Temporary Shoring

Soil Unit	Moist Unit Weight (pcf)	Submerged Unit Weight (pcf)	Cohesion (psf)	Internal Angle of Friction (degrees)
Fill	125	63	0	34
Lincoln Creek Formation	125	63	50	32

pcf = pounds per cubic foot

psf = pounds per square foot

5.0 USE OF THIS REPORT

Landau Associates, Inc. (LAI) prepared this report for the exclusive use of SCJ Alliance and the City of Chehalis for the proposed Chehalis Pump Station project in Chehalis, Washington. Within the limitations of scope, schedule, and budget, LAI's services have been conducted in accordance with generally accepted practices of the geotechnical engineering profession; no other warranty, express or implied, is made as to the professional advice included in this report.

The conclusions and recommendations contained in this report are based on the conditions observed during the field investigation. There may be some variation in subsurface soil and groundwater conditions, and the nature and extent of the variation may not become evident until construction. Accordingly, a contingency for unanticipated conditions should be included in the construction budget and schedule.

If variations in subsurface conditions are encountered during construction, LAI should be asked to review the recommendations in this report and revise as necessary. If there is a substantial lapse of time between the submission of this report and the start of construction, LAI should review the applicability of the conclusions and recommendations contained herein.

6.0 REFERENCES

- ASTM. 2012. D1557-12e1: Standard Test Methods for Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m<sup>3

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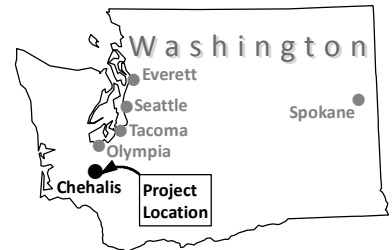
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USDA. Web Soil Survey. U.S. Department of Agriculture Natural Resources Conservation Service. Accessed July 17, 2019. Available online at: <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.</sup>

DRAFT



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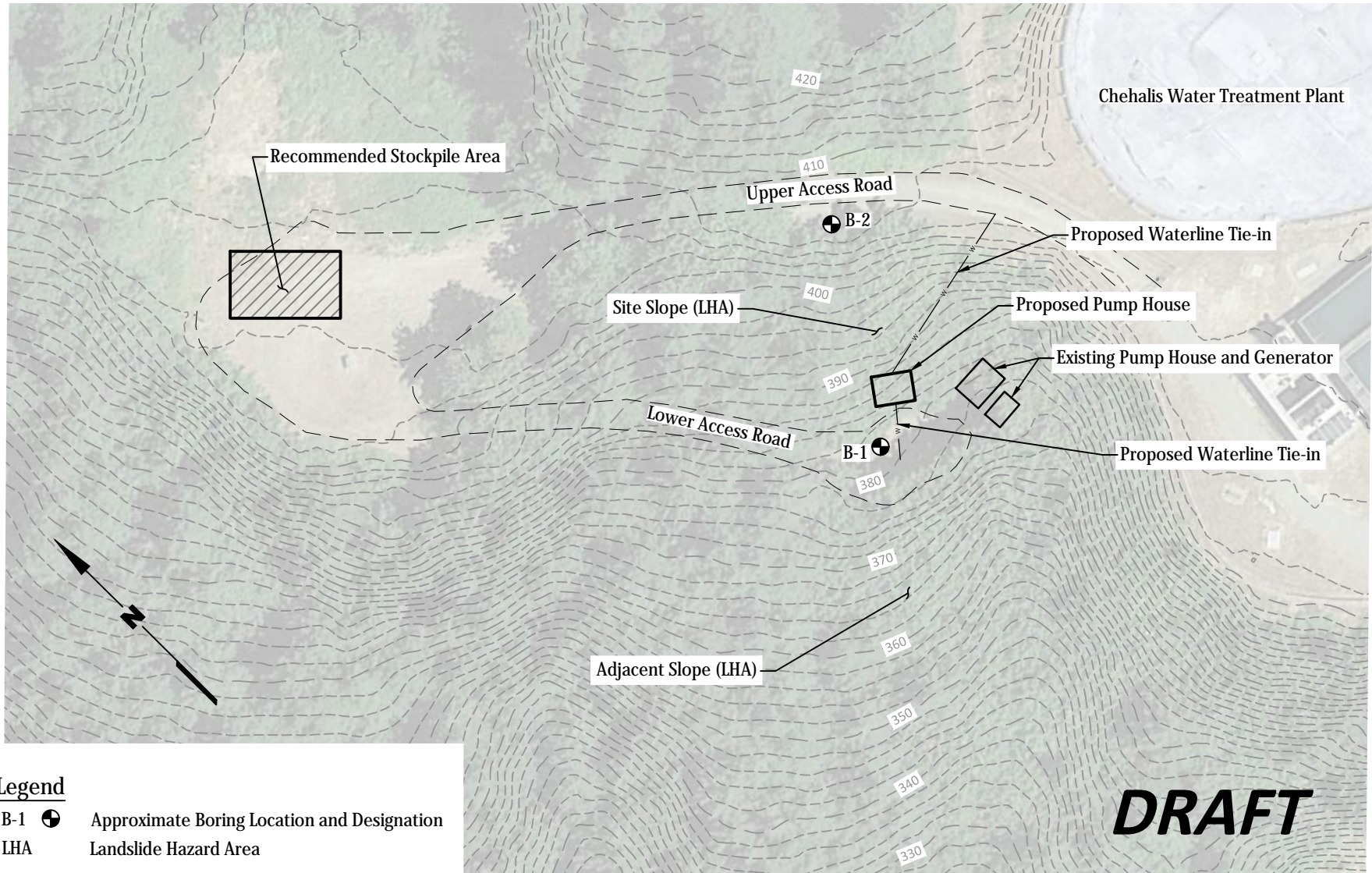
Data Source: Esri 2012



City of Chehalis
Chehalis Pump Station
Chehalis, Washington

Vicinity Map

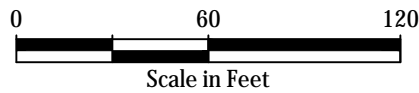
Figure
1



Legend

- B-1 Approximate Boring Location and Designation
- LHA Landslide Hazard Area

Image Source: Google Earth 2019



City of Chehalis
Chehalis Pump Station
Chehalis, Washington

Site and Exploration Plan

Figure
2

Field Explorations

APPENDIX A FIELD EXPLORATIONS

Site subsurface conditions were explored on June 18, 2019 by advancing and sampling two hollow-stem auger borings (B-1 and B-2) at the approximate locations shown on Figure 2. Holocene Drilling, Inc., subcontracted by Landau Associates, Inc. (LAI), advanced boring B-1 approximately 40.3 feet (ft) below ground surface (bgs), and boring B-2 approximately 31.5 ft bgs.

The field investigation was coordinated and monitored by LAI personnel, who also obtained representative soil samples, maintained a detailed record of the subsurface soil and groundwater conditions observed, and described the soil by visual and textural examination. Each representative soil type was described using the soil classification system shown on Figures A-1 and A-2, in general accordance with ASTM International standard test method D2488, *Standard Recommended Practice for Description of Soils (Visual-Manual Procedure)*. The summary logs on Figures A-3 and A-4 represent LAI's interpretation of the subsurface conditions identified during the field explorations. The stratigraphic contacts shown on the logs represent the approximate boundaries between soil types; actual transitions may be more gradual.

Disturbed soil samples were obtained from the borings at frequent intervals using a 1.5-inch inside-diameter, standard penetration test, split-spoon sampler. The sampler was driven 18 inches (or a portion thereof) into the undisturbed soil ahead of the auger bit with a 140-pound automatic hammer falling a distance of approximately 30 inches. The number of blows required to drive the sampler for the final 12 inches (or a portion thereof) of soil penetration is noted on the boring logs, adjacent to the appropriate sample notation. Samples were transported to LAI's soils laboratory for further examination and testing.

Upon completion of drilling and sampling, the boreholes were decommissioned in general accordance with the requirements of Washington Administrative Code 173-160.

Soil Classification System


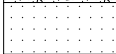


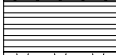
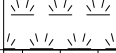
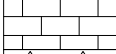




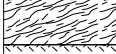
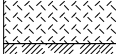

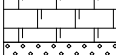


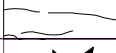


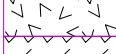

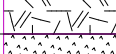

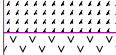


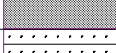
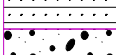
	MAJOR DIVISIONS	CLEAN GRAVEL (Little or no fines)	GRAPHIC SYMBOL	LETTER SYMBOL ⁽¹⁾	TYPICAL DESCRIPTIONS ⁽²⁾⁽³⁾
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
		CLEAN SAND (Little or no fines)		SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)	SILT AND CLAY (Liquid limit less than 50)		ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
		SILT AND CLAY (Liquid limit less than 50)		CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
		SILT AND CLAY (Liquid limit less than 50)		OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)	SILT AND CLAY (Liquid limit greater than 50)		MH	Inorganic silt; micaceous or diatomaceous fine sand
		SILT AND CLAY (Liquid limit greater than 50)		CH	Inorganic clay of high plasticity; fat clay
		SILT AND CLAY (Liquid limit greater than 50)		OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL		PT	Peat; humus; swamp soil with high organic content	

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

- Notes:
- USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
 - Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
 - Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:
 - Primary Constituent: > 50% - "GRAVEL," "SAND," "SILT," "CLAY," etc.
 - Secondary Constituents: > 30% and ≤ 50% - "very gravelly," "very sandy," "very silty," etc.
 - > 15% and ≤ 30% - "gravelly," "sandy," "silty," etc.
 - Additional Constituents: > 5% and ≤ 15% - "with gravel," "with sand," "with silt," etc.
 - ≤ 5% - "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.
 - Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key		Field and Lab Test Data																																																				
SAMPLER TYPE	SAMPLE NUMBER & INTERVAL																																																					
<table border="0" style="width: 100%;"> <tr> <th style="text-align: left;">Code</th> <th style="text-align: left;">Description</th> </tr> <tr><td>a</td><td>3.25-inch O.D., 2.42-inch I.D. Split Spoon</td></tr> <tr><td>b</td><td>2.00-inch O.D., 1.50-inch I.D. Split Spoon</td></tr> <tr><td>c</td><td>Shelby Tube</td></tr> <tr><td>d</td><td>Grab Sample</td></tr> <tr><td>e</td><td>Single-Tube Core Barrel</td></tr> <tr><td>f</td><td>Double-Tube Core Barrel</td></tr> <tr><td>g</td><td>2.50-inch O.D., 2.00-inch I.D. WSDOT</td></tr> <tr><td>h</td><td>3.00-inch O.D., 2.375-inch I.D. Mod. California</td></tr> <tr><td>i</td><td>Other - See text if applicable</td></tr> <tr><td>1</td><td>300-lb Hammer, 30-inch Drop</td></tr> <tr><td>2</td><td>140-lb Hammer, 30-inch Drop</td></tr> <tr><td>3</td><td>Pushed</td></tr> <tr><td>4</td><td>Vibrocore (Rotasonic/Geoprobe)</td></tr> <tr><td>5</td><td>Other - See text if applicable</td></tr> </table>	Code	Description	a	3.25-inch O.D., 2.42-inch I.D. Split Spoon	b	2.00-inch O.D., 1.50-inch I.D. Split Spoon	c	Shelby Tube	d	Grab Sample	e	Single-Tube Core Barrel	f	Double-Tube Core Barrel	g	2.50-inch O.D., 2.00-inch I.D. WSDOT	h	3.00-inch O.D., 2.375-inch I.D. Mod. California	i	Other - See text if applicable	1	300-lb Hammer, 30-inch Drop	2	140-lb Hammer, 30-inch Drop	3	Pushed	4	Vibrocore (Rotasonic/Geoprobe)	5	Other - See text if applicable		<table border="0" style="width: 100%;"> <tr> <th style="text-align: left;">Code</th> <th style="text-align: left;">Description</th> </tr> <tr><td>PP = 1.0</td><td>Pocket Penetrometer, tsf</td></tr> <tr><td>TV = 0.5</td><td>Torvane, tsf</td></tr> <tr><td>PID = 100</td><td>Photoionization Detector VOC screening, ppm</td></tr> <tr><td>W = 10</td><td>Moisture Content, %</td></tr> <tr><td>D = 120</td><td>Dry Density, pcf</td></tr> <tr><td>-200 = 60</td><td>Material smaller than No. 200 sieve, %</td></tr> <tr><td>GS</td><td>Grain Size - See separate figure for data</td></tr> <tr><td>AL</td><td>Atterberg Limits - See separate figure for data</td></tr> <tr><td>GT</td><td>Other Geotechnical Testing</td></tr> <tr><td>CA</td><td>Chemical Analysis</td></tr> </table>	Code	Description	PP = 1.0	Pocket Penetrometer, tsf	TV = 0.5	Torvane, tsf	PID = 100	Photoionization Detector VOC screening, ppm	W = 10	Moisture Content, %	D = 120	Dry Density, pcf	-200 = 60	Material smaller than No. 200 sieve, %	GS	Grain Size - See separate figure for data	AL	Atterberg Limits - See separate figure for data	GT	Other Geotechnical Testing	CA	Chemical Analysis
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Approximate water level at time of drilling (ATD)																																																						
Approximate water level at time after drilling/excavation/well																																																						

Rock Classification System

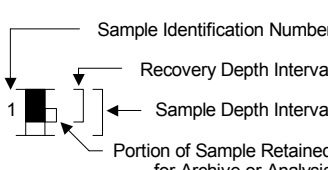
Primary Rock Types				
Sedimentary	Clastic		Conglomerate	
			Sandstone/ Sedimentary Quartzite	
			Siltstone/Graywacke	
			Claystone/Mudstone	
			Shale	
			Coal	
			Limestone/Dolomite	
	Crystalline		Gypsum/Halite/ Anhydrite	
			Chert	
			Gneiss/Schist	
Metamorphic	Foliated		Schist/Talc	
			Phyllite	
			Slate	
			Mylonite	
			Marble	
	Massive		Quartzite	
			Hornfels	
			Serpentine/Soapstone/ Greenstone	
	Igneous	Phaneritic <small>(Individual crystals distinguishable with unaided eye.)</small>		Granite
				Monzonite/ Quartz Monzonite
			Granodiorite/ Diorite Quartz Diorite	
			Gabbro	
			Diabase/Perioite	
Aphanitic <small>(Crystals not distinguishable or visible crystals in a fine-grained groundmass.)</small>			Rhyolite	
			Latite/Quartz Latite	
			Dacite/Andesite	
Glassy			Obsidian/ Pumice/Scoria	
			Agglomerate/ Breccia/Tuff	
Pyroclastic		Bombs/Blocks/ Cinders/Ash		


Relative Hardness			
Term	Designation	Approx. Unconfined Compressive Strength	Field Identification
Extremely Soft	R0	< 100 psi	Moldable or friable with finger pressure.
Very Soft	R1	100 - 1,000 psi	Peeled by knife with ease. Crumbles under firm blows with point of a geology pick.
	R2	1,000 - 4,000 psi	Peeled by knife with difficulty. Shallow indentation made by firm blow of geology pick.
Medium Hard	R3	4,000 - 8,000 psi	Scratched by knife with ease. Fractured with a single firm blow of hammer/geology pick.
	R4	8,000 - 16,000 psi	Scratched by knife with difficulty. Several hard hammer blows required to fracture.
Very Hard	R5	> 16,000 psi	Cannot be scratched with knife. Many hard hammer blows required to fracture or chip.

Relative Weathering	
Fresh	Crystals are bright; no discoloration in rock fabric
Slightly Weathered	Some discoloration in rock fabric; decomposition extends up to 1 inch
Moderately Weathered	Rock mass is decomposed 50 % or less
Predominately Decomposed	Rock mass is more than 50 % decomposed; can be excavated with pick
Decomposed	Completely decomposed; can be reduced to soil with hand pressure

Structural Descriptions			
Spacing (in)	Bedding/Foliation	Joint/Shear/Fracture	Attitude and Angle
< 2	Very Thin	Very Close	Horizontal (0-5°)
2 - 12	Thin	Close	Shallow or Low Angle (5-35°)
12 - 36	Medium	Moderately Close	Moderately Dipping (35-55°)
36 - 120	Thick	Wide	Steep or High Angle (55-85°)
> 120	Very Thick	Very Wide	Vertical (85-90°)

Core Recovery and Rock Quality Designation	
$\text{Core Recovery} = \frac{\text{length of core recovered}}{\text{total length of core run}} \times 100$	
$\text{RQD} = \frac{\text{total length of all pieces 4 inches or greater}}{\text{total length of core run}} \times 100$	

Coring and Sampling Key																	
SAMPLE NUMBER & INTERVAL	SAMPLER TYPE																
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>e</td> <td>Other - See text if applicable</td> </tr> <tr> <td>f</td> <td>Single Tube Core Barrel</td> </tr> <tr> <td>g</td> <td>Double Tube Core Barrel</td> </tr> <tr> <td>4</td> <td>Other - See text if applicable</td> </tr> <tr> <td>5</td> <td>Air Rotary</td> </tr> <tr> <td>6</td> <td>Wash Rotary</td> </tr> <tr> <td>7</td> <td>Rotosonic</td> </tr> </tbody> </table>	Code	Description	e	Other - See text if applicable	f	Single Tube Core Barrel	g	Double Tube Core Barrel	4	Other - See text if applicable	5	Air Rotary	6	Wash Rotary	7	Rotosonic
Code	Description																
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f	Single Tube Core Barrel																
g	Double Tube Core Barrel																
4	Other - See text if applicable																
5	Air Rotary																
6	Wash Rotary																
7	Rotosonic																

Field and Lab Test Data		Groundwater
Code W = 10 D = 120 CS = 1.0 TS = 0.5 GT CA	Description Moisture Content, % Dry Density, pcf Compressive Strength, tsf Tensile Strength, tsf Other Geotechnical Testing Chemical Analysis	 Approximate water elevation at time of drilling (ATD) or on date noted. Groundwater levels can fluctuate due to precipitation, seasonal conditions, and other factors.

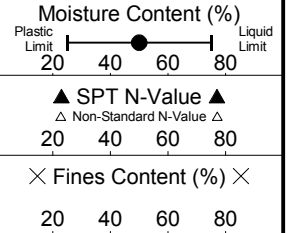
B-1

LAI Project No: 1174035.010

SAMPLE DATA

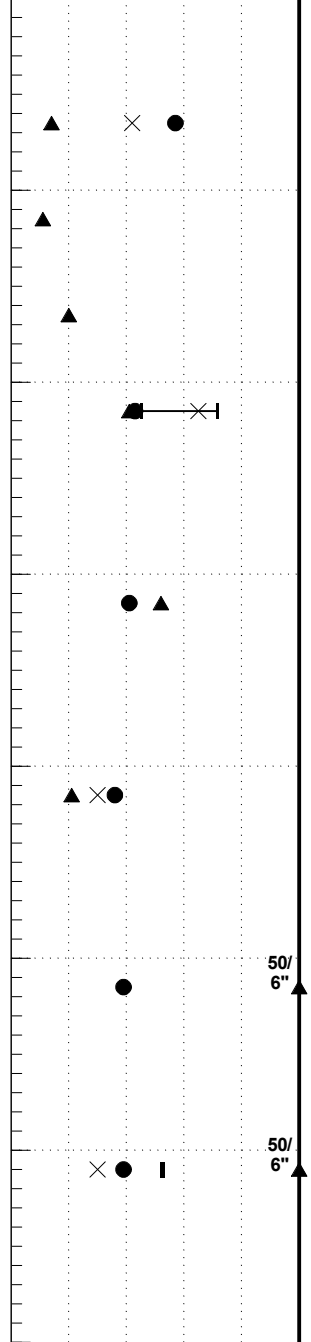
SOIL PROFILE

Groundwater



Drilling Method: Hollow-Stem Auger
 Ground Elevation (ft): 381.0
 Drilled By: Holocene Drilling Inc.
 Logged By: DAR Date: 06/18/19

Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Description
380		S-1	b2	14	W = 57 -200 = 42	GP-GM SM		Gray, angular, fine to coarse GRAVEL with sand and silt (medium dense, moist) (GRAVEL SURFACING) Brown, very silty, fine to coarse SAND (medium dense, moist) (LINCOLN CREEK FORMATION)
375		S-2	b2	11				
370		S-3	b2	20		MH		Mottled orange/brown, very sandy, elastic SILT (very stiff, moist)
370		S-4	b2	41	W = 43 -200 = 65 AL			-Grades to hard
365		S-5	b2	52	W = 41			
360		S-6	b2	21	W = 36 -200 = 30	SM		Reddish-brown, very silty, fine to coarse SAND (medium dense, moist)
355		S-7	b2	50/6"	W = 39			-Grades to gray and very dense
350		S-8	b2	50/6"	W = 39 -200 = 30 AL			
350						MH		Gray SILT (hard, moist)



- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1174035.01 7/23/19 Y:\1174035.010\1174035.010.011.GPJ SOIL BORING LOG WITH GRAPH



Chehalis Pump Station
Chehalis, Washington

Log of Boring B-1

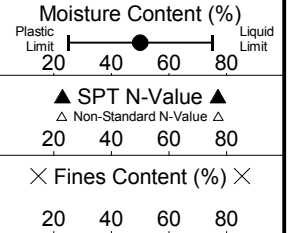
Figure
A-3
(1 of 2)

B-1

LAI Project No: 1174035.010

SAMPLE DATA

SOIL PROFILE



Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Description
35	345	S-9	b2	50/6"			MH	Gray SILT (hard, moist) -Grades to without sand -Grades to wet
40		S-10	b2	50/3"			SLS	Gray SILTSTONE; medium hard (R3); includes sand; (volcaniclastic sedimentary rock)

38.0 ft Perched Groundwater

Boring Completed 06/18/19
Total Depth of Boring = 40.3 ft.

DRAFT

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1174035.01 7/23/19 Y:\1174035.010\1174035.010.011.GPJ SOIL BORING LOG WITH GRAPH



Chehalis Pump Station
Chehalis, Washington

Log of Boring B-1

Figure
A-3
(2 of 2)

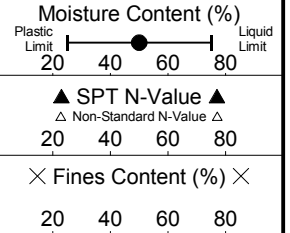
B-2

LAI Project No: 1174035.010

SAMPLE DATA

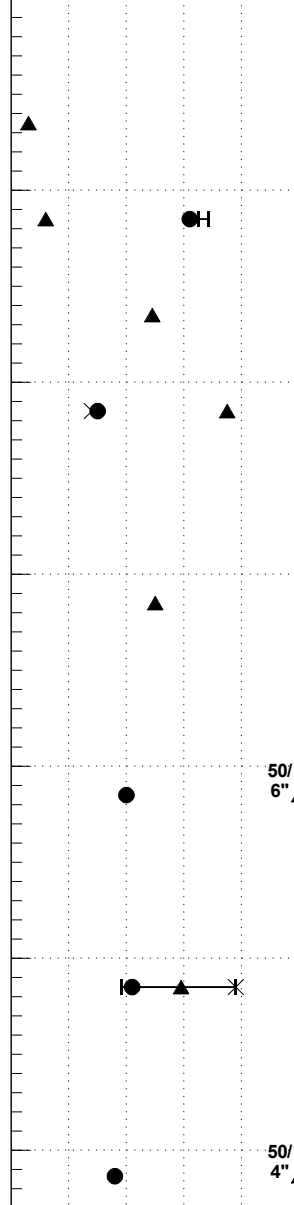
SOIL PROFILE

Groundwater



Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Description
0	408.0					ML ML		2 inches of sod over 3 inches of dark brown, sandy SILT with organics (soft, moist) (TOPSOIL) Brown SILT with gravel (medium stiff, moist) (FILL)
405		S-1	b2	6				
5		S-2	b2	12	W = 62 AL		MH	Brown, elastic SILT (stiff, moist) (LINCOLN CREEK FORMATION)
400		S-3	b2	49			SM	Brown, silty, fine to coarse SAND (dense, moist)
10		S-4	b2	75	W = 30 GS			-Grades to very dense
395								
15		S-5	b2	50				-Grades to dense
390							MH	Mottled orange/gray, very sandy, elastic SILT (hard, moist)
20		S-6	b2	50/6"	W = 40			
385								
25		S-7	b2	59	W = 42 GS AL			
380								
30		S-8	b2	50/4"	W = 36			-Grades to gray

Groundwater Not Encountered



Boring Completed 06/18/19
Total Depth of Boring = 31.5 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1174035.01 7/23/19 Y:\1174035.010\1174035.010.011.GPJ SOIL BORING LOG WITH GRAPH



Chehalis Pump Station
Chehalis, Washington

Log of Boring B-2

Figure
A-4

Laboratory Testing

APPENDIX B LABORATORY TESTING

To facilitate soil classification, natural moisture content determinations, Atterberg limit determinations, U.S. No. 200 wash tests, and grain size analyses were performed on select samples obtained from the borings. Laboratory testing was performed in accordance with the ASTM International (ASTM) standard test methods described below. The samples were checked against the field log descriptions, which were updated where appropriate in general accordance with ASTM standard test method D2487.

Natural Moisture Content

Natural moisture content determinations were performed in accordance with ASTM standard test method D2216. The natural moisture content is shown as $W = xx$ (i.e., percent of dry weight) at the respective sample depth in the column labeled "Test Data" on the summary boring logs in Appendix A.

Atterberg Limit Determination

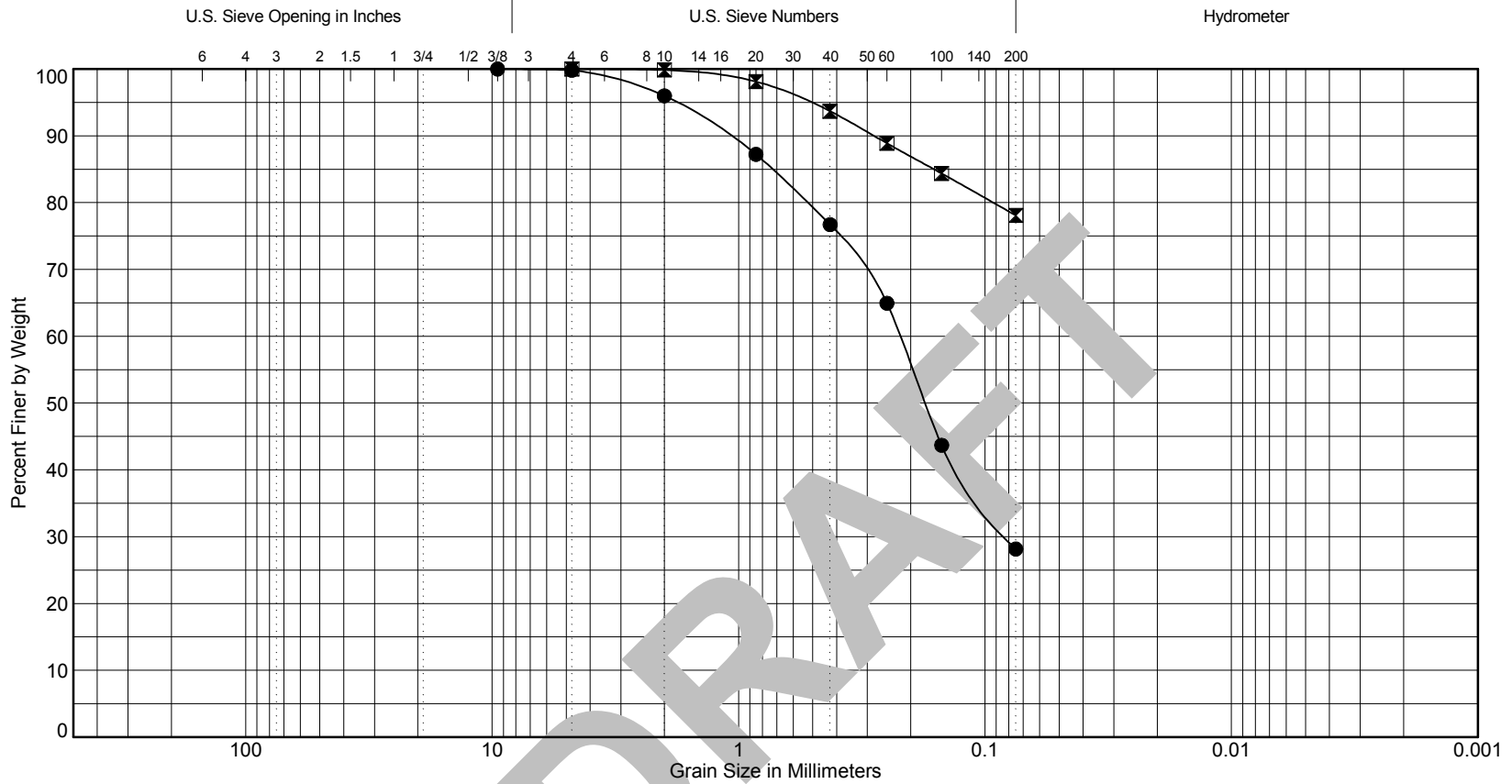
The liquid limit (LL), plastic limit (PL), and plasticity index (PI) were determined in accordance with ASTM standard test method D4318. The tests were conducted on fine-grained soil samples to estimate engineering properties of the soil. Test results are summarized on Figure B-2.

U.S. No. 200 Wash

To provide an indication of the amount of fines present, select soil samples were washed over a U.S. No. 200 sieve in accordance with ASTM standard test method C117. Samples selected for U.S. No. 200 wash are designated with a "-200 = xx" in the column labeled "Test Data" on the summary boring logs in Appendix A.

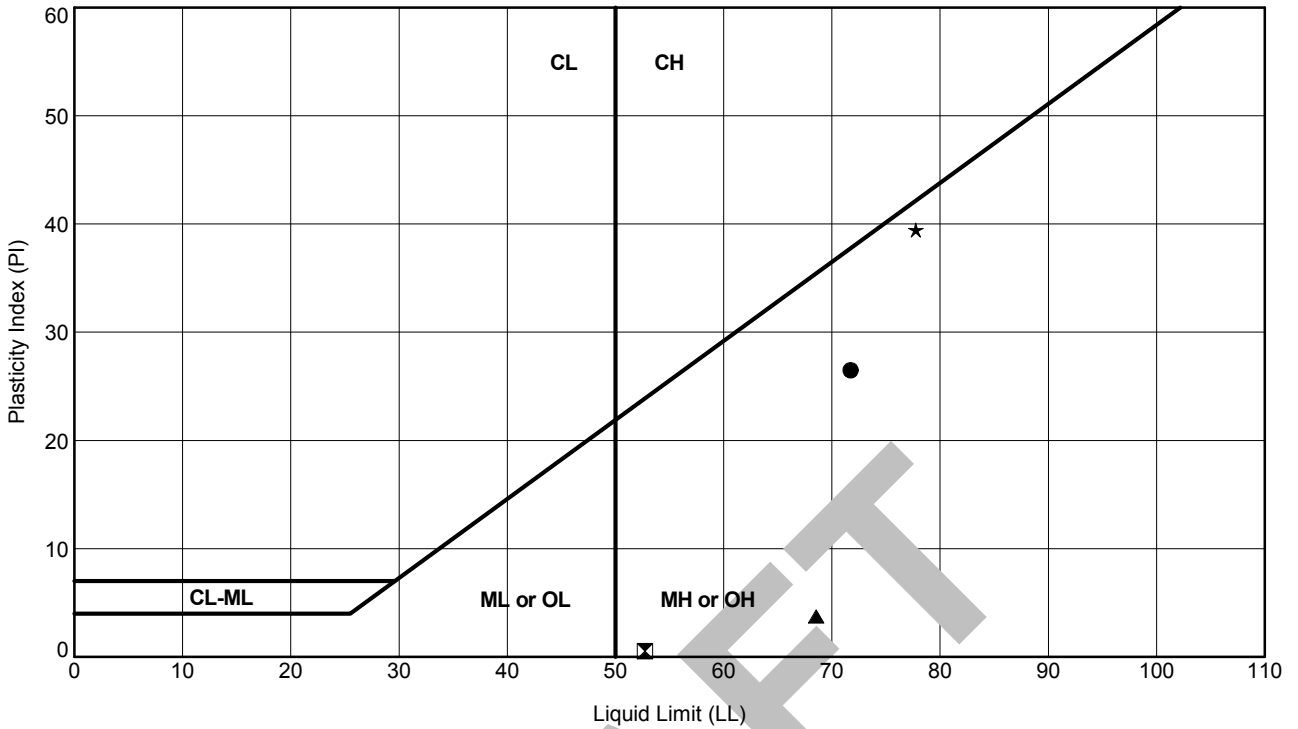
Grain Size Analysis

To provide an indication of the grain size distribution of site soil, sieve analyses were conducted in accordance with ASTM standard test method D422. Samples selected for grain size analyses are designated with a "GS" in the column labeled "Test Data" on the summary boring logs in Appendix A. Results of the grain size analyses are presented in the form of grain size distribution curves on Figure B-1.



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	B-2	S-4	10.0	30	Silty, fine to coarse SAND	SM
◻	B-2	S-7	25.0	42	Very sandy, elastic SILT	MH



ATTERBERG LIMIT TEST RESULTS

Symbol	Exploration Number	Sample Number	Depth (ft)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	B-1	S-4	10.0	72	45	27	43	Elastic SILT	MH
⊠	B-1	S-8	30.0	53	52	1	39	Very silty SAND	SM
▲	B-2	S-2	5.0	69	65	4	62	Elastic SILT	MH
★	B-2	S-7	25.0	78	38	40	42	Very sandy, elastic SILT	MH

ASTM D 4318 Test Method

1174035.01 7/23/19 Y:\1174035.010\1174035.010.011.GPJ ATTERBERG LIMITS FIGURE

SECTION 01 10 00
SUMMARY OF WORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK COVERED BY THE CONTRACT DOCUMENTS

- A. Briefly, and without force and effect upon the Contract Documents, the Work of the Contract can be summarized as follows:

Constructing a proposed pump station, which includes excavation, grading, stormwater facilities, water main connections, and other work as shown in the Contract Documents.
- B. The Work is included in a single Lump Sum Bid.

1.3 SPECIAL REQUIREMENTS

- A. Special requirements and conditions apply to the work of this contract and are intended to limit the disruption of existing operations. Refer to Section TEMPORARY FACILITIES & CONTROLS, Section 01 50 00.
- B. The Contractor shall photograph and videotape in sufficient detail the grounds of all areas that will be affected by construction and haul routes to substantiate existing conditions that might otherwise be construed as damage caused by the Contractor. Date all material and deliver a copy to the Owner within (7) days following the Notice to Proceed. Any damage within the limits of construction or areas used by the Contractor outside of the limits of construction shall be the responsibility of the Contractor to repair unless the damage can be positively identified by photograph or videotape as being a previously existing condition.

1. Photo-documentation of special, secure areas may require special handling and storage. Owner will identify when these circumstances are present and how the photo-documentation will be handled

1.4 HAZARDOUS MATERIALS

- A. No hazardous materials have been identified or are known to exist within the project area at the time of bid. Should any work activities by this Contract discover/disturb any hazardous material, the Contractor is directed to immediately cease work activity in the area found to be potentially hazardous, notify the Owner, and await Owner's directions as the appropriate action to be initiated.
- B. All products used in the construction shall be asbestos free. Products which are described as "less than 1% asbestos" or "virtually asbestos free" are not acceptable. Only products which are asbestos free are permitted in the construction of this project.
- C. All paint products used in the construction shall be lead free.

1.5 WORK UNDER OTHER CONTRACTS

- A. Work on the Project which may be executed by others and which is excluded from this Contract, are as follows:
 1. Prior to the Contractor's Notice to Proceed, the Owner will remove all moveable items within the limits of construction that are not identified to remain or be removed or reused by the contractor.

2. The removal from the construction area of any containers of toxic or hazardous chemicals or materials is to be accomplished by the Owner prior to any construction activities commencing. Should there be any known hazardous materials left in the construction area, Contractor shall be informed by the Owner pursuant to Article 5.07 of the General Conditions.
 - B. The Contractor shall be aware that the Owner is planning on undertaking a number of other distinct projects which will be occurring in and around the project site during the duration of this project. At the time of bid, those projects include:
 1. None at this time.
 - C. Cooperate fully with separate contractors so that work under those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.
- 1.6 CONTRACTOR'S WORK & RESPONSIBILITIES – GENERAL
- A. Unless otherwise indicated, Contractor's work and responsibilities include, but are not limited to the following:
 1. Providing and paying for labor, materials, equipment, tools, machines, facilities, and services necessary for proper execution and completion of work.
 2. Paying required taxes.
 3. Securing and paying for, the following items as necessary for proper execution and completion of work (as applicable at time or receipt of Bid):
 - a. Permits; See 01 11 00 - 8.
 - b. Fees.
 - c. Licenses.

- d. Inspections, unless otherwise noted.
 - e. Connection and tap charges.
 4. Enforcing strict discipline and good order among employees.
 - a. Smoking shall not be permitted within any building or within 25 feet of any building entrance. Smoking shall not be permitted on building rooftops or parking garages
 - b. No Contractor employee shall bring family members or animals onto project site.
 5. Using new materials, unless otherwise noted.
 6. Maintaining required egress and other requirements in accordance with governing Codes and Ordinances throughout the work.
 7. Disposing of demolition debris and other non-usable items on a regular basis. Do not allow debris to accumulate. Do not leave food waste to attract rodents.
 8. Maintaining all existing utilities used by State personnel.
 9. Maintain in a secure state all areas used or controlled by the Contractor.
 10. Compliance with all OSHA and WISHA requirements.
 11. Ensuring that all subcontractors are familiar with requirements of Division 0, Division 1, and the work of other sections related to its own work.
 12. Giving required notices.
 13. Providing hazard free Project site.
- B. Do not employ on work persons not skilled in assigned tasks.

1.7 WORKING HOURS

- A. The existing pump station on site will still be in operation during construction. At any given time, the Owner may or do operate twenty-four (24) hours per day, seven (7) days per week.
- B. Contractor's normal working hours for this project shall be defined as follows:
Normal working hours for this project are defined as 7:00am to 6:00pm Monday through Friday. Outside working hours for this project are defined as 6:00pm to 5:00am Monday through Friday. Construction phasing and work hours are identified in the Contract Documents.
Contractor's normal working hours may, at Contractor's option, also include weekends which shall be defined as beginning at 6:00pm Friday evening and ending at 5:00am Monday morning.
Owner approval of weekend work must be obtained before weekend work will be permitted. Contractor shall notify Owner of intent to engage in weekend work a minimum of seven (7) days in advance of dates of work. Owner reserves right to deny request for weekend work depending on potential conflicts with other activities that may be occurring. Denial of request for weekend work shall not be cause for a delay claim to project.
- C. All service outages and electrical tie-ins will be required to be made at specific times and may occur only with advance notification and Owner approval. The Contractor shall be responsible for scheduling and completing this work in compliance with the requirements of the contract documents. Refer to Temporary Facilities & Controls for scheduling service interruptions and outages with the Owner. Refer to Project Coordination for specified utility outage and tie-in requirements.
- D. Weekly and Special construction meetings during the workday are to be

attended by the Contractor's Project Manager, Superintendent, Quality Control Representative and Sub-contractor representative(s) of current work in progress.

The construction meetings shall be held at the **project location**.

- E. At the end of the Contractor's normal working hours, adjacent areas to the Project shall be suitable for normal operations. The Contractor shall continue working, at no additional cost, to rectify anything affecting normal operations caused by Contractor work.
- F. The Contractor shall provide the Owner a contact list of people who are capable of addressing an emergency issue that may occur outside of Contractor's normal working hours. See 01 31 15.

1.8 PREMIUM PAY

- A. Any overtime required to complete this Project outside the Contractor's defined normal working hours shall be included as a part of this contract. No additional payments will be authorized for work performed on weekends, holidays, time required to attend meetings outside the Contractor's normal working hours, or time outside the Contractor's normal working hours required to communicate any identified issues from a previous work shift.

1.9 OWNER'S USE OF PREMISES

- A. Owner will make the site and all areas accessible to the Contractor by the date of the Notice to Proceed.
- B. Owner will maintain existing lawn and landscape areas outside the Contractor's limits of construction.
 - 1. During the project contract time, the contractor is to maintain the appearance of landscaping, grass and other features within its limits of construction as they were when turned over to the contractor.

2. Contractor shall provide reasonable and safe access to Owner's personnel as needed for maintenance of these areas.
- C. Owner's personnel will be present on a limited basis during the construction period as necessary to maintain or inspect existing facilities.
 1. Contractor shall provide Owner's personnel reasonable and safe access and escort as needed to maintain and inspect facilities.

1.10 CONTRACTOR USE OF THE PREMISES

- A. During the construction period the Contractor shall have use of the premises in areas containing project work as indicated in the Contract Documents.

Coordinate ingress and egress to minimize disruption of traffic and Owner's use of the premises. Contractors shall not block ingress and egress to accessible entrance, accessible routes of travel or accessible parking.
- B. Contractor shall control, secure and have responsibility for certain portions of the project site and building areas from the date when the area is vacated made available by Owner to the date of Substantial Completion. These areas shall generally include:
- C. Monitor and secure portions of the buildings and site under Contractor's control to prevent unauthorized access. Inspect premises at end of each work day to ensure all doors are locked and exterior openings are closed and secure.
- D. Keep existing driveways and entrances serving the premises clear at all times. Do not use these areas for parking or storage of materials, except where noted.
- E. Do not unreasonably encumber the sites with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary, obtain and pay for such storage off-site.

- F. Limit construction access to only those areas that require work under this Contract.
- G. Contractor is fully responsible for damage or loss that occurs to existing facilities, occupants and public as a result of the work performed. Take precautions to protect existing facilities, occupants and public. Immediately repair or replace items damaged or lost as a result of work under the Contract.
- H. Cooperate fully with the Owner during construction operations to minimize disruptions of Owner's operations at and around the project site.
- I. Assume full responsibility for protection and safekeeping of products stored on-site.
- J. Do not use the following area except as indicated:
 - 1. Owner occupied areas and accessible route of travel without permission
 - 2. Parking or accessible parking areas other than indicated.
 - 3. Owner's garbage and recycle dumpsters.
- K. The existing building and surrounding surfaces that are affected by this Project are to be maintained in a watertight condition throughout the construction period. At all times during the Project, the Contractor is to cover any existing horizontal or vertical surfaces exposed by construction work which have not been made watertight by the installation of new materials prior to the end of the work shift. Repair damage immediately caused by water infiltration.

1.11 WORK SEQUENCE

- A. Specific interim milestones within the overall Contract Time may be required by this Contract. Refer to Project Coordination, Section 01 31 00.

1.12 PRODUCTS ORDERED IN ADVANCE

- A. General: The Owner has negotiated purchase orders with suppliers of material and equipment to be shipped to the project site for incorporation into the Work.

The Owner has assigned these purchase orders to the Contractor. The costs for purchasing and shipping are included in Owner's pre-purchase. Costs for receiving, handling, storage, and installation shall be included in Contractor's Contract Sum.

1. The Contractor's responsibilities are the same as if the Contractor negotiated the purchase orders. If necessary as directed by the Owner, the Contractor shall execute final purchase order agreements and arrange for shipping.
2. A "Schedule of Products Ordered in Advance" is included at the end of this Section, Appendix A.

1.13 OWNER-FURNISHED ITEMS

- A. FOIC Equipment: Items designated by the abbreviation "FOIC", furnished by Owner and Installed by Contractor, will be delivered to the jobsite for consignment to the Contractor. Contractor shall assume custody and responsibility for same after inspecting and determining that they are complete and in acceptable condition for installation. Under no conditions is any equipment to be installed prior to the building being enclosed and heated unless specifically approved by the Owner. Installation of such items includes uncrating and all preparatory work necessary for proper installation including blocking and backing, rough-ins, setting in place, building-in, leveling and attaching to building elements, making all mechanical and electrical connections required, and finish work including caulking, grouting, furring, and painting adjacent surfaces, leaving same in completely installed and operable conditions satisfactory to Owner.
 1. The Owner will arrange for and deliver necessary shop drawings, product data, and samples to the Contractor.

2. The Owner will arrange and pay for delivery of Owner-furnished items according to the Contractor's Construction Schedule. Contractor shall clearly identify dates for delivery of F.O.I.C. items on schedule.
3. Following delivery, the Owner and Contractor will inspect items delivered for damage.
4. If Owner-furnished items are damaged, defective, or missing, the Owner will arrange for replacement before the Contractor takes possession of Owner furnished items.
5. The Owner will arrange for manufacturer's field services and for the delivery of manufacturer's warranties to the appropriate Contractor.
6. The Contractor shall designate delivery dates of Owner-furnished items in the Contractor's Construction Schedule.
7. The Contractor shall review shop drawings, product data, and samples and return them to the Owner noting discrepancies or problems anticipated in use of the product.
8. The Contractor is responsible for receiving, unloading, and handling Owner- furnished items at the site. An Owner's representative shall be present at the time of delivery for inspection of delivered F.O.I.C. items.
9. The Contractor shall take possession of Owner furnished items upon receipt of items.
10. The Contractor shall repair, replace, or make good all Owner provided materials that are damaged or lost due to the Contractor's operation or while in the Contractor's possession, including damage from exposure to the elements, at no expense to the Owner.

1.14 WORK NOT INCLUDED IN CONTRACT

A. Work Not Included in Contract: NIC & FIO: The items of work noted on Drawings and/or described in the Project Manual as “NIC” (Not In Contract) or “FIO” (Furnished and Installed by Owner) will be performed under other contracts operating concurrently with the work of this Contract, and are not included in this Contract:

1. Construction Project Sign will be provided by Owner.

B. Contractor is responsible for scheduling the work, storing such equipment if requested, and coordinating related work in the Contract with installation of NIC and FIO equipment. Contractor shall provide all preparatory work necessary for proper installation including blocking and backing, and finish work including caulking, grouting, furring, and painting adjacent surfaces as required for NIC and FIO equipment.

1.15 MISCELLANEOUS PROVISIONS

A. Stored Products

1. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on and off the site.
2. Move any stored products, under Contractor’s control, interfering with operations of the Owner or separate contractor.
3. Obtain and pay for the use of additional storage or work areas needed for operations.

B. Notify subcontractors to become familiar with requirements of Division 0, Division 1 and the work of Sections related to their own work. Instruct them that these conditions and requirements apply to their work in each Section of the technical specifications.

C. Contractors and Subcontractors submitting bids for this Project are required to

thoroughly familiarize themselves with specified products and installation procedures. Submit any objections or substitution requests for the products and procedures specified in accordance with Product Requirements. Submittal of Bid constitutes acceptance of products and procedures specified.

D. Conflicts & Omissions in Contract Documents

1. Bring immediately to Owner's attention any conflicts and omissions between the Drawings and Specifications and between the Drawings or Specifications and actual site conditions. In the event of a conflict or discrepancy among or in the Contract Documents, interpretation shall be the stricter specification.
2. Where conflicts and omissions have not been brought to Owner's attention, it is understood that Contractor has figured the most costly method or methods.

E. Mechanical/Electrical Requirements of General Work

1. General: Except as otherwise indicated, comply with applicable requirements of Divisions 22 and 23 for mechanical provisions within units of general work (Divisions 02-14) and with applicable requirements of Division 26 Sections for electrical provisions within units of general work (Divisions 02-14).
2. Refer to Division 22, 23 and 26 Sections for the characteristics of the respective mechanical and electrical services to be connected to units of general work. Provide units manufactured or fabricated for proper connection to and utilization of available services. Except as otherwise indicated, final connection of mechanical service to general work is defined as being mechanical work, and final connection of electrical service to general and mechanical work is defined as being electrical

work.

3. Except as otherwise indicated, comply with applicable provisions of the National Electrical Code (NEC) and standards by National Electrical Manufacturer's Association (NEMA), for electrical components of General Work. Provide Underwriters Laboratories listed and labeled products where applicable.

- F. It is the Contractor's responsibility to verify all field measurements, survey control, staking and conditions. No allowance will be made for any items incorrectly fabricated or installed due to failure to perform such verification prior to commencing the work.

1.16 PERMITS AND FEES

A. General.

1. For projects within the City of Chehalis jurisdiction, the Owner will provide the General Contractor an Owner Permit Billing Tracking Slip for the Contractor to submit to the City to obtain the General Contractor's Building Permit. The Tracking Slip will be used by the City to bill the Owner directly.
2. The Contractor shall obtain all other permits and local business licenses necessary for the execution of the work and pay all permit (except as indicated in paragraph "1" above), utility and miscellaneous fees required by the appropriate Authority Having Jurisdiction (AHJ).
3. The Contractor shall coordinate and schedule all work with respective permitting agencies and utility companies necessary for completion of the work.
4. Contractor shall be responsible for providing all information, documents, and fees to the permitting agencies and utility companies within 30 days

after issuance of the Notice to Proceed as necessary to obtain and coordinate permits and utility connections.

- B. The Drawings and Specifications have been submitted for plan review to the appropriate AHJ, so that permits will be available to the Contractor for this project on or before the Date of Notice to Proceed.

1.17 UTILITIES

A. Existing Utilities

1. Utilities of record are shown on the Drawings insofar as possible to do so. These however, are shown for convenience only and neither the Owner nor Engineer assumes responsibility for improper locations or failure to show utility locations on the Drawings.
2. The Contractor shall contact all utility companies to perform a site locate of the respective utilities, including but not limited to telephone/cable/data, electrical, gas, sewer, water and storm services. Notify Owner's Site Representative when such utility locates are to take place.
3. The Contractor is responsible to locate and protect all public utilities. The Contractor is to work with Owner's staff for locating and protecting all utilities that belong to the Owner. See other applicable Sections of Divisions 01, 02, 22, 26 and 33 for more information.
4. Exercise reasonable care to prevent damage to existing utilities. If damage does occur, immediately notify Owner to determine appropriate repair. If repair is a life safety issue, proceed with necessary repairs to eliminate this issue and make final repairs upon arrival and approval of Owner. Contractor shall not leave site until repairs have been accomplished.

- B. Coordinate all new utility service requirements with serving utility companies including, telephone/cable/data, electrical, gas, sewer, water and storm services. Observe specification standards, written details, and sketches showing equipment locations and dimensions as indicated by the utility company. Coordinate scheduling of utility company work with all other trades.
- C. Utility Costs
 - 1. Contractor shall be responsible for securing all public utility connection, tap and inspection fees necessary to make the project fully operational. See Supplemental Conditions for reimbursement / payment of utility connection charges. The Owner will not reimburse the Contractor for additional charges due to the Contractor's lack of coordination, timelines or schedules and payment of charges.
 - 2. Contractor to obtain and pay for, without reimbursement from Owner, permits and fees required for water usage from fire hydrants.
- D. Utility shut-downs may not occur prior to the Date of the Notice to Proceed, or after the date of Substantial Completion.
- E. Contractor to provide all layout, site preparation, trenching, temporary services backfilling, patching and restoration work required for utility work at no additional cost to the Owner.
- F. See Section 01 50 00 for using existing permanent utilities.

PART 2 – PRODUCTS

Not Used.

PART 3 EXECUTION

- A. The Contractor shall be aware of all special requirements for the Project execution described in the Contract Documents. These items consist of but are not limited to: specific time frames for work, sequence and special requirements for demolition, load limits, and all other criteria described in the Contract Documents.

END OF SECTION

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies additional detail regarding administrative and procedural requirements for handling and processing contract modifications. In the event of conflicts between this specification the stricter specification supersedes.

1.3 INITIAL REQUIREMENTS

- A. Prior to submitting any cost proposals, the Contractor shall submit a breakdown of all applicable trade and class wage rates intended to be incorporated into this Project using a form acceptable to the Engineer and Owner. As a minimum, the breakdown shall show:
 - 1. Basic wage rate (based on L&I Intent to Pay Prevailing Wages or union agreement);
 - 2. Fringe Package (based on L&I Intent to Pay Prevailing Wages or union agreement);
 - 3. FUI (Federal Unemployment Insurance);
 - 4. FICA (Federal Insurance Compensation Act);
 - 5. SUI (State Unemployment Compensation Act);
 - 6. WC (Workers Compensation);
 - 7. Medicare;
 - 8. Any other specific trade costs that affect hourly rate. If an acronym is used, also identify the full name for it.
- B. Contractor shall submit verification of the above rates if requested by the Owner.

- C. Within 5 working days of the Notice to Proceed, the Contractor shall submit a list of all equipment anticipated to be used on the project and whether it is owned or to be rented, using a form acceptable to the Engineer and Owner. If during the construction process additional equipment is brought to the Project site, the Contractor shall submit an updated list.

1.4 MINOR CHANGES IN THE WORK

- A. The Engineer will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on a form prepared by the Engineer. If the contractor believes a cost is associated with the supplemental instructions, the Contractor is to provide written notice to the Engineer within 7 days of receipt of the instructions.

1.5 OTHER CHANGES IN THE WORK

- A. Changes to the work can be by:
 - 1. Change Order Proposal issued by the Engineer to the Contractor on the Owner's behalf.
 - 2. Field Authorization issued by the Engineer to the Contractor on the Owner's behalf.
 - 3. Request initiated by the Contractor and submitted to the Engineer.
- B. Change Order Proposal (COP). The Engineer will issue a detailed description of proposed Owner initiated changes in the Work on the Owner's standard COP form that may require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. COP requests issued by the Engineer are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.

2. Within 14 calendar days of receipt of a proposal request, or quicker if the project schedule necessitates, the contractor shall submit an estimate of cost necessary to execute the change to the Engineer who will evaluate the cost and make a recommendation for the Owner's review.
- C. Field Authorization (FA). The Engineer may issue, on behalf of the Owner, a FA instructing the Contractor to proceed with a change or specific portion of the change in the Work or specific portion of a COP, for subsequent inclusion in a Change Order.
1. The FA will contain a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.
 2. The Contractor must provide a Not To Exceed (NTE) amount to be indicated on the FA.
 3. As the Work progresses, the Contractor is to monitor its costs. If the costs indicate they will exceed the NTE prior to being able to complete the work, the Contractor is to stop work and notify the Owner. A decision will be made by the Owner to stop the change at that time, or authorize an increase in the NTE amount.
 4. The Contractor is not to proceed with the work until the FA is signed by the Contractor, Engineer, and Owner.
 5. Maintain detailed records of time and material documentation of work as required by the Field Authorization.
 - a. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
 - b. Include daily accounting of time spent by each person working specifically on such work, signed by Owner's Site Representative, together with copies of all related purchase orders.

- D. Contractor Initiated Change Request. When latent, unforeseen, or other conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Engineer.
 - 1. Provide initial documentation describing the proposed change, reason for changes, and why the proposed change is not part of the Base Bid.
- E. Detailed Documentation of Owner or Contractor initiated Changes.
 - 1. Support each lump sum proposal quotation, and each unit price (not previously established) with sufficient substantiating data.
 - 2. On request, provide additional data to support time and cost computations:
 - a. Labor required.
 - b. Equipment required.
 - c. Products required.
 - 1) Recommended source of purchase and unit cost.
 - 2) Quantities required.
 - d. Taxes, insurance, and bonds.
 - e. Documented credit for work deleted from Contract.
 - f. Overhead and profit.
 - g. Justification for any change in Contract Time.
 - 3. Support each proposal for additional costs, and time-and-material/force account work with documentation, as required for lump-sum proposal. Include additional information:
 - a. Name of Engineer or Owner's authorized agent who ordered work, and date of order.
 - b. Dates and times work was performed, and by whom.
 - c. Time record, summary of hours worked, and hourly rates paid.

- d. Receipts and invoices for:
 - 1) Equipment used, listing dates and times of use.
 - 2) Products used and listing of quantities.
 - 3) Subcontracts.
- 4. Document Requests for Substitutions.
- 5. Statement as to whether overtime work is, or is not, authorized.
- F. Approval or Rejection of Proposal.
 - 1. When change is initiated by Engineer or Owner through a COP.
 - a. Contractor to submit a detailed proposal in writing. Quotation will be guaranteed for period specified in Proposal Request beginning from signing of proposal. If no period is specified, guarantee quotation for sixty (60) days from signing.
 - b. Owner reviews proposal and responds in writing as follows:
 - 1) Request for additional information.
 - 2) Proposal will be incorporated into a Change Order.
 - 3) Rejecting the proposal.
 - c. Contractor is not to proceed with work until a signed Change Order is received from the Owner.
 - 2. When change is initiated by Contractor.
 - a. Owner reviews and responds in writing as follows:
 - 1) Agrees with Contractor's cost proposal;
 - 2) Request for additional information;
 - 3) Rejecting the proposal.
 - b. If the Owner responds by agreeing to the Contractor's change proposal, a Change Order will be processed.

- c. If additional information is requested by Owner, respond in writing within fifteen (15) days of Owner's request.

1.6 CHANGE ORDER PROCEDURES

A. Upon final agreement of costs and/or time on either an Owner COP, FA or a Contractor initiated proposal, a Change Order will be processed by the Engineer.

1. The Contractor cannot submit an invoice for Work changes until a fully executed Change Order is completed.

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
- B. This specification section includes additional detail regarding procedural requirements. In the event of conflicts between specifications occurs the more strict specification shall supersede.

1.3 SCHEDULE OF VALUES

- A. Submit a list of all Subcontractors and Material Suppliers. Submit a copy of each Subcontractor's and Material Supplier's contract with the General Contractor, signed by both parties.
- B. The Schedule of Values and the Contractor's Construction Schedule are to be developed and agreed to with the Subcontractors.
 - 1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - a. Contractor's Construction Schedule.
 - b. Application for Payment forms, including Continuation Sheets.
 - c. List of subcontractors.
 - d. Schedule of allowances.
 - e. Schedule of alternates.

- f. List of products.
 - g. List of principal suppliers and fabricators.
 - h. Schedule of submittals.
2. Submit the Schedule of Values to the Engineer for approval at the earliest possible date but no later than 10 working days after the issuance of the Notice to Proceed, and not less than 5 working days prior to the first application for payment.
- C. Use the Project Manual table of contents as a guide to format the Schedule of Values. Provide at least one line item for each listed Specification Section beginning with Division 2. Relate applicable activities of the Progress Schedule with each line item broken down separately for labor and materials.
- D. Identify work, if any, to be performed by minority-owned business enterprises (MBE) and women-owned business enterprises (WBE).
- E. Identification: Include the following Project identification on the Schedule of Values:
1. Project name and location.
 2. Name of Architect.
 3. Project Number.
 4. Contractor's name and address.
 5. Date of submittal.
- F. Listing: Arrange the Schedule of Values in tabular form with separate columns indicating the following for each item listed:
1. Related Specification Section.
 2. Description of Work.
 3. Name of subcontractor.
 4. Name of manufacturer or fabricator.
 5. Name of supplier.

6. Change Order (numbers) that affect value.
 7. Dollar value.
 8. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
- G. Schedule of Values Updating: Update and resubmit Schedule of Values prior to the next Application for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum. Add a new line item for each Change Order, and provide a breakdown of several line items for large or complicated Change Orders.

1.4 APPLICATIONS FOR PAYMENT

A. General:

1. Payment shall be for installed items, not items on hand.
 2. Submit itemized payment request as required in General Conditions together with Schedule of Values and other submittals as listed herein.
 3. Except as otherwise indicated, sequence of progress payments is to be regular, and each must be consistent with previous applications and payments; it is recognized that certain applications involve extra requirements, including initial application, application at times of Substantial Completion, and final payment application.
 4. Contractor shall not "project" work completed beyond the date of Application for Payment submittal for the purpose of payment request.
- B. Each Application for Payment shall be consistent with previous applications and payments as certified by the Engineer and paid for by the Owner.
1. If the Contractor withholds any portion of a previous payment from a subcontractor or material supplier, other than normal retainage, the Contractor shall provide a letter to the Engineer with the next Application for Payment stating the reasons for withholding the payment.

- C. Payment Application Times: Progress payments will be based upon a monthly period, with the 24th day of each month being the cut-off date. The new payment period will then begin on the 25th of each month.
- D. Draft Payment Application: Draft copies shall be provided to the Engineer and Owner at least 48 hours prior to the last regular construction meeting of the month at which the payment request will be reviewed. The draft payment request shall be a copy of the previous month's approved payment request, with proposed percentages and dollar amounts (rounded off to nearest whole dollar) hand written beside each line item, and a total percentage complete and dollar amount for the month. Once the amounts are reviewed and agreed to by the Engineer and Owner, the Contractor shall prepare the actual payment request as required in this section based upon the amounts agreed to.
 - 1. Have available for Engineer review current Project Record Documents delineating any and all revisions since the previous application for payment.
- E. Application Preparation: Complete every entry on the actual payment request form. The Engineer will return incomplete applications without action.
 - 1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions were made.
 - 2. Include amounts of Change Orders issued prior to the last day of the construction period covered by the application. If a Change Order includes more than one Change Order Proposal (COP) or Field Authorization (FA), list each COP or FA individually.
- F. Transmittal: Submit 3 original signed copies (no photocopies of signatures are permitted) of each Application for Payment to the Engineer by a method ensuring receipt within 48 hours.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the

Engineer.

G. Initial Payment Application: The principal administrative actions and submittals which must precede or coincide with submittal of first payment application can be summarized as follows, but not necessarily by way of limitation:

1. Submit Statement of Intent to Pay Prevailing Wages on Public Works Contract on form issued by the State of Washington, Department of Labor and Industries. One is required from the Contractor and one from each of those subcontractors who will provide labor on the project site.

When these forms have been filled in, the Contractor shall send them to the Industrial Statistician in Olympia for certification. After certification, three copies will be returned to the Contractor. The Contractor shall forward the Owner's copy directly to the PM (do not send through the Engineer). The Contractor shall also post on the project site one certified copy of each Statement of Intent. For further information, phone the Industrial Statistician (360)902-5335.

Processing of an application will not begin until an approved copy is on file with the Owner for each classification of laborers, workers, or mechanics employed by the Contractor or Subcontractor that are included in an application for payment; no exceptions.

2. Submit and receive review comments for latest construction schedule.
3. Submit Schedule of Values, allocated to the various portions of the work; the schedule shall be used as a basis for the Contractor's Application for Payment.
4. List of Subcontractors, complete with phone numbers, business address and contact person.
5. List of major material suppliers and fabricators, complete with phone numbers, business address and contact person.

5. Contractor's Progress Schedule (preliminary if not final).
 6. Schedule of Unit Prices, as applicable.
 7. Schedule of Submittals (preliminary if not final).
 8. Listing of Contractor's staff assignments and principal consultants.
 9. Copies of acquired building permits and similar authorizations and licenses from governing authorities for current performance of the work.
 10. Initial progress report.
 11. Initial settlement survey and damage report, if required.
 12. Quality Control Plan.
 13. Safety Plan.
 14. MWBE participation listing.
 15. Waste Management Plan.
 16. List of emergency contact information.
 17. Other documents as may be required in the Contract Documents.
- H. Applications each Month During Construction:
1. Submit itemized application, in number of copies as specified herein, each with waivers of mechanics liens from principal subcontractors, sub-subcontractors and suppliers as specified below.
 2. Applications are to be signed by a responsible officer of Contracting firm. Do not sign in black ink; no photocopies or signature permitted.
 3. Application for Payment shall include the following:
 - a. Application and Certificate for Payment on Contract.
 - b. State of Washington Invoice Voucher.
 - c. Invoice Voucher - Escrow.
 - d. Certificate for Material Stored on Job Site.

- e. Invoices for materials stored off site, as applicable.

Updated Construction and Submittal Schedules: If substantial changes have occurred in the Project Construction Schedule, or if enough changes have occurred that the schedule is rendered inaccurate or ineffective, submit with Application For Payment a revised updated Construction Schedule for evaluation and measurement of actual work-in-place with said application for payment, together with updated submittal schedule. If the Contractor does not submit a revised schedule with a payment request it is agreed by the Contractor that the project is still on schedule according to the last submitted schedule.

- 1) If actual work completed is more than 14 days behind schedule, submit a recovery schedule per requirements of Section 01 32 16, Construction Progress Schedule, subparagraph 3.04C.4.b.
- 4. When Engineer finds Application for Payment properly completed and correct, the Engineer will sign and transmit all copies of Application for Payment to Owner for processing.
- 5. If Engineer or Owner find Application for Payment improperly or incorrectly executed, an annotated copy will be returned for a NEW SUBMITTAL.
- 6. Only minor corrections are allowed, with approval of Owner.
- I. Application at Time of Substantial Completion: See Section 01 77 00 for principal administrative actions and submittals which must precede or coincide with such special applications.

1.5 PAYMENT FOR STORED MATERIAL

- A. See General Conditions for Washington State Facility Construction Article 6.03.

1.6 SUBSTANTIATING DATA

- A. When Engineer requires substantiating information, submit data in a timely manner justifying line item amounts in question.

1.7 APPLICATION FOR FINAL PAYMENT

- A. Application for a FINAL pay request will be accepted for processing only after satisfactory completion of the following:
 - 1. Punchlist items complete and accepted;
 - 2. Agreement on all Change Order costs;
 - 3. Required permits signed off;
 - 4. Submittal of Record Documents (as-builts);
 - 5. Submittal of O&M Manuals;
 - 6. Submittal of Warranty Manuals;
 - 7. All training has been provided to Owner's designated staff and signed rosters of those attending submitted to the PM.
 - 8. All security badges and building keys have been returned.
 - 9. Other requirements as specified in Section 01 77 00, Closeout Procedures.

1.8 RELEASE OF RETAINAGE

- A. Pursuant to the completion of Work performed in accordance with a public works contract and Final Acceptance by the Owner, the following requirements must be satisfied to allow the release of retained contract funds at the earliest possible date.
 - 1. All Contract Closeout items have been reviewed by the Engineer, any corrections made by the Contractor, and final copies received by the Owner.

2. The Engineer maintains a Construction Completion Checklist of requirements for completing the project. When the Engineer determines that the checklist has been completed, the Engineer consults with Owner for concurrence that all requirements have been met for establishing Final Completion.
3. If there are no outstanding items required of the Contractor on the Construction Completion Checklist, the Engineer provides a letter to the Owner with a copy to the Contractor that to the best of its knowledge, information, and belief, the Contractor has reached Final Completion on the project in conformance with the Contract Documents.
4. Owner sends the Contractor its Notification of Project Completion for the Contractor's signature and return to Owner.
5. Upon receipt of the signed Notification of Project Completion, Owner issues its Completion Notice.
6. Owner sends the Department of Revenue its Notice of Completion of Public Works Contract and sends the Contractor written notice of Final Acceptance.
7. Certificate of Payment of State Excise Taxes by Public Works Contractor. Following receipt of Owner's notice of completion and after determining that all taxes, increase and penalties due from Contractor have been paid, the Department of Revenue will issue this certificate to the Owner, releasing the state's lien on the retained percentage.
8. Certificate of Payment of Contributions, Penalties and Interest on Public Works Contract. Upon receiving a copy of the Owner's notice of completion from the Department of Revenue and determining that the Contractor is in compliance with the provisions of the Employment Security Act, the Employment Security Department will issue this certificate to the Owner, releasing its lien on the retained percentage.

9. Request for Release. This form must be completed by the Contractor and mailed to the Department of Labor and Industries, Industrial Insurance division, Contract Release Section, Olympia, Washington 98504. One copy of the Contractor's request for release, including attached list of Subcontractors, shall be transmitted to Owner.
10. Certificate of Release. Upon receipt of Contractor's request for release and verification from its records that the industrial insurance and medical aid premiums have been paid by Contractor and each Subcontractor, the Department of Labor and Industries will so note on its internet site. Owner will review L&I's internet site for status compliance. Once full compliance is noted, it is confirmation that L&I does not hold a lien against the project.
11. At the time Owner sends the Contractor written notice of Final Acceptance, it advertises the acceptance of the project which begins the forty five (45) day period for liens to be filed.
12. At the end of the forty five (45) day period, releases have been received, or confirmed, and there are no liens filed that have not been released, the retainage will be released.
 - a. If the retainage was placed in an escrow account, Owner will notify the escrow company that the retainage may be released. No invoice billing from the Contractor for the retainage is required.
 - b. If the Contractor has elected to not put the retainage in escrow, an invoice for the retainage amount must be submitted and processed to allow release of the retained money.

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Project Closeout meeting.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

- A. Schedule meeting after Notice of Award.
- B. Attendance Required: Owner, Engineer, and Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates, where applicable.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Designation of personnel representing parties in Contract, and Engineer.

6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 7. Scheduling.
- D. Engineer will record minutes and distribute copies within two days after meeting to participants, with electronic copy to Owner, Engineer and Contractor. Contractor shall be responsible for distribution to those affected by decisions made.

1.4 PROGRESS MEETINGS

- A. Schedule and administer weekly meetings throughout progress of the Work.
- B. Make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.
- C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
 1. Review minutes of previous meetings.
 2. Review of Work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems impeding planned progress.

5. Review of submittals schedule and status of submittals.
 6. Review of off-site fabrication and delivery schedules.
 7. Maintenance of progress schedule.
 8. Corrective measures to regain projected schedules.
 9. Planned progress during succeeding work period.
 10. Coordination of projected progress.
 11. Maintenance of quality and work standards.
 12. Effect of proposed changes on progress schedule and coordination.
 13. Other business relating to Work.
- E. Engineer will record minutes and distribute copies within two days after meeting to participants, with electronic copy to Owner, Engineer and Contractor. Contractor shall be responsible for distribution to those affected by decisions made.
- 1.5 Project Closeout Meeting
- A. Schedule commencing immediately following established date of Substantial Completion and administer.
 - B. For the purpose of attaining project closeout, Contractor's project manager and superintendent and all subcontractors who have outstanding punch list items associated with their work, or as otherwise requested and including all

subcontractors involved in the building systems commissioning process, shall attend weekly closeout meetings which shall be held at the jobsite.

- C. Such meetings shall be held to review and discuss the resolution of all punch list items in order to attain Final Completion. Closeout meetings shall continue on a weekly basis until all punch list items have been resolved and Final Completion is attained.

- D. Agenda:
 - 1. Review the Work done and create a punch list.
 - 2. Obtain Final completion.
 - 3. Owner take ownership of Project.

- E. Engineer will record minutes and distribute copies within two days after meeting to participants, with electronic copy to Owner, Engineer and Contractor. Contractor shall be responsible for distribution to those affected by decisions made.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. The complexity of accomplishing a site redevelopment project adjacent to occupied and fully operational buildings requires that careful planning and coordination be developed and followed to accomplish the work. This planning and coordination shall minimize disruption to operations and allow involved parties to anticipate construction activity and to integrate other contract(s) with this Project.
- B. Coordinate scheduling, submittals and work identified in the Contract to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.
- C. Coordinate work between all Sections of Contract Documents to avoid conflicts and omissions. Take special care to coordinate work indicated as Civil, Landscape, and other major Divisions of the Contract Documents.
- D. Responsibility
 - 1. The Contractor shall be in charge of this Contract and the site, as well as the directing and scheduling of all Work. Contractor shall be on site at all times work of this Contract is in progress. Do not delegate responsibility for coordination to any subcontractor.
 - 2. Anticipate interrelationship of all subcontractors and their relationship with the total Work.

3. Resolve differences or disputes between subcontractors and materials suppliers concerning coordination, interference, or extent of Work between Sections.

Contractor's decisions, if consistent with Contract Document requirements, shall be final.

4. Final responsibility for the performance, interface, and completion of the Work and the Project in accordance with the Contract Documents shall be with the Contractor.

1.3 PROJECT PHASING & MILESTONES – NOT USED

1.4 SPECIAL COORDINATION

- A. There are occupied spaces outside of the limits of construction. These spaces will not be vacated for construction during this contract. Any work in these surrounding areas must be coordinated with the Owner.
- B. Additional special requirements and conditions apply to the work of this contract. Refer to Section 01 50 00 for detailed description of these additional requirements and conditions.
- C. The Owner may require access to the site to perform work related or unrelated to the project. The Contractor shall coordinate with the Owner to accommodate such work within the contract time.

1.5 CONSTRUCTION ORGANIZATION

- A. On-Site Lines Of Authority & Communications: Refer to Section 01 31 15.
- B. Intra-Project Communications: Comply with procedures for intra-project communications including:
 1. Submittals.
 2. Reports and records.
 3. Recommendations.
 4. Coordination drawings.
 5. Schedules.

6. Resolution of conflicts.
- C. Construction Mobilization
1. Cooperate with the Site Representative in allocation of mobilization areas of site; for field offices and sheds, for access, traffic and parking facilities.
 2. During construction, coordinate use of site and facilities through Site Representative.
 3. Comply with Engineer and Site Representative's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
 4. Coordinate field engineering and layout work under instructions of Site Representative.
- D. Coordination Of Reports/Activities: Coordinate both the procedural timing and the listing (naming and sequencing) of reports/activities required by provisions of this Section and other sections, to afford consistency and logical coordination between submitted reports or lists. Maintain coordination and correlation between separate reports by updating at monthly or shorter time intervals. Distribute each report and updated report to entities involved in the work, including Engineer and PM. In particular, provide close coordination of Progress Schedule, Schedule of Values (see Section 01 29 00), listing of subcontracts, schedule of submittals, progress reports, and payment requests.
- E. Coordination Of Submittals
1. Schedule and coordinate submittals specified in the Contract Documents.
 2. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to and placing equipment in service.
 3. Coordinate request for substitutions to assure compatibility of space, operating elements, and effect on work of other Sections.
- F. Coordination & Pre-Installation Meetings: Refer to Section 01 31 19, Project Meetings.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.1 COOPERATION & COORDINATION OF WORK

- A. The Contractor is responsible for the coordination of the work of all trades; coordinating the installation of their work and that of all subcontractors to ensure compliance with the Contract Documents and to expedite the progress of the Project. Contractor shall check specifications, addenda, and drawings covering all trades as the work progresses. Contractor shall promptly report to the Engineer what they consider omissions, conflicts or points requiring clarification.
- B. Contractor shall prepare and distribute to each entity performing work at project site, a written memorandum of instructions on required coordination activities, including required notices, reports and attendance at meetings.
- C. It is the responsibility of the Contractor to ensure that the work of subcontractors complies with Conditions of the Contract, Division 1 - General Requirements, and the work of other Sections related to their own work. No additional payments or time extensions will be authorized for failure on the part of subcontractors to be familiar with and in compliance with the aforementioned specification divisions and sections.
- D. Inclusion of portions of the work under particular divisions of the specifications or sections of the drawings does not in every case conform to the categories of work customarily subcontracted to particular crafts or trades. In such cases, the Contractor shall be responsible to inform bidders, subcontractors, crafts and trades, that work assigned to them is contained in sections other than the usual. In every case, the General Contractor shall be responsible to provide at its cost, all work required in the Contract Documents.

1. Provide project interface and coordination as required to properly and accurately bring together the several parts, components, systems, and assemblies and as required to complete the Work and the Project.
2. Provide interface and coordination of all trades, crafts, and subcontracts as required to provide correct and accurate connection of abutting, adjoining, overlapping, and related Work, and provide all anchors, fasteners, accessories, appurtenances, and incidental items as required to complete the Work properly, fully, and correctly in accordance with the Contract Documents.
3. Provide additional structural components, miscellaneous metal, bracing, blocking, backing, clips, anchors, fasteners, and installation accessories as required to properly anchor, fasten, or attach materials, equipment, appliances, hardware, systems, assemblies, cabinets, and architectural features to the structure.
4. Provide excavation and backfill, trenching and drilling for all trades as required for the installation of their Work.
5. Provide concrete foundations, pads, supports, bases, and grouting for all trades as required for the installation of their Work.
6. Provide caulking, sealing, and flashings as required to completely weatherproof the building and as required to insulate the building thermally and acoustically. Include caulking, sealing, flashings, and related work as required to prevent moisture intrusion, air infiltration, and light leakage.
7. Provide equipment, appliances, fixtures, and systems requiring plumbing and mechanical services, rough-in, and connections, or other utilities and services, with such services, rough-in, and final connections.
8. Provide equipment, appliances, fixtures, and systems requiring electrical and cabling services, rough-in, and connections, or other utilities and services, with such services, rough-in, and final connections.

9. Materials, equipment, component parts, accessories, incidental items, connections, and services required to complete the Work which are not provided by subcontractors shall be provided by the Contractor.

3.2 PROJECT COORDINATION & SCHEDULING CONTROL

- A. The Contractor shall schedule and coordinate the work of all subcontractors on the project including their use of the site. Responsibility for coordination and close adherence to time schedules rests solely with the Contractor who shall maintain coordination and scheduling control at all times.
- B. Each subcontractor responsible to the Contractor shall cooperate diligently with the Contractor in the execution of their work so as to cause no delay in the completion of the Project. This responsibility includes the completion of all work in a timely manner. All Contractors, Prime Contractor and Subcontractors, shall diligently comply with the following requirements:
 1. Cooperate in planning and layout of the work well in advance of operations.
 2. Inform other contractors of requirements at proper time to prevent delay or revisions.
 3. Be informed on the requirements of other contractors and check own work for conflicts with the work of other contractors.
 4. Insure delivery of materials and performance of work on coordinated schedule with other contractors.
 5. Contractor shall ensure subcontractors and equipment suppliers are responsible for compatibility and completeness of the installation and operation of the equipment in their respective Specification Sections including conformance with code requirements.
 6. Attend Pre-Installation meetings identified in Section 01 31 19.

7. Contractor shall be represented on the job site by his superintendent at all times when there is construction going on, including the work of his subcontractors, as well as his own.

C. Changing Subcontractors: The General Contractor shall be responsible for all the additional expenses incurred by changing subcontractors during the course of this project. These additional expenses include, but are not limited to, the engineering expenses for revised submittal, request for information, or any clarification or duplication that might occur due to the fact that the initial documents have been revised.

3.3 MECHANICAL AND ELECTRICAL COORDINATION

A. Mechanical and Electrical Coordination shall follow Part 3.2 of this section.

3.4 JOB SITE FIELD MEASUREMENTS AND TEMPLATES

A. Obtain field measurements required for accurate fabrication and installation of Work included in this Contract. Exact measurements are the Contractor's responsibility.

B. Contractor shall be responsible for field verifying actual.

C. Furnish or obtain templates, patterns, and setting instructions as required for installation of all Work. Verify all dimensions in the field.

3.5 DIMENSIONS

A. Contractor shall verify all dimensions and report any discrepancies to the Owner and Engineer before proceeding with the Work.

3.6 INTENT OF DRAWINGS

A. The work of the Contractor and subcontractors shall conform to the intent of the engineering and coordination drawings as reviewed by the Engineer. Drawings are partly diagrammatic and do not intend to show in details all features of work. The Contractor shall carefully review the work to be performed by other trades, compare related drawings and shall thoroughly understand the building conditions affecting their work.

- B. All changes required in the work caused by failure to do so shall be at no expense to the Owner.

3.7 INTERFERENCES & RIGHT-OF-WAY

- A. Make proper provisions to avoid interferences.
- B. Submit conflicts which cannot be resolved by right-of-way to the Engineer for direction.

3.8 NOTIFICATION & CORRECTION OF DEFECTIVE WORK

- A. Coordinate the Work of all subcontractors and make certain that, where the work of one trade is dependent upon the work of another trade, the work first installed is properly placed, installed, aligned and finished as specified or required to properly receive subsequent materials applied or attached thereto.
- B. Direct subcontractors to correct defects in substrates they install when subcontracts of subsequent materials have a reasonable and justifiable objection to such surfaces. Promptly notify the Owner's Representative and Engineer of any defects or imperfections in preparatory work which will in any way affect satisfactory completion of the work.
- C. Under no condition shall a section of work proceed prior to preparatory work having been completed, cured, dried or otherwise made satisfactory to receive such related work. Do not force subcontractors to apply or install products to improperly finished product.
- D. Correction of defective work shall be the responsibility of the Contractor or subcontractor providing the defective work. Correction of work due to underlying defects shall be the responsibility of the Contractor or subcontractor providing overlying work.

3.9 COORDINATING UTILITIES

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

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

3.10 COORDINATION DRAWINGS

A. Coordination Drawings - General

1. The purpose of coordination drawings is to resolve potential interdisciplinary dimensional interferences and conflicts prior to shop fabrication or field installation of components and systems. While the Engineer has exercised the accepted standard of care in performing overall dimensional coordination in the preparation of the Construction Documents, additional factors influence coordination which the Contractor must address in the coordination drawings. These factors include, but are not limited to, specific means and methods, the sequence of work, the characteristics of the specific equipment to be installed (where the documents allow multiple options), and the bidding assumptions made by each Contractor.
2. Where work by separate entities requires off-site fabrication of products and materials which must be accurately interfaced and closely intermeshed to produce required results, prepare coordination drawings consisting of plans, sections and details to indicate how the work shown by separate shop drawings will be interfaced, intermeshed, and sequenced for installation; comply with submittal requirements of Section 01 33 00.
3. Each trade's superintendent is expected to participate in the development of coordination drawings. All piping and equipment shall be shown, and all piping greater than 4 inches shall be indicated in double line fashion on the coordination drawings.
4. Coordination meetings shall be held on a minimum of once a week for the duration of the coordination process which shall commence immediately upon Notice to Proceed.

5. The Contractor shall notify the Owner or Owner's Representative of any conflicts in the field. The Contractor shall stop work and relocate resources to another part of the project, if feasible, until conflict is resolved. The Owner or Owner's Representative shall arrive on site to participate in the resolution of the conflict.
 6. The Contractor and each applicable subcontractor shall sign drawings to indicate their participation in the coordination process and their agreement that the individual systems and components can be installed as indicated in the drawings and in the conformance with the Contract Documents.
 7. Upon completion of the Project, all coordination drawings shall be turned over to the Owner as a record document submittal.
- B. Coordination Drawings – Drawing Criteria: Prepare coordination drawings per the following guidelines:
1. Sheet size same as Contract Drawings. Drawings at appropriate scale to depict necessary detail.
 2. Drawings to contain elements of construction in their correct dimensional relationship.
 3. Put signatures of Contractor and each subcontractor on each drawing to confirm their participation in coordination process and agreement that individual systems and components can be installed accordingly.

3.11 CLOSEOUT DUTIES

A. General

1. Coordinate completion and cleanup of work by the various trades in preparation for Substantial Completion.
2. After Owner occupancy of premises, coordinate access to site by the various trades involved for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

3. Assemble and coordinate closeout submittals.
- B. At Completion Of Work Of Each Subcontract: At completion of work of each subcontract, conduct inspection to assure that:
1. Work is acceptable.
 2. Temporary facilities and debris have been removed from site.
- C. At Substantial Completion
1. Conduct inspection and prepare list of work to be completed or corrected.
 2. Assist Engineer and Owner's Representative in inspection.
 3. Supervise correction and completion of Work as established in Engineer's inspection reports ("punch lists").
 4. Obtain Certificate of Occupancy from governing authorities.
- D. At Final Completion: Assist Engineer and Owner's Representative in inspection.

END OF SECTION

SECTION 01 31 15

COMMUNICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 GENERAL COMMUNICATION

- A. Telephone communication and correspondence shall be between Contractor's Representative and Engineer.
- B. Subcontractors are not to contact members of the design team directly unless explicitly agreed to by Contractor, Engineer and PM. All such contact and discussions are to be documented in writing by the subcontractor and submitted to the Engineer and PM through the Contractor.
- C. The Contractor shall transmit in writing planned disturbances of all utilities, roadways and parking areas in a set time acceptable to the Owner.
- D. The General Contractor shall transmit problems or questions in writing using a Request for Information (RFI).
- E. On-Site Lines Of Authority & Communications: Establish on-site lines of authority and communications including attendance at Pre-Construction Meeting and Progress Meetings as required by the Engineer and Owner's Site Representative. All on-site lines of authority and communications shall be established through the Engineer.
- F. The Engineer and PM will not typically be working during weekends and public holidays. The Contractor's normal working hours are as defined in Section 01 01 00. The Contractor shall anticipate that all communication and weekly construction meetings with these parties will occur between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday throughout the duration of the Project.

- G. The Contractor shall incorporate any cost affect this may have on the progress of the Project into his Base Bid. No overtime payments will be authorized, or time delays allowed, for the Contractor or subcontractors to communicate with the Engineer and PM during weekends and holidays outside of the Contractor's normal working hours.

1.3 EMERGENCY COMMUNICATION

- A. An Emergency list will be established.

- 1. The Contractor shall provide a list of names, pagers, wireless and wired telephone numbers of staff who are capable of addressing an emergency issue that may occur outside of Contractor's normal working hours. The persons designated on the list shall be available at the project site within 60 minutes of being contacted. Provide two names for each of the following:

- a. General Contractor
- b. General Contractor's Project Manager
- c. Site Forman
- d. Site Work Subcontractor

- 2. Submit the list to the Engineer 5 working days prior to the Preconstruction Meeting. The Engineer will include the same information for design team members and Owner representatives and distribute the list at the Preconstruction Meeting.

1.4 CORRESPONDENCE

- A. All correspondence to and from Contractor will be routed through Engineer with a copy to PM.
- B. Include project title and project number on all correspondence.

1.5 REQUEST FOR INFORMATION (RFI)

- A. It is the Contractor's responsibility to review Contract Documents in a timely manner so that the Engineer shall have sufficient time to respond to a Request for Information prior to the start of actual construction of that part of the Work.
- B. When field conditions or Contract Document contents require clarification or verification by the Engineer or Engineer's sub-consultants, a written RFI is to be submitted as follows:
 - 1. Identify the nature and location of each clarification/verification using a RFI form; provide as a minimum the following information:
 - a. Project name and number;
 - b. Date;
 - c. Date response desired.
 - d. RFI number;
 - e. Subject;
 - f. Initiator of the question;
 - g. Indication of costs, if known;
 - h. Location on site;
 - i. Contract drawing reference;
 - j. Contract specification section and paragraph reference;
 - k. Descriptive text;
 - l. Space for reply on same page as questions; and
 - m. Single subject matter, 1 item each - architectural, civil, structural, mechanical, electrical
 - 2. Number each RFI sequentially beginning with number 001 (RFI-001). Only one question per RFI.

C. Uses

1. The RFI form shall be used for interpretation or clarification of the Contract Documents only.
2. Do not use the RFI form for the following; the Engineer will not reply and the RFI will be returned without action:
 - a. Product or material substitution.
 - b. Questions relating to construction means, methods, techniques, sequences, procedures, or safety precautions. These are the Contractor's responsibilities exclusively.
 - c. Questions relating to construction schedule, coordination between trades, or division of work among subcontractors. These are Contractor's responsibilities exclusively.
 - d. Questions on contract administration procedural matters, unless they require interpretation or clarifications of the Contract Documents.
 - e. Dimensions or quantities which are shown on the Contract Documents, which can be measured or calculated from the information contained in the Contract Documents where such measurement or calculation is standard construction industry practice.
 - f. Confirmation of interpretations or clarifications previously provided by the Engineer.
 - g. The Contractor shall not initiate requests for interpretations or clarifications of the Contract Documents which can be reasonably derived from a review of the Contract Documents.

D. Route: RFI's in same manner as correspondence

- E. Clarifications may be discussed on-site or by telephone with Engineer or Engineer's Consultant with concurrence of the Engineer. The essence of these discussions are to be incorporated into a RFI form and submitted for normal RFI processing.
- F. Reply
 - 1. The Engineer will endeavor to reply to all RFI's promptly as his work schedule allows and generally no later than 7 working days from the day received. The consultant will expedite those RFI's indicated by the contractor as being critical to the construction process.
 - 2. When an RFI involves a complex subject, extensive research or governmental agency contact, the Engineer will inform the Contractor that additional time is required to prepare a reply. The Contractor shall cooperate and agree to reasonable additional time.
 - 3. The reply shall be a clarification or an interpretation of the Contract Documents; the reply is not an authorization of change in the Contract Sum or Time.

1.6 NON-COMPLIANCE NOTICE (NCN)

- A. Any work that is identified as not in compliance with the Contract Documents, either by oral discussion with the contractor, or written communication to the contractor, shall be removed and replaced without cost to the Owner, including removal of additional material necessary to confirm non-compliance. At its option, the Owner may accept written alternative solutions by the contractor and recommended by the Engineer. The Contractor shall notify the Engineer and Owner in writing immediately following oral discussion or receipt of any written communication if the contractor believes they are in compliance with the Contract Documents. The Engineer will make a determination based on the Contract Documents. If the Engineer finds the work is in non-compliance the Engineer will issue a written Non-Compliance Notice (NCN). Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. Upon receipt of the NCN, the

Contractor shall take immediate action to correct work. Review corrections at progress meetings for closure.

- B. If the Contractor fails or refuses to comply promptly after the final determination of the appropriate corrective action, the Owner may:
1. issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Owner will not pay for non-complying work or follow on work until the non-complying work is corrected or replaced. If it becomes necessary to stop work due to non-correction or non-complying work, no delay claim, time extension, or compensation will be granted, or
 2. the Owner may elect to correct the non-compliant work and back charge the Contractor by a deductive Change Order

END OF SECTION

SECTION 01 31 19
PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
 - 1. Preconstruction meeting;
 - 2. Progress meetings;
 - 3. Project closeout meetings;

1.3 PRECONSTRUCTION MEETING

- A. The Owner will schedule a preconstruction conference before starting construction, at a time convenient to the Contractor and the Engineer, but no later than 15 days after the Notice To Proceed. The conference will be held at the Project Site or another convenient location as selected by Owner.
- B. Attendance is required of the following:
 - 1. Engineer and Engineer's consultants;
 - 2. Owner's Representatives;
 - 3. Contractor's S Project Manager; Contractor's QC Representative if different individual than the Project Manager.
 - 4. Major Subcontractors;
 - 5. Others, as requested.

- C. Discussion will cover items of significance, including the following:
1. Communication chain and persons authorized to direct changes;
 2. The Work;
 3. Site Representative's roles;
 4. Work hours, sequence, phasing, and occupancy;
 5. Special project procedures;
 6. Procedures and processing:
 - a. Application for payments;
 - b. Change Order Proposals (COP);
 - c. Field Authorizations (FA);
 - d. Change Orders (CO);
 - e. Requests for Information (RFI);
 - f. Engineer Supplemental Instructions (ASI)
 - g. Field decisions;
 - h. Submittals;
 - i. Universal Design;
 - j. Others as appropriate.
 7. Project record documents including review of as-builts on a regular basis during construction;
 8. Construction facilities, and controls;
 9. Temporary utilities;
 10. Security procedures;
 11. Housekeeping procedures;
 12. Utility shutdowns / Outage Request Form;
 13. Parking;

14. Equipment deliveries and priorities.
15. Schedule Review;
16. Hazardous material abatement procedures, if any.
17. Use of site and premises by Owner and Contractor.
18. Others, as appropriate.

D. The Engineer will:

1. Conduct the meeting to review contract administration requirements.
2. Record, produce, and distribute copies of the minutes to the PM and General Contractor within seven (7) days of the meeting.

E. The General Contractor shall be responsible to distribute copies to all other Contractor attendees.

1.4 PROGRESS MEETINGS

- A. For purposes of coordination and scheduling after start of the work, weekly Progress Meetings will be held to enable an orderly review of the construction progress and to provide for systematic discussion and analysis of concerns that may arise relative to execution of the work.
- B. Contractor, and Subcontractors as required, shall incorporate attendance at these meetings as part of the Base Bid of the project – no overtime payments will be authorized for Contractor or Subcontractors to attend weekly Progress Meetings or other special meetings if required.
- C. Meeting Locations: ADA accessible Contractor's project field office or Owner provided meeting room, unless otherwise agreed.
- D. Attendance: Representatives attending meetings are required to be qualified and authorized to act on behalf of their firms. Attendance shall include:
 1. Engineer and Engineer's consultants, as appropriate;

2. Owner's Representatives;
3. Contractor's Project Manager, Site Forman;
4. Subcontractors, as appropriate;
5. Suppliers, as appropriate;
6. Others, as appropriate.

E. Agenda: Discussion will pertain to items, such as:

1. Attendees; list of attendees and company they represent;
2. Review and approve minutes of previous meeting; written corrections, additions and/or deletions to previous minutes acknowledged;
3. Review Short Interval Schedule;
4. Review Outages;
5. Review construction schedule; confirm current status of work;
6. Present corrective measures and procedures to regain project schedule, as applicable;
7. Present field observations, problems, and conflicts; discuss concerns pertaining to:
 - a. Civil items.
8. Discuss problems impeding progress schedule;
9. Review Contractor's quality control system; discuss any concerns and corrective measures.
10. Review submittal schedules and logs, present methods to expedite as required;
11. Review off-site fabrication;
12. Review delivery schedules;
13. Review outstanding RFIs;
14. Review proposed changes for:
 - a. Effect on construction schedule and on completion date.
 - b. Effect on any other contracts of the project,

15. Review Change Order Proposal log and finalize prices;
16. Review draft of Application for Payment (at end of month);
17. Confirm status of the "as-built" drawings and review required revisions to Project Record Documents; see update requirements specified below;
18. Confirm status of shop drawing submittals and approvals.
19. Review project safety;
20. Review any outstanding Non-Compliance Notices;
21. Review any tenant impacts.
22. Review any other business.
23. Confirm next meeting date, location and time plus those requested to be in attendance.

F. Engineer will:

1. Administer weekly Progress Meetings throughout work progress;
2. Record and distribute the following by e-mail within 3 working days after the meeting. Minutes, RFI, ASI, Submittal/Shop Drawing and Cost Change logs. Distribution to include all attendees other than those related to the General Contractor's contract. The General Contractor is responsible to distribute copies to all Contractor attendees.
3. Provide paper copies of the minutes, RFI, ASI, Submittal/Shop Drawing and Cost Change logs to attendees at the next meeting.
4. Ascertain that work is prosecuted consistently with contract documents and construction schedules.

G. At Contractor's option, weekly progress meetings can be held integrally with monthly CPM Scheduling meeting and As-Built Update meeting specified herein.

H. Contractor shall be responsible to provide the following at each meeting:

1. Current (and updated if necessary) construction schedule which includes the past week and 2 week 'look ahead'.

2. One set of record documents (drawings, specifications, COs, COPs, RFIs, FAs, etc.).
3. Current (and updated if necessary) submittal schedule.
4. Current (updated) set of "as-built" Project Record Documents.

1.5 MONTHLY CONSTRUCTION SCHEDULE MEETINGS, REPORTING

- A. In addition to specific coordination meetings for each element of work, and other regular project meetings for other purposes, hold general scheduling meeting each month to review status according to recent updated schedule reports.
- B. Require each entity then involved in planning, coordination or performance of work to be properly represented at each meeting. Review each entity's present and future needs including interface requirements, time, sequences, deliveries, access, site utilization, temporary facilities and services, hours of work, hazards and risks, housekeeping, change orders, and documentation of information for payment requests.
- C. Discuss whether each element of current work is ahead of schedule, on time, or behind time in relation with updated progress schedule. Determine how behind-time work will be expedited, and secure commitments from entities involved in doing so.
- D. Discuss whether schedule revisions are required to ensure that current work and subsequent work will be completed within Contract Time.
- E. Review everything of significance which could affect progress of the work.
- F. Engineer will take meeting notes of each meeting and distribute copies to everyone in attendance. General Contractor shall distribute copies of meeting notes to all others affected by decisions or actions resulting from each meeting.

1.6 AS-BUILT UPDATE MEETING

- A. Following each monthly scheduling meeting, Contractor shall meet with all major subcontractors whose work is in progress at the site, including but not limited to civil, and as otherwise designated, to review and verify incorporation of all revisions of the previous month and transfer all non-recorded installed record information to the day-by-day working set of "Project Record Copy" blueprints, with all revisions clearly indicated in red pen. Where applicable, said information shall be obtained from generated coordination drawings; refer to Section 01 31 00. Refer also to Section 01 78 00, Closeout Submittals, for basic required information and other provisions related to 'as-built' requirements.

1.7 COORDINATION MEETINGS

- A. Contractor shall hold coordination meetings with his subcontractors and suppliers as deemed necessary by the Contractor for coordination of the work. Meetings shall be held on site. The Owner and the Engineer will be available to attend such meetings upon request. Refer to Section 01 31 00 for additional information and requirements pertaining to coordination meetings.
- B. The Contractor shall hold coordination meetings with its prime subcontractors beginning the first week after the Notice To Proceed, as deemed necessary by the Contractor. The site forman of the Contractor and prime subcontractors shall review the Contractor's schedule for the first three (3) months of work and thoroughly review the work required by the Contract Documents for that period. The Contractor shall submit Design Clarification Requests, Requests For Information, or any other type of information requests the Contractor may use, for the three (3) month work period during the first month after Notice To Proceed to minimize any conflicts that might occur when mobilization begins.
- C. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special preinstallation meetings.

- D. Request representation at each meeting by every trade currently involved in coordination or planning for the construction activities involved.
- E. The Contractor shall continue to hold coordination meetings with its prime subcontractors on a regular weekly basis, and, beginning one month in advance of the next three (3) month work increment, review the Contractor's schedule and contract documents and submit Design Clarification Requests, Requests For Information, or any other type of information requests the Contractor may use. This process shall continue for each three (3) months, or increments of 3 month work segments until the completion of the Project.
- F. Record meeting results and distribute copies to Engineer and Owner and to others affected by decisions or actions resulting from each meeting.

1.8 PRE-INSTALLATION MEETINGS

- A. General: Prior to commencement of work listed below or as otherwise determined by the Engineer or Owner, the General Contractor or his general superintendent, the responsible foremen for the subcontractors performing said work, plus all associated sub-subcontractors, suppliers, fabricators, vendors, and others as appropriate, shall attend a meeting for the purpose of establishing a full understanding of the procedures and requirements for the orderly progress of the designated work.
- B. All subcontractors and major suppliers are required to attend these pre-installation meetings prior to commencing work of their respective specifications Section, or as required by related work in other specification sections. Contractor may elect to group several Sections or Divisions to minimize the number of these meetings.
- C. Require attendance of entities directly affecting, or affected by, work of the Section including Engineer, Owner's Representatives, Contractor's Project Manager and Site Forman with lead personal performing the work, and/or the appropriate Subcontractors/Suppliers/Fabricators.

- D. Contractor shall notify the Engineer and PM of the Contractor's scheduled pre-installation meeting not less than seven (7) days prior to the scheduled start of any of the work listed below so that the Engineer and PM may schedule their appropriate staff. All applicable submittals as well as the Subcontractor's safety plan and insurance certificates shall have been submitted to and reviewed by the Engineer and PM prior to scheduling this meeting. Work requiring pre-installation meetings shall include, but not necessarily be limited to, the following.
1. Cast-in-place concrete
 2. Waster main.
 3. Storm drainage.
- E. Work Plan: Develop a written work plan for each definable segment of work. Complete the work plan prior to the pre-installation meeting, and this shall serve as the basis for discussion and contract compliance. Include a review of contract requirements to assure that materials and equipment delivered and assembled for construction conform to contract requirements and that control testing, including procedures, are finalized. Examine work areas, upon which new work is to be placed, to verify the substrate for the new phase of work.
- F. Agenda
1. Review technical contract requirements with any options. Contractor to submit any options and resolve with Owner any conflicts, interference, or compatibility problems.
 2. Insurance and certifications.
 3. Schedule. Include the work on the three (3) week Short Interval Schedule.
 4. Review requirements as relates to:
 - a. Schedule.

- b. Submittals and mock-ups - status of approval; review contract requirements. Note:
All submittals pertaining to a pre-installation meeting shall have been reviewed by Engineer and returned to Contractor.
- c. Tolerances.
- d. Manufacturer's requirements.
- e. Weather limitations.
- 5. Materials - available and ready for use.
- 6. Persons responsible for work.
- 7. Quality control methods:
 - a. Testing/Inspection requirements - required inspections and tests, who samples and how often? Criteria for performance of work.
 - b. Acceptability of substrates - criteria for approving substrate.
 - c. Required performance results.
 - d. Recording requirements.
- 8. Applicable governing rules and regulations.
- 9. Temporary facilities and controls:
 - a. Safety, environmental controls, security, noise.
 - b. Space and access limitations.
- 10. Protection of work, curing periods and related subjects.
- 11. Other business
- G. Engineer will record, reproduce and distribute copies of minutes prior to the next meeting or within seven (7) days of each meeting to all meeting participants.

1.9 COMMISSIONING MEETINGS

- A. Refer to respective sections of the various general, mechanical-and electrical Divisions of the Project Manual for associated commissioning meeting requirements.

1.10 PROJECT CLOSEOUT MEETINGS

- A. For the purpose of attaining project closeout, commencing immediately following established date of Substantial Completion, Contractor's project manager and superintendent and all subcontractors who have outstanding punch list items associated with their work, or as otherwise requested and including all subcontractors involved in the building systems commissioning process, shall attend weekly closeout meetings which shall be held at the jobsite.
- B. Such meetings shall be held to review and discuss the resolution of all punch list items in order to attain Final Completion. Closeout meetings shall continue on a weekly basis until all punch list items have been resolved and Final Completion is attained.

1.11 TRAINING MEETINGS FOR OPERATING INSTRUCTIONS OF OWNER'S PERSONNEL

- A. Refer to Section 01 77 00 for training requirements related to operating instructions of Owner's personnel.

1.12 ADDITIONAL MEETINGS

- A. As the construction progresses, additional meetings may be required. These may be called at the direction of or by the Engineer or PM.

END OF SECTION

SECTION 01 70 00

CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. This section supplements General and Supplemental Conditions requirements and specifies administrative and procedural requirements for preparation of a preliminary Construction Schedule, Contractor's final master Construction Schedule, hereinafter called the Construction Schedule, Short Interval Schedules ('look-ahead'), and monthly updates.
2. The provisions and requirements of this Section supersede those contained in Article 3.02 of the General Conditions, as supplemented, where said provisions or requirements are in conflict.

B. Definitions:

"Day", as used throughout the Contract unless otherwise stated, means "calendar day".

1.2 SYSTEM DESCRIPTION

A. System Requirements: The purpose of the schedules and reports is to:

1. Ensure adequate planning and execution of the work by the Contractor so that it is completed within the milestone dates and total number of working days allowed in the Contract.
2. Establish the standard against which satisfactory completion of the project shall be judged.

3. Assist the Engineer and Owner's Representative in monitoring progress.
4. Assess the impact of any changes to the Contract.
5. Support the basis for progress payments.

B. Float or Slack Time in the Schedule:

1. Float time is defined as the amount of time between the earliest start date and the latest start date or between the earliest finish date and the latest finish date of an activity or chain of activities on the 'Critical Path Method' (CPM) Construction Schedule.
2. Joint Ownership of Float: The Contractor's construction schedule will begin with the date of issuance of Notice to Proceed and conclude with the date of Substantial Completion of the Project, which is the Time of Completion indicated in the Bid Proposal. Float or slack time within this construction schedule is not for the exclusive use or benefit of either the Owner or the Contractor, unless otherwise identified in these Contract Documents, but is a jointly owned project resource available to both parties as needed to meet Contract milestones and the Contract Substantial Completion date. Any float time to activities not on the critical path shall belong jointly to the Contractor and Owner and may be used by the Contractor and Owner throughout the construction process. However, the Contractor and Owner can mutually reserve and apportion float time according to the needs of the Project.

3. Limited Damage for Delay:
 - a. No time extensions will be granted nor delay damages paid until a delay occurs that impacts the project's critical path, consumes all available float or contingency time available, and extends the work beyond the specified contract completion date.
 - b. Any float time remaining at the established date of Substantial Completion shall belong to the Owner and may be used by the Owner in determining if additional contract days are to be awarded for changes in the Contract or for delays to the Contract caused by the Owner. The Contractor shall not be entitled to any adjustment in the Contract Time, the Contract Schedule, or the Contract Price, or to any additional payment of any sort by reason of the Owner's use of any float time remaining between established date of Substantial Completion and the final completion date.
4. Non-Sequestering of Float: Pursuant to the float-sharing requirements of these Contract Documents, the use of float suppression or float hiding techniques such as preferential sequencing or logic, special lead/lag restraints, using multiple critical paths, scheduling activities which can be done concurrently as sequential activities on the critical path or artificially inflating the duration of activities on the critical path are prohibited and the use of float time disclosed or implied by the use of alternate scheduling techniques shall be shared to the proportionate benefit of the Owner and the Contractor. Sequestering of float shall be cause for rejection of Contractor's schedule submittal.

5. Float Developed by Accelerated Actions of Owner or Engineer: Float may be added to the Construction Schedule through the expedited activities of the Owner or the Engineer. The Construction Schedule must show all scheduled Owner or Engineer activities which can affect the critical path including submittal review, delivery of Owner provided items, testing or permit compliance reviews or inspections. Times for these activities on the Construction Schedule must reflect the maximum time or latest date of delivery/arrival indicated in the Specifications or Drawings. If no duration or delivery date is shown or specified, the schedule is to indicate reasonable dates and duration for those items. If Engineer or Owner create float by doing activities ahead of schedule, this time will be identified each month and may be used to offset delays which may be caused by Engineer, Owner or other delay occurrences outside of the Contractor's control.
- C. If the Contractor should desire or intend to complete the Work earlier than any required Milestone or Completion date, the Owner or Engineer shall not be liable to the Contractor for any costs or other damages should the Contractor be unable to complete the Work before such Milestone or Completion date.

1.3 SUBMITTALS

- A. General: Comply with pertinent provisions of Section 01 33 00.
- B. All schedule submittals, including schedule updates, will be reviewed jointly by the Engineer and the Contractor. Such review of the Contractor's schedules shall not constitute an approval or acceptance of the Contractor's construction means, methods, or sequencing or its ability to complete the Work in a timely manner. Neither the Owner's nor the Engineer's review will relieve the Contractor of the

sole responsibility for the accuracy, adequacy, or completeness of the schedule, the logic of the schedule, and/or completion of the Contract requirements in accord with such schedule. Neither Owner's nor Engineer's review shall constitute acknowledgment that the relationships between various work items or activity durations are reasonable or appropriate.

C. Preliminary Progress Schedule:

1. Submit the Preliminary Progress Schedule to the Engineer within fourteen (14) days after the Notice to Proceed.
4. Re-submit the Preliminary Progress Schedule to the Engineer until the schedule meets all requirements of this Section.
5. Each submittal shall be in the form of three (3) copies of a computer plotted time-scaled logic diagram, the accompanying baseline schedule CD-ROM, and hard copy computer reports sorted by activity number, early start and total float.

D. Progress Schedule:

1. Within ten (10) working days after issuance of Owner's written Notice to Proceed, and before any further progress payment need be made, the Contractor, after consultations and sign-offs with its major Subcontractors and Suppliers of any tier has been performed, shall submit a complete Contractor's Construction Schedule to the Owner and Engineer for Owner's and Engineer's review.
2. Initial submittal shall be in the form of one reproducible copy and three prints, in addition to providing CD-ROM of the baseline schedule.

3. The Owner and Engineer will review the substance of Contractor's Construction Schedule and return to the Contractor with comments within ten (10) days. Within ten (10) days following return of reviewed Construction Schedule, the Contractor shall meet with the Engineer to discuss Owner's and Engineer's Schedule review comments and revisions to the Schedule.
 - a. Within ten (10) days following said meeting, Contractor shall submit a final Construction Schedule implementing all revisions as directed in the above noted meeting.
 - b. This submittal shall be in the form of four (4) colored copies of a computer plotted time scaled logic diagram with the critical path highlighted in bold contrasting color, the accompanying schedule CD-ROM, four (4) copies of the computerized reports sorted by activity identification number, early start, total float and cash flow curves indicating early and late starts, plus four (4) copies of the corresponding Schedule of Values. Provide the same for each update.
 4. When submitting the final schedule, the Contractor shall include its cover letter of transmittal and include a statement that the schedule has been completed and concurred with by its subcontractors.
 5. Progress Payment will be withheld until Contractor's Construction Schedule has been submitted in final form and content satisfactory to the Engineer and Owner.
- E. Periodic Updates to Progress Schedule:
1. Submit an Updated Progress Schedule with each request for a monthly progress payment as required in Part 3 of this Section.

2. Each submittal shall be in the form of one reproducible copy and three prints, in addition to providing a CD-ROM of each update version.
- F. Distribution: Copies of reviewed schedule and every revision thereof shall be submitted to the Engineer, the Owner, and to everyone whose time performance is essential to achieving the progress shown on the schedule.

1.3 QUALITY ASSURANCE

D. Experience of Scheduler:

1. Employ a scheduler who is thoroughly trained and experienced in compiling construction schedules, in analyzing schedules by use of the Critical Path Method, and in preparing and issuing periodic reports as required.
 2. Provide references from a minimum of three past projects of work similar to this project, with similar scheduling requirements.
 3. Replace any scheduler whom the Owner deems incompetent.
 4. If Contractor does not have the qualified scheduling personnel, he shall retain an outside consultant specializing in CPM scheduling to prepare and maintain the progress schedule.
 5. Submit names and experience of proposed employee or consulting firm to Owner prior to submission of preliminary schedule.
 6. Upon review of Contractor's scheduler/consultant, the Contractor shall conduct a meeting with the Engineer and Owner, Contractor Project Superintendent and Contractor's Subcontractor's to explain the scheduling system, monitoring system and demonstrate the use of the schedule during the project.
- E. ***[Specifier modify as required]*** The Owner may contract for independent certified CPM scheduler assistance throughout the project in reviewing and providing

recommendations regarding the draft and regular updates of the Contractor's schedule.

F. Coordination with Subcontractors and Suppliers:

1. The scheduler shall prepare the Project Schedules and their updates in cooperation with major subcontractors and suppliers.
2. In scheduling work of subcontractors and deliveries by suppliers, the Contractor represents that he has agreement regarding schedule with those supplying materials and performing the work.

G. Reliance Upon the Reviewed Schedule:

1. The Progress Schedule, as reviewed by the Engineer, will be an integral part of the Contract and will establish interim completion dates for the various activities under the Contract.
2. Should any activity on the critical path not be completed within 15 calendar days after the stated scheduled date, the Owner shall have the right to require the Contractor to expedite completion of the activity by whatever means appropriate and necessary, without additional compensation to the Contractor. In addition, Contractor shall submit a "Recovery Schedule" which shall logically demonstrate method or methods Contractor proposes to initiate to get back on schedule within thirty (30) days of said date; i.e., additional tradespersons, shifts, work days, or crews.
3. In addition to above, should any activity be 15 days or more behind schedule, the Owner shall have the right to perform the activity or have the activity performed by whatever method the Owner deems appropriate.

4. Costs incurred by the Owner and the Engineer in connection with expediting construction activity under this Article shall be the responsibility of the Contractor.
5. It is expressly understood and agreed that failure by the Owner to exercise the option either to order the Contractor to expedite an activity or to expedite the activity by other means shall not be considered to set a precedent for any other activities.

PART 2 – PRODUCTS

2.1 CONSTRUCTION PROGRESS SCHEDULE REQUIREMENTS

A. Critical Path Network Analysis Diagram:

1. Prepare and maintain a computer generated progress schedule using Microsoft Project software consisting of a network analysis system generally known as the Critical Path Method (CPM). Software version shall match versions owned by Owner and, where applicable, independent scheduler.
2. Comply with "The Use of CPM in Construction--A Manual for General Contractors" published by the Associated General Contractors of America, Inc.
3. Graphically show the order and interdependence of all activities necessary to complete the Work, and the sequence in which each such activity is planned to be accomplished.
4. Commence progress schedule preparation immediately following Notice of Award of the Contract.
1. Key the progress schedule to the Schedule of Values (Section 01 29 00) in order to aid analysis of monthly payment requests.

- B. Required Data: Show complete sequence of construction by activity, indicating critical path of activities, including but not limited to:
1. Date for Notice to Proceed;
 2. Date for Substantial Completion;
 3. Project mobilization;
 4. Operating constraints and sequences specified by Owner;
 5. Shop Drawing, product data, samples, mock-up submittals and reviews, by specification section;
 6. Date for final color selections to not affect the Critical Path;
 7. Provide demolition schedule as indicated in the Construction Documents;
 8. Planned versus actual status for each Work activity;
 9. Material procurement - fabrication, delivery to job site, and installation - of equipment and critical materials;
 10. Fabrication of special material and equipment, its installation and testing;
 11. Utility shutdowns, road closures, etc.;
 12. Any intermediate (milestone) completion dates identified in the Contract Documents; include coordination activities as milestones, such as utility tie-ins, outages, Owner furnished items, City inspections, etc.;
 13. Delivery windows for all Owner furnished items. Establish earliest and latest delivery dates in consultation with the manufacturer;
 14. Pre-Installation Meetings;
 15. Contractor transfer of any existing Owner equipment;
 16. Show interrelationships and dependencies including activities of separate contractors;

17. Long lead items;
 18. Testing, commissioning, Owner training sessions, and other close out activities;
 19. Show Field Authorizations (FA) and Change Orders (CO) when they impact the critical path of the schedule;
 20. Punch list;
 21. Punch list corrections.
 22. Final cleanup.
 23. All activities by the Engineer that affect progress, required dates for completion, or both, for all and each part of the Work.
- C. Number and Duration of Activities on the Network Analysis:
1. Treat each trade or type of work as a separate activity or set of activities on the network analysis. Each activity shall be coded for responsibility (Contractor, Owner, Engineer, etc.), Subcontractor, Discipline (Fire Suppression, Plumbing, Mechanical, Automation, Electrical, Communications, Roofing, etc.). Each project phase (i.e., 1, 1-A, 2, etc.) shall be scheduled separately.
 2. At a minimum treat each section of the technical specifications as one or more trades or types of work.
 3. Treat submittal, fabrication, delivery, installation, and startup as separate activities for each trade, type of work and item of equipment, including any items procured under any early procurement contracts transferred and/or assigned by Owner, required for performance of Work. The fabrication and delivery activities shall have the appropriate logic ties to submittal/review and construction activities.
 4. Submittal and review activities for shop drawings, samples, etc., shall allow

reasonable durations for preparation of submittals, submittal review, revisions and re-submittal review. Refer to Section 01 33 00 for specified durations for processing submittals by the Engineer and its Consultants, or the Owner and its Consultants, as applicable. Shorter review times for critical submittals may be negotiated on an individual basis. Re- submittals shall have the same review times allotted as the initial submittals. Re- submittal of shop drawings or samples necessitated by required corrections shall not be cause for extension of time. If certain submittals are critical, they shall be so identified at the time of submission to assure priority treatment. The submittal activities shall have the appropriate logic ties to delivery and construction activities.

5. No activity or task shall be longer than 15 calendar days duration, with shorter durations if they affect other activities. The activities shall show early and late start, early and late finish, and float dates. Break down major tasks into sub-tasks or by area to meet this criteria.
 5. Where activities extend more than 15 days divide activities into logical component activities.
 6. Show on the diagram, as a minimum for each activity, preceding and following event numbers, description of each activity, cost, and activity duration in calendar days.
- B. Cost Loaded Schedule: All construction activities which occur on-site shall be cost loaded. Show dollar value of activities correlated to the Schedule of Values

C. Mathematical Analysis:

1. Furnish the mathematical analysis of the network diagram by computer printout, including a tabulation of each activity. Show the following information as a minimum for each activity:
 - a. Preceding and following event numbers.
 - b. Activity description.
 - c. Estimated duration of activities.
 - d. Earliest start date and earliest finish date (by calendar date).
 - e. Latest start date and latest finish date (by calendar date).
 - f. Slack or Float (in calendar days).
 - g. Monetary value of each activity.
 - h. Percentage of activity completed.
 - i. Contractor's earnings based on portion of activity completed.
2. The means used in making the mathematical computation shall be capable of compiling the total value of completed and partially completed activities and be capable of accepting modifications reviewed for time and logic adjustment.

D. Baseline Schedule: The initial Schedule when reviewed by the Engineer and Owner shall be identified as the Baseline Schedule and shall be known as Revision 0. Each subsequent reviewed change to the Schedule shall be as a Revision numbered in sequence (Revision 1, 2, 3, etc.). The Baseline Schedule shall be submitted with no progress percentages applied to activities. The first update shall include the preliminary schedule activities and remaining activities updated as of the second monthly pay request.

PART 3 – EXECUTION

3.1 PRELIMINARY CONSTRUCTION SCHEDULE

A. General:

1. Prepare and submit the Preliminary Progress Schedule to the Engineer within 14 days after the Notice of Award, showing all elements itemized in 2.01B above.
2. The schedule shall have been developed by the Contractor in conjunction with its Subcontractors. Major subcontractors greater than 20 percent of the contract are required to review and sign off on the progress schedules as a condition to the Owner authorizing progress payment approval.

B. Re-submittal: Re-submit the Preliminary Construction Schedule to the Engineer until the schedule meets all requirements of this section.

C. Scope of Preliminary Construction Schedule: The Preliminary Progress Schedule shall detail, at a minimum, all work which will be accomplished in the first 60 calendar days following the Notice to Proceed. The general approach of the balance of the work shall be indicated.

D. Limitation on Construction:

1. Mobilization and submittals can be in process during the review period.
2. No construction work shall be permitted until the Preliminary Construction Schedule is submitted and reviewed.

E. Initial Progress Payment: The first pay request will be based on the update of the preliminary schedule. This submittal shall be in the form of three (3) copies of a computer plotted time- scaled logic diagram, the accompanying Microsoft Project CD-ROM, and hard copy computer reports sorted by activity number, early start

and total float.

3.2 COMPLETE CONSTRUCTION SCHEDULE

- A. General: Submit the complete (Master) Construction Schedule to the Engineer within ten (10) working days following the Notice to Proceed.
- B. Subcontractor Participation:
 - 1. Involve all major subcontractors in preparation of the Master Construction Schedule.
 - 2. Obtain approval of the schedule from each major subcontractor and submit in writing together with the final Construction Schedule.
- C. Start-Up and Testing: Include adequate time for start-up and testing of the complete facility.
- D. Progress Payments:
 - 1. Shall be withheld in the absence of a reviewed Construction Schedule.
 - 2. No adjustment or extension of time shall be granted for failure to meet the activity dates as shown. Failure to comply with these requirements shall be cause for rejection of any progress payments presented thereafter, until such time as these requirements are met.
- E. Distribution: Copies of reviewed preliminary Construction Schedule and every reviewed revision thereof shall be submitted to the Engineer, the Owner, and to everyone whose time performance is essential to achieving the progress shown on the schedule.

3.3 SHORT INTERVAL SCHEDULE

- A. Prepare a 3-week Short Interval (“look-ahead”) Schedule. Show one (1) prior week of actual progress (planned vs actual performance). Forecast two (2) weeks of

start and completion dates for each activity, task or event in comparison to the prepared schedule.

1. Activities in the Short Interval Schedule shall relate directly to activities in the Construction Schedule. Each activity shall be coded with the same ID number, specification number, or other reference the contractor uses on the Construction Schedule. The Short Interval Schedule will have more detail, but each of the details must be related to the Construction Schedule coding.
 2. Indicate start, on-going, intermittent and completion for each activity, task, or event.
 3. The schedule shall show critical path work, as defined by the Construction Schedule, that has been affected by any changed conditions authorized through a change order or field order.
- B. Distribute paper copies of the Short Interval Schedule to all attendees at each weekly Progress Meeting.

3.4 UPDATES

A. General:

1. The scheduler shall attend all meetings concerning project progress, alleged delays, or time impact.
2. The schedule shall be modified to reflect the original Contract completion date, subject to review by the Owner. Prior to submittal of the schedule update, the Contractor shall submit an advanced worksheet indicating the intended report status. The Owner, Engineer and Contractor shall then meet and agree upon the completion status of the work in progress, and any major logic changes proposed by the Contractor.

3. Maintain the Construction Schedule at the project meeting location and update weekly by drawing a line vertically through the corresponding progress of each task on the schedule as of the date of that project meeting. The line shall be in varying colors so that differentiation between weeks is readily apparent.

B. Weekly Meetings:

1. Update the reviewed Construction Schedule at each weekly Project Meeting.
2. Indicate "actual" progress in percent complete for each activity.
3. At each project meeting discuss the Short Interval Schedule. Any deviation from the planned schedule shall be explained by Contractor, with corrective measures, if necessary, to bring progress of Work back in line with the Contract Completion date.

C. Monthly Update:

1. If substantial changes have occurred in the Construction Schedule, or if enough changes have occurred that the schedule is rendered inaccurate or ineffective, submit with the next application for payment a revised updated Construction Schedule showing the original baseline schedule and revised schedule on the same copy for evaluation and measurement of actual work-in-place.
2. If the contractor does not submit a revised schedule with a payment request, it is agreed by the Contractor that the project is still on schedule according to the last submitted schedule.
3. The Contractor shall maintain an ID system so that if the logic changes, or other tasks are inserted, the original task and any inserted task always maintain the originally assigned ID number.

4. Contractor shall submit an updated schedule at the monthly progress meeting following either one of the following two occurrences:
 - a. Upon completion of a major milestone; or,
 - b. When the actual work completed is more than two (2) weeks behind schedule. Should the schedule show the project completion to be more than two weeks behind, the Contractor shall submit a written explanation and recovery schedule outlining corrective action taken or proposed to bring events back on schedule within a 30 day period.
 5. Show changes occurring since previous schedule submission, such as:
 - a. Any major changes in scope, including authorized Field Orders or Change Orders;
 - b. Contractor reorganization of his work sequence unrelated to changes in scope;
 - c. Activities modified since previous submission;
 - d. Revised projections for progress and completion, as applicable; and
 - e. Any other identifiable changes.
 6. Provide narrative report as needed to define:
 - a. Problem areas, anticipated delay, and impact of these on schedule; and
 - b. Corrective action recommended and its effect.
- D. Subcontractor Participation:
1. Involve all major subcontractors in preparation of the Periodic Updates of the Construction Schedule.
 2. Obtain approval of the schedule from each major subcontractor and submit in writing together with the Periodic Updates of the Construction Schedule.

E. Change Orders:

1. Authorized changes to the work shall be included in the schedule network as they occur in the same format and level of detail as contained in the current updated schedule. Enough activities shall be included to adequately describe the work. Code the activities in such a way that they can be identified to the specific Change Order. Insert the Change Order Activities in the network with appropriate logic ties to original network activities.
2. Utilize the time impact analysis submitted with the change order to demonstrate the effect of delays on the overall project schedule.

3.5 TIME EXTENSIONS

- A. The Contractor shall notify the Owner and Engineer in writing within seven (7) days of the event of any event which could delay performance or supplying of any item of the work affecting the critical path. Contractor shall indicate the expected duration of the delay, the anticipated effect of the delay on the Contractor's Construction Schedule, and the action being taken to correct the delay situation.
- B. Extensions of time to the Contractor's Contract may be granted only for delays to activities on the critical path that actually delay the Project Completion beyond the date of Substantial Completion, or for delays to activities that transform that activity onto the critical path, and as a result cause a final completion date beyond the contracted final completion date.
- C. Following receipt of an executed Change Order extending the Contract Time, the activity data and logic relationships shall be incorporated into the current detailed CPM schedule during the next scheduled progress update, as outlined above in Paragraph F "Change Orders" above. In the event the Contractor is entitled to a

change in the Contract Time, the adjustment to the contract Time shall be as defined in the General Conditions.

3.6 ABNORMAL INCLEMENT WEATHER

- A. The Contractor shall not be entitled to an extension of time for inclement weather except under the provisions of Paragraph 3.05A.6 of the General Conditions, as supplemented.
- B. Except for site work which may critically affect the Contract Time, no extension of time will be made for abnormal inclement weather after the principle portions of the Work are sufficiently closed-in (exterior walls up and roof in place) so as to permit any structure, or major portion thereof which is part of the Work, to be adequately heated so as to allow the various trades to perform their work.
- C. If the total calendar days lost due to abnormal inclement weather, from the start of the Work at the Project site by the Contractor until the principle portions of the Work are enclosed, exceeds the total number of days to be expected for the same period, a time extension, if granted, shall only be the number of calendar days needed to equal the excess number of calendar days lost due to such abnormal inclement weather.

3.7 AS-CONSTRUCTED PROGRESS SCHEDULES

- A. General:
 - 1. At the completion of the project submit an as-constructed progress schedule.
 - 2. The contractor's project manager and project scheduler must certify the progress schedule as representing the way in which the project was actually constructed.

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:

- 1. Shop Drawings.
- 2. Product Data.
- 3. Samples.

The individual submittal requirements of certain submittals are specified in applicable sections for each unit of work.

- B. Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:

- 1. Permits.
- 2. Applications for Payment.
- 3. List of subcontractors.

- C. Shop drawings, product data, samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate, for those portions of the Work for which submittals are required, how Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents.

1.3 DEFINITIONS

- A. Shop Drawings: Shop drawings include specially-prepared technical data for this project, including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form for general application to several projects. Reproduction of Contract Document drawings are not considered to be shop drawings unless approved by the ENGINEER.
- B. Product Data: Product data includes standard printed information on materials, products and systems, not specially-prepared for this project, other than the designation of selections from among available choices printed therein.
- C. Samples: Samples include both fabricated and unfabricated physical examples of materials, products, and units of work; both as complete units and as smaller portions of units of work; either for limited visual inspection or (where indicated) for more detailed testing and analysis.
- D. Field Samples: Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.
- E. Mockups: Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Field Samples.

F. Coordination Drawings: Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.

1. Preparation of Coordination Drawings is specified in Section 01 31 00 and may include components previously shown in detail on Shop Drawings or Product Data.

1.4 SUBMITTAL PROCEDURES

- A. Provide a submittal on every product and material used in the Project. Before submittal of shop drawings, brochures, and lists, Contractor shall carefully review same for proper identification, completeness, correctness, dimensions, and technical applicability to the Contract Document requirements and note all corrections, items needing clarification, additional comments, and the like. Upon thorough review and subsequent acceptance by the Contractor, if so accepted, Contractor is to note its approval together with said notes or amendments thereto for compliance with the Contract Documents by suitable stamp, date and the signature of the Contractor or its authorized representative. Submittals will be returned to the Contractor without action by the ENGINEER if the items submitted are not stamped, signed, and identified as approved or approved as noted or other similar language indicating approval by the Contractor, or if the submittal is obviously not thoroughly reviewed.
- B. Submission of shop drawings and samples shall be accompanied by one original and one copy of a transmittal letter containing Project name, Contractor's name, number of drawings and samples, titles and other pertinent data.
- C. Many products are specified by one or more named products/manufacturers. In those circumstances where Contractor submits an unnamed, non-prior approved product/manufacture during this 'shop drawing' phase, said submittal shall be submitted in conformance with product substitution requirements of Section 01 60 00, Article 2.03.

- D. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Contractor shall provide submittals requiring coordination with other submittals to the ENGINEER at one time. The ENGINEER will review submittals as received, provide comments, and return them to the Contractor. If the Contractor did not submit all submittals requiring coordination at the same time, and a later submittal identifies conflicts, the Contractor will be responsible for all costs associated with changes necessary to properly coordinate the installation of the materials.
 3. To avoid the need to delay installation as a result of the time required to process submittals, the Contractor shall anticipate the review times noted in this section and anticipate the possibility of a resubmittal or rejected submittal and the effect that action would have on the Project schedule.
 - a. All required submittals shall be initially received by the ENGINEER within 30 days following the Notice To Proceed date, or sooner as required by the following submittal review times, to meet the Construction Schedule need for materials related to the submittals. Submittals received after these time periods shall not be a cause for delay claims to the Project. ENGINEER will not accelerate review time for submittals received after the indicated time periods, regardless of any potential

- impact to the Contractor's schedule.
- b. Submittals requiring color selection and material selection are interdependent on receiving all submittals at the same time that have such selection requirements. Allow 20 working days from the date of receipt of the last such submittal by the Contractor for the ENGINEER to complete color selections and mail out from the ENGINEER's office.
 - c. For all other submittals, allow 10 working days after receipt by the ENGINEER to complete the initial review and mail out from the ENGINEER's office.
 - d. If the ENGINEER must delay processing a submittal to permit coordination with subsequent submittals, the 10 working days will begin upon receipt of the last such coordination submittal from the Contractor.
 - e. If several submittals are provided by the Contractor at the same time, allow 20 working days after receipt by the ENGINEER to complete the initial review and mail out from the ENGINEER's office. Provide an "Order of Priority List" to the ENGINEER with the submittal.
 - f. If an intermediate submittal is necessary, process the same as the initial submittal.
 - g. Allow 10 working days for reprocessing each submittal after receipt.
- E. Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block. Consecutively number each submittal beginning with the number 001.
- 1. Provide adequate space for the Contractor's stamp and approval, plus a space approximately 4 by 5 inches each on the label or beside the title block on Shop Drawings to record the Engineer's review and approval markings and the action taken.

2. Include the following information on the label or title block for processing and recording action taken.
 - a. Project name and job number.
 - b. Date.
 - c. Name and address of the Engineer.
 - d. Name and address of the Contractor, subcontractor, supplier and manufacturer as appropriate.
 - e. Number and title of appropriate Specification Section.
 - f. Drawing number and detail references, as appropriate.

- F. Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Engineer using a transmittal form. Submittals received from sources other than the Contractor will be returned through the Contractor without action.
 1. Address no more than one topic or related topics on a single transmittal (i.e. mechanical items shall not be submitted under same transmittal with electrical items).
 2. Record relevant information, deviations, and requests for data, including minor variations and limitations from the Contract Documents.
 3. Shop drawings, product data, samples, and mock-up as required for submissions by the technical specification sections are to be submitted for Engineer's review/approval. The number of submittals required is noted in the parenthesis.
 - a. Shop Drawings: (6) sets; provide one (1) additional set for Electrical submittals
 - b. Product Data: (6) copies; provide one (1) additional copy for Electrical submittals

- c. Samples: (3) samples
 - d. Mock-ups: As required by any technical specification section.
 - e. Demonstrations: As required by any technical specification section.
 - f. Reference applicable mechanical and electrical technical specifications' sections for additional submittal requirements.
4. Material and Color Submittal: Submit samples of actual colors of materials.
 5. Number submittals as follows: Numerical Order, Spec Section, Revision Letter.
 6. In the event of the need to "revise and resubmit" a submittal, resubmit same in acceptable form/content, clearly identifying deviations from previous submittal content.

1.5 SHOP DRAWINGS

- A. Submit drawings drawn to accurate scale. Do not reproduce Contract documents or copy standard information for use as Shop Drawings. Standard information prepared without specific references to the project is not a Shop Drawing.
- B. Include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:
 1. Dimensions;
 2. Identification of products and materials included;
 3. Compliance with specified standards;
 4. Notation of coordination requirements;
 5. Notation of dimensions established by field measurements; and
 6. Any deviation from contract drawings or specifications;

7. Date when review has to be finalized to meet schedule.
- C. Except for templates, patterns and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2" x 11", but no larger than 24" x 36".
- D. Shop drawings shall clearly indicate the correct configurations and relative sizes, materials, metal gauges, etc. of the various components and the proposed methods of fabrication, required clearances, supports and any other pertinent data.
- E. All items shown on shop drawings that do not conform to plans and specifications shall be specifically noted as such (flagged) and brought to the Engineer's attention. In any case, the Engineer's stamp of review shall not include approval of unauthorized changes in the Contract Documents, except where specific written approval is given.
- F. Contractor is responsible for obtaining and distributing required prints of shop drawings to its subcontractors and material suppliers after as well as before final review by the ENGINEER. Prints of reviewed shop drawings shall be made from returned transparencies which carry the Contractor's and Engineer's appropriate stamps. ENGINEER / Owner and applicable consultants and governing agencies will retain copies of each shop drawing submittal. Reproducible transparency and all remaining prints not otherwise retained will be returned to Contractor.
- G. At Engineer's discretion, the prints distributed by the Engineer including the one print returned to the Contractor (in addition to the original transparency) may consist of copies made from the marked-up and stamped transparencies.

1.6 PRODUCT DATA

- A. Product data includes Material Safety Data Sheets (MSDS), manufacturer's printed installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves.
1. Where product data must be specifically prepared because standard printed data is not suitable, submit as Shop Drawings.
- B. Mark each copy to show applicable choices and options and indicate the applicable information on selected products. Include the following information:
1. Manufacturer's printed recommendations.
 2. Compliance with recognized trade association standards;
 3. Compliance with recognized testing agency standards;
 4. Application of testing agency labels and seals;
 5. Notation of dimensions verified by field measurement;
 6. Notation of coordination requirements; and
 7. Any deviation from Contract Drawings or Specifications;
 8. Date when review has to be finalized to meet schedule.
- C. The Contractor is responsible for providing certification that all construction materials used on the Project are 100% free of asbestos and lead.

1.7 SAMPLES AND MOCK-UPS

- A. Submit samples and mock-ups that are identical with the material or product proposed. Samples include partial sections of components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.
1. Package samples to facilitate review. Prepare samples to match the Engineer's sample. Include the following:
- a. Generic description of the sample;
 - b. Sample source;
 - c. Product name or name of manufacturer;
 - d. Compliance with recognized standards;
 - e. Availability and delivery time; and
 - f. Specification section.
- B. Submit samples and mock-ups for review of kind, color, pattern, and texture, for a comparison of these characteristics before the actual component installation and after final submittal.
1. Where variation in color, pattern, texture or other characteristics are inherent in the material, submit not less than four (4) units to show approximate limits of the variations.
- C. Where samples are for selection of appearance characteristics from a range of standard choices, submit a full set of choices for the material or products.
- D. Maintain sets of approved samples and mock-ups, at the project site, for quality comparisons throughout the course of construction.

- E. Demolish and remove all samples and mock-ups, at the project site, for quality comparisons throughout the course of construction.

1.8 ENGINEER'S ACTION

- A. Except for submittals for record, information or similar purposes, Engineer will review each submittal, mark to indicate action taken, and return promptly.
- B. Engineer review of submittals does not release Contractor from a proper installation, compliance with applicable codes, or coordination of the Work.
- C. The Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be marked to indicate the action taken.

D. The following is a copy of the Engineer's review stamp:

ENGINEER'S RFVIFW	RESPONSE REQUIRED OF CONTRACTOR
----------------------	------------------------------------

No Exceptions Taken Rejected

Confirm and Verify

Note Markings Comments Attached

Resubmit

Engineer's 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 project plans and specifications, nor departures therefrom. The Contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of assembly, for coordination of his work with that of other trades, and for performing his work in a safe manner.

By: _____ Date: _____

E. The Engineer will distribute, as a minimum, the reviewed submittals as follows:

(1) copy to Engineer file; along with (1) sample

(1) Copy to Engineer sub consultants. For those submittals requiring review by Engineer sub consultant (i.e. Landscaping, etc.)

(1) copy to PM; along with (1) sample

Remainder of copies submitted by the Contractor

END OF SECTION

SECTION 01 35 20
SAFETY PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 PRELIMINARY WORK

- A. Prior to the start of and during the course of above and below ground Work the Contractor shall make a thorough survey of the entire worksite to determine all potential hazards and notify the Owner in writing of any such hazards prior to the commencement of work. Workmen shall be made aware of those hazards and shall be instructed in procedures and the use of equipment for their protection. The Contractor shall verify the location, condition, and whether it is active or inactive of all utilities on and near the worksite and take precautions to protect all people working on the project, the general public, and the property.
- B. Submit a site specific safety plan in accordance with Supplemental Conditions section 5.07. Submit to allow review and re-submittal with modifications prior to beginning any work.

1.3 IMMINENT DANGER

- A. The Contractor shall be wholly responsible for all accidents or death occurring at any time during the progress or completion of this project which may happen to any person employed to perform work on this project; or for any injury or death its work, operations, or persons performing work on this project may cause to any person not employed in the work of this project; or for any damage its work, operations, or persons performing work on this project may cause to the work being constructed, or to any existing public or private property, either

on or adjoining the project site or along any routes of travel. Completion of this project includes any time work is being performed on this project, even after final acceptance by the Owner.

1.4 SAFETY

- A. The Contractor shall ensure that all persons, while on the work site, comply with the requirements of WISHA, these requirements, and the safety precautions contained in the several Specification Sections. The Contractor shall promptly and fully comply with, execute and, without separate charge thereof to the Owner, shall enforce compliance with the provisions of the latest adopted Washington Industrial Safety and Health Act, with particular attention paid but not limited to Chapter 296-155, WAC Safety Standards for Construction Work; with particular attention paid but not limited to Chapter 296-24 WAC General Safety and Health Standards; with particular attention paid but not limited to Chapters 296-27, 296-350 and 296-360 WAC regarding Administrative Safety and Health Act Chapter 49-17 RCW, and any addenda thereto.
- B. The Contractor shall immediately advise the Owner of inspections conducted by WISHA at the work site, and shall transmit copies of reports, citations and violations to the Owner and Engineer.
- C. Entry into Permit-Required Confined Spaces:
 - 1. Entry into confined spaces such as steam tunnels, storm sewers, and as otherwise defined in Section 296-809-20002 of Chapter 296-809 WAC, Confined Spaces, shall be performed in conformance with permit entry procedures set forth in Section 296-809-500.
 - 2. Employee training for employees entering a confined space shall conform to WAC Section 296-809-400.

3. It is recommend that when entry into a confined space is anticipated, a sub-consultant such as Pipe Experts LLC (360-943-5840) be contacted.

1.5 SAFETY RESPONSIBILITIES

A. Contractor shall be responsible to:

1. Ensure compliance with these requirements, WISHA requirements, and other safety requirements.
2. Authorize immediate action to correct substandard safety conditions.
3. Review and act to ensure compliance with safety procedures with its supervisors, subcontractors, and suppliers.
4. Make thorough daily safety inspections of the work site and immediately act to eliminate unsafe acts and unsafe conditions.
5. Investigate worksite accidents and recommend immediate corrective action.
6. Assist in the preparation of accident investigation and reporting procedures.
7. Be responsible for the control, availability, and use of safety equipment, including employee personal protective equipment.
8. Submit two (2) copies of site specific safety plan to Owner.
9. Coordination of Safety programs with State employees where Construction would adversely impact safety of State workers. For example, coordination of Contractor Lock-out Tag-out procedures with State employees and with the State Lock-out Tag-out procedure where State maintenance work would occur concurrent with a Contractor scheduled power outage.

1.6 REQUEST FOR VARIANCES

- A. Requests for variances to deviate from WISHA requirements must follow the current established procedures by that Agency.

1.7 FAILURE TO COMPLY

- A. If work on the project is stopped due to the Contractor's failure to comply with the requirements of WISHA or other applicable safety requirements, no part of the time loss due to any such suspension of operations or stop orders shall be made the subject of a claim for extension of time or for increased cost or damage by the Contractor.

END OF SECTION

SECTION 01 41 00
REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The Contractor is responsible for gaining approval as required for Owner occupancy within contract schedule requirements.
- B. Make any and all adjustments or modifications as required to conform to ordinances, and regulations.

1.2 COMPLIANCE REQUIREMENTS

- A. Referenced codes establish minimum requirement levels. Where provisions of various codes or standards conflict, the more stringent provisions govern. Promptly submit to A/E written notice of observed contract document variations from legal requirements.
- B. Compliance requirements include, but are not limited to the following:
 - 1. International Building Code, Washington State Amendments, as adopted by the Authorities Having Jurisdiction (AHJ); Barrier-Free Code Washington Administrative Code (WAC) 51-50; ANSI 117.1; ADA Accessibility Guidelines (ADAAG), whichever is most stringent.
 - 2. The Life Safety Code NFPA 101.
 - 3. Fire Doors/Windows, NFPA 80.
 - 4. Rules and Regulations for the State Board of Health.
 - 5. Department of Labor and Industries Regulations.

- a. In particular, note requirements of the Hazard Communication Standard, WAC 296- 62-054 through -05427.
6. Department of Ecology Regulations.
 - a. In particular, note requirements of Emission Standards - Volatile Organic Compounds, WAC 173-490.
7. Mechanical, Plumbing & Fire Suppression Work:
 - a. International Plumbing Code.
 - b. National Fire Protection Association Codes.
 - c. International Fire Code.
8. Electrical Work:
 - a. Underwriters' Laboratories (UL).
 - b. National Manufacturers' Association.
 - c. National Fire protection Association, National Electric Code (NEC), National Electric Safety Code.
9. Environmental Requirements: All work to be performed in compliance with applicable provisions of chapters 43.21C RCW and 90.50 RCW as amended, 70.105 RCW, Hazardous Waste Management Act of 1976, and other applicable federal, state, and local statues, ordinances and regulations dealing with prevention of environmental pollution and the preservation of public natural resources that affect or are affected by this project, as well as applicable provisions of Title 39 RCW and Chapter 60.28 RCW are referred to the attention of the Contractor and are incorporated herein.
10. Factory Mutual (FM).

11. Industrial Risk Insurers (IRI).
 12. Energy Requirements:
 - a. Comply with insulation and energy conservation requirements of State of Washington.
 13. Remediation Requirements: Reference technical specifications for additional regulations concerning abatement and remediation of hazardous materials.
 14. Occupational Safety and Health Administration (OSHA)
 15. Washington Industrial Safety and Health Act (WISHA)
 16. AHJ Codes, Standards & Ordinances.
- C. Drawings and Specifications govern whenever Drawings and Specifications require higher standards than are required by governing codes, regulations, and the like.

1.3 SUBMITTALS

- A. For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established in conjunction with compliance with standards and regulations bearing upon performance of the Work prior to Final Completion.

END OF SECTION

SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. See other sections of the specifications for additional definitions.

1.2 DEFINITIONS

- A. General: Basic contract definitions are included in the WSDOT Standard Specifications for Road, Bridge, and Municipal Construction 2018. The following supplements Part 1 of those Conditions and expands on definitions and intent of language generally used in the Contract Documents.
- B. "Accepted": Means accepted by the Engineer when used in conjunction with the Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Approved": Where used in conjunction with Engineer's response to submittals, requests, applications, inquires, reports, and claims by Contractor, the meaning of the term "approved" will be held to limitations of Engineer's responsibilities and duties as specified in General and Supplementary Conditions. Where the terms "or approved" or "as approved" or "for approval" are used, the Engineer is the sole judge of the quality and suitability of the proposed substitutions. In no case will "approval" by Engineer be interpreted as a release of Contractor from responsibilities to fulfill requirements of the Contract Documents. Whenever a material, article or piece of equipment is identified on the Drawings or in the Project Manual by reference to manufacturer's or vendor's names, trade names, catalog numbers, or the like, and followed by the wording "or approved", "or approved substitute" or "equivalent, as approved", it is so identified for the purpose of establishing a standard,

and any material, article, or piece of equipment of other manufacturers or vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided the material, article, or piece of equipment so proposed is, in the opinion of the Engineer, of equivalent substance, quality, appearance or function and has been approved by the Engineer in writing prior to bid opening in conformance with the provision of Section 01 61 00, Common Product Requirements, Article 2.03. It shall not be purchased or installed by the Contractor without Engineer's and Owner's prior written approval.

- D. "Engineer", "Consultant": Means the design firm identified in the Contract Documents.
- E. "As required": Means as required to suitably complete the work and at the direction of the Engineer.
- F. "Authority Having Jurisdiction" (AHJ): Means any person which has responsibility related to issuing final occupancy and permits for this Project.
- G "Concealed": Means spaces out of sight. Such as above ceilings, below floors, between double walls, furred-in areas, pipe and duct shafts, and similar spaces.
- H. "Conditions" or "General Conditions": Means WSDOT Standard Specifications for Road, Bridge, and Municipal construction 2018.
- I. "Coordinate": Means the Contractor is to coordinate scheduling, submittals, and work of various sections of the specifications, drawings and construction of all trades to assure efficient and orderly sequence of interdependent construction elements for a complete and operating installation.
- J. "Demolish": Means to tear down and remove completely, including any anchors, unless noted otherwise, without damaging adjacent surfaces that all to remain.

- K. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Engineer, requested by the Engineer, and similar phrases. However, no such implied meaning will be interpreted to extend Engineer's responsibility into Contractor's area of construction supervision.
- L. "Engineer": Where the term Engineer is used, it means either:
1. Consultant in its respective discipline to the Engineer or Owner as listed in the Project Manual.
 2. Consultant to the Contractor, retained by contractor to perform services required by construction activities.
- M. "Experienced": When used with respect to any trade performing services for the project, means having a minimum of 5 successfully completed previous projects similar in size and scope to this project, being familiar with the special requirements indicated, and aware of and compliance with AHJ requirements.
- N. "Exposed": Means open to view and not covered or concealed.
- O. "First Class Workmanship": Means to
1. Verify before installing any material that the receiving surface is plumb, level, true to line, and straight to achieve tolerances identified. Surfaces not meeting this criteria are to be identified to the contractor and corrected before proceeding.
 2. New work is to be tight, straight, even, and smooth with respect to the new work and interfacing with adjoining surfaces.
- P. "Furnish": Means to supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- Q. "General" or "General Requirements": The provisions or requirements of Division 1 Sections. General Requirements apply to entire work of Contract and where so indicated, to other elements of work which are included in the Project.

- R. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Project Manual (Specifications and Detail Book), and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited and is applicable where reasonably implied and necessary in conformance with work specified, drawn, or required for completion.
- S. "Inspection": As used in reference to actions of the Engineer or his/her consultants, shall mean to review or observe the Work, but not to "inspect" the Work as the Contractor or Authority Having Jurisdiction will inspect.
- T. "Install": Means operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations to permanently affix to project, as applicable in each case.
- H. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
- I. "Install in Accordance with Manufacturer's Instructions and Directions": Throughout the Documents, although it may not be specifically stated, the Contractor is to install all work in accordance with Manufacturer's literature, unless otherwise noted or directed, for the best results. Where more than one Manufacturer is involved in the work, or its component parts, the Contractor shall follow each Manufacturer's literature.
1. In the event of conflict between the Manufacturer's literature, or its literature and the Contract Documents, the Contractor shall submit the discrepancy or conflict to the Engineer for resolution and written instruction prior to proceeding with any work.

2. No Manufacturer preparatory steps or installation procedures may be omitted. If the Contract Documents generalize the installation procedure, but do not necessarily mention all procedures, those procedures are not exempt from being completed by the Contractor unless they are specifically modified or stated as being exempt.
- J. "Owner": Means the Contracting Agency.
1. Owner may assign a project specific Site Representative to be present on-site during construction. This "Site Rep" will observe and report daily activities to the Owner and provide assistance to assure Owner impacts, project access, construction quality and construction related responses are addressed. As an agent of the Owner, the Site Rep may expedite Owner decisions.
 - a. The Site Representative will make daily visits to the site to review the progress of the work and its conformance with the Contract Documents. The Site Representative will bring relevant issues to the attention of the Contractor's QA Representative, Engineer, and PM. The Site Representative will coordinate with other Project staff on Owner related issues.
 - b. The Site Representative will participate in the pre-construction meeting, quality control meetings, progress meetings, pre-installation meetings, and closeout/punch list meetings in addition to walk-throughs.
- K. "Patch": Means to cut out to nearest joint and replace with like kind material.
- L. "Product": Means materials, systems and equipment provided by the Contractor for use in the Work.
- M. "Project Manual": Means the volume(s) included as part of the Project Documents.
- N. "Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical

with the description of the land on which the Project is to be built.

- O. "Provide": Means to furnish, coordinate, and install, complete, in place and ready for the intended use.
- P. "Regulations": Means laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- Q. "Remove": Means to detach items from the existing construction and legally dispose of off-site unless indicated to be "removed and salvaged" or "removed and reinstalled".
- R. "Repair": Means to perform minor corrections and patching of all indicated materials.
- S. "Replace": Means to provide new material to match adjacent materials, unless noted otherwise.
- T. "As Required": Means to complete the work in a first-class workmanship manner.
- U. "Remove and Salvage": Means to remove, clean, and pack or crate item to protect against damage, identify contents of packed item, and deliver to Owner's designated storage area.
- V. "Remove and Reinstall": Means to remove, clean, service, and otherwise prepare the item to be reused; restore if the item is historic; store and protect against damage and reinstall in the same location or as otherwise indicated.
- W. "Satisfactory": Means "satisfactory to the Engineer and Owner"; the Engineer shall be the sole judge of the acceptability of a product or an installation.
- X. "Selected": Means "selected by the Engineer and Owner" and is not necessarily limited to a manufacturer's standard line of colors, finishes or details.
- Y. "Similar", "Similar to": Where the words "similar" or "similar to" are used:
 - 1. Where it occurs in the Contract Documents, shall mean that a portion of the Work shall have common features and be visually consistent with, but may not necessarily be identify to, related portions of the Work. Contractor shall correlate similar conditions of

the Work. The Contractor shall identify any uncertainties to the Engineer. Do not proceed without Engineer's direction.

2. Where it is followed by a manufacturer's name and product, model, or type number, such manufacturer, product, model or type number shall be considered as the standard of quality for the item or product work specified, in a general and technical sense, not meaning "identical", and the provisions pertaining to "or approved" shall apply to any other proposed material, article, or piece of equipment of other manufacturers or vendors.
- Z. "Testing Agencies": Means an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.
- AA. "Trades": Means any person or group of people which provides services to or work on the Project. Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
- BB. "Verify": Means the Contractor is to verify existing conditions and coordinate any variations from what is shown in the Contract Documents with the Engineer.

1.3 SPECIFICATION AND DRAWING FORMAT AND CONTENT EXPLANATION

- A. The General Conditions, Supplemental Conditions, and Division 01 of these specifications shall be a part of technical Divisions and Sections the same as if they were specifically called for in each section.
- B. Wording of these Specifications: These Specifications are of the abbreviated or streamlined type and may include incomplete sentences. Words such as "shall," "the Contractor shall," "shall be," and similar mandatory phrases, are included by inference.
- C. Tense, Gender, Singular, Plural: Present tense words include future tense. Words in

masculine gender include feminine and neuter genders. Words in the singular include plural. Plural words include singular.

- D. All, Entire, and the Like: For brevity throughout the documents, these words may be omitted. Read their implications into all work, as the following parenthetical insertion exemplifies: "Balance and adjust (all) dampers."
- E. Specification by Reference: Any material specified by reference or number, symbol or title of a specified standard, such as commercial standard, ANSI and ASTM documents, Federal Specifications, trade association standard, or the like, shall comply with the following:
1. The latest revision requirements thereof;
 2. Any amendment or supplement thereto in effect on date of the Project Manual, except as modified;
 3. When building code requirements refer to a different issue of standards specifications, such issue governs.
- F. Drawings are in part diagrammatic and do not necessarily show complete details of construction, work or materials, performance or installation. They do not necessarily show how construction details, other items or work, fixtures, and equipment may affect any particular installation. The Contractor is required to ascertain and correlate the work to bring the parts together into a satisfactory and completed whole.
1. Where on any of the drawings a portion of the work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to all other portions of the work.
 2. Wherever a detail is referenced and developed for a specific condition, same or similar detail shall apply to identical or similar conditions elsewhere on project even though not specifically referenced.

1.4 INDUSTRY STANDARDS

- A. Except where the Contract Documents include more stringent requirements, applicable

construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Comply with the standards in effect as of the date of the Contract Documents.
- C. Where compliance with 2 or more standards is specified and the standards established differ or have conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer to the Engineer before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum acceptable. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Engineer for a decision before proceeding.
- D. Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Contractor shall obtain copies directly from the publication source and have them available at the job site all reference standards which are referenced in the technical specifications of the Project Manual or on the Drawings.
- E. Graphic Standards: Symbols used in the Contract Documents, except as otherwise noted, are those symbols recognized in the construction industry for purposes indicated.

END OF SECTION

SECTION 01 45 16

FIELD QUALITY CONTROL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Relate Work Specified Elsewhere
 - 1. Testing Laboratory Services Provided by Owner: Section 01 45 29

1.2 SUMMARY

- A. The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with these specifications. The Contractor Quality Control (CQC) system shall consist of plans, procedures, and organization necessary to provide materials, equipment, workmanship, fabrication, construction, and operations, both on-site and off-site, that complies with contract requirements and is keyed with the construction schedule. The Contractor shall review and certify as correct and complete, and in compliance with contract requirements, all shop drawings and lists of materials, fixtures, and equipment as required by technical specifications.
- B. Quality Control is the sole responsibility of the Contractor. Quality Assurance is the responsibility of the Owner.
- C. Recurring Deficiencies: If recurring deficiencies indicate that the CQC System is not adequate, corrective action shall be taken as directed by Owner. Progress payments may be withheld until such corrective action has been completed per the General Conditions, Section 6.05.

1.3 DEFINITIONS

- A. Definable Feature of Work: A “definable feature of work” is a task which is separate and distinct from other tasks and has separate control requirements. It could be identified by different

trades or disciplines, or it could be work by the same trade in a different environment. Although each Section of the specifications may generally be considered as a definable feature of work, there is frequently more than one definable feature under a particular Section.

1.4 QUALITY CONTROL SYSTEM

A. The 3 phase inspection system shall include the following minimum requirements:

1. Preparatory Inspection: This shall be an integral part of pre-installation meeting for designated portion of work, as set forth in Section 01 31 19, be performed prior to beginning any such work, and shall include:
 - a. A review of applicable specifications.
 - b. A review of the contract plans.
 - c. A check to assure that all materials and/or equipment have been tested, submitted and approved.
 - d. A check to assure that provisions have been made to provide control inspection and testing.
 - e. Examination of the work area to assure that all required preliminary work has been completed and is in contract compliance.
 - f. A physical examination of required materials, equipment and sample work to assure that they conform to approved shop drawings or submitted data and are properly stored.
 - g. Discussion of procedures for constructing the work, including repetitive deficiencies, construction tolerances and workmanship standards specified in the documents.
2. Initial Inspection: This shall be performed as soon as work begins on a definable feature of work and the following shall be accomplished:
 - a. A check of preliminary work to ensure that it is in contract compliance. Review of the preparatory meeting minutes.

- b. Verification of full contract compliance and verify required control inspection and testing is underway.
 - c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare work with sample panels, etc., as appropriate.
 - d. Resolve all differences.
 - e. This inspection phase should be repeated for new crew on site performing the work or any time standards are not being met.
3. Follow-Up Inspection: These should be performed to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. The Owner or Owner's representative may require joint inspections at any time and on a periodic basis to evaluate the effectiveness of the quality control system.
- B. As-Builts: The Contractor shall maintain full size marked-up drawings, survey notes, sketches, nameplate data, pricing information, description, and serial numbers of all installed equipment as well as other information depicting as-built conditions. This information shall be updated daily and be maintained in a current condition at all times until completion of work and shall be available for review by Owner or Owner's representative at all times. Upon completion of the work, this information shall be furnished to the Owner in conformance with requirements of Section 01 78 00, Close-Out Submittals.
- C. Tests: All operation and acceptance tests, where specified, are to be performed to verify control measures are adequate. These tests are to be documented (see example test form; Form 01 45 16-F2) and a copy provided to the Owner and Engineer.

1.5 QUALITY CONTROL ORGANIZATION

- A. The Contractor shall identify a Quality Control (QC) organization, describing lines of authority and acknowledgment that the QC staff shall implement the inspection program. The staff shall include an on-site representative who shall report to the Project Manager or

someone higher in the Contractor's organization. Project Manager in this context shall mean the individual with responsibility for the overall management of the project including quality and production and shall be subject to approval by the Owner.

- B. The Contractor's site representative shall be on the work site during progress of the work and shall notify the Owner and Engineer of any actions necessary to ensure compliance with the Contract Documents. Additional staff, if needed, for the QC organization is to be at a satisfactory level as required to perform the activities outlined in this Section, subject of Owner's approval.

1.6 CONTRACTOR QUALITY CONTROL PLAN

- A. Quality Control Plan: The Contractor shall submit its quality control plan to the Owner for review prior to the start of construction. Allow 15 working days after receipt in the Owner's office for Engineer and Owner review and comments. The plan shall include the following elements:
1. A statement of how the plan will operate and a supporting organization chart to show the individual on the Contractor's staff responsible for implementing and controlling the plan and staffing of the testing and inspection activities.
 2. Identify a Contractor Quality Control Representative, if other than the Contractor's site formen, who shall be on the site at all times during progress of the work with complete authority to take action necessary to assure compliance with the contract documents.
 3. A staffing plan for Contractor inspectors which is consistent with the scope and Construction Schedule for the project.
 4. Resume(s) of proposed inspector(s) showing their experience and qualifications for the proposed inspection activities. Experience must be of the same type as will be required for this project.
 5. A coordination plan showing how the efforts of the Contractor's quality control staff will be coordinated with the Owner, retained special inspectors, and engineers.
 6. Procedures for scheduling, reviewing, certifying and managing submittals.

7. Methods to be used for documenting the 3-phase inspection system.
8. Procedures for tracking contractor identified construction deficiencies and NCN's, from identification through corrective action and establishing verification that deficiencies have been corrected.
9. Copy of Contractor's Quality Control Daily Report (see example daily report form following this Section; Form 01 45 16-F1). Report shall include entries for identifying weather conditions (temperature, dry, wet, amount of rain), trade activities (classification of workers within the trade, staffing number for each trade, what work trade was performing on the project), equipment on site (rented and contractor owned, what equipment was being used for each day), important communications with Owner, Engineer, Inspectors, Supplier or specific Trade, factual record containing specification reference for the work being performed, and quality control activities. The report shall include entries for the Quality Control Representative's signature certifying that all materials and supplies incorporated into the work are in compliance with the Contract Documents and Owner approved modifications. This report will not be accepted as the daily quality control report unless it also incorporates the specific requirements of this Section.
10. Copy of inspection form for the different activities which will be inspected including but not limited to the following:
 - a. For concrete elements inspection forms shall include pre-placement, placement, and post-placement inspection items:
 - 1) Concrete paving inspection.
 - a) Subgrade preparation.
 - b) Reinforcing.
 - c) Concrete placement/curing.
 - c. The Contractor shall prepare inspection forms with check-off items for key construction elements to be signed off by the Contractor's inspectors and reviewed from time to time

by the Owner.

11. Procedure for tracking and inspecting "As-Built" plans.

1.7 COORDINATION MEETING / ACCEPTANCE OF PLAN

A. Before start of construction, the Contractor shall meet with the Owner and Owner representatives to discuss the QC Plan. During the meeting, a mutual understanding of the system details shall be developed. Acceptance of the QC Plan is conditional and will be predicated on satisfactory performance during construction. The Owner shall be notified of any changes to the plan, and those changes are subject to review and acceptance by the Owner.

1.8 CONTRACTOR'S PRE-INSTALLATION QUALITY CONTROL

- A. Well in advance of the installation of every major unit of work, which requires coordination with other work, the Contractor shall ensure that the unit of work can be installed and function as intended and required in conjunction with other work which has preceded or will follow. In the event of conflict, the Contractor shall determine corrective action required, inform the Owner, and proceed with the Owner's concurrence.
- B. See Section 01 61 00, COMMON PRODUCT REQUIREMENTS for further requirements.
- C. Perform inspection of all products and equipment immediately following delivery to the Project site to determine conformance with the Contract Documents and any evidence of damage.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 QUALITY ASSURANCE - CONTROL OF INSTALLATION

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, both on and off-site to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step-in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Owner before proceeding.

- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

3.2 TOLERANCES

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of the highest quality.
- B. Comply with manufacturer's tolerances. Should manufacturer's tolerances conflict with Contract Documents, request clarification from Owner before proceeding.
- C. Adjust Products to appropriate dimensions, position before securing Products in place.

3.3 REFERENCES & STANDARDS

- A. For products and workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue of Contract Documents, except where a specific date is established by code.
- C. Obtain copies of standards and instructions where required by product specification sections.
- D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Owner shall be altered from the Contract Documents by mention or inference otherwise in any reference documents.
- E. Assure manufacturer's instructions are adhered to obtain specified warranties.

3.4 MANUFACTURER'S CERTIFICATES

- A. When required by individual Specification Sections, submit manufacturers' certificate, in duplicate, that products meet or exceed specified requirements.

3.5 MANUFACTURER'S FIELD SERVICES

- A. When specified in respective Specification Sections, require supplier and manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to make appropriate recommendations.
- B. Representative shall submit written report to Owner listing observations and recommendations. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

3.6 REPORTING

- A. The QC representative shall maintain in an appropriate format a daily record of all inspections and tests performed for each shift of Subcontractor operations. These records shall provide factual evidence that continuous QC inspections and tests have been performed, including any defects, causes for rejection, proposed remedial action and corrective actions taken.

3.7 TRANSMITTAL OF DOCUMENTATION

- A. Submit copies of previous weeks Contractor's handwritten Contractor Quality Control Daily Reports and Contractor's Quality Control Test Report forms to the Engineer and Owner at each weeks progress meeting.

3.8 NON-COMPLIANCE OF WORK

- A. See Section 01 31 15 Communication.

END OF SECTION

Report Number: _____

Date: __

Project No.: _____

Location of Work: _____

[]	AM		Max	_____			
[]	PM	Weather	_____	Temp	Min	_____	Wind _____ Rain _____ inches

1. Contractor / Subcontractor

Activity:

Scheduled

Contractor /

Activity

Time

Work in Progress Subcontractor ID# Equipment Craft Worked

- A. _____
- B. _____
- C. _____
- D. _____
- E. _____
- F. _____
- G. _____
- H. _____
- I. _____
- J. _____
- K. _____

L.

2. List specific inspection performed (pre-installation, initial, and follow-up) and results of these inspections (include corrective actions):

3. List type and location of test performed and results of these tests:

4. List work done under Change Order Proposal:

5. List any instructions given by Owner on construction deficiencies, re-testing required, etc., with action to be taken:

- 6. Activity Safety Inspection: (Note safety violations and corrective action taken. Indicate phase of work where violations occurred.)

- 7. Upcoming Work:(Indicate next major phase of work anticipated and approximate date of Preparatory Inspection meeting to cover this work.)

8. Indicate items of construction equipment, other than hand tools, at the job site and whether or not used:

9. Remarks: (Cover any conflicts in plans, specifications, or instructions or any delay to the job attributable to weather conditions.)

10. CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected all work performed this day by the Contractor and each subcontractor and have determined that materials, equipment and workmanship are in compliance with the plans and specifications, except as may be noted above.

Contractor's Quality Control Representative

Contractor's Quality Control Test Report

Test Report Number: _____ Date: _____ Project No.: _____

Location of Test: _____

DESCRIPTION OF ITEM, SYSTEM OR PART OF SYSTEM TESTED:

DESCRIPTION OF TEST:

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TESTS FOR
CONTRACTOR:

NAME _____

TITLE _____

SIGNATURE _____

*I HEREBY CERTIFY THAT THE ABOVE DESCRIBED ITEM, SYSTEM OR PART OF SYSTEM
HAS BEEN TESTED AS INDICATED ABOVE AND FOUND TO BE ENTIRELY SATISFACTORY
AS REQUIRED IN THE CONTRACT SPECIFICATIONS.*

SIGNATURE OF

CONTRACTOR

QUALITY CONTROL INSPECTOR _____

REMARKS:

SECTION 01 45 29

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Testing and Inspection Service: The Owner may select and employ one or more Independent Testing Agencies, Engineering Services or Special Inspectors, hereinafter called Owner's Testing Representative (OTR), to conduct tests and inspections as specified, requested by the Owner, or required by Authorities Having Jurisdiction (AHJ). The OTR will provide inspector(s) approved by the AHJ. For the purpose of this specification section, all references made herein to OTR shall be those tests or inspections which will be conducted by an inspector provided by the Owner.
- B. Soils Engineer: Owner will employ and pay for services of Soil Engineer to monitor the geotechnical aspects of construction as required.
- C. Tests and inspections which are normally associated with obtaining permit approval by AHJ shall be provided and paid for by the Contractor.
- D. In general, materials, quantities and extent of tests are identified in the respective specification sections.

1.3 QUALITY ASSURANCE - INDEPENDENT TESTING AGENCY

- A. Qualifications:
 - 1. Agency employed by Owner shall be a testing laboratory qualified by the United States Bureau of Standards, to provide inspection and material testing services for the general construction quality control, and which will meet basic requirements of ASTM E329

"Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction".

2. Meet "Recommended Requirements for Independent Laboratory Qualification" published by American Council of Independent Laboratories.
3. Authorized to operate in the State of Washington.

B. Testing Equipment: Calibrated at reasonable intervals by devices of accuracy traceable to either:

1. National Bureau of Standards.
2. Accepted values of natural physical constants.

C. Certification: The OTR will submit to A/E and Local Building Department certification of meeting the above qualifications. Inspector(s) performing welding inspection shall be AWS certified.

1.4 DUTIES OF OWNER'S TESTING AGENCY

- A. The OTR will be available during Contractor's normal working hours and identified overtime, second shift and out of area activity as scheduled by the Contract Documents.
- B. The OTR shall conduct testing and inspection services, interpret them, and evaluate the results for compliance with the Specifications. Testing and inspection services which are performed shall be in accordance with applicable standard methods of ASTM or other procedures specified.
- C. Continuous and special inspections shall be performed by the OTR as required by Contract Documents and governing authorities.
- D. The Inspectors are not authorized to do the following:
 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
 2. Approve or accept any portion of the work, unless otherwise specifically noted.
 3. Perform any duties of the Contractor.

4. Stop Work.

1.5 CONTRACTOR'S RESPONSIBILITIES

- A. It is the Contractor's responsibility to initiate and coordinate all required tests and inspections including conformance with requirements of all applicable public agencies and authorities. Inspection of the work shall not relieve the Contractor from any obligation to fulfill this contract. Contractor shall be responsible for coordinating the testing requirement with the OTR and provide the OTR no less than two (2) working days advance notification to schedule tests.
- B. For the purpose of inspection, the OTR shall at all times have free access to all parts of the work and to the shops where the work is in preparation, and the Contractor shall at all times provide and maintain proper facilities and safe access for such inspection. The Contractor shall cooperate with OTR personnel, and furnish access, tools, samples, certifications, test reports, design mixes, equipment, storage, and assistance as requested by the OTR. The Contractor shall:
1. Make available to the OTR or Soils Engineer safe access and working environment, and adequate quantities of samples of materials proposed to be used which require testing.
 2. Provide to the OTR the approved design mix to be used for concrete, mortar, grout, and other materials mixes which require testing by the testing laboratory.
 3. Furnish copies of product test reports performed by Contractor as required by Contract Documents.
 4. Furnish incidental facilities necessary for the following:
 - a. To obtain and handle samples at the project site or at the source of the product to be tested.
 - b. To facilitate inspections, geotechnical monitoring, and tests.

- c. For storage and curing of the test samples.
- d. Electrical power and water required for testing procedures.
- 5. Provide incidental labor, when requested, to facilitate testing and inspections.
- C. Where defective work requires redesign of portions of construction, such redesign costs shall be back charged to the Contractor by a deductive Change Order.
- D. All costs associated with Contractor scheduled testing outside its normal working hours which is not identified in the Contract Documents, insufficient advance notice to the OTR of cancellation of a test or inspection to allow rescheduling of the OTR's workload, and for re-testing of non-conforming material, will be back charged to the Contractor by a deductive Change Order.

1.6 TEST AND INSPECTION REPORTS

- A. Copies of tests, special sampling operations and inspection reports shall be distributed by the OTR at weekly intervals, except as noted under NOTIFICATION OF NON-COMPLIANCE. All reports will be signed by a Registered Engineer. Such reports shall include all tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported.
- B. The OTR will:
 - 1. Obtain and handle samples at project site or at source of product to be tested.
 - 2. Furnish laboratory test reports of materials and construction as required; include:
 - a. Date issued.
 - b. Project title and number.
 - c. Testing laboratory or engineering firm name, address, and telephone number.
 - d. Name and signature of representative.
 - e. Description of method of test.
 - f. Identification of sample and portion of the work tested.

- g. Description of location in the work of the sample.
 - h. Time and date of obtaining sample.
 - i. Time and date of test of sample.
 - j. Weather and climatic conditions.
 - k. Results of tests and compliance with Contract Documents.
 - l. Evaluation of results tests, including recommendations for action, when requested by Owner or Structural Engineer.
- C. The OTR will furnish "Inspection at Site" reports for each site visit documenting activities, observations, and inspections of work being inspected include:
- 1. Date issued.
 - 2. Project title and number.
 - 3. Testing Laboratory or engineering firm name, address, and telephone number.
 - 4. Name and signature of representative.
 - 5. Observations on weather and climatic conditions.
 - 6. Time and date.
 - 7. Conditions and/or status of the work being inspected.
 - 8. Actions taken.
 - 9. Recommendations or evaluation of the work.
- D. The OTR will distribute test and inspection reports as follows: ***[Specifier modify as required]***
- 1. Engineer: 2 copies;
 - 2. Structural Engineer: 2 copies.
 - 3. Soil Consultant: 1 copy;
 - 4. Owner: 2 copies;
 - 5. Contractor: 1 copy

1.7 NON-COMPLIANCE OF WORK

- A. See Section 01 31 15 Communication.

1.8 NOTIFICATION OF NON-COMPLIANCE

- A. Anything found by the OTR or Site Representative that is believed to be in non-compliance when they are on-site shall be immediately reported. The OTR shall notify the Contractor, Owner, Site Representative, and/or Project Manager. If the Site Representative believes there is a non-compliance the Site Representative shall notify the Contractor, OTR, Owner, and Engineer if they are on-site, and Project Manager. The Project Manager shall notify the OTR, Owner, and Engineer if they are not on site.
- B. If a laboratory test result indicates material on-site did not conform to the Contract Documents, the OTR shall make an effort to immediately contact the Contractor by phone. The OTR shall also fax a copy of the Non-Conformance to the Contractor, Owner, Engineer, and the Project Manager.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.1 DETAILED SITEWORK INSPECTION & TESTING REQUIREMENTS

- A. Special Inspection & Structural Observation Requirements -General
 - 1. Special inspection and structural observation requirements and programs shall be in accordance with the following provisions of the IBC, as adopted and amended by the State of Washington and AHJ:
 - a. Section 109 Inspections.
 - b. Chapter 17 Structural Tests and Special Inspections.
 - c. Section 1709 Structural Observations; as amended by WAC 51-50-1709.
 - 2. Structural Notes may also have additional provisions pertaining to special inspection

and are incorporated as if specified herein.

B. Geotechnical Inspections

1. General:

- a. During excavations or fill operations and preparation for building foundations, placement of subsurface drainage systems, utility bedding, or other major excavations, the Contractor shall notify the Owner and the Engineer and facilitate inspection of site by Owner's Geotechnical Testing Agency to ascertain that conditions encountered are in conformance with the contract documents for depth of foundation, influence of groundwater, and requirements for drainage for foundations, excavations, cut, fill and slopes.
- b. Placement and compaction of all structural fill shall be inspected by Owner's Testing Agency.

2. OTR Inspections:

- a. Inspect and approve native and imported structural backfill materials proposed for the various conditions of work for conformance with specifications.
- b. Determine whether weather conditions are detrimental to site grading cut and fill work.
- c. Observe and approve all subgrades for suitability for receiving any backfill.
- d. Observe subgrade compaction procedures of subgrades under future paving and slab areas to evaluate the subgrade performance, the effectiveness of the procedure, and to recommend adjustments in the procedure as field conditions dictate.
- e. Observe and approve precautionary measures taken by the Contractor for protection of exposed sloped subgrades and recommend necessary adjustments in such measures as field conditions dictate. Determine whether replacement or

reconditioning and recompaction of subgrade materials which become soft/wet is necessary due to wet weather conditions.

- a. Determine whether previously frozen and thawed subgrade soils at excavations are suitable for new work to be placed thereon.

2. Compaction Tests:

- a. Within the provisions of the technical specifications (Divisions 31 and 32) for earthwork testing and sampling, Contractor shall cooperate with the OTR for performing testing or sampling for verification of conditions as noted above. Moisture Density tests, in-place density tests, and other tests may be performed as required by the Contract Documents or IBC, as adopted by local AHJ, and to verify Contractor's earthwork operations.
- b. Conform to referenced ASTM D1557, ASTM D2922, ASTM D3017, ASTM D4318 and ASTM C136, as applicable. Take in-place density tests for the following, of frequencies set forth in Civil Drawings or applicable Sections of Division 31:
 - 1) Compacted fills, subgrades, sub-bases and base courses.
 - 2) Utility trench bottoms backfill of utility trenches under all future concrete slabs on grade, foundation walls, and asphalt paving.
 - 3) Fills under grade beams and pile caps and backfill of new building walls.

C. Structural Cast-In-Place Concrete

1. General: Testing will be performed by the OTR as required by IBC, adopted by local AHJ, and these Specifications. Tests and inspections may include, but not necessarily be limited to, the following:
 - a. Inspection of reinforcing steel and embedded items in place. Verify proper placement of reinforcing bars, fabric, and spirals prior to placement of concrete check condition of surfaces of reinforcing and embedded items for bond integrity

- with concrete; verify placement locations, sizes and anchorage of all items embedded in concrete.
- b. Concrete formwork including configuration, form and steel cleanliness. Inspect erected formwork for conformance with approved drawings, for design and seal of form joints, and for type and location of form ties.
 - c. Reinforced concrete inspection and material testing shall be made in accordance the ACI 301 Chapter 16, Testing, and Chapter 17, Evaluation and Acceptance of Concrete, and appropriate ASTM Standards.
2. Testing: Test materials for compliance with Specifications. Review and check proposed mix designs. Conduct tests of concrete in accordance with the following procedures:
- a. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.
 - b. Slump: ASTM C143; one test for each concrete load at point of discharge and one test for each set of compressive strength test specimens.
 - c. Air Content: ASTM C173, volumetric method and ASTM C231 pressure for normal weight concrete; one for each set of compressive strength test specimens.
 - d. Concrete Temperature: Test hourly when air temperature is 40 degrees F and below, and when 80 degrees F and above; and each time a set of compression test specimens made.
 - e. Compression Test Specimen: ASTM C31; one set of 6 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
 - f. Compressive Strength Tests: ASTM C39; one set for each 100 CY or fraction thereof, of each concrete class placed in any one day or for each 5,000 SF of surface

area placed; 2 specimens tested at 7 days, 1 specimen tested at 14 days, 2 specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

- 1) When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - 2) When total quantity of a given class of concrete is less than 50 CY, strength test may be waived by Owner if, in his judgment, adequate evidence of satisfactory strength is provided.
 - 3) When strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - 4) Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
3. Test Results: Test results will be reported in writing by the OTR and expedited to Contractor, Engineer, Structural Engineer, Owner, and Local Building Department. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
4. Additional Tests: The OTR will make additional tests of in-place concrete, as directed by Owner or Engineer, when test results indicate specified concrete strengths and other

characteristics have not been attained in the structure. OTR may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

5. Patching: Where core test results are satisfactory, fill core holes with non-shrink patching grout to meet or exceed the strength of the adjoining concrete, and finish to match adjoining concrete surface.

D. Mortar

1. General: OTR to test exact proportions of mortar mixes specified under Section 04 05 00 using the same aggregate and other materials furnished by Contractor proposed to be used on the work; material samplings shall comply with ASTM C780, Article 9, "Sampling".
2. Pre-Construction Evaluation of Mortars:
 - a. Provide pre-construction evaluation of mortars in compliance with ASTM C780 using test methods and procedures specified therein in Annexes A1 through A7, inclusive.
 - b. Under test method Annex A6, test mortar mixes for compliance with specified compressive strengths.
 - c. Should test specimens fail to meet specified compressive strengths, immediately notify Owner, Engineer, and Contractor.
3. Construction-Site Evaluation of Mortars:
 - a. Sample and test mortar specimens in accordance with ASTM C1019 for compliance with specified compressive strengths as indicated on Structural Drawings.
 - b. Should test specimens fail to meet specified compressive strengths, immediately notify Owner, Engineer, and Contractor; perform further testing of construction-site mortar when so directed by Owner or Engineer.

- E. Welding: Verify conformance with applicable Sections of Division 5. All welding shall be subject to special inspection.
- F. Structural Steel Framing & Fabrications
 - 1. General: Tests will be performed by the OTR as required by IBC, Chapter 17, as adopted by AHJ and these specifications.
 - 2. Shop Bolted Connections: Inspect in accordance with AISC specifications.
 - 3. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:
 - a. Verify use of "Washington Association of Building Officials" (WABO) certified welders, and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 - b. Perform visual inspection of all welds including fillet welds.
 - c. Perform tests of complete penetration welds as required by technical specifications as follows. Inspection procedures listed are to be used at Testing Laboratory's option.
 - 1) Radiographic Inspection: ASTM E94 and ASTM E142; minimum quality level "2- 2T".
 - 2) Ultrasonic Inspection: ASTM E164.
 - 4. Field Bolted Connections: Inspect in accordance with AISC specifications.
 - 5. Field Welding: Inspect and test during erection of structural steel as follows:
 - a. Verify use of "Washington Association of Building Officials" (WABO) certified welders, and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies and submit copies of such reports to Contractor, A/E, Owner, Structural Engineer

and Local Building Department.

- b. Perform visual inspection of all welds including fillet welds.
- c. Perform tests of full penetration welds as required by technical specifications as follows:
 - 1) Radiographic Inspection: ASTM E94 and ASTM E142; minimum quality level "Z- 2T".
 - 2) Ultrasonic Inspection: ASTM E164.

6. Testing Program Summary: Testing agency special inspector shall submit a summary of the proposed testing program for review and approval; submit directly to Contractor, Engineer, Owner, Structural Engineer and Local Building Department.

G. Metal Deck & Shear Studs

1. General: Tests will be performed by the OTR as required by IBC, as adopted by AHJ, and if required by specific technical specification sections.
2. Tests and Inspections: Will include, but not necessarily be limited to, providing inspection during welding as required. Inspection of welds shall be done visually, except as indicated otherwise.

H. Structural Metal & Light gauge Framing: Inspection by the OTR at jobsite as required during high tensile bolting and welding to assure specification and IBC, or as adopted by the AHJ, for compliance.

I. Roofing & Waterproof Membranes

1. OTR to inspect and approve substrates for application of waterproofing and roofing materials, inspect all joints and flashings.
2. Furnish inspection during application of waterproofing and roofing materials, including roofing related sheet metal flashings and counter flashings.

J. Water Repellent Application

1. OTR to inspect and approve substrates for application of water repellent materials.
2. Furnish inspection during application of water repellent materials.

M. Miscellaneous

1. General: Provide other special inspections required by IBC as adopted by AHJ for structural or other work, or as requested by Owner.
2. Additional Testing Services: Additional testing which may be performed by the Owner's OTR, if any, are specified elsewhere in Contract Documents.

3.2 MECHANICAL & ELECTRICAL WORK SUBCONTRACTS

- A. Inspection and tests required for Fire Suppression, Plumbing, Mechanical and Electrical Systems Work are covered under Sections of Divisions 21 through 28 respectively and will not be performed by Owner's OTR.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, security and protection. Nothing in this section is intended to limit types and amounts of temporary work required, and no omission from this Section will be recognized as an indication that such temporary activity is not required for successful completion of the work and compliance with the requirements of the Contract Documents.
- B. Unless otherwise noted, the temporary utilities described herein shall be provided by the Contractor. Work and requirements include, but are not necessarily limited to, the following:
 - 1. Provide temporary devices, equipment, power and other utilities as needed for use, convenience and safety of personnel engaged in the work of the Contract. Installations of temporary utilities are to be safe, non-hazardous and sanitary; they are to be protective of persons and property and be free of deleterious effects.
 - 2. Locate temporary utilities where required or as directed or approved by Owner and A/E.
 - 3. Make all service connections to existing services in approved manner, in accordance with code requirements, and with prior approval of Owner.
 - 4. Install extensions and branches, as required.
 - 5. Maintain and protect temporary utilities.
 - 6. Remove from site upon completion of the Project or when directed.

1.3 SUBMITTALS

- A. Within 15 calendar days of the Notice To Proceed, the Contractor shall submit to the A/E and Owner a schedule with dates and a location sketch indicating implementation and termination of each temporary utility.
- B. Within 15 calendar days of the Notice To Proceed, the Contractor shall submit to the A/E and Owner a list of the General Contractor principal staff assignments, including the Superintendent and other personnel that will be in attendance at the site. Identify individuals, list their addresses and telephone numbers, and their duties and responsibilities.
 - 1. Submit separate emergency contact list in accordance with Section 01 13 15, Communication.
- C. Within 15 calendar days of the Notice To Proceed, the Contractor shall submit to the A/E a Fencing Plan indicating layout of construction fence and gates around its staging area(s).
 - 1. Indicate how building entrances are maintained for occupants and visitors, and if overhead work is going to occur, overhead protection. Fencing shall not have any direct attachment to any buildings.

1.4 QUALITY ASSURANCE

- A. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - 1. Building code requirements: Local and state.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, fire department, and rescue squad rules.
 - 5. Environmental protection regulations.

- B. Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.
- C. Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

1.5 WORKING HOURS

- A. Refer to SUMMARY OF WORK for a description of the Contractors normal working hours.

1.6 SPECIAL CONDITIONS

- A. The Contractor is responsible for providing and maintaining controls using methods, equipment and temporary construction as necessary to protect against unfavorable conditions during the construction of the project. Following are requirements related to restrictions and other physical conditions that will affect the Contractor's methods of work.
 - 1. Varying types of temporary dust barriers shall be required to isolate construction areas from non-construction areas and provide for sound attenuation.
 - 2. Circulation through areas under construction shall be required to maintain egress or other circulation paths. Contractor shall be required to keep these areas available for such uses during the course of construction.
 - 3. Availability of on-site storage is minimal. Contractor shall account for bringing materials in and disposing of materials on a regular basis.
 - 4. Construction access is limited, both for location and height restrictions.

5. The Contractor shall provide exhausting for any vehicles or equipment which will be in a space where exhaust fumes can accumulate. Exhaust ducting must be routed to open air space in a manner acceptable to the Owner which will not restrict normal daily activities. The Contractor shall provide temporary exhausting, or other proven method of controlling other odor causing activities, such as, but not limited to, welding or demolition.
6. Demolition shall occur in a controlled manner to avoid excessive dust, noise and vibration generation.
7. Avoid use of tools and equipment that leak or leave waste material behind. In cases where minor leakage is unavoidable (generators, compressors, etc.), drip pans shall be provided.
8. Provide protection for any historical elements that may exist and are to remain or be reused.

1.7 EXISTING WORK

- A. Existing construction and equipment not scheduled to be removed shall be kept in its original condition. If damaged, replace at no additional cost to the Owner.
- B. Repair damaged surfaces to match adjacent finish.

1.8 PROTECTION OF EXISTING UTILITIES

- A. Known utilities of record are shown on the Contract Drawings but are not to be considered as As-Built. The Contractor shall consider that the actual As-Built location may be within a tolerance of five (5) feet vertically or five (5) feet either side horizontally of that indicated in the documents. The Contractor shall take the following steps:

1. Notify Owner in writing, on each occasion, of the intent to work near existing utility services or structures or when a new excavation or sawcutting operation is about to begin. Submit procedure for approval to assure safe and continuous operation of the services.
2. Proceed with sufficient caution within the As-Built tolerance area to preclude damaging any known utilities. In the event unidentified utilities are encountered, notify Owner's Representative immediately.
3. In the event unknown utilities are damaged during construction, temporary services and/or repairs shall be made immediately by the Contractor to maintain continuity of services. Costs for temporary and/or permanent repairs will be accounted for through a Change Order.

1.9 CONSTRUCTION OPERATIONS IN OR AROUND A PUBLIC BUILDING

- A. Contractor shall recognize that employees of the Owner can be expected to be on the project site during the course of the project. Certain areas within the limits of construction may be vacated by the Owner prior to the NTP. When vacated, these areas will be available for Contractor use throughout the duration of the project. Access through these areas by the Owner shall be provided where indicated, both during and outside the Contractor's normal working hours. Regular and emergency egress and accessible routes of travel shall be maintained at all times and shall be kept free of construction materials and debris.
- B. Contractor shall be limited to staging areas and routes into and out of the project area as designated in the Contract Documents and which do not block accessible entrances or accessible parking. Storage of construction debris and stockpiled materials shall only be permitted in those areas indicated and within the construction area in a manner that does not obstruct or cause potential harm to anyone using identified paths through the construction area. Care must be taken that no hazardous or dangerous materials or debris be left in accessible areas. All construction materials shall be stored in secured areas.

C. A portion of the work may require the Contractor to work outside the identified limits of construction. Contractor shall be required to coordinate all such work with the Owner and notify the Owner a minimum of (2) weeks in advance. Such notification shall include an identification of the area which the Contractor will require to perform the work, a description of the work to be performed, and a duration (in calendar days) until the work is completed.

1. Work in these areas will affect the Owner's normal operations and require coordination. The Owner will be responsible for temporarily relocating people. The Contractor shall be responsible for the protection of any equipment or furniture in these locations during construction.

D. Security.

1. Maintenance of Security:

- a. It is the Contractor's responsibility to provide adequate security to protect the work site from unauthorized entry. Contractor shall be solely responsible for any theft, damage, or injury caused by a breach of such security.
- b. Initiate security program promptly after job mobilization, when enclosure fence, gates, and temporary enclosures are installed.
- c. Maintain security program throughout construction period, until Owner occupancy or Owner acceptance precludes the need for Contractor security.

2. Entrance Control:

- a. Provide control of all persons and vehicles entering and leaving Project site.
- b. Allow entrance only to authorized persons with proper identification.
- c. Owner's access to construction site shall be allowed at all times.

E. Emergency Procedures.

1. For emergencies requiring ambulance, fire department or police assistance, dial 9-1-1 from regular phones or verify the process for Owner system phones. This phone number shall be posted at all Contractor phones.
2. Should the Contractor find it necessary to call for police assistance or protection in the exercise of its responsibilities, or in the event of other emergencies, call 9-1-1 first, then contact Owner. The contact number and name will be provided at the Preconstruction Meeting

F. Fire Safety.

1. Conduct operations in a manner that is fire-safe for the work area and adjacent areas. Maintain the premise clear of rubbish, debris, or other materials constituting a potential fire hazard. Maintain a proper fire separation between work area and any adjacent occupied areas. The local fire codes are incorporated herein by reference; adhere to all applicable provisions as determined by the local fire department. Contractor shall notify the Fire Department at commencement of construction.
2. Obtain permits as necessary, including but not limited to:
 - a. Cutting, Welding, Soldering, or any other type of open flame. Confirm with the local Fire Department if a Burn Permit is required on any open flame work, including soldering.
 - b. Storage of flammable materials (propane, butane, etc.) and/or compressed gasses.
3. Where significant or continued non-compliance with fire safety is noted, Owner reserves the right to stop the work at no extra cost or extension of time, pending remedial action. Reimburse Owner as appropriate, for any fines or penalties levied by the local fire department.

4. Report all construction fires and/or hazardous spills immediately by calling 9-1-1 and notifying the Owner Representative.

G. Service Outages

1. Continuity of equipment and utility services to Owner property around the Project shall be maintained at all times. Equipment or utility shutdowns required to facilitate construction work shall be accomplished in accordance with the following requirements:
 - a. Service outages and interruptions shall be indicated on the overall construction schedule as well as the interval schedule.
 - b. Confirm all requests for equipment and utility outages in writing to the Owner not less than two (2) calendar weeks prior to the proposed outage date. (Note outages of medium voltage power electricity or the OB-2 Computer facility may require up to 90 days advance notice and may be scheduled by the State for times other than those requested by the Contractor to minimize impact on State operations.)
2. Service outages to existing equipment and utilities shall be kept to an absolute minimum. Any outages required in the course of construction, whether for temporary services, cutovers, or testing shall be closely coordinated with the Owner and A/E. All service outages and electrical tie-ins will be required to be made between 6:00 p.m. Sunday and 4:00 a.m. Monday, unless otherwise indicated. The Contractor is responsible to reimburse the Owner for back charges of missed outages or re-connect stand-by time of Owner staff.

3. Do not proceed with any work requiring a service outage until confirmation is received from the Owner. Unless otherwise specifically indicated, written permission from the Owner takes a minimum of two (2) working days and a maximum of seven (7) working days from the time of request by the Contractor. Failure of the Contractor to submit outage requests which allow adequate time for Owner review and action shall not be grounds for requesting additional time or compensation.
4. Materials & equipment required for the work to be accomplished during an outage shall be complete and available on the job for review by the Owner at the time of the outage request. If the Contractor is not adequately prepared, the shutdown request will not be granted and must be rescheduled.
5. Only Owner's personnel will shut down and restart equipment and utilities, including medium voltage service entrance disconnects. Other electrical medium voltage switching will be a base bid fee requirement of the Contractor should any such medium voltage switching (de-energizing, NETA electrical testing, energizing and restarting required to accomplish the Work or install or modify electric utilities). Owner will inspect the installation prior to restarting and will not restart its other utilities if an unsafe condition exists. In the event Contractor's work is not completed during the time scheduled for the shutdown, Owner may elect to restart the equipment or utility services. In that event, additional outage requirements shall be rescheduled in accordance with the preceding requirements. Restarting shall not be construed as acceptance of the work as complete.
 - a. Owner's personnel required to complete utility outages, restarts and inspections will not typically be working during the Contractor's normal working hours as defined in Section 01 11 00. Contractor shall incorporate any affect that this may have on the progress of the project as part of the Base Bid. No overtime payments will be

authorized for contractor or subcontractors to coordinate such work with Owner's personnel outside of Contractor's normal working hours nor will time delays be recognized due to the unavailability of these parties to complete these tasks during Contractor's normal working hours.

6. Include in the bid all costs associated with equipment and utility outages. Owner will make no extra payment for overtime work, schedule changes or failure to complete utility connections within authorized shutdown periods.

H. Material Storage

1. Confine storage to the designated areas. Maintain the storage areas in a clean and orderly manner.
2. Storage of materials on any existing structure shall not exceed the following:
 - a. Roof: 25 lbs. per square foot
 - b. Framed Floors: 100 lbs. per square foot
 - c. Slab-on-Grade Floors: 100 lbs. per square foot
3. Contractor shall be responsible for making provisions for any additional storage areas needed that cannot be accommodated within the limits of construction.

1.11 SPECIAL REQUIREMENTS

- A. Coordination: In addition to the requirements stated elsewhere in these specifications, Contractor shall coordinate the following with the Owner:
 1. Pedestrian access and emergency egress routes shall be maintained throughout the Contract duration.

PART 2 – PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary work. Locate temporary installations where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify as required.
- B. Provide each temporary installation ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until they are no longer needed or are replaced by authorized use of completed permanent installations.

3.2 TEMPORARY UTILITIES

- A. If the Contractor decides to use any of the equipment or materials installed under this contract for heating, power, lighting, or any other project need while the Project is still under construction, warranty on those materials shall not begin until Substantial Completion.
- B. Engage the appropriate local utility company to install temporary service as needed or connect to existing service when it is on a public right-of-way, or the Owner when it will be connected to systems within the Owner's property lines. Where the utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
 - 1. Arrange with utility company and Owner for a time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
 - 3. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.

4. The Contractor may use existing Owner power, heat and water, and Owner will pay all consumption costs. The Owner has a number of agreements in place with outside entities related to conservation of resources. In using Owner services, the Contractor shall take reasonable measures to conserve usage. Should these existing systems be less than adequate for construction purposes, Contractor shall provide additional means as necessary at no additional cost to the Owner. Any damage to existing systems as a result of the Contractor's use shall be immediately repaired at the Contractor's expense.
- C. Temporary Water. The Contractor may use existing Owner water. Supplement as required. Provide additional piping, hoses, etc. as required. The contractor is to confirm the source of any existing water to be used with the Owner prior to either connecting to, or opening, any source. Water lines may be unmarked and may relate to potable water, fire suppression systems, irrigation, or other service. Failure to confirm with the Owner the proper source could cause false alarms.
- D. Temporary Electric Power. The Contractor may use existing Owner power, if it is appropriate. The Contractor is to determine, with the Owner, the source and voltage prior to making any connections. The Contractor is to confirm the source of power with the Owner prior to making any connections. When the work is to be performed, the Owner is to be notified so they may observe any modifications being made. If existing power is inadequate for any reason, the Contractor is to provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
1. If the Contractor provides its own distribution system, overhead wiring shall be installed where least exposed to damage and the vertical clearance is adequate for any Owner related service or delivery vehicles.

2. No arc welders of heavy usage equipment are to be connected to the Owners system.
The Contractor shall provide separate gas generators for this purpose.
- E. Temporary Lighting. The Contractor may use existing Owner lighting. Where lighting is inadequate, supplement as follows:
1. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
 2. Provide temporary lighting as required for Owner use during non-construction times where construction has caused existing lighting to be temporarily out-of-service or blocked by construction staging materials. Temporary lighting must provide illumination levels equal to pre-construction conditions.
 3. Remove temporary lighting and power equipment and accessories and their connections at completion of the work or sooner if approved or directed.
- F. Temporary Telephones and Fax Machine. The Contractor may request the use of existing Owner wiring system to arrange for its individual needs. The Owner will not pay for any costs the Contractor may be required to pay for rewiring or extending wiring to locations for the Contractors use. The Contractor is to arrange for its own direct billing of local and long distance service and pay for all local and long distance service.
1. Provide separate lines for voice and for fax, using the project local area code. Provide a telephone and fax machine.
 2. At the telephone, post a list of important telephone numbers.
 3. The Contractor's Superintendent shall be required to carry a cellular phone with a local area code related to the project area code throughout the duration of the project. The phone shall be always on, except when the Superintendent is at the site office and available to the connected phone.

- G. Temporary Toilets. Contractor shall provide temporary sanitary facilities, including temporary toilets, wash facilities, and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
- H. Temporary Storm Sewer. If storm sewers are available, provide temporary connections to provide drainage that can be discharged lawfully, or other storm drainage accommodations as indicated on the Civil documents. Provide drainage ditches, dry wells, stabilization ponds, and similar facilities as indicated on the Civil documents or as required by the agencies having jurisdiction.
 - 1. Filter out excessive amounts of soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 - 2. Maintain temporary drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.

3.3 TEMPORARY SUPPORT FACILITIES

- A. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- B. Field Office. The Contractor shall provide a prefabricated or mobile unit to accommodate:
 - 1. With the capability to accommodate ADA access if needed.
 - 2. An office for the Contractor.
 - 3. A separate area of adequate size for weekly Progress Meetings of sufficient size to accommodate table(s) and chairs for up to (15) attendees and a lay-out table of adequate size to accommodate the construction documents. Space shall be wheelchair accessible.

4. Locate field offices, storage sheds, and other temporary construction and support facilities for easy access and within the limits of construction and staging area.
- C. Provide noncombustible construction for offices, shops, and sheds located within the construction area or within 30 feet of building lines. Comply with requirements of NFPA 241.
- D. Temporary Enclosures. Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
 1. The Contractor shall be responsible for the determination and maintenance of proper security measures for the job site temporary facilities for the duration of the construction Project including, but not limited to:
 - a. Locks on all construction equipment boxes, temporary storage and office facilities, and construction equipment (vehicles, cranes, dozers, forklifts, etc.).
 - b. Temporary construction cores for all exterior and storage room doors, locksets or cylinders.
 - c. Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism. Contractor is responsible for any theft or vandalism of its materials and equipment.
 - d. The Contractor shall hold the Owner harmless from all damage, vandalism, stolen equipment or supplies on the Project Site for whatever reason, or from injury to or death of unauthorized persons trespassing on Project Site because of inadequate security measures until the Owner releases the Contractor from security responsibilities in writing or at Final Completion, whichever occurs first.

- E. Chain Link Fence. Provide temporary six (6) foot high, or higher if indicated or needed by the contractor to limit access, chain link fence panels with top rail securely fastened to tubular metal posts set in heavy concrete bases to prevent easy relocation. As a minimum, provide around contractor staging area, and pedestrian pathways to Project site, or as otherwise indicated. Do not attach construction fencing to the building or permanent site improvement.
- F. Temporary Lifts, Hoists, Towers, or Crane. Temporary construction lifts, hoists, towers, or cranes, if determined by the Contractor to be necessary to accomplish the work required by this contract, shall be the responsibility of the Contractor. The locations for this equipment shall be within the limits of construction. Do not attach any supports to the building.
1. Structural support required for temporary lifts, hoists, towers, or cranes shall be provided by the contractor. Structural support shall be designed by a licensed structural engineer and shall be submitted for review in accordance with Section 01 33 00, Submittal Procedures.
 2. Placement of temporary construction lifts, hoists, towers or cranes outside of the limits of construction shall not be permitted.
- G. Project Temporary Signs.
1. Temporary Signs: Temporary signs for directional information are acceptable. Contractor shall prepare such signs as required to provide directional information to construction personnel and visitors. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.
 2. Contractor will be allowed one (1) separate sign placed on their temporary field office structure, limited to a maximum 3' x 3' size.
- H. Collection and Disposal of Waste. Refer to Section 01 74 19, Construction Waste Management and Disposal.

J. Traffic Maintenance and Control. Whenever the Contractor's operations affect public vehicular or pedestrian traffic including accessible routes for people with disabilities, the Contractor shall be responsible for the installation and maintenance of any and all traffic and pedestrian control devices including flaggers, signage, temporary barriers and other measures as deemed necessary by the authority having jurisdiction.

1. Right-of-Way. Strict attention should be paid to maintaining fire lanes, roadways, walkways, accessible routes of travel including entrances and loading areas with a minimum interruption, with appropriate safety measures, and as required by Owner, Department of Labor and Industry, Police Department, and Fire Department. Obtain written approval to restrict any public or private street, sidewalk, lane or alley from Owner. Restrictions include partial or full lane closures, parking restrictions, sidewalk closures, detours, complete street closures, shoulder work, and pedestrian rerouting, as well as the placing of building materials or equipment on Public right-of-way
2. Vehicular Access to the Project Area shall be limited as follows:
 - a. Do not park vehicles in traffic lanes fire lanes or reserved parking stalls.
 - b. Conduct operations in such a manner to avoid unnecessary interference to existing pedestrian and vehicle traffic. Provide flaggers and traffic control signs and devices as necessary and/or as required by Owner. Follow construction traffic routes as specified by Owner or provide traffic plan detailing proposed method of delivery, storage, equipment.
 - c. Limit vehicle deliveries during Owner peak traffic hours of 7:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:00 p.m.
 - d. Interfering with existing traffic and pedestrian patterns is not permitted during construction except as permitted by the drawings.
 - e. Do not remove or alter any exiting vehicular traffic control, parking, building, or any

other signs or devices without obtaining approval from Owner and/or the AHJ.

- f. Do not install any of the above mentioned type of signs without approval of Owner and/or the AHJ.
 - g. The Contractor shall review delivery routes to the construction site and staging areas to determine any limitations for height or length of delivery vehicles. The Contractor shall be responsible for any damage repair costs caused by either Contractor or subcontractor's vehicles or deliveries to the Contractor or Subcontractor's.
3. Contractor Parking. Parking is limited to the Contractor's staging area.
- a. Parking by the Contractor is not permitted in any stalls designated as "RESERVED", ADA, or otherwise marked, regardless what time of day. Parking citations and/or impounding of vehicles may result from failure to comply with these regulations and will be the sole responsibility of the Contractor.

K. Temporary Equipment

- 1. Protective Headgear: Provide for visitor's use three (3) new adjustable WISHA approved hard hats.

L. Construction Aids

- 1. Provide construction aids and equipment required by personnel to facilitate the execution and inspection of the work.
 - a. Refer to respective Sections for particular requirements for each trade.
- 2. Maintain all facilities and equipment in a first-class condition.
- 3. Comply with all applicable requirements specified in Project Manual. Install in accordance with "Quality Assurance" provisions, Specifications and Manufacturer's instructions. Where these may be in conflict, the more stringent requirements govern.
- 4. Relocate construction aids as required by:

- a. Construction progress.
 - b. Storage requirements.
 - c. Accommodation of Owner’s legitimate requirements.
 - d. Accommodation of any other Contractor employed at site.
5. Completely remove temporary materials, equipment and services when construction needs can be met by use of permanent construction, or at Project completion.
 6. Clean and repair damage caused by installations or by use of temporary facilities and clean site areas affected by temporary installations. Restore damaged vegetation.
 7. Restore existing permanent facilities used for temporary purposes to specified or to original conditions.
- M. Cleaning: Refer to Section 01 74 00 Cleaning, for cleaning during construction and final cleaning.

3.4 PROTECTION OF EXISTING FACILITIES AND OCCUPANTS

- A. Contractor shall plan their work to ensure that they complete construction in accordance with the Contract Time allowed while complying with the access and time restrictions established.
- B. Noise and Vibration Control

1. The following environmental performance standards are to be considered a minimum level of requirement for this project, unless local AHJ requirements are more restrictive. The maximum allowable noise levels as measured at the property line of noise impacted uses or activities shall not exceed the following levels:

Maximum (dB(A))	Duration of (min)	Hours**
47	Continually	10 p.m. – 7
52	15	
57	5	15*
62	1	10 p.m. – 7

* Total not to exceed 15 minutes in any one hour.

** The lower noise levels apply on all hours of weekends and holidays.

2. Maintain the level of construction noise inside adjacent buildings and/or rooms from exceeding 85 dBA during the periods the Contractor is working. Contractor shall meet this criterion by erecting barriers between equipment or job and such interior areas, or by providing equipment noise attenuators.
3. Machinery and Equipment – General: Electric-driven is preferred in place of gas or diesel powered machinery. If noise levels on any equipment cannot reasonably be brought down to criteria, either that equipment will not be allowed on the job or use times will have to be scheduled subject to approval of the Owner. Conformance to this specification shall be included in the Contract price and no compensation shall be allowed for special equipment, overtime, etc., that may be required.
4. Outdoor Vehicle and Internal Combustion Engine Noise: Notwithstanding the exterior noise level requirements specified in paragraph “1.” above, the noise level of each piece of vehicle and internal combustion engine noise shall not be greater than 85 dBA at a distance of 50 feet as measured under noisiest operating conditions. Rubber-tired equipment shall be used whenever possible instead of equipment with metal tracks. Mufflers for stationary engines shall be equipped with noise attenuators of hospital-area quality for silencing. Construction traffic plan shall be approved by the Owner. Routing shall be through the nearest exit, subject to approval of Owner.
5. Equipment:
 - a. Air Compressors: Equip air compressors with isolating spring base for vibration and silencing packages for noise reduction. Electric-driven preferred.
 - b. The use of core-drilling or saw cutting equipment, or electric driven drills, is required for all demolition. Scabblers and Roto Hammers are permitted.

- b. Arc Welders: No arc welders are to be connected to Owner's utilities, unless approved by the Owner. Provide separate gas generators for arc welders.

C. Pollution Control

6. Provide methods, means, and facilities required to prevent contamination of soil, water, and atmosphere. Allow no discharge of noxious substances from construction operations.
7. Provide equipment and personnel and perform emergency measures required to contain any spillages. Remove contaminated soils and liquids.
 - a. Excavate and dispose of all contaminated earth off-site in compliance with laws and regulations.
 - b. Replace with suitable compacted fill and topsoil. Provide Owner with receipt of soil acceptability prior to installation.
8. Take special measure to prevent harmful substances from entering public waters.
 - a. Prevent disposal of wastes, effluents, chemicals, and other such substances in or adjacent to bodies of water, or in sanitary or storm sewers.
 - b. When any runoff contains hazardous chemicals, collect and dispose of legally. Submit proposed collection methods to A/E and Owner for approval by Owner.
9. Provide systems for control of atmospheric pollutants in accordance with Federal/State/Local published rules and regulations.
 - a. Prevent toxic concentrations of chemicals.
 - b. Prevent harmful dispersal of pollutants into the atmosphere.

D. Tree, Plant & Lawn Protection

10. Preserve and protect existing trees, plants and lawns at the site which are designated to remain, and those adjacent to the site.
11. No storage or traffic shall be permitted within the drip or root zone of any planting.

12. Carefully supervise excavating, grading and filling, and subsequent construction operations, to prevent damage.
 - a. All work within the branch spread of trees shall be done by hand. When roots are encountered during excavation, the Owner shall be immediately notified. Do not further expose or cut until a determination is made by the A/E or Site Representative. Where roots are to be cut, pruned cleanly. Protect all exposed roots with moist organic mulch or burlap; backfill as soon as possible.
 - b. Under no circumstances shall the Contractor, for his convenience or ease of construction, remove existing trees designated to remain.
 - c. Fertilize all trees where roots have been exposed.
13. If branches or roots need to be removed due to construction, use a certified arborist approved by the Owner to perform such work.
14. Any damaged plant material that is to remain shall be replaced with the same species and equal size, or repair in accordance with arborist requirements, at no cost to the Owner. Damage is defined as changes to the tree appearance which were not originally there.
 - a. Trees which cannot be suitably replaced greater than six (6) inch caliper shall be paid for at the rate of \$100.00 per square inch of cross sectional area measured three (3) feet above existing grade. This amount shall be credited to the Owner.
 - b. Damaged and destroyed trees shall be removed from the site, the stumps grubbed, and the ground surface repaired, all at Contractor's expense.
15. Do not drive heavy equipment directly over lawn areas; protect with boards and/or plywood to prevent rutting and need for restoration. Remove protection at the end of each work day so as to maintain healthy growth and reapply as necessary. Any damaged lawn areas shall be restored to an 'as-is' condition.

E. Landscape Maintenance and Restoration

16. If a landscaped area is indicated to be a construction staging/parking area, protect surface adequately to avoid damage. Restore to existing condition using the following requirements:

- a. Remove all construction equipment, building material, debris, and remnants of destroyed sod or plantings before commencing landscape restoration.
- b. Rough grade the site according to the existing conditions or specified grading plan.
- c. Till or hand pick (except under trees) soil to a depth of 8 inches. Remove any rocks over 1 inch in diameter, torn roots and debris.
- d. Amend soil, if topsoil does not exist or was removed, with 4 inches of organic material and till to a depth of 12 inches.
- e. Fine grade the area according to existing conditions or to exact grading specifications.
- f. Replace materials to match original conditions.

17. Tree and Shrub Planting

- a. Location and spacing of trees, shrubs and groundcover according to existing conditions shall be determined in the field with the A/E and Owner. Do not plant material without an approval or in field locating.
- b. Standard planting procedure shall consist of:
 - 1) Preparing a hole for the plant of 1-1/2 times the diameter of the rootball to be planted.
 - 2) Do not dig the hole any deeper than the rootball to assure proper surface grade. Bottom of hole shall have loose material amended with organic material.
 - 3) The plant shall be planted at the proper depth.

- 4) The hole shall be backfilled with existing loose soil taken from the excavation of the hole and watered in until the proper grade is achieved.

18. Final Landscape Inspection: Final inspection shall take place at the completion of the work to verify conformance to the specifications and/or original conditions.

19. The Contractor shall maintain its staging area by mowing or trimming grass and other growth to a height no greater than six (6) inches.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Unless the A/E requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove all materials placed by the contractor that do not comply with requirements for fill or subsoil in the

area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances, as required by the governing authority.

2. At Substantial Completion, clean and restore permanent facilities used during the construction period to its original condition.

END OF SECTION

SECTION 01 57 13

TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Prevention of erosion due to construction activities.
- B. Prevention of sediment of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
- C. Restoration of areas eroded due to insufficient preventive measures.

1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplemental Conditions and Division 1 specification sections, apply to this section.
- B. Section 31 20 00 - Earth Moving
- C. Section 31 22 00 Grading
- D. Section 31 23 35 - Excavating, Backfilling, and Compacting for Utilities and Structures

1.3 REFERENCE STANDARDS

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. WSDOT Standard Specifications - Washington State Department of Transportation 2018 Standard Specifications for Road, Bridge, and Municipal Construction.

1.4 PERFORMANCE REQUIREMENTS

- A. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.
- B. Do not begin clearing, grading, or other work involving disturbance of the ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
- C. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.
- D. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
 - 1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
- E. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project
 - 1. Control movement of sediment and soil from temporary stockpiles of soil
 - 2. Prevent development of ruts due to equipment and vehicular traffic.
 - 3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- F. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.

1. Prevent windblown soil from leaving the project site.
2. Prevent tracking of mud onto public roads outside site.
3. Prevent mud and sediment from flowing onto sidewalks and pavements.
4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

G. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

H. Open Water: Prevent standing water that could become stagnant.

1.5 SUBMITTALS

- A. Product Submittals: Product catalog cuts for erosion control blanket, silt fence, and catch basin inserts.
- B. Aggregate Materials: Coarse aggregate for gravel construction entrance.
- C. Records and Logs: Submit copies of records and logs at substantial completion.

1.6 REGULATORY REQUIREMENTS

- A. All Work and material shall be in accordance with WSDOT Standard Specifications.
- B. Update and maintain the Stormwater Pollution Prevention Plan (SWPPP) documents,

as required.

1.7 QUALITY ASSURANCE

- A. Site Inspection of Erosion and Sediment Control: Certified as a Certified Erosion and Sediment Control Lead (CESCL).

1.8 MAINTENANCE

- A. Maintain erosion control through the duration of the project.
- B. Maintain erosion control after substantial completion per this section.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Erosion Control Blanket: In accordance with WSDOT Standard Specifications Section 9-14.5(2), Table 6 and Table 7.
- B. Catch Basin Inserts: Commercially manufactured filter bags specifically manufactured for silt filtering and which will provide filtering performance required.
- C. Storm Drain Pipe: Section 33 40 00.
- D. Silt Fence: In accordance with WSDOT Standard Specifications Section 9-33.2(1), Table 6 – Geotextile for Temporary Silt Fence.
- E. High Visibility Construction Fencing: In accordance with WSDOT Standard Specifications Section 9-14.5(8).

PART 3 - EXECUTION

3.1 PREPARATION

- A. Locate existing utilities, avoid damage or disturbance. Provide and pay for marking as required.

- B. Survey limits of Work to install orange construction and silt fence.
- C. Perform clearing or other work required to installing erosion control.

3.2 CONSTRUCTION

- A. Silt Fence: Field adjust location to perimeter of clearing and stripping. Location shown on Drawings is schematic. Cast all trench excavation soils from fence installation to the Construction side of fence. Overlap filter fabric fence joints minimum 1 foot prior to backfilling trench.
- B. Erosion Control Blanket: Place on exposed slopes and install as shown in Plans.

3.3 FIELD QUALITY CONTROL AND NPDES PERMIT CONDITIONS

- A. Site Inspection: Comply with WSDOE requirements.
- B. Reporting and Recordkeeping:
 - 1. Comply with WSDOE requirements.

3.4 PROTECTION AND MAINTENANCE

- A. Protection:
 - 1. Where possible, maintain natural vegetation for silt control.
 - 2. Prevent silt-laden water from leaving site or from entering off-site storm sewer systems.
 - 3. Stabilize slope, cut, or fill areas where Work is stopped for more than 30 days by erosion control blanket, mulching, polyethylene sheeting, or other method to prevent erosion and sediment transport.
 - 4. Keep off-site parking areas, fire access, sidewalks, and streets clean from construction activities. Keep paved surfaces clean using mechanical sweeping equipment, hand shovels, brooms, or other accepted methods

suitable for removing dirt, rock, silt, and sand. No street washing will be allowed.

- B. Supplementary Measures: Provide additional silt control and temporary erosion control measures required to protect soils and prevent silt-laden runoff from leaving project site.
- C. Maintenance: Monitor and maintain silt control measures. Maintain temporary erosion control facilities until need for each facility is superseded by other stabilization methods or until Owner's Representative authorizes removal.
- D. Inspect and repair temporary erosion control facilities. Inspect entire system to ensure proper operation a minimum of once per week, during and after storms, and prior to weekends and holidays.

3.5 CLEAN UP

- A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Engineer.
- B. Clean out temporary sediment control structures that are to remain as permanent measures.
- C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

SECTION 01 61 00

COMMON PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions and other division 1 specification sections, apply to this section.
- B. For requirements peculiar to a given product, material, or piece of equipment, see appropriate technical specification section.

1.2 DEFINITIONS

- A. Definitions used in this section are not intended to change the meaning of other terms used in the contract documents.
 - 1. Product: "products" are items purchased for incorporation in the work, whether purchased for the project or taken from the contractor's previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 2. "Named products" are items identified by the manufacturer's product name, including such items as a make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the contract documents.
 - 3. "Materials" are products that must be shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the work.
 - 4. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.3 SUBMITTALS

- A. See section 01 33 00 for submittal requirements.
- B. Proposed product list: submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. See article 2.03 below for product options.
- C. Long-lead-time items
 - 1. Provide copies of purchase orders for long-lead-time items to the Owner and Engineer within ten (10) working days after receipt of notice to proceed.
 - 2. Forward copies of acknowledgment, production and shipping schedules to Owner and Engineer as they are received for all required items.
- D. Submit three (3) copies in conformance with provisions of article 2.03 below.

1.4 QUALITY ASSURANCE

- A. To the fullest extent possible, provide products of the same kind from a single source.
- B. When the contractor is given the option of selecting between two or more products for use on the project, the product selected shall be compatible with products previously selected, even if previously selected products were also options. Compatibility is a basic general requirement of product/material selections.
- C. Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior. Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. All access routes, staging areas, loading restrictions, and other uses of the building shall be coordinated and approved by the Owner and Engineer and owner prior to the start of work. Ease of access to the building is limited and should be verified prior to moving materials.

- B. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
 - 1. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing to prevent damage, deterioration, loss or theft. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage. Where appropriate, submit msds for all delivered products.
 - 2. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
 - 3. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
 - a. Store with lids sealed, outside of building, all glues, adhesives, sealers, caulking, mastics, cleaners, paints, thinners and related flammable and hazardous materials.
 - 4. Inspect products upon delivery to ensure compliance with the contract documents and to ensure that quantities are correct and that products are undamaged and properly protected. Reject damaged and defective items.

5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units. Store and protect in accordance with manufacturers' instructions, with seals and labels intact and legible.
6. Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.
7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.
8. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
9. Prevent contact with material that may cause corrosion, discoloration, or staining.
10. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.6 JOB CONDITIONS

A. Pre-installation conferences

1. At each meeting review progress of other work and preparations for particular work under consideration, including requirements of contract documents, options, related change orders, purchases, deliveries, shop drawings, product data, quality control samples, possible conflicts, compatibility problems, time schedules, weather limitations, temporary facilities, space and access limitations, structural limitations, governing regulations, safety, inspection and testing requirements, required performance results, recording requirements, and protections.
2. Record attendees, signification discussions of each conference, and agreements and

disagreements, along with final plan of action; distribute record of meeting promptly to everyone concerned including Engineer and owner.

- a. Do not proceed with the work if associated pre-installation conference cannot be concluded successfully.
 - b. Instigate actions to resolve impediments to performance of the work and reconvene conference at earliest date feasible.
3. Discuss any pertinent issues at the weekly progress meetings; see section 01 31 19 project meetings.

PART 2 - PRODUCTS

2.1 General product requirements

- A. Provide products that comply with the contract documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
 1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
 2. Standard products: where available, provide standard products of types which have been produced and used previously and successfully on other projects and in similar application.
 3. Color and appearance consistency of finish materials: all finish materials of their respective kinds, in regards to construction phasing, shall be consistent in color and appearance throughout the total project and shall be purchased out of one dye lot, production run, batch, etc., as applicable, for the total project for each respective material.

- B. Additional requirements: material and equipment incorporated in to the work:
1. Shall conform to applicable specifications and standards.
 2. Shall comply with size, make, type and quality specified or as specifically approved in writing by architect.
 3. Shall be free of asbestos, formaldehyde and lead.
 4. Manufactured and fabricated products:
 - a. Design, fabricate, and assemble in accordance with first-class "workmanship" as defined in these contract documents.
 - b. Manufacture like parts of duplicate units to standard sizes and gauges; parts to be interchangeable.
 - c. Two or more items of the same kind to be identical and by same manufacturer (whether furnished under one section or more).
 - d. Products shall be suitable for service conditions.
 - e. Adhere to indicated equipment capacities, sizes, and dimensions unless variations are specifically approved in writing.
 - f. Except where field finishing is specified or otherwise required, products and fabricated items shall be pre-finished off-site.
 5. Do not use materials and equipment for other than designed or specified purposes and uses.
- C. Nameplates: except as otherwise indicated for required approval labels, and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in

occupied spaces or on exterior of the work.

1. Labels: locate required labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.
2. Equipment nameplates: provide permanent nameplate on each item of service-connected or power-operated equipment. Indicate manufacturer, product name, model number, serial number, capacity, speed, ratings and similar essential operating data. Locate nameplates on an easily accessed surface which, in occupied spaces, is not conspicuous.

2.2 PRODUCT SELECTION

- A. The contract documents and governing regulations govern product selection. Procedures governing product selection include the following:
 1. Proprietary specification requirements. Where only a single product or manufacturer is named, or indicates “no equals”, “no substitutions”, or “no exceptions”, provide the product indicated. Notify Owner and Engineer if it is discovered that the named product does not comply with the contract documents or is not appropriate for the function intended.
 2. Semi proprietary specification requirements. Where two or more products or manufacturers are named, or indicates “no equals”, “no substitutions”, or “no exceptions”, provide one of the products indicated. Notify Owner and Engineer if it is discovered that none of the named products complies with the contract documents or is not appropriate for the function intended.
 3. Nonproprietary specification requirements. Where the specifications list products or

manufacturers or indicates "or approved equal" or "other acceptable", comply with contract document provisions concerning product substitution to obtain approval for use of another product.

4. Descriptive specification requirements. Where specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with contract requirements.
5. Performance specification requirements. Where specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated. Submit manufacturer's recommendations contained in published product literature or by the manufacturer's certification of performance for approval by Owner and Engineer.
6. Visual matching. Where matching an established sample is required, the Owner and Engineer's decision will be final on whether a proposed product matches satisfactorily.
 - a. Where there is no product available within the specified category which matches satisfactorily and also complies with other specified requirements, comply with the provisions of the contract documents concerning "substitutions" for selection of a matching product in another product category.
7. Visual selection. Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures ..." or similar phrases, select a product and manufacturer that complies with other specified requirements. The Owner and Engineer will select the color, pattern, and texture from the product line selected.

2.3 PRODUCT SUBSTITUTION

A. General provisions

1. The requirements for substitutions do not apply to specified subcontractor options on products and construction methods. Revisions to contract documents, where requested by owner or architect, are "changes" not "substitutions".
2. Subcontractor's determination of and compliance with governing regulations and orders issued by governing authorities do not constitute "substitutions" and do not constitute a basis for change orders, except as provided for in contract documents. Otherwise, the

Subcontractor's requests for changes in products, materials and methods of construction required by contract documents are considered requests for "substitution" and are subject to requirements hereof.
3. If a bidder or contractor desires approval of some material or product other than that specified, it shall submit a written request for approval of the substitute item in accordance with the following requirements:
 - a. All such requests must be made on the substitution request form at end of this section. Where specifications specify a product color and/or pattern, contractor shall include a sample of proposed product/item at a size appropriate to make an evaluation with the specified product.
 - b. No request for approval will be considered unless submitted in accordance with this section.
 - c. Final decision as to whether an item is an equal or satisfactory substitution rests with owner.

4. Every substitution request must state whether the item offered is equal or equivalent to the specified product. The substitute material or product must be accompanied by its reference in the contract documents and complete catalog, technical and other information. If applicable, include samples showing comparison of physical and other pertinent characteristics as required to establish equivalence of acceptability for the proposed application. Where specific test results are required by the contract documents, the comparison data for the proposed item shall be based upon the same test methods as those specified, or they shall be correlated to clearly demonstrate comparability. The same guarantee described for the specified product is required for the substitution.
- B. Substitutions – during bidding period: during the bid period, submit substitution requests for approval of substitute materials or products, for all items indicated as proprietary or “approved equal” semi-proprietary. All requests shall be received by Owner and Engineer no later than seven (7) days, or as indicated elsewhere in the contract documents, prior to scheduled time for receipt of bid in order to receive consideration. Bidders will be informed by addendum of additional materials and products approved for use. No other form of approval will be given during the bid period and bidders shall not rely upon any approval not incorporated into the contract documents in this manner.
- C. Substitutions – after starting work: after contract award, requests for approval of substitute materials or products for all items indicated as proprietary, semi-proprietary or “approved equal” will not be considered, unless one or more of the following conditions exists. With its request, contractor shall indicate which condition it believes applies.
1. Unavailability. A substitution is required because the specified item is not available, due to factors beyond the control of contractor. (unavailability due to late order is not cause for substitution requests).

2. Unsuitability. Subsequent information or changes disclose inability of the specified item to perform as intended.
 3. Regulatory requirements. Final interpretation of code, regulatory requirements, safety requirements, or insurance requirements necessitate a change due to inability of the specified item to conform.
 4. Warranty. Manufacturer or fabricator cannot certify or warrant performance of specified item as required.
 5. Owner's benefit. In the judgment of the contractor, acceptance of the proposed substitution is clearly in owner's best interest because of cost, quality, or other consideration. In requesting a substitution under this clause, contractor shall furnish substantiation of any such reason and proposed credit.
- D. Substitution requests for approval of substitute materials or products for all items **not** followed by restrictive language will be considered if the contractor submits information and documentation as required by 2.03c above. The proposed product or material shall be equal or equivalent to the specified item and shall be subject to the same redesign and coordination as all substituted items.
1. Substitution requests submitted for an unnamed, non-prior approved product/ manufacturer where such products are specified by the listing of three or more named approved products/manufacturers, shall be accompanied with a check in the amount of \$100, made payable to the Owner for additional time required to research and evaluate such unnamed product/manufacturer. Such payment will only afford review of such a submittal and does not guaranty said proposed substitute product/ manufacturer will be approved.

- E. In making request for approval of substitute materials, the bidder/contractor shall represent that it has investigated the proposed product, and, in its opinion, it is equal or superior in equivalence in all respects to that specified. Also, contractor shall coordinate all trades including changes thereto as may be required, that it waives all claims for additional costs which subsequently become apparent as a consequence of the substitution, and that it will bear all costs related hereto, including costs of the Engineer's services for redesign, if deemed necessary.

- F. Substitutions will not be considered if they are indicated or implied on shop drawings or other project data submittals, without proper notice shown on the substitution request form at the end of this section. Submissions received that include products or manufacturers not listed in the specifications or approved on the form during the bid period will be returned and marked "revise and resubmit".

- G. Action by Owner
 - 1. During bidding period: if the Owner and Engineer approves any proposed substitution, such approval will be set forth in an addendum. Bidders shall not rely upon approvals made in any other manner.

 - 2. After start of work:
 - a. Within one week of receipt of contractor's request for substitution, the Owner and Engineer will request whatever additional information or documentation may be needed for their evaluation of the request.

 - b. Within two weeks of receipt of request, or within one week of receipt of requested additional information or documentation (whichever is later), the Owner will notify the contractor of either their acceptance or rejection of the proposed substitution.

- 1) Rejection will be the endorsement on the form provided by the contractor and will include statement of the reasons for rejection (non-compliance with the requirements for requested substitutions, or other reasons as detailed).
- 2) Acceptance will be the endorsement on the form provided the contractor.

Part 3 - execution

3.1 Inspections & acceptance of substrates

A. Installer's inspection of conditions

1. Require installer of each major unit of work to inspect substrate to receive the work, and conditions under which the work will be performed, and to report (in writing to contractor) unsatisfactory conditions.
2. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

B. Contractor's inspection. Inspect each item of material or equipment immediately prior to installation and reject damaged and defective items.

3.2 General installation provisions

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in contract documents.

1. When contract documents require installation of work to comply with manufacturer's printed instructions, obtain and distribute instructions to concerned parties, including Owner, Engineer, and field office, before starting that particular work.

2. Until project is complete, maintain at jobsite one (1) set of complete installation and maintenance instructions for materials and equipment.
 3. Handle, install, connect, clean, condition and adjust products in accordance with manufacturer's recommendations, directions and specified requirements.
 - a. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Owner and Engineer for further instructions.
 - b. Do not proceed with work without clear instructions.
 4. Perform work in accordance with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless it is:
 - a. Verified with and accepted by Owner and Engineer in writing.
 - b. Specifically modified or exempted by contract documents.
 - c. Perform additional requirements that are specified which are greater than the manufacturer's requirements and do not have a deleterious effect on the product being installed.
- B. Owner-furnished products
1. Refer to drawings and/or section 01 11 00 for identification of owner furnished products.
 2. Owner's responsibilities:
 - a. Arrange for and deliver owner reviewed shop drawings, product data, and samples, to contractor.
 - b. Arrange and pay for product delivery to site.
 - c. On delivery, inspect products jointly with contractor.

- d. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - e. Arrange for manufacturers' warranties, inspections, and service.
3. Contractor's responsibilities:
- a. Review owner reviewed shop drawings, product data, and samples.
 - b. Receive and unload products at site; inspect for completeness or damage jointly with owner.
 - c. Handle, store, install and finish products.
 - d. Repair or replace items damaged after receipt.
- C. Attachment & connection devices & methods
- 1. Provide attachment and connection devices and methods necessary for anchoring work securely and properly in place as it is installed; install true to line and level, and within recognized industry tolerances if not otherwise indicated.
 - 2. Allow for expansions and building movements.
 - 3. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Owner and Engineer for final decision.
- D. Precautions
- 1. Acclimate product to room conditions as required by standard specifications and/or as recommended by manufacturer.
 - 2. Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each unit of work, in coordination with entire work.

3. Isolate each unit of work from non-compatible work, as required to prevent deterioration.
 4. Re-check measurements and dimensions of the work, as an integral step of starting each installation.
 5. Coordinate enclosure (closing-in) of work with required inspections and tests, so as to avoid necessity of uncovering work for that purpose.
- E. Mounting heights: except as otherwise indicated in the contract documents, mount individual units of work at industry recognized standard mounting heights, for applications indicated. Refer questionable mounting height choices to Owner and Engineer for final decision.
- F. In-place protection
1. General
 - a. During handling and installation of work at project site, clean and protect work in progress and adjoining work on a basis of perpetual maintenance.
 - b. Apply suitable protective covering on newly installed work where reasonably required to ensure freedom from damage or deterioration at time of substantial completion; otherwise, clean and perform maintenance on newly installed work as frequently as necessary through remainder of construction period.
 - c. Adjust and lubricate moving components to ensure operability without damaging effects. Contractor is responsible for function, condition and unblemished appearance of all work on project, and any item or work judged defective by Owner or Engineer shall be subject to replacement at no additional cost to Owner.

2. To extent possible through reasonable control and protection methods, supervise performance of work in a manner and by means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous, damaging, or otherwise deleterious exposures during construction period.

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Starting of systems.
- D. Demonstration and instructions.
- E. Protecting installed construction.
- F. Project record documents.
- G. Operation and maintenance data.
- H. Manual for materials and finishes.
- I. Manual for equipment and systems.
- J. Spare parts and maintenance products.
- K. Product warranties and product bonds.
- L. Maintenance service.

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.
- B. Provide submittals to Engineer required by authorities having jurisdiction.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean debris from drainage systems.
- C. Clean site; sweep paved areas, rake clean landscaped surfaces.
- D. Clean pervious paved areas appropriate to surface type and requirements.
- E. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer seven days prior to start-up of each item.

- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative or Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01 33 00 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate Project equipment by qualified manufacturer's representative or Contractor's personnel who is knowledgeable about the Project.

- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at designated location.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 TESTING, ADJUSTING AND BALANCING

- A. Contractor and Engineer will perform testing for adjustment and balancing of installed systems prior to punch list.
- B. Notify Engineer and Owner minimum of one week prior to date of testing.

1.7 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Prohibit traffic from landscaped areas.

1.8 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.

- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 2. Field changes of dimension and detail.
 - 3. Details not on original Contract drawings.
- G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.9 OPERATION AND MAINTENANCE DATA

- A. Submit data two (2) copies bound in 8-1/2 x 11-inch text pages, three-ring binders with durable plastic covers and PDF copy on a thumb drive.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

- E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers.
Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.

- b. Air and water balance reports.
- c. Certificates.
- d. Originals of warranties and bonds.

1.10 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two sets of final volumes in final form within 10 days after final inspection.
- B. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom manufactured products.
- C. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- D. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
- E. Additional Requirements: As specified in individual product specification sections.
- F. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.11 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- B. Submit two (2) sets of final volumes in final form and electronic copy on a thumb drive within 10 days after final inspection.
- C. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- D. Provide electrical service characteristics, controls, and communications.
- E. Include color coded wiring diagrams as installed.
- F. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.
- G. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- H. Include manufacturer's printed operation and maintenance instructions.

- I. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Include Contractor's coordination drawings as installed.
- K. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- L. Additional Requirements: As specified in individual product specification sections.
- M. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.12 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

1.13 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.

- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include Table of Contents and assemble in binder with durable plastic cover.
- F. Submit prior to final Application for Payment.
- G. Time Of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 - 2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.14 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components during one-year project warranty period.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and/or lubricate as required.

- C. Include systematic examination, adjustment, and lubrication of components.
Repair or replace parts whenever required. Use parts produced by manufacturer of original component.

- D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 71 23
FIELD ENGINEERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for field-engineering services including, but not limited to, the following:
 - 1. Utility verification
 - 2. Work layout and control

1.3 SUBMITTALS

- A. Submit a certificate signed by the land surveyor or professional engineer certifying the location and elevation of improvements.
- B. Submit a record of Work performed and record survey data as required under provisions of Sections 01 33 00 and 01 78 00.

1.4 QUALITY ASSURANCE

- A. Engage a land surveyor registered in Washington State to perform required land surveying services. The same firm shall provide the project record document for that work.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify layout information shown in the Documents, in relation to the property survey and existing benchmarks, before proceeding to lay out the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
 - 1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points or requirements to relocate reference points because of necessary changes in grades or locations.
 - 2. Promptly replace lost or destroyed Project control points. Base replacements on the original survey control points.

- B. Establish and maintain a minimum of 2 permanent benchmarks on the site, referenced to data established by survey control points.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

- C. The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.
 - 1. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping.

3.2 PERFORMANCE

- A. The Contractor shall include in his Bid retaining and paying all associated costs for the following:
1. Registered land surveyor for project layout;
 2. Registered land surveyor to complete as-built survey at completion of the project.
- B. Work from established lines and levels. Establish benchmarks and markers to set lines and levels for the construction and elsewhere as needed to locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
1. Advise entities engaged in construction activities of marked lines and levels provided for their use.
 2. As construction proceeds, check every major element for line, level, and plumb.
- C. Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.
- E. At the completion of work, complete an as-built site survey covering the same site area, extent of detail, and scale as included in the Contract Documents; also including all changes and improvements resulting from work under this contract. Provide final Project Record Document in accordance with Section 01 78 00.

END OF SECTION

SECTION 01 74 00

CLEANING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION

- A. This Section includes administrative and procedural requirements for cleaning and protection during construction and final cleaning at Substantial Completion.
- B. Related Requirements: Coordinate related requirements specified in other parts of the Project Manual; special cleaning requirements for specific construction elements are included in appropriate Sections of Divisions 2 through 33, as applicable.

1.3 QUALITY ASSURANCE

- A. General Cleaning Requirements: Conduct cleaning and waste disposal operations in compliance with governing laws, codes, and ordinances. Comply fully with Federal and Local environmental and anti-pollution regulations.
 - 1. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.
 - 2. Burning or burying of debris, rubbish, or other waste material on premises is not permitted.
- B. Conform to State safety regulations (WISHA requirements).

- C. Documentation of waste management, spill response, procedures and contingency plans to be made available to Owner's Representative upon request.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents (for non-historic materials and spaces)
 - 1. Use only cleaning agents and methods recommended by Manufacturer of surface material to be cleaned.
 - 2. Use cleaning materials only on surfaces recommended by cleaning material Manufacturer; Do not use cleaning materials damaging to surfaces.
 - 3. Do not use cleaning materials creating hazards to health or property.

PART 3 - EXECUTION

3.1 CLEANING DURING CONSTRUCTION – GENERAL REQUIREMENTS

- A. Execute periodic cleaning. Keep work, site, and adjacent properties free from accumulation of construction waste materials, rubbish, and windblown debris.
 - 1. Protect new materials from damage by construction debris.
 - 2. Dispose daily all flammable, hazardous, and toxic waste materials. Storage of these materials will not be permitted on the interior of the building.
 - a. Disposal and storage shall be in accordance with 40 CFR; WAC 173-303; 49CFR; State and Local fire codes and regulations.
- B. Provide on-site containers for collection of waste materials, debris, and rubbish.
 - 1. Periodically remove from site.

2. Dispose of legally at disposal areas away from site.
- C. Store volatile wastes in covered metal containers and remove from premises daily. Prevent accumulation of wastes which create hazardous conditions. Provide adequate ventilation during use of volatile or noxious substances.
- D. Debris Control: In accordance with Section 01 74 19, Construction Waste Management and Disposal, and the following:
1. Maintain all areas free of extraneous debris.
 2. Initiate and maintain a specific program to prevent accumulation of debris at construction site, storage and parking areas, and along access roads and haul routes.
 - a. Provide containers for deposit of debris as specified.
 - b. Prohibit overloading of trucks to prevent spillages on access and haul routes.
 - 1) Provide periodic inspection of traffic areas to enforce requirements.
 3. Schedule periodic collection and disposal of debris as specified. Provide additional collection and disposal of debris whenever the periodic schedule is inadequate to prevent accumulation.
 4. Keep storm sewers free of debris or extraneous materials.
- E. Street and Off-Site Cleanup
1. Vehicles used to haul materials off-site shall be constructed or loaded so as to prevent any leaking of materials from the vehicle (RCW 46.61.655). Contractor shall be responsible for keeping sidewalks, lawns, parking areas and streets clear of all construction materials, debris, gravel, rock and dirt attributed to the Contractor or his Subcontractors. Clean-up shall be on a daily and/or "upon request" basis as determined

by the Owner or the Engineer.

2. Contractor shall plan operations to minimize the need for cleaning street areas adjacent to the construction site, access roads, and haul routes utilized for Work under this Contract. The use of water to perform cleaning work shall be held to a minimum. Contractor shall provide self-propelled pickup sweepers for pavement cleaning and for debris removal. As a minimum:
 - a. Clean streets in accordance with local street use requirements.
 - b. Clean streets used for hauling excavated material from the work site to the nearest arterial or for a minimum distance of three blocks at the end of each shift of hauling excavated materials.
 - c. Clean streets of debris from installation of systems or other construction activities.
 - d. Prohibit overloading of trucks to prevent spillages on access road and haul streets.
 - e. Water wash staging areas once per week or more frequently as needed to control dust.
 - f. provide wheel wash facilities to remove dirt, clay, stones, or other deposits from the tires or between wheels before trucks and/or other equipment be allowed to travel over paved streets.
 - 1) Water used for washing vehicles and equipment shall not be allowed to enter storm drains unless sediment, petroleum products, fresh concrete products, or other deleterious materials are separated prior to drainage.
 - g. Transportation of excavated material by vehicles driven or moved on public streets or highways shall conform to the requirements of the local jurisdictions.

3.2 FINAL CLEANING

- A. Provide final cleaning operations when indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of Work to the condition expected in a normal commercial building cleaning and maintenance program, complying with manufacturer's instructions.
- B. Cleaning to include all exposed surfaces and materials within the limits of construction, whether installed by the Contractor, installed by the Owner, or existing prior to the beginning of this project.
 - 1. The extent of cleaning existing facilities (remodel and/or addition projects) shall apply only to those areas of new work, or existing areas impacted by the construction activities, even if simply due to workmen passing through the space.
- C. Complete the following cleaning operations before requesting review for certification of Substantial Completion for the entire Project or a portion of the Project. Cleaning shall include adjacent existing surfaces, such as, but not limited to, walls, floors, ceilings and glazing, that have been affected by the construction activity.
 - 1. Clean the Project Site, yard and grounds, in areas disturbed or impacted by construction activities, including landscape development areas, of rubbish, waste material, litter, and foreign substances.
 - 2. Sweep paved areas broom clean, and wash.
 - 3. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - 4. Remove all rubber tire marks and other discoloration from all new concrete paving, and all existing concrete paving impacted by construction activities

5. Remove petrochemical spills, stains, and other foreign deposits.
 6. Remove tools, construction equipment, machinery, and surplus material from the site.
 7. Remove snow and ice to provide safe access to the building.
 8. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 9. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 10. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 20. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 21. Leave the Project clean and ready for occupancy.
- D. Rid the project of rodents, insects and other pests that may have entered as a result of the work.
- E. Removal of Protection: Remove temporary protection and facilities installed for protection and administration of the work during construction. Restore landscaping and other repair as necessary or required.
- F. Compliances: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials

on Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner. Do not use Owner's containers for trash generated by cleaning or construction.

1. Where extra materials of value remaining after completion or associated work have become Owner's property, arrange for disposition of these materials as directed.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION

- A. The Owner desires that this project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.
- B. Of the waste material that is generated, as much as economically feasible shall be reused, salvaged, or recycled. Recycle and/or salvage at least 50% of the non-hazardous construction and demolition. Recycle and/or salvage an additional 25% (75% total) of non-hazardous construction and demolition debris. This is consistent with the intent of RCW 39.04.135 and is mandated whenever practicable.
- C. With these goals, the contractor shall develop a Waste Management Plan for this project.

1.3 DEFINITIONS

- A. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes.
- B. Class III Landfill: A landfill that accepts non-hazardous waste such as household, commercial and industrial waste, including construction, remodeling, repair and demolition operations.

- C. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- D. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- E. Environmental Pollution and Damage: The presents of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humanity; or degrade the utility of the environment for aesthetic, cultural or historical purposes.
- F. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- G. Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively.
 - 1. Inert Solids / Inert Waste: Non-liquid solid waste including, but not limited to, soil and concrete, that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board pursuant to local regulations and does not contain significant quantities of decomposable solid waste.
- H. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- I. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

- J. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- K. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- L. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- M. Return: To give back reusable items or unused products to vendors for credit.
- N. Reuse: To reuse a construction waste material in some manner on the project site.
- O. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- P. Sanitary Wastes:
 - 1. Garbage: Refuse and scraps resulting from preparation, cooking, distribution or consumption of food.
 - 2. Sewage: Domestic sanitary sewage.
- Q. Sediment: Soil and other debris that has been eroded and transported by storm or well production runoff water.
- R. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- S. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- T. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

- U. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4 SUBMITTALS

- A. See Section 01 33 00 for submittal procedures.
- B. Landfill Alternatives Proposal – Draft Waste Management Plan: Within 14 working days after receipt of Notice to Proceed, or prior to any trash or waste removal, whichever occurs first, Contractor shall submit to the Engineer and Owner for review and approval three (3) copies of the Draft Waste Management Plan projecting trash/waste that will require disposal and alternatives to landfilling, with net costs. The plan shall contain, as a minimum, the following:
 - 1. An analysis of trash/waste to be generated and landfill options as specified for Waste Management Plan described below.
 - 2. Describe as many alternatives to landfilling as possible.
 - a. List each material proposed to be salvaged, reused, or recycled during the course of the Project.
 - b. Estimate quantities for each waste stream.
 - c. State the proposed recycle or disposal method for each waste stream.
 - d. State on-site storage method for each waste stream.
 - e. State transportation method for each waste stream.
 - f. State the estimated net cost resulting from each alternative, after subtracting revenue from sale of recycled or salvaged materials and landfill tipping fees saved due to diversion of materials from the landfill.

3. Provide alternatives to landfilling for at least the following materials:
 - a. Aluminum and plastic beverage containers.
 - b. Corrugated cardboard.
 - c. Wood pallets.
 - d. Clean dimensional wood: May be used as blocking or furring.
 - e. Land clearing debris.
 - f. Excavated soils.
 - g. Concrete: May be crushed and used as riprap, aggregate, sub-base material, or fill.
 - h. Bricks.
 - i. Concrete masonry units (CMUs).
 - j. Precast concrete panels.
 - k. Asphalt paving: May be recycled into paving for project.
 - l. Metals, including packaging banding, metal studs and trim, ductwork, piping, sheet metal, structural steel, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - m. Glass.
 - n. Gypsum drywall and plaster.

- o. Carpet, carpet cushion, carpet tile, and carpet remnants, both new and removed: DuPont (<http://flooring.dupont.com>) and Interface (www.interfaceinc.com) conduct reclamation programs.
 - p. Asphalt roofing shingles.
 - q. Paint.
 - r. Plastic sheeting.
 - s. Rigid foam insulation.
 - t. Plumbing fixtures.
 - u. Mechanical and electrical equipment.
 - v. Fluorescent lamps (light bulbs).
 - w. Acoustical ceiling tile and panels.
4. Include the names for each subcontractor who will transport solid or hazardous waste from the site and the name of the receiving facility that will accept waste for disposal.
- C. Review: The Draft Waste Management Plan will be reviewed by the Engineer for comment with a copy going to the Owner.
- 1. The plan is checked to make sure all materials that may be economically recycled are listed.
 - 2. The plan is also checked for the haulers, recyclers and disposal facilities, to include recycling, general waste and hazardous waste facilities.
 - 3. Plan review comments are made by the Engineer. Once no further comments are necessary, the contractor may proceed with its plan.

D. Waste Management Plan: Include the following information:

1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
 - a. List each material proposed to be salvaged, reused, or recycled.
 - b. List the local market for each material.
 - c. State the estimated net cost, versus landfill disposal.
4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
7. Recycling Incentives: Describe procedures required to obtain credits, rebates, or similar incentives.

E. Implementation: The Contractor shall submit monthly a progress report summary of waste generated at the project. The summary shall be submitted on a form acceptable to the Owner and shall contain the following information:

1. For each material recycled, reused, or salvaged from the project, the amount (in tons or cubic yards), the date removed from the job site, the receiving party, the transportation cost, the amount of any money paid or received for the recycled or salvaged material, the net total cost or savings of salvage or recycling the material. Include manifests, weight ticket receipts or invoices.
2. The amount (in tons or cubic yards) of material landfilled from the project, the location of the receiving facility, the total amount of tip fees paid at the landfill, and the total disposal cost. Include manifests, weight tickets, receipts and invoices.

F. Recycling Incentive Programs:

1. Where revenue accrues to Contractor, submit copies of documentation required to qualify for incentive.
2. Where revenue accrues to Owner, submit any additional documentation required by Owner in addition to information provided in periodic Waste Disposal Report.

1.5 RESOURCES

A. Contractor may request specific technical assistance or referrals from the following resources: Waste Reduction Specialist

Solid Waste Services Program

Department of Ecology

(360) 407-6352

1.6 ADDITIONAL RECYCLING REQUIREMENTS

A. Handling

1. Materials shall be free of dirt, adhesives, solvents, petroleum contamination and other substances deleterious to recycling process. Clean materials which are contaminated prior to placing in collection containers.
2. Arrange for collection by or delivery to the appropriate recycling center or transfer station that accepts construction and demolition waste for purpose of recycling.

B. Participation In Re-Use Programs

1. Industrial Materials Exchange (IMEX) program sponsored by the Local Hazardous Waste Management Program in King County.
 - a. IMEX is a free service designed to help businesses find markets for materials that traditionally would be discarded. The premise of the IMEX program is that material discarded by one business may be a resource for another business.
 - b. To obtain a current Materials Listings Catalog, call IMEX at (206) 296-4899.
2. Habitat for Humanity - South Puget Sound, a non-profit housing organization that rehabilitates and builds housing for low income families.
 - a. Sites requiring donated materials vary. Contact HFH at (360) 956-3456.

- C. Rebate, Tax Credits, Etc.: Rebates, tax credits and other savings obtained for recycled or re-used materials shall accrue to Contractor.

PART 2 - PRODUCTS

2.1 PRODUCT SUBSTITUTIONS

- A. Notify Owner's Representative when Contractor is aware of materials, equipment or products that meet the aesthetic and programmatic intent of Contract Documents, but which are more environmentally sensitive than materials, equipment or products specified or indicated in the Contract Documents.
- B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 61 00:
 - 1. Relative amount of waste produced, compared to specified product.
 - 2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Sum.
 - 3. Proposed disposal method for waste product.
 - 4. Markets for recycled waste product.

PART 3 - EXECUTION

3.1 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.

- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
 - 1. Pre-bid meeting.
 - 2. Pre-construction meeting.
 - 3. Regular job-site meetings.
 - 4. Job safety meetings.

- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. As a minimum, provide:
 - a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
 - b. Separate dumpsters for each category of recyclable.
 - c. Recycling bins at worker lunch area.
 - 2. Provide containers as required.
 - 3. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
 - 4. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.

5. Locate enclosures out of the way of construction traffic.
 6. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 7. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
 8. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.
- J. Disposal Operations:
1. Promptly and legally transport and dispose of removed and demolished items and waste materials that are not identified to be recycled or reused.
 2. Do not burn, bury or otherwise dispose of rubbish and waste materials on project site.
 3. Aggregating material and/or hauling it off site shall not occur between the hours of 10:00 PM and 7:00 AM unless it complies with Specification Section 01 50 00 – 3.04H.

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
 - 1. Training of Owner's personnel.
 - 2. Maintenance Materials submission.
 - 3. Substantial Completion.
 - 4. Final Acceptance.

1.3 SEQUENCE OF CLOSE-OUT

- A. The Contractor's superintendent shall perform a review of all installed work (general) and note any corrections, touch-up, or otherwise restore marred, exposed surfaces that is necessary to comply with the Contract Document requirements before requesting the Engineer to review the Work. The Contractor shall develop a written correction list (pre-punch list) and track the completion of the items by initialing and dating each item, signifying that it has been reviewed and properly completed.

- B. Comply with items under SUBSTANTIAL COMPLETION by submitting documentation and the Contractor's initialed correction list to the Engineer with a letter requesting the Engineer's review of the project.
- C. Upon receipt of the information from the Contractor, the Engineer will visit the site and review the Project with the Owner for compliance with the Contract Documents. The Engineer will develop a punch-list of any work that still needs corrections. If the list is incidental corrective punch work to complete, the Engineer will issue the notice of Substantial Completion with the corrections list attached. If the correction work is still significant, the Contractor shall complete the corrections in the same format as its pre-punch list and request additional reviews by the Engineer as necessary to establish that the Project is complete to the point where the Substantial Completion notification can be issued.
- D. Provide operation and maintenance instruction on installed equipment to Owner designated staff.
- E. The Contractor shall correct any outstanding punch list items and submit all other close-out documentation to the Engineer as indicated under FINAL ACCEPTANCE. When punch lists have been verified by the Engineer as being complete and all documentation is satisfactory and accepted by the Engineer, the Engineer will issue its notification of Final Acceptance.
- F. Upon receipt of the Engineer's notification of Final Acceptance, Owner will advertise the Project as being accepted, starting the 45-day lien period.

1.4 PROJECT RECORD DOCUMENT SUBMITTAL

Refer to Section 01 78 00, Closeout Submittals.

1.5 OPERATION AND MAINTENANCE MANUALS

Refer to Section 01 78 00, Closeout Submittals.

1.6 OPERATING INSTRUCTION OF OWNER'S PERSONNEL

A. The Contractor shall provide for operating and maintenance instruction of Owner's personnel for items installed under this contract. Contractor shall provide for this instruction at a mutually agreeable time and place, which may be outside of Contractor's normal working hours.

1. Prior to any training, the Contractor is to complete all system start-up and functionality testing. The Contractor/Sub-contractor will then assist the Engineer to review and confirm the systems are performing in accordance with the Contract Documents. If the documents identify that systems will be commissioned, the Owner may elect to have the commissioning agent also perform the functionality review with the Contractor. If commissioning is required, this will be completed prior to the Contractor and major subcontractors providing qualified personnel for conducting full on-site operation and maintenance training and instruction to Owner's designated user personnel and maintenance crews. Instruction shall include the proper operation, adjustment and maintenance of all general, mechanical and electrical operating systems and equipment. Contractor shall schedule this period in advance with the Owner and appropriate subcontractor or vendor's representative. This shall be scheduled two (2) weeks after submittal of the final Operating and Maintenance Manuals so that such information will be available for Owner staff familiarization prior to the time of this instructional period. Provide a minimum of (8) hours of such training and instructions on site, unless otherwise directed, conducted to Owner's satisfaction. Such instruction shall be given in time blocks not exceeding (4) hours in any one-day and shall be exclusive of off-site factory training for such items as the energy management system.

2. At each training session, provide a sign-in sheet for signature of all Owner staff that attend. Identify the sign-in sheet with the training being provided and the date of the training. Submit the sign-in sheet(s) with FINAL ACCEPTANCE procedure.
3. Except as otherwise specified, arrange for each installer of work requiring continuing maintenance or operation to meet with Owner's personnel at project site to provide basic instructions needed for proper operation and maintenance of entire work. Include instructions by manufacturer's representatives where installers are not expert in the required procedures.
4. Use operation and maintenance manuals as the basis for instruction. Review contents of manual with personnel in full detail to explain all aspect of operations and maintenance; include as a minimum record documentation, tools, spare parts and materials, lubricants, fuels, identification system, control sequences, hazards, cleaning and renewal of finishes, and similar procedures and facilities.
5. For operational equipment, demonstrate start-up, shut-down, emergency operations, noise and vibration adjustments, safety, economy/efficiency adjustments, and similar operations. Review maintenance and operations in relation with applicable warranties, agreements to maintain bonds, and similar containing commitments.
6. All equipment operation and maintenance instructions and training shall be videotaped in a professional manner, at the expense of the Contractor, and the edited film delivered with documents for FINAL ACCEPTANCE.
7. In addition, provide (4) hours training for the energy management system.
8. Provide a minimum of (4) hours additional follow-up training sessions to be conducted four (4) months following initial training. Systems/equipment to be covered under these

training sessions shall be as determined by the Owner.

9. In addition to or in conjunction with these training sessions, provide for (4) seasonal adjustment training sessions of the energy management system.
- B. The Contractor shall submit a training synopsis for each system required under the Contract Documents to review operations and maintenance instruction and training. Submit training synopsis with each respective preliminary Operation and Maintenance Manual submittal. Each synopsis shall be reviewed by the Engineer and approved or returned with comments if necessary. Written approval by the Engineer of each synopsis is required prior to beginning such training.
- C. For additional requirements for operating instructions, see respective Specification Sections.

1.7 MAINTENANCE MATERIALS

- A. Provide maintenance materials (tools, spare parts, extra stock, etc) indicated in other sections of the specifications.
1. Submit a receipt to the Owner identifying the product and quantity that is being provided.
 2. Obtain Owner's signature on the receipt.
 3. Send original receipt to Owner's Project Manager and include a copy of the receipt in the Warranties, Bonds, Extra Stock, and Permits manual.

1.8 SUBSTANTIAL COMPLETION

- A. Substantial Completion is defined in the General Conditions. Before requesting Engineer's review for certification of Substantial Completion, complete the following, and provide a letter of request for Substantial Completion. List exceptions in the request.
1. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 2. Advise the Owner of pending insurance changeover requirements.
 3. Make final changeover of permanent locks and transmit keys, and a list identifying each key to the Owner. The list is a receipt to be signed by the Owner with a copy delivered to Owner's Project Manager and a copy placed in the Operation and Maintenance Manual hardware section. Advise the Owner's personnel of changeover in security provisions.
 4. Complete startup testing and commissioning of systems; submit Balancing Logs.
 5. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
 6. Complete final clean-up requirements.
 7. Return all security badges and keys that were issued to the Contractor

1.9 FINAL ACCEPTANCE

- A. Before requesting certification of Final Acceptance and final payment, complete the following. Submit all of the following items together – no partial submittals will be accepted.
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
 2. Submit an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner of property might in any way be responsible, have been paid or otherwise satisfied. (AIA Document G706).
 3. Submit Contractor's Affidavit of Release of Liens (AIA Document G706A): If any liens are filed and cause the Owner to employ the services of any attorneys, the cost of the services will be deducted from the retainage.
 4. Submit a letter from the Contractor's Bonding Company addressed to Owner and submitted to Engineer approving release of final payment and waiving submittal of final receipts as well as a statement confirming the extension of the Bond for the one-year warranty period. Final receipts from all subcontractors and material and equipment suppliers shall be furnished to the Engineer by the Contractor if the Surety does not waive this requirement.
 5. Submit a copy of the Engineer's final review list ("punch list") of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, identifying the name and company of the individual who confirmed completion of each item, and date when confirmation inspection was performed.
 6. Submit consent of surety to final payment on AIA Form G707.

7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
8. Submit State Department of Labor and Industries Affidavit of Wages Paid (State Form 9843) approved by Department of Labor and Industries for all trades that have performed work on the Project.
9. Submit certified Statement indicating asbestos or lead containing material were not utilized or incorporated on the Project provided by Contractor under this contract.
10. Submit final As-Built Documents.
11. Submit final Operation and Maintenance Manuals.
12. Submit final Warranties, Bonds, and Permit Manual.
13. Submit keys and keying schedule.
14. Submit a list of all paints used, manufacturer, and formulation for each.
15. Submit evidence of completion of commissioning of designated building systems.
16. Submit evidence of completion of Owner's training for all designated systems and videotape(s).
17. Submit evidence of compliance with requirements of governing Authorities.
 - a. Certificate of Occupancy, if not submitted at time of Substantial Completion.

(Note: Certificate of Occupancy is required to be submitted with Substantial Completion Request unless otherwise exempted by Owner in writing.)
 - b. Certificates of Inspection
 - 4) Mechanical Work.

- 2) Plumbing Work.
- 3) Fire Suppression Work.
- 4) Electrical Work.

c. Others as required by Regulatory Agencies.

18. Submit all other required close-out documents.

1.10 REVIEW FEES

A. The Owner and its consultants will complete one initial and one final project review of the Work at Substantial Completion and at Final Acceptance to establish and verify completion of punch list work. Should it be necessary for the Engineer or its consultants to perform any additional reviews due to failure of Work to comply with completion status claimed by the Contractor, Engineer and its consultants shall be compensated by the Contractor for each additional review required until the Work is satisfactorily completed. This compensation shall be at the Engineer's and its consultants standard hourly billing rate at the time of the review, and expenses associated with the visit. Compensation by the Contractor will be through a deductive change order to the Contractor's contract.

END OF SECTION

SECTION 01 77 13
PRELIMINARY CLOSEOUT REVIEW

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Contractor's punch list work.
- B. Engineer's and Design Team punch list work.
- C. Punch list form.

1.02 CONTRACTOR PUNCH LISTS

- A. Prior to any punchlist work starting by the Engineer or other members of the Design Team, the following items will be submitted to the Engineer:
 - 1. When the project is sufficiently completed as judged by the Engineer to warrant punchlist inspection, the Contractor will issue typed letters on company letterheads to the Engineer documenting that the project is ready for a punchlist. The following items will be required:
 - a. Letter from the General Contractor documenting a 'complete' listing of all items of work not completed. *All punch list items to be tabulated on attached punch list form or similar accepted form.*
 - b. Letter from each of the major subcontractors, (Site, Landscape, and Electrical), documenting a 'complete' listing of all items of work not completed. *All punch list items to be tabulated on attached punch list form or similar accepted form.*

2. The Contractor's punch lists will be a tabulated list per area of items that are not complete, defective items and materials that do not conform to the Contract Documents. *All punch list items to be tabulated on attached punch list form, or similar accepted form.*

1.03 ENGINEER'S & DESIGN TEAM MEMBER'S PUNCH LISTS.

- A. Upon receipt of the noted punch lists in items number 1.02.A1 and 1.02.A2 above, the Engineer and members of the Design Team will begin consultant punch list documentation. If the Engineer or other Design Team members find more than five (5) items beyond what the Contractor has documented on the Contractor's punch list, the Engineer and Design Team members will suspend all punch list work. Written notification will be forwarded to the Contractor that the Project is not ready for punch list work by the Architect and Design Team members.
- B. After the Contractor amends punch list to the satisfaction of the A/E, A/E will begin punch list work and forward punch list documents to the Contractor.
- C. Upon receipt of the A/E's punch lists, the Contractor shall complete the items listed and all subsequent items added in a timely manner. Contractor shall submit a Project Completion Notice to the Engineer when work is completed or special arrangements have been made with the Owner and Engineer to complete items which have resulted in unavoidable delay.
- D. Upon receipt of the Contractor's Project Completion Notice, Engineer and Design Team members will begin back check of punch list items. If the Engineer and Design Team members find five (5) or more items not complete, they will abandon back check work and forward written notification to the Contractor. The Contractor

shall be required to complete the work and resubmit a Project Completion Notice.

- E. All additional back check time incurred by the Engineer or other Design Team members beyond item 1.03.D above will be charged to the Contractor. No additional requests for payment by the Contractor will be processed by the Engineer until the punch list work is complete and the additional back check expenses have been paid to the Engineer and other members of the Design Team.

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Project Record Document submittal.
- B. Operation and Maintenance manuals.
- C. Warranties, Bonds, Extra Stock, and Permits manuals.

1.3 SUBMITTALS

- A. Project Record Documents: Submit documents to Engineer with claim for final Application for Payment. The following submittal procedure shall occur prior to Final Acceptance.
 - 1. Submit original copy of as-builts (drawings & specifications) to Engineer for review.
 - 2. Compile and organize any drawings or schedules in the Project Manual onto sheets of the same size as the Contract Drawings and submit with other record documents.
 - 3. Contractor will be notified within 15 work days if the submitted documents are acceptable.
 - 4. Should the submittal be unacceptable for any reason, the Contractor shall make requested modifications and resubmit to the Engineer. Continue to resubmit as necessary until the submittal is acceptable.

5. Upon acceptance of the submittal, Engineer will within 30 work days incorporate the Contractor's as-builts into the Engineer's original Contract Documents.
 6. The Engineer will return the specifications, the Contractor's original as-builts, and provide the Contractor with an AutoCAD disk.
 7. The Contractor shall use the AutoCAD disk to obtain at its cost the following from a printer of its choice:
 - a. Electrostatic reproducible made of each sheet of the Contract Drawings and compilation sheets at its original size, and any other drawings the Contractor may have provided as as-built drawings. The Contractor shall stamp each reproducible sheet as "As-Built", date, and sign each sheet.
 - b. After item a. is completed, for each electrostatic reproducible, the Contractor shall have three sets of prints made on bond paper (or blue/black line prints at Contractor's option) and edge bound.
 8. The Contractor shall submit to the Owner the electrostatic reproducible, 3 sets of prints, record specifications, and Contractor's original marked-up as-builts.
- B. Operation and Maintenance Data:
1. Submit two (2) copies of preliminary Operating and Maintenance Manuals for operational and non-operational equipment for review by Engineer. Submit for each system upon attaining 50% system completion, together with respective training synopsis; refer to Section 01 77 00. Upon review, Engineer will return one copy with comments.

2. Submit 1 copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Engineer comments. Revise content of all document sets as required prior to final submission.
3. Within 10 days following receipt of the Engineer approval and comments, and prior to Owner training, Contractor shall prepare and transmit to the Engineer three (3) final copies of each of the above manuals.

C. Warranties, Bonds, Extra Stock, and Permits:

1. Obtain and assemble executed certificates, warranties, bonds, receipts for extra stock, permits signed by any authorities having jurisdiction, and any required service and maintenance contracts from the respective manufacturer's, suppliers, and Subcontractors. These may be tabbed in the front of the General Operation and Maintenance Manual provided they do not over-fill the binder(s).
2. Verify that documents are in proper form, contain full information, and are notarized.
3. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.
4. Co-execute submittals when required.
5. Submittal of warranties, bonds, extra stock and permit manual to match submittal requirements of Operation and Maintenance Manual.
6. Provide Table of Contents neatly typed, in complete and orderly sequence. Include complete information for each of the following:
 - a. Product or work item;
 - b. Firm, with name of principal, address, and telephone number;

- c. Scope;
 - d. Date of beginning of warranty or service and maintenance contract;
 - e. Duration of warranty or service maintenance contract;
 - f. Proper procedure in case of failure;
 - g. Instances which might affect validity of warranty or bond; and
 - h. Contractor, name or responsible principal, address, and telephone number.
7. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 8. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
 9. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.
 10. Furnish two (2) executed copies, except furnish three (3) additional confirmed copies required for inclusion into Operation & Maintenance manuals.

PART 2 PRODUCTS

2.1 PROJECT RECORD DOCUMENTS

A. Project Record Documents include the following:

1. Marked-up copies of Contract Drawings.
2. Marked-up copies of Project Manuals (Specifications and Detail Book, as applicable), all volumes.

3. Addenda.
4. Reviewed and marked-up copies of shop drawings and product data.
5. Newly prepared drawings.
6. Change Orders, RFIs and other modifications to the Contract issued in printed form during construction.
7. Architect's Clarifications and Proposal Request with all supporting documentation.
8. Construction Change Directives.
9. Record Samples.
10. Field records for variable and concealed conditions.
11. Record information on Work that is recorded only schematically.
12. Manufacturer's instruction for assembly, installation, and adjusting.
13. Other miscellaneous record documents as listed below and applicable.
 - a. Field records on excavations and foundations.
 - b. Field records on underground construction and similar work.
 - c. Survey showing locations and elevations of underground lines.
 - d. Invert elevations of drainage piping.
 - e. Surveys establishing building lines and levels.
 - f. Authorized measurements utilizing unit prices or allowances.
 - g. Records of plant treatment.
 - h. Ambient and substrate condition tests.

- i. Certifications received in lieu of labels on bulk products.
- j. Batch mixing and bulk delivery records.
- k. Testing and qualification of tradesmen.
- l. Documented qualification of installation firms and/or personnel.
- m. Load and performance testing.
- n. Inspections and certifications by governing authorities.
- o. Leakage and water-penetration tests.
- p. Fire-resistance and flame-spread test results.
- q. Final inspection and correction procedures.

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

A. Maintenance of Documents and Samples:

1. Store and maintain in field office apart from the Contract Documents used for construction, one complete set of record documents and samples which are used to record as-built conditions.
2. Do not use Project Record Documents for construction purposes; protect from deterioration and loss in a secure fire-resistant location. Maintain record documents in good order and in a clean, dry, legible condition.
3. Make record documents and samples available at all times for review by Owner and Owner's Representatives.
4. Record actual revisions to the Work concurrent with construction progress.

5. Ensure entries are complete and accurate, enabling future reference by Owner.
 - a. As specified in Section 01 31 19, following each monthly progress schedule meeting, Contractor shall meet with all major subcontractors whose work is in progress at the site, including but not limited to mechanical, plumbing, electrical, security, fire protection, civil, and as otherwise designated, to review all "as-built" revisions on the day-by-day working set of "Project Record Copy" and verify installed record information from the previous month is properly recorded on the day-by-day "Project Record Copy", with all revisions and pertinent information clearly indicated.
- B. Record Drawings and Shop Drawings: A clean, undamaged set of Contract Drawings including coordination drawings and shop drawings shall be kept at the job site as as-built record documents. Record "as-built" drawings shall be comprised of all sheets contained in the Contract Drawings, as well as all special equipment or systems drawings.
 1. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawings that show conditions fully and accurately. Where shop drawings, RFI's or other communication record are used to identify a change, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Items required to be marked include, but are not limited to, the following:
 - a. Indicate field changes of dimension and detail.
 - b. RFIs.
 - c. Depths of foundations below the first floor.
 - c. Horizontal and vertical measurements of underground services and utilities,

- referenced to the building or other permanent construction.
- d. Note changes of directions and locations, by dimensions and elevations, as utilities are actually installed.
 - e. Duct size and routing. Indicated locations of mechanical dampers, valves, reheat boxes, cleanouts, and other items that require maintenance.
 - f. Show measured locations of construction-concealed internal utilities and appurtenances referenced to visible and accessible features of the structure.
 - g. Record accurate locations of piping, valves, traps, dampers, duct work, equipment, and the like.
 - h. Revisions to electrical circuitry.
 - i. Indicate details not on original Contract drawings.
 - j. "X-out" conditions not constructed and appropriately annotate "not constructed" to convey the actual "as constructed" condition.
2. Mark record sets in a clear, legible manner, using red ink (no pencils); use other colors to distinguish between variations in separate categories of the work. Use 'whiteout' to erase errors.
 3. Mark new information that is important to Owner, but which was not shown on Contract Documents or Shop Drawings.
 4. Show addenda items, change orders, RFI, or other means of communication used in the construction process.
 5. Show and date revisions to drawings with a "cloud" drawn around the revision.
 6. Organize record drawing sheets in manageable sets, bind with durable paper cover

sheets, and print suitable titles, dates and other identification on the cover of each set.

Where shop drawings, RFI's or other communication record are used as a reference, include a copy of them as part of the record drawings.

C. Shop Drawings

1. Maintain as record documents; legibly annotate to record changes made after review.
2. Include subcontractor reproducible shop drawings for all special equipment including as a minimum where applicable to the project, ductwork layout, fire sprinkler system layout, temperature control system, fire alarm system, intrusion alarm system, communications systems, data systems, detention security systems and others as deemed appropriate. Record Drawing shop drawings shall be easily reproducible; i.e., on mylar or of standard copy machine size, as appropriate and approved.

D. Project Manual(s): During the construction period, maintain one complete copy of the Project Manual(s), including Specifications, Detail Book(s), addenda, and one copy of other written construction documents, such as Change Orders and RFI's issued in printed form during construction.

1. Legibly mark these documents in red ink to show substantial variations in actual work performed in comparison with the text of the specification and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and product data. Record at each product section description of actual products installed, including the following:
 - a. Manufacturer's name and product model and number.
 - b. Product substitutions or alternates utilized.

- c. Changes made by Addenda and modifications.
2. Mark Detail Book schedules, details, etc., to indicate the actual installation where the installation varies from that indicated in the Detail Book and modifications issued. Complete information in accordance with Paragraph 3.01C below for all detail drawings.
3. Each prime contractor (Subcontractor) is responsible for marking up Sections that contain its own Work.
 - a. General Contractor shall be responsible for collecting marked-up record Sections from each of the other prime contractors. General Contractor shall also be responsible for collating these Sections in proper numeric order with its own Sections to form a complete set of record Specifications.
 - b. General Contractor shall be responsible for submitting the complete set of record Specifications as specified.

E. Record Product Data

1. Maintain one copy of each product data submittal, and mark-up variations in actual work in comparison with submitted information. Include both variations in product as delivered to site, and variations from manufacturer's instructions and recommendations for installation.
2. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned at a later date by direct observation. Note related change orders and mark-up of record drawings and project manuals.
3. Note related Change Orders and mark-up of record Drawings, where applicable.
4. Upon completion of mark-up, submit complete set to Architect for Owner's records.

5. Where record Product Data is required as part of maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as record Product Data.
 6. Each prime contractor (Subcontractor) shall be responsible for marking up and submitting record Product Data for its own Work.
 7. Insofar as possible, insert record product data in individual sub-sections of O&M Manuals. Refer to 3.05 below.
- F. Record Sample Submittal: Immediately prior to date(s) of substantial completion, Architect (and including Owner's personnel where desired) will meet with Contractor at site, and will determine which (if any) of submitted samples maintained by Contractor during progress of the work are to be transmitted to Owner for record purposes. Comply with Architect's instructions for packaging, identification marking, and delivery to Owner's sample storage place.
- G. Miscellaneous Record Submittals: Refer to Paragraph 2.01A.13 above for listing of miscellaneous record documents and to other Sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the work. Immediately prior to date of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to Architect for Owner's records.

3.2 OPERATION AND MAINTENANCE DATA - GENERAL

- A. General: For all operational equipment installed, Contractor shall submit operation and maintenance documents in manuals as specified herein. Separate sets of manuals shall be prepared for Divisions 21 through 25 and Divisions 26 through 28 equipment. For non-Division 21 through 28 equipment, the manuals shall contain both operational and non-operational items and equipment.

- B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE MANUALS

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products. Prepare data in the form of an instructional manual.
- B. Format of Operation and Maintenance Manuals
 - 1. Binders
 - a. Commercial quality, stiff cover, metal-hinged 8-1/2 x 11 inch three D side ring binders with durable and cleanable plastic covers.
 - b. Provide suitable ring size for content with a 1-inch minimum, up to 3-inch maximum, range.
 - c. When multiple binders are used, correlate data into related consistent groupings.
 - 2. Cover and Spine: Identify the cover and spine of each volume with typed or printed title of the project, project number, and the words OPERATION AND MAINTENANCE INSTRUCTIONS.

3. For Contractor produced pages, paper shall be 8-1/2" x 11", white, 20 pound minimum.
4. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
5. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
6. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
7. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
8. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
 - a. Part 1: Directory, listing names, addresses, and telephone numbers of Owner, Owner's Consultants, Contractor, Subcontractors, and major equipment suppliers.
 - b. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - 1) Significant design criteria.
 - 2) List of equipment.
 - 3) Parts list for each component.
 - 4) Operating instructions.
 - 5) Maintenance instructions for equipment and systems.
 - 6) Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

- c. Part 3: Project documents and certificates, including the following:
 - 1) Shop drawings and manufacturer's printed product data.
 - 2) Air and water balance reports.
 - 3) Certificates.
 - 4) Photocopies of warranties and bonds.
 - 5) Materials Safety Data Sheets (MSDS) for each product used on the Project.
- 9. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- 10. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.4 WARRANTIES, BONDS, AND PERMIT MANUAL

A. Project Warranty – General:

- 1. If, within one (1) year after the Date of Substantial Completion of the Work, or designated portion thereof, or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor, and where applicable, his subcontractor that portion of the work, shall correct it promptly after receipt of a written notice from the Owner or Architect to do so. This obligation shall survive Termination of the Contract. The Owner will give such notice promptly after discovery of the condition.

2. Refer to Section 01 78 36 for administrative and procedural requirements for tracking project warranty issues subsequent to date of Substantial Completion.

B. Categories of Specific Warranties

1. Warranties on the work are in several categories, including those of General Conditions, and including (but not necessarily limited to) the following specific categories related to individual units of work specified in Sections of Divisions 02 through 28 of these specifications.
 - a. Special Project Warranty (Guarantee): A warranty specifically written and signed by Contractor for a defined portion of the work; and, where required, countersigned by subcontractor, installer, manufacturer or other entity engaged by Contractor.
 - b. Specified Product Warranty: A warranty which is required by contract documents, to be provided for a manufactured product incorporated into the work; regardless of whether manufacturer has published warranty without regard for specific incorporation of product into the work, or has written and executed warranty as a direct result of contract document requirements.
 - c. Coincidental Product Warranty: A warranty which is not specifically required by contract documents (other than as specified in this section); but which is available on a product incorporated into the work, by virtue of the fact that manufacturer of product has published warranty in connection with purchases and uses of product without regard for specific applications except as otherwise limited by terms of warranty.
2. Refer to individual sections of Divisions 02 through 28 for the determination of units of work which are required to be specifically or individually warranted, and for the specific requirements and terms of those warranties (or guarantees).

C. Disclaimer and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

D. General Limitations

1. It is recognized that specific warranties are intended primarily to protect Owner against failure of the work to perform as required, and against deficient, defective and faulty materials and workmanship, regardless of sources.
2. Except as otherwise indicated, specific warranties do not cover failures in the work which result from: 1) Unusual and abnormal phenomena of the elements, 2) The Owner's misuse, maltreatment or improper maintenance of the work, 3) Vandalism after time of substantial completion, or 4) Insurrection or acts of aggression including war.

E. Related Damages & Losses

1. General: In connection with Contractor's correction of warranted work which has failed, remove and replace other work of project which has been damaged as a result of such failure, or must be removed and replaced to provide access for correction of warranted work.
2. Consequential Damages: Except as otherwise indicated or required by governing regulations, special project warranties and product warranties are not extended to cover damage to building contents (other than work of Contract) which occurs as a result of failure of warranted work.

- F. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- G. Reinstatement Of Warranty Period: Except as otherwise indicated, when work covered by a special project warranty or product warranty has failed and has been corrected by replacement or restoration, reinstate warranty by written endorsement for the time period starting on the date of acceptance of replaced or restored work and ending upon date original warranty would have expired if there had been no failure, with an equitable adjustment for depreciation.
- H. Replacement Cost, Obligations: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. Contractor shall be responsible for the cost of replacing or restoring defective Work regardless of whether the Owner has benefited from use of the Work through a portion of anticipated useful service life.
- I. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, right, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
- J. Rejection of Warranties: Owner reserves the right, at time of final acceptance or thereafter, to reject coincidental product warranties submitted by the Contractor, which in opinion of Owner tend to detract from or confuse interpretation of requirements of Contract Documents.
- K. Contractor's Procurement Obligations: Do not purchase, subcontract for, or allow others to purchase or sub-subcontract for materials or units of work for project where a special project warranty, specified product warranty, certification or similar commitment is

required, until it has been determined that entities required to countersign such commitments are willing to do so.

L. Co-execute warranties when required. Provide originals of each for inclusion in each operation and maintenance manual.

M. Retain warranties and bonds until time specified for submittal.

N. SPECIFIC WARRANTY FORMS

1. Where a special project warranty (guarantee) or specified product warranty is required, prepare a written document to contain terms and appropriate identification, ready for execution by required parties.
2. Submit draft to Owner (through Architect) for approval prior to final executions.
3. Form of Warranty to state the following:

I (We), (insert Contractor name), certify (insert name of trade or portion of work being guaranteed) installed by (insert name of appropriate subcontractor) on (insert the name of the project and project number) located in Olympia, WA, is performed in strict accordance with Contract Documents. Further, I (we) guarantee this work to be (watertight, without lead, other, etc.) caused by defects in materials and workmanship, for (fill in specific required guarantee period) years from (date of substantial completion), and will repair, or replace, without delay, any defects in materials and workmanship discovered within warranty period.

Sincerely,

(Name of Contractor/responsible principal/address/telephone number) Signed by Owner, Partner, or other person authorized to commit firm.

END OF SECTION

SECTION 01 78 36
WARRANTY TRACKING PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes administrative and procedural requirements related to warranty issues:
 - 1. Tracking issues
 - 2. Tracking responses
 - 3. Tracking closure

1.3 SEQUENCE

- A. The Contractor shall develop an internet-based home page tracking process for access by designated construction team and Owner members prior to final acceptance of the project, or when warranty issues begin to arise, whichever occurs first. The internet tracking process is to be maintained for the general warranty period of one year. Extended warranties will be tracked through a normal paper, fax, e-mail and/or telephone process.
- B. As warranty issues arise, designated Owner members will log in to the site and enter the issue. The Contractor will notify the appropriate trade (AT) that corrective work is needed. The log will show when the AT was notified and when the AT will visit the site and make corrections. The AT shall contact the Owner representative to make arrangements to visit

the site. The site visit is to be no later than 48 hours after notification. The AT will advise the Owner representative when they leave the site and if the issue has been corrected.

- C. The AT will enter data into the tracking process identifying when the visit occurred and a description of what corrective measures were taken (tighten loose connection, replace switch, etc.), or include the reason corrections were not made (need to order replacement switch, etc) and when the correction is anticipated.
- D. The AT will make a final entry when all corrections have been completed and the issue has been resolved.
- E. If an AT fails to respond within 48 hours after a notification, or the Contractor does not proceed with corrections, the Owner may proceed with corrections and the Contractor shall reimburse the Owner for the costs.
- F. If after the Contractor receives a request for warranty service, the Contractor advises the Owner they believe it is outside of warranty requirements, resolution of the issue will be through a meeting of the Contractor and Owner.

END OF SECTION

SECTION 02 41 00

SITE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Demolition of concrete pavements.

B. RELATED DOCUMENTS

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
2. Section 01 57 13 – Temporary Erosion and Sedimentation Control
3. Section 31 20 00 – Earth Moving

1.2 REFERENCES

- A. WSDOT Standard Specifications - Washington State Department of Transportation 2018 Standard Specifications for Road, Bridge, and Municipal Construction.

1.3 DEFINITIONS

- A. Site Improvements: Manmade objects, including portions on, over, and below surface of ground.
- B. Pothole: Exploratory excavation to uncover buried utility, structure, or other feature to determine location, elevation, size, and type of material.

- C. Unsuitable Material: Soil, organics, waste, or other material not complying with these specifications, not capable of supporting foundations, or not capable of compaction to specified density.

1.4 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. Record Drawings:
 - 1. Submit under provisions of Section 01 78 00.
 - 2. Record actual locations of pipe runs, connections, and invert elevations. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.
 - 3. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
 - 4. Prepare record drawings in accordance with City of Chehalis requirements.
 - 5. Certificates:
 - a. Disposal site operator certification that disposal site complies with local, state, and federal regulations.

1.5 REGULATORY REQUIREMENTS

- A. Comply with federal, state, and local regulations.
- B. Comply with City of Chehalis requirements.

1.6 DUST AND DEBRIS CONTROL

- A. Prevent spread of dust and debris and avoid creation of nuisance or hazard in surrounding area. Limit use of water to amount required to control dust. Do not allow water to accumulate and create runoff. Avoid creating hazardous or objectionable conditions, such as, but not limited to, ice, flooding, or pollution.

1.7 SEQUENCING AND SCHEDULING

- A. Maintain emergency accesses to existing buildings open during construction.

PART 2 – PRODUCTS

2.1 PRODUCTS

- A. Structural Fill: Section 31 20 00.
- B. Controlled Density Fill (CDF): Section 31 20 00.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions:
 - 1. Identify existing survey monuments, benchmarks, and survey control points that may be disturbed by work.
 - 2. Verify erosion control is in place and operating properly.

3.2 PREPARATION

- A. Locate existing utilities; avoid damage or disturbance. For aid in utility location, call “Dial Dig 811,” 48 hours (two working days) before beginning construction.
- B. Employ and pay for locator service to locate and mark utilities in addition to “DIAL DIG” service.

- C. Protect and maintain existing utilities intended to remain.
- D. Identify existing structural foundations near excavations. Verify excavation will not undermine footings or supports and cause damage to structures.
- E. Protect benchmarks, survey monuments, existing and proposed structures, sidewalks, and paving to remain.
- F. Reference survey monuments and benchmarks, property corners, and survey control points that may be disturbed by Work.
- G. Erect barriers and barricades to direct and protect adjacent traffic.
- H. Prevent erosion of disturbed areas during construction.

3.3 DEMOLITION

- A. Pavements:
 - 1. For cement concrete pavements, remove entire pavement panel to nearest joints, saw cutting pavement at nearest locations as indicated on Drawings.
 - 2. Break up and remove pavements.
 - 3. Dispose of debris and rubble at off-site facility.
- B. Saw Cutting Pavement:
 - 1. Construct neat straight lines.
 - 2. Avoid creating narrow pointed patch areas. Do not create inside joint angles less than 45 degrees.
 - 3. Saw cut entire thickness.

C. Disposal:

1. Dispose of debris, rubble, and waste at Contractor-provided site.
2. Dispose of debris, rubble, and waste at licensed and permitted site.
3. Provide letter from disposal site operator stating that disposal site complies with local, state, and federal regulations.
4. Comply with federal, state, and local laws and regulations.
5. Comply with Section 01 74 19.

3.4 FIELD QUALITY CONTROL

- A. Comply with Section 01 45 16.
- B. Comply with City of Chehalis requirements.

3.5 CLEANING

- A. Comply with Section 01 74 00.
- B. Dispose of unsuitable material off site.
- C. Clean pavements within two days of substantial completion.

3.6 PROTECTION

- A. Protect subgrade in areas to receive pavement:
 1. Do not allow contamination of existing soils.
 2. Take necessary precautions to protect soil from excess moisture by covering exposed soils.
 3. Do not expose more area than can be worked and protected.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.
- B. Structural Drawings and Structural Notes apply to this Section and when in conflict with this Section, shall have precedence.

1.2 SUMMARY

- A. Section includes general concrete materials information, concrete formwork, placement procedures, finishes and other related concrete work not indicated on the Structural Drawings or specified in the Structural General Notes.

1.3 ACTION SUBMITTALS

- A. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at project site.
- B. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

C. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

2. ACI 301, "Specifications for Structural Concrete"

3. ACI 303, "Specifications for Cast-In-Place Architectural Concrete"

4. ACI 347, Recommended Practices for Concrete Formwork".

1.5 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: Comply with Structural Drawings. ASTM A 615/A 615M, Grade 60, deformed.

- A. Comply with Structural Drawings.
- B. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I/II
- C. Normal-Weight Aggregate: ASTM C 33, graded, 1-1/2-inch nominal maximum aggregate size.
- D. Water: ASTM C 94/C 94M.

2.3 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Sealer for Interior Floor Slab: Sherwin Williams H&C® High Performance Industrial Clear Coat or prior approved equal.

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

2.6 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

2.7 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301 and ACI 347, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Chamfer exterior corners and edges of permanently exposed concrete where indicated.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Build such items into the forms in a manner that will prevent displacement or damage to them during placing of concrete.

3.3 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.4 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness.

3.5 FINISHING SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Troweled Finish: Provide smooth troweled finish on interior slab. Seal interior floor slab with Sherwin Williams H&C® High Performance Industrial Clear Coat.
- C. Broom or Belt Finish: Immediately after concrete has received a troweled finish, give the concrete surface a coarse transverse scored texture by drawing a broom or burlap belt across the surface.

3.6 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Unformed Surfaces: Begin curing immediately after finishing concrete. Moisture cure unformed surfaces, including floors and slabs, and other surfaces.

- A. Defective Concrete: Repair and patch defective areas. Remove and replace concrete that cannot be repaired and patched.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one-part Portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

3.8 FIELD QUALITY CONTROL

- A. Testing and Inspecting: A qualified testing and inspecting agency shall be engaged to perform field tests and inspections and prepare test reports.
- B. Inspections:
 - 1. Steel reinforcement placement.

END OF SECTION

SECTIONS 06 10 00

PUMP HOUSE ROUGH CARPENTRY AND RELATED

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall framing studs and sheathing.
- B. Preservative treated wood materials.
- C. Miscellaneous framing and sheathing.
- D. Concealed wood blocking, nailers, and supports.
- E. Miscellaneous wood nailers, furring, and grounds.
- F. Roofing
- G. Siding and Trim
- H. Doors and Hardware

1.2 RELATED REQUIREMENTS

SEE GENERAL PROVISIONS.

1.3 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware: 2016a.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2017.
- C. AWPA C27 - Plywood -- Fire-Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 2002.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood; 2017.

E. PS 1 - Structural Plywood; 2009.

F. PS 20 - American Softwood Lumber Standard; 2015.

1.4 SUBMITTALS

- A. See Division 1 for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and framing materials.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Protect materials from elements, store inside until ready for installation.
- C. Remove and replace all damaged materials from site.

PART 1 PART 2 PRODUCTS

1.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Metal Roofing, Siding and Trim: GALVALUME 1.5" NAIL STRIP sheet compliant to ASTM

Specification A792/A792M-97a "Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process." Provide commercial, lock-forming and structural qualities. Provide all required trim and transitions at ridges, valleys, gables, eaves, corners, doors, transitions and bases.

1. Finish coating AZ50 or 0.50 oz/sq. ft. (150 g/sq. m.) coated GALVALUME pre-painted sheets.
 2. Provide UL-90 rated wind up-lift resistance requirement specified in the Underwriters Laboratories' UL 580 test. Provide required sheet thickness and width, clips, fasteners, secondary structural gages and spacings, as well as by panel rib height and configuration.
 3. Siding: Galvalume NAIL STRIP or approved compatible substitution.
 4. Trim: Galvalume NAIL STRIP or approved compatible substitution.
 5. Gutters and downspouts: Galvalume K-Style, Galvanized steel and painted to match roofing and trim.
 6. Contractor may propose substitutions of other products to engineer for review and approval.
- C. Metal Doors and Frames and Hardware: Exterior grade, galvanized and shop painted.
1. Man Door: 36 in. x 80 in. 18 ga. Fire-Rated Gray Left-Hand Flush Steel Pre-Hung Commercial Door with Welded Frame, Keyed Deadlock and Hardware.
 2. Overhead Door: 8'-0"x9'-0" Metal Insulated Flush Overhead Door with all associated hardware, track, rollers, seals, weather stripping and keyed locks and handle.

1.2 2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC 19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, Comply with Structural Drawings. No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

1.3 CONSTRUCTION PANELS

- A. Wall Sheathing: APA PRP-108, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
 - 1. Span Rating: 24/0.
 - 2. Thickness: 1/2-inch, nominal.
- B. Exterior Wall and Roof Sheathing: Plywood, PS 1, Grade C-D, Exposure I.
- C. Interior Wall Sheathing: Plywood, PS 1, Grade A-C, Exposure I.

2.4 ACCESSORIES

- A. Fasteners and Anchors
 - 1. Hot-clipped galvanized steel per ASTM A 153/A 153M for high humidity, all exterior lumber. Unfinished steel is acceptable elsewhere.
 - 2. Provide stainless steel fasteners for lumber assemblies installed at roof assemblies and other preservative-treated wood locations.

2.5 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.

- B. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an AL SC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.

C. Preservative Treatment:

1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using borate to 0.25 lb./cu ft retention.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - b. Treat lumber in contact with roofing, flashing, or waterproofing.
 - c. Treat lumber in contact with masonry or concrete.
 - d. Treat lumber in other locations as indicated.

PART 2 PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.
- D. Protect treated wood from the weather. Store according to the manufacturer's recommendations.

3.2 FRAMING INSTALLATION

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

- B. Make provisions for temporary construction loads and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- E. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.3 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Provide the following specific non-structural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Wall-mounted door stops.
 - 6. Wall paneling and trim.

7. Joints of rigid wall coverings that occur between studs.

3.4. INSTALLATION OF CONSTRUCTION PANELS

- A. Subflooring/Underlayment Combination: Glue and nail to framing; staples are not permitted.
- B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
- C. Equipment Mounting Boards: Secure with screws to studs with edges over firm bearing-, space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 3. Install adjacent boards without gaps.
 4. Size: 48 by 96 inches, installed horizontally at ceiling height.

3.5 INSTALLATION OF METAL ROOFING, SIDING, GUTTERS, DOWNSPOUTS AND DOORS

- A. Install to watertight condition without leakage.
- B. Install roofing and siding 30 lb. felt over plywood sheathing. Attach in accordance with manufacturer's instructions to meet wind uplift and local snow requirements.
- C. Install gutters and downspouts per manufacturer's instructions.
- D. Install doors, frames and hardware per manufacturer's instructions to provide a solid and secure locking and operable door.
- E. Provide metal trim and flashing around frames and openings as required to ensure a weathertight installation.

- A. A Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.7 CLEANING

- A. Waste Disposal:
 - 1. Comply with applicable regulations.
 - 2. Do not burn scrap on project site.
 - 3. Do not burn scraps that have been pressure treated.
 - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 22 11 23
DOMESTIC WATER PUMPS

Part I – GENERAL

1.1 WORK INCLUDED

- A. Provide and Install a Packaged Pumping System
- B. Hydronix (PumpTech Engineered Systems) model 703 booster pump station as manufactured by PumpTech Inc. Bellevue WA. (425) 644-8501

1.2 REFERENCE STANDARDS

The work in this section is subject to the requirements of applicable portions of the following standards:

- A. Hydraulic Institute
- B. ANSI – American National Standards Institute
- C. ASTM – American Society for Testing and Materials
- D. IEEE – Institute of Electrical and Electronics Engineers
- E. NEMA – National Electrical Manufacturers Association
- F. NEC – National Electrical Code
- G. ISO – International Standards Organization
- H. UL – Underwriters Laboratories, Inc.

Part 2 – Pumping System

2.1 PACKAGED PUMPING SYSTEM

- A. Furnish and install a pre-fabricated and tested packaged pumping system.
- B. The packaged pump system shall be a standard product of a single pump manufacturer.
- C. The entire pump system including pumps and pump logic controller, shall be designed and built by the same manufacturer.
- D. The complete packaged water booster pump system shall be certified and listed by UL (Category QCZJ – Packaged Pumping Systems) for conformance to U.S. and Canadian Standards.
- E. The packaged water booster pump station shall be manufactured by:
PumpTech Inc, Bellevue WA. (425) 644-8501

2.2 PUMPS

- A. Qty (2) Pumps shall be 40 hp Paco brand model 20953-LC rated for 360 GPM @ 250 FT TDH
- B. All pumps shall be ANSI/NSF 61 approved for drinking water.
- C. The pumps shall be single stage close coupled design.

D. The head-capacity curve shall have a steady rise in head from maximum to minimum flow within the preferred operating region. The shut-off head shall be a minimum of 20% higher than the head at the best efficiency point.

E. The pumps shall have the following features:

1. The pumps shall be close coupled, single stage, end suction top discharge design, cast iron stainless steel fitted construction.

2. All pumps shall be of the back pull-out design so that the rotating element can be removed from the casing without disconnecting the suction or discharge piping. The casing material shall be close-grained cast iron ASTM A48 - Class 30 with a minimum tensile strength of 30,000 P.S.I. Volute shall have integrally cast suction and discharge connections, gauge ports at nozzles, and vent and drain ports. Pumps with specific speed greater than 1600 shall have double volute casing. Pumps with discharge size 3" and larger shall have suction splitter to reduce pre-rotation and improve efficiency. Casings shall be designed for scheduled working pressure and can withstand hydrostatic test at 150% of the maximum working pressure under which the pump could operate at design speed.

3. Pumps with impeller diameter larger than 5" shall be fitted with bronze renewable case wear rings.

4. Pumps with discharge size 2.5" and larger shall have full flanged connections on both suction and discharge. Suction and discharge flanges shall be drilled to ANSI Class 125# standards and be machined flat face.

5. Pumps with discharge sizes 2" and below shall have NPT threaded connection.

6. The motor shaft shall be of cold rolled steel AISI 1024 with bronze sleeves covering the wetted area of the shaft. Motors with 56J frame shall have a motor shaft of stainless steel AISI 416.

7. The pump manufacturer shall recommend the proper mechanical seal based on the pressure, temperature and liquid outlined on the equipment schedule. Mechanical seals, at a minimum, shall have ceramic stationary seats, carbon rotating rings, buna elastomers and stainless steel hardware. Application of a mechanical seal shall be internally flushed type, without requiring external flushing lines. Seals shall be capable of being inspected and easily replaced without removing the piping or volute.

8. Impeller shall be of the enclosed francis vane type, single suction design, made of Stainless Steel 304 (UNS S30400), both hydraulically and dynamically balanced to ISO 1940-1:2003 balance grade G6.3 and keyed to the shaft. The impeller shall be trimmed to meet the specific hydraulic requirements.

9. Pump Construction. The standard material of construction for the pump shall be as below. Special material shall be available as option to suit the liquid pumped.

- Volute: Cast Iron ASTM A48 - Class 30
- Case Wear ring: Tin Bronze ASTM B584-90500
- Impeller: Stainless Steel 304 (UNS S30400)
- Shaft: Cold Roll Steel AISI 1024 or Stainless Steel AISI 416
- Shaft Sleeve: Bronze III932 C89835
- Mechanical Seals: Carbon – Ceramic with Buna Elastomers and Stainless Steel hardware.

2.3 SYSTEM CONSTRUCTION

- A. The suction and discharge manifolds shall be constructed of sch 40 steel pipe coated internally and externally with NSF Approved Skotchkote #134 Epoxy.
- B. Manifold connection sizes shall be as follows:
- 3 inch and smaller: Male NPT threaded
 - 4 inch through 8 inch: ANSI Class 150 rotating flanges (Optional Class 300 rotating flanges)
 - 10 inch and larger: ANSI Class 150 flanges (Optional Class 300 Flanges)
- C. Pump Isolation valves shall be provided on the suction and discharge of each pump. Isolation valve sizes 2 inch and smaller shall be stainless steel, full port ball valves. Isolation valve sizes 3 inch and larger shall be a full lug style butterfly valve. The valve disk shall be of stainless steel. The valve seat material shall be EPDM and the body shall be cast iron, coated internally and externally with fusion-bonded epoxy.
- D. A spring-loaded non-slam type check valve shall be installed on the discharge of each pump. The valve shall be a wafer style type fitted between two flanges. The head loss through the valve shall not exceed 5 psi at the pump design capacity. Check valves 1-1/2" and smaller shall have a POM composite body and poppet, a stainless steel spring with EPDM or NBR seats. Check valves 1 1/4" and larger shall have a body material of stainless steel or epoxy coated iron (fusion bonded) with an EPDM or NBR resilient seat. Spring material shall be stainless steel. Disk shall be of stainless steel or leadless bronze.
- E. For systems that require a diaphragm tank, a minimum diaphragm tank connection size of 3/4" shall be provided on the discharge manifold.
- F. A bourdon tube pressure gauge, 2.5 inch diameter, shall be placed on the suction and discharge manifolds. The gauge shall be liquid filled and have copper alloy internal parts in a stainless steel case. Gauge accuracy shall be 2/1/2 %. The gauge shall be capable of a pressure of 30% above it's maximum span without requiring recalibration.
- G. Systems with a flooded suction inlet or suction lift configuration shall have a factory installed water shortage protection device on the suction manifold.
- H. Skid Base: Pump skid base shall be constructed of ASTM A36 structural steel. Frame shall provide adequate structural supports for pumps, motors, and piping. The frame shall extend to lift points and assure adequate strength to resist deformation of structure during shipping, lifting, handling, and operation. Skid frame shall be a minimum of 6" I beam weighing no less than 12.5 lbs per foot. The station base shall incorporate a flange designed to secure the pump station to the concrete floor in accordance with the pump station manufacturer's structural design. The skid shall be constructed with a 3/8" minimum-thickness floor plate covering the entire base and welded to the frame.
Skid Coatings: All surfaces of the exposed steel structure, interior and exterior, shall be grit blasted equal to commercial base cleaning (SSPC-SP6). The protective coating shall take place immediately after surface preparation. The protective coating shall be Gray industrial powder coating to a minimum total dry film thickness (DFT) of 8.0 mils.
- I. Skid configuration:

- a. The skid shall be configured for Qty (3) pumps with two pumps initially installed and a third slot for a future pump. All branch manifold piping and isolation valves shall be provided for all three pumps with one pump slot capped off for future 3rd pump installation.

3.0 CONTROL PANEL –

3.01 Tri-plex pump control panel shall be provided as per specification drawings and shall have as a minimum, main disconnect. The control panel should be configured for operation of three pumps with one pump deactivated initially until such time a third pump is installed

3.02 COMPONENTS: Components shall be provided as listed below.

- a) Enclosure shall be UL Type 4X stainless steel, minimum _____ dimensions with pad-lockable 3 point latch. A swing out inner door shall be provided.
- b) A GFCI convenience receptacle shall be provided. Receptacle shall be industrial grade, 120V 20A.
- c) Control panel shall have a thermostatically controlled heater with fan. Heater package shall be Hoffman DAH1002A or approved equal.
- d) Main disconnect switch shall be UL98 listed and sized to handle full load amps of the panel, with pad-lockable door interlocking handle.
- e) Control power transformer with primary fuse protection.
- f) An HOA selector switch, RUN indicator, and OUT-OF-SERVICE indicator shall be provided for each pump. All pilot devices shall be UL Type 4X rated, 22mm type manufactured by Square D or equal. The indicators shall be long life LED type.
- g) An alarm horn shall be provided and mounted on the side of the panel. Horn shall be Federal Signal model 350 or equal with a minimum sound level of 100 db. A silence pushbutton shall be located on the inner door.
- h) An alarm light shall be mounted on the top of the panel, and shall be red polycarbonate and UL Type 4X rated.
- i) Control relays shall be provided as shown on plan drawings and shall be blade type, with indicator lights. Relays shall be IDEC or approved equal.
- j) Analog 4-20mA loops shall be provided with fuse protection.

3.03 WIRE ENDS: All wire ends shall be finished with crimped ferrules to prevent strands from splaying.

3.04 UL LISTING: The panel shall be manufactured in by a UL508A registered shop and provided with a UL 508A label. A plastic laminated copy of the wiring diagram shall be attached to the inside of the panel door with waterproof adhesive.

3.06 PUMP CONTROLLER: The pressure booster control system shall include a digital pressure controller (DPC). The DPC shall, as a minimum, consist of a microprocessor with I/O and a color touch screen operator interface panel. The DPC shall be an integrated system and factory programmed to start, stop and sequence the pumps based on the relationship between the user accessible set points on the interface panel and the analog input from the pressure transducer.

The DPC shall be an industrial type controller designed for harsh environments and a standard catalog item of a manufacturer with at least five years experience in manufacturing micrologic pressure controllers. The DPC shall be rated for a minimum of 0-50 C operating temperature.

The digital pressure controller shall be mounted on the control panel door and shall include:
3.5 Inch 320 x 240 pixel TFT touch screen
5 key sealed membrane keypad

- 4.5M application memory
- 312K data table memory
- 8GB micro SD card
- (1) RS232 programming port
- (1) 4-20ma or 0-10V analog inputs
- (22) 24VDC digital inputs
- (12) 5A relay contact outputs rated for up to 230VAC
- (2) 10 KHz high-speed inputs

The DPC shall have pull-apart terminals so that the controller can be easily replaced without disconnecting or disturbing any wiring from the unit.

The Pressure Controller shall operate with iRover Mobile HMI and docRover Dynamic Document Management for iPad. See Spec Section 4.50.

- 3.07 DIGITAL INPUT AND OUTPUTS: Inputs shall be provided for each pump to include pump starter auxiliary contact to confirm pump operation when called and HOA Auto position to confirm the pump is available. Outputs shall be provided for each pump run command, out-of-service indicator for each pump, alarm horn and general fault contact.
- 3.08 PROGRAM FEATURES
- 3.09 CONFIGURATION: The DPC shall have the following minimum configuration capabilities, all accessible by simply enabling them by touching a button in a user friendly setup wizard:
1. Simplex, duplex, triplex or quadraplex operation – system shall automatically adjust all screens and functions for the number of pumps in the system.
 2. Constant speed or variable speed pumps
 3. 0-10V or 4-20ma pressure sensor input
 4. User scalable pressure sensor range and units
- 3.10 MONITORING AND SET POINTS: The pressure controller shall be designed with easy to navigate screens that will allow user access to the following functions and data:
1. Pressure display – in PSI
 2. Number of pumps called
 3. Pump status (Running, Stopped, Called, Failed, Out-of-service) for each pump
 4. HOA selector (in controller to allow remote control of the pumps) for each pump
 5. Run hour meter for each pump – minimum 100,000.00 hours (hundredths Resolution)
 6. Number of starts counter for each pump
 7. Alternation status
 8. Alternation mode selector (Automatic, time clock, or manual)
 9. Low suction pressure alarm set point
- 3.11 ALARM CONFIGURATION: The DPC shall have alarm configuration screens for each of the following alarm conditions:
1. Low suction pressure
 3. High discharge pressure
 4. Pump failure

Each alarm condition shall have touch buttons that enable or disable each of the above alarm conditions individually to:

1. Enable/disable alarm condition
2. Shutdown pumps
3. Manual or Auto reset

4. Turn on the horn output
5. Turn on the alarm light output
6. Flash the alarm light
7. Turn on the general fault contact
8. Send email and/or text message
9. Adjust time delay

All enabled alarms shall be recorded in the DPC alarm history log and in an alarm handler that provide data regarding time of alarm, active or not, and number of same faults since last time cleared.

3.12 PASSWORD PROTECTION: All set points shall be password protected with two levels of passwords.

3.14 FAULT DATA LOGGING: Fault logging shall be provided with a screen that gives access to the past 1000 fault conditions, complete with date and time stamp. The system data log shall log any alarm condition that is enabled. A separate fault log shall be provided for each VFD that will log the last 250 VFD fault conditions.

3.15 TREND GRAPH AND HISTORY: The DPC shall have a trend graph that automatically saves suction pressure, system pressure, motor speed and number of pumps running data at one second interval to a file on an SD card. A new file shall be automatically created at the beginning of each month. A minimum of 64 months of data shall be stored and can be retrieved by the DPC for on screen display in real time, or history mode.

A Windows based software utility shall be available, at no additional charge, which can copy the file to a PC and display the data on the PC screen in graphical format (trend chart).

This trend data shall serve the purpose of providing data regarding peak flow periods, system efficiency, and pump run times and duration.

3.16 PUMP RUN DATA LOGGING

The DPC shall log every pump run event. The log shall record the start time, stop time and run duration, complete with date stamp, every time the pump runs. The log shall record a minimum of 10 years of data based on a frequency of 30 seconds between events.

3.17 MANUFACTURER: The digital level controller shall be PUMP Vision as manufactured by California Motor Controls, Inc. or pre-approved equal.

PART 4 - COMMUNICATION

4.20 SERIAL PORT: The DPC shall have a serial port that can be configured, with simple on the screen touch, for the following configurations:
1. RS232 programming mode

4.21 DDE SERVER: A DDE .dll shall be available, at no additional charge that allows the owner to configure a customized Excel spreadsheet that displays data from any register within the DPC.

PART 4 - SEQUENCE OF OPERATION

The tri-plex packaged pump station control panel will be configured for remote I/O operation as follows:

The existing main PLC is located in the filter plant. The existing main PLC currently receives level signals from the upper storage tank. The existing main PLC will communicate remotely with the

new packaged booster pump tri-plex control panel to send pump on and off commands based on the level signals it receives from the upper storage tank. Only a single pump will be allowed to run at any given time, at no time will the pumps on the packaged booster skid be asked to operate simultaneously, however the packaged booster pump tri-plex control panel shall be equipped with an automatic pump alternation function to maintain equal running time on all active pumps. The tri-plex control panel on the packaged booster station shall be capable of sending alarms outputs

5.0 TESTING

- A. Each pump shall be factory performance tested as a unit prior to shipment. The performance test shall consist of five (5) points over the operating range of the pump. One point will be the specified primary design point of the pump. The performance tests will meet the acceptance criteria of the Hydraulic Institute. Verified test data will include head vs. capacity, motor output (HP), RPM and pump efficiency.
- B. Job-site programming shall be entered into the controller prior to shipment (details of installation requirements shall be communicated to the pump system manufacturer). A verified Controller performance test report shall be made available from the system manufacturer.
- C. The system shall undergo a hydrostatic test of 250 psig for a minimum of 15 minutes prior to shipment.

6.0 WARRANTY

- A. The warranty period shall be a non-prorated period of 24 months from date of installation, not to exceed 30 months from date of manufacture.

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 – GENERAL

1.01 SUMMARY

- A. This section specifies general requirements for electrical work. Detailed requirements for specific electrical items specified in other sections are subject to the requirements of this section. The Electrical Drawings and Schedules included in the specification are functional in nature and do not specify exact locations of equipment or equipment terminations.
- B. All electrical Work included in this Contract including pre-fabricated assemblies shall conform to the requirements of this section.

1.02 QUALITY ASSURANCE

- A. Referenced Standards: This section incorporates by reference the latest revision of the following documents. These references are a 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.

<u>Reference</u>	<u>Title</u>
1. ANSI A58.1	Minimum Design Loads for Buildings and Other Structures
2. NFPA 70	National Electrical Code (NEC) and local amendments
3. NEMA	National Electrical Manufacturers Association
4. ICEA	Insulated Cable Engineers Association
5. IBC / IBO	International Building Code
6. UL	Underwriters Laboratories

B. Identification of Listed Products:

1. Electrical equipment and materials shall be listed and labeled for the purpose for which they are to be used, by UL or equivalent NRTL agency approved lab as the independent testing laboratory. Independent testing laboratory shall meet the requirements of the local or state inspection authority having jurisdiction.
2. 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. All costs and expenses incurred for such inspections shall be included in the original contract price.
3. When the product is an assemblage of individual parts, whether the individual parts are listed or not, the entire assemblage shall be listed and labeled as a complete unit for the purpose for which it is to be used.

C. Factory Tests: Where specified in the specification section, perform factory tests at the place of fabrication. Perform on completion of manufacture or assembly.

D. Qualifications: Not Used

1.03 SUBMITTALS

A. Procedures: Section 01 33 00.

B. Catalog cuts of equipment, devices, and materials requested by the specification sections.

1. Catalog information includes technical specifications and application information, including ratings, range, weight, accuracy, etc.
2. Catalog cuts shall be edited to show only the items, model numbers, and information which apply to the submittal requirements.
3. Catalog cuts shall be assembled in a folder. Each folder shall contain a cover sheet, indexed by item, and cross-referenced to the appropriate specification paragraph.

- C. Applicable operation and maintenance information on an item-by-item basis. Operation and maintenance information shall be provided at the time of equipment, device, or material site delivery, or at a certain stage of project completion as required by Section 01 78 23, whichever is the earlier. Full-size drawings shall be reduced to 11 x 17 inches.
- D. Test results for motors and electrical systems per NECA testing requirements. Maintain a file of the original test results and submit to the Project Representative prior to Final Acceptance.
- E. Description of functional checkout procedures, specified in this specification, 30 days prior to performing functional checkout tests.
- F. Interconnection diagrams depicting all cable requirements together with their actual terminations.
- G. Electrical room plan and elevation drawings showing conformance with electrical working clearances and installation clearances required by selected manufacturer.

1.04 DEFINITIONS

- A. Elementary or Schematic Diagram: A schematic (elementary) diagram shows, by means of graphic symbols, the electrical connections and functions of a specific circuit arrangement. The schematic diagram facilitates tracing the circuit and its functions without regard to the actual physical size, shape, or location of the component devices or parts.
- B. One-Line Diagram: Shows by means of single lines and graphical symbols the course of an electrical circuit or system of circuits and the components, devices, or parts used therein. Physical relationships are usually disregarded.
- C. Block Diagram: A diagram of a system, instrument, computer, or program in which selected portions are represented by annotated boxes and interconnecting lines.

D. Wiring Diagram or Connection System: A wiring or connection diagram includes all of the devices in a system and shows their physical relationship to each other including terminals and interconnecting wiring in an 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.

E. Interconnection Diagram:

1. Show all external connections between terminals of equipment and outside points, such as motors and auxiliary devices.
2. References shall be shown to all connection diagrams which interface to the interconnection diagrams.
3. Interconnection diagrams shall be of the continuous line type.
4. Bundled wires shall be shown as a single line with the direction of entry/exit of the individual wires clearly shown. Wireless diagrams and wire lists are not acceptable.
5. Each wire identification as actually installed shall be shown.
6. The wire identification for each end of the same wire shall be identical.
7. All devices and equipment shall be identified.
8. Terminal blocks shall be shown as actually installed and identified in the equipment complete with individual terminal identification.
9. All jumpers, shielding and grounding termination details not shown on the equipment connection diagrams shall be shown on the interconnection diagrams.
10. Wires or jumpers shown on the equipment connection diagrams shall not be shown again on the interconnection diagram.
11. Signal and DC circuit polarities and wire pairs shall be shown.
12. Spare wires and cables shall be shown.

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- F. Arrangement, Layout, or Outline Drawings: An arrangement, layout, or outline drawing is one which shows the physical space and mounting requirements of a piece of equipment. It may also indicate ventilation requirements and space provided for connections or the location to which connections are to be made.

1.05 DRAWINGS

- A. Prepare drawings specified as part of the work and submit per Section 01 33 00.
- B. Drawings shall be complete with borders and title blocks clearly identifying Contract name, equipment, and the scope of the drawing.
- C. Drawing standard requirements will be supplied by the City of Chehalis.

1.06 SITE CONDITIONS

- A. General: Unless otherwise indicated, size and derate equipment and materials for the ambient conditions, but not less than an ambient maximum temperature of 40 degrees C at an elevation ranging from sea level to 3000 feet without exceeding the manufacturer's stated tolerances.
- B. Seismic:
 - 1. Electrical equipment and supports: Braced per IBC requirements.
 - 2. Provide calculations for overturning moment and design of the embedded anchors for securing free-standing equipment to the building structure.
 - 3. Fasten equipment that is front-accessible only to the wall or ceiling as well as the floor.

1.07 STORAGE OF MATERIALS AND EQUIPMENT

- A. Store materials and equipment to prevent accidental damage.
- B. Store indoor equipment and materials to be permanently located indoors and seal with plastic film wrap.

1.08 FACILITY ELECTRICAL POWER SERVICE

A. Coordinate electrical service with electric power service provider in order to:

1. Position the utility’s transformer on-site.
2. Locate the revenue meter.
3. Locate CT enclosure in the electrical room.

1.09 INDICATING LAMP COLORS

A. Unless otherwise specified, equipment to follow with colored lenses in accordance with the following schedule:

Color	Function	Example
Red	Run, open valve	Equipment operating, motor running
Green	Ready, closed valve	Equipment ready, end of cycle
White/Clear	Normal condition	Control power on, status OK or clear
Amber/Yellow	Abnormal condition	Failure of equipment or status (yellow) abnormal, fault condition

PART 2 – PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. General:

1. Equipment and materials shall be new and free from defects.
2. All material and equipment of the same or a similar type shall be of the same manufacturer throughout the work.
3. Standard production materials shall be used wherever possible.

B. Equipment Finish: Unless otherwise indicated, electrical equipment and materials shall be painted by the manufacturer.

2.02 CONDUCTOR / WIRE MARKERS

- A. Identify each power and control conductor at each end of each terminal to which it is connected.
- B. Conductors size No. 10 AWG or smaller shall have identification sleeves.
- C. Conductors:
 - 1. Identify each end as shown on the Drawings.
 - 2. If not shown on the Drawings, identify conductor ends with the Equipment number, followed by -Cxx, where xx is a unique number for that wire.
- D. Machine print on sleeves with permanent black ink the letters and numbers that identify each wire.
- E. Figures: 1/8-inch high.
- F. Sleeves: Yellow or white tubing, sized to fit the conductor insulation.
- G. Acceptable Manufacturer:
 - 1. TMS Thermofit Marker System by Raychem Co.
 - 2. Sleeve style wire marking system by W. H. Brady Co.
 - 3. Or Approved Equal.
- H. Adhesive strips are not acceptable.
- I. Use cable markers of the locking tab type for conductors No. 8 AWG and larger.
- J. Tabs: white plastic with conductor identification number permanently embossed.

2.03 NAMEPLATES

- A. Laminated phenolic plastic.
- B. Nominal Size: 3/4 inch high by 2 inches long.
- C. Black backgrounds with 3/16-inch white letters.
- D. If abbreviations are required because of space limitations, submit to the Project Representative prior to manufacture.

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- E. Fastened using self-tapping stainless steel screws. The use of adhesives will not be permitted on the outside of enclosures.

2.04 TERMINAL BLOCKS

- A. Unless otherwise indicated, panhead strap screw type.
- B. Terminals shall be provided with integral marking strips which shall be permanently identified with the connecting wire numbers as shown on the Drawings.
- C. Terminal blocks for P-circuits (power 208-600 volts): Rated not less than the conductor current rating and less than 600 VAC.
- D. Terminal blocks for C-circuits (control and/or power 120 volts or less power) and S-circuits (signal): Rated not less than 20 amperes and less than 600 VAC.
- E. Terminals: Tin-plated.
- F. Insulating material: Nylon.

PART 3 – EXECUTION

3.01 GENERAL

- A. Construction:
 - 1. Unless otherwise indicated, electrical layout drawings are diagrammatic.
 - 2. Coordinate the location of electrical material or equipment with other equipment and work.
 - 3. Make necessary minor changes in location of electrical material or equipment to avoid interferences with other work prior to installation.
- B. Housekeeping:
 - 1. Protect electrical equipment from dust, water and damage.
 - 2. Wipe motor control centers, switchgear, and buses free of dust and dirt on the outside keep dry and vacuumed on the inside within 30 days of Substantial Completion.
 - 3. Touch up any scratches on equipment.

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4. During construction, allow no electrical equipment to be temporarily exposed to weather, debris, liquids, or damage.

C. Dust Free Areas:

1. Protect electrical, instrumentation and control equipment from dust by wrapping the equipment in plastic film wrap until installed to prevent dust from entering the equipment.
2. Once electrical, instrumentation and control equipment is installed, protect from dust. Rewrap the equipment if necessary to keep the equipment dust free.

3.02 RECORD DOCUMENTS

- A. Provide record drawings in accordance with Section 01 78 39. Include the following schedules, lists, and drawings:
 1. Interconnection diagrams (Section 26 05 00).
 2. Original submittal drawings (Section 26 05 00).

END OF SECTION

SECTION 26 05 19

600 VOLT CONDUCTORS AND CABLES

PART 1 – GENERAL

1.01 SUMMARY

- A. This section specifies conductors and cables rated 600 volts used for power, lighting, receptacle, signal, and control circuits.

1.02 QUALITY ASSURANCE

- A. Referenced Standards: This section incorporates by reference the latest revision of the following documents. These references are a 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.

<u>Reference</u>	<u>Title</u>
1. ASTM B3	Soft or Annealed Copper Wire
2. ASTM B8	Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
3. ASTM B33	Tinned Soft or Annealed Copper Wire for Electrical Purposes
4. ASTM B189	Lead-Coated and Lead-Alloy-Coated Soft Copper Wire for Electrical Purposes
5. ICEA S-68-516	Ethylene-Propylene-Rubber-Insulated Wire
6. IEEE 383	Type Test of Class IE Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations
7. NEMA WC7	Cross-Linked-Thermosetting Insulated Wire and Cable for the Transmission and Distribution of Electric Energy

8. NEMA WC57/ICEA S-73-532 Standard for Control Cables
9. NEMA WC70/ICEA S-95-658 Non-Shielded Power Cables Rated 2000 V or less
10. NEC 310-12 General Conductors Color Code
11. NFPA 820 Fire Protection in Wastewater Treatment and Collection Facilities
12. NFPA 70 National Electric Code (NEC)
13. UL 44 Rubber-Insulated Wires and Cables
14. UL 83 Thermoplastic-Insulated Wires and Cables
15. UL 1277 Type TC Power and Control Tray Cable
16. UL 1581 Reference Standards for Electrical Wires, Cables, and Flexible Cords

B. Qualifications: Not used.

1.03 SUBMITTALS

A. Procedures: Section 01 33 00.

B. Catalog cuts showing general information of the conductors and cable.

PART 2 – PRODUCTS

2.01 GENERAL

A. Unscheduled Conductors and Cables:

1. With the exception of lighting, communication, paging, security and receptacle circuits, the type, size and number of conductors shall be as specified on the Drawings.
2. Lighting and receptacle circuit conductors are not shown on the Drawings and shall be sized by the Contractor in accordance with the NEC to limit voltage drop to 3 percent.
3. Minimum size of lighting and receptacle circuits shall be 12 AWG.
4. Number and types of communication, paging, and security cables shall be as required for the particular equipment provided.
5. Unless otherwise indicated, provide lighting and receptacle circuit conductors in accordance with CABLESPEC "XHHW-2".

B. Cable Specification Sheets (CABLESPEC): General requirements for conductors and cables specified in this section are listed on CABLESPEC sheets in this section.

2.02 COLOR CODING

A. General:

1. Multiconductor power and control cable colors shall be manufacturer's standard.
2. Single conductor control conductor color shall be yellow, except for the grounded conductor which shall be white.

B. Power Conductors:

1. Single-conductor power conductors shall be color coded in accordance with the following:

Use	Cable	Color
Three-phase, 480-volt power or 480/277	Phase A	Brown
	Phase B	Orange
	Phase C	Yellow
	Ground	Green
	Neutral	Gray
Three-phase, 120/208-volt power	Phase A	Black
	Phase B	Red
	Phase C	Blue
	Neutral	White
	Ground	Green
Single-phase, 120/240-volt power	Line 1	Red

	Line 2	Black
	Neutral	White
	Ground	Green

2. Cables sized No. 4 AWG and larger may be black with colored 3/4-inch vinyl plastic tape applied in 3-inch lengths around the cable at each end.

3. Tag the cables at terminations and in pull boxes, handholes, and manholes.

C. Signal Conductors: Unless otherwise indicated, cables shall be color coded black and white for pairs or black, red, and white for triads.

D. Control Conductors: Control conductors color coding shall be manufacturer's standard.

2.03 POWER AND CONTROL CONDUCTORS AND CABLE, 600 VOLT

A. Single Conductor:

1. Stranded and used in conduits for power and control circuits.
2. Unless otherwise indicated, provide in accordance with CABLESPEC "XHHW-2".

B. Multiconductor Cable:

1. Used for power and control circuits routed in cable tray.
2. Cables shall be UL labeled, Type TC, designed for cable tray installation in accordance with NEC 340.
3. The type of insulation, number of conductors, and size of conductor shall be as specified.
4. Unless otherwise indicated, provide multiconductor power and control cable in accordance with CABLESPEC "MC".
5. Power Cable: Containing three or four conductors, as specified, plus an equipment grounding conductor.
6. Control Cable: Unless otherwise indicated, shall be size 14 AWG.
7. VFD Cables: Unless otherwise indicated, shall not be sized smaller than 12 AWG.

2.04 SIGNAL CABLES

A. General:

1. Provide signal cable for instrument signal transmission, alarm, communication and other circuits as specified. Circuit shielding shall be provided in addition to cable shielding.
2. Provide circuits for Type A and B signals in compliance with the instrument manufacturer's recommendations.
3. Unless otherwise indicated, provide single circuit signal cable in accordance with CABLESPEC "SIC".
4. Unless otherwise indicated, provide multicircuit signal in accordance with CABLESPEC "MIC".

B. Communication System Cables: Communication, system cables shall be as specified in Division 40.

2.05 PORTABLE CORD

- A. Unless otherwise indicated, provide portable cord in accordance with CABLESPEC "CORD".
- B. Cords shall contain an equipment grounding conductor.

2.06 SPLICING AND TERMINATING MATERIALS

A. Connectors:

1. Tool applied compression type of correct size and UL listed for the specific application.
2. Tin-plated high conductivity copper.
3. For wire sizes No. 10 AWG and smaller: Nylon self-insulated, ring tongue or locking-spade terminals.
4. For wire sizes No. 8 AWG and larger: One-hole lugs up to size No. 3/0 AWG, and two-hole or four-hole lugs for size No. 4/0 and larger.
5. Mechanical clamp, dimple, screw-type connectors are not acceptable.

B. Motor Connection Kits:

1. Shall consist of heat-shrinkable, polymeric insulating material over the connection area and a high dielectric strength mastic to seal the ends against ingress of moisture and contamination.
2. Shall accommodate a range of cable sizes for both in-line and stub-type configurations.
3. Shall be independent of cable manufacturer's tolerances.

C. Splicing is not allowed without prior approval from the Project Representative.

PART 3 – EXECUTION

3.01 GENERAL

A. Identify each power and control conductor at each terminal to which it is connected. The marking system shall comply with Section 26 05 00.

B. Wire Pulling:

1. Complete the pulling of wire and cable into conduit or trays without damaging or putting undue stress on the cable insulation.
2. Soapstone, talc or UL listed pulling compounds are acceptable lubricants for pulling wire and cable.
3. Grease is not acceptable.
4. Raceway construction shall be complete, cleaned, and protected from the weather before cable is placed.

C. Whenever a cable leaves a raceway, provide a cable support.

D. When flat bus bar connections are made with unplated bar scratch-brush the contact areas. Torque bolts to the bus manufacturer's recommendations.

E. Provide and install yellow three-strand copolymer polyolefin pull string in all new conduits. String shall extend at least 1 foot beyond each end of the conduit and be tied off on bushing or in other manner acceptable to the Project Representative

- F. Splicing is not allowed without prior approval from the Project Representative.

3.02 600 VOLT CONDUCTOR AND CABLE

A. Lacing and Bundling:

1. Lace and bundle conductors in panels and electrical equipment, No. 6 AWG and smaller, at intervals not greater than 6 inches, spread into trees and connected to their respective terminals.
2. Lacing shall be made up with plastic cable ties.
3. Lacing is not necessary in plastic panel wiring duct.
4. Bundle conductors crossing hinges into groups not exceeding 12 and arrange so that they will be protected from chafing when the hinged member is moved.

B. Slack:

1. Provide slack in junction and pull boxes, handholes and manholes.
2. Slack shall be sufficient to allow cables or conductors to be routed along the walls of the box.
3. Amount of slack shall be equal to largest dimension of the box.
4. Where plastic panel wiring duct is provided for wire runs, lacing is not required.
5. Do not use plastic panel wiring duct in manholes and handholes.

C. Stranded Conductors:

1. Terminate as described in this section, except where terminals will not accept such terminations.
2. In these cases, terminate the conductors directly on the terminal block.
3. Install compression lugs and connectors using manufacturer's recommended tools.

- D. Raceway fill limitations shall be as defined by NEC and the following:
 - 1. Lighting and receptacle circuits may be in the same conduit in accordance with derating requirements of the NEC.
 - 2. However, lighting and receptacle circuits shall not be in conduits with power or control conductors.
- E. Make terminations at solenoid valves, 120 volt motors, and other devices provided with pigtail leads using self-insulating tubular compression connectors.

3.03 SIGNAL CABLE

- A. Circuits:
 - 1. Run as individually shielded twisted pairs or triads.
 - 2. Do not, in any case, make up a circuit using conductors from different pairs or triads.
 - 3. Use triads wherever 3-wire circuits are required.
 - 4. Unless otherwise indicated, provide terminal blocks at instrument cable junctions, and identify circuits at such junctions.
 - 5. Run signal circuits without splices between instruments, terminal boxes, or panels.
- B. Shields are not acceptable as a signal path, except for circuits operating at radio frequencies and utilizing coaxial cables.
- C. Common grounded return conductors for two or more circuits are not acceptable.
- D. Unless otherwise indicated, bond shields to the signal ground bus at the control panel and isolated from ground and other shields at other locations. Provide terminals for running signal leads and shield drain wires through junction boxes.
- E. Shield Drain Wire:
 - 1. Terminate spare circuits and the shield drain wire on terminal blocks at both ends of the cable run and cause to be electrically continuous through terminal boxes.
 - 2. Do not ground shield drain wires for spare circuits at either end of the cable run.
- F. Terminal Boxes:

1. Provide at instrument cable splices.
2. If cable is buried or in raceway below grade at splice, provide an instrument stand as specified with terminal box mounted approximately 3 feet above grade.

G. Install and terminate cable for telephone systems in compliance with the manufacturer's recommendations.

3.04 PORTABLE CORD

- A. 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.
- B. Connect portable cords to permanent wiring with the use of terminals.
- C. Use in-line taps and splices only where specified.

3.05 TESTING

- A. General: Test conductors and cable in accordance with Section 26 05 00.
- B. Signal Cable:
 1. Test each signal pair or triad for electrical continuity.
 2. Test each shield drain conductor for continuity. Shield drain conductor resistance shall not exceed the loop resistance of the pair or triad.
 3. Test each conductor (signal and shield drain) for insulation resistance with all other conductors in the cable grounded.
 4. Instruments used for continuity measurements shall have a resolution of 0.1 ohms and an accuracy of better than 0.1 percent of reading plus 0.3 ohms. Use a 500 volt megohmmeter for insulation resistance measurements.

3.06 SCHEDULES

- A. Cables are scheduled on the Drawings.

3.07 CABLE SPECIFICATION SHEETS (CABLESPEC)

- A. General:

1. Conductor and cable types for different locations, service conditions and raceway systems are specified on individual cable specification sheets (CABLESPECS).
2. Install scheduled and unscheduled conductors and cables in accordance with the CABLESPECS.

B. CABLESPEC SHEETS: CABLESPEC sheets follow.

3.07 CABLE SPECIFICATION SHEETS (CABLESPEC)

Cable System Identification:	MC
Description:	Multiconductor power and control cable, No. 1/0 AWG and larger, approved for tray installation and in accordance with UL 1569.
Voltage:	600 volts.
Conductor Material:	Bare annealed copper; stranded in accordance with ASTM B8.
Insulation:	XHHW-2, 90 degree C dry, 75 degree C wet, crosslinked polyethylene in accordance with NEMA WC57 / ICEA S-73-532 (control cable), NEMA WC70 / ICEA S-95-658 (Power Cable), and UL 44.
Assembly:	Individual conductors cabled together with nonhydroscopic fillers and binding tape.
Sheath:	Impervious, continuous, corrugated aluminum welded over cable core. sheath shall meet the grounding conductor requirements of NEC table 250-95.
Jacket:	50 mil minimum, polyvinylchloride (PVC) in accordance with UL 1277.
Flame Resistance:	IEEE 383.
Manufacturer(s):	Okonite, Houston Wire & Cable, or approved equal.
Uses Permitted:	Cable tray, direct burial, encased in concrete in normal

or Class 1, Division 2 atmospheres.

Execution:

Installation: Install in accordance with this Section.

Testing: Test in accordance with Section 26 05 00.

3.07 CABLE SPECIFICATION SHEETS (CABLESPEC)

Cable System Identification:	TC
Description:	Multiconductor power and control cable, No. 14 AWG minimum through No. 1 AWG, approved for tray installation and in accordance with UL 1581
Voltage:	600 volts.
Conductor Material:	Bare annealed copper; stranded in accordance with ASTM B8.
Insulation:	XHHW-2, 90 degree C dry, 75 degree C wet, crosslinked polyethylene in accordance with NEMA WC57 / ICEA S-73-532 (control cable), NEMA WC70 / ICEA S-95-658 (Power Cable), and UL 44.
Assembly:	Individual conductors cabled together with nonhydroscopic fillers and binding tape.
Jacket:	50 mil minimum, polyvinylchloride (PVC) in accordance with UL 1581.
Flame Resistance:	IEEE 383.
Manufacturer(s):	Okonite, Houston Wire & Cable, or approved equal.
Uses Permitted:	Cable tray, direct burial, encased in concrete in normal or Class 1, Division 2 atmospheres.
Execution:	Installation: Install in accordance with this section.

Testing: Test in accordance with Section 26 05 00.

3.07 CABLE SPECIFICATION SHEETS (CABLESPEC)

Cable System Identification:	XHHW-2
Description:	Single conductor Cross-linked polyethylene power and control cable for sizes No. 14 AWG through No. 600 kCMIL.
Voltage:	600 volts.
Conductor Material:	Bare annealed copper; stranded in accordance with ASTM B8.
Insulation:	XHHW-2, 90 degree C dry, 75 degree C wet, cross-linked polyethylene in accordance with NEMA WC57/ ICEA S-73-532 (control cable), NEMA WC70/ ICEA S-95-658 (power cable).
Jacket:	None.
Flame Resistance:	N/A.
Manufacturer(s):	Okonite, X-Olene; Cablec, Durasheath XLP; or approved equal.
Execution:	Installation: Install in accordance with this Section. Testing: Test in accordance with Section 26 05 00.

3.07 CABLE SPECIFICATION SHEETS (CABLESPEC)

Cable System Identification: SIC

Description: Single twisted, shielded pair or triad, 16 AWG, instrumentation cable, UL listed. NEC type TC.

Voltage: 600 volts.

Conductor Material: Bare annealed copper; stranded in accordance with ASTM B8.

Insulation: 15 mil, 90°C Dry / 75°C Wet, Polyvinyl chloride (PVC) with 4 mil nylon conduit or jacket.

Lay: Twisted on a 2-inch lay.

Shield: 100 percent, 1.35 mil aluminum-Mylar tape with 18 AWG 7-strand tinned copper drain wire.

Jacket: 45 mil polyvinylchloride (PVC).

Flame Resistance: UL 1277.

Manufacturer(s): Okonite, Okoseal-N type P-OS; or approved equal.

Execution:

Installation: Install in accordance with this section.

Testing: Test in accordance with this section.

3.07 CABLE SPECIFICATION SHEETS (CABLESPEC)

Cable System Identification:	MIC
Description:	Multiple twisted, shielded pairs or triads, 16 AWG, instrumentation cable, UL listed.
Voltage:	600 volts.
Conductor Material:	Bare annealed copper; stranded in accordance with ASTM B8.
Insulation:	15 mil, 90°C Dry / 75°C Wet, Polyvinyl chloride (PVC) with 4 mil nylon conduit or jacket.
Lay:	Twisted on a 2-inch lay.
Shield:	100 percent, 1.35 mil aluminum-Mylar tape with 18 AWG 7-strand tinned copper drain wire.
Overall Shield:	2.35 mil aluminum-Mylar tape with a No. 20 AWG 7-strand tinned copper drain wire.
Jacket:	45 mil polyvinylchloride (PVC).
Flame Resistance:	UL 1277.
Manufacturer(s):	Okonite, Okoseal-N type SP-OS; or approved equal.
Execution:	Installation: Install in accordance with this section.

Testing: Test in accordance with this section.

3.07 CABLE SPECIFICATION SHEETS (CABLESPEC)

Cable System Identification: CORD

Description: Portable Cord, 10 AWG and smaller, UL listed,
type SO; larger than 10 AWG, UL listed type G.

Voltage: 600 volts

Conductor Material: Flexible rope stranded per ASTM B189 and B33.
Conductors shall be coated except ground
conductors may be uncoated.

Insulation: Bare annealed copper; stranded in accordance with
ASTM B8. Insulation shall be ethylene propylene
(EPR) as per ICEA S-68-516 and rated for
continuous operation at 90 degrees C.

Jacket: Heavy-duty neoprene as per ICEA S-68-516.

Manufacturer(s): Okonite, Okocord; or approved equal.

Execution: Installation: Install in accordance with this Section
26 05 19.

Testing: Test in accordance with Section 26 05 00.

3.07 CABLE SPECIFICATION SHEETS (CABLESPEC)

Cable System Identification:	VFD
Description:	Variable frequency drive cable, No. 16 AWG minimum through 4/0 AWG, approved for tray installation and in accordance with UL 1277, type MC. Four conductors (three power and one full sized ground), overall 100% aluminum tape shield, 85% tinned copper braid shield, and tinned copper drain wire.
Voltage:	600 volts.
Conductor Material:	Tinned copper; stranded.
Insulation:	90 degree C dry and wet, crosslinked polyethylene in accordance with UL TC, XHHW-2.
Sheath	Interlocked armor aluminum. Sheath shall meet the grounding conductor requirements of NEC table 250.95.
Jacket:	Polyvinylchloride (PVC) in accordance with UL 1581.
Flame Resistance	IEEE 383.
Manufacturer(s):	Belden Variable Frequency Drive Cable, or approved equal.

Uses Permitted: Cable tray, direct burial, encased in concrete.

Execution: Installation: in conduit and cable trays. Install in accordance with the manufacturer's requirements, in this section, and as indicated on Drawings.

Testing: Test in accordance with Section 26 05 00.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.01 SUMMARY

- A. This section specifies the system for grounding electrical equipment, exposed nonenergized metal surfaces of equipment, and metal structures.

1.02 QUALITY ASSURANCE

- A. Referenced Standards: This section incorporates by reference the latest revision of the following documents. These references 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.

<u>Reference</u>	<u>Title</u>
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IEEE 81	Guide for Measuring Earth Resistivity, Ground Impedance, and Earth
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NEC	National Electrical Code Article 250 Grounding and Bonding
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NFPA 70	National Electric Code (NEC)
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- B. Qualifications: Not Used.
- C. Comply with requirements of NEC Article 250.

1.03 SUBMITTALS

- A. Procedures: Section 01 33 00.
- B. Product Data.
- C. Grounding System Test Results.

PART 2 – PRODUCTS

2.01 GROUND CABLE

- A. Annealed bare copper, concentric stranded as specified. If cable sizes are not indicated, the minimum sizes shall be as follows:
 - 1. 15kV – 480V transformer: 250 MCM.
 - 2. 15kV Load Interrupter: 4/0 AWG.
 - 3. 480V switchgear: 4/0 AWG.
 - 4. 480V MCC and switchboards: 2/0 AWG.
 - 5. Lighting panels: 1/0 AWG.
 - 6. Exposed metal: 2 AWG.

2.02 GROUND RODS

- A. Copper covered steel, 3/4-inch diameter and ten feet long.
- B. Rods shall have threaded type removable caps so that extension rods of same diameter and length may be added where necessary.

2.03 COMPRESSION CONNECTORS

- A. Cast copper.
- B. Acceptable Manufacturer:
 - 1. Thomas and Betts.
 - 2. Burndy.
 - 3. Or Approved Equal.

2.04 BOLTED CONNECTORS

- A. Acceptable Manufacturer:
 - 1. Burndy.
 - 2. O. Z. Gedney.
 - 3. Or Approved Equal.

2.05 EXOTHERMIC CONNECTORS

A. Acceptable Manufacturer:

1. Thermoweld.
2. Cadweld.
3. Or Approved Equal.

2.06 GROUNDING PLATE – CAST IN CONCRETE

A. Cast copper plate for use with future two-hole lug connection. Flush mounted in concrete.

B. Acceptable Manufacturers:

1. Burndy.
2. Erico.
3. Or Approved Equal.

PART 3 – EXECUTION

3.01 GENERAL

A. Make embedded and buried ground connections by compression connectors utilizing diamond or hexagon dies. Use a hand compression tool for wire sizes 2/0 AWG and smaller and a hydraulic pump and compression head for wire sizes larger than 2/0 AWG.

B. Tools and dies:

1. Approved for purpose used.
2. Dimple compressions are not acceptable.

C. Prepare compression connections in accordance with the manufacturer's instructions.

D. Unless otherwise indicated, make exposed ground connections to equipment by bolted clamps.

E. Do not use solder in any part of the ground circuits.

F. Cables:

1. Securely attach embedded ground cables and fittings to concrete reinforcing steel with tie wires and prevented from displacement during concrete placement.

2. As each part of the grounding system below finished grade is completed, notify the Project Representative a minimum of four hours prior to backfilling.

G. Extensions:

1. Extend grounding conductors that are extended beyond concrete surfaces for equipment connection a sufficient length to reach the final connection point without splicing.
2. Minimum extensions: 3 feet.

H. Conductors:

1. Locate grounding conductors that project from a concrete surface as close as possible to a corner of the equipment pad, protected by conduit, or terminated in a flush grounding plate.
2. Terminate grounding conductors for future equipment using a two-hole copper flush mounted grounding plate.
3. Support exposed grounding conductors by non-corrosive metallic hardware at 4-foot intervals or less.
4. Ground conductors, except signal conductor shields entering enclosures:
 - a. Bonded together to the enclosure if it is metallic and to metallic raceways within or terminating at the enclosure.
5. Grounding conductor shall not be used as a system neutral.

I. Use compression-type lugs in accordance with manufacturer's recommendations.

J. Directly connect lightning arresters to the ground system using copper conductors, sized as specified.

K. Metallic sheaths or shields of shielded power cable:

1. Terminated by a copper grounding strip provided with cable connection for connection to the grounding system.

- L. Prior to making ground connections or bonds, clean metal surface at the point of connection.
- M. For all control devices with sealed cable connection, include a ground conductor in the control cable.
- N. Prior to burying of the ground conductors, record location for Record Drawings.

3.02 RACEWAY GROUND

- A. Metallic conduits:
 - 1. Assembled to provide a continuous ground path and bonded using insulated grounding bushings.
 - 2. Bond using insulated grounding bushings.
- B. Non-metallic conduits: Insulated ground conductor sized in compliance with the NEC.
- C. Grounding bushings: Connected to the grounding system using conductors sized in compliance with NFPA 70.
- D. Cable trays:
 - 1. No. 2/0 AWG bare copper ground conductor run on the outside of each tray.
 - 2. Conductor to be connected to each section or fitting using a carriage bolt and clamp.
- E. Every conduit shall contain an insulated green ground conductor sized in compliance with NEC.
- F. Duct Banks:
 - 1. Run along the duct bank a continuous No. 2/0 AWG minimum bare copper conductor.
 - 2. Bond using insulated grounding bushings.

3.03 EQUIPMENT AND ENCLOSURE GROUND

- A. Connect electrical and distribution equipment to the grounding system. Cables sized as indicated.
- B. Connect non-electrical equipment with metallic enclosures to the grounding system.
- C. Securely bond transformer yard fences and gates as specified.

3.04 ISOLATED GROUNDING

- A. Where the manufacturer of equipment supplied from 120 volt instrument power panels requires an isolated ground, provide an additional isolated ground conductor from the equipment through the instrument power panel for connection to a single point ground bus in the automatic transfer switch enclosure.
- B. Conductor: Green insulation with a yellow stripe and run in the same raceway as the power and neutral conductors.
- C. Neutral conductor from the ultra-isolation transformers:
 - 1. Grounded only at the single point ground bus in the automatic transfer switch.

3.05 GROUNDING SYSTEM TESTS

- A. Test per IEEE 81 each grounding connection to determine the ground resistance.
- B. Submit a plot of ground resistance readings for each isolated ground rod or ground mat on 8-1/2 by 11 inch size graph paper.
- C. Current reference rod: At least 100 feet from the ground rod or grid under test.
- D. Make measurements at 10-foot intervals beginning 25 feet from the test electrode, and ending 75 feet from it, in direct line between the ground rod or center of grid and the current reference electrode.
- E. Consider a grounding system that shows greater than 2-ohm resistance for the flat portion of the plotted data inadequately grounded. Add additional parallel-connected ground rods and deeper driven rods until the ground resistance measurements meet the 2-ohm or less requirement.
- F. Use of salts, water, or compounds to attain the indicated ground resistance is not acceptable.

END OF SECTION

SECTION 26 05 33

RACEWAYS, BOXES, AND SUPPORTS

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies the electrical conduits, wireways, pull boxes, cable vault, cable trays, fittings, and supports.

1.02 QUALITY ASSURANCE

- A. Referenced Standards: This section incorporates by reference the latest revision of the following documents. These references are a 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.

Reference	Title
ANSI C80.1	Rigid Steel Conduit-Zinc Coated
ANSI C80.3	Electrical Metallic Tubing-Zinc Coated
ASTM A 48 REV A	Gray Iron Castings
ASTM A193 REV C	Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service
ASTM F512	Smooth-Wall Polyvinylchloride Conduit and Fittings for Underground Installation
FEDSPEC WW-C-581E	Conduit, Metal, Rigid and Intermediate; and Coupling, Elbow, and Nipple, Electrical Conduit; Zinc Coated
FEDSPEC W-C-1094A	Conduit and Conduit Fitting Plastic, Rigid
NEC 500	Classified Locations, Classes I, II, and III, Divisions 1 and 2

Reference	Title
NEMA ICS 6	Industrial Control and Systems Enclosures
NEMA RN1	Polyvinyl Chloride (PVC) externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
NEMA TC2	Electrical Plastic Tubing (EPT) and Conduit (EPC 40 and EPC 80)
NEMA TC6	PVC and ABS Plastic Utilities Duct for Underground Installation
NEMA VE-1	Metal Cable Tray Systems
NEMA 250	Enclosures for Electrical Equipment (1000 volts maximum)
NFPA 70	National Electrical Code (NEC)
NFPA 79	Electrical Standards for Industrial Machinery
UL 1	Flexible Metal Electrical Conduit
UL 6	Rigid Metal Electrical Conduit
UL 360	Liquid Tight Flexible Electrical Conduit
UL 651	Rigid Nonmetal Electrical Conduit

B. Qualifications: Not Used.

1.03 SUBMITTALS

A. Procedures: Section 01 33 00.

B. Include manufacturer's catalog cuts as specified by Section 26 05 00. Include general information and detailed specifications for the products specified in this section.

C. Certifications and calculations that raceway supports meet the seismic requirements specified in Sections 26 05 00 and this section.

PART 2 – PRODUCTS

2.01 RACEWAY

- A. General requirements for raceway materials specified in this section are listed in the RACESPECS sheets at the end of this section. The type of raceway to be used for any given area and application shall conform to the requirements of Table A in this section.

2.02 BOXES AND FITTINGS

A. Pull Boxes and Wiring Gutters:

1. Device and junction boxes less than 6 inches square shall be Type FD galvanized cast ferrous. Boxes larger than FD boxes shall be constructed of sheet steel, galvanized after fabrication, or NEMA 4X stainless steel or nonmetallic.
2. Outdoor boxes and enclosures shall be provided with neoprene gaskets on the hinged doors or removable covers.
3. Conduit bodies shall be ferrous alloy with screw taps for fastening covers. Gaskets shall be made of neoprene.
4. Boxes and enclosures in corrosive areas shall be NEMA 4X stainless steel or nonmetallic.
5. Boxes in classified areas shall be NEMA Class 7 galvanized cast ferrous.
6. Box and gutter sizes, metal thickness, and grounding shall comply with the National Electrical Code.
7. Bolt-on junction box covers 3 feet square or larger, or heavier than 25 pounds, shall have a rigid handle.
8. Covers larger than 3 by 4 feet shall be split.

B. Terminal Cabinets:

1. Terminal cabinets located indoors shall be NEMA 4.
2. Cabinets located outdoors and in corrosive areas shall be NEMA 4X.
3. Cabinets shall be provided with hinged doors.

4. Adjustable terminal strip mounting accessories shall be provided.
5. Cabinets shall be provided with channel mounted terminal blocks rated 30 A, 600 Vac.
6. Terminals shall be No. 8 minimum strap-screw type, suitable for ring tongue or locking spade terminals.

C. Conduit Seals:

1. Install conduit seals in classified areas in conduit runs leaving the space. They shall be of the EYS or EZS type with male and female hubs.
2. Use PVC-coated fittings with urethane interior coating for PVC-coated GRS; use copper free cast aluminum for rigid aluminum.
3. The sealing compound shall be as prescribed by the manufacturer of the sealing conduit body.
4. Use the sealant, such as Chico, in areas that are defined as classified and meet the NEC requirements for Article 500.

2.03 RACEWAY SUPPORTS

A. Conduit Supports:

1. Provide hot-dip galvanized framing channel with end caps to support groups of conduit.
2. Individual conduit supports shall be one-hole galvanized malleable iron pipe straps used with galvanized clamp backs and nesting backs where required.
3. Conduit supports for PVC-coated rigid steel and PVC conduit systems shall be one-hole PVC-coated rigid steel or clamps conduit wall hangers.

B. Ceiling Hangers:

1. Ceiling hangers shall be adjustable galvanized carbon steel rod hangers as specified. Straps or hangers of plumber's perforated tape are not acceptable.
2. Unless otherwise indicated, hanger rods shall be 1/2-inch all-thread rod and shall meet ASTM A193.

3. Hanger rods in corrosive areas and those exposed to weather or moisture shall be stainless steel.

C. Suspended Raceway Supports (Racks):

1. Suspended raceway supports shall consist of concrete inserts, galvanized carbon steel rod hangers, and jamb nuts supporting hot-dip galvanized framing channel or lay-in pipe hangers as required.
2. Unless otherwise indicated, hanger rods shall be 1/2-inch all-thread rod and shall meet ASTM A193.
3. Brace all suspended raceway supports at 30-foot intervals (alternating from one side to the other) to meet specified seismic requirements.

D. Design by Professional Engineer:

1. Raceway supporting systems, structures, and elements shall be designed to meet seismic and other building structural requirements and to support the static and dynamic load of the wiring and raceways that they will carry. Systems to be installed shall be prepared by a Professional Structural Engineer registered in the state of Washington to ensure conformance with IBC seismic, building, and load requirements.

2.04 CONCRETE ENCASED DUCT BANKS

- A. Concrete used for duct banks shall be Type CDF with red oxide added per Controlled Density Fill (CDF). Concrete used for protective cap shall be Class C with red oxide added.
- B. Conduit embedded in concrete which is in contact with the earth shall be separated from the earth by at least 3 inches of concrete. Clearances equal to the nominal conduit diameter, but not less than 1-1/2 inches, shall be maintained between conduits encased in slabs. Clearances of less than 1-1/2 inches at conduit crossing and terminating locations are not acceptable. Expansion fittings shall be provided whenever embedded conduit crosses building expansion joints, between 2 adjacent structures, and between a duct bank and structure.

- C. Duct banks shall be placed on an undisturbed soil base. Use Class Z backfill as a base when an undisturbed soil base is not available. Backfill over the duct bank shall be consistent with the backfill required for the immediate area. The fill shall be brought up to finish grade.
- D. Duct banks where upper surface is required to be exposed thus forming a walkway shall have the top surface finished smooth and level and free from defects. In these cases, do not add red pigment to the cement.
- E. Locate plastic conduit spacers used in duct bank installations 5 feet on centers. Secure the spacers to the conduits by wire ties. The duct bank shall be securely anchored to prevent conduit flotation while the concrete is being placed. Conduit runs shall be watertight.
- F. The ends of conduits shall be protected from damage during construction by using plastic plugs. A 1/4-inch hole shall be drilled in the lower portion of the plug to provide drainage.

2.05 UNDERGROUND MARKING TAPE

- A. Provide underground marking tape.
- B. Used for early warning protection of digging around reinforced concrete duct banks.
- C. Low density polyethylene plastic, nominally 6 inches wide and 4-mil thickness.
- D. Plastic Color: Red.
- E. Imprinted continuously along the length, with message reading similar to "CAUTION – STOP DIGGING – BURIED ELECTRIC LINE BELOW."
- F. Acceptable Manufacturer:
 - 1. Brady "Identoline."
 - 2. Services and Materials "Buried Underground Tape."
 - 3. Somerset (Thomas & Betts) "Protect-A-Line."
 - 4. Or Approved Equal.
- G. Underground Marking Tape for Directly Buried Conduits:

1. 6-inch wide metallic lined tape with red polyethylene film on top and clear polyethylene film on the bottom.
2. The message shall be clearly printed with black over red tape and shall read
"CAUTION ELECTRIC LINE BURIED BELOW."

2.06 NAMEPLATES

- A. Provide nameplates for all boxes in accordance with the requirements of Section 26 05 00. Nameplate wording shall be as indicated on the Drawings.
- B. Where no wording is specified, the Contractor shall provide the functional description of the device on the nameplate.

2.07 FIRESTOPS

- A. Apply in accordance with manufacturer's recommendations.
- B. Acceptable Manufacturers:
 1. 3M CP25WB+.
 2. Vimasco WC-5 FR.
 3. Flamemastic 77.
 4. Or Approved Equal.
- C. Products which are affected by water are not acceptable.

PART 3 – EXECUTION

3.01 GENERAL

- A. Specific raceway types and applications are indicated on the Drawings and/or in the raceway schedule. When not indicated on the Drawings and/or in the schedule Table A specifies the type of raceway required for each location and application by RACESPEC sheet. Use fittings, hubs and boxes as specified by the raceway type in RACESPEC. Unless otherwise indicated, in Table A, unscheduled conduit shall be galvanized rigid steel, RACESPEC type GRS.

TABLE A

Location	Application/Condition	RACESPEC
Indoor noncorrosive	Exposed	GRS
Indoor corrosive	Exposed	PGRS
Outdoor	Exposed	PGRS
Concealed	Embedded in concrete structure or beneath slab-on-grade	GRS
Underground	Instrumentation, communications and data signals encased in concrete, duct bank	GRS
Underground	Instrumentation, communications and data signals directly buried	PGRS
Underground	Power and control signals directly buried	PGRS
Underground	Power encased in concrete, duct bank	PVC8
Non-Classified	Final connection to equipment and light fixtures	LFS
Underground	Telephone service direct buried	PVC8
Architecturally finished areas	Final connection to light fixtures	FLEX
All Locations	Classified	PGRS

3.02 RACEWAY NUMBERING SYSTEM

A. General:

1. Identify each conduit; rack shall be identified by a unique number shown in the Drawings.

B. Conduit Identification:

1. Pressure stamp conduit numbers into a non-corrosive metal tag. Fix a tag with number to each end of each conduit and at each manhole, pullbox and handhole with Type 304 Stainless Steel wire.

3.03 CONDUIT

A. General:

1. The number of directional changes of a conduit shall be limited to 270 degrees in any run between pull boxes.
2. Conduit runs shall be limited to a maximum of 400 feet, less 100 feet or fraction thereof, for every 90 degrees of change in direction.
3. Raceways shall be provided for lighting, receptacles, power, control, fire alarm, instrumentation, signaling, and grounding systems.

B. Indoor and Outdoor Conduit Systems:

1. Unless otherwise indicated, in general, conduit inside structures shall be exposed.
2. Unless otherwise indicated, the Contractor shall be responsible for determining conduit routing that conforms to the installation requirements set forth herein.
3. Install conduit to conform to the requirements of the RACESPEC sheets and the following:
 - a. Install exposed conduit either parallel or perpendicular to structural members and surfaces.
 - b. Two or more exposed conduits in the same general routing shall be in parallel with symmetrical bends.
 - c. Exposed conduit shall be run on supports spaced not more than 8 feet apart.
 - d. Where three or more conduits are located in parallel run, space them out from the wall using framing channel.

- e. Where conduits are suspended from the ceiling, support systems shall comply with the requirements of this section.
- f. Secure conduit rack supports to concrete walls and ceilings by means of cast-in-place anchors or framing channel concrete inserts.
- g. Conduits shall be at least 6 inches from high temperature piping, ducts, and flues with temperatures higher than 90 degrees C.
- h. Install conduits between the reinforcing steel in walls or slabs which have reinforcing in both faces. In slabs which have only a single layer of reinforcing steel, place conduits under the reinforcement.
- i. Route conduit clear of structural openings and indicate future openings.
- j. Flash and seal watertight those conduits which pass through roofs or metal walls.
- k. Neatly group conduit into any openings cut into concrete and masonry structures, and grout using non-shrink type grout.
- l. During construction, cap conduits to prevent entrance of dirt, trash, and water.
- m. Terminate exposed conduit stubs for future use with galvanized pipe caps.
- n. Determine concealed conduit stubup locations from the manufacturer's shop drawings.
- o. Terminate concealed conduit for future use in equipment or by galvanized couplings plugged flush with structural surfaces.
- p. Where the Drawings indicate future duplication of equipment wired hereunder, provide concealed portions of conduits for future equipment.
- q. Conduit installed horizontally shall allow headroom of at least 7 feet except where it may be installed along structures, piping, and equipment, or in other areas where headroom cannot be maintained because of other considerations.
- r. Terminate all conduits that enter enclosures by fittings that ensure that the NEMA rating of the enclosure is not affected or changed.

- s. Connect underground metallic or nonmetallic conduit that turns out of concrete, masonry or earth to a 90-degree elbow of PVC-coated rigid steel conduit before emergence.
- t. Transitions from concealed or underground or embedded locations to exposed or aboveground or above-grade locations shall be made using type PGRS conduit for a distance of at least 12 inches on either side of transition.
- u. Conduit across structural joints where structural movement is allowed shall have an OZ-Gedney "Type DX" or Crouse-Hinds "Type XD," bonded, weathertight expansion and deflection fitting of that conduit size.

C. Underground Conduit System:

1. All excavation, backfilling, and concrete work shall conform to respective sections of these Specifications. Underground conduit shall conform to the following requirements:
 - a. Unless otherwise indicated, all underground conduits shall be concrete encased.
 - b. Concrete shall be Type C with red dye mixed throughout mix.
 - c. Concrete encasement on exposed outdoor conduit risers shall continue to 3 inches above grade, with top crowned and edges chamfered.
 - d. Underground conduit bend radius shall be not less than 2 feet at vertical risers nor less than 3 feet elsewhere.
 - e. Unless otherwise indicated, underground conduits and conduit banks shall have 2 feet minimum earth cover.
 - f. Underground conduit banks through building walls shall be cast-in-place or concreted into boxouts with waterstops on all sides of the boxout. Waterstops shall be as specified in the Cast-in-Place Concrete.

- g. Using a special rubber gasketed sleeve and joint assemblies, or with sleeves and modular rubber sealing elements, seal watertight those conduits not encased in concrete and passing through walls that have one side in contact with earth.
- h. Immediately upon completion of pouring concrete, thoroughly swab conduits on the inside. After the concrete has set, and before backfilling, pull a mandrel, having a diameter equal to the nominal conduit inside diameter minus 1/2 inch, and not less than 4 inches long, through each conduit. If the mandrel showed signs of protrusions on the inside of the conduit, repair or replace the conduit.
- i. Provide all spare raceways with a nylon pull rope.

3.04 RACEWAY SPECIFICATION (RACESPEC) SHEETS

- A. The following RACESPECS are included in this section:

RACESPEC Symbol	Raceway Description
FLEX	Flexible steel conduit
GRS	Galvanized rigid steel conduit
LFS	Liquidtight flexible steel conduit
PGRS	PVC coated rigid steel conduit
PVC8	Schedule 80 PVC conduit
WW	Wireway and auxiliary gutter

(RACESPEC SHEETS FOLLOW)

Raceway Identification:	FLEX
Description:	Flexible steel conduit.
Application:	Final connection to lighting fixtures in architecturally finished areas only.
Compliance:	UL 1.
Construction:	Spirally wound galvanized steel strip with successive convolutions securely interlocked.
Minimum Size:	1/2 inch.
Fittings:	Compression type.
Other:	FLEX shall be provided with an internal ground wire.
Installation	Flexible steel conduit shall be made up tight and with conductive "coppershield" thread compound.

Raceway Identification: GRS

Description: Galvanized rigid steel conduit.

Compliance: ANSI C80.1, UL 6.

Finish: Hot-dip galvanized after fabrication, inside and outside.
Smooth finished surfaces.

Manufacturers: Allied Tube and Conduit Corp., Wheatland Tube Co., or
approved equal.

Minimum Size: Unless otherwise specified, 3/4 inch for exposed, 1 inch for
embedded, encased, or otherwise inaccessible.

Fittings: Hubs: Insulated throat with bonding locknut, hot-dip
galvanized. The hubs shall utilize a neoprene O-ring and shall
provide a watertight connection. O-Z Gedney, CHM-XXT, or
approved equal.

Unions: Electrogalvanized ferrous alloy type Appleton UNF or UNY,
Crouse-Hinds UNF or UNY, or equal. Threadless fittings are
not acceptable.

Boxes:

Indoor: Type FD cast ferrous for all device boxes and for junction
boxes less than 6 inches square. NEMA 12 welded steel
6 inches square and larger. Door shall have hinges with clamp
locks. Boxes in process areas shall be NEMA 4 watertight.

Raceway Identification: GRS

Conduit Bodies: Ferrous alloy type with screw taps for fastening covers. Gaskets shall be made of neoprene.

Outdoor and Wet Areas: Type FD cast ferrous for all devices and for junction boxes less than 6 inches square. NEMA 4X stainless steel or nonmetallic for 6 inches square and larger.

Corrosive: NEMA 4X stainless steel or nonmetallic.

Classified: NEMA Class 7 cast ferrous.

Elbows:

3/4" through 1-1/2": Factory fabricated or field bent.

2" through 6": Factory fabricated only.

Conduit Bodies:

3/4" through 4": Malleable iron, hot-dip galvanized, unless otherwise noted. Neoprene gaskets for all access plates. Tapered threads for all conduit entrances.

5" and 6": Electrogalvanized iron or cast iron box.

Expansion Fittings: Expansion fittings in embedded runs shall be watertight and shall be provided with an internal bonding jumper. The expansion material shall be neoprene and shall allow for 3/4-inch movement in any direction.

Manufacturers: Appleton, Crouse-Hinds, Hubbel, O.Z. Gedney, Or Approved Equal.

Raceway Identification: GRS

Installation: Galvanized rigid steel conduit shall be made up tight and with conductive “coppershield” thread compound. Joints shall be made with standard couplings or threaded unions. Steel conduit shall be supported away from the structures using hot-dip galvanized malleable iron straps with nesting backs.

Conduit entering boxes shall be terminated with a threaded hub with a grounding bushing.

Exposed male threads on galvanized rigid steel conduit shall be coated with zinc-rich paint.

Raceway Identification: LFS

Description: Liquidtight flexible steel conduit.

Application: Final connection to equipment subject to vibration or adjustment.

Compliance: UL 360.

Construction: Spirally wound galvanized steel strip with successive convolutions securely interlocked and jacketed with liquidtight plastic cover.

Minimum Size: 3/4 inch.

Fittings: Cadmium-plated malleable iron body and gland nut with cast-in lug, brass grounding ferrule threaded to engage conduit spiral and O-ring seals around the conduit and box connection and insulated throat. Forty-five and 90-degree fittings shall be used where applicable.

Installation: The length of flexible liquidtight conduit shall not exceed 15 times the trade diameter of the conduit. The length of liquidtight conduit shall not exceed 36 inches.

Liquid-tight flexible steel conduit shall be made up tight and with conductive "coppershield" thread compound.

Raceway Identification: PGRS

Description: Galvanized rigid steel conduit, corrosion-resistant, polyvinyl chloride (PVC) coated.

Compliance: ANSI C80.1, UL 6, NEMA RN1.

Finish: PGRS shall be hot dipped galvanized rigid steel conduit. The inside and outside, as well as the threads shall be galvanized. A minimum 40-mil thick PVC coating shall be bonded to the outside of the conduit and the inside shall be coated with 2-mil urethane. Coating shall be free of pinholes. Bending of conduit shall not damage either the interior or exterior coating. Bond strength shall exceed the tensile strength of the PVC coat. Elbows shall be factory made and coated.

Minimum Size: 3/4 inch.

Fittings: Similarly coated to the same thickness as the conduit and provided with Type 304 stainless steel hardware. A 2-mil urethane coating shall be applied to the interior, and the threads of all fittings and couplings. Conduit and fittings shall be manufactured by the same company.

Hubs: Hubs for connection of conduit to junction, device, pull or terminal boxes shall be threaded and made of cast ferrous alloy. Hubs shall be galvanized steel and have insulating

bushings with bonding locknuts. The hubs shall utilize a neoprene O-ring and shall provide a watertight connection.

Boxes:

Non-Classified: NEMA 250, Type 4X stainless steel or nonmetallic.

Classified: NEMA 250, Type 7D cast ferrous.

Installation: PVC-coated conduit shall be supported away from the structure using PVC-coated conduit wall hangers. All conduit threads shall be covered by a plastic overlap which shall be coated and sealed per manufacturer's recommendations. Plastic coated conduit shall be made tight with special wrenches and fittings designed for tightening PVC-coated conduit. All threads shall be protected against corrosion per NEC 300.6 (a) by liberally applying an approved electrically conductive, corrosion-resistant compound – "coppershield." Pipe wrenches and channel locks shall not be used for tightening plastic coated conduits. Damaged areas shall be patched, using manufacturer's recommended material. The area to be patched shall be built up to the full thickness of the coating. Painted fittings are not acceptable.

Raceway Identification: PVC8

Description: Rigid nonmetallic conduit, extra heavy wall thickness for all locations including direct bury under roadways and where exposed to physical damage.

Compliance: NEMA TC2, UL 651.

Construction: Schedule 80, high-impact, polyvinylchloride (PVC).

Minimum Size: 3/4 inch exposed; 1 inch embedded or encased.

Fittings: PVC solvent weld type.

Boxes:

Indoor: NEMA Class 4, nonmetallic.

Outdoor and

Corrosive:

NEMA Class 4X, nonmetallic.

Installation: Exposed PVC conduit shall be run on supports spaced not more than 3 feet apart for conduits up to 1 inch 5 feet apart for conduits 1-1/4 inches to 2 inches and 6 feet apart for conduits 2-1/2 inches and larger. PVC conduit shall not be provided where it will be damaged by heat.

PVC conduit shall have bell ends where terminated at walls.

Raceway Identification: WW

Description: Wireway and auxiliary gutter, flanged, oiltight type with hinged covers.

Compliance: JIC EMP-1.

Minimum Size: 4-inch by 4-inch.

Finish: Hot-dip galvanized after fabrication, inside and outside. Smooth finished surfaces.

Application: As indicated on the Drawings.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 – GENERAL

1.01 SUMMARY

- A. This section specifies panelboards for lighting and power distribution.
- B. Equipment List:

Equipment	Equipment No.
Panelboard No. 1	PNL YYY AAA
Panelboard No. 2	PNL YYY BBB
Panelboard No. 3	PNL YYYCCC

1.02 QUALITY ASSURANCE

- A. Referenced Standards: This section incorporates by reference the latest revision of the following documents. These references 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.

Reference	Title
NFPA 70	National Electrical Code (NEC).
UL 50	Enclosures for Electrical Equipment
UL 67	Panelboards
UL 489	Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures

- B. Qualifications: Not Used.

1.03 SUBMITTALS

- A. Procedures: Section 01 33 00.
- B. Product Technical Data:
 - 1. Manufacturer's certification that bus bracing is capable of withstanding the specified short circuit condition.
 - 2. Quantity and rating of circuit breakers for each panelboard.

1.04 PANELBOARDS

- A. As indicated on the Drawings.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Panelboards: Circuit breaker, dead front type, with bus bar construction.
- B. Acceptable Manufacturer:
 - 1. Square D.
 - 2. Eaton: Cutler-Hammer.
 - 3. Or Approved Equal.

2.02 ARRANGEMENT AND CONSTRUCTION

- A. Panel Front: Concealed trim clamps and hinges.
- B. Locks: Flush with cylinder, tumbler-type with spring loaded door pulls.
- C. Non-removable fronts with doors in the locked position.
- D. Panelboard Locks: Keyed alike.
- E. Gutter space on all sides of the breaker assembly to neatly connect and arrange incoming wiring.
- F. Panelboard: Composed of individually-mounted circuit breakers designed to be removable without disturbing other breakers.
- G. Mount a directory holder with clear plastic plate and metal frame on the inside of the door.

2.03 BUS

- A. Tin-plated copper with current ratings as indicated on the panelboard schedules and sized in accordance with UL 67.
- B. Determine ratings by temperature rise test.
- C. Minimum Size: 100 amperes.
- D. Panel fault withstand rating: Equal to the interrupting rating of the smallest circuit breaker in the panel.
- E. Other Buses:
 - 1. Panelboards shall be provided with a separate ground bus and, where indicated, with a full capacity neutral bus.
 - 2. Mount neutral bus of instrument power panels on insulated stand-offs.

2.04 CIRCUIT BREAKERS

- A. Molded-case type provided for the current ratings and pole configurations indicated on the panelboard schedule.
- B. Rated 120/208 volt and 120/240 Vac: Minimum interrupting current rating of 18,000 amperes (symmetrical) at 240 Vac.
- C. Rated 480 VAC: Unless otherwise indicated on the panelboard schedule, a minimum interrupting current rating of 25,000 amperes (symmetrical) at 480 Vac.
- D. Bolt-on Type.
- E. Listed in accordance with UL 489 for the service indicated.
- F. Load Terminals: Solderless connectors.

2.05 PANELBOARD FINISH

- A. Cabinet: Fabricated from hot-dip galvanized steel in accordance with UL 50.
- B. Fronts: ANSI 61 – gray, baked enamel finish.

2.06 NAMEPLATES

- A. Provided in accordance with the requirements of Section 26 05 00.

PART 3 – EXECUTION

3.01 GENERAL

- A. Type in the circuit description on the circuit directory or panelboard schedule.

3.02 TESTING

- A. Test for proper operation and function per Section 26 05 00.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 – GENERAL

1.01 SUMMARY

- A. This section specifies wiring devices consisting of receptacles, plugs, switches, and appurtenances.

1.02 QUALITY ASSURANCE

- A. Referenced Standards: This section incorporates by reference the latest revision of the following documents. These references are a 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.

Reference	Title
NEMA 250	Enclosures for Electrical Equipment (1,000 volts maximum)
NEMA 5	
NEMA WD-1	General Purpose Wiring Devices
NFPA 70	National Electrical Code (NEC)

- B. Qualifications: Not used.

1.03 SUBMITTALS

- A. Procedures: Section 01 33 00.
- B. Catalog cuts for all materials.

PART 2 – PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. UL-list wiring devices for the current, voltage, and frequency specified and complying with NEMA WD-1.

- B. Use devices containing provisions for back wiring and side wiring with captively held metallic binding screws.
- C. Devices are to be brown, except those located in finished areas are to be ivory.
- D. All to be supplied by a single manufacturer.
- E. Enclosures shall meet or exceed requirements of NEMA 250.

2.02 RECEPTACLES AND PLUGS

- A. General: Grounding type.
 - 1. Receptacles to be grounding type.
 - 2. Provide outdoor receptacles with weatherproof lift covers, while in use.
- B. 120V Receptacles:
 - 1. Indoor, clean areas:
 - a. Duplex 20 amp NEMA 5-20R that accept NEMA 5-15P or 5-20P plug caps.
 - b. Acceptable manufacturer:
 - 1) Hubbell 5362.
 - 2) Arrow Hart.
 - 3) Or Approved Equal.
 - 2. GFI protected receptacles:
 - a. Indoor and outdoor areas:
 - b. Duplex 20 amp NEMA 5-20R that accept NEMA 5-15P or 5-20P plug caps.
 - c. Tamper and weather resistant.
 - d. Acceptable manufacturer:
 - 1) Hubbell GFR5362 series.
 - 2) Arrow Hart TWRVGF20 series.
 - 3) Or Approved Equal.
 - 3. Where the manufacturer of cord connected equipment requires an isolated ground, provide a receptacle with isolated ground.

4. Isolated ground receptacles:
 - a. Acceptable manufacturers:
 - 1) Hubbell IG-5362.
 - 2) Arrow Hart 6766.
 - 3) Or Approved Equal.
 5. Classified Areas:
 - a. Acceptable manufacturers:
 - 1) Crouse Hinds, FSQ 20 Amps 600 Vac.
 - 2) Appleton, FSQX Series.
 - 3) Or Approved Equal suitable for classified areas.
- C. 250V receptacles:
1. Duplex 15-amp NEMA 6-15R that accept NEMA 6-15P plug caps.
 2. Acceptable manufacturers:
 - a. Hubbell 5662.
 - b. Arrow Hart.
 - c. Or Approved Equal.
- D. Three Phase Receptacles and Plugs:
1. Receptacles:
 - a. Suitable for 480V, 3-phase, 4-wire service, with ampere ratings as specified.
 - b. Provided complete with cast back box, angle adapter, gaskets, and a gasketed screw-type, weathertight cap with chain fastener.
 - c. Provide each receptacle with one plug.
 2. Receptacles and plugs: Designed so that the grounding pole is permanently connected to the housing.
 3. Contacts:

- a. The grounding pole shall make contact before the line poles are engaged when the plug is connected to the receptacle housing.
 - b. The plug sleeve shall make contact with the receptacle housing before the line and load poles make contact.
4. Acceptable manufacturers:
- a. Crouse-Hinds "Arktite".
 - b. Appleton "Powertite".
 - c. Or Approved Equal.
- E. Receptacles for classified areas:
1. Rate receptacles for use in classified areas in accordance with NEC for the area in which they are to be located and factory seal.
 2. Design receptacles so the plug must be inserted and turned before load is energized.
 3. Provide receptacles with mounting box, sealing chamber and compatible plug.
 4. Voltage and current ratings to be as specified.
 5. Acceptable manufacturers:
 - a. Appleton "U-Line".
 - b. Crouse Hinds.
 - c. Or Approved Equal.
- F. Male plug caps for 120V and 250V receptacles:
1. Cord grip armored type with heavy phenolic housing, of the same manufacture as the receptacle.
 2. Rate plug caps at 15 amps.
 3. Provide one plug cap for every 4 receptacles, with a minimum of 2 plug caps.
- 2.03 SWITCHES
- A. General Purpose (Indoor, Clean Areas):

1. General purpose switches: Quiet AC type, specification grade, with rated capacities as required.
2. Match receptacles in color.
3. Acceptable manufacturers:
 - a. Arrow Hart.
 - b. Hubbell.
 - c. Or Approved Equal, as follows:

	15A, 120-277V		20A, 120-277V	
	Arrow Hart	Hubbell	Arrow Hart	Hubbell
Single:	1891	1201	1991	1221
Three-way	1893	1203	1993	1223
Four-way	1894	1204	1994	1224
SPST momentary	1895		1995	

B. Switches for classified areas:

1. Switches for control of lighting and small single-phase power loads in classified areas:

Factory assembled and sealed combination general purpose type switch in an explosion proof housing.
2. Rate the switch in accordance with NEC for the area in which it is to be installed.
3. External operating mechanism: wing-type handle having the "ON" and "OFF" positions visible from the front.
4. Acceptable manufacturers:
 - a. Crouse Hinds Cat. No. EFS2129, 20 AMP. 277 Vac.
 - b. Appleton, EDS Series.
 - c. Or Approved Equal.

C. Switches for outdoor and corrosive areas:

1. Maintained contact switches:

- a. Press switch type with a weatherproof hypalon or neoprene cover.
- b. Acceptable manufacturers:
 - 1) Arrow Hart.
 - 2) Hubbell.
- c. Or Approved Equal.

2. Momentary contact switches: sealed contact pushbutton switches, rated NEMA 4X, mounted on a NEMA 4X control station.

2.04 DEVICE PLATES

A. Provide with switches.

B. Non-corrosive indoor areas:

- 1. Type 302 stainless steel device plates on sheet metal boxes. Sheet steel, zinc electroplated with chrome finish in all other indoor areas.
- 2. Acceptable Manufacturer:
 - a. Crouse-Hinds.
 - b. Appleton.
 - c. Or Approved Equal.

C. Corrosive or outdoor areas: Impact resistant, marine grade fiberglass.

D. Factory provided explosion-proof equipment.

E. Provide device plates for instrumentation power supply disconnect switches with general purpose switches and a lockoff feature with provision for a single padlock.

F. Nameplates:

- 1. Provide with engraved laminated phenolic nameplates with 1/8-inch black characters on white background.
- 2. Switches: Identify panel and circuit number and area served.

3. Receptacles: Identify circuit and also voltage if other than 120V, single phase.
4. Indoor nameplates may be secured by epoxy glue.
5. Secure outdoor or corrosive area nameplates with Type 316 stainless steel screws.

PART 3 – EXECUTION

3.01 GENERAL

A. Boxes:

1. Independently support boxes by galvanized brackets, expansion bolts, toggle bolts, or machine or wood screws as appropriate.
2. Do not use wooden or plastic plugs inserted in masonry or concrete as a base to secure boxes. Do not use welding or brazing for attachment.

B. Unless otherwise indicated, flush mount receptacles and switches installed in sheet steel boxes. Locate flush-mounted receptacles 18 inches above the finished floor.

C. Mount switch boxes 48 inches above the floor. Locate receptacles installed in cast device boxes 48 inches above the finished floor.

D. Wire all 480V receptacles to suit the plant's standard phase rotation.

E. Test wiring devices for correct connections.

F. Perform all work in accordance with NFPA 70 and these specifications.

END OF SECTION

SECTION 26 50 00

LIGHTING

PART 1 – GENERAL

1.01 SUMMARY

- A. This section specifies lighting fixtures.

1.02 QUALITY ASSURANCE

- A. Referenced Standards: This section incorporates by reference the latest revision of the following documents. These references are a 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.

Reference	Title
ANSI/IEEE C62.11	Metal-Oxide Surge Arresters for Alternating Current Power Circuits
ANSI/IEEE C62.41	Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits
IES LM-79-08	Electrical and Photometric Measurements of Solid State Lighting Products
NFPA 70	National Electrical Code (NEC)

1.03 SUBMITTALS

- A. Procedures: Section 01 33 00.
- B. Shop Drawings and equipment data: Section 26 05 00.
- C. Large scale photometric charts for each fixture type.
- D. Catalog information describing fixture make, materials, and dimensions.
- E. Ballast data.

F. Lamp data.

G. Product Data:

1. Polar plots on 8-1/2 by 11 inch paper providing candlepower vs. angle and foot-lamberts (brightness) vs. angle for longitudinal and transverse axes.
2. Table of utilization factors for calculation of illumination levels by the zonal cavity method.

H. Provide Operation and Maintenance information.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Unless otherwise indicated, lighting materials, including fixtures, accessories, and hardware conform with LIGHTING FIXTURE SPECIFICATION SHEETS (LIGHTSPECs) in this section and as shown on the Drawings.

B. Ballasts:

1. LED:

- a. LED Drive shall be installed in an electrical enclosure.
- b. Maximum case temperature: 75 degrees C.
- c. Minimum ambient operating temperature: -40 degrees C.
- d. Typical output current: 350mA, 525mA or 700mA.
- e. Total harmonic distortion: less than Approved Equal to 20 percent.
- f. Minimum power factor: 0.90.
- g. Minimum surge protection: 2.5kV.
- h. Sound rating: Class A or quieter.
- i. Reduces output power to LEDs if max allowable case temperature is exceeded.
- j. Minimum life expectancy of 50,000 hours at temperature case ≤ 70 degrees C.
- k. Maximum failure rate of ≤ 0.01 percent per 1,000 hours at case temperature ≤ 70 degrees C.

- I. Standard: Complies with UL standard UL1012.
 - m. Regulation: Complies with the Federal Communications Commission (FCC), Title 47 CFR part 15 Non-Consumer (Class A).
 - n. Acceptable Manufacturers:
 - 1) Philips "Xitanium".
 - 2) Acuity Brands: Holophane, Lithonia.
 - 3) Approved Equal.
- C. Lamps:
- 1. General:
 - a. Lamps: Per LIGHTSPECs.
 - 2. Acceptable Manufacturers:
 - a. General Electric.
 - b. North American Philips (Norelco).
 - c. Osram Sylvania.
 - d. Venture Lighting International.
 - e. Approved Equal.
- D. Exterior Lighting Poles:
- 1. Pole cap and all necessary fixture mounting hardware.
 - 2. Designed to withstand 100 mile per hour wind force with specified fixtures.
- E. Site Junction Boxes:
- 1. Distribution of outdoor lighting circuits: Precast concrete, set flush with the ground.
 - 2. Size: Approximately 10-1/2 inches by 17-1/4 inches by 12 inches deep.
 - 3. Acceptable Manufacturers:
 - a. Brooks Products.
 - b. Christy Concrete Products.
 - c. Forni Corporation.

- d. Utility Vault Company.
 - e. Approved Equal
- F. Photoelectric Cell Units:
- 1. Cadmium sulfide cell housed in a plug receptacle assembly.
 - 2. Plug receptacle assembly: Three-prong polarized locking type, suitable for outdoor mounting and rated for 1800 VA at 120V maximum capacity.
- G. Emergency Power Supply:
- 1. Sealed battery, inverter, and automatic transfer switch: Rated to start one lamp immediately and maintain a lamp output of at least 600 lumens for 90 minutes following power failure.
 - 2. Install at the factory and internally mount inside the fixture ballast compartment.
 - 3. External status pilot light and manual test button.
 - 4. Acceptable Manufacturers:
 - a. Bodine.
 - b. Daybrite.
 - c. Guth.
 - d. Lithonia.
 - e. Siltron.
 - f. Holophane
 - g. Approved Equal.

2.02 SPARE PARTS

- A. Lamps: 10 percent of the quantity provided, but not less than 12 of each lamp type and size specified.

PART 3 – EXECUTION

3.01 GENERAL

- A. The location, type, and number of fixtures and receptacles are shown on the Drawings. Unless specifically detailed, the information is diagrammatic.
- B. Plan and layout work to avoid interferences with other Contract work. If unavoidable conflict, notify the Project Representative.
- C. Raceways and wire from the fixtures, switches, and receptacles to the lighting panel per the NEC.
- D. Raceways: Per Section 26 05 33.
- E. Wire: Per Section 26 05 19.
- F. Splice circuit conductors in a separately mounted junction box for fixtures labeled to require conductors with a temperature rating exceeding 75 degrees C.
- G. Connect fixture to junction box using flexible conduit with a temperature rating equal to that of the fixture.
- H. Photoelectric cells: Orient toward the north.
- I. Remove labels and marks, except the UL label, from exposed parts of the fixtures.
- J. Provide a concealed latch and hinge mechanism to permit access to the lamps and ballasts and for removal and replacement of the diffuser without removing the fixture from ceiling panels.
- K. Provide a protective coating of bituminous paint for fixtures recessed in concrete.
- L. Align and direct fixture to illuminate an area as specified.
- M. Directly and rigidly mount on supporting structures.
- N. Unless otherwise indicated, do not use fixtures to support conduit system.
- O. Treat weld area with rust-resistant primer and finish paint where brackets or supports for lighting fixtures are welded to steel members.
- P. Underground and outdoor wire splices per Section 26 05 19.

3.02 FIELD QUALITY CONTROL

- A. Provide a lighting system test plan.
- B. Test lighting system including operation and controls in accordance with Section 26 08 00.

3.03 FIXTURE SCHEDULE

A. General:

- 1. Manufacturer's catalog numbers listed are examples of the basic model, or series, and the overall quality required.
- 2. While the referenced catalog numbers attempt to be as definitive as available literature permits,
- 3. such items as voltage, mounting style, modifications, and other special features may not be included.
- 4. Verify and provide all of the specified requirements.

B. LIGHTSPEC:

- 1. Lamp codes specified on LIGHTSPEC sheets are Osram Sylvania designations.
- 2. Do not use catalog numbers given on the LIGHTSPECs for selection of mounting hardware, but only as a reference to the type of fixture required.
- 3. Contains the following Family groups of fixtures:
 - a. ET – Exit sign.
 - b. ETH – Exit sign, classified location.
 - c. EX – Emergency, classified locations.
 - d. L – LED.
 - e. LH – LED, classified location.
 - f. LR – LED, recessed-mounted.

Family group: ET – Exit sign.

Group description: LED exit sign with battery-powered emergency lighting sign, 90-minute minimum light from integral batteries.

Family member: E: Single face, maintenance-free nickel-cadmium battery and reliable, solid-state charging system.

Fabrication:

Housing: Die-cast aluminum signage.

Lighting:

Distribution: N/A

Reflector: N/A

Lamps: LED.

Electrical:

Input voltage: 120V.

Mounting: Surface, wall or ceiling mount. Mount at 7'-6" above finish floor when wall mounted.

Acceptable manufacturers: Lithonia LE, Approved Equal.

Family member: F: Single face, maintenance-free nickel-cadmium battery and reliable, solid-state charging system. Protection against water entry NEMA 4.

Fabrication:

Housing: Fiberglass reinforced polyester with clear polycarbonate lens

cover.

Lighting:

Distribution: N/A

Reflector: N/A

Lamps: LED.

Electrical:

Input voltage: 120V.

Mounting: Surface, or wall mount. Mount at 7'-6" above finish floor when wall mounted.

Acceptable manufacturers: Holophane DeLeon NM, Approved Equal.

Family group: **ETH** – Exit sign, classified location.

Group description: Single face, Class I, Div 2 exit sign. 90-minute minimum light from integral batteries.

Family member: **G:** Maintenance free LED source with green lettering.

Fabrication:

Housing: Impact-resistance, fiberglass reinforced polyester with clear polycarbonate cover.

Lighting:

Distribution: N/A

Reflector: N/A

Lamps: LED.

Electrical:

Input voltage: 120V.

Mounting: Surface or wall mount. Mount at 8'-0" when wall mounted.

Acceptable manufacturers: Lithonia LHZ, Holophane HDX, Approved Equal.

Family group: EX – Emergency, classified location.

Group description: Battery-powered emergency lighting unit, corrosion-resistant, 90-minute minimum light from integral batteries.

Family member: N/A

Fabrication: N/A

Lighting:

Distribution: Adjustable light heads.

Reflector:

Lamps: 12-watt minimum, 12-volt sealed-beam, one per head.

Electrical:

Input voltage: 120. Integral 12-volt transformer and battery charger.

Mounting: Power unit wall mounted in custom angle iron bracket assembly with bottom at +7-1/2 feet. See detail on Drawings.

Acceptable manufacturers: Crouse-Hinds, Hubbell, or Approved Equal.

Family group: L – LED.

Group description: Array of LED's with thermal management system.

Family member: **C:** Silicone type gasket to withstand harsh environments. Type 4X enclosure with IP66 ingress protection.

Fabrication:

Housing: Low copper aluminum alloy.

Finish: Polyester powder paint.

Lighting:

Distribution: Symmetric.

Reflector: Endural borosilicate glass.

Lamps: LED light engine. 98 LED's total.

Electrical:

Input voltage: 120V.

LED Driver: Electronic.

Mounting: Ceiling mount.

Acceptable manufacturers: Holophane LED Petrolux, Approved Equal.

Family member: **H:** Outdoor LED with full cut-off. Flow through thermal management. IP66 rated. Sealed against moisture and environmental contaminants.

Fabrication:

Housing: Low-copper aluminum, single piece die cast.

Finish: Zinc-infused super durable TGIC thermoset powder coat.

Family group: L – LED.

Resistance to corrosion and weathering.

Lighting:

Distribution: Type III.

Reflector: N/A

Lamps: 2 LED light engines. 4000K, 65CRI.

Electrical:

Input voltage: 120V.

LED Driver: 700ma Electronic driver.

Mounting: Building mount.

Acceptable manufacturers: Lithonia CSX1 LED, Approved Equal.

Family member: J: Outdoor LED with full cut-off. Flow through thermal management. IP66 rated. Sealed against moisture and environmental contaminants. Photocell provided with fixture.

Fabrication:

Housing: Rugged, die cast, single piece aluminum. Resistance to corrosion and weathering.

Finish: Zinc-infused super durable TGIC thermoset powder coat.

Family group: L – LED.

Lighting:

Distribution: Type IV forward throw.

Reflector: N/A

Lamps: 1 LED light engine. 4000K, 65 CRI.

Electrical:

Input voltage: 120V.

LED Driver: 700ma Electronic driver.

Mounting: Building mount.

Acceptable manufacturers: Lithonia CSXW LED, Approved Equal.

Family member: **M:** 1 foot Linear exterior wall grazing fixture.

Fabrication:

Housing: Low-profile aluminum housing.

Lighting:

Distribution: Beam angle between 30Deg – 60Deg.

Reflector: N/A

Lamps: Color range: 4000K.

Electrical:

Input voltage: 120V.

Mounting: Mounted on metal sill behind glass.

Family group: L – LED.

Acceptable manufacturers: Philips Color Kinetics eW, Approved Equal.

Family member: N: 2 foot Linear exterior wall grazing fixture.

Fabrication:

Housing: Low-profile aluminum housing.

Lighting:

Distribution: Beam angle between 30Deg – 60Deg.

Reflector: N/A.

Lamps: Color range: 4000K.

Electrical:

Input voltage: 120V.

Mounting: Mounted on metal sill behind glass.

Acceptable manufacturers: Philips Color Kinetics eW, Approved Equal.

Family group: LH – LED, classified location.

Group description: Array of LED's with thermal management system. Class I, Div 2

Family member: **C:** Silicone type gasket to withstand harsh environments. Type 4X enclosure with IP66 ingress protection. Rated for classified locations class I, Div 2.

Fabrication:

Housing: Low copper aluminum alloy.

Finish: Polyester powder paint.

Lighting:

Distribution: Symmetric.

Reflector: Endural borosilicate glass.

Lamps: 98 LED array.

Electrical:

Input voltage: 120V.

LED Driver: Electronic.

Mounting: Ceiling mount.

Acceptable manufacturers: Holophane PLED Petrolux Haz location Approved Equal.

- Family group:** LR – LED, recessed-mounted.
- Group description: Recessed into concrete for step lighting.
- Family member: **K:** Recessed into concrete step light. Outdoor wet location. Internal splice area behind lamp plate.
- Fabrication:
- Housing: Die cast low copper aluminum alloy with clear anodized finish.
- Finish: Black.
- Lighting:
- Distribution: Asymmetrical step lighting.
- Lens: Tempered prismatic glass with silicone gasket.
- Lamps: 3 LED emitters.
- Electrical:
- Input voltage: 120V.
- LED Driver: Electronic
- Mounting: Recessed into concrete.
- Acceptable manufacturers: Kim lighting EL807, Approved Equal.

END OF SECTION

SECTION 31 11 00
CLEARING AND GRUBBING

PART 1 – GENERAL

1.1 SUMMARY

- A. The Contractor shall clear, grub, and clean up those areas staked or described in the Special Provisions. This Work includes protecting from harm all trees, bushes, shrubs, or other objects selected to remain.
- B. Related Sections:
 - 1. Section 01 57 13 – Temporary Erosion and Sedimentation Control
 - 2. Section 31 20 00 – Earth Moving

1.2 REFERENCES

- A. WSDOT Standard Specifications for Roads, Bridges and Municipal Construction 2018.

1.3 DEFINITIONS

- A. Clearing: Removing and disposing of all unwanted material from the surface, such as trees, brush, down timber, or other natural material.
- B. Grubbing: Removing and disposing of all unwanted vegetative matter from underground, such as sod, stumps, roots, buried logs, or other debris.
- C. Debris: All unusable natural material produced by clearing, grubbing, or roadside cleanup.

1.4 SUBMITTALS

- A. Comply with Section 01 33 00.

1.5 EXISTING CONDITIONS

- A. Install Erosion and Sedimentation Control prior to beginning the Work.
- B. Utility Locator Services: Notify utility locator services for area where Project is located before beginning Work.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Obtain required permits and permission from local governing authorities and Engineer prior to commencing work.
- B. Locate and clearly flag trees and vegetation to remain or be relocated.
- C. Verify that site improvements may safely and appropriately begin.

3.2 EROSION CONTROL

- A. Refer to TESC plan.
- B. Construct and maintain TESC measures in accordance with the plans and Section 01 57 13.

3.3 CLEARING

- A. The Contractor shall:
 - 1. Fell trees only within the area to be cleared.
 - 2. Close-cut parallel to the slope of the ground all stumps to be left in the cleared area outside the slope stakes.
 - 3. Follow these requirements for all stumps that will be buried deeper than 5 feet from the top, side, or end surface of the embankment or any structure and are in a location that will not be terraced as described in WSDOT Standard Specification Section 2-03.3(14):
 - a. Close-cut stumps under 18 inches in diameter.
 - b. Trim stumps that exceed 18 inches in diameter to no more than 12 inches above original ground level.
 - 4. Leave standing any trees or native growth indicated by the Engineer.
 - 5. Trim all trees to be left standing to the height specified by the Engineer, neatly cutting all limbs close to the tree trunk.
 - 6. Thin clumps of native growth as the Engineer may direct.
 - 7. Protect, by fencing if necessary, all trees or native growth from any damage caused by construction operations.

3.4 GRUBBING

A. The Contractor shall:

1. Grub all areas:
 - a. Indicated by the Engineer or the Plans.
 - b. To be excavated, including area staked for slope treatment.
 - c. Where subdrainage trenches will be dug, unsuitable material removed, or Structures built.
 - d. In which hillsides or existing embankments will be terraced as described in WSDOT Standard Specification Section 2-03.3(14).
 - e. Upon which embankments will be placed, except stumps may be close-cut or trimmed as allowed in WSDOT Standard Specification Section 2-01.3(1) item 3.

3.5 DISPOSAL

A. The Contractor shall meet all requirements of state, county, and municipal regulations regarding health, safety, and public welfare in the disposal of all usable material and debris

B. The Contractor shall dispose of all debris by one or more of the disposal methods described below.

1. Debris shall be hauled to a waste site obtained and provided by the Contractor in accordance with WSDOT Standard Specification Section 2-03.3(7)C.
2. Chipping: Wood chips may be disposed of on-site in accordance with the following:
 - a. Chips shall be no larger than 6 square inches and no thicker than ½ inch.
 - b. Chips shall be disposed outside of environmentally sensitive areas, and in areas that aren't in conflict with permanent Work.
 - c. Chips shall not be incorporated into the embankment but may be spread on slopes where feasible at depths no greater than 2 inches.

d. Chips shall be tractor-walked into the ground.

3.6 CLEANING

A. Cleaning: Leave premises clean and free of residue of work of this Section.

END THIS SECTION

SECTION 31 20 00

EARTH MOVING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Accomplishing indicated and required stripping, excavation, filling, compaction, sub-grade preparation, rough and finish grading, and the like.
2. Excavate and backfill trenches as necessary for water, storm drain, foundation drain, sanitary sewer installation and other work as shown on drawings.
3. Removing materials from the site which are either
 - a. unsuitable for use, or;
 - b. are in excess of that required.
4. Importing additional required materials.
5. Coordinating earthwork operations with other work of the project.
6. Dewatering requirements including providing, operating, maintaining and removing temporary dewatering systems for controlling surface water in the construction area.
7. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
8. Excavating and backfilling for buildings and structures.
9. Drainage course for concrete slabs-on-grade.
10. Subbase course for concrete walks and pavements.
11. Subbase course and base course for asphalt paving.
12. Excavating and backfilling for utility trenches.

1.02 DEFINITIONS

- A. Backfill: Soil material used to fill an excavation.
1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Aggregate layer supporting a slab-on-grad that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Contracting Office Representative.
Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Contracting Office Representative.
Unauthorized excavation, as well as remedial work directed by Contracting Office Representative, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.

- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Drain Rock: Aggregate placed around a drain pipe.
- J. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- K. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- L. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.03 REFERENCES

- A. WSDOT Standard Specifications for Road, Bridge and Municipal Construction 2018.
- B. ASTM D-1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
- C. Lewis County Code.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. See referenced codes and ordinances.
 - 2. Obtain all permits.

- B. A qualified Soils Engineer shall be employed by the Owner to perform all required tests of fill and of soil compaction, and for supervision of the earthwork. Contractor shall notify the Soils Engineer 24-hours prior to completion of each lift and phase of the work in order to permit him to make tests as required. Samples of all fill materials proposed for use shall be delivered to him at least five days prior to the time that such materials are expected to be placed in the work. No materials shall be placed until receipt of written approval of samples and all materials used shall be the same as those in the samples submitted. The Soils Engineer shall be considered the Engineers/Owner's representative on the job during earthwork operations. Any fill which in his opinion does not meet the specification requirements shall be removed or otherwise corrected as he directs.
- C. Submittal: Submit samples of all imported fill materials to be used 7 days in advance of use. Samples shall consist of sieve analysis of material gradation.
- D. Conform to requirements of the Geotechnical Report referenced in these specifications.

1.05 PROJECT CONDITIONS

- A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.
- B. Do not commence earth moving operations until Erosion and Sedimentation Control measures are in place as specified in Section 31 25 00.
- C. Contractor shall protect existing utilities to remain in place.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Earth Fill Materials: Furnish the following materials for fills and backfills where indicated or where specified.
1. Imported Structural Fill: Structural fill shall consist of a granular soil free of organics, debris, or other deleterious material. Structural fill during wet weather conditions shall meet following gradation requirements: Imported well graded sand and gravel with less than 5 percent fines. Conform to "Gravel Borrow" in accordance with WSDOT Section 9-03.14(1) with gradation modified so that a maximum 5 percent by weight of the material passes the U.S. No. 200 sieve as based on the minus 3/4 inch fraction.
 2. Gravel Backfill for Pipe Bedding: Rigid pipe bedding shall be in accordance with the WSDOT Section 7-08.3(1)C and Section 9-03.12(3).
 3. Backfill for Utility Trenches; Utility trench backfill shall be in accordance with WSDOT Section 7-08.3(1)
 4. Patching for Utility Trenches: Utility trenches shall be patched in accordance with Pierce County's Standard Drawing PC.A7.1 (Utility Patch).
 5. Furnish additional off site material as may be required for completion of work.
 6. Excavated materials for use as Structural fill: The suitability of excavated site soils for compacted backfill will depend on gradation and moisture content of soil when placed. In general, use excavated on-site material except as specified above. Excavated materials shall meet the following requirements:
 - a. be tested and approved for use.

- b. be free from organic and deleterious matter.
 - c. be maintained at moisture content suitable for compaction.
 - d. no silty soils permitted.
 - e. no Demolition debris permitted
 - f. Soil shall contain not more than 5% fines passing a No. 200 sieve.
- 7. Stockpile site material to be used as fill material where permitted by Owner.
 - 8. Stockpile any topsoil material to be reused where agreed upon.
 - 9. Fill Under Sidewalks: depth and material per plan; material shall meet the requirements of Section 9.03.9(3) of the WSDOT Standard Specifications.
 - 10. Concrete: Lean concrete shall be utilized as structural fill when required by unsuitable soil conditions.

B. CRUSHED SURFACING BASE COURSE (CSBC)

- 1. Crushed surfacing base course shall conform to WSDOT Section 9-03.9(3). Thickness as shown on the plans.

C. CRUSHED SURFACING TOP COURSE (CSTC)

- 1. Crushed surfacing base course shall conform to WSDOT Section 9-03.9(3). Thickness as shown on the plans.

D. Drain Rock:

- 1. Drain Rock shall conform to WSDOT Section 9-03.12(4) Gravel Backfill for Drains.

2.02 DEWATERING

- A. Dewatering includes lowering the water table for the purposes of reducing seepage which would otherwise emerge from the slopes or bottom of the excavation, increasing the stability of excavated slopes, preventing loss of material from beneath the slopes or bottom of the excavation, reducing hydrostatic heads and seepage forces, and preventing rupture or heaving of the bottom of an excavation. Provide necessary pipe, pumps, and filter material suitable for conditions of construction.
- B. Disposal of dewatering water shall be to an approved location and water shall be free of silts and fines. Settlement of dewatering water may be required prior to disposal. Contractor to provide water disposal plan to Architect prior to commencing with dewatering.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Field Measurements: Locate and carefully maintain all bench marks, monuments, control markers and other reference points; if disturbed or destroyed, replace as directed at no cost to Owner.
- B. Permits and Inspections: Obtain all permits and required inspections; pay all fees. Maintain property in as good condition as possible. At completion, leave in as good condition as before work started.
- C. Protection:
 - 1. Utilities
 - a. The Contractor shall protect from damage private and public utilities. Contractor shall, before excavation begins, call the Utilities Underground Location Center 1-800-

424-5555. Contractor shall pay all costs associated with location of existing utilities; including costs for private locate service to determine connection points and crossings.

- b. Notify owners of underground facilities at least two full business days prior to commencing any excavation. Provide schedule of excavation to all owners of underground facilities in accordance with RCW 19.122.
 - c. The Contractor shall, at its own expense, make excavations and borings ahead of the work, as necessary, to determine the exact location of utilities, service stubs, and underground structures.
 - d. All existing utilities to remain shall be protected and maintained by the Contractor and shall not be disturbed, disconnected or damaged during work. The Contractor shall be responsible for all expenses arising from damaged utilities/structures except for unforeseen underground items.
2. Site Improvements
- a. The Contractor shall protect from damage all pavement, curbs, sidewalks, paved areas, and other improvements to remain.
 - b. Contractor shall be responsible for replacement if damage occurs to improvements to remain.
3. Access: Contractor shall provide full access to adjacent driveways, fire hydrants, building entrances as indicated on the drawings, sidewalks, use of the fire lane, and other points as designated by the Owner.

3.02 SITE GRADING

- A. General: Required contours and elevations are indicated and noted on Drawings; should indicated figures conflict with actual conditions, notify project Engineer and await their directions before proceeding.
- B. Grading:
1. Shape surface of site to grades and contours as noted (as applicable).
 2. Strip topsoil in areas to be graded and those to be excavated and stockpile on site where directed and remove excess subsoil and topsoil not being reused from site.
 3. Remove debris and rocks, which will interfere with reusable topsoil and lawn maintenance.
 4. Control grading around building areas and building excavations at all times to prevent flow of water into excavated areas.
 5. At paving and other site improvements, shape subgrades to lines, grades, and cross sections indicated; remove and replace soft or otherwise unsatisfactory material; excavate rock encountered to a depth of 6" below finish subgrade elevations; bring low areas up to required elevations with suitable structural fill materials.

3.03 EXCAVATION

- A. General: Do all excavation work for building and other work shown on the drawings, to lines and elevations required for the work.
- B. Removal of Obstructions: Remove rocks, boulders, and other obstructions.
- C. Depth of Excavation:
1. Slope banks to angle of repose or less, until shored.

2. Excavation shall not undermine any foundation.
- D. Excess Excavation: If through error, excavation is to levels lower than shown, and is in compacted fill, recompact to required compaction percentages at Contractor's expense.
- E. Do not excavate wet topsoil or subsoil without approval of General Contractor; refer to paragraph 3.9 in this section for work completed in wet weather conditions. Coordinate all wet conditions work stoppages beforehand with General Contractor.
- F. Dewatering Excavation: Maintain excavation in dry condition as required, free from frost.
- G. Trench Excavations:
1. Excavate trenches to depths required and widths as necessary; make sides as nearly vertical as practicable. Brace and shore per governing agency requirements. Grade and smooth trench bottoms for uniform support of utility lines. Excavate to depths allowing for bedding.
 2. Excavation Near Mature Trees: Preserve and protect existing trees at the site which are designated to remain, and those adjacent to the site. Any fines levied by the Centralia College for tree damage or destruction shall be the responsibility of the Contractor.
- H. Catch basins, manholes, inlets, and similar utility structures: Excavate to furnish a minimum of 12 inches between sides of excavation and outer surfaces of structure. Take care to excavate to exact depths required; fill over excavation with compacted gravel borrow. If the material at the bottom of excavations becomes unstable or muddy due to weather conditions, the Contractor shall excavate all unsuitable material below grade and replace the unstable material with gravel borrow.
- I. Excavation Safety Systems
1. Provide all trench excavation in excess of 4 feet in depth with a safety system conforming to the referenced standards and requirements.

2. All excavation not requiring trench safety systems shall also meet the WISHA safety standards.

J. Trench Excavation

1. Trenching shall include all excavation of every description and of whatever materials encountered to the depth indicated on the Drawings or in the Project Manual.
2. Grade and smooth bottoms of trenches to furnish uniform bearing and support for utility lines; remove rocks and similar material causing point bearings.
3. Form bell holes and depressions for joints after grading of bottom limit such depressions to lengths, depths, and widths required for particular type of joint.
4. Excavate to depths allowing for bedding.
5. Excavate trenches to receive fire protection lines to furnish not less than 48 inches of cover and domestic service water lines to furnish not less than 36 inches of cover except where governing requirements prevail.

K. Bedding and Backfilling for Utility Lines

1. Bedding shall provide uniform support along the entire pipe barrel, without load concentration at joint collars or bells. No blocking of any kind shall be used to adjust the pipe to grade except when used with embedment concrete.
2. Bell holes shall be excavated as required to ensure uniform support along the pipe barrel. Bedding disturbed by pipe movement or by removal of shoring or movement of a trench shield or box shall be reconsolidated prior to backfill. Special care shall be taken to provide adequate bedding support at wye or tee connections and adjacent to manholes or other Structures, so as to avoid bending or shearing stresses at these critical points.

3. In backfilling the trench, the Contractor shall take all necessary precautions to protect the pipe from any damage or shifting. The Contractor shall backfill from the side of the trench to a uniform depth of 2 feet above the crown of the pipe before starting compaction.
4. During all phases of the backfilling operations and testing as outlined herein, the Contractor shall protect the pipe installation, provide for the maintenance of traffic as may be necessary, and provide for the safety of property and pedestrians.
5. Pipe trenches shall be backfilled as soon as possible after the pipe installation. Backfilling of trenches in the vicinity of catch basins, manholes, or other appurtenances will not be permitted until the cement in the masonry has become thoroughly hardened. Walking on the pipe shall not be allowed until at least 1 foot of earth has been placed upon it.
6. Trench backfill shall be spread in layers and be compacted by mechanical tampers of the impact type approved by the Owner's Soils Engineer. The backfill Material shall be placed in successive layers with the first layer not to exceed 2 feet above the pipe, and the following layers not exceeding 12 inches in loose thickness, with each layer being compacted to the density specified herein.
7. If the required compaction density has not been obtained, the Contractor shall remove the backfill from the trench and recompact using heavier compaction Equipment or more passes. This process shall be repeated until the Contractor has established a procedure that provides the required field density. The Contractor will then be permitted to proceed with backfilling and compacting the remainder of the pipeline under the approved compaction procedure. In the event routine field densities taken during the course of construction show the specified compaction is not being obtained because of changes in soil types or for any other reason as determined by the Owner's Soils Engineer, the

Contractor will be required to reestablish the compaction procedure. In no case will excavation and pipe installation operations be allowed to proceed until the specified compaction is attained. Water setting will not be allowed as a method for compaction of backfill.

L. Embankment Construction:

1. The Contractor shall place earth embankments in horizontal layers of uniform thickness. These layers shall run full width from the top to the bottom of the embankment. Slopes shall be compacted to the required density as part of embankment compaction.
2. During grading operations, the Contractor shall shape the surfaces of embankments and excavations to uniform cross-sections and eliminate all ruts and low places that could hold water.
3. Embankments shall be constructed in accordance with the requirements for fill placement in the Geotechnical Report.

3.04 FILLING AND BACKFILLING

A. General: Fill to elevations or grades indicated or required. Remove debris and decayable matter from all areas before filling. Protect shored walls from damage during filling operations. Verify foundation walls are braced to support surcharge forces imposed by placed fill materials near optimum (+/- 2%) moisture content to permit compaction to specified density. Fill over excavated areas under structure bearing surfaces in accordance with geotechnical report.

1. Backfill areas to contours and elevations as shown on plans and in accordance with the Soils Report. Use unfrozen and unsaturated materials.
2. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

3. Place and compact fill materials in continuous layers not exceeding 6 inches loose depth.
 4. Employ a placement method so not to disturb or damage foundations, foundation perimeter drainage, foundation damp-proofing, foundation waterproofing and protective cover, or utilities in trenches.
 5. Maintain optimum moisture content of backfill materials to attain required compaction density. Certification of proper placement shall be provided by Soils Engineer.
 6. Backfill against supported foundation walls. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
 7. Slope grade away from building minimum of 2%, unless noted otherwise.
- B. Backfill: Place fills and backfills in lifts, before compaction, not to exceed 6 inches for hand operated mechanical compactors and not to exceed 12 inches for heavy equipment compactors. Place fill and backfill as soon as practicable to allow time for thorough settlement at time of completion of the Work.
1. Bedding for Utility Lines: Properly place material in trenches. Do not disturb sides of trenches. Place and compact and shape material to conform to the barrel of the pipe to ensure continuous firm bedding for full length of pipe. Backfill trenches in lifts as specified above.
 2. Topsoil: Distribute evenly around site as required.

3.05 COMPACTION

- A. General: Place fills in uniform lifts, depending on equipment used for compaction, see paragraph 3.5 B, this Section. Compact with approved vibratory compactors, or other approved rollers, or equipment necessary to obtain specified density.

- B. Compact areas occupied by building and paving to attain 95% minimum of maximum dry density in accordance with ASTM D-1557.
- C. Compact other areas to attain 90%, as indicated in soils report, minimum of maximum dry density, in accordance with ASTM D-1557.
- D. Moisture Content of Fill Material: Material shall be at near optimum moisture content (within +/-2%) when compacted. Take appropriate means to obtain moisture content.

3.06 EXCESS OR SHORTAGE OF EARTH MATERIAL

- A. Remove all excavated material, except as required for fill onsite, at Contractor's expense. Legally dispose of off site. Keep streets free from spillage of excavated material and debris by power sweepers or other approved methods.
- B. If shortage, provide suitable materials as needed to complete work.

3.07 FINISH GRADING (AS APPLICABLE)

- A. Finish grade to +/-0.05 foot.
- B. Finish grades flush with adjacent surface unless otherwise indicated.
 - 1. Finish grades will be inspected and approved by Project Engineer.
 - 2. Place topsoil in areas where seeding, sodding and planting is scheduled.
 - 3. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of sub-grade.
 - 4. Remove large stones, roots, grass, weeds, debris, and foreign material while spreading.
 - 5. Roll placed topsoil.
 - 6. Leave stockpile area and site clean and raked, ready to receive landscaping.

- C. Protect and maintain finished surfaces. Allow no heavy objects, to be moved over finish grade surfaces. At no cost to Owner, repair any ruts or holes in finished surfaces, and any obstructions to positive drainage. Repair areas showing settlement.

3.08 FIELD QUALITY CONTROL

- A. Conduct inspections to verify conformance with Specifications and Drawings.
- B. Provide equipment to roll compact site areas as advised by the project geotechnical or field engineer. Roll compact such areas as requested by general contractor.

3.09 PROTECTION FROM WEATHER

- A. The Contractor shall protect excavated sub-grade, stockpiled soils and excavations from damage due to weather, surface runoff or other source of water that may render the soil unworkable or unusable for filling and compaction on the site.
- B. The Contractor shall furnish, install, maintain, replace, operate and remove any and all facilities necessary to keep excavations, stockpiled materials, exposed sub-grades and surrounding working surfaces free from water, surface runoff, mud or deterioration during construction.
 - 1. The Contractor shall provide plastic sheeting, tarpaulins, rock armoring and protection, or other methods to protect exposed sub-grades and stockpiled material from deterioration or damage from water or construction traffic.
 - 2. The Contractor shall dewater all excavations and dispose of the water so as not to cause injury to public or private property, or to cause a nuisance or menace to the public. The Contractor shall at all times have on hand sufficient pumping equipment and machinery in good working condition for all emergencies, including power outage and flooding, and shall have available at all times competent workers for the continuous and successful

operation of the dewatering systems. Systems shall be operated so as to accomplish dewatering as necessary to perform and protect the work.

3. It is understood that the Contractor shall, throughout the course of construction which will be occurring during normally wet weather conditions, adequately protect, stabilize or armor all site areas. The Contractor agrees that the measures required to work in wet weather conditions are usual and ordinary, and are reflected in the bid and plan of operation. It is understood that additional compensation will not be granted to the Contractor for impacts due to construction in wet weather conditions.

3.10 CLEANING

- A. Cleaning: Leave premises clean and free of residue of work of this Section.

END OF SECTION

SECTION 31 23 35

EXCAVATING, BACKFILLING, AND COMPACTING
FOR UTILITIES AND STRUCTURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating, backfilling, and compacting for utilities, including pipe, structures, and appurtenances.
2. Control of water in trenches.
3. Foundation stabilization for pipe and utility structures.
4. Pipe bedding for pipe and utility structures.

B. Related Sections

1. Section 01 57 13 – Temporary Erosion and Sedimentation Control
2. Section 33 11 00 – Water Utilities
3. Section 33 40 00 – Storm Drainage Utilities

1.2 REFERENCES

- A. WSDOT Standard Specifications - Washington State Department of Transportation 2018 Standard Specifications for Road, Bridge, and Municipal Construction.
- B. ASTM D-422 - Method for Particle Size Analysis of Soils.
- C. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-pound Rammer and 18-inch Drop.
- D. ASTM C94-86 - Ready-Mixed Concrete.

- E. AASHTO T176 - Plastic Fines in Graded Aggregates and Soils by use of the Sand Equivalent Test.
- F. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods - (Shallow Depth).
- G. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.3 DEFINITIONS

- A. Unsuitable Material: Section 31 20 00.
- B. Pothole: Section 31 20 00.

1.4 SUBMITTALS

- A. General: Comply with Section 01 30 00.
- B. Samples: Submit minimum 50-pound sample for each material four business days prior to placing material.
- C. Quality Assurance/Control Submittals:
 - 1. Test Reports: Sieve analysis for each material.
 - 2. Certificates: WSDOT pit certification for each pit.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Surveyor: Land surveyor licensed in state of Washington with experience on similar projects.
 - 2. Construction Crew Foreman: Minimum six years' working experience and four years' experience as foreman performing similar work.

1.6 REGULATORY REQUIREMENTS

- A. Work and material shall be in accordance with WSDOT Standard Specifications.

PART 2 - PRODUCTS

2.1 AGGREGATE MATERIALS

- A. Bedding Material for Pipe: WSDOT Standard Specifications Section 9-03.12(3), Gravel Backfill for Pipe Zone Bedding. 100 percent passing 1 inch.
- B. Foundation Material: WSDOT Standard Specifications Section 9-03.17, Class A.
- C. Structural Fill: Section 31 20 00.
- D. Bank Run Gravel: WSDOT Standard Specifications Section 9-03.19, Bank Run Gravel for Trench Backfill.

2.2 SOURCE QUALITY CONTROL

- A. Tests and Inspection: Provide sieve analysis in accordance with ASTM D422 for each material type. Perform tests and analyses of aggregate material in accordance with WSDOT Standard Specifications. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions: Verify as follows:
 - 1. Verify survey benchmark and intended elevations for Work are as indicated.
 - 2. Verify erosion control is in place and operating properly.
 - 3. Verify locations and elevations of existing pipes and structures at points of connection and at crossings prior to beginning Work. Pothole, expose pipes, determine invert elevations, verify with design, and inform Engineer of deviations affecting design prior to mobilizing crews and beginning construction.

4. Locate existing utilities, avoid damage or disturbance. For aid in utility location call "Dial Dig 811," 48 hours (two working days) prior to beginning construction. There are utilities on site that Dial Dig will not locate. Employ and pay for locator service to locate and mark utilities in addition to "DIAL DIG" service

3.2 PREPARATION

A. Protection:

1. Protect and maintain existing utilities that are to remain.
2. Identify existing structural foundations near excavations. Verify excavation will not undermine footings or supports and cause damage to structures.
3. Protect plant life, lawns, trees, and other features remaining as portion of final landscaping or preserved for erosion control.
4. Protect benchmarks, existing structures, rockeries, sidewalks, railings, paving, and curbs to remain,
5. Protect pavement or paved areas intended to remain from damage.
6. Use all means necessary to prevent erosion of freshly graded areas during construction or until such time that permanent drainage and erosion control measures are fully operational.

3.3 CONSTRUCTION

A. Grade and Alignment:

1. Identify and set required lines, levels, contours, and datum.
2. Stake alignment and grade and construct in locations shown on Drawings.
3. Comply with City of Olympia requirements for stormwater, water, sewer, and power.
4. Establish extent of excavation by area and elevation.

5. Adjust alignment and grade to accommodate conflicts and field conditions. Obtain A/E's approval prior to adjustments.
- B. Utilities And Structures, Shoring and Bracing of Excavation:
1. Provide sheeting, shoring, and bracing in accordance with state and local codes.
 2. Do not use horizontal strutting below pipe barrel.
 3. Do not use pipe as support for trench bracing.
 4. Do not remove shoring below top of pipe.
 5. Backfill immediately following removal of shoring and bracing.
 6. Support adjacent structures, including utilities and pipe chases, which may be damaged by excavation Work.
- C. General Excavation:
1. Perform excavation of every description and whatever substance encountered to depths, lines, and grades indicated.
 2. Pile trench excavated material so surface water is prevented from flowing into excavation, and there is minimum inconvenience to Owner's access to buildings. Provide free access to fire hydrants, water valves, meters, and driveways and leave clearance to enable free flow of storm water in gutters, conduits, and natural watercourses.
 3. Remove and reconstruct utilities as required to perform Work.
 4. Do not interfere with or excavate within pressure prism of foundations. Pressure prism is defined as one horizontal to one vertical line projected down from nearest edge of footing bottom.
 5. Hand trim excavation and leave free of loose matter.
 6. Correct unauthorized excavation at no cost to Owner.

7. Schedule Work to include backfilling trenches by completion of each shift.

D. Trench Excavation:

1. Perform trench excavation in conformance to requirements of WSDOT Standard Specifications Section 7-08.03(1)A.
2. Unless otherwise indicated, open cut excavations.
3. Exercise caution in operating heavy equipment over pipelines. Do not damage existing improvements.
4. Immediately repair leaks or breaks caused by construction operations at no cost to Owner and in manner acceptable to Engineer and utility owner.
5. Control sidewalls of excavation to minimize caving.
6. In event maximum allowable trench width is exceeded, and depending on depth of trench, improve pipe bedding by utilizing concrete or other bedding materials as directed by Engineer.
7. Excavate trench bottom to lines and grades shown with proper allowance for pipe thickness and pipe bedding. Do not permit material containing rocks or cobbles larger than 2 inches in maximum dimension within 6 inches of pipe. Remove material of this type from trench bottom and replace with foundation gravel.
8. Should excavation be carried below lines and grades as shown because of trenching operations, backfill such excavated space to proper elevation as directed by Engineer, at no cost to Owner.
9. Clean trench bottom of loose and disturbed soils with smooth-bladed bucket. Make sure trench bottom is firm and free of loose soil.

10. Over-excavate trench bottom to one foot below pipe bedding. Backfill over-excavation with foundation material. Compact foundation material by tamping backhoe buckets.
- E. Control of Water:
1. Keep excavation free from water. Dewater as necessary.
 2. Direct drainage away from excavation.
 3. Grade top perimeter of excavation to prevent surface water from draining into excavation.
 4. Direct runoff and water from dewatering into sedimentation filtration. Provide additional filtration necessary to prevent silt-laden water from leaving site.
- F. Pipe Bedding:
1. Provide pipe bedding in accordance with pipe materials. Bedding requirements for various pipe materials are shown on Drawings.
 2. Place bedding on approved trench bottom before pipe is installed. Spread smoothly to support pipe uniformly. Do not use blocking to adjust pipe to grade. Dig holes for bells as required to ensure uniform support along pipe barrel.
 3. Compact bedding as follows: Compact bedding to at least 95 percent maximum density as determined by ASTM D1557 within paved areas and sidewalks. Compact bedding in other areas to at least 90 percent maximum density as determined by ASTM D1557.

G. Initial Backfill:

1. After pipe has been laid properly and inspected, place and compact initial backfill around pipe to minimum depth of 6 inches over top of pipe. Place initial backfill in lifts of not more than 6 inches in compacted thickness. Bring lifts together on both sides of pipe and carefully work backfill under pipe haunches by means of shovel, vibration, or procedures approved by Engineer. Take necessary precautions to protect pipe from damage or shifting.
2. Subsequent Backfill: Place and compact subsequent backfill material after initial backfill has been placed and approved by Engineer.
3. Perform compaction within 2 feet of existing or new structures by hand-operated vibratory compactors. Compact within 5 feet of wall to 95 percent maximum density as determined by ASTM D 1557.
4. Water settling or water jetting will not be allowed.

H. Backfilling:

1. Backfill trenches in accordance with WSDOT Standard Specifications Section 7-08.3(3).
2. Backfill to grades, contours, levels, and elevations shown on Drawings with material indicated on Drawings. On-site material is not suitable for use as trench backfill.
3. Do not backfill over wet, frozen, or spongy subgrade surfaces.
4. Place and compact backfill materials in continuous layers not exceeding 6 inches loose lift thickness when using hand equipment and 12 inch loose lift when using heavy compaction equipment such as hoe-packs. Decrease lift thickness as needed based on compaction test results.

5. Employ placement method that does not disturb or damage utilities in trenches.
6. Condition backfill within plus or minus 3 percent of its optimum moisture content so specified compaction can be attained readily. Material containing excessive moisture, beyond moisture content for specified density as determined by laboratory compaction tests, shall not be used for backfill.
7. Raise backfill around structures evenly.
8. Finish area to uniform contour to drain properly and grade entire surface to neat appearing surface.
9. Remove excavated on-site soil material and surplus fill material from site to approved contractor-provided off-site waste site.

I. Compaction:

1. Compact first 18 inches of backfill above pipe zone with hand-operated compaction equipment.
2. Under pavements, curbs, curbs and gutters, sidewalks, and other structural improvements: minimum 95 percent, within 2-foot vertical of finish subgrade and minimum 90 percent below this level per ASTM D1557. Compact pavement bases in accordance with Section 32 13 13.
3. Compact backfill material by towed or self-propelled mechanical compactors in uniform layers not exceeding 12 inches in loose depth.

3.4 FIELD QUALITY CONTROL

- A. Comply with Section 01 45 16.
- B. Obtain required inspections, tests, approvals, and location recording prior to covering or enclosing Work.

- C. Site Tests:
 - 1. Comply with City of Chehalis requirements.
 - 2. Owner will perform compaction tests.
 - 3. If tests indicate Work does not meet specified requirements, recompact and retest, or remove and replace and retest at direction of Engineer.

- D. Inspection: Owner will observe Work at the following milestones
 - 1. After completion of trench and prior to placing bedding and pipe.
 - 2. After completion of pipe and bedding, and prior to backfilling.

3.5 PROTECTION

- A. Protect bottom of excavations and soil adjacent to and beneath foundations from freezing.
- B. Protect excavated material and excavating foundation (subgrade) from damage due to excess moisture.
- C. Take necessary precautions to protect soil from excess moisture by such means necessary, including: Construct ditches and swales to intercept surface water; cover stockpiled material; cover exposed trenches; do not expose more area than can be worked and protected; and dewater by pumping.

3.6 CLEANUP

- A. Comply with Section 01 74 00.
- B. Dispose of excavated surplus or unsuitable material at Contractor provided off- site location approved by Owner.
- C. Remove and dispose of abandoned pipe, broken pavement, and rubbish from Project site in accordance with laws, regulations, and ordinances of approved off- site location provided by Contractor.

- D. Dispose of waste, surplus, and unsuitable materials according to laws, regulations, and ordinances.

END OF SECTION

SECTION 32 10 00

BASES, BALLASTS, AND PAVING

PART 1 – BASIS OF DESIGN

This standard applies to the design and installation of site pavements and appurtenances, including associated paving bases and ballasts.

1.1 Design Criteria

A. Concrete Approach shall be designed and constructed to be able to withstand a driving load of 36,000 lbs. without cracking.

1. Concrete Approaches shall be placed on minimum 4" of compacted structural fill, compact subgrade and structural fill to minimum 95% of maximum dry density as determined by ASTM D1557.

1.2 Submittals

A. Per Section 01 33 00.

PART 2 – PRODUCTS, MATERIALS, AND

EQUIPMENT

2.1 Concrete

Minimum 3,000# of Portland cement concrete of materials including admixtures per requirements of Division 3 for cast-in-place concrete, or greater if required by design.

PART 3 – INSTALLATION, FABRICATION, AND CONSTRUCTION

3.1 Saw Cutting Existing Paving

A. Wherever saw cutting of existing Concrete Approach or roadway paving occurs, all slurry resulting from the saw cutting process shall be vacuumed and removed off site and disposed of in a lawful manner. Do not allow slurry to enter storm

drainage sewer system.

- B. Begin curing immediately after placement, protect concrete from premature drying, excessively hot and cold temperatures, and mechanical injury.
- C. Contractor shall provide and utilize tents, heaters and coverings as necessary to facilitate curing
- D. Maintain curing procedures for seven (7) days at minimum temperature of 50 degrees F; keep moist and protect from vehicle and pedestrian traffic.
- E. Cleaning of concrete mixers will not be allowed on campus grounds. Contractor shall submit methods of cleaning concrete equipment including delivery equipment.
- F. Where appropriate, temporary storm drain catch basin filters shall be installed to prevent construction materials from entering into the system.

END SECTION

SECTION 32 13 13

CEMENT CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Portland cement concrete pavement.
2. Preparing subgrade to receive base course material for concrete pavement.
3. Soil sterilization.
4. Base COURSES for cement concrete pavement.
5. Joints for cement concrete pavement.
6. Tie bar and dowel bar for cement concrete pavements.

B. Related Sections:

1. Section 01 57 13 – Temporary Erosion and Sedimentation Control
2. Section 31 20 00 – Earth Moving

1.2 REFERENCE STANDARDS

- A. WSDOT Standard Specifications - Washington State Department of Transportation 2018 Standard Specifications for Road, Bridge, and Municipal Construction.
- B. WSDOT Standard Plans for Road Bridge and Municipal Construction, current edition.

- C. ASTM D422 -90 - Method for Particle Size Analysis of Soils.
- D. ANSI/ASTM D1557-91 - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort 56,000 ft-lb./ft³.
- E. ASTM D2922-91 – Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- F. ASTM D3017-88 – Test Method for Moisture Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- G. ASTM D1556-90 – Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
- H. ACI 305 – Specification for Hot Weather Concreting.
- I. ACI 306 – Standard Specification for Cold Weather Concreting.

1.3 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. Product Data Submittals:
 - 1. Soil residual herbicide, including hazardous waste data sheet.
 - 2. Add mixtures.
 - 3. Portland cement.
 - 4. Curing compound.
 - 5. Premolded joint filler, joint sealant, and bond breaker.

C. Shop Drawings:

1. Concrete pavement joint layout.

D. Quality Assurance/Control Submittals:

1. Design Data: Concrete mix design.
2. Test Reports: Sieve analysis for each aggregate.
3. Certifications: Letter of certification from supplier.
4. Contractor experience list.

1.4 REGULATORY REQUIREMENTS

- A. Comply with WSDOT Standard Specifications.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Comply with WSDOT Standard Specifications Section 5-05.

PART 2 - PRODUCTS

2.1 MATERIAL

- A. Crushed Surfacing Top Course (CSTC): WSDOT Standard Specifications Section 9.03.9(3).
- B. Crushed Surfacing Base Course (CSBC): WSDOT Standard Specifications Section 9.03.9(3).
- C. Soil Residual Herbicide:

1. Comply with WSDOT Standard Specifications Section 5-04.3(5)D.
 2. Use only products approved by Owner.
- D. Portland Cement: Type II in accordance with WSDOT Standard Specifications Section 9-01.
- E. Aggregates for Cement Concrete: WSDOT Standard Specifications Section 9-03.
- F. Curing Material and Add Mixtures: WSDOT Standard Specifications Section 9-23.
- G. Joint Filler: WSDOT Standard Specifications Section 9-04.1.
- H. Joint Sealant: Sikaflex 1A, match color of concrete.

2.2 MIXES

- A. Cement Concrete Mix: In accordance with WSDOT Standard Specifications Section 5-05.3(1). Where surface must return to service as soon as possible, use three-day mix.

2.3 SOURCE QUALITY CONTROL

- A. Submit proposed mix design prior to commencement of Work.
- B. Tests and analyses of aggregate material: WSDOT Standard Specifications.
- C. Certification: Letter from supplier certifying Portland cement concrete mix complies with specifications.

- D. If tests indicate materials do not meet specified requirements, change material and retest.

2.4 GEOTEXTILE

- A. Non-woven. Per WSDOT Standard Specifications Section 9-33.2, Table 3.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify erosion control is in place and operating properly.
- B. Verify prepared subgrade is dry and ready to support paving and imposed loads and is approved by Engineer.
- C. Verify base gradients and elevations are correct.
- D. Verify subsurface Work is completed and no further excavation will be required within limits of Work.
- E. Verify demolition Work within or adjacent to Work is complete.
- F. Verify heavy construction traffic is as complete as possible and traffic remaining will not damage or degrade Work.
- G. Verify Owner and fire and police departments have been advised of restrictions to site access during Work.

- H. Verify weather forecast during planned time of placement is within weather limitations.

3.2 PREPARATION

- A. Prepare and compact subgrade in accordance with Section 31 20 00 and WSDOT Standard Specifications Section 2-06.
- B. Conditioning of existing surface in accordance with WSDOT Standard Specifications Section 5-04.3(5).
- C. Water and mix subgrade thoroughly until optimum moisture content is obtained when deficiency of moisture content exists. When excess moisture exists, rework and aerate subgrade until optimum moisture content is obtained.
- D. Adjust storm drainage frames and grates, manhole covers, valve boxes, and other structures to grade immediately before placing concrete pavement.

3.3 CONSTRUCTION

- A. Subgrade Preparation: Section 31 20 00.
- B. Soil Sterilization:
 - 1. Apply Soil Residual Herbicide in accordance with WSDOT Standard Specifications Section 5-04.3(5)D.
 - 2. Protect surrounding area from effects of soil sterilization.
 - 3. Do not allow toxic material to run off onto adjacent vegetation or to storm system.

C. Base Courses:

1. Place in accordance with WSDOT Standard Specifications Section 4-04.3.
2. Spread aggregate over prepared substrate to total compacted thickness indicated on Drawings.
3. Place aggregate in maximum 6-inch layers and compact to 95 percent in accordance with ASTM D1557.
4. Level and contour surfaces to elevations and gradients indicated.
5. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
6. Add water as necessary to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
7. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

D. Forming:

1. Place and secure forms to correct location, dimension, and profile.
2. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
3. Place joint fillers and seals vertical in position in straight lines. Secure to formwork during concrete placement.
4. Adjust forms as necessary if required by engineer/owner inspections.

E. Placing Concrete Pavement:

1. In accordance with WSDOT Standard Specifications Section 5-05.3(7).
2. Hot weather placement: ACI 305.
3. Cold weather placement: ACI 306.

F. Joint Layout:

1. Prepare and submit a joint layout plan. Joint layout plan on Drawings is schematic.
2. Include joints for catch basins, manhole covers, and other utility covers.

G. Contraction and Construction Joints:

1. Locations as shown on WSDOT Standard Plan A-40.10-03.
2. Saw cut joints in accordance with WSDOT Standard Specification Section 5-05.3(8)A.
3. Seal joints in accordance with WSDOT Standard Specification Section 5-05.3(8)B.

H. Isolation Joints:

1. Install isolation joints at locations as shown on WSDOT Standard Plan A-40.15-00.
2. Construct joints in accordance with WSDOT Standard Specification Section 5-05.3(8)D.
3. Fill joints with joint fillers of required profile, and seal joints with joint sealant.
4. Set joint fillers 3/8-inch below finish concrete surface. Fill top of

joint with sealant. Place bond breaker on top of joint filler prior to placing sealant.

- I. Surface Finishing: Transverse tining in accordance with WSDOT Standard Specification Section 5-05.3(11).
- J. Curing: WSDOT Standard Specifications Section 5-05.3(13). Use curing method that will preserve surface finish and color.

3.4 TOLERANCES

- A. At abutting existing surfaces to be matched: Within 1/16 inch.
- B. In accordance with WSDOT Standard Specifications Section 5-05.3(12).

3.5 FIELD QUALITY CONTROL

- A. Comply with Section 01 45 16.
- B. Site Tests: Owner will perform following tests:
 - 1. Compaction test on subgrade density before placing bases and before paving.
 - 2. Compaction test on base course density.
 - 3. Concrete pavement testing.
 - 4. If tests indicate work does not meet specified requirements, recompact or remove and replace work.
- C. Inspection: Owner will observe Work at the following milestones:

1. After completion of subgrade and before placing base course.
2. After placing base course and before placing concrete.
3. After placing forms, dowel bar, and tie bar and before placing concrete.
4. After finishing concrete.

3.6 CLEANING

- A. Comply with Section 01 74 00.
- B. Clean surfaces within five days of substantial completion.
- C. Dispose of surplus, unsuitable, or waste materials according to laws, regulations, and ordinances at site obtained by Contractor.

3.7 PROTECTION

- A. Protect concrete pavement in accordance with WSDOT Standard Specification Section 5-05.3(16).
- B. Protect concrete from damage during curing.
- C. Keep heavy equipment and vehicular traffic off new concrete until it has attained specified strength.

END OF SECTION

SECTION 33 1100

WATER UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Water distribution mains.
2. Pipe, fittings, valves, hydrants, and appurtenances.
3. Connection to existing water main.
4. Water services for domestic
5. Irrigation sleeves.

1.2 RELATED REQUIREMENTS

- A. Section 31 20 00 – Earth Moving
- B. Section 31 23 35 – Excavating, Backfilling, and Compacting for Utilities and Structures

1.3 REFERENCES

- A. WSDOT Standard Specifications – Washington State Department of Transportation 2018 Standard Specifications for Road, Bridge, and Municipal Construction.

- B. ASTM A252 – Welded and Seamless Steel Pipe Piles.
- C. AWWA C104 – Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
- D. AWWA C105 – Polyethylene Encasement for Ductile - Iron Pipe Systems.
- E. AWWA C111 – Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.
- F. AWWA C151 – Ductile Iron Pipe.
- G. AWWA C153 – Ductile-Iron Compact Fittings.
- H. AWWA C509 – Resilient-Seated Gate Valves for Water and Sewerage Systems.
- I. AWWA C550 – Protective Epoxy Interior Coatings for Valves and Hydrants.
- J. AWWA C651 – Disinfecting Water Mains.
- K. NFPA 24 – Installation of Private Fire Service Mains and their Appurtenances.

1.4 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Surveyor: Land surveyor licensed in state of Washington with experience surveying underground utilities.

2. Crew Foreman:
 - a. Minimum six years' working experience and four years' experience as foreman performing similar work.

B. Pre-Installation Meetings:

1. Schedule, coordinate, attend, and lead pre-installation meeting per Section 01 31 19.
2. Schedule and attend meeting prior to beginning work.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. Product Data: All products in this section.
- C. Operation and maintenance data for gate valves.
- D. Certification: Certification of accuracy for test gage.
- E. Closeout Submittals: Record Drawings:
 1. Record actual locations of piping mains, sizes, valves, connections, and invert elevations.
 2. Record location of utilities and structures encountered and not shown or not in agreement with Drawings.
 3. Record changes in soil conditions not noted on Drawings.

4. Prepare record drawings per Section 01 78 00 and City of Chehalis requirements.

1.6 REGULATORY REQUIREMENTS

- A. Comply with City of Chehalis requirements.
- B. Comply with NFPA requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handle pipe, fittings, and specials to ensure delivery to site and final installation in undamaged condition. Do not damage pipe coating and lining. Keep pipe clean. Load and unload pipe and fittings using hoists in manner to avoid shock or damage. Do not drop, skid, or roll pipe against other pipe. Repair damaged coating or lining. Separate rejected pipe immediately from undamaged pipe. Remove damaged pipe from site within 24 hours.

1.8 SEQUENCING AND SCHEDULING

- A. Notify Owner 72 hours prior to making connections to existing mains.
- B. Notify Owner of service shutdown. Provide notification at least 48 hours prior to discontinuation of service, including estimated duration of shutdown.
- C. Advise Fire Marshall and Owner of proposed water shut off that will affect hydrants, fire sprinkler systems, alarm systems, and other services.
- D. Maintain water systems in areas of site to be occupied and remain in opera-

tion by Owner during construction.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with WSDOT Standard Specifications.
- B. Comply with Reduction of Lead in Drinking Water Act.

2.2 PIPE AND FITTINGS

- A. Ductile Iron Pipe: Centrifugal cast in 18 foot nominal lengths conforming to AWWA C151; cement-mortar lined conforming to AWWA C104; bituminous exterior coating conforming to AWWA C151; Standard Thickness Class 52.
- B. Non-restrained Joints: Rubber gasket, push-on type or mechanical joint (MJ) conforming to AWWA C111.
- C. Restrained Joints: Mega-lug or approved substitutes. 350-psi working pressure. Use same joint restraint throughout project.
- D. Pipe Fittings: Ductile iron short body, conform to AWWA C153, cement mortar lined per AWWA C104. Mechanical joint pressure rating 350 psi, flange joint pressure rating 250 psi.
- E. Flanged Fittings: Conform to ANSI B16.1, Class 125 drilling pattern, gas-

ket neoprene or chlorinated butyl.

2.3 STEEL PIPE AND FITTINGS

- A. Conform to ASTM A53, Schedule 40. Galvanized.
- B. Fittings: Malleable iron threaded type, pressure rating 150 psi. Conform to ANSI B16.3. Threading conform to ANSI B2.1. Material conform to ASTM A 47, Grade 32510. Fittings shall be banded and hot-dip galvanized inside and out.

2.4 TRANSITION, REDUCING, AND FLEXIBLE COUPLINGS

- A. Conform to City of Chehalis standards. Determine existing pipe size and order transition coupling with proper dimensions.
- B. Rockwell or Romac constructed with gray iron sleeves and ductile or malleable iron followers; ductile iron or electrogalvanized steel bolts and nuts; manufacturer's standard factory finish.

2.5 PIPE FOR WATER SERVICES

- A. 1/2 inch through 2-1/2 inch diameter: Polyethylene (PE) Pipe:
 - 1. Conform to AWWA C901, material PE3408, copper tube size.
 - 2. Pipe Rating: Pressure Class 200 minimum.
 - 3. Markings: bear seal of National Sanitation Foundation for potable water pipe.

4. Pipe Joints: Brass, mechanical couplers, compression joint type, with stainless steel sleeve.

2.6 VALVES AND APPURTENANCES

- A. General: Provide 2-inch square AWWA standard operating nut direct buried valves. Furnish extended stem within 2 feet of finished grade and 1/4-inch thick steel plate welded to stem as rock stop for direct buried valves with operating nuts installed 5 feet or more below finished grade.
- B. Gate Valves, 2 inches and larger to 10 inches.
 1. Seat: Resilient, wedge-type conforming to AWWA C509.
 2. Stem: Non-rising with o-ring stem seals.
 3. Joints: Mechanical or flange as noted on Drawings. Restrain joints where indicated on Drawings.
 4. Opening Direction: Counterclockwise.
 5. Pressure Rating: Service at 200 psig working and 400 psig test pressure.
 6. Internal Coating: Iron surfaces and valve body with epoxy to AWWA C550.
 7. Portion of gate exposed to line velocity: Rubber encapsulated, field replaceable, and with dual seal on mating body seal.

8. Installation: In any position with rated seating in both directions.
 9. Marking: AWWA C 509, include name of manufacturer, year of manufacture, maximum working pressure, and valve size.
 10. Acceptable products: M&H, Clow, Mueller, Kennedy, AVK.
- C. Valve Boxes: Olympic Foundry 910 or 940 per City of Chehalis Standard Plan 4-12.

2.7 Restrained Joints

- A. The restraining of ductile iron pipe, fittings, and valves shall be accomplished by the use of either a bolted or boltless system. Any device utilizing round set screws shall not be permitted.
- B. All couplings installed underground to connect ductile iron or PVC pipe shall be manufactured of ductile iron.

2.8 SERVICE SADDLE

- A. Ductile iron with double stainless steel strap, tapped IP threads.

2.9 TRACER TAPE

- A. Terra Tape D or approved substitute.

2.10 TONING WIRE

- A. Green, UL listed, Type UF, 14-gauge coated copper.

2.11 IRRIGATION SLEEVES

- A. Schedule 40 PVC.

2.12 POLYETHYLENE FILM

- A. AWWA C105.

2.13 CONCRETE

- A. Type III cement, minimum compressive strength of 3,000 psi. Design mix to achieve strength prior to pressure testing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify surfaces are ready to receive Work.
- B. Verify grades are at subgrade elevation.
- C. Verify erosion control is installed and functioning.
- D. Verify field measurements are as shown on Drawings.
- E. Verify location, size, and type of existing utilities at point of connection and at points of crossing other utilities. Pothole, expose pipes, determine invert elevations, verify with design, and inform Engineer of deviations affecting design prior to mobilizing crews and beginning construction.
- F. Verify and coordinate location and elevation of plumbing stub out and ad-

just locations to match.

- G. Field locate and mark existing utilities, whether shown or not, prior to construction, avoid damage or disturbance. Protect, maintain, and repair, where damaged. For aid in utility location call 1-800-424-5555, 48 hours (two working days) prior to beginning construction. Some utilities cannot be located by Dial Dig. Provide and pay for additional marking as required.

3.2 PREPARATION

- A. Protect surrounding Work from damage or disfiguration. Protect adjacent pavement remaining in service from damage.
- B. Protect existing utilities from damage and disturbance. Provide shoring to support existing utilities and their support prism or remove and replace utilities where shoring is not practical. Removing and replacing utilities to be performed per utility owner's standards.
- C. Erect barriers and barricades to direct and protect adjacent traffic.
- D. Maintain water service to existing buildings. Coordinate with Owner and Engineer to determine time and duration of required water system shut-downs. Provide temporary watermain as needed to ensure uninterrupted service during construction.
- E. Field stake alignment and grade. Comply with City of Chehalis requirements.

3.3 EXECUTION

- A. Excavation and Backfill: Comply with Section 31 23 35. Provide extra width trench as necessary where deflecting pipe. Excavate to depths required to provide minimum cover as indicated on Drawings. Excavate deeper as required to accommodate changes in grade, vaults, connections, or to install pipe under existing pipelines or other utilities. Adjust pipe depth at connection to existing main. Adjust pipe profile to pass below conflicting utilities. Provide minimum 12-inch clearance. Depth Adjustments: 2 feet or less at no adjustment in cost.
- B. Installation of Pipe and Fittings:
1. Inspect pipe for structural defects and defects in coating and lining before it is placed in trench. Clean pipe fittings and valves of dirt and foreign material as they are placed. Plug open ends of pipe and fittings with temporary water-tight plug whenever Work is stopped or when water in trench threatens to enter pipe. Keep groundwater from entering pipe at all times. Lay and maintain pipe to required lines with fittings and valves at required locations and valve stems plumb. Lay pipe in accordance with manufacturer's instructions and to AWWA standards for type of pipe being installed. Construct pipelines to provide cover shown on Drawings. Slope need not be constant, but install pipelines so no high or low points exist in finished line except at locations of fire hydrants, blow offs, air/vacuum valves, or future pipe extensions.
 2. Alignment of Pipe: At conflicts with other utilities, such as tele-

phone, power, and existing water mains, realign pipe subject to approval of Engineer.

3. Cutting Pipe: Cut pipe smooth, even, and square. Remove chips and cuttings from interior of pipe. Bevel cut pipe ends to prevent damage to gaskets during installation.
4. Laying of Pipe on Curves: Long radius curves, either horizontal or vertical, may be laid with standard pipe by deflecting joints. If pipe is shown curved on Drawings and no special fittings are shown, assume curves can be made by deflecting joints with standard lengths of pipe. Do not exceed 50 percent of manufacturer's printed recommended deflection at each pipe joint when pipe is laid on horizontal or vertical curve. Where field conditions require deflection or curves not anticipated by Drawings, Engineer will determine methods to be used. Additional payment will not be made for laying pipe on curves nor for field changes involving standard lengths of pipe deflected at joints. When rubber gasketed pipe is laid on curve, join pipe in straight alignment and deflect to curved alignment.

Make trenches wider on curves for this purpose.

- C. Installation of Valves and Valve Boxes: Upon delivery at job site, open valves to prevent collection of water in valve. Clean valve interior of foreign matter and inspect both in open and closed position prior to installation. Set valves and valve boxes plumb except where otherwise indicated on Drawings, and

place valve boxes over valve or valve operator so valve box does not transmit shock or stress to valve. Tamp backfill carefully around valve box to distance of 3 feet on sides or to undisturbed face of trench if it is closer. Provide concrete tie down at valves indicated on Drawings.

- D. Reaction Blocking (Thrust Blocking): Furnish and install cast-in-place concrete reaction blocking at plugs, caps, tees, bends deflecting more than 11 degrees and where indicated on Drawings. Cast concrete directly against undisturbed trench wall. Place PE sheeting between pipe and concrete. Form blocking should not obstruct access to pipe joints or fittings. Size thrust block per detail on Drawing. Increase thrust blocking size for existing soils conditions as directed by Engineer.
- E. Restrained Joints: Provide restrained joints at fire hydrant laterals and other locations where shown on Drawings. Restrained joints may be used at vertical bends in lieu of gravity thrust block. Install lengths of restrained pipe from each side of fittings at vertical bends as indicated on Drawings or as determined by Engineer. Minimum 45 feet of restrained joint pipe each side of restrained fitting. Install per manufacturers' recommendations.
- F. Connection to Existing Water Mains:
1. Expose existing pipe and verify diameter and proper material type and sizes prior to beginning Work.
 2. Comply with City of Chehalis and WSDOT requirements.

3. Connection to existing water mains shall be performed by Contractor.
4. Use prechlorinated pipe valves and fittings.
5. Do not connect new construction to existing water mains until new system is pressure tested, disinfected, flushed, purity tested, and approved by Engineer.

G. Flexible Couplings:

1. Install in accordance with manufacturer's instructions.
2. Wrap buried flexible couplings with two layers of PE film extending minimum of 3 feet each side of center of flexible coupling over lap joints in film minimum 6 inches.

H. Vertical Bends:

1. Fabricate vertical bends on water main 4 inches in diameter and larger with restrained joint ductile iron pipe.
2. Provide minimum 45 feet restrained joint pipe on each side of vertical bend or as shown on Plans where restrained joint pipe is called out.

3.4 PRESSURE TESTS

- A. Comply with City of Chehalis and WSDOT requirements.

- B. Notify Owner's Representative 48 hours prior to required inspection time.
- C. Provide test equipment and personnel to prepare for and perform test.
- D. Pressure Tests: Backfill pipeline sufficiently to prevent movement of pipe under pressure. Place reaction blocking and allow concrete to cure and reach specified strength before testing. Repair damage due to failures at no cost to Owner.
- E. Furnish pumps, test gages, plugs, saddles, corporation stops, miscellaneous hose, piping, and other equipment necessary to fill pipeline with water and complete hydrostatic test. Furnish 4.5-inch minimum diameter test gage having 0 to 300 psi range with 1/4 of 1 percent accuracy accompanied with certifications of accuracy from laboratory approved by Engineer. Fill water main only through backflow prevention device supplied by Contractor and approved by City of Chehalis.
- F. Prior to testing, fill pipeline with water and allow to stand under pressure sufficient time to allow escape of air and, if applicable, allow pipe lining to absorb water.
- G. Test pipelines and connecting piping in sections between temporary caps or valves by admitting water to line gradually to full test pressure. Testing against closed valves will be permitted provided pressure differential across valve does not exceed rated working pressure of valve.
- H. Hydrostatically test water mains and appurtenances 6 in diameter and

larger at 225 psi. Apply test pressure at low end of section of water main being tested. Vent air in pipe prior to test.

- I. Test by pressurizing main to required pressure, stop pump for 15 minutes, and then pressurize main to test pressure again. Observe section being tested to detect visible leakage. Use clean container for holding water for pressurizing main being tested. Sterilize makeup water by adding chlorine to concentration of 50 mg/l. Accurately determine water quantity required to restore pressure by pumping through positive displacement water meter with sweep unit hand registering 1 gallon per revolution. Use meter approved by City of Chehalis and WSDOT. Test acceptability will be determined as follows: WSDOT Standards Specifications Section 7-09.3(23). There shall not be appreciable or abrupt loss in pressure during 15-minute test period.
- J. Limit sections to be tested normally to 1,500 feet. Engineer may require first section of pipe, not less than 1,000 feet in length, be tested in order to qualify crew and material. Do not continue pipe laying more than additional 1,000 feet until first section has been tested successfully.
- K. Perform hydrostatic tests on every complete section of water main between valves, or as directed by Engineer. Each valve side shall withstand same test pressure as pipe, with no active pressure in pipe section beyond closed valves. Make tests with hydrant auxiliary gate valves open and pressure against hydrant valve. After test is completed, each gate valve will be acceptable if there is no immediate loss of pressure on gage when pressure is applied to valve being checked. Verify pressure differential across valve

does not exceed rated test pressure of valve.

- L. When hydrants are included with section of main pipe to be tested, conduct testing in two separate tests as follows:
 - 1. Test No. 1 - Water main gate valves and hydrant auxiliary gate valves closed, with hydrant operating stem valves and hose ports wide open.
 - 2. Test No. 2 - Water main gate valves and hydrant operating stem valves tightly closed but hydrant auxiliary gate valves and hose ports wide open.
- M. Correct visible leakage detected regardless of allowable leakage specified above. Should tested section fail to meet pressure test successfully as specified, locate and repair defects and retest pipeline at no cost to Owner.
- N. Prior to notifying Engineer to witness pressure test, have equipment set up completely, ready for operation, and have tested successfully to ensure pipe is in satisfactory condition.

3.5 DISINFECTION OF WATER MAINS

- A. Before being placed in service, chlorinate and obtain satisfactory bacteriological report for new water mains and repaired portions of, or extensions to, existing mains.
- B. Flush pipe (including private fire lines not receiving sterilization) prior to disin-

fection to remove solids or contaminated material that may have become lodged in pipe. If no hydrant is installed at end of main, provide tap large enough to develop velocity of at least 2.6 fps in main. Provide taps required for temporary or permanent release of air and chlorination or flushing purposes. Where dry calcium hypochlorite is used for disinfection of pipe, perform flushing after disinfection. Dispose of treated water flushed from mains and neutralize wastewater for protection of aquatic life in receiving water before disposal into natural drainage channel. Dispose disinfecting solution during test to Engineer's and local authorities' satisfaction. If approved by sewer system owner, disposal may be made to available sanitary sewer provided rate of disposal will not overload sewer.

- C. Sterilization: WSDOT Standard Specifications Section 7-09.3(24)B.
- D. Preventing Reverse Flow: Do not make connections between existing distribution system and pipelines not disinfected and constructed under this Contract without DSHS approved back flow preventer installed in connecting line.
- E. Chlorinating Connections to Existing Water Mains: Follow chlorinating procedure as specified in AWWA C651. Swab closure fittings with very strong chlorine solution (5 to 6 percent Cl).

3.6 FINAL FLUSHING AND TESTING OF MAINS

- A. Following chlorination, flush treated water from newly laid pipe until replacement water throughout its length shows, upon test, absence of chlorine. In event chlorine is normally used in supply source, then tests shall show resid-

ual not in excess of that carried in system.

- B. Dispose of chlorinated water according to Department of Ecology and Department of Fish and Wildlife requirements. Neutralize water for protection of aquatic life in receiving water before disposal into drainage system.
- C. Locate sample tap ahead of flushing hose for convenience and sanitary sampling.
- D. Before placing lines into service, satisfactory report shall be received from certified test lab on samples collected from representative points in new system. Samples shall be collected and bacteriological tests obtained by Contractor. Costs of water sample analysis shall be borne by Contractor as incidental Work to water main installations.
- E. Should initial treatment result in unsatisfactory bacteriological test, repeat original chlorination procedure until satisfactory results are obtained. Failure to obtain satisfactory bacteriological test will be considered as failure to keep pipe clean during construction or to chlorinate main as specified. Additional chlorination required to obtain satisfactory test result shall be at no additional cost to Owner.

END OF SECTION

SECTION 33 40 00
STORM DRAIN UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Storm drains.
2. Manholes, catch basins, and clean outs.
3. Pipe outlets and inlets.

B. Footing drain.

1.2 RELATED SECTIONS

- A. Section 01 57 13 – Temporary Erosion and Sedimentation Control.
- B. Section 31 20 00 – Earth Moving.
- C. Section 31 23 35 – Excavating, Backfilling, and Compacting for Utilities and Structures.

1.3 REFERENCE STANDARDS

- A. WSDOT Standard Plans – Washington State Department of Transportation. Standard Plans for Road, Bridge, and Municipal Construction, current edition.
- B. WSDOT Standard Specifications – Washington State Department of Transportation 2018 Standard Specifications for Road, Bridge, and Municipal Construction.
- C. City of Chehalis Standards.

1.4 QUALITY ASSURANCE

- A. Qualifications: Crew Foreman: Minimum six years' working experience and four years' experience as foreman performing similar work.

- B. Regulatory requirements:
 - 1. Comply with City of Chehalis Standards.
 - 2. Comply with WSDOT Standards.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Pipe, fittings, manholes, catch basins, yard drains, castings, and accessories.
- C. Manufacturers' Installation Instructions: Indicate special procedures required to install products specified.
- D. Record Documents:
 - 1. Submit under provisions of Section 01 77 00 and 01 78 00.
 - 2. Accurately record actual locations of pipe runs, connections, and invert elevations.
 - 3. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
 - 4. Prepare record drawings according to City of Chehalis requirements
- E. Samples:
 - 1. Submit under provisions of Section 01 33 00.
 - 2. Submit minimum 50-pound sample for each material four business days prior to placing material.
- F. Quality assurance/control submittals:
 - 1. Test Reports: Sieve analysis for each material.

1.6 SEQUENCING AND SCHEDULING

- A. Maintain on-site storm drainage during construction.
- B. Construct erosion control facilities as shown in Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Structural Fill: Section 31 20 00.
- B. Pipe Bedding: Section 31 23 35.
- C. Drain Rock: Section 31 20 00.
- D. Perforated Pipe: Section 33 40 00.
- E. Concrete: Section 32 13 13.
- F. Storm Drain Pipe: In accordance with WSDOT Standard Specifications Section 9-05. Comply with City of Chehalis standards. Acceptable pipe materials:
 - 1. Corrugated Polyethylene Storm Sewer Pipe according to WSDOT Standard Specifications Section 9-05.20.
 - 2. PVC according to WSDOT Standard Specifications Section 9-05.12.
- G. Catch Basins, Inlets, and Yard Drains:
 - 1. Type 1 Catch Basins: WSDOT Standard Plan B-5.20-01.
 - 2. Yard Drain: Small catch basin type. Cement concrete. H-20 loading cast iron frame and grate.
- H. Metal Castings: Load ratings: HS20. Locking type.
- I. Grates in pedestrian access areas to comply with ADA requirements.
- J. Catch Basin Frame and Grate: WSDOT Standard Plan B-5.20. Comply with ADA requirements at pedestrian areas.
- K. Solid Ring and Cover: WSDOT Standard Plan B-30.70-03. Lettering: "DRAINAGE".

L. Perforated Pipe:

1. Pipe and Coupling Bands: WSDOT Standard Specifications
Section 9-05.2
2. Acceptable Pipe Materials:
 - a. PVC, WSDOT Standard Specifications Section 9-05.02(6), ASTM
D3034, SDR 35.
 - b. ADS N-12 or approved substitute
3. Perforations: 1/2-inch-diameter holes on 60-degree radial lines, 8 inches on
center.

M. Geotextile Fabric: Non-woven. WSDOT Standard Specifications

Section 9-33.2(1), Table 3.

2.2 SOURCE QUALITY CONTROL

A. Tests and Inspections:

1. Tests and analyses of aggregate material will be performed in accordance
with WSDOT Standard Specifications.
2. If tests indicate materials do not meet specified requirements, change
material and retest.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions: Verify as follows:
1. Verify survey benchmark and intended elevations for Work are as indicated.
 2. Verify excavation is ready to receive Work; and excavations, dimensions, and elevations are as indicated on Drawings.
 3. Verify existing utilities have been marked.
 4. Verify erosion control is in place and operating properly.
 5. Verify inverts at points of connection. Pothole, expose pipes, determine invert elevations, verify with design, and inform Engineer of deviations affecting design prior to mobilizing crews and beginning construction.
 6. Verify vegetation to remain is protected and marked prominently.
 7. Verify removal of abandoned utilities is complete.

3.2 PREPARATION

- A. Protection:
1. Locate existing utilities, avoid damage or disturbance. For aid in utility location, call "Dial Dig 811," 48 hours (two working days) prior to beginning construction. Dial Dig cannot locate utilities. Provide and pay for additional marking as required.
 2. Protect and maintain existing utilities that are to remain.
 3. Protect utilities to be abandoned until they have been abandoned.
 4. Protect plant life, lawns, and other features remaining as portion of final landscaping.
 5. Protect benchmarks, existing structures, sidewalks, paving, and curbs.

6. Use all means necessary to prevent erosion of freshly graded areas during construction or until such time that permanent drainage and erosion control measures are fully operational.

3.3 PREPARATION

- A. Survey and stake limits. Slope stake toe and top of cuts and fills. Construct orange fence at construction limits.
- B. Identify required lines, levels, contours, and datum. Should indicated figures conflict with actual conditions, notify Engineer, and await direction before proceeding.
- C. Verify elevations where matching existing grade. Notify Engineer where grading to match existing creates adverse effects, such as blocking grading, abrupt change in grade, slopes steeper than allowed.

3.4 CONSTRUCTION

- A. Excavation:
 1. Comply with Section 31 23 35.
 2. Comply with Section 31 13 16.
 3. Use hand tools or air vacuum equipment for excavation within tree protection zone.
 4. Remove large stones or other hard matter that could damage piping or impede consistent backfilling or compaction.
- B. Pipe:
 1. Install in accordance with manufacturer's recommended procedures, ASTM Standards, and WSDOT Standard Specifications.
 2. Maintain line and grade according to Drawings.

3. Join pipe in accordance with manufacturer's recommended procedure and WSDOT Standard Specifications.
 4. Connect pipe at structures using non-shrink grout per 9-20.3(2)
 5. Comply with WSDOT Standard Specifications Section 7-04.3.
- C. Catch Basins and Storm Drain Manholes:
1. Comply with WSDOT Standard Specifications Section 7-05.
 2. Form bottom of excavation, clean and smooth to correct elevation.
 3. Place base sections on 12 inches minimum compacted thickness bedding. Smooth and level to ensure uniform contact and support. Where subgrade cannot be compacted due to excess moisture, provide lean concrete pad minimum 12 inches thick.
 4. Extend bedding to limits of excavation.
 5. Compact bedding 95 percent of maximum density. Verify alignment and elevation of entering pipes.
 6. Construct structures plumb and level.
 7. Make completed manhole rigid, true to dimensions, and watertight.
 8. Connect pipe using non-shrink grout per 9-20.3(2)
 9. Backfill evenly around structure to prevent displacement and unequal stresses.
 10. Wet lift holes and fill with mortar inside and out.
 11. Smooth and point structure joints inside and out. Ensure water tightness.
 12. Remove loops flush with inside wall surface after manhole has been completed for precast manhole elements where steel loops have been provided in lieu of lift holes.
 13. Remove sharp cutoff protrusions. If concrete spalling occurs as result of loop

removal, restore spalled area to uniform smooth surface with cement mortar.

- D. Backfilling: Comply with Section 31 23 35.

3.5 FIELD QUALITY CONTROL

- A. In accordance with Section 01 40 00.
- B. Low-Pressure Air Test: WSDOT Standard Specifications Section 7-17.3(12)F.
- C. Television Inspection:
 - 1. Pay for sewer main television inspection.
 - 2. Coordinate, schedule, and provide assistance to City of Chehalis work force for television inspection.
 - 3. Television inspection will be performed by City of Chehalis work force.
- D. Site Tests and Inspection: Section 31 23 35.

3.6 CLEANING

- A. Prior to final acceptance, flush out accumulated construction debris and remove other foreign matter from storm drains. Do not allow flushed material to enter downstream system.

3.7 PROTECTION

- A. Protect completed work from damage. Protect slopes from erosion.

END OF SECTION

SECTION 40 75 00
PROCESS LIQUID ANALYTICAL MEASUREMENTS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Work Included: This Section specifies analytical instruments for process instrumentation, auxiliary equipment, and supplies directly related to the installation of and operation of these analytical instruments, to perform the required functions in conjunction with the drawings.

B. Equipment specified herein is within the scope of the contractor.

1.02 SUBMITTALS

Submit material or equipment data in accordance with the requirements of 01 33 00.

Shop Drawings: In addition to the requirements of 01 33 00, shop drawings shall include for each type of instrument: supply voltage and frequency, electrical load, accuracy, description of operation, operating instructions, and calibration procedure.

Installation Method: Provide proposed method and manufacturer recommendations for mounting sensors or probes and instruments with submittal.

Parts List: Submit a Parts List with current net prices and a list of recommended spares.

Manuals: Furnish manufacturer's installation, operation and maintenance manuals, bulletins, and spare parts lists.

Submit the completed calibration and commissioning test data forms.

1.03 QUALITY ASSURANCE

Manufacturer: Analytical instruments furnished shall be manufactured by firms regularly and currently engaged in the design and manufacture of similar equipment. All equipment furnished shall be new and of current design.

Maintainability: All equipment shall be designed for ease of maintenance and repair, and access to critical parts shall not require a major disassembly. Internal field adjustments where permitted or required herein shall be easily accessible upon removal of a panel or cover.

Materials and Installation: Materials and installation shall comply with the requirements of the current editions of referenced electrical codes and standards, and the codes and standards referred to shall be used for establishing the minimum quality of the materials and equipment supplied and installed. All equipment of the same type shall be products of the same manufacturer. Capacities of all equipment shall not be less than that indicated on the Drawings or specified.

PRODUCTS

2.01 CHLORINE/PH PROBES AND ANALYZER

A. Chlorine analyzer with total/free chlorine and pH probe:

- 1) CL2 Range 0 – 10 mg/l
- 2) Manufactured by Chemtrac, Model HydroACT 2 with Free Chlorine, PN: HA2-FCI
- 3) Probe(s):
 - a) CL2 Probe – pH measuring range: 0 to 20
Corresponding part number: 17605
 - b) Dual Open Flow Cell
Corresponding part number: 17210

B. Turbidity analyzer:

- 1) Universal Smart Controller (accepts up to two inputs).
 - 2) TU90 Turbiditymeter.
 - 3) Turbidity Sensor Unit – Includes flow cell sensor electronics and electric flush valve.
 - 4) Cable Length: Contractor to field verify manufacturer cable prior to submittal review.
- 2) Manufactured by AQUASummit, Model UCX/TU90

C. Spare Parts: Provide the following spare parts:

- One CL2 probe.
- One Dual Open Flow Cell
- One turbidity bulb.
- One set of manufacturer recommended spare parts for the analyzer/transmitters.

EXECUTION

3.01 INSTALLATION

Installation, testing, calibration, validation, startup, and instruction shall be in accordance with the manufacturers installation and startup manuals.

Factory-trained personnel shall assist in the installation and calibration of the equipment.

Complete the applicable calibration and commissioning test data forms and submit to the Engineer. All testing forms and affidavits shall be submitted.

END OF SECTION

SEC. 32, T14N., R2W., W.M. CHEHALIS PUMP STATION CONSTRUCTION DOCUMENTS

PROJECT DATA:

PARCELS: 00490400000

CLIENT: CITY OF CHEHALIS
2007 NE KRESKY AVE
CHEHALIS, WA 98532
PH: 360.748.0328
CONTACT: DAVE VASILIAUSKAS

SITE ADDRESS:
278 SE ADAMS AVE
CHEHALIS, WA 98532

CIVIL ENGINEER:
SCJ ALLIANCE
8730 TALLON LANE NE, SUITE 200
LACEY, WA 98516
PH: 360.352.1465
CONTACT: BOB CONNOLLY, PE

STRUCTURAL ENGINEER:
TRANSOLYMPIC ENGINEERING, INC.
PO BOX 849
MONTESANO, WA 98563
PH: 360.339.5660
CONTACT: MARK LEINGANG, PE

ELECTRICAL ENGINEER:
PARAMETRIX, INC
710 PACIFIC AVE, SUITE 100
TACOMA, WA 98402
PH: 253.604.6724
CONTACT: ART STOKES

GEOTECH:
LANDAU ASSOCIATES, INC.
955 MALIN LANE SW, SUITE B
TUMWATER, WA 98501

SURVEYOR:
MTN2COAST LLC
1506 FAIRVIEW ST SE
OLYMPIA, WA 98501
PH: 360.239.1497
CONTACT: BLAIR PRIGGIE, PLS

UTILITIES:

STORMWATER/SEWER/WATER:
CITY OF CHEHALIS
PUBLIC WORKS DEPARTMENT
2007 NE KRESKY AVENUE
CHEHALIS, WA 98532

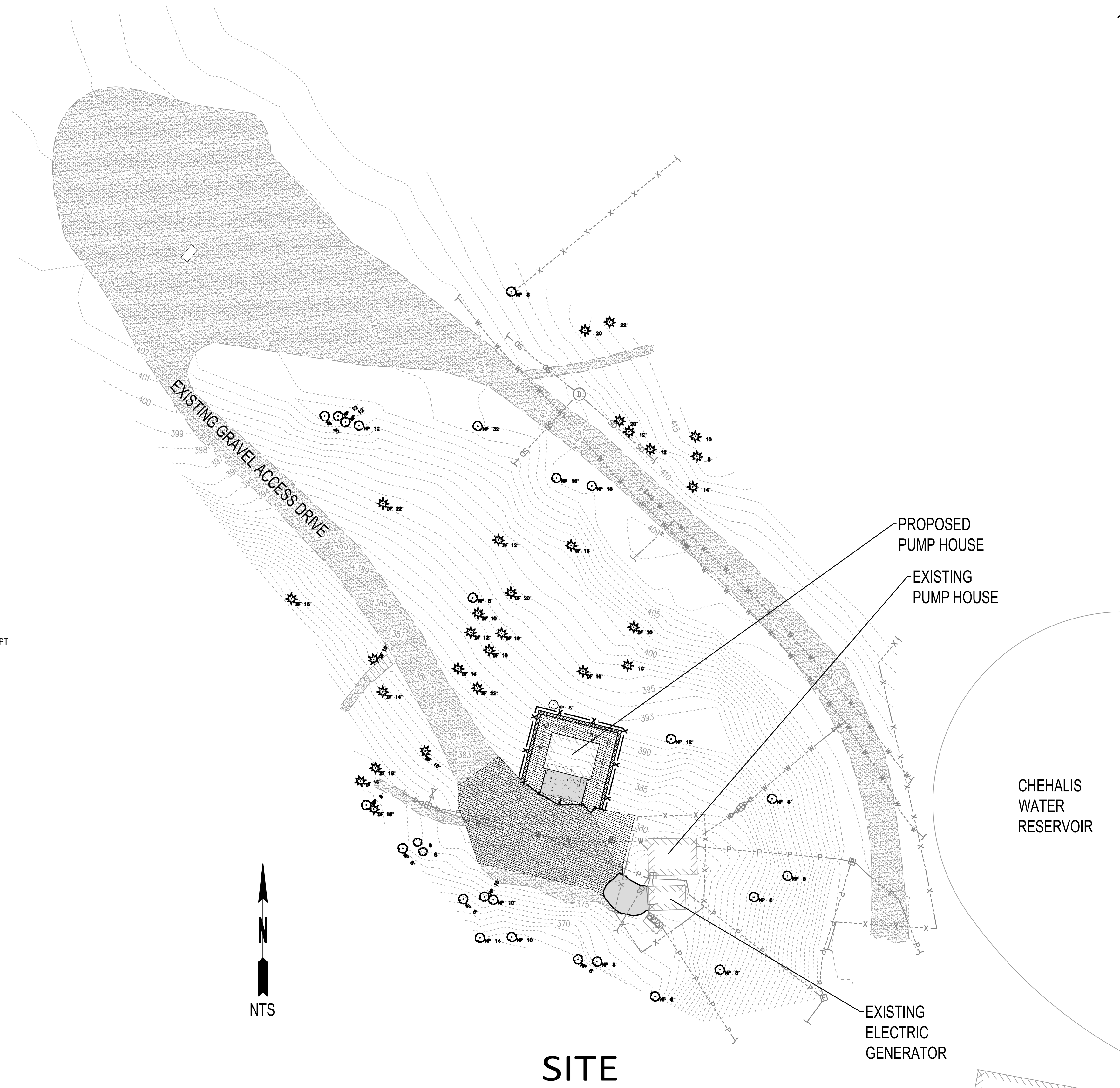
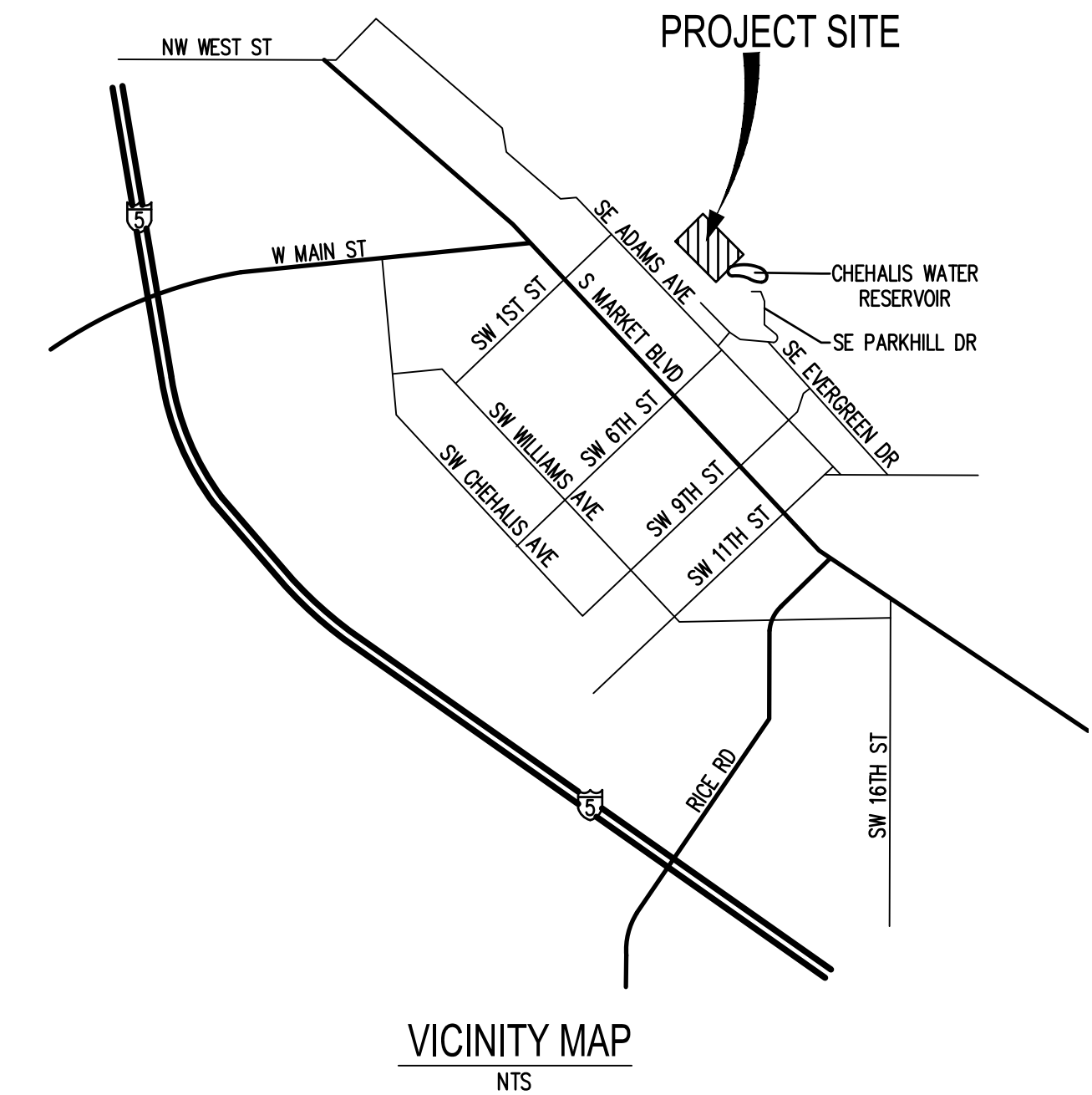
LEGAL DESCRIPTION:

SECTION 32, TOWNSHIP 14N, RANGE 02W, BLOCKS 4, 5 & 6 EXCEPT THE SOUTHWESTERLY 240 FEET OF W.M. UROUHART ADDITION

DATUM:

HORIZONTAL - WASHINGTON STATE PLANE COORDINATES, SOUTH ZONE, NAD 83/2011 BASED ON GPS TIES TO MONUMENTS USING THE WASHINGTON STATE REFERENCE NETWORK.

VERTICAL - NAD 88 BASED ON GPS TIES TO MONUMENTS USING THE WASHINGTON STATE REFERENCE NETWORK.



SHEET INDEX		
SHEET NO.	SHEET TITLE	SHEET DESCRIPTION
CIVIL PLANS		
1	C-01	COVER SHEET
2	C-02	EXISTING CONDITIONS
3	C-03	DEMOLITION AND EROSION CONTROL PLAN
4	C-04	EROSION CONTROL DETAILS AND NOTES
5	C-05	SITE PLAN
6	C-06	SITE DETAILS AND NOTES
7	C-07	GRADING AND DRAINAGE PLAN
8	C-08	GRADING AND DRAINAGE DETAILS AND NOTES
9	C-09	WATER PLAN
10	C-10	WATER PROFILES
11	C-11	WATER DETAILS AND NOTES
12	C-12	PUMP HOUSE FLOOR PLAN
13	C-13	PUMP AND PLUMBING DETAILS AND NOTES
STRUCTURAL PLANS		
14	S-01	ELEVATIONS AND NOTES
15	S-02	PUMP HOUSE PLANS AND DETAILS
16	S-03	RETAINING WALL PLAN AND DETAILS
17	S-04	RETAINING WALL AND ADD'L DETAILS
ELECTRICAL PLANS		
18	E-01	ELECTRICAL LEGEND AND ABBREVIATIONS
19	E-02	ELECTRICAL ONE-LINE DIAGRAM
20	E-03	ELECTRICAL SCHEDULES
21	E-04	ELECTRICAL DETAILS
22	E-100	ELECTRICAL SITE PLAN
23	E-101	ELECTRICAL SITE PLAN
LANDSCAPE		
24	LS-01	SITE RESTORATION PLAN
25	LS-02	RESTORATION DETAILS AND NOTES

REVISIONS	DATE	BY

SCJ ALLIANCE
CONSULTING SERVICES

8730 TALLON LANE NE SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

COVER SHEET

CHEHALIS PUMP STATION

CHEHALIS, WA

SEAL:

09/27/2019

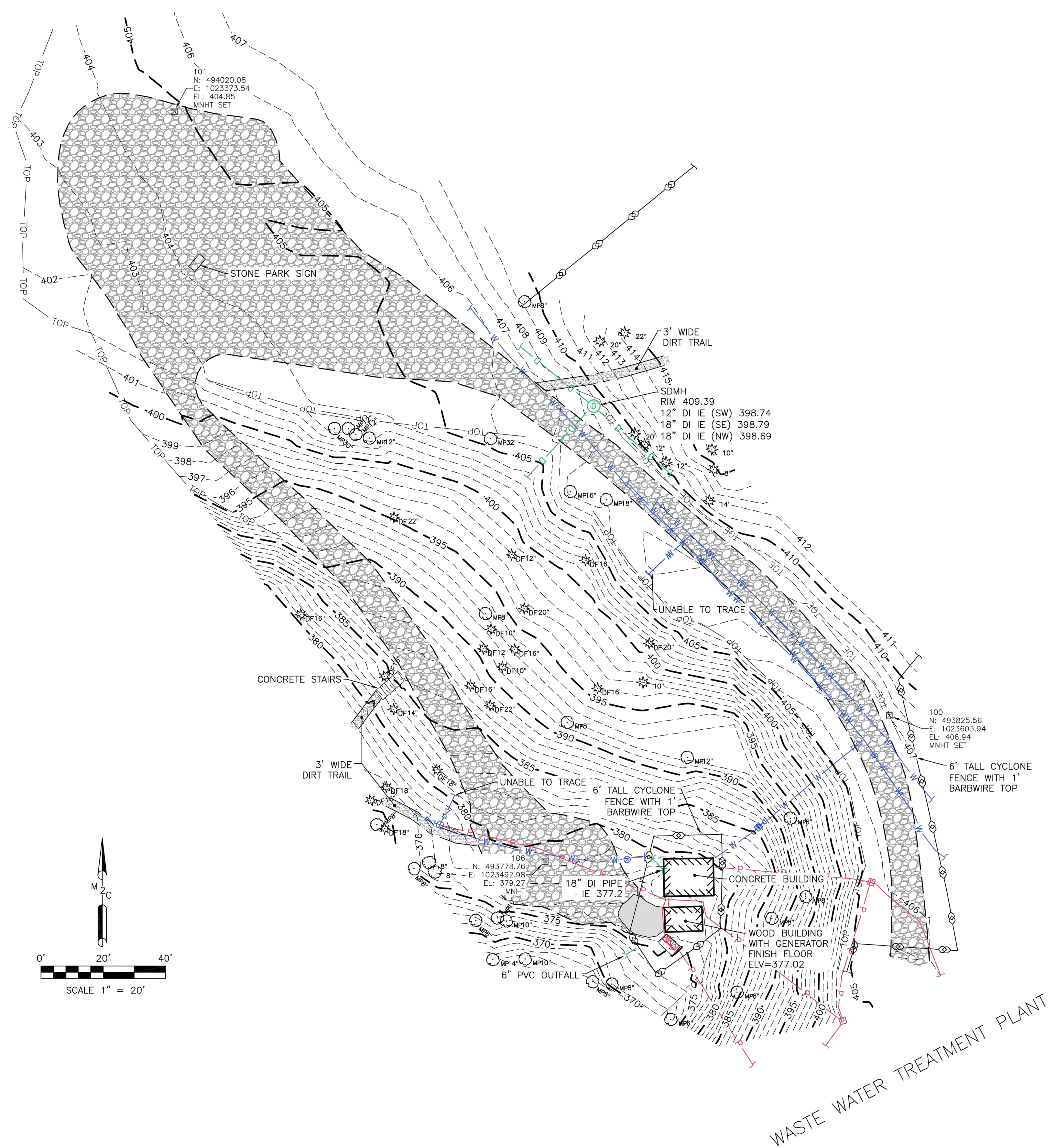
DESIGNER: B. CONNOLLY
DRAWN BY: S. EGAN
APPROVED BY: B. CONNOLLY
DATE: SEPT. 27, 2019
JOB NO: 1608.01
DRAWING FILE NO: 1608.01 CV-01
DRAWING NO: C-01
SHEET NO: 1 OF 25

Sep 27, 2019 7:46:56am - User: steve.eagan
C:\PROJECTS\1608 CITY OF CHEHALIS\1608.01 CHEHALIS PUMP STATION\PHASE 02 - SCHEMATIC DESIGN\CADD\1608.01 CV-01.DWG

CALL BEFORE YOU DIG

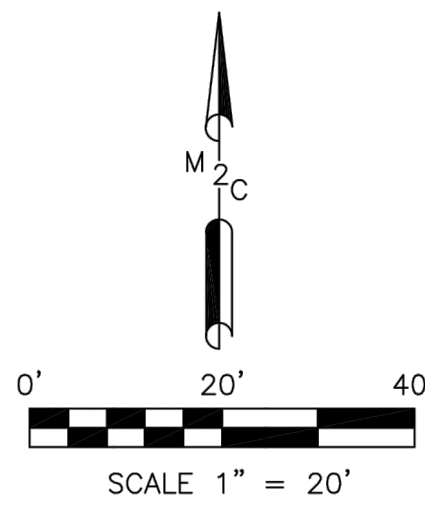
THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT (800) 424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

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NOT FOR CONSTRUCTION**



RESERVOIR TANK BASE ELEVATIONS

MTN2COAST WAS ASKED TO COLLECT BASE ELEVATIONS OF THE RESERVOIR TANKS LOCATED EAST OF THE WATER TREATMENT PLANT. MTN2COAST SET A TEMPORARY BENCHMARK ON NAVD 88 DATUM USING GPS TIES USING THE WASHINGTON STATE REFERENCE NETWORK. FROM SAID BENCH MARK MTN2COAST RAN LEVELS AROUND BOTH RESERVOIR TANKS COLLECTING SIX BASE GRADES ON EACH TANK. GRADES AROUND THE NEW TANK (FURTHEST NORTH) WERE TAKEN ON THE CONCRETE SLAB AND AVERAGED AN ELEVATION OF 608.1 ±. GRADES AROUND THE OLD TANK (FURTHEST SOUTH) WERE TAKEN ON CLOSEST ADJACENT GROUND. THE LOWEST ADJACENT GRADE WAS 613.2 AND THE HIGHEST ADJACENT GRADE WAS 615.9 WITH AN AVERAGE ADJACENT GRADE OF 614.2



LINE TYPES

	WOOD FENCE
	CHAIN LINK FENCE
	WIRE FENCE
	GROUND TOE
	STORM LINE
	SANITARY SEWER LINE
	BURIED TELEPHONE
	OVERHEAD TELEPHONE
	BURIED POWER
	OVERHEAD POWER
	WATER LINE
	NATURAL GAS LINE
	BURIED CABLE TV LINE
	BURIED FIBER OPTIC LINE
	MAJOR CONTOUR
	MINOR CONTOUR

LEGEND (UTILITIES)

	CABLE RISER/ PEDESTAL
	CABLE VAULT/MANHOLE
	DUCTILE IRON CULVERT
	LUMINAIRE WITH LONG ARM
	LUMINAIRE WITH SHORT ARM
	LANDSCAPE/YARD LIGHT
	POWER CONDUIT
	GUY ANCHOR
	GUY POLE
	POWER JUNCTION BOX
	POWER METER
	POWER POLE
	PP WITH LIGHT
	POWER TRANSFORMER
	POWER VAULT/ MANHOLE
	NATURAL GAS METER
	NATURAL GAS VALVE
	SS CLEANOUT
	SS MANHOLE
	SEPTIC TANK
	STORM CATCH BASIN
	STORM MANHOLE
	STORM CLEANOUT
	TELEPHONE CABINET
	TELEPHONE JUNCTION BOX
	TELEPHONE RISER
	TELEPHONE VAULT/MANHOLE
	WATER AIR RELEASE VALVE
	WATER BLOW OFF
	FIRE DEPARTMENT CONNECTION
	IRRIGATION CONTROL VALVE
	WATER METER
	WATER POST INDICATOR VALVE
	WATER VALVE
	WATER FIRE HYDRANT
	WATER VAULT/MANHOLE
	WELL

HATCHING

	GRAVEL
	ASPHALT
	CONCRETE
	DIRT TRAIL

LEGEND (SURFACE FEATURES)

	DECIDUOUS TREE
	CONIFER TREE
	MAPLE TREE
	DOUGLAS-FIR TREE
	STUMP
	SHRUB
	STREET SIGN (AS DESCRIBED)
	BRASS CAP
	HUB AND TACK
	IRON PIPE
	PK NAIL
	REBAR AND CAP
	REBAR AND CONTROL CAP

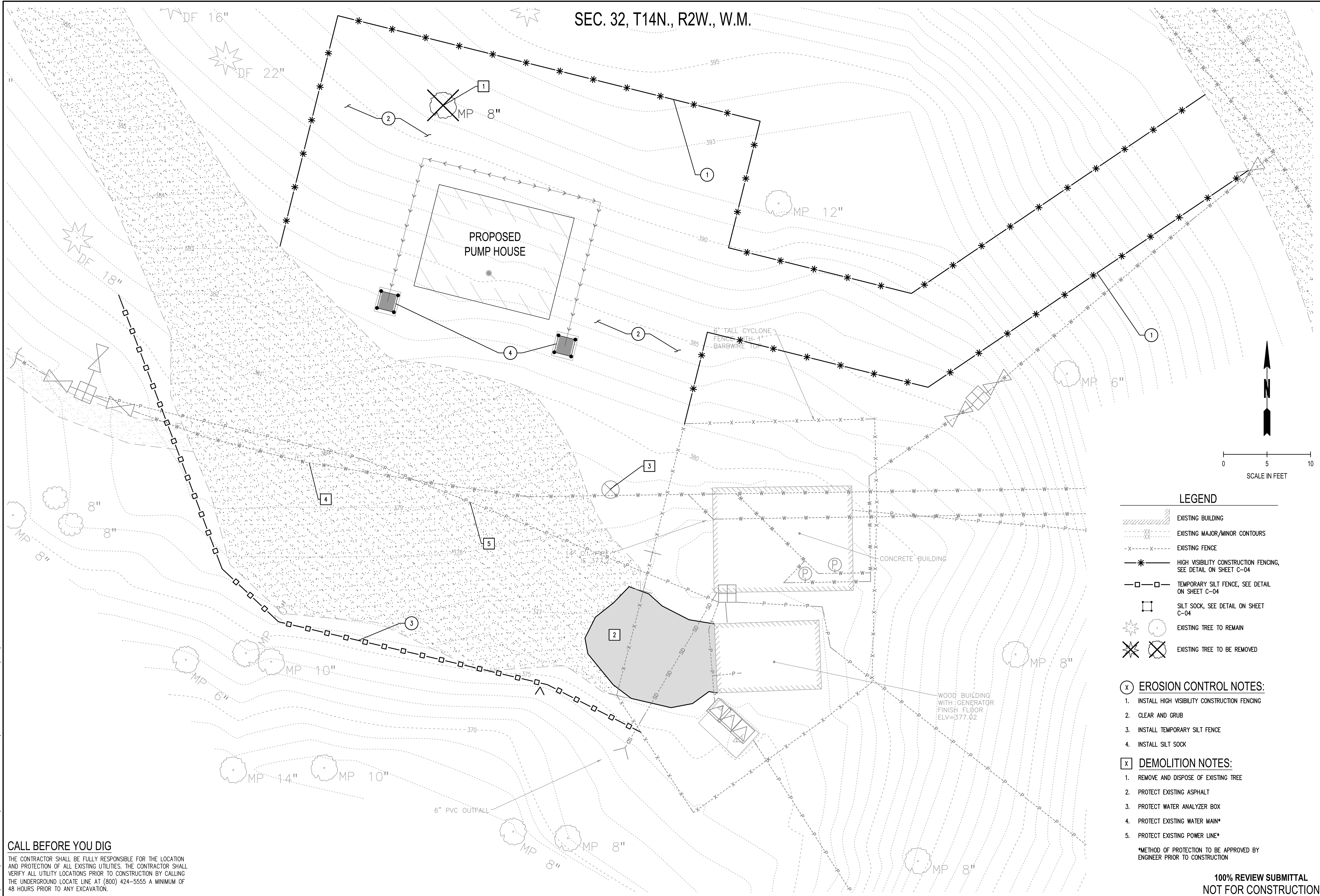
DATUM
 HORIZONTAL - WASHINGTON STATE PLANE COORDINATES, SOUTH ZONE, NAD 83/2011 BASED ON GPS TIES TO MONUMENTS USING THE WASHINGTON STATE REFERENCE NETWORK.
 VERTICAL - NAVD 88 BASED ON GPS TIES USING THE WASHINGTON STATE REFERENCE NETWORK.

UTILITY NOTE
 UTILITIES SHOWN HEREON ARE FROM MAPPING VISIBLE SURFACE APPURTENANCES AND MAPPING UTILITY PAINT MARKS FROM A UTILITY LOCATING SERVICE. BURIED UTILITIES ARE ONLY SHOWN AS APPROXIMATE AND SHOULD BE VERIFIED BEFORE CONSTRUCTION.

SURVEY NOTES
 1. INSTRUMENT USED: SOKKIA SX 3 TOTAL STATION AND TOPCON GR5 GPS.
 2. SURVEY COMPLETED 06/25/2019

DATE 06/26/2019			PROJECT NAME: CHEHALIS PUMP STATION TOPOGRAPHICAL SURVEY	SHEET NAME: SV-1
SCALE 1" = 20'			CLIENT NAME: SCJ ALLIANCE	SHEET NO. 1 OF 1
M2C PROJECT NO.: 19-993	PROFESSIONAL LAND SURVEYORS 2320 MOTTMAN RD SW, STE 106 TUMWATER, WA 98512 360.688.1949			
DRAWN PEJ				
CHECKED BEP				
APPROVED BEP				

SEC. 32, T14N., R2W., W.M.



LEGEND

- EXISTING BUILDING
- EXISTING MAJOR/MINOR CONTOURS
- EXISTING FENCE
- HIGH VISIBILITY CONSTRUCTION FENCING, SEE DETAIL ON SHEET C-04
- TEMPORARY SILT FENCE, SEE DETAIL ON SHEET C-04
- SILT SOCK, SEE DETAIL ON SHEET C-04
- EXISTING TREE TO REMAIN
- EXISTING TREE TO BE REMOVED

- (X) EROSION CONTROL NOTES:**
1. INSTALL HIGH VISIBILITY CONSTRUCTION FENCING
 2. CLEAR AND GRUB
 3. INSTALL TEMPORARY SILT FENCE
 4. INSTALL SILT SOCK
- (X) DEMOLITION NOTES:**
1. REMOVE AND DISPOSE OF EXISTING TREE
 2. PROTECT EXISTING ASPHALT
 3. PROTECT WATER ANALYZER BOX
 4. PROTECT EXISTING WATER MAIN*
 5. PROTECT EXISTING POWER LINE*
- *METHOD OF PROTECTION TO BE APPROVED BY ENGINEER PRIOR TO CONSTRUCTION

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Sep 27, 2019 7:47:19am - User: afeve@gn.com
 PROJECTS\1608 CITY OF CHEHALIS\160801 CHEHALIS PUMP STATION\PHASE 02 - SCHEMATIC DESIGN\CADD\160801 EC-01.DWG

CALL BEFORE YOU DIG
 THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT (800) 424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

REVISIONS	DATE	BY

SCJ ALLIANCE
 CONSULTING SERVICES
 8730 TALLON LANE NE SUITE 200, LACEY, WA 98516
 P: 360.352.1465 F: 360.352.1509
 SCJALLIANCE.COM

SHEET TITLE: **DEMOLITION AND EROSION CONTROL PLAN**
 PROJECT NAME: **CHEHALIS PUMP STATION**
 CHEHALIS, WA

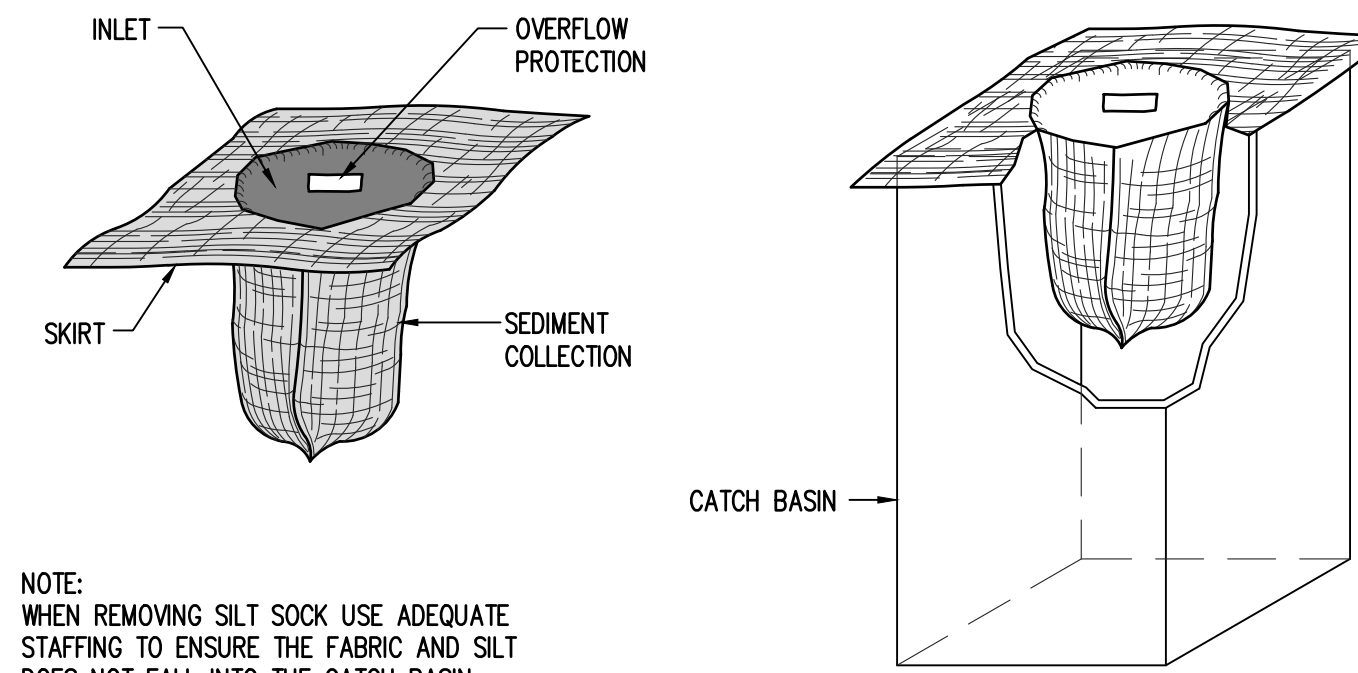


DESIGNER:	B. CONNOLLY
DRAWN BY:	S. EGAN
APPROVED BY:	B. CONNOLLY
DATE:	SEPT. 27, 2019
JOB NO.:	1608.01
DRAWING FILE NO.:	1608.01 EC-01
DRAWING NO.:	C-03
SHEET NO.:	3 OF 25

GENERAL NOTES (EROSION CONTROL):

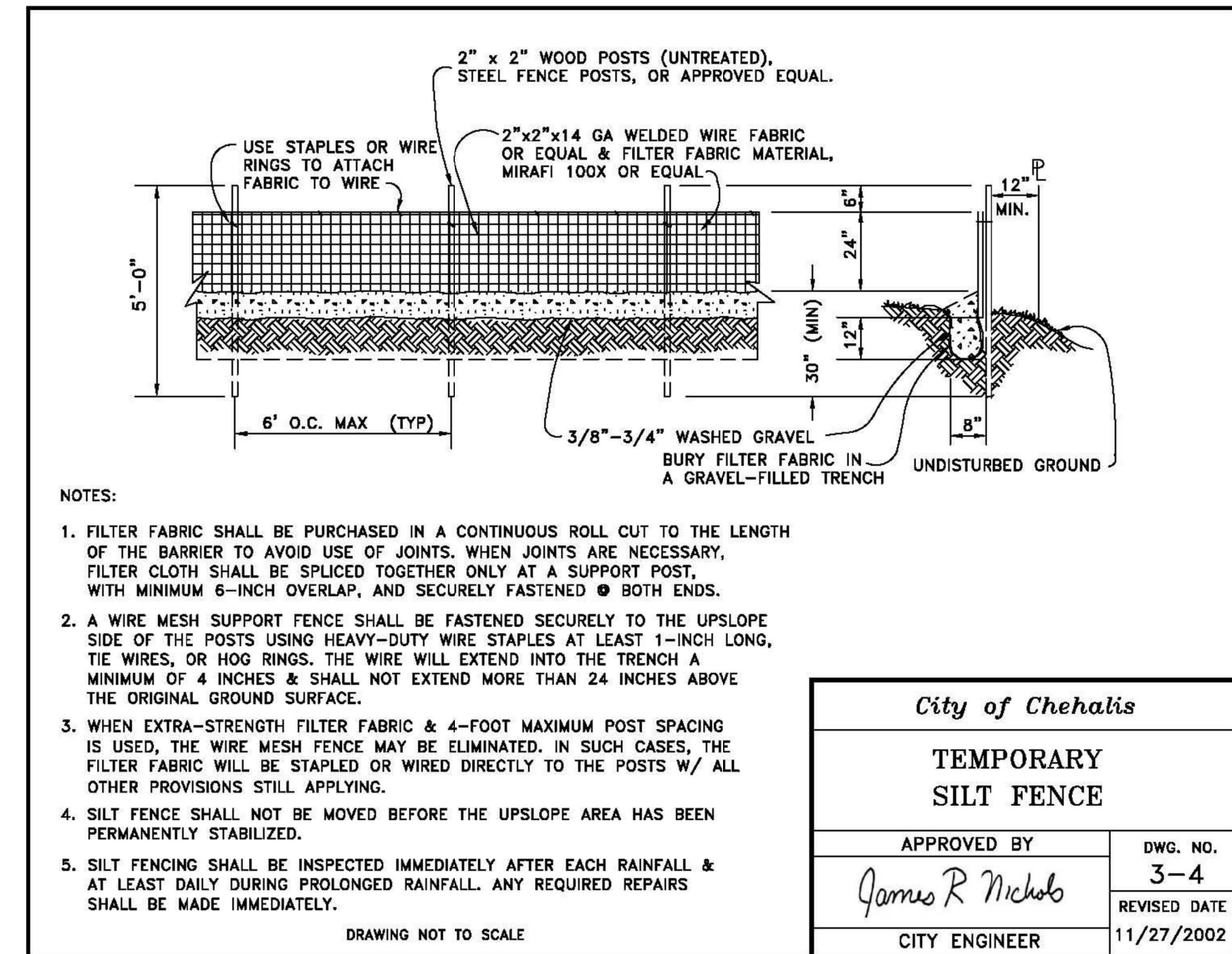
- EROSION CONTROL MEASURES WILL BE IN PLACE PRIOR TO THE BEGINNING OF CONSTRUCTION. A REPRESENTATIVE FROM THE CITY WILL INSPECT AND APPROVE THE EROSION CONTROL MEASURES PRIOR TO THE START OF CONSTRUCTION.
- EROSION CONTROL MEASURES ARE NOT LIMITED TO THE ITEMS ON THIS PLAN. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF ALL EROSION MEASURES, AS REQUIRED UNDER THE MOST RECENT VERSION OF THE CHEHALIS STORM WATER MANAGEMENT PLAN. CARE WILL BE TAKEN TO PREVENT MIGRATION OF SILT AND/OR POLLUTED RUNOFF TO OFF-SITE PROPERTIES.
- THE CONTRACTOR WILL MAKE REGULAR SURVEILLANCE OF ALL EROSION CONTROL MEASURES. IN ADDITION, EROSION CONTROL WILL BE THOROUGHLY INSPECTED AFTER EACH RAINFALL EVENT. THE CONTRACTOR WILL MAKE ALL NECESSARY REPAIRS, MODIFICATIONS, AND ADDITIONS AS NECESSARY TO ENSURE THE PROPER OPERATION OF THE EROSION CONTROL MEASURES. THE CITY MAY REQUIRE MORE FREQUENT INSPECTIONS OF EROSION CONTROL MEASURES BY THE CONTRACTOR SHOULD SITE OR WEATHER CONDITIONS DICTATE.
- DURING THE WET SEASON, NOVEMBER THROUGH MARCH, ALL DISTURBED SOILS WILL BE STABILIZED WITHIN 48 HOURS AFTER LAND DISTURBANCE ACTIVITIES HAVE CEASED. EROSION CONTROL MEASURES WILL INCLUDE, BUT ARE NOT LIMITED TO, INSTALLATION OF STRAW MATTING, JUTE MATTING, STRAW MULCH AND/OR WOOD CHIPS, AND COVERING THE AFFECTED AREA AND SPOIL PILES WITH PLASTIC SHEETING.
- THE CONTRACTOR WILL CHECK ALL SEEDED OR SODDED AREAS REGULARLY TO ENSURE THAT THE VEGETATIVE COVER IS BEING ADEQUATELY ESTABLISHED. AREAS WILL BE REPAIRED, RESEEDED, AND FERTILIZED AS REQUIRED.
- TRACKING OF SOIL OFF SITE WILL NOT BE ALLOWED. IF ANY SOIL IS TRACKED BEYOND THE LIMITS OF THE SITE, IT WILL BE REMOVED BEFORE THE END OF THAT WORKING DAY. TO PREVENT ADDITIONAL TRACKING, VEHICLE TIRES MUST BE SWEEPED OR WASHED PRIOR TO LEAVING THE PROJECT SITE.
- NO MORE THAN 500 LINEAL FEET (LF) OF TRENCH ON A DOWNSLOPE OF MORE THAN FIVE PERCENT WILL BE OPENED AT ONE TIME.
- EXCAVATED MATERIAL WILL BE PLACED ON THE UPHILL SIDE OF TRENCHES.
- EXCAVATED MATERIAL WILL NOT BE PLACED IN ESTABLISHED DRAINAGE DITCHES UNDER ANY CIRCUMSTANCES.
- TRENCH DEWATERING DEVICES WILL BE DISCHARGED IN A MANNER THAT WILL NOT ADVERSELY AFFECT FLOWING STREAMS, DRAINAGE SYSTEMS, OR OFF-SITE PROPERTIES. AN ESTABLISHED SEDIMENT TRAP WILL BE USED AS THE RECEIVER FOR ALL TRENCH DEWATERING OPERATIONS.
- ALL DISTURBED AREAS WILL BE SEEDED OR SODDED UPON COMPLETION OF WORK. THE CONTRACTOR WILL BE RESPONSIBLE TO ENSURE THAT COMPLETE COVERAGE OF THE DISTURBED AREAS IS PROVIDED AND THAT GROWTH OF VEGETATION IS ESTABLISHED. SEED AND SOD APPLICATIONS WILL BE CONDUCTED IN ACCORDANCE WITH THE TIMELINES NOTED IN THE MOST RECENT EDITION OF THE WSDOT STANDARD SPECIFICATIONS.
- ALL EROSION CONTROL WILL REMAIN IN PLACE UNTIL SUCH TIME AS THE SITE IS ADEQUATELY STABILIZED. PRIOR TO REMOVAL OF EROSION CONTROL MEASURES, THE ENGINEERING DIVISION WILL BE NOTIFIED FOR FINAL INSPECTION AND APPROVAL.

SEC. 32, T14N., R2W., W.M.

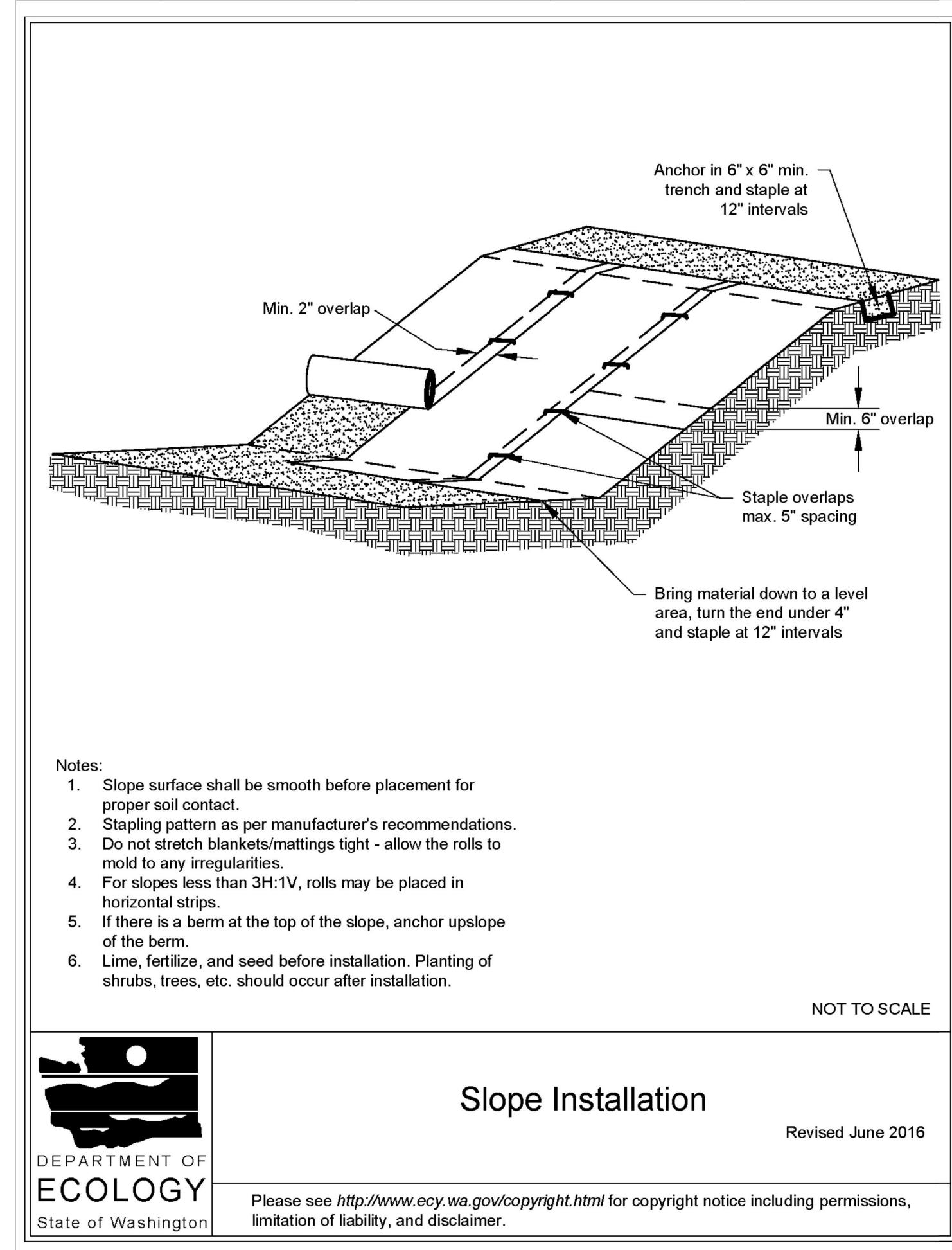


NOTE:
WHEN REMOVING SILT SOCK USE ADEQUATE STAFFING TO ENSURE THE FABRIC AND SILT DOES NOT FALL INTO THE CATCH BASIN.

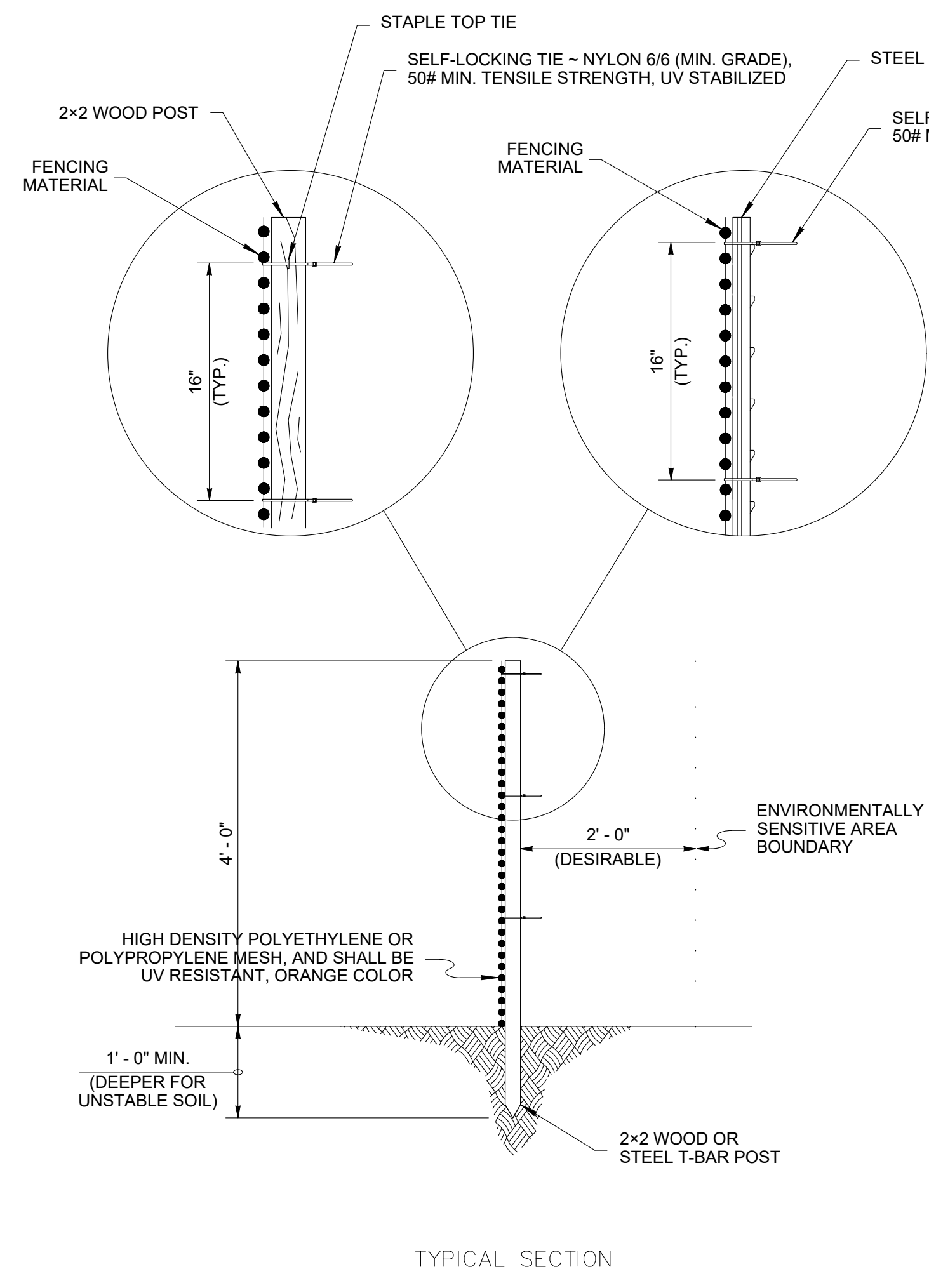
SILT SOCK DETAIL
NTS



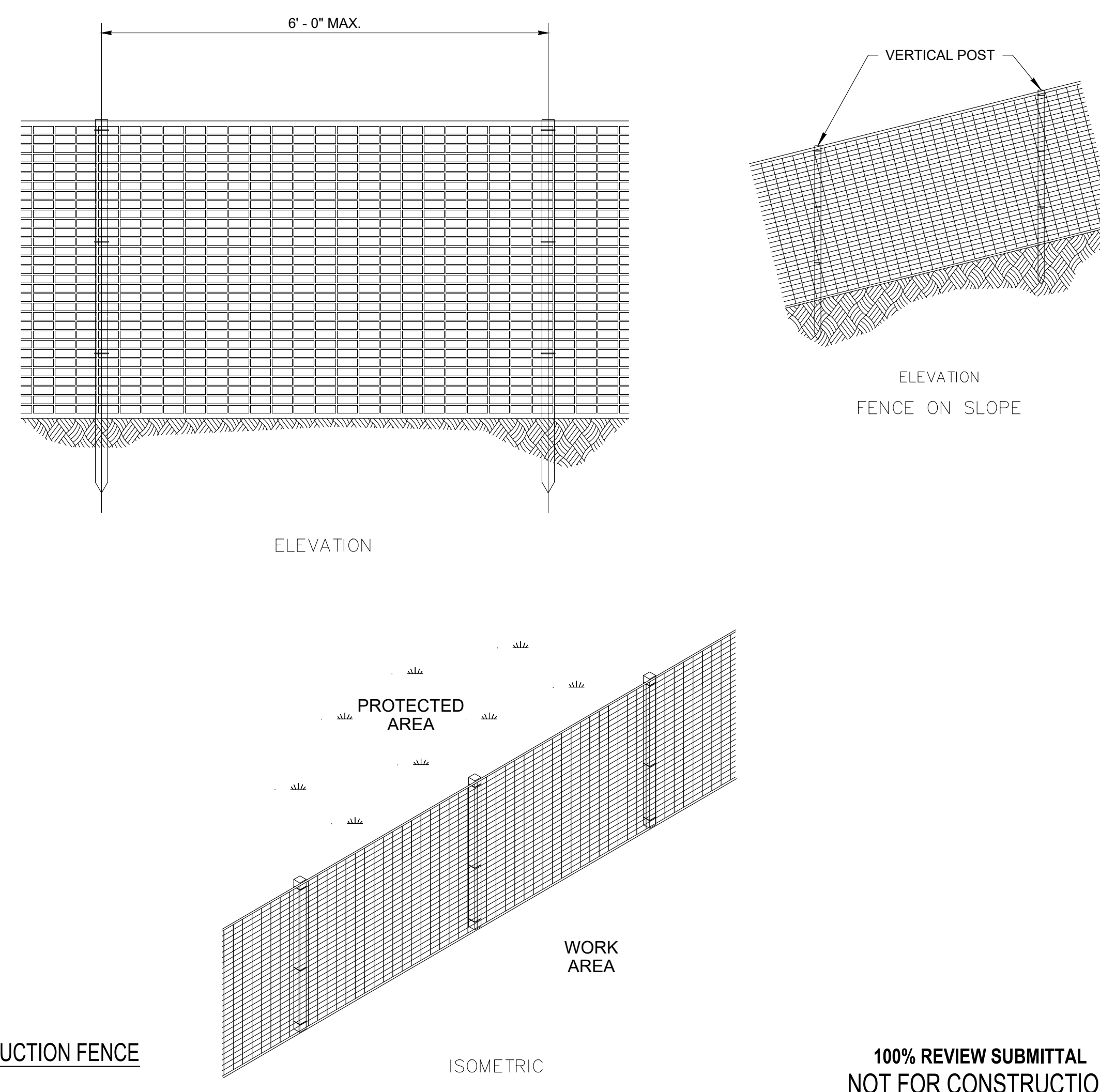
NOTE
1. Post shall have sufficient strength and durability to support the fence through the life of the project.



BMP C122 - EROSION CONTROL BLANKET/ NETTING



HIGH VISIBILITY CONSTRUCTION FENCE
NTS



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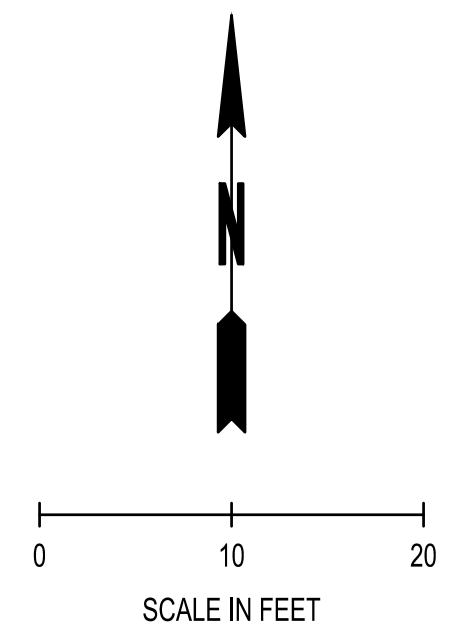
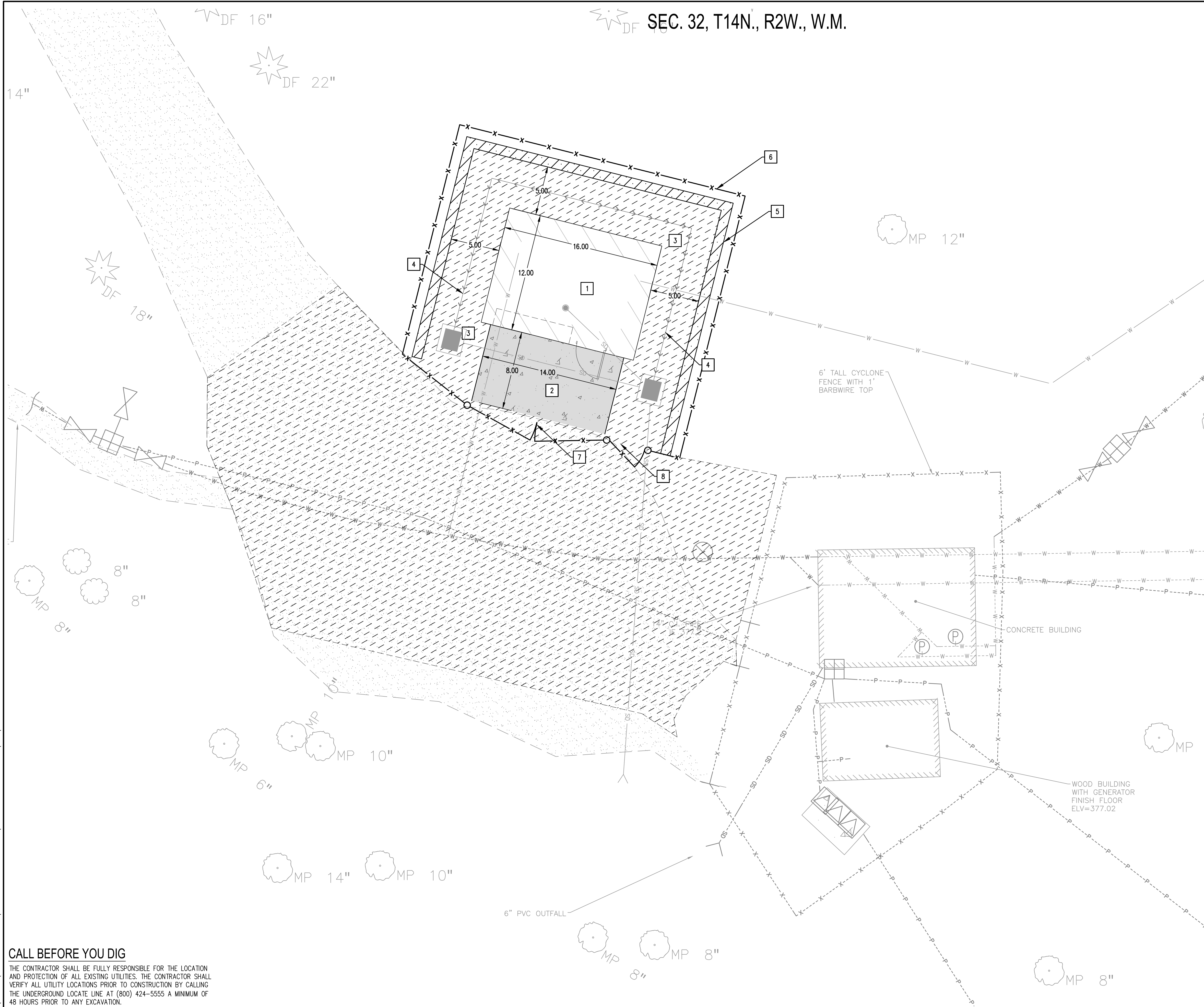
BY	
DATE	
REVISIONS	
 SCJ ALLIANCE CONSULTING SERVICES 8730 TALLON LANE NE SUITE 200, LACEY, WA 98516 P: 360.352.1465 F: 360.352.1509 SCJALLIANCE.COM	
EROSION CONTROL DETAILS CHEHALIS PUMP STATION CHEHALIS, WA	
SHEET TITLE:	
PROJECT NAME:	
SEAL:	
DESIGNER:	B. CONNOLLY
DRAWN BY:	S. EGAN
APPROVED BY:	B. CONNOLLY
DATE:	SEPT. 27, 2019
JOB NO.:	1608.01
DRAWING FILE NO.:	1608.01 CV-01
DRAWING NO.:	C-04
SHEET NO.:	4 OF 25

Sep 27, 2019 7:47:26am - User: steve.egan
 PROJECTS\1608 CV-01 - CHEHALIS PUMP STATION PHASE 02 - SCHEMATIC DESIGN\1608.01 EC-02.DWG

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THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT (800) 424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

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LEGEND

	PROPOSED BUILDING
	PROPOSED CONCRETE APRON SEE DETAIL ON SHEET C-06
	PROPOSED GRAVEL PAVING SEE DETAIL ON SHEET C-06
	PROPOSED RETAINING WALL SEE STRUCTURAL PLANS
	PROPOSED 6' CHAIN LINK FENCE W/ BARBED WIRE SEE DETAIL ON SHEET C-06

- CONSTRUCTION NOTES:**
1. PROPOSED PUMP HOUSE, SEE STRUCTURAL PLANS.
 2. CONCRETE APRON PER DETAIL ON SHEET C-06.
 3. CONTRACTOR TO GRADE AWAY FROM BUILDING TO ENSURE POSITIVE DRAINAGE WILL BE MAINTAINED AWAY FROM BUILDING FACE
 4. DRAINAGE SWALE, SEE DETAIL SHEET C-08.
 5. PROPOSED RETAINING WALL, SEE STRUCTURAL PLANS.
 6. 6' CHAIN LINK FENCE WITH 1' OF BARBED WIRE, SEE DETAIL ON SHEET C-06.
 7. 12' VEHICLE GATE W/LOCK, SEE DETAIL ON SHEET C-06.
 8. 4' ACCESS GATE W/LOCK, SEE DETAIL ON SHEET C-06.

Sep 27, 2019 7:47:40am - User: stave@agm.com
 PROJECT: 1608 CITY OF CHEHALIS (VAD001) CHEHALIS PUMP STATION PHASE 02 - SCHEMATIC DESIGN (VAD001) SP-01.DWG

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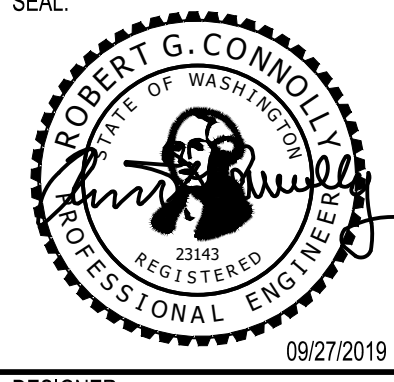
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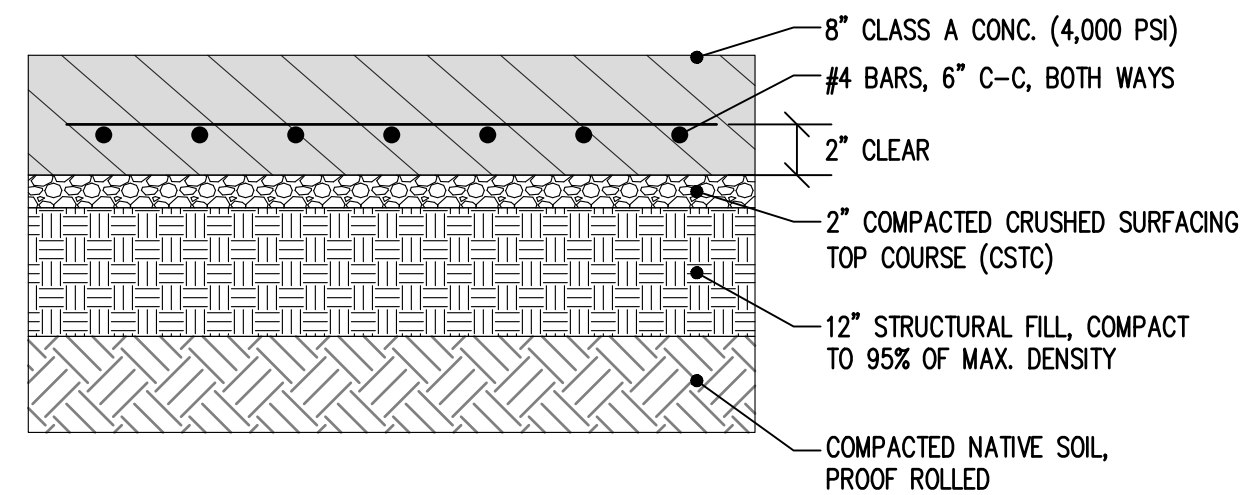
BY	
DATE	
REVISIONS	

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 CONSULTING SERVICES
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 P: 360.352.1465 F: 360.352.1509
 SCJALLIANCE.COM

SHEET TITLE: **SITE PLAN**
 PROJECT NAME: **CHEHALIS PUMP STATION**
 CHEHALIS, WA



DESIGNER:	B. CONNOLLY
DRAWN BY:	S. EGAN
APPROVED BY:	B. CONNOLLY
DATE:	SEPT. 27, 2019
JOB NO:	1608.01
DRAWING FILE NO:	1608.01 SP-01
DRAWING NO:	C-05
SHEET NO:	5 OF 25

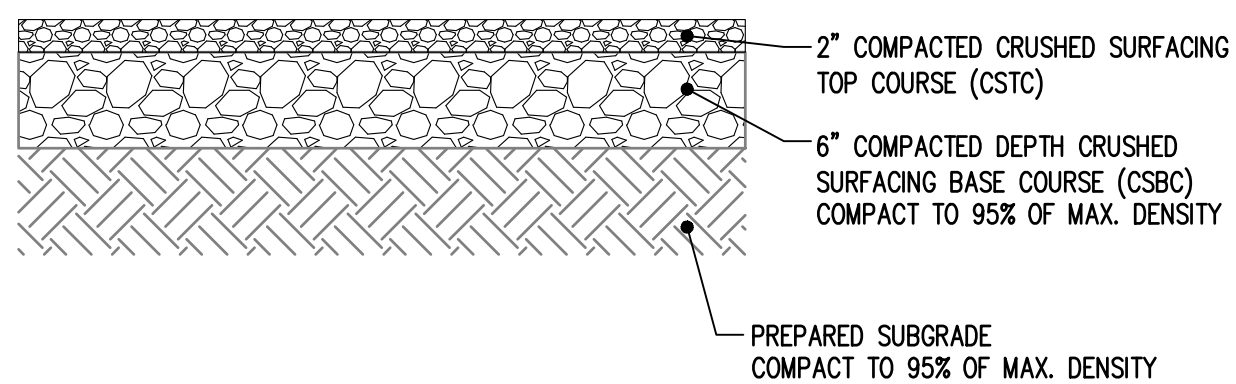


CONCRETE APRON

NTS

NOTES

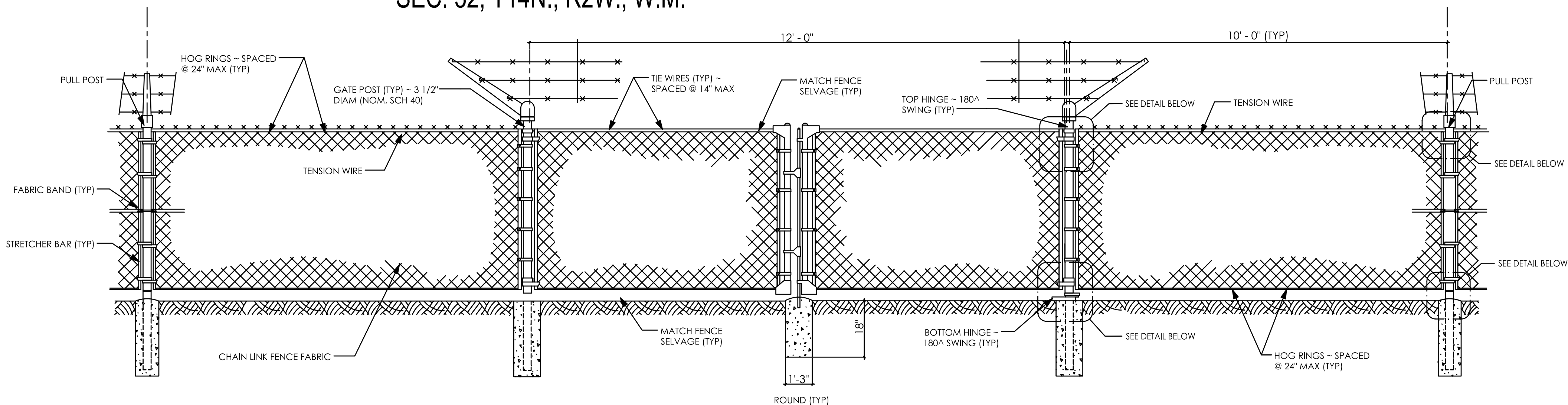
1. MATERIALS, PREPARATION, AND PLACEMENT OF PAVEMENTS, BASES AND SUBGRADES FOR THIS PROJECT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND SPECIFICATIONS OF THE GEOTECHNICAL SUBSURFACE DATA AND THE MOST CURRENT WSDOT STANDARD SPECIFICATIONS.
2. PAVEMENT SUBGRADES SHALL BE PROOF ROLLED IN ACCORDANCE WITH THE RECOMMENDATIONS NOTED IN THE GEOTECHNICAL SUBSURFACE DATA.
3. PER THE GEOTECHNICAL RECOMMENDATIONS, REUSE OF NATIVE SOILS IS AN ACCEPTABLE SUBSTITUTE FOR STRUCTURAL FILL. STRUCTURAL FILL BENEATH PAVEMENT SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH THE RECOMMENDATIONS NOTED IN THE GEOTECHNICAL SUBSURFACE DATA AND WSDOT SPECIFICATION 2-03.3(14)C. STRUCTURAL FILL SHALL BE PLACED IN LOOSE LIFTS NOT TO EXCEED 12" THICKNESS. COMPACTION AND MOISTURE CONTROL TESTS SHALL BE COMPLETED IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATION 2-03.3(14)D.
4. BASE COURSE MATERIAL SHALL BE COMPACTED TO AT LEAST 95% MAXIMUM DRY DENSITY PER THE GEOTECHNICAL SUBSURFACE DATA.



GRAVEL ACCESS DRIVEWAY SECTION

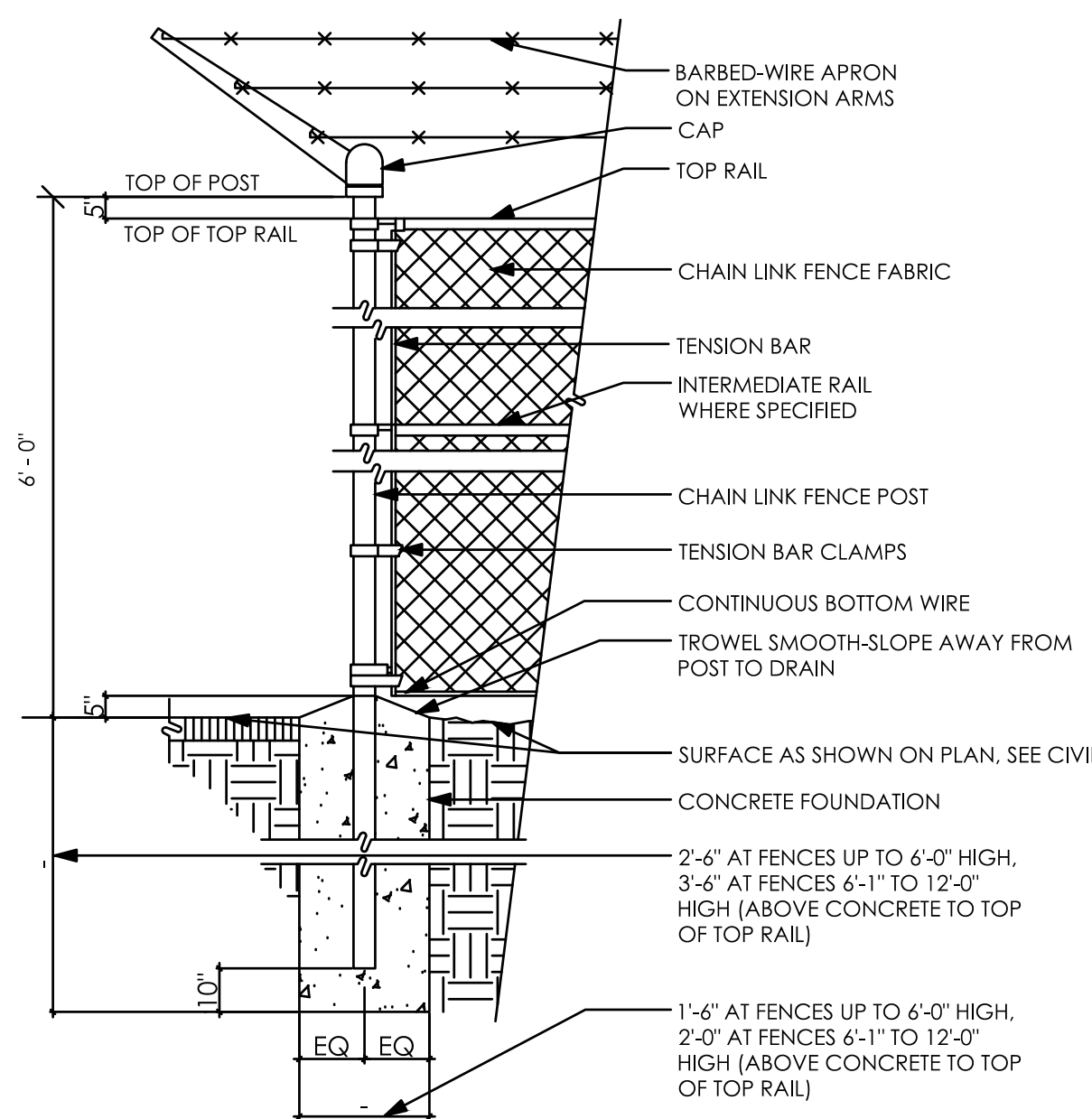
NTS

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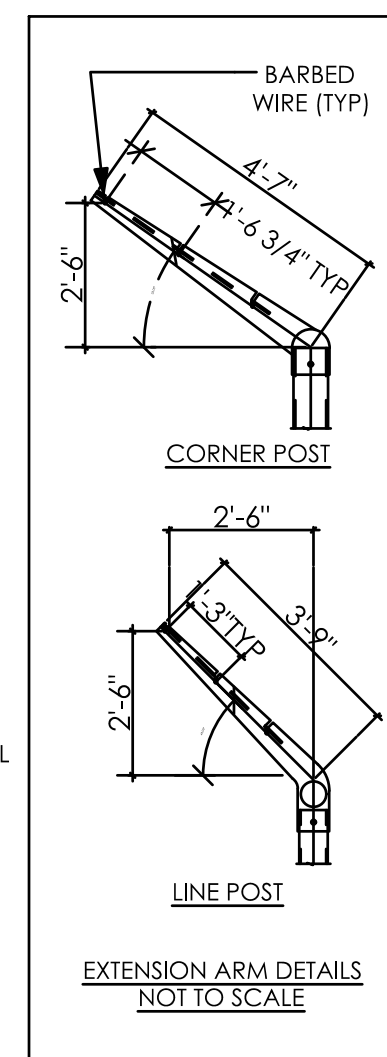
CHAIN LINK GATE ELEVATIONS - DOUBLE GATE

NTS



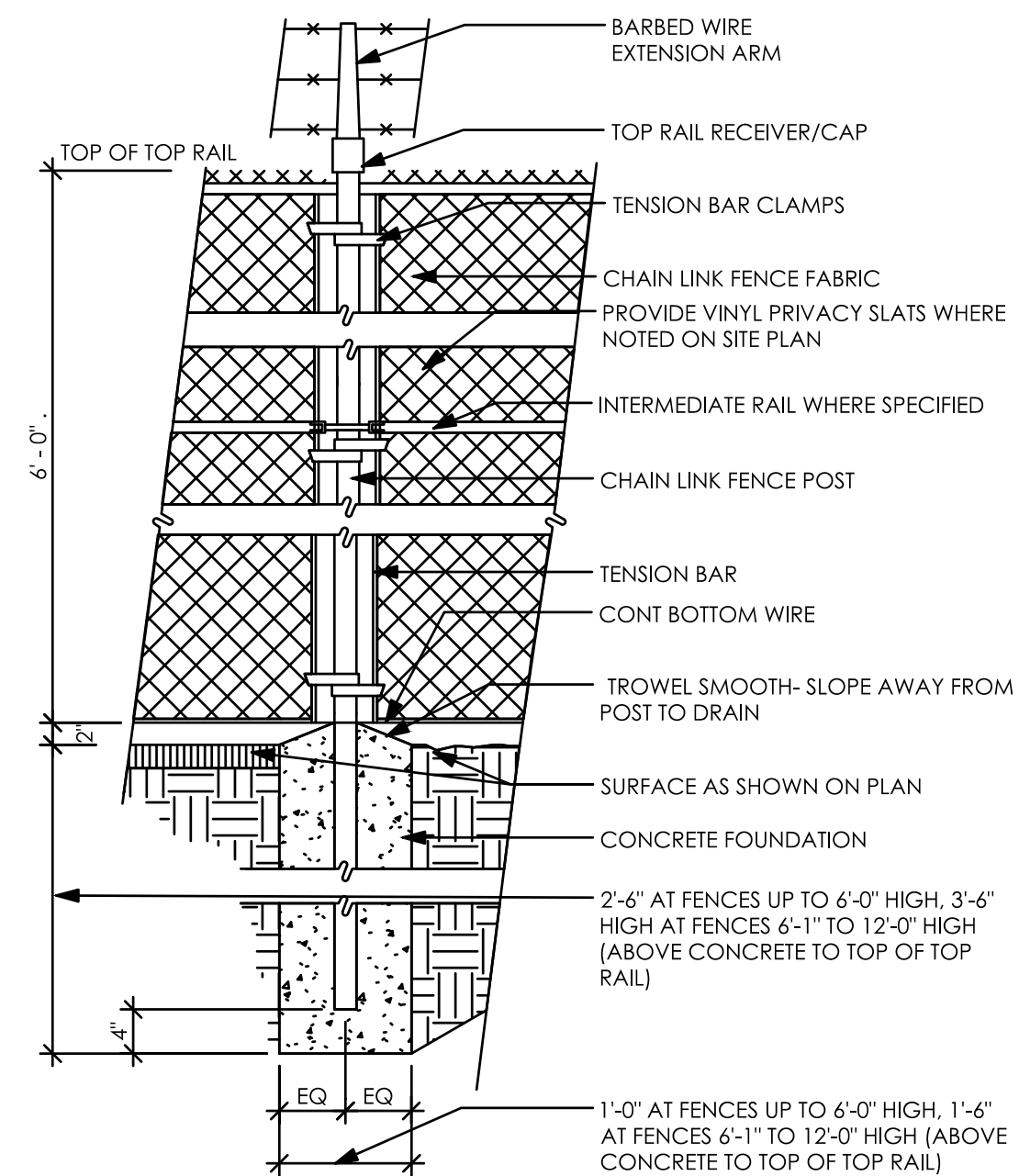
CHAIN LINK END, CORNER AND GATE POST

NTS



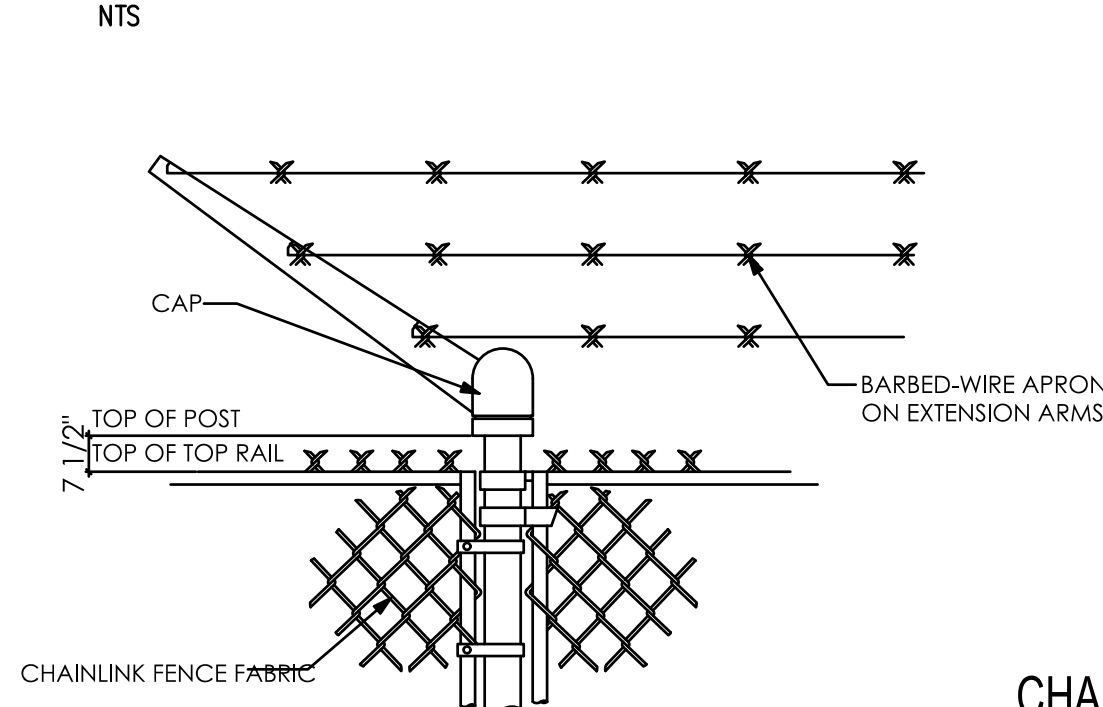
EXTENSION ARM DETAILS

NOT TO SCALE



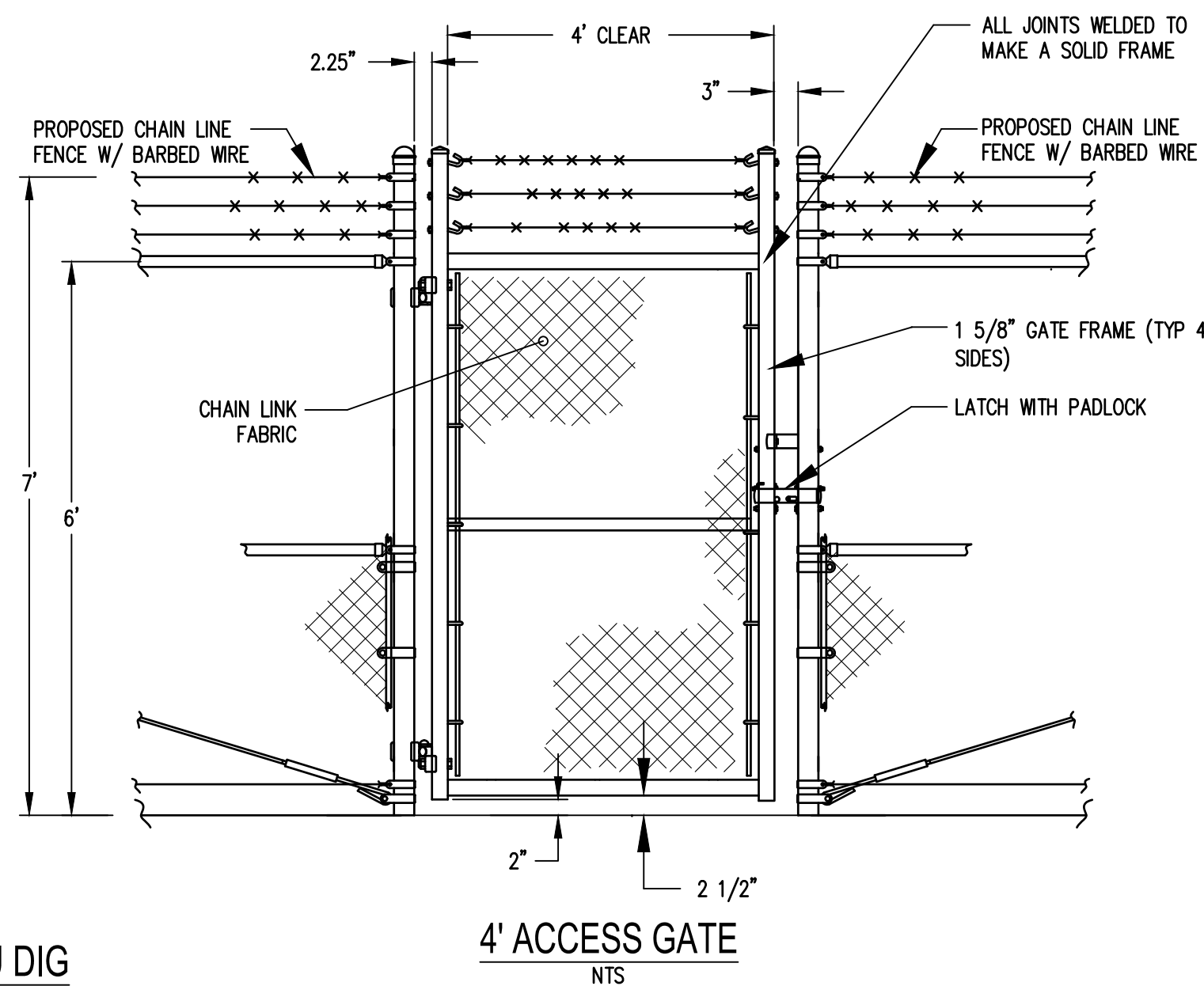
CHAIN LINK POST

NTS



CHAIN LINK GATE DETAILS

NTS



4' ACCESS GATE

NTS

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BY	
DATE	
REVISIONS	

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE SUITE 200, LACEY, WA 98516
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SITE DETAILS AND NOTES
CHEHALIS PUMP STATION
CHEHALIS, WA

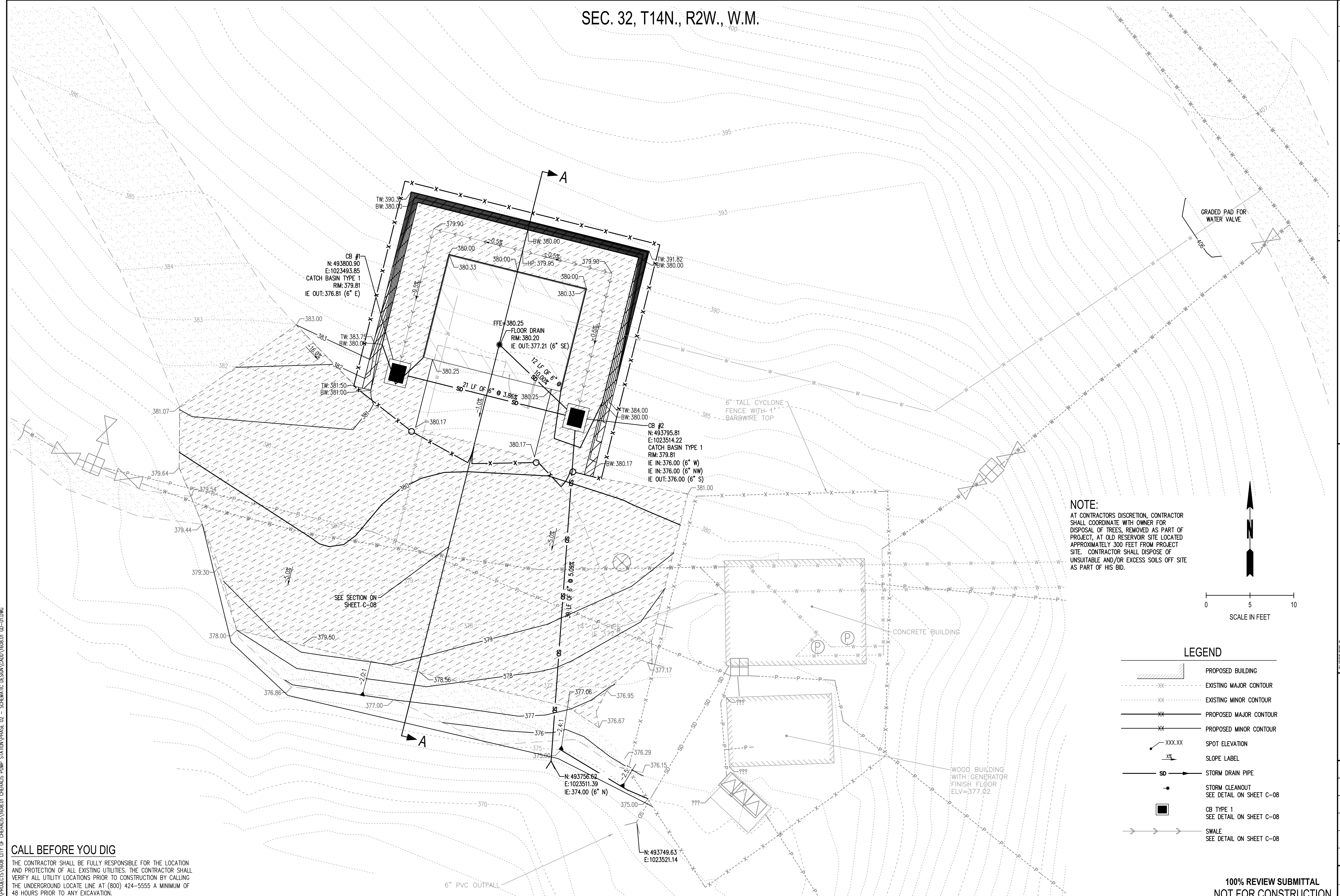
SEAL:

DESIGNER:	B. CONNOLLY
DRAWN BY:	S. EGAN
APPROVED BY:	B. CONNOLLY
DATE:	SEPT. 27, 2019
JOB NO:	1608.01
DRAWING FILE NO:	1608.01 SP-02
DRAWING NO:	C-06
SHEET NO:	6 OF 25

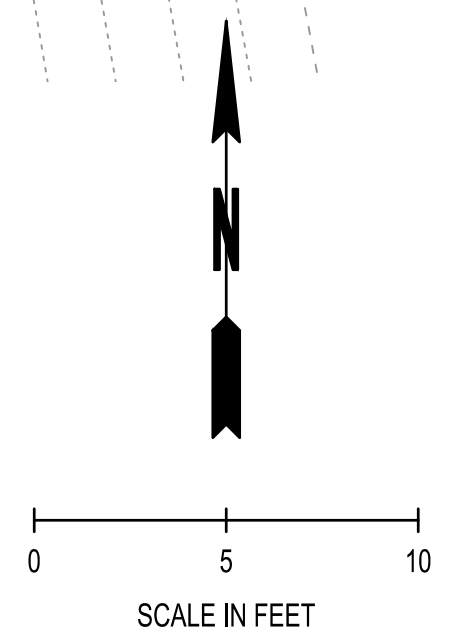
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C:\PROJECTS\1608.01 CHEHALIS PUMP STATION\1608.01 SP-02.DWG

SEC. 32, T14N., R2W., W.M.



NOTE:
 AT CONTRACTOR'S DISCRETION, CONTRACTOR SHALL COORDINATE WITH OWNER FOR DISPOSAL OF TREES, REMOVED AS PART OF PROJECT, AT OLD RESERVOIR SITE LOCATED APPROXIMATELY 300 FEET FROM PROJECT SITE. CONTRACTOR SHALL DISPOSE OF UNSUITABLE AND/OR EXCESS SOILS OFF SITE AS PART OF HIS BID.



LEGEND

	PROPOSED BUILDING
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	SPOT ELEVATION
	SLOPE LABEL
	STORM DRAIN PIPE
	STORM CLEANOUT SEE DETAIL ON SHEET C-08
	CB TYPE 1 SEE DETAIL ON SHEET C-08
	SWALE SEE DETAIL ON SHEET C-08

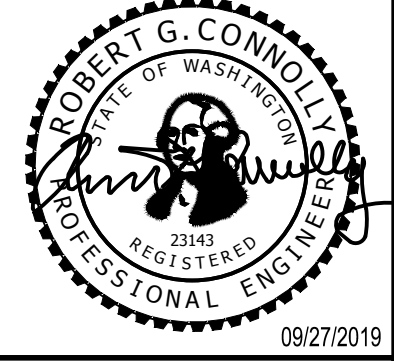
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REVISIONS	DATE	BY

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 P: 360.352.1465 F: 360.352.1509
 SCJALLIANCE.COM

SHEET TITLE: **GRADING AND DRAINAGE PLAN**
 PROJECT NAME: **CHEHALIS PUMP STATION**
 CHEHALIS, WA



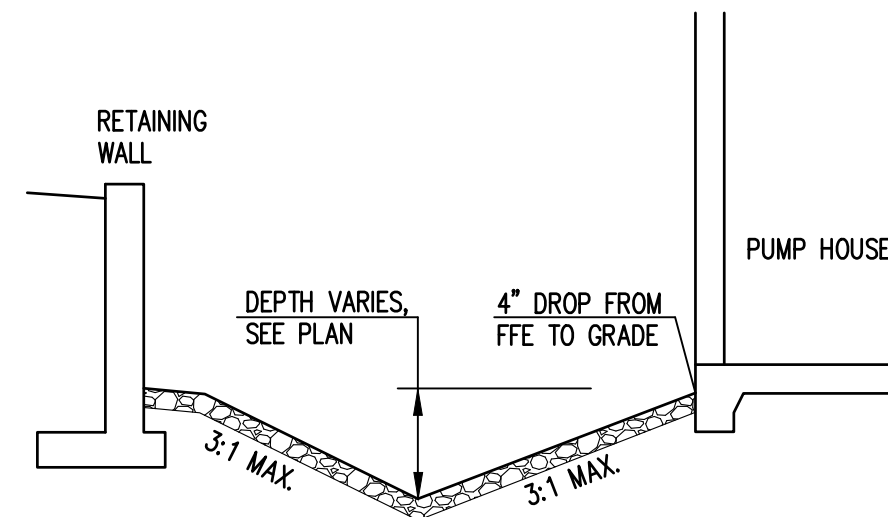
DESIGNER:	B. CONNOLLY
DRAWN BY:	S. EGAN
APPROVED BY:	B. CONNOLLY
DATE:	SEPT. 27, 2019
JOB NO:	1608.01
DRAWING FILE NO:	1608.01 GD-01
DRAWING NO:	C-07
SHEET NO:	7 OF 25

Date: 08/28/2019 10:15:00am User: shawna@scj.com
 W:\PROJECTS\1608.01 CITY OF CHEHALIS\1608.01 CHEHALIS PUMP STATION\PHASE 02 - SCHEMATIC DESIGN\CADD\1608.01 GD-01.DWG

GENERAL NOTES (STORM DRAIN CONSTRUCTION):

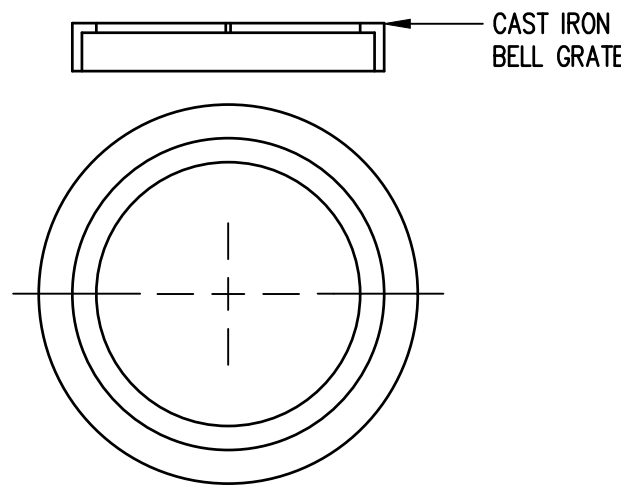
- ALL WORKMANSHIP AND MATERIALS WILL BE IN ACCORDANCE WITH THE CITY OF CHEHALIS DEVELOPMENT ENGINEERING STANDARDS AND THE MOST RECENT COPY OF THE STATE OF WASHINGTON STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION (WSDOT/APWA).
- TEMPORARY EROSION/WATER POLLUTION MEASURES WILL BE REQUIRED IN ACCORDANCE WITH THE STORM WATER MANAGEMENT PLAN AND SECTION 1-07.15 OF THE STANDARD SPECIFICATIONS.
- COMPLY WITH ALL OTHER PERMITS AND REQUIREMENTS OF THE CITY OF CHEHALIS AND/OR OTHER GOVERNING AUTHORITIES OR AGENCIES.
- A PRECONSTRUCTION MEETING WILL BE HELD WITH THE PUBLIC WORKS DEPARTMENT AND THE ENGINEERING DIVISION PRIOR TO THE START OF CONSTRUCTION.
- ALL STORM MAINS AND RETENTION/DETENTION AREAS WILL BE STAKED FOR GRADE AND ALIGNMENT BY AN ENGINEERING OR SURVEYING FIRM CAPABLE OF PERFORMING SUCH WORK.
- STORM DRAINPIPE WILL MEET THE FOLLOWING REQUIREMENTS:
 - PLAIN CONCRETE PIPE CONFORMING TO THE REQUIREMENTS OF AASHTO M 86, CLASS 2.
 - REINFORCED CONCRETE PIPE CONFORMING TO THE REQUIREMENTS OF AASHTO M 170.
 - PVC PIPE CONFORMING TO ASTM D3034 SDR 35 OR ASTM F794 OR ASTM F679 TYPE 1 WITH JOINTS AND GASKETS CONFORMING TO ASTM D3212 AND ASTM F477.
 - DUCTILE IRON PIPE CONFORMING TO THE REQUIREMENTS OF AWWA C151, THICKNESS CLASS AS SHOWN ON THE PLANS.
 - HIGH-DENSITY POLYETHYLENE SMOOTH INTERIOR PIPE CONFORMING TO AASHTO M 252 TYPES OR AASHTO M 294 TYPE S, WITH A GASKETED BELL AND SPIGOT JOINTS.
 - ALUMINIZED STEEL HELICAL OR SPIRAL RIB PIPE IN DIAMETERS OF 30 INCHES OR GREATER, WITH A MANNING'S VALUE OF 0.020 OR LESS.
- SPECIAL STRUCTURES, OIL/WATER SEPARATORS AND OUTLET CONTROLS WILL BE INSTALLED PER PLANS AND MANUFACTURER'S RECOMMENDATIONS.
- PROVIDE TRAFFIC CONTROL PLAN(S) AS REQUIRED IN ACCORDANCE WITH MUTCD TO THE PUBLIC WORKS DEPARTMENT. TRAFFIC CONTROL PLANS MUST BE APPROVED PRIOR TO THE START OF CONSTRUCTION.
- CALL THE UTILITIES UNDERGROUND LOCATION CENTER AT 1-800-424-5555 A MINIMUM OF TWO BUSINESS DAYS PRIOR TO ANY EXCAVATIONS.
- WHERE CONNECTIONS REQUIRE FIELD VERIFICATIONS, THE CONTRACTOR WILL EXPOSE CONNECTION POINTS AND VERIFY NECESSARY FITTINGS TWO BUSINESS DAYS PRIOR TO INITIATING THE WORK.
- ALL STORM LINES AND CATCH BASINS WILL BE HIGH-VELOCITY CLEANED AND PRESSURE TESTED IN ACCORDANCE WITH DIVISION 7 OF THE STANDARD SPECIFICATIONS PRIOR TO PAVING. HYDRANT FLUSHING OF THE LINES IS NOT AN ACCEPTABLE CLEANING METHOD. TESTING OF THE STORM MAIN WILL INCLUDE TELEVISION INSPECTION AT THE CONTRACTOR'S EXPENSE. THE PUBLIC WORKS DEPARTMENT OR DESIGNATED CONSULTANT WILL DETERMINE WHETHER THE INSPECTION WILL BE PERFORMED BY THE CITY OR BY A REPRESENTATIVE OF THE CONTRACTOR UNDER THE CITY'S DIRECTION. TESTING WILL TAKE PLACE AFTER ALL UNDERGROUND UTILITIES ARE INSTALLED AND COMPACTION OF THE ROADWAY SUBGRADE IS COMPLETED.
- FILL PLACEMENT WILL NOT BE ALLOWED IN ANY OPEN CHANNEL USED FOR STORM CONVEYANCE WITHOUT WRITTEN APPROVAL FROM THE PUBLIC WORKS DEPARTMENT OR DESIGNATED CONSULTANT.
- CONTRACTORS AND/OR PROPERTY OWNERS ARE REQUIRED TO CHANNEL WATER WHEN INSTALLING OR REPAIRING A DRIVEWAY. WATER MAY BE CHANNLED WITH A BERM OR A PIPE. STORM WATER MUST BE DIVERTED TO CITY STORM MAINS WHEN POSSIBLE.
- THE CITY MUST BE NOTIFIED A MINIMUM OF TWO BUSINESS DAYS IN ADVANCE OF A TAP CONNECTION TO AN EXISTING MAIN. A REPRESENTATIVE FROM THE CITY MUST BE PRESENT AT THE TIME OF THE TAP.
- PRIOR TO BACKFILL, ALL MAINS AND APPURTENANCES WILL BE INSPECTED AND APPROVED BY A CITY INSPECTOR. APPROVAL DOES CONSTITUTE FINAL ACCEPTANCE OF THE SEWER LINE. THE CONTRACTOR WILL RETAIN RESPONSIBILITY OF REPAIRING ALL DEFICIENCIES AND FAILURES REVEALED DURING REQUIRED TESTING FOR ACCEPTANCE AND THROUGHOUT THE DURATION OF THE WARRANTY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE CITY IN ADVANCE OF ALL REQUIRED INSPECTIONS. ANY MAIN OR APPURTENANCE BACKFILLED PRIOR TO INSPECTION WILL BE REEXCAVATED FOR INSPECTION AT NO COST TO THE CITY.

SEC. 32, T14N., R2W., W.M.



- SWALE SHALL BE LINED WITH 4" OF GRAVEL.
- MAINTAIN MINIMUM SLOPE OF 0.5%

SWALE DETAIL
NTS

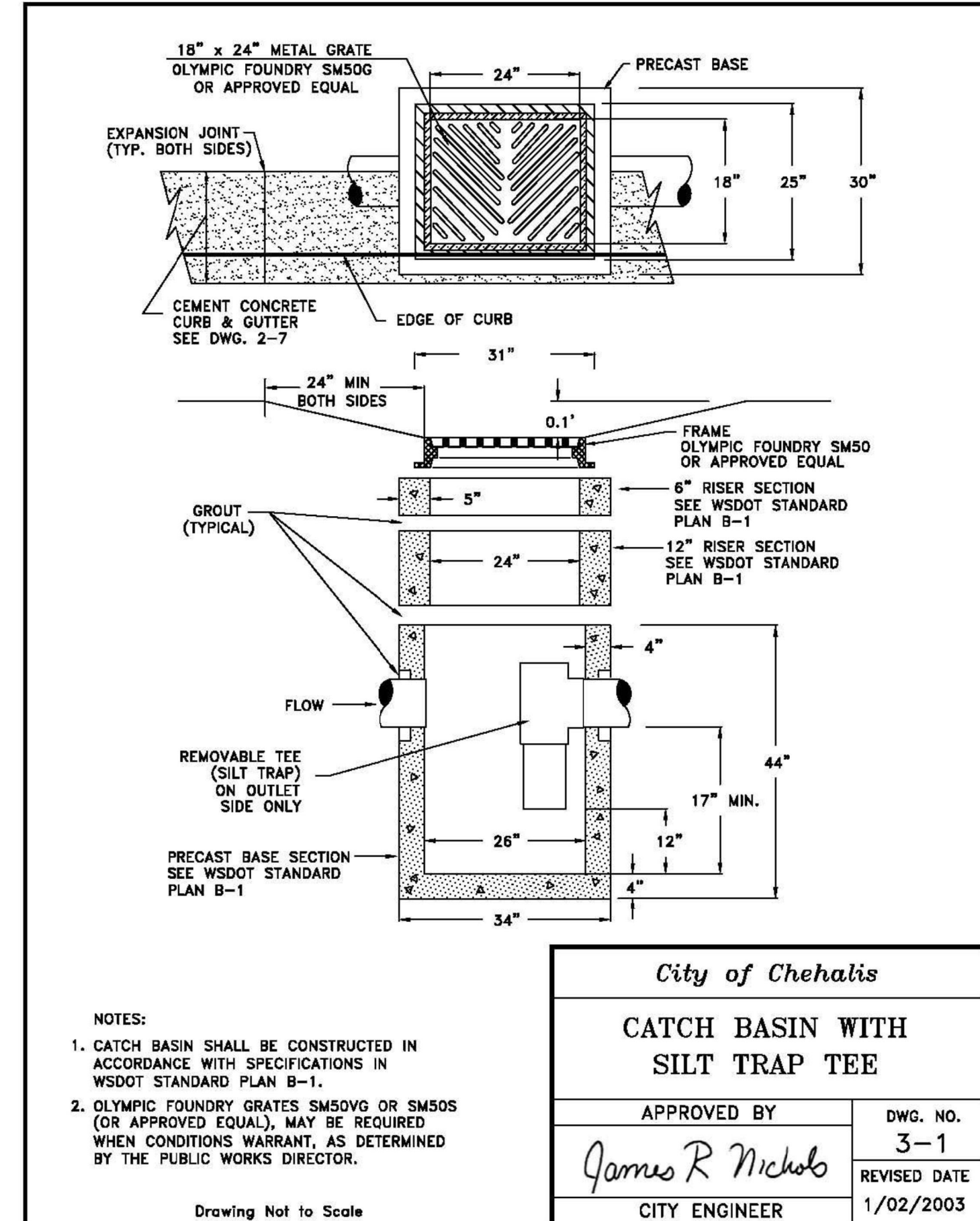


OUTLET PIPE DIA Ø	INLET DIA (D)
6"	12"
8"	18"
12"	24"

NOTES:

- AREA INLETS TO BE CONSTRUCTED FORM CONCRETE PIPE, IN ACCORDANCE WITH ASTM C 14 UNLESS OTHERWISE SHOWN ON THE PLANS OR NOTED IN THE STANDARD SPECIFICATIONS.
- CUT HOLE SIZE IS EQUAL TO OUTLET PIPE OUTSIDE DIAMETER PLUS AREA INLET WALL THICKNESS.
- CONNECTION TO OUTLET PIPE TO BE MORTARED AND MADE FLUSH WITH INSIDE OF THE AREA INLET WALL.
- CAST IRON BELL GRATE SHALL MEET THE STRENGTH REQUIREMENTS OF FEDERAL SPECIFICATIONS RR-F- 621D. THE GRATE SHALL HAVE SLOTS (HOLES) THAT CONSTITUTE 50% OPEN AREA FOR DRAINAGE. INLET BELL SURFACE SHALL BE FINISHED TO ASSURE NON-ROCKING FIT WITH ANY COVER POSITION.

WSDOT TYPE 45 AREA DRAIN DETAIL
NTS



NOTES:

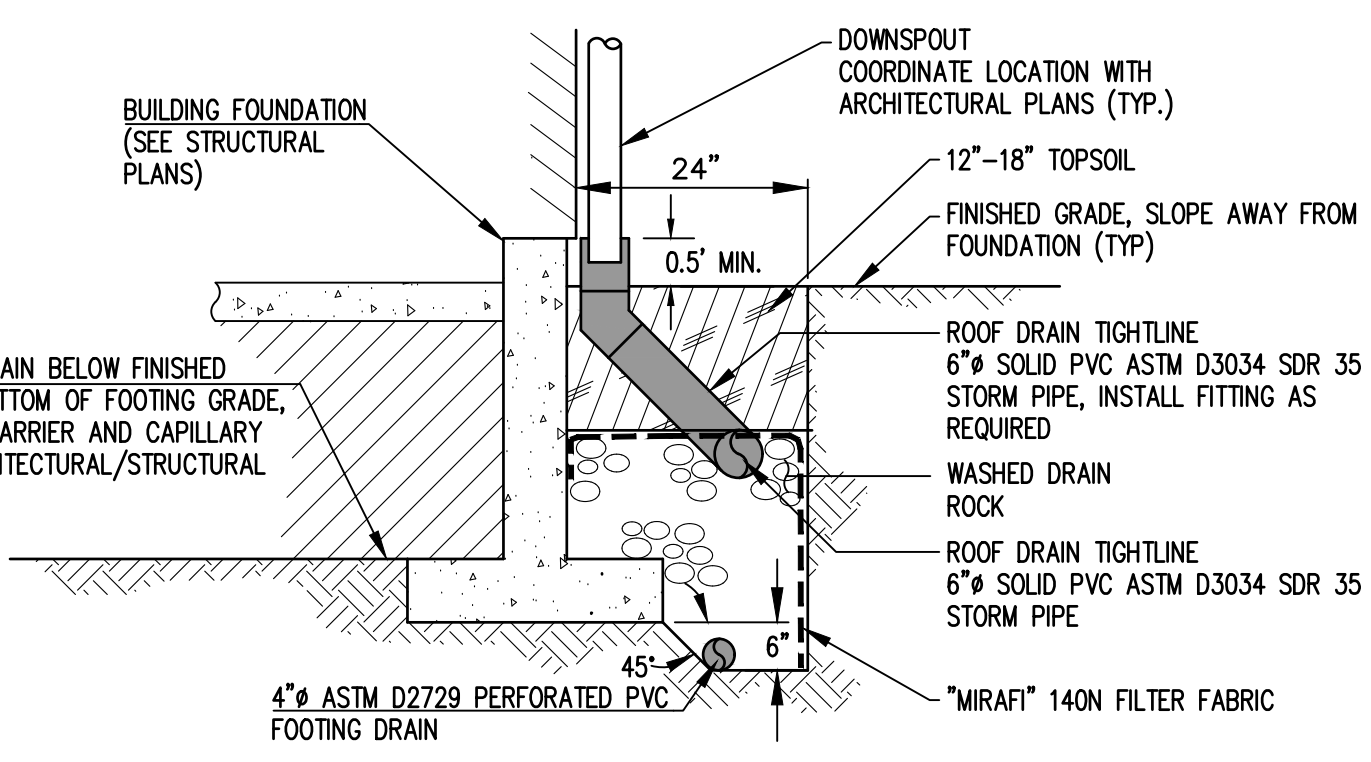
- CATCH BASIN SHALL BE CONSTRUCTED IN ACCORDANCE WITH SPECIFICATIONS IN WSDOT STANDARD PLAN B-1.
- OLYMPIC FOUNDRY GRATES SM50VG OR SM50S (OR APPROVED EQUAL), MAY BE REQUIRED WHEN CONDITIONS WARRANT, AS DETERMINED BY THE PUBLIC WORKS DIRECTOR.

City of Chehalis

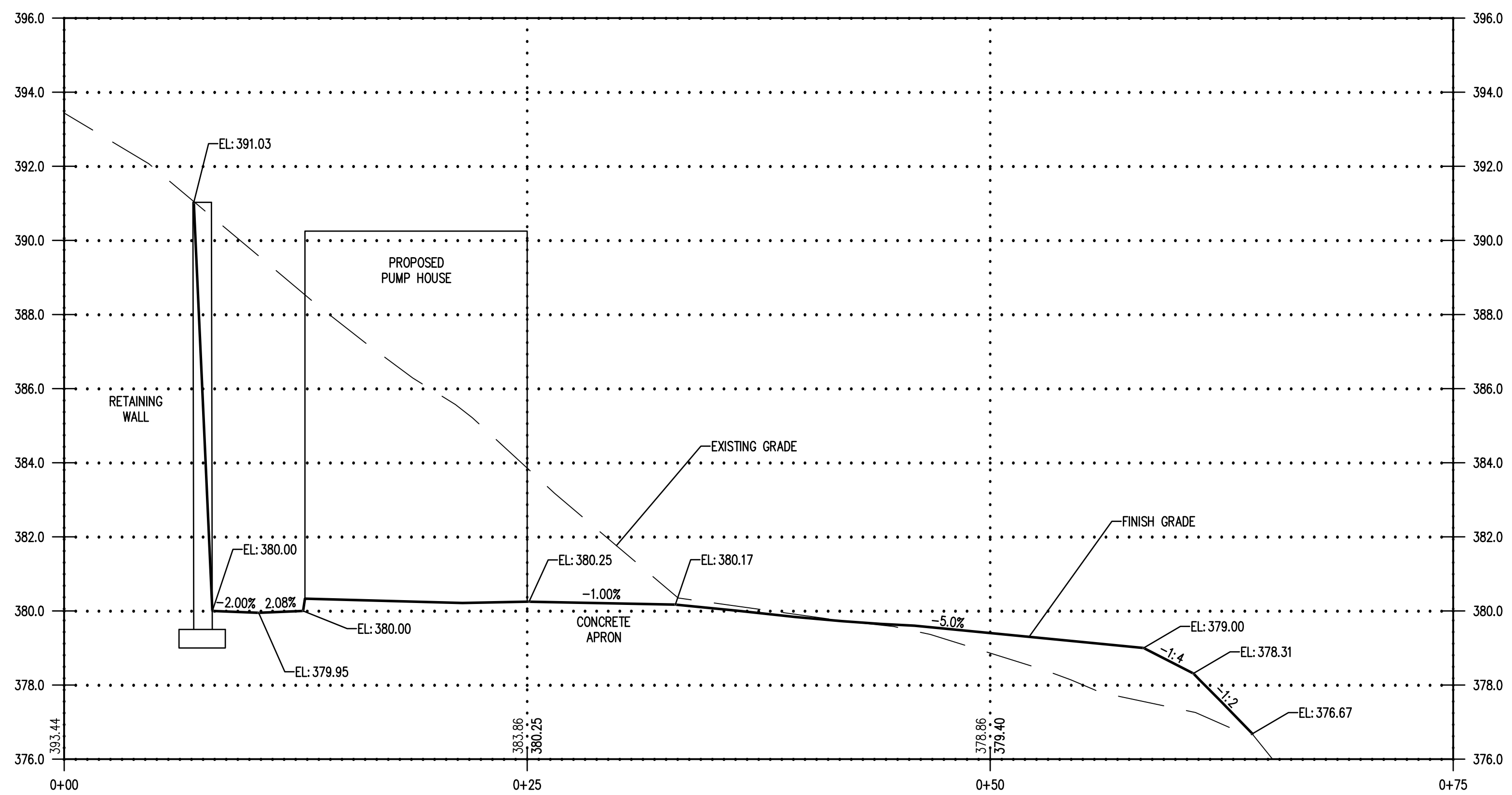
CATCH BASIN WITH SILT TRAP TEE

APPROVED BY <i>James R. Nichols</i> CITY ENGINEER	DWG. NO. 3-1 REVISED DATE 1/02/2003
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Drawing Not to Scale



FOOTING AND ROOF DRAIN DETAIL
NTS



SECTION A-A

**100% REVIEW SUBMITTAL
NOT FOR CONSTRUCTION**

Sep 27, 2019 7:48:04am - User: steve.sagin
 PROJECT: 1608 CITY OF CHEHALIS (1608) CHEHALIS PUMP STATION PHASE 02 - SCHEMATIC DESIGN (1608) 02-02.DWG

CALL BEFORE YOU DIG

THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT (800) 424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

BY	
DATE	
REVISIONS	

SCJ ALLIANCE
CONSULTING SERVICES

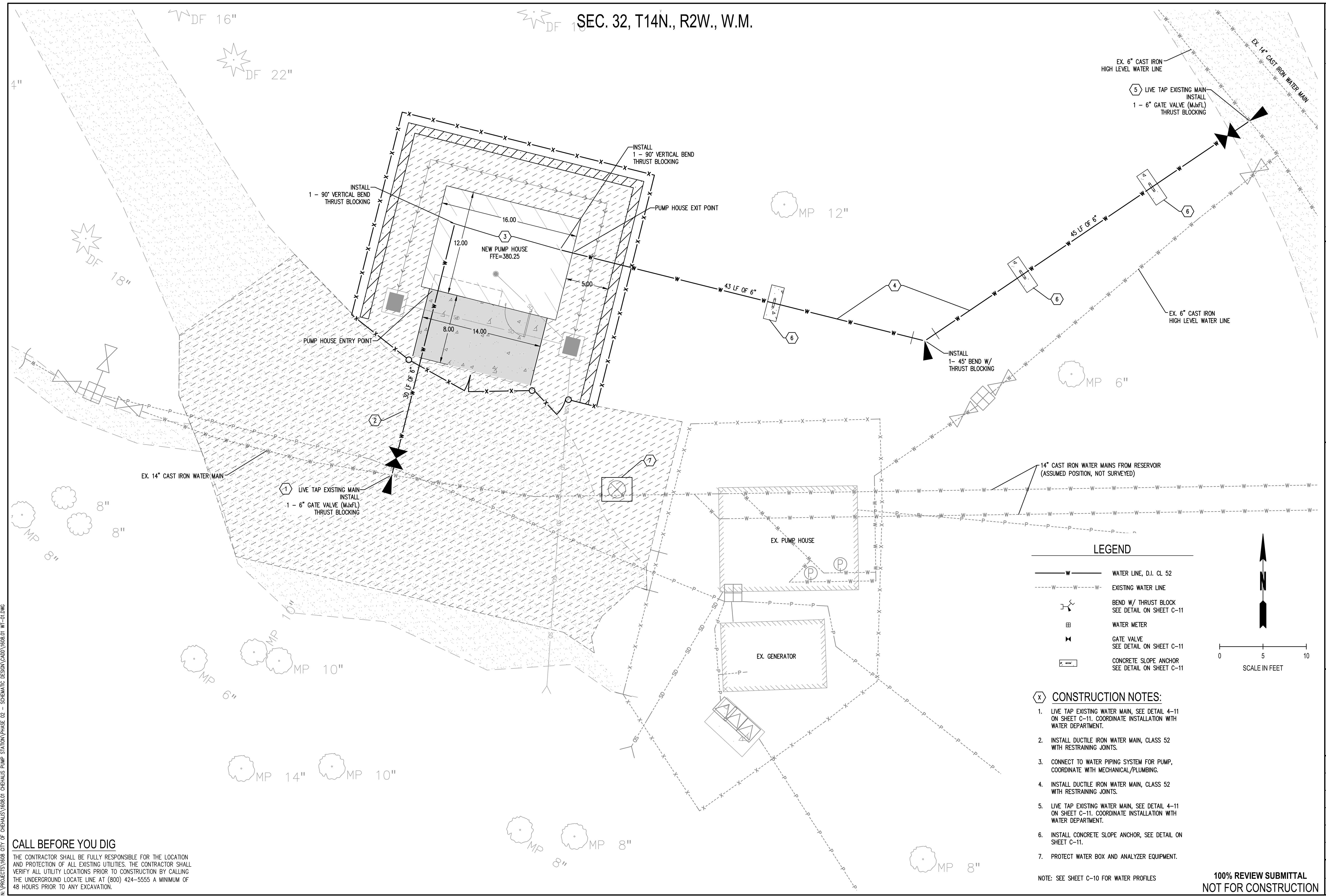
8730 TALLON LANE, SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

SHEET TITLE: GRADING AND DRAINAGE DETAILS AND NOTES
 PROJECT NAME: CHEHALIS PUMP STATION
 CHEHALIS, WA



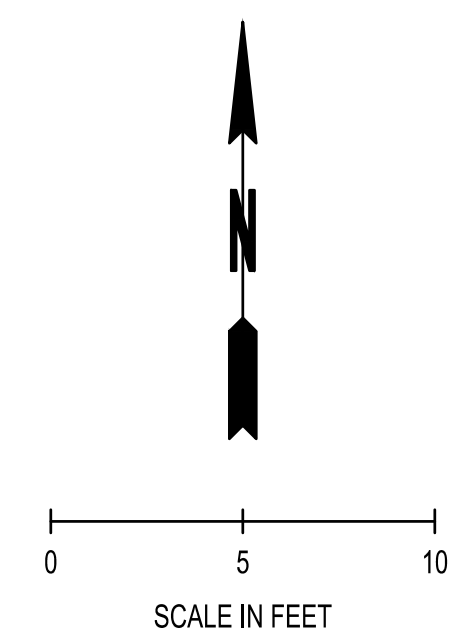
DESIGNER: B. CONNOLLY
DRAWN BY: S. EGAN
APPROVED BY: B. CONNOLLY
DATE: SEPT. 27, 2019
JOB NO: 1608.01
DRAWING FILE NO: 1608.01 GD-02
DRAWING NO: C-08
SHEET NO: 8 OF 25

SEC. 32, T14N., R2W., W.M.



LEGEND

- W — WATER LINE, D.I. CL 52
- - - - - EXISTING WATER LINE
- ⌋ BEND W/ THRUST BLOCK
SEE DETAIL ON SHEET C-11
- ⊞ WATER METER
SEE DETAIL ON SHEET C-11
- ⋈ GATE VALVE
SEE DETAIL ON SHEET C-11
- ▭ CONCRETE SLOPE ANCHOR
SEE DETAIL ON SHEET C-11



- CONSTRUCTION NOTES:**
1. LIVE TAP EXISTING WATER MAIN, SEE DETAIL 4-11 ON SHEET C-11. COORDINATE INSTALLATION WITH WATER DEPARTMENT.
 2. INSTALL DUCTILE IRON WATER MAIN, CLASS 52 WITH RESTRAINING JOINTS.
 3. CONNECT TO WATER PIPING SYSTEM FOR PUMP, COORDINATE WITH MECHANICAL/PLUMBING.
 4. INSTALL DUCTILE IRON WATER MAIN, CLASS 52 WITH RESTRAINING JOINTS.
 5. LIVE TAP EXISTING WATER MAIN, SEE DETAIL 4-11 ON SHEET C-11. COORDINATE INSTALLATION WITH WATER DEPARTMENT.
 6. INSTALL CONCRETE SLOPE ANCHOR, SEE DETAIL ON SHEET C-11.
 7. PROTECT WATER BOX AND ANALYZER EQUIPMENT.

NOTE: SEE SHEET C-10 FOR WATER PROFILES

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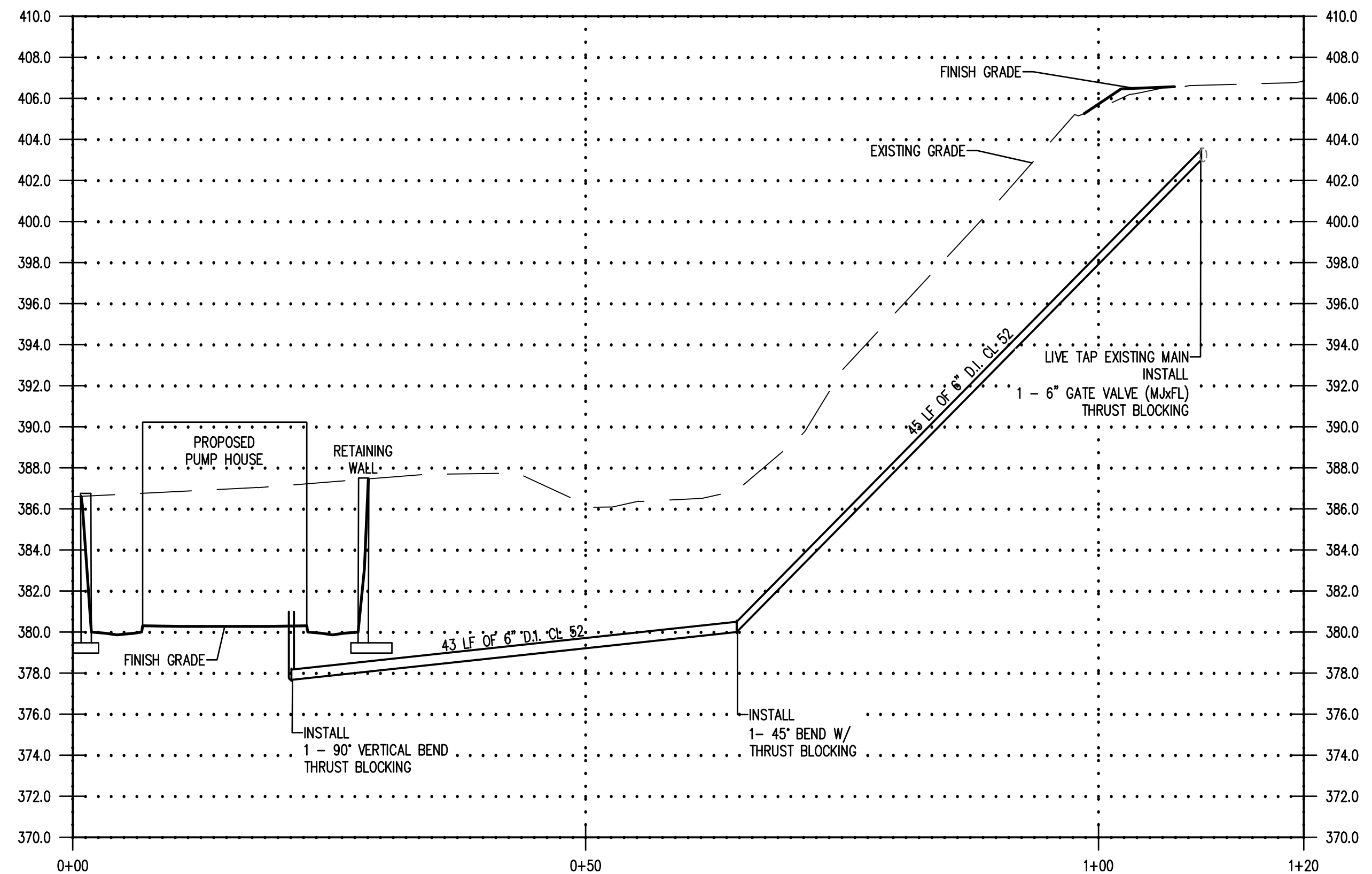
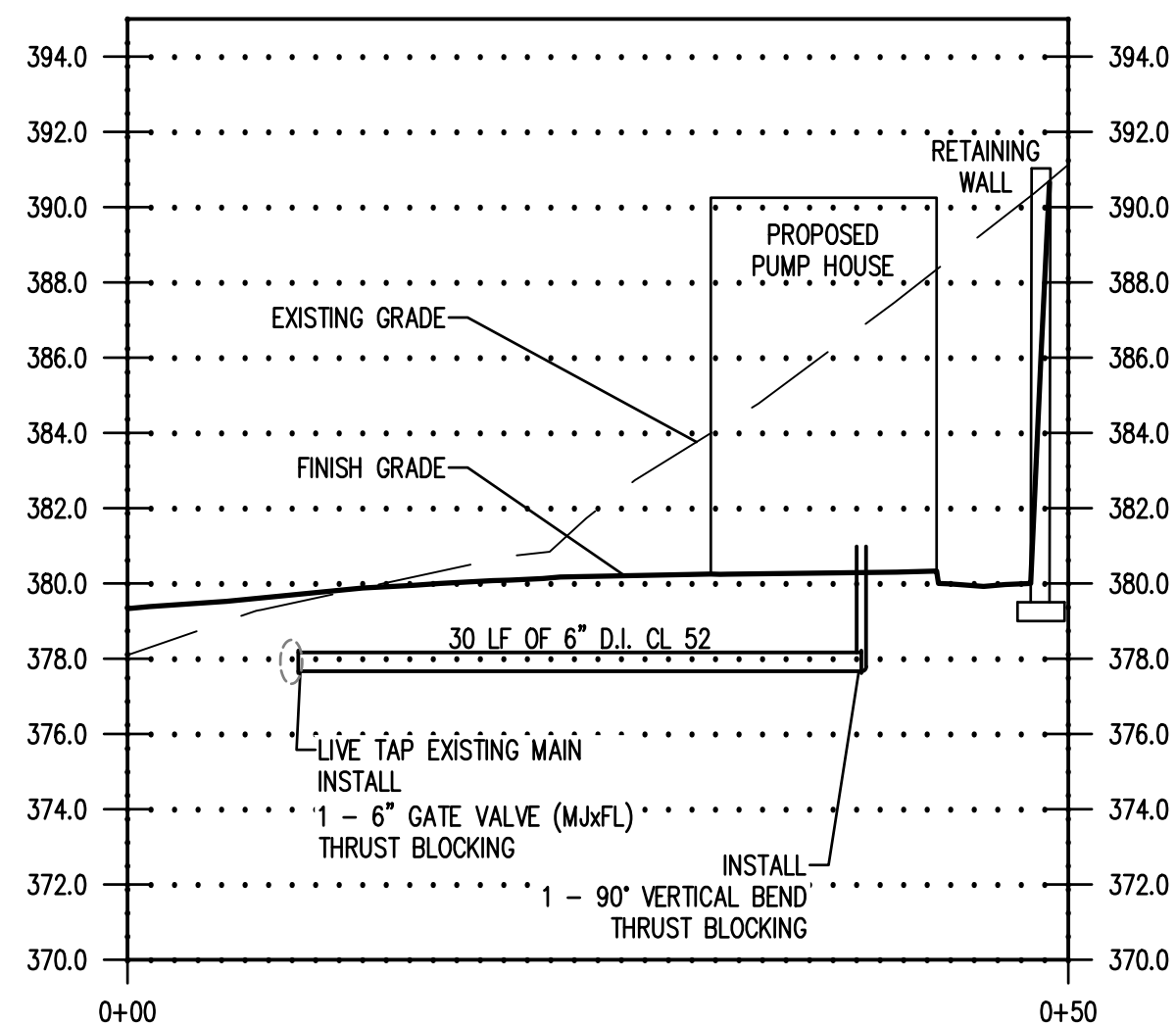
WATER PLAN
CHEHALIS PUMP STATION
CHEHALIS, WA

SEAL:

DESIGNER:	B. CONNOLLY
DRAWN BY:	S. EGAN
APPROVED BY:	B. CONNOLLY
DATE:	SEPT. 27, 2019
JOB NO:	1608.01
DRAWING FILE NO:	1608.01 WT-01
DRAWING NO:	C-09
SHEET NO:	9 OF 25

Sep 30, 2019 12:06:59pm - User: steve.egan
 C:\PROJECTS\1608 CITY OF CHEHALIS\1608-CHEHALIS PUMP STATION\PHASE 02 - SCHEMATIC DESIGN\CADD\160801 WT-01.DWG

CALL BEFORE YOU DIG
 THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT (800) 424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.



Sep 27, 2019 7:48:23am - User: steve.egan
 K:\PROJECTS\1608_01 CHEHALIS\1608_01 CHEHALIS PUMP STATION\PHASE 02 - SCHEMATIC DESIGN\CADD\1608_01 WT-03.DWG

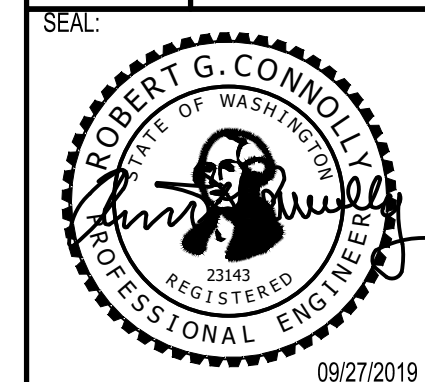
CALL BEFORE YOU DIG

THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT (800) 424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

REVISIONS	DATE	BY


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SHEET TITLE: WATER PROFILES
 PROJECT NAME: CHEHALIS PUMP STATION
 CHEHALIS, WA



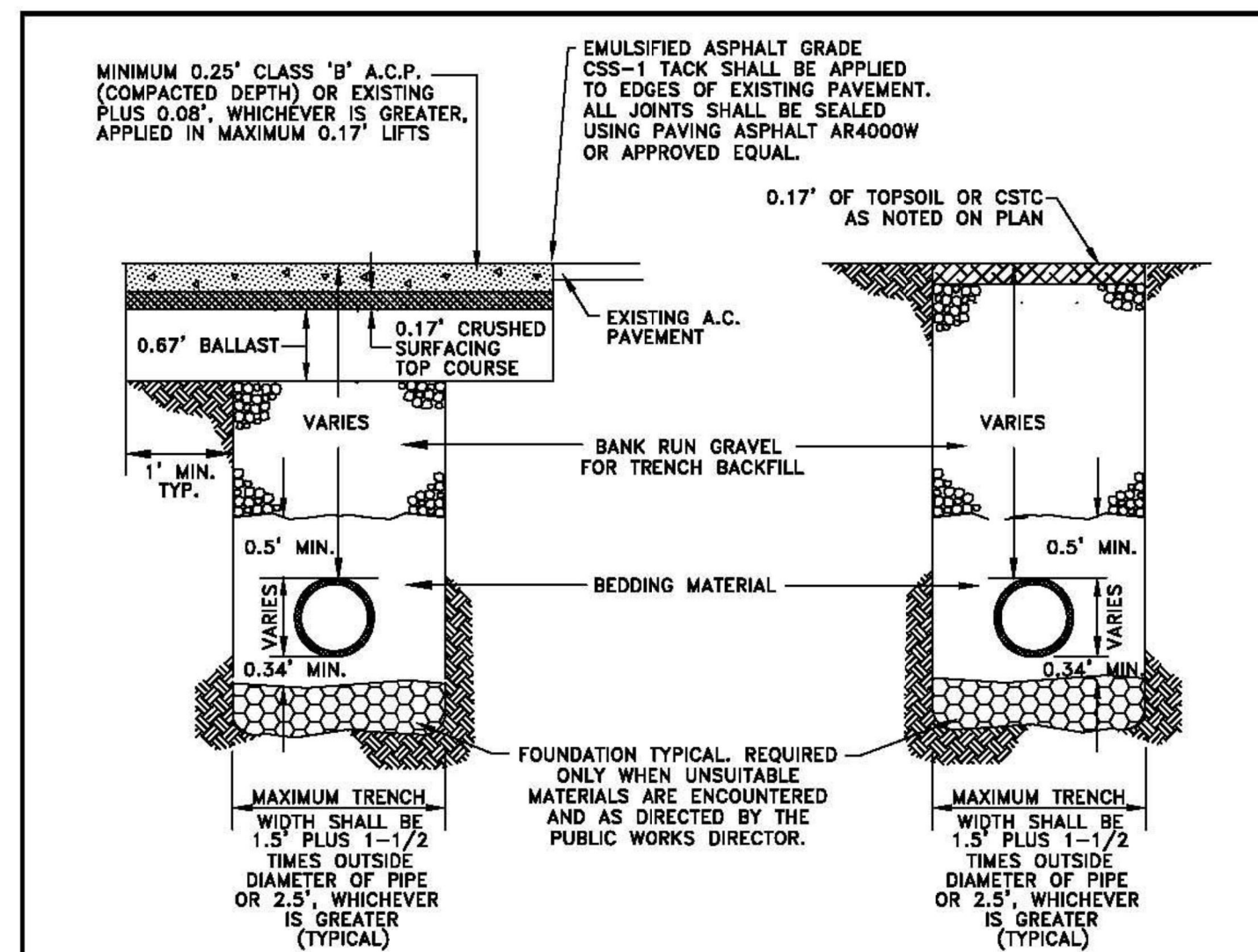
DESIGNER:	B. CONNOLLY
DRAWN BY:	S. EGAN
APPROVED BY:	B. CONNOLLY
DATE:	SEPT. 27, 2019
JOB NO:	1608.01
DRAWING FILE NO:	1608.01 WT-03
DRAWING NO:	C-10
SHEET NO:	10 OF 25

100% REVIEW SUBMITTAL
NOT FOR CONSTRUCTION

GENERAL NOTES (WATER MAIN INSTALLATION):

- ALL WORKMANSHIP AND MATERIAL WILL BE IN ACCORDANCE WITH CITY OF CHEHALIS STANDARDS AND THE MOST RECENT COPY OF THE WSDOT/APWA STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION, AMERICAN WATER WORKS ASSOCIATION (AWWA) STANDARDS AND ANSI/NFPA STANDARD 60 OR 61.
- A PRECONSTRUCTION MEETING WILL BE HELD WITH THE PUBLIC WORKS DEPARTMENT AND THE ENGINEERING DIVISION PRIOR TO THE START OF CONSTRUCTION.
- ALL WATER MAINS WILL BE DUCTILE IRON CEMENT MORTAR LINED THICKNESS CLASS 52.
- GATE VALVES WILL BE RESILIENT WEDGE, NRS (NONRISING STEM) WITH O-RING SEALS. VALVE ENDS WILL BE MECHANICAL JOINT OR ANSI FLANGES. VALVES WILL CONFORM TO AWWA 509-80. VALVES WILL BE MUELLER, M&H, KENNEDY, CLOW R/W OR AMERICAN FLOW CONTROL SERIES 2500. EXISTING VALVES AND ALL VALVES INSTALLED DIRECTLY TO AND CONNECTED TO A PORTION OF THE ACTIVE WATER SYSTEM ARE TO BE OPERATED BY CITY EMPLOYEES ONLY.
- FIRE HYDRANTS WILL BE MUELLER CENTURION A-423, M&H RELIANT STYLE 129, CLOW MEDALLION, OR KENNEDY GUARDIAN K81D, WATERGUS PACER MODEL WB-67-250 OR AWK 2780. HYDRANTS WILL BE INSTALLED IN ACCORDANCE WITH THE MOST RECENT VERSION OF THE INTERNATIONAL FIRE CODE. HYDRANTS WILL BE BAGGED AND THE CONNECTING GATE VALVES LEFT CLOSED UNTIL THE SYSTEM HAS BEEN APPROVED. HYDRANTS MUST BE PAINTED WITH SUNBURST YELLOW HIGH-GRADE ENAMEL AFTER INSTALLATION.
- ALL LINES WILL BE CHLORINATED AND TESTED IN CONFORMANCE WITH THE ABOVE-REFERENCED SPECIFICATIONS (SEE NOTE 1).
- ALL PIPES AND SERVICES WILL BE INSTALLED WITH CONTINUOUS TRACER TAPE PLACED 12 TO 18 INCHES UNDER THE PROPOSED FINISHED SUBGRADE. THE MARKER WILL BE OF PLASTIC, NONBIODEGRADABLE, METAL CORE, OR BACKING MARKED "WATER" THAT CAN BE DETECTED BY A STANDARD METAL DETECTOR. TAPE WILL BE TERRA TAPE "D" OR APPROVED EQUAL. IN ADDITION TO TRACER TAPE, TONING WIRE WILL BE INSTALLED OVER ALL PIPE AND SERVICES. TONING WIRE WILL BE UL LISTED, TYPE UF, 14-GAUGE SOLID COATED COPPER WIRE, TAPED TO THE TOP OF THE PIPE TO PREVENT MOVEMENT DURING BACKFILLING AND LAID LOOSE ENOUGH TO PREVENT STRETCHING AND DAMAGE BEFORE BEING BROUGHT UP AND TIED OFF AT THE VALVE OPERATING NUT OR VALVE BOX. IF THE OPERATING NUT IS NOT EASILY ACCESSIBLE FROM THE GROUND SURFACE, THE COPPER WIRE WILL BE TIED OFF AT THE VALVE BOX IN SUCH A WAY THAT THE WIRE IS EASILY ACCESSIBLE FROM THE GROUND SURFACE. TWO FEET OF SACK WILL BE PROVIDED TO ALLOW FOR CONNECTION TO THE LOCATOR.
- A ONE-POUND MAGNESIUM ANODE WILL BE BURIED WITH THE PIPE EVERY 1,000 LINEAR FEET MAXIMUM FOR CATHODIC PROTECTION OF THE TONING WIRE. TONING WIRE SPLICES AND CONNECTIONS TO ANODES WILL JOIN WIRES BOTH MECHANICALLY AND ELECTRICALLY AND WILL EMPLOY EPOXY RESIN OR HEAT-SHRINK TAPE INSULATION. TONING WIRE WILL BE TESTED PRIOR TO ACCEPTANCE OF THE PIPE SYSTEM. A WRITTEN NOTICE FROM THE CONTRACTOR TO THE CITY MUST BE RECEIVED TWO BUSINESS DAYS PRIOR TO WHEN TESTING IS REQUIRED.
- THE CONTRACTOR WILL PROVIDE TRAFFIC CONTROL PLAN(S) AS REQUIRED IN ACCORDANCE WITH MUTCD.
- ALL WATER MAINS WILL BE STAKED FOR GRADES AND ALIGNMENT BY AN ENGINEERING OR SURVEYING FIRM CAPABLE OF PERFORMING SUCH WORK. STAKING WILL BE MAINTAINED THROUGHOUT CONSTRUCTION.
- ALL SERVICE LINE AND WATER VALVE LOCATIONS WILL BE MARKED ON THE FACE OF THE ADJACENT CURB WITH A "W" OR "WV" EMBOSSED ONE-FOURTH INCH INTO THE CONCRETE.
- ALL WATER SYSTEM CONNECTIONS SERVING BUILDINGS OR PROPERTIES WITH DOMESTIC POTABLE WATER, FIRE SPRINKLER OR IRRIGATION SYSTEMS WILL COMPLY WITH THE MINIMUM BACKFLOW PREVENTION REQUIREMENTS ESTABLISHED BY THE DEPARTMENT OF HEALTH (DOH) AND THE CITY OF CHEHALIS CROSS-CONNECTION CONTROL PROGRAM.
- CALL UTILITIES UNDERGROUND LOCATION CENTER AT 1-800-424-5555 A MINIMUM OF TWO BUSINESS DAYS PRIOR TO ANY EXCAVATIONS.
- THE CITY WILL BE NOTIFIED FIVE BUSINESS DAYS PRIOR TO SCHEDULING A WATER SYSTEM SHUTDOWN. THE CITY'S WATER DIVISION WILL PERFORM ALL WATER SYSTEM SHUTDOWNS. WHEN CONNECTIONS REQUIRE "FIELD VERIFICATION," CONNECTION POINTS WILL BE EXPOSED BY THE CONTRACTOR AND FITTINGS VERIFIED BY THE CITY TWO BUSINESS DAYS PRIOR TO THE DISTRIBUTION OF SHUTDOWN NOTICES. CUSTOMERS INVOLVED WITH OR AFFECTED BY WATER SERVICE INTERRUPTIONS WILL BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE. SHUTDOWNS WILL NOT BE PERMITTED ON FRIDAYS, WEEKENDS, OR HOLIDAYS WITHOUT WRITTEN AUTHORIZATION FROM THE DIRECTOR OF PUBLIC WORKS.
- WHEN CONNECTING TO AN EXISTING WATER LINE WHERE A NEW VALVE IS NOT TO BE INSTALLED, THE EXISTING VALVE MUST BE PRESSURE TESTED TO THESE STANDARDS BY THE CONTRACTOR PRIOR TO CONNECTION. IF AN EXISTING VALVE FAILS TO PASS THE TEST, THE CONTRACTOR WILL MAKE THE NECESSARY ADDITIONAL PROVISIONS TO TEST THE NEW LINE PRIOR TO CONNECTING TO THE EXISTING SYSTEM OR WILL INSTALL A NEW VALVE. NEW LINES WILL NOT BE CONNECTED TO THE EXISTING SYSTEM UNTIL ALL REQUIRED TESTS HAVE BEEN PASSED.

SEC. 32, T14N., R2W., W.M.



- NOTES:**
- ALL MATERIALS EXCEPT A.C.P. AND BEDDING MATERIAL SHALL BE COMPACTED IN 6-INCH MAXIMUM LIFTS TO 95% DENSITY.
 - BEDDING SHALL CONFORM TO SECTION 9-03.16 OF STANDARD SPECIFICATIONS AS AMENDED BY CITY OF CHEHALIS STANDARDS.
 - COMPACTION: BEDDING SHALL BE COMPACTED TO 95% MAX. AS DETERMINED BY ASTM D1557. BACKFILL SHALL BE COMPACTED TO 85% IN UNPAVED AREA, AND 95% IN PAVED OR SHOULDER AREAS AS DETERMINED BY ASTM D1557.
 - ALL MATERIALS, WORKMANSHIP, AND INSTALLATION SHALL BE IN CONFORMANCE WITH THE MOST RECENT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION AS AMENDED BY CITY OF CHEHALIS PUBLIC WORKS STANDARDS.
 - KEEP TRENCH BOTTOM COMPACTED WITH UNIFORM GRADE. A BELL JOINT SHALL BE REQUIRED AT EACH JOINT FOR PROPER SUPPORT. NO TEMPORARY SUPPORTS, I.E. BLOCKS, WILL BE ALLOWED TO SUPPORT PIPE. TRENCH BOTTOM SHALL BE TO GRADE PRIOR TO PIPE INSTALLATION.

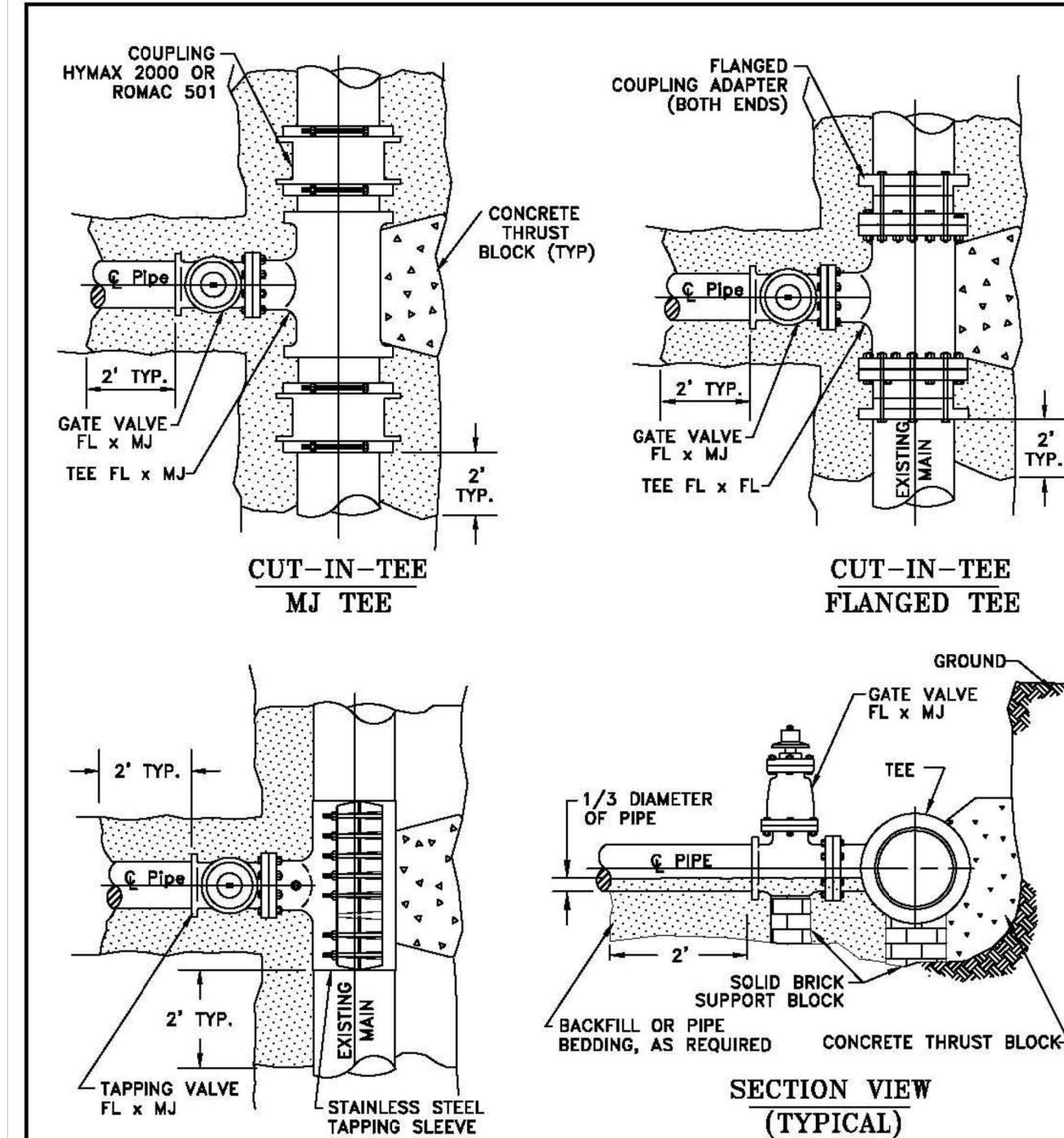
City of Chehalis

TRENCH PAVEMENT RESTORATION DETAIL

APPROVED BY *James R Nichols* DWG. NO. 2-4

CITY ENGINEER REVISED DATE 1/02/2003

Drawing Not to Scale



City of Chehalis

CONNECTION TO EXISTING MAIN

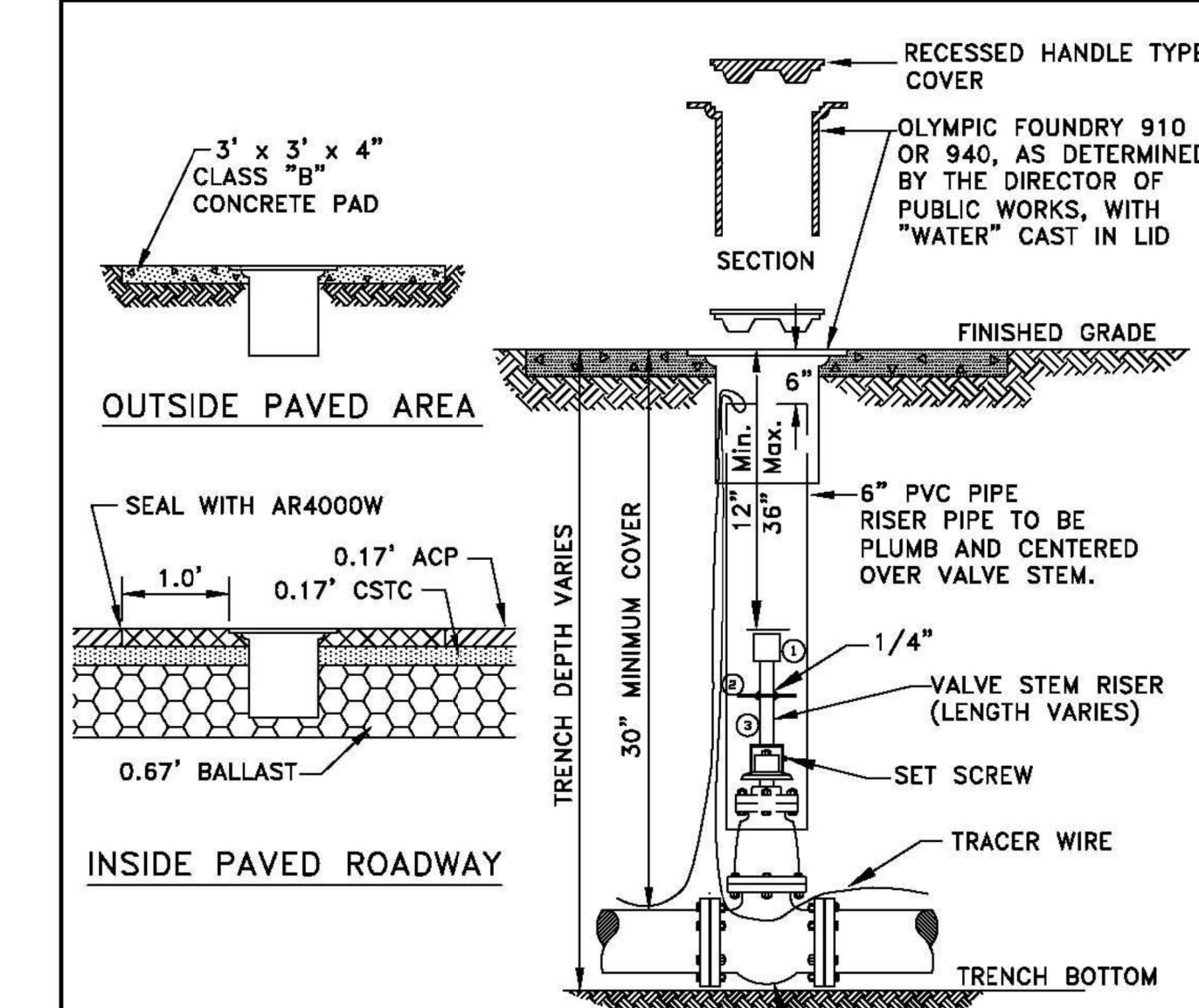
APPROVED BY *James R Nichols* DWG. NO. 4-11

CITY ENGINEER REVISED DATE 3/16/2005

NOTES:

- 11 MIL PLASTIC OR CONSTRUCTION FABRIC SHALL BE WRAPPED AROUND PIPE AND FITTINGS BEFORE THRUST BLOCK AND BACKFILL ARE POURED.
- SUPPORT VALVE AND SLEEVE CONTINUOUSLY THROUGH INSTALLATION.

DRAWING NOT TO SCALE



City of Chehalis

VALVE BOX

APPROVED BY *James R Nichols* DWG. NO. 4-12

CITY ENGINEER REVISED DATE 1/02/2003

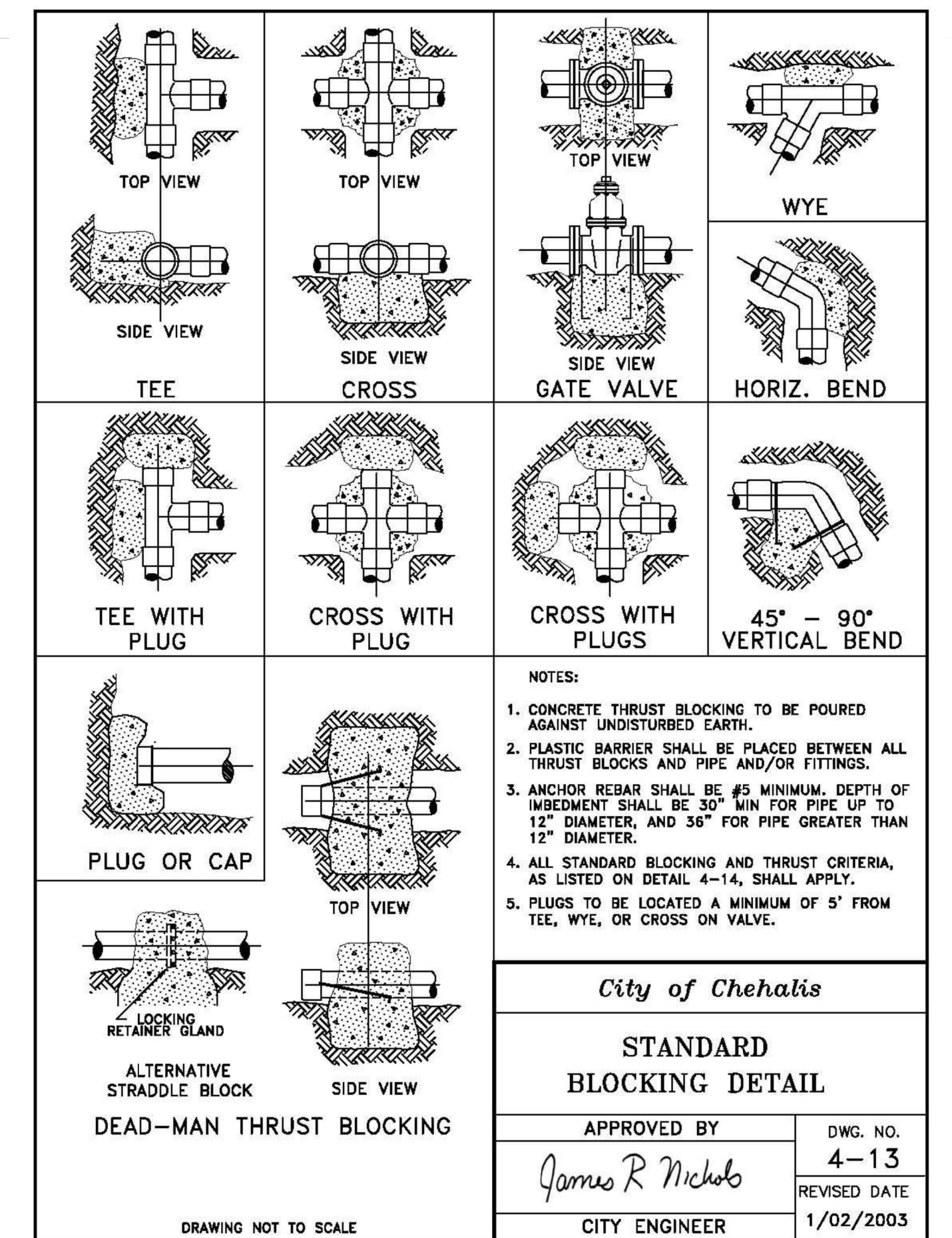
VALVE STEM EXTENSION LEGEND

- VALVE OPERATING NUT OR 1-7/8" X 1-7/8" X 2" HIGH GRADE STEEL WELDED TO GUIDE PLATE.
- 3/16" THICK X 5-1/5" DIA STEEL GUIDE PLATE WELDED TO RISER SHAFT.
- 2" X 2" X 3/16" SQUARE STRUCTURAL STEEL TUBING TO FIT OPERATING NUT. LENGTH AS REQUIRED.

NOTES:

- WELD ALL AROUND, AS SPECIFIED ABOVE.
- IN TRAFFIC LANES, OLYMPIC FOUNDRY 940 VALVE BOX SHALL BE REQUIRED.
- ALL VALVES MUST HAVE 14 GAUGE COATED COPPER TRACER WIRE TIED OFF @ VALVE BODY, EXTENDED WITHIN ONE FOOT OF THE SURFACE, AS SHOWN.

DRAWING NOT TO SCALE



THRUST LOADS

THRUST AT FITTINGS IN POUNDS AT 200 POUNDS PER SQUARE INCH OF WATER PRESSURE

PIPE DIAMETER	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND	DEAD END OR TEE
4"	3,600	2,000	1,000	500	2,600
6"	8,000	4,400	2,300	1,200	5,700
8"	14,300	7,700	4,000	2,000	10,100
10"	22,300	12,100	6,200	3,100	15,800
12"	32,000	17,400	8,900	4,500	22,700
14"	43,600	23,600	12,100	6,100	30,800
16"	57,000	30,800	15,700	7,900	40,300

NOTES:

- BLOCKING SHALL BE CEMENT CONCRETE CLASS "B" POURED IN PLACE AGAINST UNDISTURBED EARTH. FITTINGS & PIPE SHALL BE ISOLATED FROM CONCRETE THRUST BLOCK WITH PLASTIC OR SIMILAR MATERIAL.
- TO DETERMINE THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET (S.F.):
EXAMPLE : 12" - 90° BEND IN SAND AND GRAVEL
32,000 LBS ÷ 3000 LB/S.F. = 10.7 S.F. OF AREA
- AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZE, PRESSURES AND SOIL CONDITIONS.
- BLOCKING SHALL BE ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.

SAFE SOIL BEARING LOADS

FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2 FEET

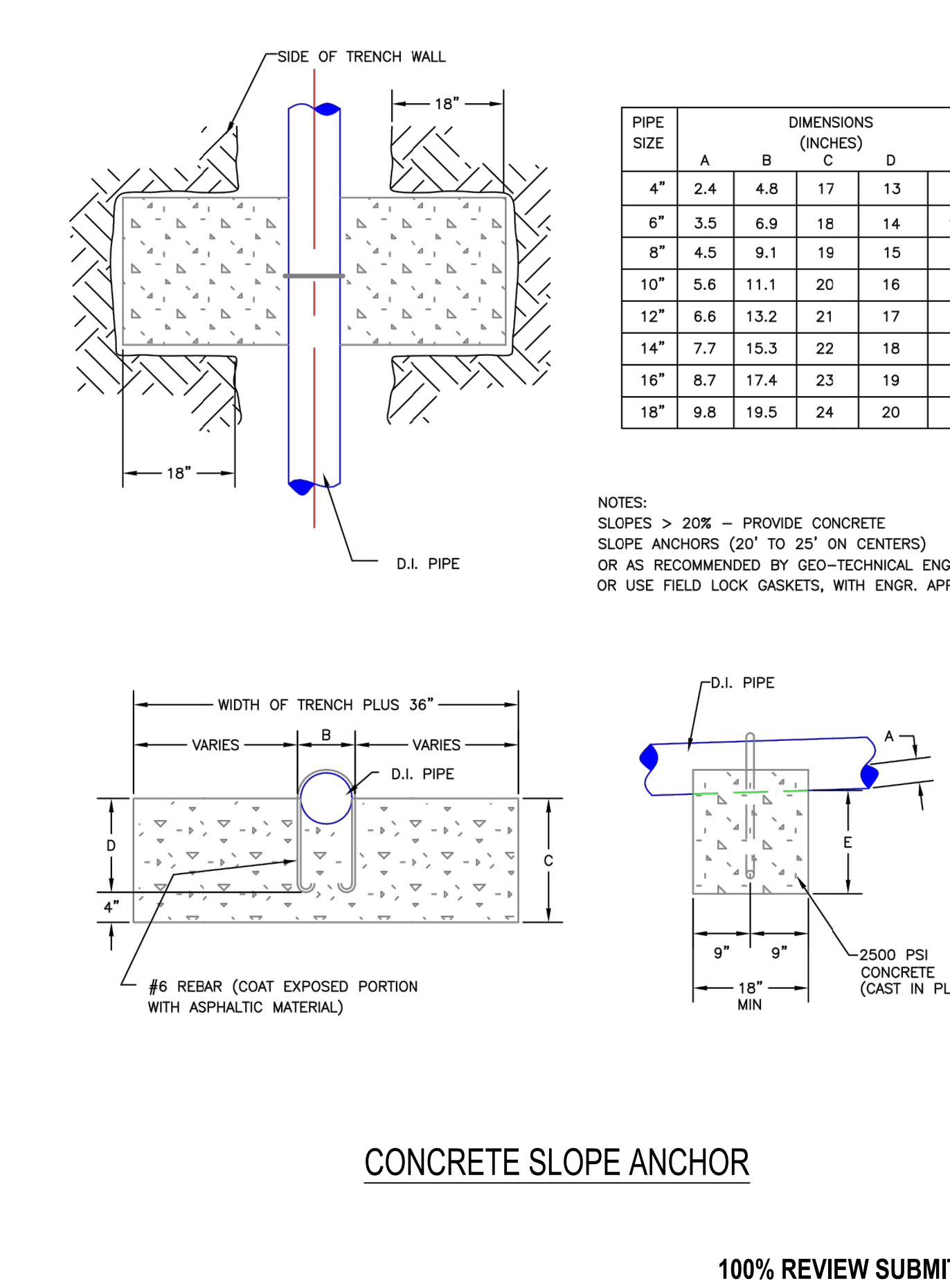
SOIL	POUNDS PER SQUARE FOOT
MUCK, PEAT	0
SOFT CLAY	1,000
SAND	2,000
SAND & GRAVEL	3,000
SAND & GRAVEL CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

City of Chehalis

THRUST LOADS

APPROVED BY *James R Nichols* DWG. NO. 4-14

CITY ENGINEER REVISED DATE 1/02/2003



Sep 27, 2019 7:48:29am - User: steve.eagan
PROJECT: V1608.01 CHEHALIS PUMP STATION PHASE 02 - SCHEMATIC DESIGN (V1608.01) WT-02.DWG

CALL BEFORE YOU DIG

THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT (800) 424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

BY: _____ DATE: _____

REVISIONS: _____

SCJ ALLIANCE
CONSULTING SERVICES

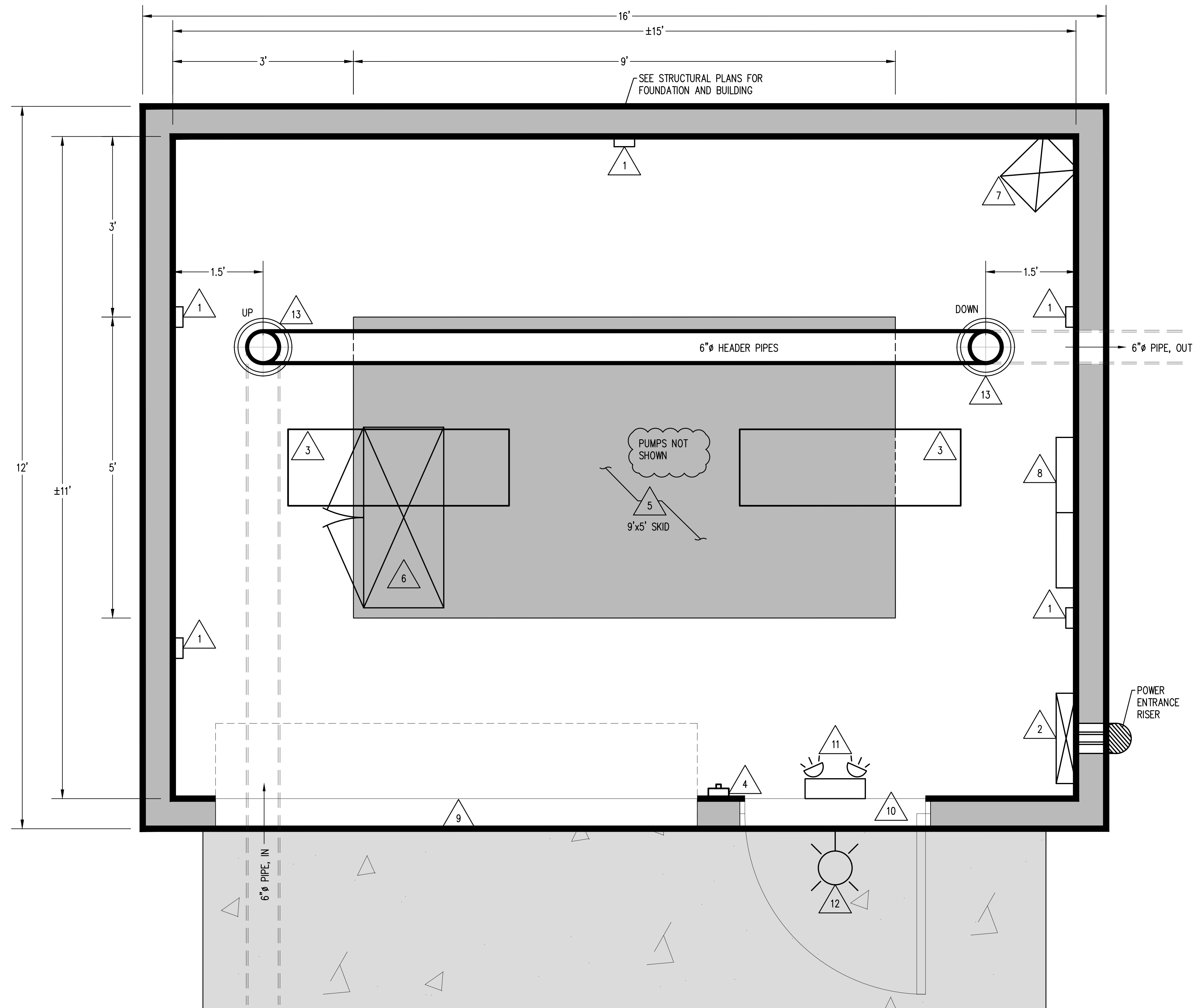
8730 TALLOW LANE, NE SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

SITE DETAILS
CHEHALIS PUMP STATION
CHEHALIS, WA

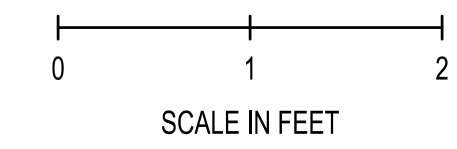
SHEET TITLE: _____ PROJECT NAME: _____

DESIGNER: B. CONNOLLY
DRAWN BY: S. EGAN
APPROVED BY: B. CONNOLLY
DATE: SEPT. 27, 2019
JOB NO: 1608.01
DRAWING FILE NO: 1608.01 WT-02
DRAWING NO: C-11
SHEET NO: 11 OF 25

SEC. 32, T14N., R2W., W.M.



- X PUMP HOUSE ITEMS:**
- 110V ELECTRICAL OUTLET, SEE ELECTRICAL DRAWINGS.
 - POWER DISTRIBUTION PANEL, SEE ELECTRICAL DRAWINGS.
 - CEILING LIGHT, SEE ELECTRICAL DRAWINGS.
 - LIGHT SWITCH.
 - PUMP SKID, SEE STRUCTURAL DRAWINGS FOR STANDARD DETAIL FOR SLED ANCHORING.
 - CONTROL PANEL, SEE ELECTRICAL DRAWINGS.
 - WALL HEATER, WITH LOW RANGE THERMOSTAT (35' - 75'), SEE ELECTRICAL DRAWINGS.
 - ANALYZER EQUIPMENT, SEE ELECTRICAL DRAWINGS.
 - 8' WIDE ROLL-UP DOOR, SEE STRUCTURAL DRAWINGS.
 - 36" ENTRY DOOR, SEE STRUCTURAL DRAWINGS.
 - EMERGENCY LIGHT, SEE ELECTRICAL DRAWINGS.
 - EXTERNAL LIGHT OVER ENTRY DOOR, SEE ELECTRICAL DRAWINGS.
 - 10" Ø PVC PIPE SLEEVE FOR WATER PIPE ENTRY/EXIT POINTS THROUGH FOUNDATION (GAP TO BE SEALED WITH HYDRAULIC CEMENT).



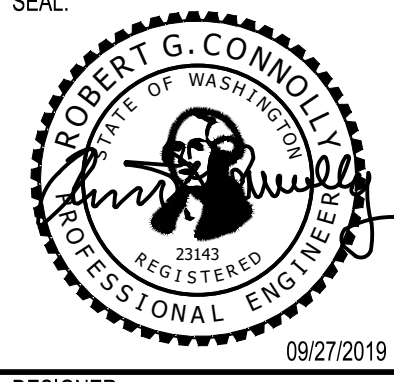
CALL BEFORE YOU DIG
 THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT (800) 424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

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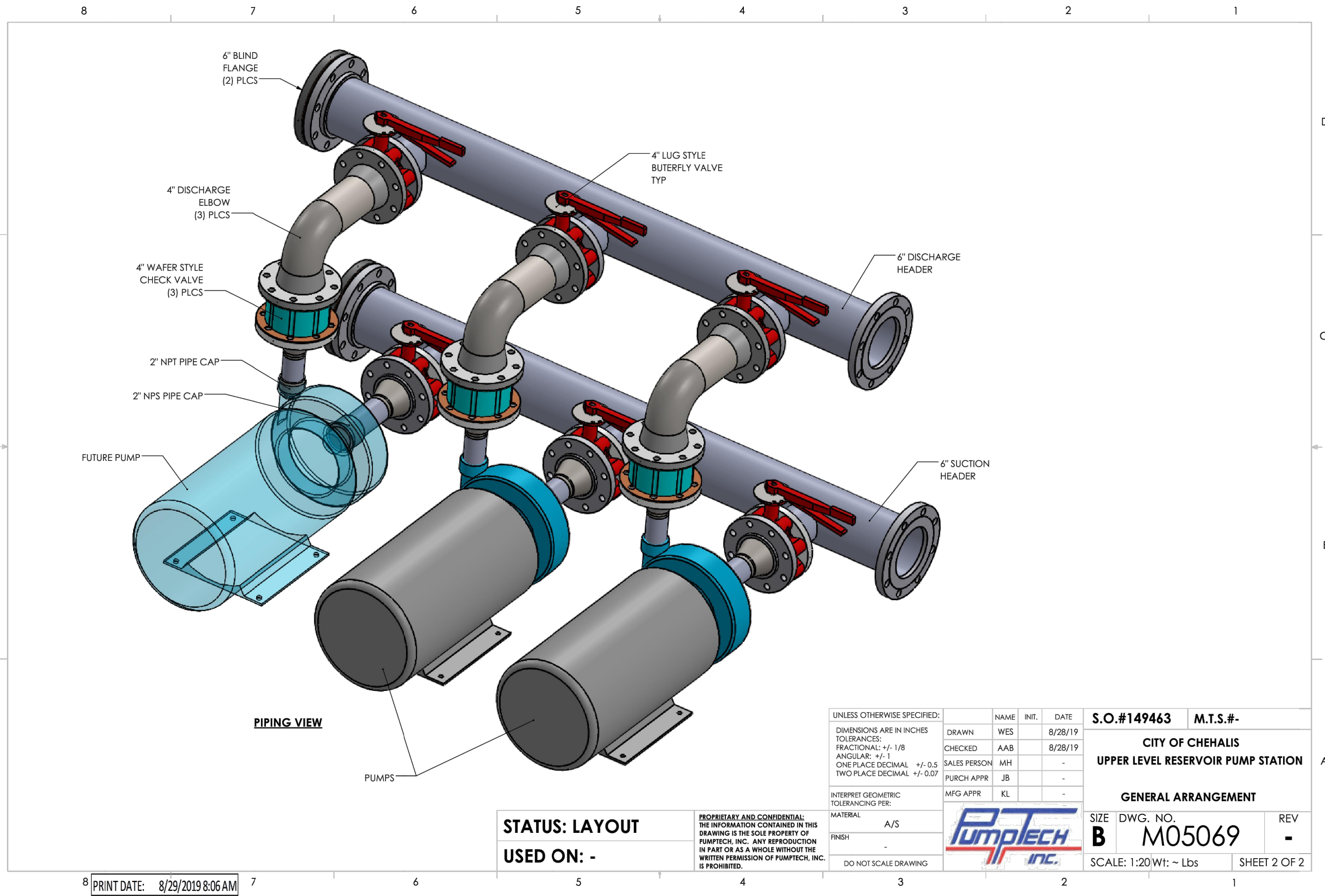
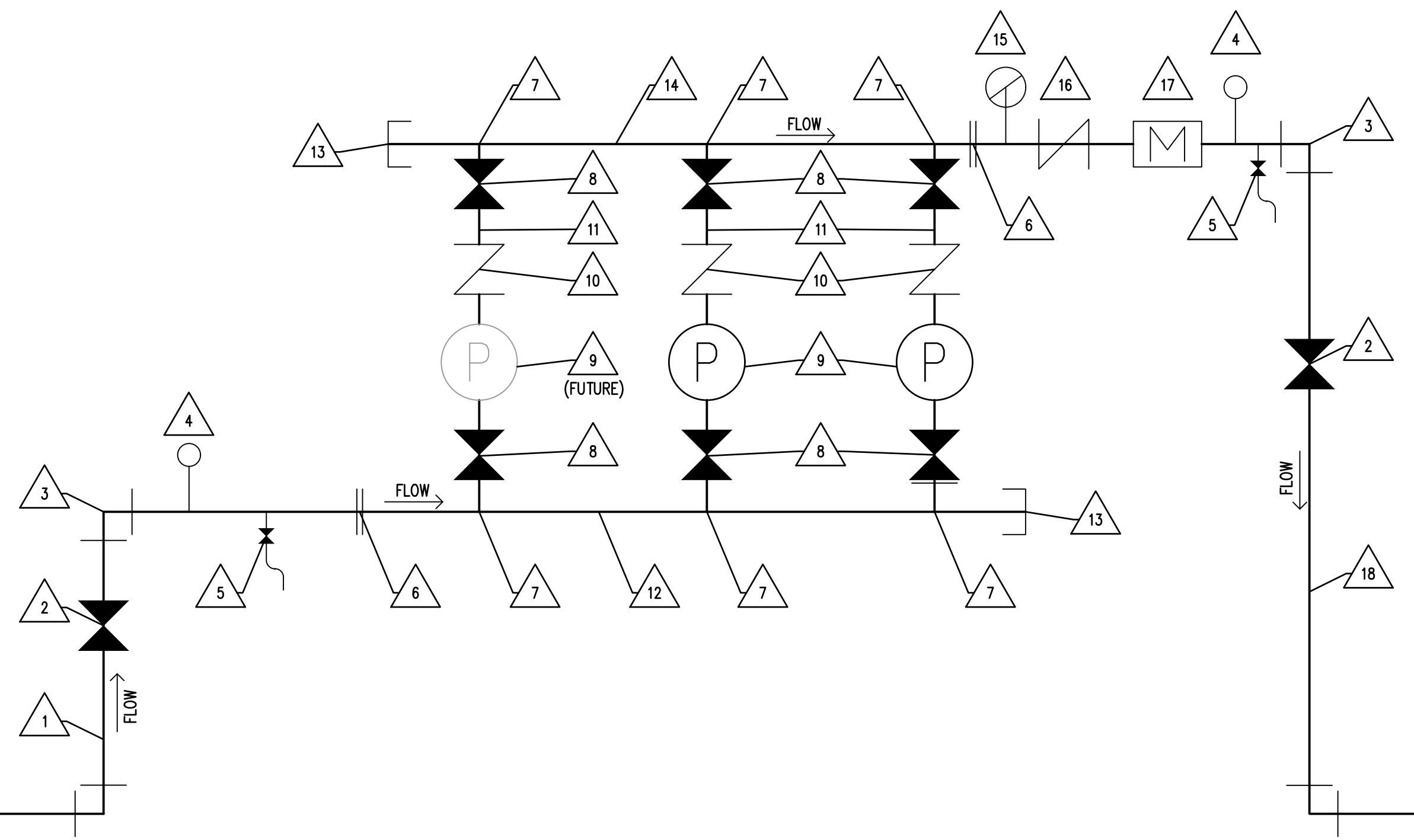
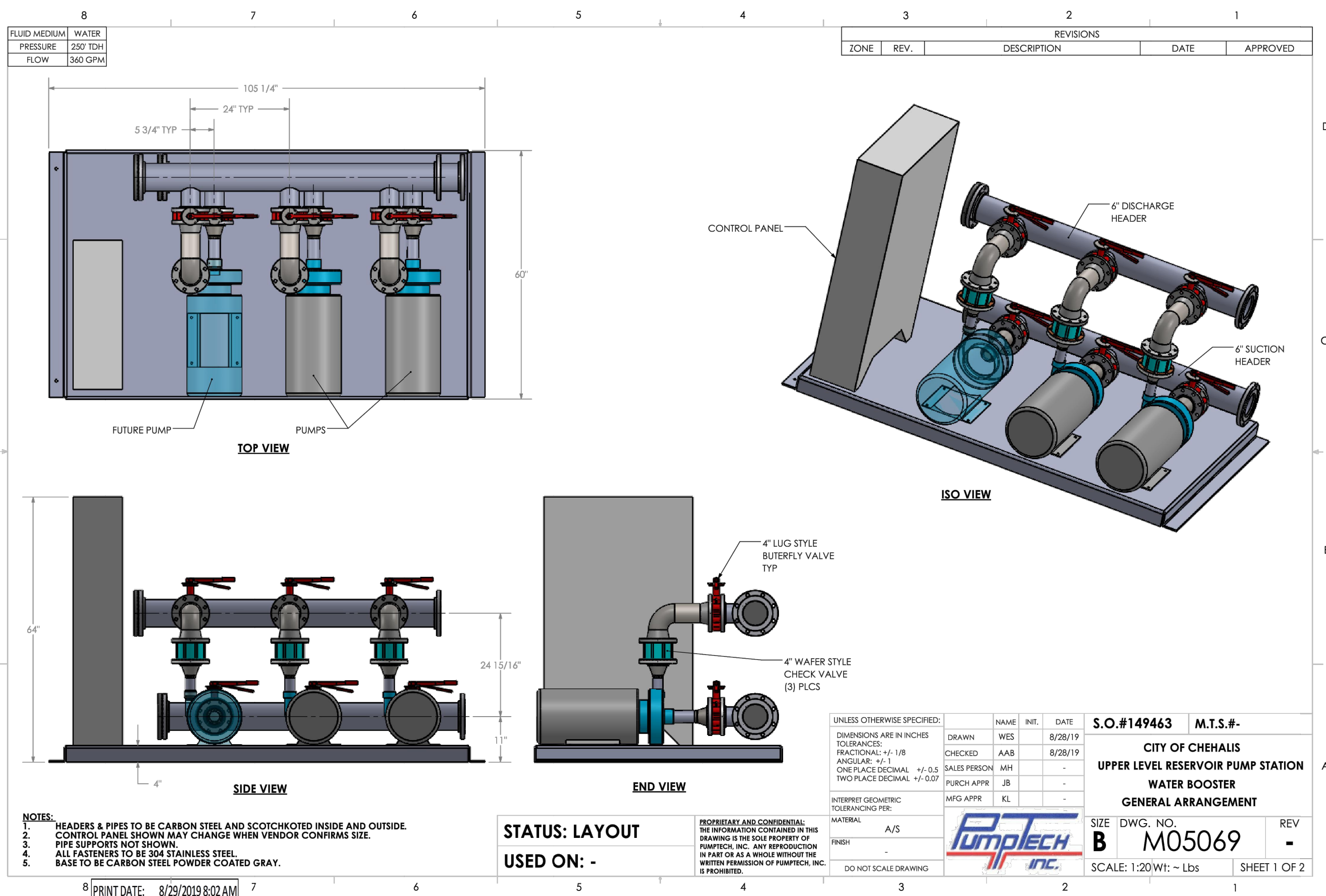
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 CONSULTING SERVICES
 8730 TALLON LANE NE SUITE 200, LACEY, WA 98516
 P: 360.352.1465 F: 360.352.1509
 SCJALLIANCE.COM

SHEET TITLE: **PUMP HOUSE FLOOR PLAN**
 PROJECT NAME: **CHEHALIS PUMP STATION**
 CHEHALIS, WA



DESIGNER:	B. CONNOLLY
DRAWN BY:	S. EGAN
APPROVED BY:	B. CONNOLLY
DATE:	SEPT. 27, 2019
JOB NO:	1608.01
DRAWING FILE NO:	1608.01 SP-03
DRAWING NO:	C-12
SHEET NO:	12 OF 25

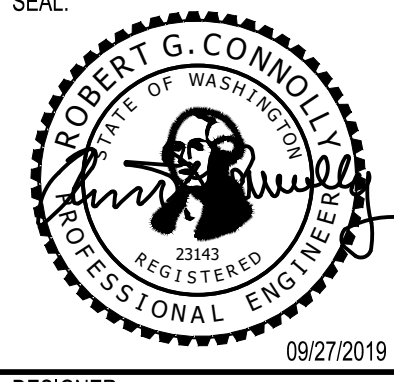
Sep 27, 2019 7:46:36am - User: steve.egan
 W:\PROJECTS\1608 CITY OF CHEHALIS\1608.01 CHEHALIS PUMP STATION\PHASE 02 - SCHEMATIC DESIGN\CADD\1608.01 SP-03.DWG



BY	DATE

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SHEET TITLE: PUMP AND PLUMBING DETAILS AND NOTES
 PROJECT NAME: CHEHALIS PUMP STATION
 CHEHALIS, WA



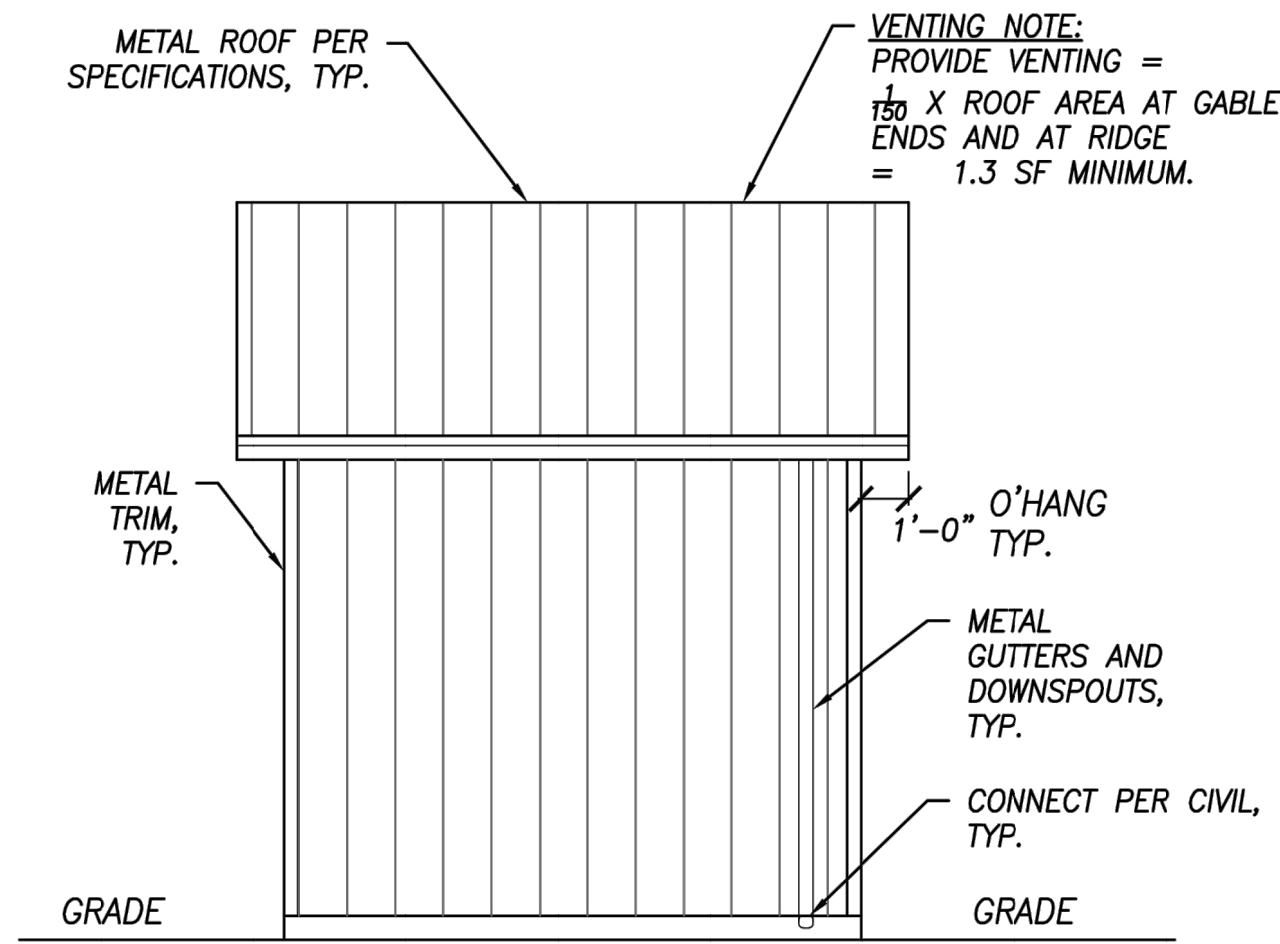
DESIGNER: B. CONNOLLY
DRAWN BY: S. EGAN
APPROVED BY: B. CONNOLLY
DATE: SEPT. 27, 2019
JOB NO: 1608.01
DRAWING FILE NO: 1608.01 SP-04
DRAWING NO: C-13
SHEET NO: 13 OF 25

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Sep 27, 2019 7:48:43am - User: steve.eagan
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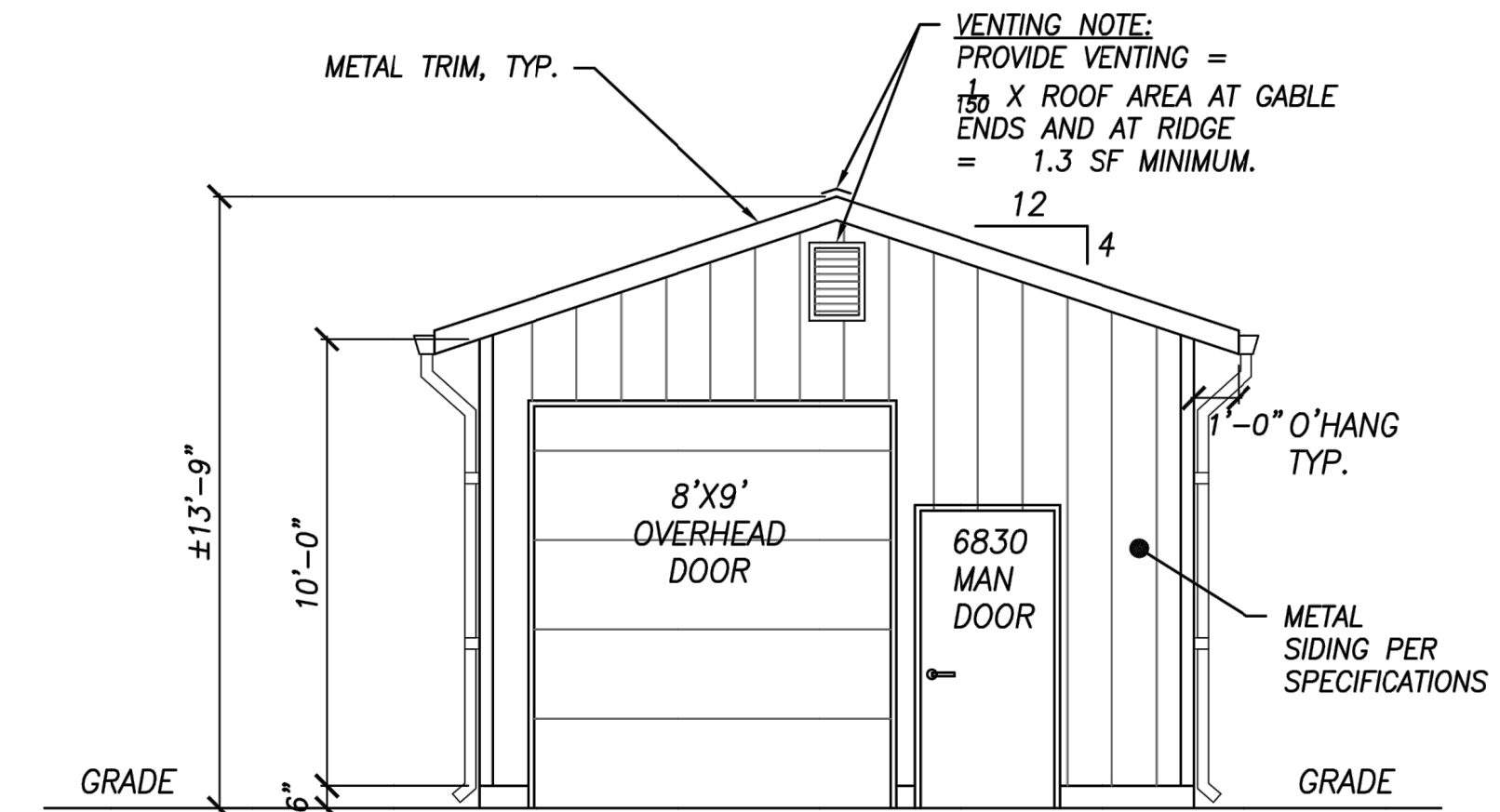
CITY OF CHEHALIS WATER PLANT PUMP STATION

16'x12' PUMP HOUSE BUILDING AND RELATED STRUCTURES



SIDE ELEVATION

1/4"=1'-0"
PLAN.DWG



END ELEVATION

1/4"=1'-0"
PLAN.DWG

STRUCTURAL NOTES

GENERAL NOTES:

THESE STRUCTURAL NOTES SUPPLEMENT THE DRAWINGS. ANY DISCREPANCY FOUND AMONG THE DRAWINGS, THESE NOTES, AND THE SITE CONDITIONS SHALL BE REPORTED TO THE ENGINEER, WHO SHALL CORRECT SUCH DISCREPANCY IN WRITING. ANY WORK DONE BY THE CONTRACTOR AFTER DISCOVERY OF SUCH DISCREPANCY SHALL BE DONE AT THE CONTRACTOR'S RISK.

THE CONTRACTOR SHALL VERIFY AND COORDINATE THE DIMENSIONS AMONG ALL DRAWINGS PRIOR TO PROCEEDING WITH ANY WORK OR FABRICATION. THE CONTRACTOR SHALL COORDINATE BETWEEN THE ARCHITECTURAL DRAWINGS AND THE STRUCTURAL DRAWINGS. THE ARCHITECTURAL DIMENSIONS ARE TAKEN TO BE CORRECT WHEN IN CONFLICT WITH THE STRUCTURAL DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR ALL BRACING AND SHORING DURING CONSTRUCTION.

ALL CONSTRUCTION SHALL CONFORM TO THE APPLICABLE PORTIONS OF THE 2015 OR LATEST EDITION OF THE INTERNATIONAL BUILDING CODE EXCEPT WHERE NOTED.

DESIGN CRITERIA:

- LIVE LOAD = 25 PSF (SNOW PER CITY OF CHEHALIS BLDG DEPT)
- DEAD LOAD = 15 PSF (ROOF)
10 PSF (WALL)
50 PCF (4" CONCRETE SLAB FLOOR)
150 PCF (CONCRETE)
- WIND = 2015 IBC EXPOSURE B @ 115 MPH 3 SEC GUST
- EARTHQUAKE = 2015 IBC: IE=1.5 S_S = 1.15 S₁ = 0.499 SITE CLASS D, RISK CATEGORY IV, DESIGN CATEGORY C
SDS=0.798, SD1=0.500 R=6.5 LIGHT FRAMED WOOD SHEAR WALLS
CS=0.184 STRENGTH, 0.7 CS=0.129 ASD
- SOIL Q_a = 3000 PSF, BEARING CAPACITY. SEE PRELIMINARY SOILS REPORT BY LANDAU AND ASSOCIATES, DATED JULY 24, 2019. IF SOFT SOILS OR SOILS DIFFERING FROM REPORT ARE FOUND, CONSULT GEOTECHNICAL ENGINEER FOR UPDATED REPORT AND COMPLY WITH RECOMMENDATIONS.

CONCRETE & REINFORCING STEEL:

- ALL CONCRETE WORK SHALL BE PER THE 2015 IBC CHAPTER 19. TOLERANCES SHALL BE PER IBC CHAPTER 19, SECTION 07. MIXING, PLACEMENT, AND INSPECTION SHALL BE PER SECTIONS 03, 04, 05, AND 06.
- ALL REINFORCING SHALL BE ASTM A615 GRADE 60 EXCEPT AS SHOWN ON THE PLANS.
- CONCRETE SHALL BE IN ACCORDANCE WITH ASTM 150.
F'C = 3000 PSI @ 28 DAY
SLUMP = 4" MAXIMUM, 6% AIR ENTRAINED.

CARPENTRY:

- 2X STRUCTURAL FRAMING SHALL BE #2 HEM FIR, UNO.
- 4X STRUCTURAL MEMBERS SHALL BE #2 HEM FIR, UNO.
- 6X BEAM MEMBERS SHALL BE #1 DOUGLAS FIR, UNO. 6X POSTS SHALL BE PER PLANS AND SHEARWALL NOTES.
- GLUE LAMINATED EXTERIOR BEAMS SHALL BE ROSBORO 24F-V4/DF TREATED GLULAMS OR APPROVED EQUAL FOR SIMPLE SPANS. INTERIOR GLUE LAMINATED BEAMS SHALL BE 24F-V4/DF BY APPROVED MANUFACTURER.

(F_b = 2,400 PSI)
(F_v = 265 PSI)
(E = 1,800,000 PSI)
(F_c = 650 PSI)

- ROOF SHEATHING: USE 3/8" PLYWOOD OR 7/16" OSB SPAN RATED 24/0 OR BETTER, NAILED WITH 8D'S AT 6" O.C. AT EDGES AND 12" O.C. IN THE FIELD, UNLESS NOTED OTHERWISE.
- TRUSS MANUFACTURERS ARE RESPONSIBLE FOR ALL BRACING OF THE TRUSSES, INCLUDING END WALL BRACING AND ALL OTHER BRACING BETWEEN THE BUILDING AND THE TRUSSES, UNLESS SPECIFICALLY SHOWN OTHERWISE ON THE DRAWINGS.
- MINIMUM NAILING _ PER IBC TABLE 2304.9.1 - FASTENING SCHEDULE.
- LUMBER EXPOSED TO EARTH, WEATHER OR CONCRETE SHALL BE PRESSURE TREATED FOR THE APPLICABLE EXPOSURE. HARDWARE USED ON PRESSURE TREATED LUMBER SHALL BE COMPATIBLE WITH THE TREATMENT TO RESIST CORROSION. USE SIMPSON ZEE-MAX OR HOT DIP GALVANIZED TREATMENT PER MANUFACTURER.

SITE WORK:

EXCAVATION:

EXCAVATE FOOTINGS DOWN TO FIRM UNDISTURBED MATERIAL TO MINIMUM DEPTH ON DRAWINGS. AREAS OVER-EXCAVATED SHALL BE BACKFILLED WITH LEAN CONCRETE (F'C=2000 PSI), AND SHALL BE AT THE CONTRACTOR'S EXPENSE. SEE CIVIL DRAWINGS FOR APPROXIMATE LOCATION OF EXISTING PIPELINES. EXERCISE EXTREME CARE DURING EXCAVATION TO AVOID DAMAGE TO BURIED LINES, TANKS AND OTHER CONCEALED ITEMS. UPON DISCOVERY, DO NOT PROCEED WITH WORK UNTIL RECEIVING WRITTEN INSTRUCTIONS FROM ENGINEER. PROVIDE DRAINAGE AS NECESSARY TO AVOID WATER SOFTENED SUBGRADES. IF NON-NATIVE FILL ENCOUNTERED, CONSULT GEOTECHNICAL ENGINEER FOR REQUIREMENTS TO ACHIEVE ADEQUATE BEARING CAPACITY.

BACKFILL AND COMPACTION:

BACKFILL AGAINST WALLS SHALL NOT BE PLACED UNTIL AFTER THE REMOVAL OF ALL FORMS, SCREEDS, OTHER WOOD DEBRIS AND MATERIAL SUBJECT TO ROT OR CORROSION. USE ONLY MATERIALS APPROVED FOR BACKFILL. IN AREAS UNDER SLABS OR FOOTINGS, MATERIAL SHOULD BE GRANULAR IN NATURE, PLACED IN 6 INCH LIFTS AND COMPACTED TO AT LEAST 95% OF ITS MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO COMPACTION TEST PROCEDURE T_180. THE FILL SHOULD BE LIMITED TO CLEAN, GRANULAR MATERIAL. PEA GRAVEL FILL WHERE SPECIFIED ON DRAWINGS SHALL HAVE A MAXIMUM PARTICLE SIZE OF 3/8" DIAMETER.

HARDWARE:

ALL CONNECTION HARDWARE SHALL BE SIMPSON "STRONG TIE". CONNECTION HARDWARE EXPOSED TO PRESSURE TREATED LUMBER, WEATHER OR SOIL SHALL BE HOT DIPPED GALVANIZED FOR SEVERE MARINE EXPOSURE.

CAUTION:

CONTRACTOR TO FIELD VERIFY ALL CONDITIONS AND ALL ELEVATIONS.

LIMITATIONS:

STRUCTURAL ENGINEERING STAMP IN THESE DRAWINGS PERTAINS ONLY TO THE SPECIFIC SCOPE OF WORK OUTLINED IN ASSOCIATED CALCULATIONS AND DOES NOT IMPLY APPROVAL, OR RESPONSIBILITY FOR ITEMS OUTSIDE OF THOSE SPECIFIC ITEMS. THIS SET OF DRAWINGS AND CALCULATIONS ARE VALID AND SHALL ONLY BE USED FOR THIS SINGLE SPECIFIC SITE AND SHALL NOT BE RE-USED WITHOUT CONSENT AND APPROVAL OF THE STRUCTURAL ENGINEER.

NOTES:

- USE 1/2" DIAMETER ANCHOR BOLTS OR SIMPSON LMA-6Z ANCHORS AT 48" O.C. UNLESS NOTED OTHERWISE ON PLAN.
- MINIMUM PER WALL.
- SEE FLOOR PLAN FOR HOLD DOWN LOCATIONS.

TYPICAL SHEAR WALL NOTES

USE LMA-6Z OR 1/2" DIA. BY 10" ANCHOR BOLTS (AB'S) WITH SINGLE 2X PLATES AND 1/2" DIA. BY 12" AB'S WITH 3X PLATES SPACED AS SHOWN ON THE DRAWINGS. AB'S SHALL HAVE 7" OF EMBEDMENT INTO FOOTING, SHALL BE CENTERED IN THE STUD WALL, AND SHALL PROJECT THROUGH THE BOTTOM PLATE OF THE WALL. USE GALVANIZED PLATE WASHERS, SUFFICIENT TO RESIST CORROSION FROM CONTACT WITH TREATED WOOD. REFER TO TREATED WOOD AND HARDWARE MANUFACTURER'S INSTRUCTIONS. PLATE WASHERS AT EACH BOLT SHALL BE A MINIMUM OF 2 INCHES BY 2 INCHES BY 3/16 INCH THICK. AT CONTRACTOR'S OPTION, USE 2X PLATES AND PROVIDE ANCHOR BOLT SPACING HALF OF THAT SHOWN ON THE DRAWINGS IN LIEU OF 3X PLATES IF TOTAL SHEAR IS LESS THAN 600PLF. SEE SHEARWALL SCHEDULE.

ALL WALL SHEATHING SHALL BE 1/2" CDX PLYWOOD, 5/8" T1-11 SIDING, OR 7/16" OSB WITH EXTERIOR EXPOSURE GLUE AND SPAN RATED "SR 24/0" OR BETTER UNLESS NOTED OTHERWISE IN THE SHEARWALL SCHEDULE. ALL FREE SHEATHING EDGES SHALL BE BLOCKED WITH 2X4 OR 2X6 FLAT BLOCKING EXCEPT WHERE NOTED ON THE DRAWINGS OR BELOW.

ALL NAILS SHALL BE 6D, 8D OR 10D COMMON (6D COMMON NAILS MUST BE 0.113 INCH DIAMETER, 8D COMMON NAILS MUST BE 0.131 INCH DIAMETER, SENCO KC27 NAILS ARE EQUIVALENT. IF 10D COMMON NAILS ARE CALLED FOR THE DIAMETER MUST BE 0.148 INCHES, SENCO MD23 NAILS ARE EQUIVALENT). ALL NAILS INTO TREATED WOOD SHALL BE GALVANIZED AND APPROVED TO RESIST CORROSION DUE TO CONTACT WITH WOOD TREATMENT. REFER TO TREATED WOOD AND HARDWARE MANUFACTURER'S INSTRUCTIONS. NAIL SIZE AND SPACING AT ALL SHEATHING EDGES SHALL BE AS REQUIRED BELOW OR AS IN THE DRAWINGS. NAIL SPACINGS SHALL BE 12" O.C. FOR ALL FIELD NAILING EXCEPT AS NOTED.

HOLD DOWNS ARE SIMPSON "STRONG TIE" AND SHALL BE INSTALLED PER THE MANUFACTURER'S RECOMMENDATION. EQUIVALENT HOLDDOWNS BY UNITED STEEL PRODUCTS COMPANY "KANT-SAG" THAT HAVE ICBO APPROVAL CAN BE SUBSTITUTED WITH ENGINEER'S PRIOR APPROVAL IN PLACE OF SIMPSON HOLD DOWNS. ALL HARDWARE IN CONTACT WITH TREATED WOOD SHALL BE STAINLESS OR GALVANIZED AND APPROVED TO RESIST CORROSION DUE TO CONTACT WITH WOOD TREATMENT. REFER TO TREATED WOOD AND HARDWARE MANUFACTURER'S INSTRUCTIONS.

NOTE: DOUBLE 2X STUDS MAY BE SUBSTITUTED FOR 3X STUDS AT CONTRACTOR OPTION PROVIDED THEY ARE GLUED AND NAILED TOGETHER WITH 10DS AT THE NAIL SPACING FOR PANEL EDGES SPECIFIED FOR THE SHEAR WALL (NOT LESS THAN 10DS AT 3" ON CENTER). EACH STUD SHALL RECEIVE EDGE NAILING FROM ONE PANEL EDGE ONLY.

ALL DOUBLE AND TRIPLE STUDS SHALL GLUED AND NAILED TOGETHER WITH 10D'S AT 3" O.C. FOR EACH LAYER. ALL 4X STUDS ARE TO BE #2 DF AND ALL 6X STUDS ARE TO BE #1 DF WHEN USED FOR HOLDDOWNS AND SHEARWALLS.

ALL WALL FRAMING LUMBER SHALL BE HEM-FIR #2 OR BETTER, EXCEPT THAT 6X MEMBERS SHALL BE #1 DOUGLAS FIR OR BETTER. ALL ROOF FRAMING LUMBER SHALL BE HEM-FIR #2 OR BETTER, EXCEPT THAT 6X MEMBERS SHALL BE #1 DOUGLAS FIR OR BETTER.

SEE STRUCTURAL ELEVATIONS AND DETAILS FOR TYPICAL SHEAR WALL FRAMING REQUIREMENTS.

SHEAR WALL SCHEDULE

- 1 SHEATHING NAILED WITH 8D'S AT 6" ON CENTER ALL EDGES. LRFD PLF = 357, 498 WIND.
- 2 SHEATHING NAILED WITH 8D'S AT 4" ON CENTER ALL EDGES WITH 3X STUDS (OR 4X OR 6X STUDS) AT ABUTTING PANEL EDGES. MUST USE 3X EDGE MEMBERS AND PLATES, LRFD PLF = 521, 729 WIND

HOLDDOWN SCHEDULE

- HTT4 ATTACHES TO CONCRETE FOUNDATION WITH A 5/8" DIA. BOLT WITH 15" MINIMUM EMBEDMENT INTO CONCRETE. HTT4 ATTACHES TO DOUBLE STUDS OR 4X OR 6X STUD WITH (18) 10D COMMON NAILS IN WALL ABOVE.

STRUCTURAL SHEET INDEX	
S-01	STRUCTURAL NOTES AND ELEVATIONS
S-02	PUMP HOUSE PLANS AND DETAILS
S-03	RETAINING WALL PLAN AND DETAILS
S-04	ADD'L DETAILS

STRUCTURAL ENGINEER

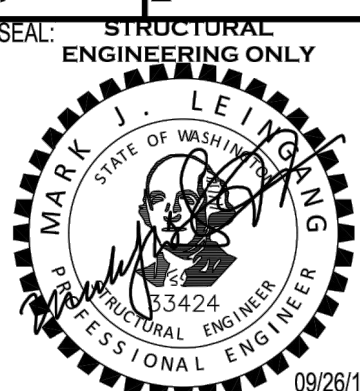
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PO Box 849, MONTESANO, WA 98563
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SHEET TITLE: ELEVATIONS AND NOTES
PROJECT NAME: PUMP HOUSE AND RELATED STRUCTURES

CHEHALIS PUMP STATION
CHEHALIS, WA



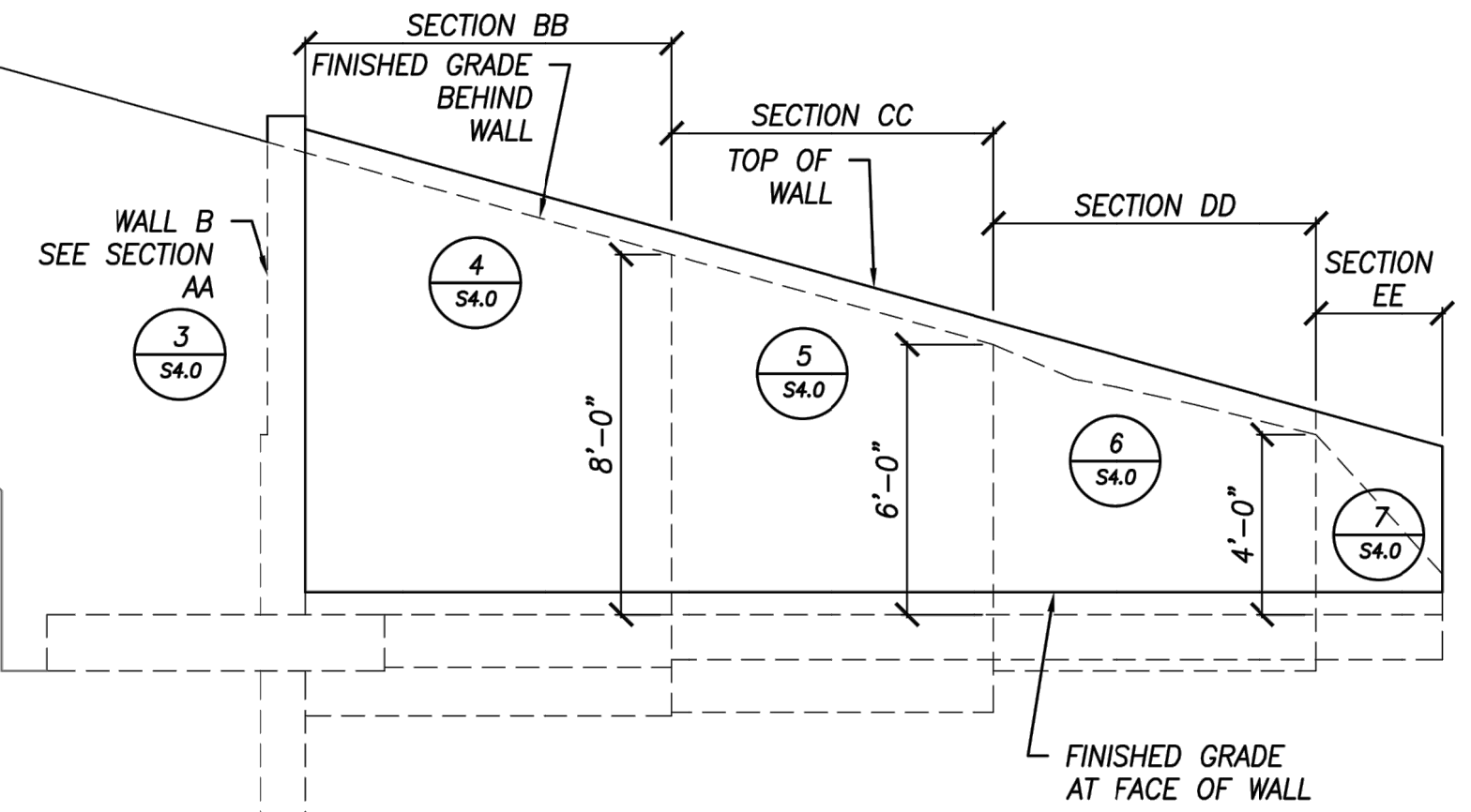
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APPROVED BY: [Signature]
DATE: SEPT. 27, 2019
JOB NO: 19025.00
DRAWING FILE NO: S10 - ELEVATIONS AND NOTES
DRAWING NO: S-01
SHEET NO: 14 OF 25

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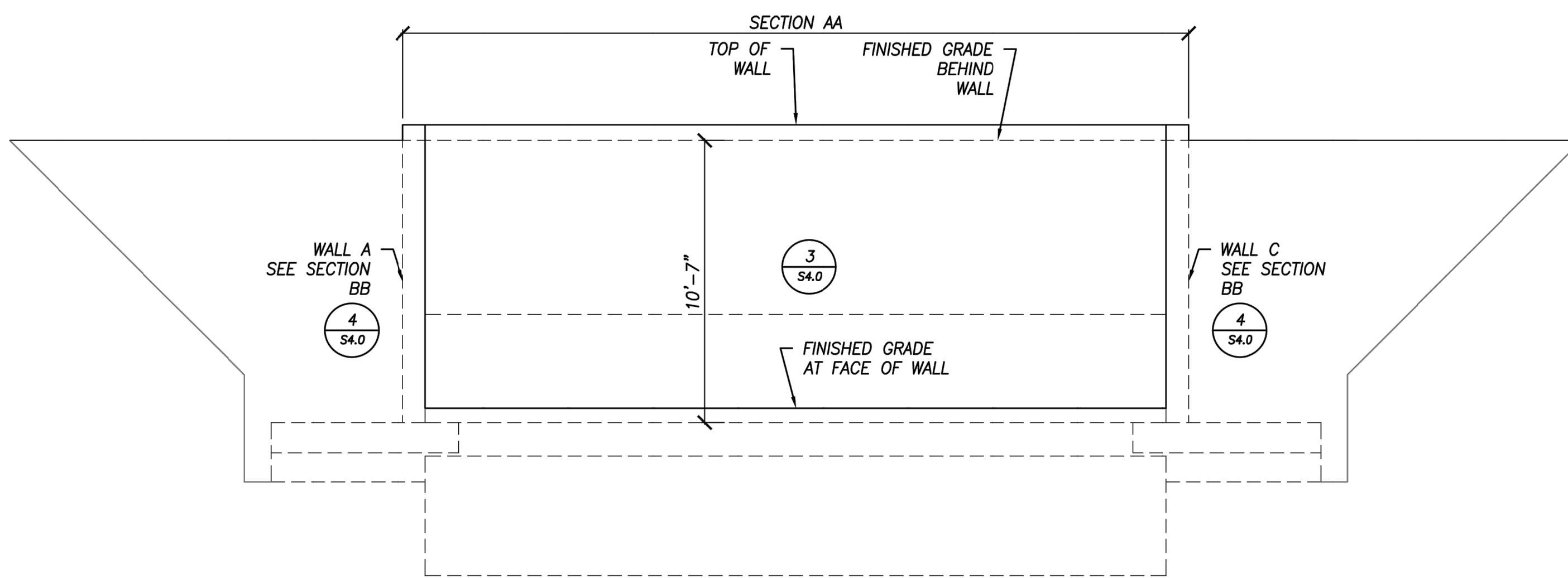
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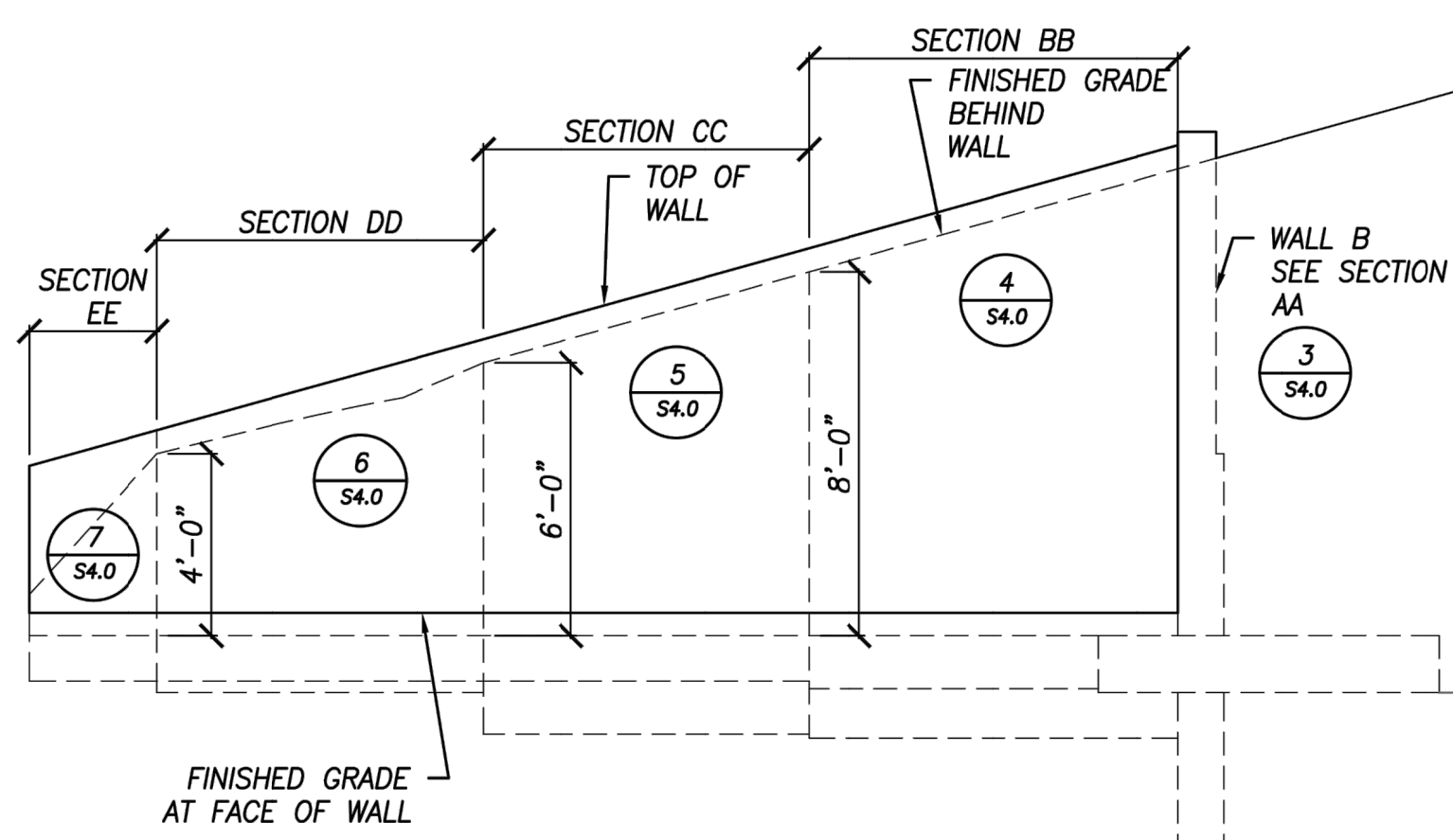
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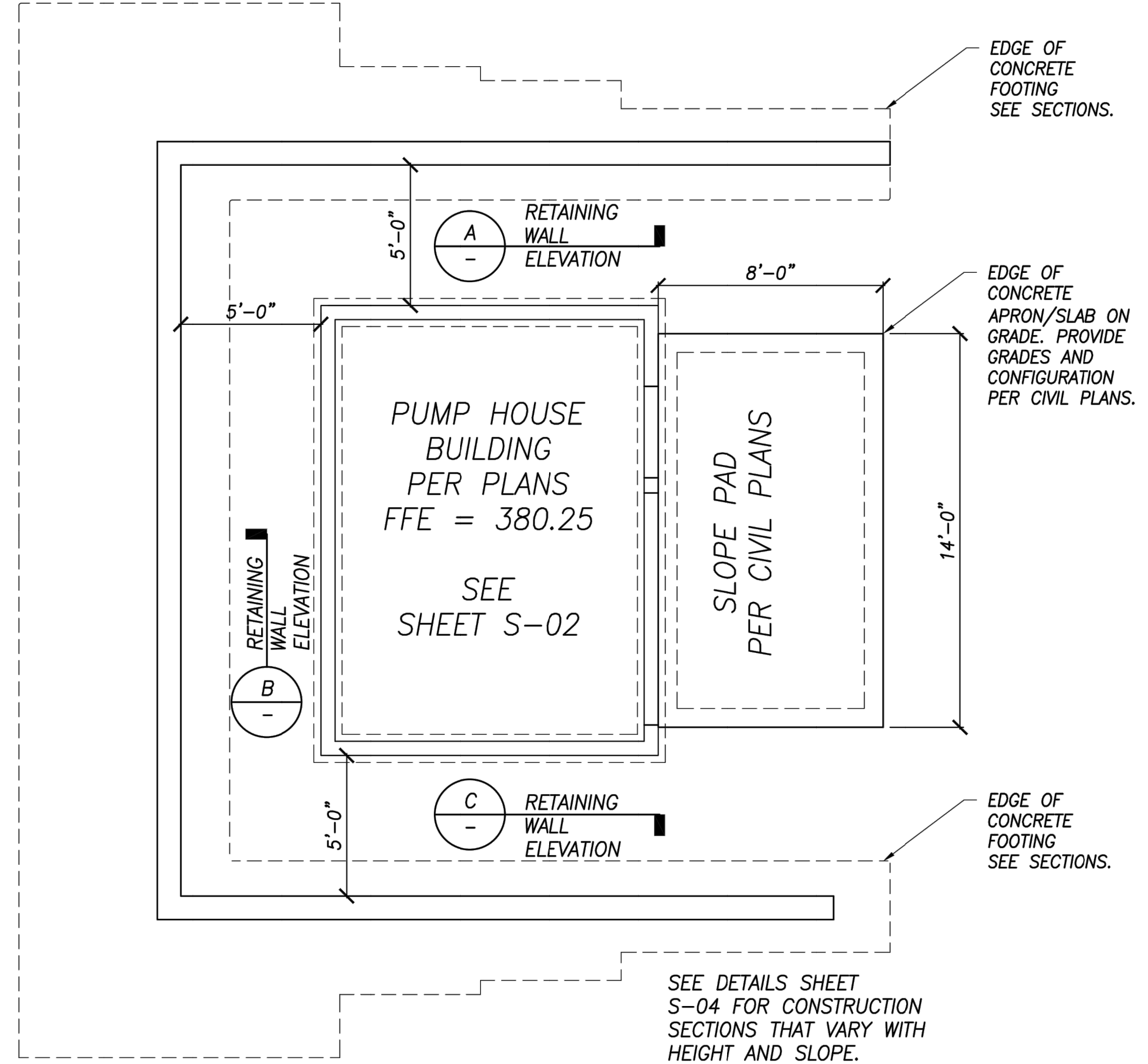
RETAINING WALL ELEVATION
 1/4" = 1'-0"
 PLAN.DWG



RETAINING WALL ELEVATION
 1/4" = 1'-0"
 PLAN.DWG



RETAINING WALL ELEVATION
 1/4" = 1'-0"
 PLAN.DWG



RETAINING WALL PLAN
 1/4" = 1'-0"
 PLAN.DWG

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RETAINING WALL PLAN AND DETAILS
 PUMP HOUSE AND RELATED STRUCTURES
 CHEHALIS PUMP STATION
 CHEHALIS, WA

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 09/26/19

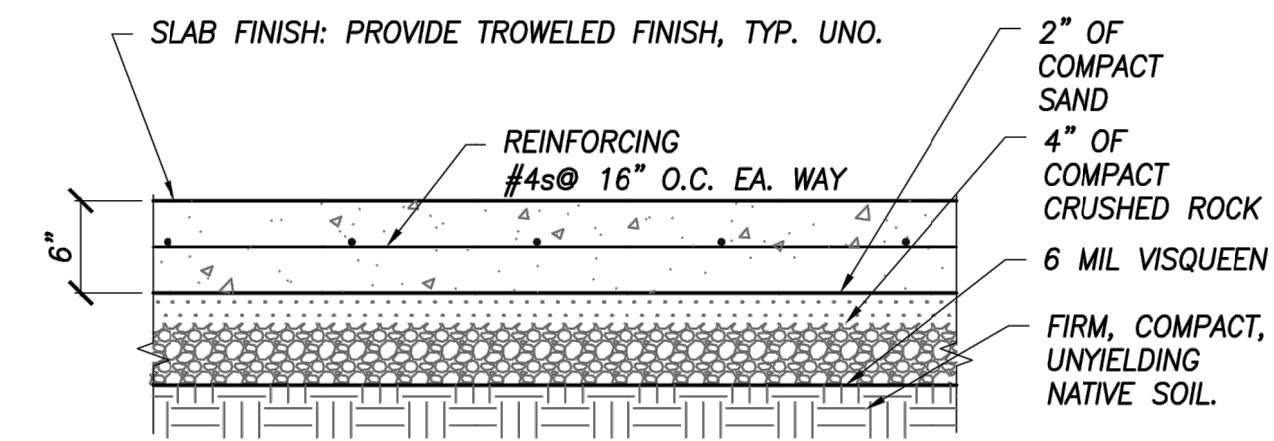
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APPROVED BY:	
DATE:	SEPT. 27, 2019
JOB NO:	19025.00
DRAWING FILE NO:	S30 - RETWALL PLAN AND DETAIL
DRAWING NO:	S-03
SHEET NO:	16 OF 25

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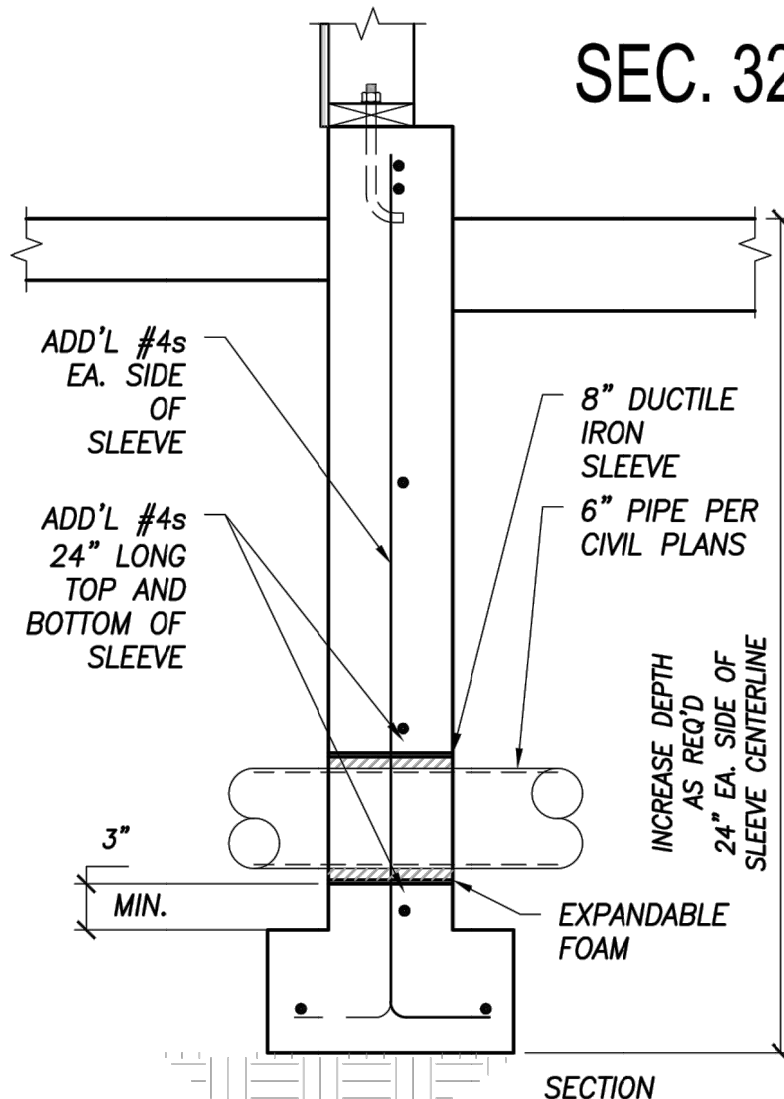
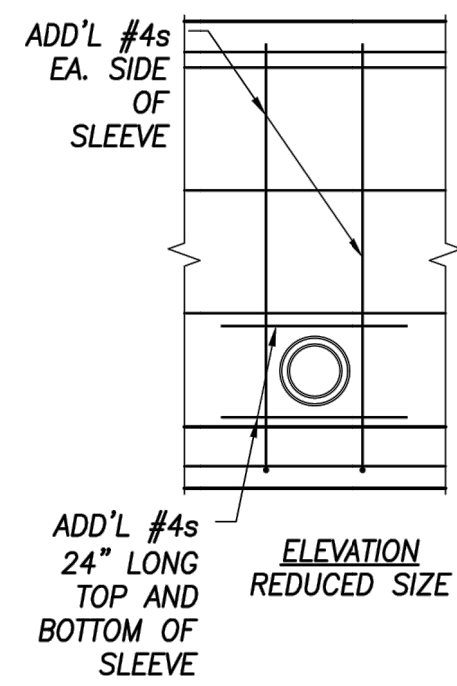
SEC. 32, T14N., R2W., W.M.



INTERIOR SLAB CROSS SECTION

1"=1'-0"
INTERIOR SLAB CROSS SECTION.DWG

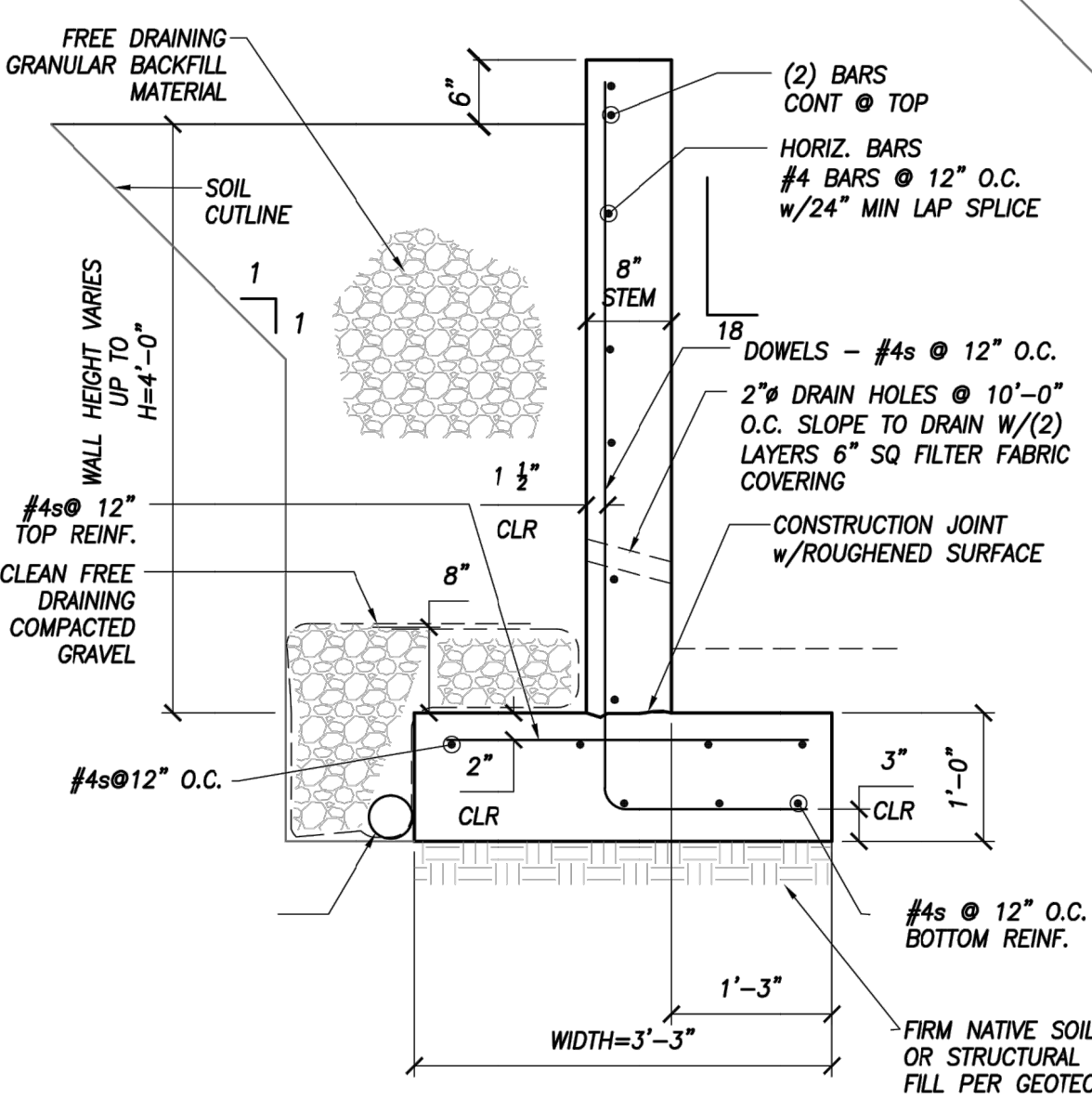
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TYPICAL STEMWALL - SLEEVE PENETRATION

1"=1'-0"
TOD073 STEMWALL SLEEVE PENETRATION.DWG

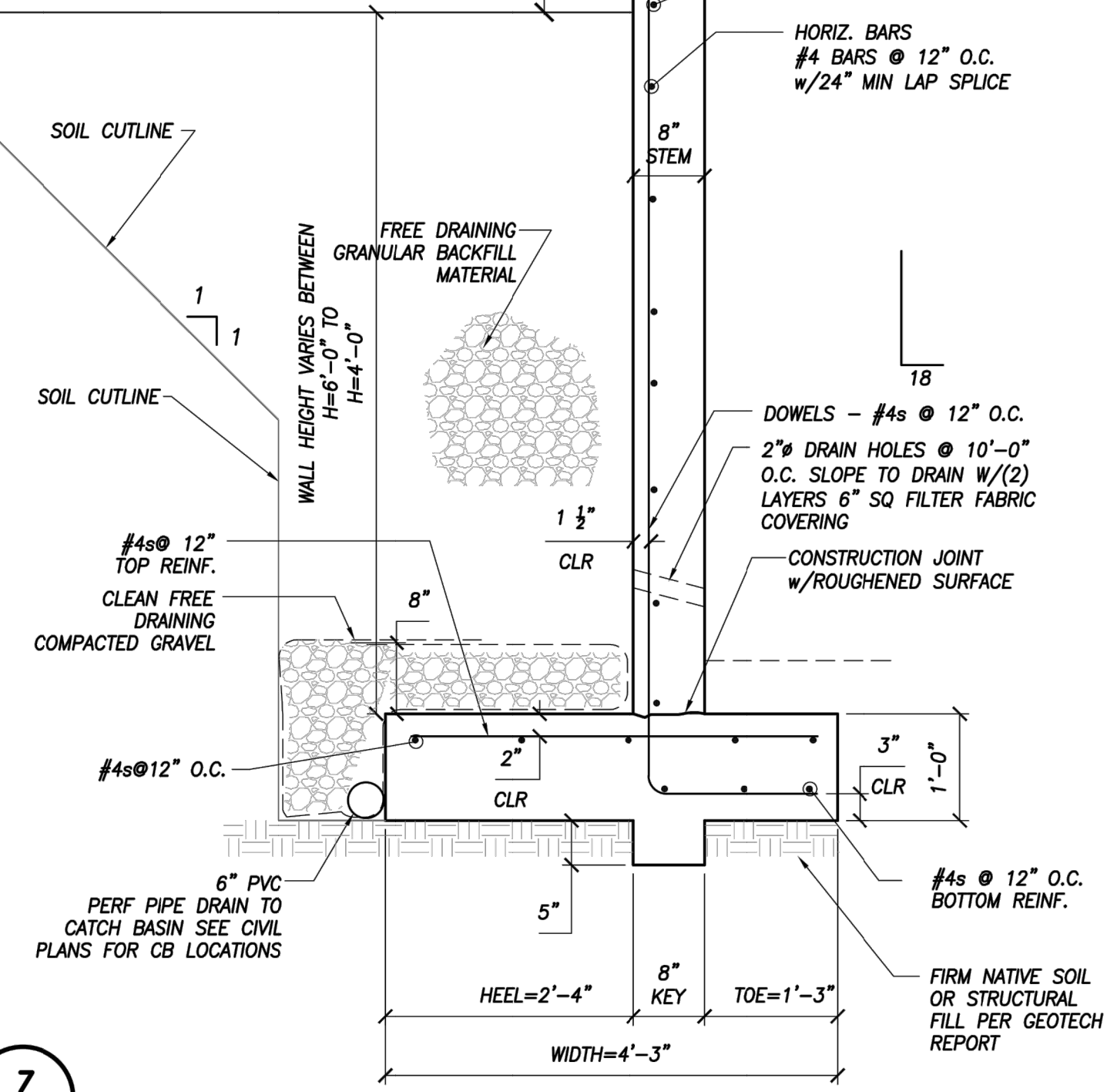
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S2.0



RETAINING WALLS- SECTION EE

3/4"=1'-0"
EE RETAINING WALL - LEVEL BACKFILL.DWG

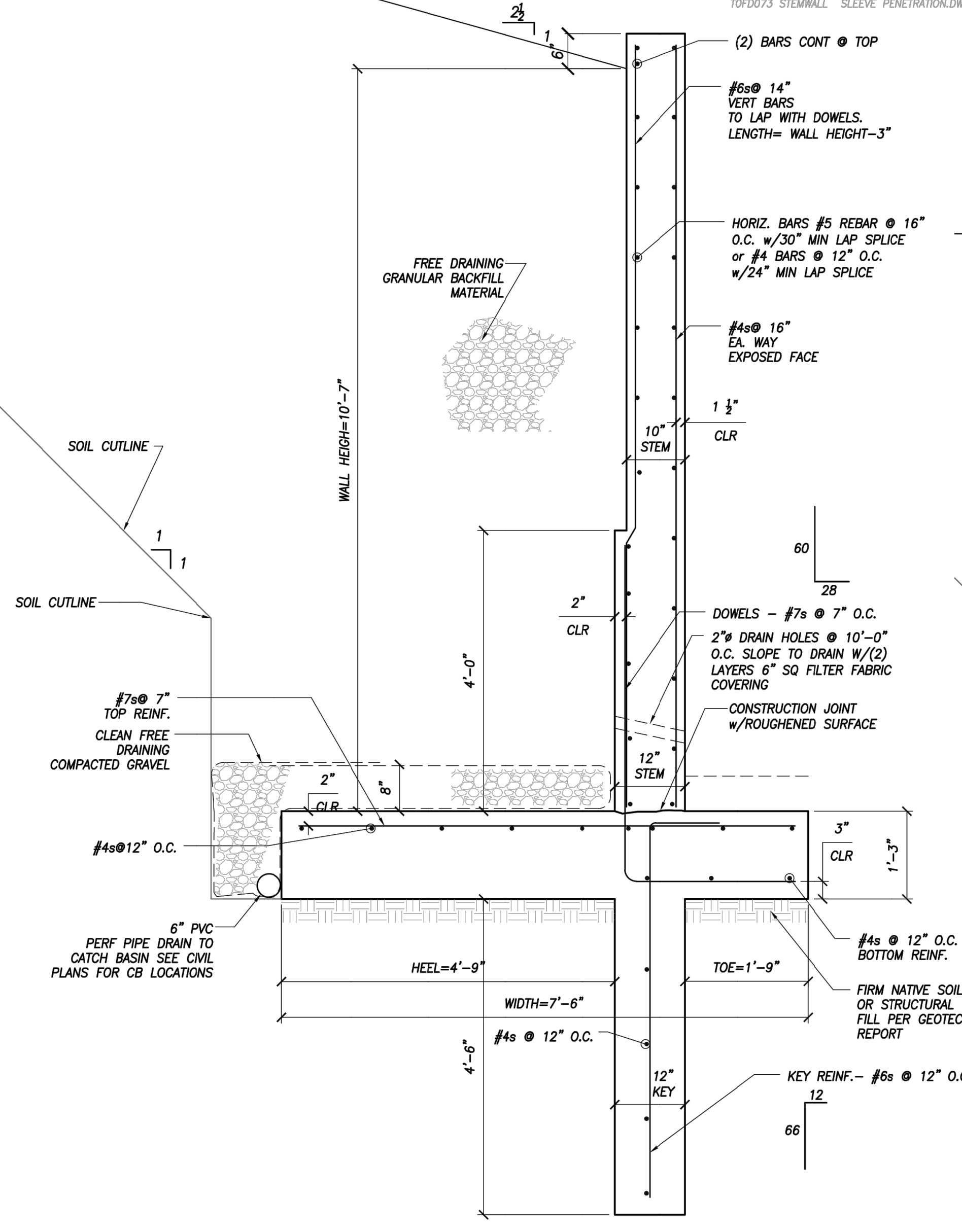
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S3.0



RETAINING WALLS- SECTION DD

3/4"=1'-0"
DD RETAINING WALL - LEVEL BACKFILL.DWG

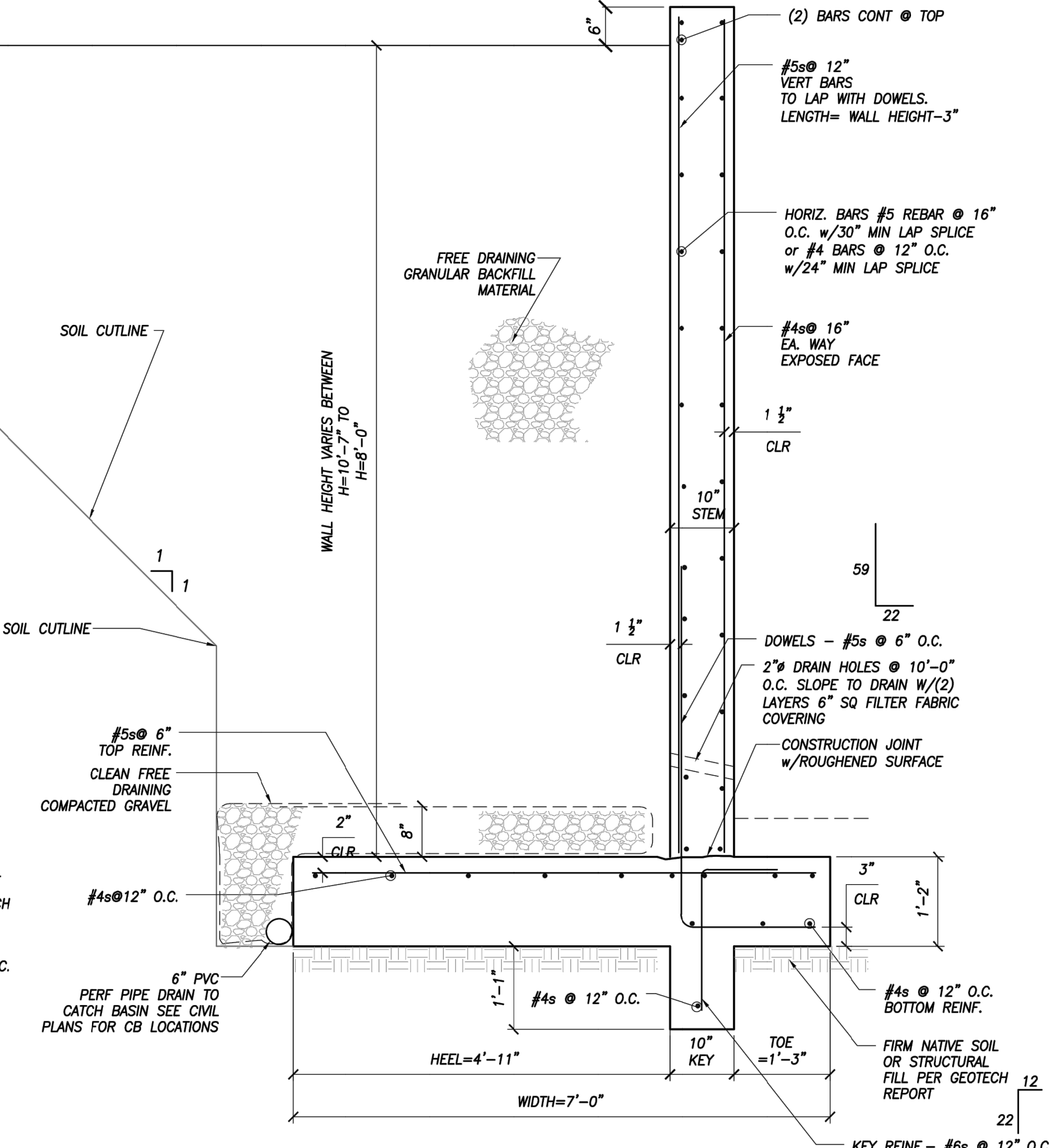
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S3.0



RETAINING WALLS- SECTION AA

3/4"=1'-0"
AA RETAINING WALL - SLOPED BACKFILL.DWG

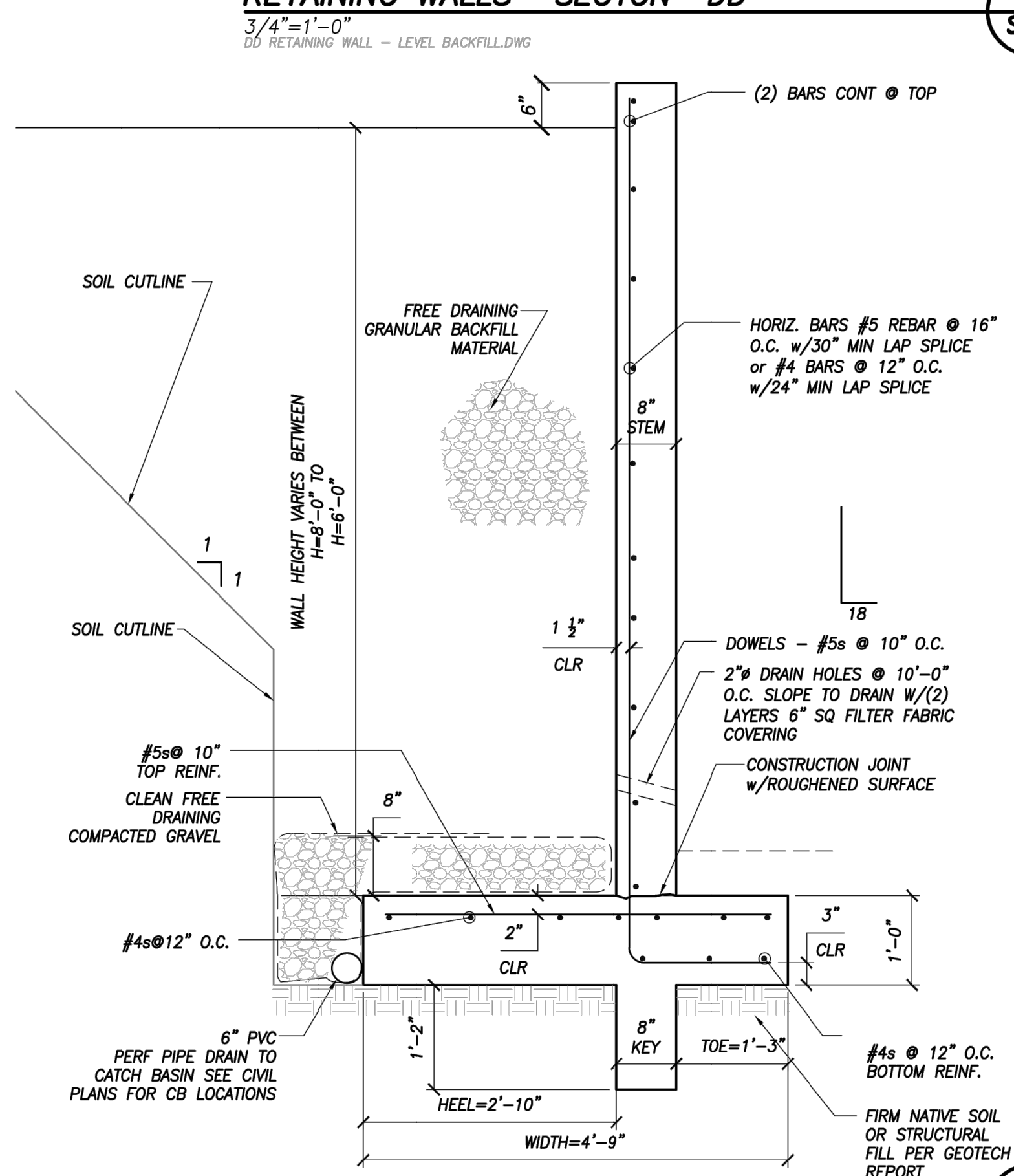
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S3.0



RETAINING WALLS- SECTION BB

3/4"=1'-0"
BB RETAINING WALL - LEVEL BACKFILL.DWG

4
S3.0



RETAINING WALLS- SECTION CC

3/4"=1'-0"
CC RETAINING WALL - LEVEL BACKFILL.DWG

5
S3.0

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RETAINING WALL AND ADD'L DETAILS
PUMP HOUSE AND RELATED STRUCTURES
CHEHALIS PUMP STATION
CHEHALIS, WA

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SHEET TITLE:
PROJECT NAME:
SEAL: **STRUCTURAL ENGINEERING ONLY**
MARK J. LEITCH
STATE OF WASHINGTON
PROFESSIONAL ENGINEER
33424
09/28/19

DESIGNER: MJL
DRAWN BY: SOG
APPROVED BY:
DATE: SEPT. 27, 2019
JOB NO: 19025.00
DRAWING FILE NO: S40 - ADDL DETAILS
DRAWING NO: **S-04**
SHEET NO: 17 OF 25

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SEP 17, 2019 9:14:27 AM User: macklin.ctb SCJ ALLIANCE 276-5491-021 CHEHALIS DESIGN-SCADA SERVICES (CAD) D:\MS\90121-ELDING

PLAN SYMBOLS		ONE-LINE SYMBOLS		SCHEMATIC SYMBOLS		ABBREVIATIONS																																																	
<p>CONDUIT SYMBOLS</p> <p>X### CONDUIT NUMBER P = POWER C = CONTROL J = SIGNAL X = SPARE</p> <p>CALLOUT INDICATING CONDUIT SIZE, NUMBER OF WIRES AND WIRE SIZE.</p> <p>X### CALLOUT INDICATING CONDUIT NUMBER AND WIRE PER SCHEDULE.</p> <p>EXPOSED CONDUIT</p> <p>CONCEALED CONDUIT</p> <p>FLEXIBLE CONDUIT</p> <p>CAP ON CONDUIT STUB</p> <p>CONDUIT TURNING UP</p> <p>CONDUIT TURNING DOWN</p> <p>CONDUIT WITH SEAL FITTING</p> <p>UNDERGROUND DIRECT BURIAL CONDUITS</p> <p>INDICATES REMOVAL</p> <p>GROUND CONDUCTOR</p> <p>CONDUIT RUN, BROKEN AND CONTINUED SAME SHEET OR AS NOTED</p> <p>GROUNDING PIGTAIL</p> <p>HOME RUN TO PANELBOARD OR AS INDICATED</p> <p>CABLE TRAY</p> <p>UNDERGROUND DUCT LINE (CONCRETE ENCASEMENT)</p> <p>JUNCTION BOXES, FLOOR, WALL AND CEILING</p> <p>HEAT TRACE</p>	<p>RECEPTACLE AND SWITCH SYMBOLS</p> <p>CKT TYPE DUPLICATION WALL RECEPTACLE, 120V CKT = CIRCUIT NUMBER TYPE: WP = WEATHERPROOF G = GROUNDED IG = ISOLATED GROUND GF = GROUND FAULT INTERRUPTER</p> <p>DUPLICATION WALL RECEPTACLE, 120V EMERGENCY/ STAND-BY</p> <p>SINGLE RECEPTACLE, EMERGENCY/ STAND-BY</p> <p>DOUBLE DUPLICATION RECEPTACLE, 120V</p> <p>DOUBLE DUPLICATION RECEPTACLE, EMERGENCY/STAND-BY</p> <p>DUPLICATION FLOOR RECEPTACLE, 120V TYPE: F = FLUSH S = SURFACE</p> <p>MULTI-OUTLET ASSEMBLY WITH SINGLE RECEPTACLE, 120V SPACING (X IN.) AS NOTED. MOUNTING HEIGHT AS NOTED.</p> <p>SPECIAL PURPOSE WALL RECEPTACLE, RATING AS NOTED.</p> <p>SINGLE POLE SWITCH (SEE NOTE S1) * = SINGLE POLE 2 = 2 POLE 3 = 3 WAY 4 = 4 WAY M = HP RATED, LOCKABLE OS = OCCUPANCY SENSOR P = SWITCH WITH PILOT LIGHT WP = WEATHERPROOF</p> <p>NOTES: S1 LOWER CASE LETTERS IN PARENTHESIS ADJACENT TO A SWITCH OR LIGHT FIXTURE INDICATE A SWITCHED CIRCUIT AND IDENTIFY THE FIXTURE/SWITCH COMBINATIONS. FOR FOUR LAMP FLUORESCENT FIXTURES WIRED IN PAIRS WITHIN EACH FIXTURE, THE "a" SWITCH CONTROLS THE OUTER LAMPS AND THE "b" SWITCH CONTROLS THE INNER LAMPS. WIRE 3 LAMP FIXTURES SIMILARLY.</p> <p>S2 NUMBERS IN PARENTHESIS ADJACENT TO A LIGHT FIXTURE OR RECEPTACLE INDICATE THE LIGHTING PANEL BRANCH CIRCUIT FEEDING THE DEVICE.</p>	<p>XXX### EQUIPMENT ID #</p> <p>X### CONDUIT NUMBER P = POWER C = CONTROL J = SIGNAL X = SPARE</p> <p>G GENERATOR xxKW = SIZE</p> <p>xx MOTOR xx = HORSEPOWER</p> <p>xxAF EQUIPMENT CONNECTION</p> <p>xxAT INSTRUMENT LOCATION</p> <p>xxA THERMOSTAT</p> <p>xxA DISCONNECT SWITCH, UNFUSED xxA = AMPERAGE</p> <p>xxAF DISCONNECT SWITCH, FUSED xxAF = FRAME SIZE xxAT = TRIP SIZE</p> <p>xxAF ENCLOSED CIRCUIT BREAKER xxAF = FRAME SIZE xxAT = TRIP SIZE</p> <p>MH MANHOLE</p> <p>HH HANDHOLE</p> <p>GROUND ROD</p> <p>GROUND ROD AND BOX</p> <p>WALL-MOUNTED CONTROL PANEL, PANELBOARD, OR TERMINAL CABINET, SHOWN WITH EQUIPMENT ID TAG.</p> <p>PNL-100</p> <p>FLOOR-STANDING DISTRIBUTION ASSEMBLY, SUCH AS MCC, SWITCHBOARD, OR XFMR. 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ABOVE FINISHED FLOOR</p> <p>A.F.G. ABOVE FINISHED GRADE</p> <p>AIC AMPERES INTERRUPTING CAPACITY (M)</p> <p>AMP AMPERES</p> <p>ANN ANNUNCIATOR</p> <p>AS AMMETER SWITCH</p> <p>AT AMMETER TRIP</p> <p>ATS AUTOMATIC TRANSFER SWITCH</p> <p>AUTO AUTOMATIC</p> <p>AWG AMERICAN WIRE GAUGE</p> <p>BCG BARE COPPER GROUND</p> <p>C CONDUIT</p> <p>CAB CABINET</p> <p>CAP CAPACITOR</p> <p>CB CIRCUIT BREAKER</p> <p>CC CONTROL CABLE, CLOSING COIL, CLARIFIER CONSOLE</p> <p>CHH COMMUNICATION HANDHOLE</p> <p>CKT CIRCUIT</p> <p>CMH COMMUNICATION MANHOLE</p> <p>CO CONDUIT ONLY</p> <p>COMM COMMUNICATION</p> <p>COND CONDUCTOR</p> <p>CPT CONTROL POWER TRANSFORMER</p> <p>CP CONTROL PANEL</p> <p>CR CONTROL RELAY</p> <p>CS CONTROL STATION</p> <p>CT CURRENT TRANSFORMER</p> <p>DB DIRECT BURIAL</p> <p>DC DIRECT CURRENT</p> <p>DIAG DIAGRAM</p> <p>DISC DISCONNECT</p> <p>DISTR DISTRIBUTION</p> <p>DIV DIVISION</p> <p>DP DISTRIBUTION PANEL</p> <p>DPST DOUBLE POLE, DOUBLE THROW</p> <p>DPST DOUBLE POLE, SINGLE THROW</p> <p>(E) EXISTING</p> <p>EE ELECTRICAL ENCLOSURE</p> <p>EHH ELECTRICAL HANDHOLE</p> <p>ELEM ELEMENTARY</p> <p>EMERG EMERGENCY</p> <p>ENCL ENCLOSURE</p> <p>EFFL EFFLUENT</p> <p>EGC EQUIPMENT GROUND CONDUCTOR</p> <p>EQPT EQUIPMENT</p> <p>ETM ELAPSED TIME METER</p> <p>FDR FEEDER</p> <p>FE FLOW ELEMENT</p> <p>FVNR FULL VOLTAGE, NON-REVERSING</p> <p>FVR FULL VOLTAGE, REVERSING</p> <p>FWD FORWARD</p> <p>GEN GENERATOR</p> <p>GFI GROUND FAULT INTERRUPTER</p> <p>GND GROUND</p> <p>GRS GALVANIZED RIGID STEEL</p> <p>H HYDROGEN PEROXIDE</p> <p>HH HANDHOLE</p> <p>HOA HAND-OFF- AUTOMATIC</p> <p>HOR HAND-OFF-REMOTE</p> <p>HPS HIGH PRESSURE SODIUM</p> <p>HT HEAT TAPE</p> <p>HTR HEATER</p> <p>HV HIGH VOLTAGE</p> <p>HZ HERTZ (CYCLES PER SECOND)</p> <p>IND LT INDICATING LIGHT</p> <p>INCAND INCANDESCENT</p> <p>INSTR INSTRUMENT</p> <p>INSTR INSTRUMENTATION</p> <p>I/O INPUT/OUTPUT</p> <p>ISB INTRINSICALLY SAFE BARRIER</p> <p>ISR INTRINSICALLY SAFE RELAY</p> <p>JB JUNCTION BOX</p> <p>KA KILOAMPERES</p> <p>KCMIL THOUSANDS OF CIRCULAR MILS</p> <p>KV KILOVOLTS</p> <p>KVA KILOVOLT AMPERES</p> <p>KVAR KILOVOLT AMPERES REACTIVE</p> <p>KWH KILOWATT HOURS</p> <p>LCP LOCAL CONTROL PANEL</p> <p>LCS LOCAL CONTROL STATION</p> <p>LTG LIGHTING</p> <p>LTS LIGHTS</p> <p>LP LIGHTING PANEL</p> <p>M MODIFIED</p> <p>MA MILLIAMPERES</p> <p>MCC MOTOR CONTROL CENTER</p> <p>MCP MOTOR CIRCUIT PROTECTION OR MAIN CONTROL PANEL</p> <p>MCM THOUSAND CIRCULAR MILS (KCMIL)</p> <p>MON MONITOR</p> <p>MOV MOTOR OPERATED VALVE</p> <p>MS MOTOR STARTER</p> <p>MTD MOUNTED</p> <p>MTG MOUNTING</p> <p>MTS MANUAL TRANSFER SWITCH</p> <p>(N) NEW</p> <p>NC NORMALLY CLOSED</p> <p>NEMA NATIONAL ELECTRICAL MANUFACTURER'S ASSOC.</p> <p>NEUT NEUTRAL</p> <p>NO NORMALLY OPEN, NUMBER</p> <p>OCF OZONE CONTROL PANEL</p> <p>OL OVERLOAD</p> <p>OT OVER TEMPERATURE</p> <p>OVL THERMAL OVERLOAD RELAY</p> <p>OIT OPERATOR INTERFACE TERMINAL</p> <p>P POLE, PUMP</p> <p>PB PULLBOX</p> <p>PBSW PUSHBUTTON SWITCH</p> <p>PEC PHOTOELECTRIC CELL</p> <p>PF POWER FACTOR</p> <p>PGRS PVC COATED GALVANIZED RIGID STEEL</p> <p>pH MEASURE OF ACIDITY OR ALKALINITY</p> <p>PH PHASE</p> <p>PIOP PLC I/O PANEL</p> <p>PLC PROGRAMMABLE LOGIC CONTROLLER</p> <p>PNL PANEL</p> <p>PNLBD PANELBOARD</p> <p>POSN POSITION</p> <p>POT POTENTIOMETER</p> <p>PPS PACKAGED POWER SUPPLY</p> <p>PRI PRIMARY</p> <p>PWR POWER</p> <p>(R) RELOCATED</p> <p>RCPT RECEPTACLE</p> <p>RCT REPEAT CYCLE TIMER</p> <p>RT RESET TIMER</p> <p>SCCR SHORT CIRCUIT CURRENT RATING</p> <p>SCHD80 SCHEDULE 80 PVC</p> <p>SCR SILICON CONTROLLED RECTIFIER</p> <p>SD SMOKE DETECTOR</p> <p>SIG SIGNAL</p> <p>SN SOLID NEUTRAL</p> <p>SPD SURGE PROTECTIVE DEVICE</p> <p>SPDT SINGLE POLE, DOUBLE THROW</p> <p>SST STAINLESS STEEL</p> <p>SV SOLENOID VALVE</p> <p>SW SWITCH</p> <p>SWBD SWITCHBOARD</p> <p>SWGR SWITCHGEAR</p> <p>SYNC SYNCHRONIZING</p> <p>TB TERMINAL BOX</p> <p>TC TELEPHONE CABINET</p> <p>TEL TELEPHONE</p> <p>TERM TERMINAL</p> <p>TO TIMED OPENING</p> <p>TOA TEST-OFF- AUTOMATIC</p> <p>TSP TWISTED SHIELDED PAIR</p> <p>TST TWISTED SHIELDED TRIAD</p> <p>UGND UNDERGROUND</p> <p>UV ULTRAVIOLET</p> <p>VA VOLT-AMPERES</p> <p>VAR VOLT AMPERES REACTIVE</p> <p>VFD VARIABLE FREQUENCY DRIVE</p> <p>VH VAR-HOUR</p> <p>VS VOLT METER SWITCH</p> <p>W WIRE, WATTS</p> <p>WH WATTHOUR METER</p> <p>WHDM WATTHOUR DEMAND METER</p> <p>WP WEATHERPROOF</p> <p>WR WEATHER RESISTANT</p> <p>WT WATERTIGHT</p> <p>WWR WASHWATER RECOVERY</p> <p>XFMR TRANSFORMER</p>
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<p>GENERAL NOTES</p> <p>G1 THE INSTALLATION OF ALL EQUIPMENT SHOWN ON THESE DRAWINGS OR DESCRIBED IN THE SPECIFICATIONS SHALL CONFORM TO THE REQUIREMENTS SET FORTH IN THE LATEST EDITIONS OF ALL APPLICABLE CODES AND UTILITY COMPANY STANDARDS. CONTACT THE UTILITY COMPANY REPRESENTATIVES AND VERIFY THEIR REQUIREMENTS.</p> <p>G2 THIS IS A GENERALIZED LEGEND SHEET. THIS CONTRACT MAY NOT USE ALL INFORMATION SHOWN.</p>		<p>G3 NOTIFY THE ENGINEER IMMEDIATELY IF CONFLICTS IN EQUIPMENT LOCATIONS ARE DISCOVERED OR IF PROBLEMS ARISE DUE TO FIELD CONDITIONS, LACK OF INFORMATION OR ANY OTHER REASON.</p> <p>G4 INFORMATION SHOWN MAY NOT BE ALL INCLUSIVE. SEE ALSO ANSI C37.2, Y1.1, Y32.2, AND Y32.9.</p>	<p>G5 REFER TO THE MECHANICAL DRAWINGS FOR EXACT LOCATIONS OF MECHANICAL EQUIPMENT AND FOR CERTAIN CONNECTIONS TO BE MADE TO ELECTRICAL CIRCUITS.</p> <p>G6 EQUIPMENT SHOWN IN HALF TONE OR GREY TONE ARE EXISTING OR BY OTHERS.</p> <p>G7 VERIFY ALL LOCAL REQUIREMENTS BEFORE ORDERING MATERIALS.</p>	<p>G8 CONDUIT SIZE AND FILL SHALL BE AS INDICATED. WHERE NO SIZE IS SHOWN, THE CONDUIT SHALL BE SIZED IN ACCORDANCE WITH THE EDITION OF THE NATIONAL ELECTRIC CODE ADOPTED BY THE AUTHORITY HAVING CODE ENFORCEMENT JURISDICTION. WHERE NO FILL IS INDICATED, PROVIDE (3) #12 WIRES. PROVIDE 3/16 INCH NYLON PULL ROPE IN EACH EMPTY CONDUIT.</p>																																																			

BY: _____

DATE: _____

REVISIONS: _____

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ELECTRICAL LEGEND AND ABBREVIATIONS

CITY OF CHEHALIS

WATER PLANT PUMP STATION

ELECTRICAL DESIGN AND SCADA / TELEMETRY PROGRAMMING

DESIGNER: A. STOKES

DRAWN BY: D. PETERSON

APPROVED BY: _____

DATE: SEPTEMBER 2019

JOB NO: 216-5491-021

DRAWING FILE NO: PSS491021-E1

DRAWING NO: E1

SHEET NO: 18 OF 25

100% REVIEW SUBMITTAL

NOT FOR CONSTRUCTION

LIGHTING FIXTURE SCHEDULE					
TYPE	DESCRIPTION	LAMPS	WATTS /FIXTURE	MANUFACTURER INFO	MOUNTING
H1	HI BAY 15.25" X 44" SUSPENSION LED FIXTURE WITH AIRCRAFT CABLE SUSPENSION AND INTEGRAL OCCUPANCY SENSOR	LED	146	LITHONIA IBHST LED BAY LIGHT, 18,000LM, 120V, 40K OR EQUAL	SUSPENSION CEILING
F1	WALLPACK, LED WITH INTEGRAL PHOTOELECTRIC CELL AND TAMPER PROOF SCREWS	LED	58	LITHONIA TWH LED P2, 40K T3M 120 PE TP DBLXD OR EQUAL	SURFACE WALL
EM1	EMERGENCY LIGHT, NICKLE-CADMIUM BATTERY OPERATED TWO 12V, 1.5W LED LAMPS, FUSED 120 VOLT INPUT WITH TEST SWITCH	(2) 1.8W LED	1.5	LITHONIA EU2C HO ERE BT WP 120V OR EQUAL	SURFACE WALL

- NOTES:**
- RELOCATE CHEMICAL ANALYZERS TO NEW BUILDING AND PROVIDE POWER AS REQUIRED. COORDINATE NEW LOCATION WITH CLIENT. SEE SHEET E100 FOR NEW LOCATION.
 - ONLY ONE PUMP RUNS AT A TIME, NONCOINCIDENT LOAD.
 - CONDUIT FOR LIGHTING AND RECEPTACLES NOT SHOWN FOR DRAWING CLARITY.
 - MATCH EXISTING PLANT FIBER OPTIC CABLE TYPE.

CONDUIT AND WIRE SCHEDULE							
NUMBER	FROM	TO	CONDUIT SIZE (")	CABLE SIZE & QUANTITY			COMMENTS
				POWER	CONTROL	SIGNAL	
240/120V POWER							
P-101	EXISTING DISTRIBUTION PANEL	NEW BUILDING DP-1 PANEL	2-1/2"	(3)#3/0, (1)#6G			
P-102	DP-1	PSP-1	2"	(3)#1, (1)#6G			
P-103	PSP-1	P-1 (PUMP 1)	1-1/4"	(3)#3, (1)#8G			
P-104	PSP-1	P-2 (PUMP 2)	1-1/4"	(3)#3, (1)#8G			
P-105	DP-1	RECEPTACLES (OUTLETS)	3/4"	(2)#12, (1)#12G			
P-106	DP-1	LIGHTS	3/4"	(2)#12, (1)#12G			
P-107	DP-1	UNIT HEATER	1"	(3)#8, (1)#10G			
SIGNAL							
C-100	(E) PUMP HOUSE OR GENERATOR	PSP-1 CONTROL PANEL	2"		PULL WIRE		CONDUIT ONLY
SIGNAL							
S-100	EXISTING CONTROL PANEL	PSP-1 CONTROL PANEL	3/4"			FIBER	8 STRAND
S-101	PSP-1	LIT-100	3/4"			(1)#16TSP	

PANELBOARD SCHEDULE											
NAME: DP-1											
VOLTAGE RATING: 120/240 VOLTS, 3 PHASE, 4 WIRE						LOCATION: NEW PUMP BLDG					
BUS RATING: 200 AMPS						FED FROM: OLD PUMP BLDG					
MAIN BREAKER: 200 AMPS						NOTES:					
FEED: BOTTOM											
MOUNTING: SURFACE											
SPECIAL FEATURES: 65,000 AIC BRACING											
LOAD TYPE	CIRCUIT DESCRIPTION	VA	CKT	BRKR	L1	L2	BRKR	CKT	VA	CIRCUIT DESCRIPTION	LOAD TYPE
L	ELECTRICAL ROOM LIGHTING	352	1	15 / 1	-A-			2	7,460		
M		7,460	3		-B-		100 / 3	4	7,460	PUMP 2 (P-2)	
M	PUMP 1 (P-1)	7,460	5	100 / 3	-A-			6	7,460		
M		7,460	7		-B-		20 / 1	8	250	RECEPTACLES	R
X	LCP-1	1,200	9	20 / 1	-A-			10	3,750		H
	SPACE		11	/	-B-		40 / 2	12	3,750	UH-1	H
	SPACE		13	/	-A-		/	14		SPACE	
	SPACE		15	/	-B-		/	16		SPACE	
	SPACE		17	/	-A-		/	18		SPACE	
LINE LOADS:		27,682 VA(L1)						26,380 VA(L2)			
TOTAL LOAD:		54.06 KVA						225.3 AMPS			

DP-1 LOAD CALCULATION:

		CONNECTED VA	METHOD	NEC DEMAND	CALC. VA
TOTAL LIGHTING (L) LOAD:	L	352	ALL @	125%	439
TOTAL RECEPTACLE (R) LOAD:	R	250	FIRST 10KVA @	125%	313
			REMAINDER OVER 10KVA	50%	0
TOTAL MOTOR (M) LOAD:	M	22380	ALL @	100%	22380
	LM	0	125% OF LARGEST	125%	0
TOTAL HVAC (H) LOAD:	H	7500	ALL @	125%	9375
TOTAL MISCELLANEOUS (X) LOAD:	X	1200	ALL @	125%	1500
TOTAL VA:		31682 VA			34007 VA
AVERAGE AMPS @		132 AMPS			142 AMPS
VOLTAGE PHASE TO PHASE=		240			

* NOTE: ONLY ONE PUMP TO RUN AT A TIME.



**ANALYZER COMPONENTS
DETAIL**
SCALE: NONE

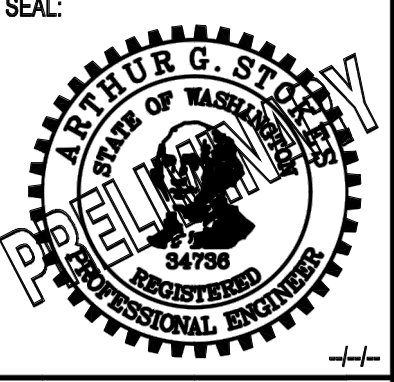


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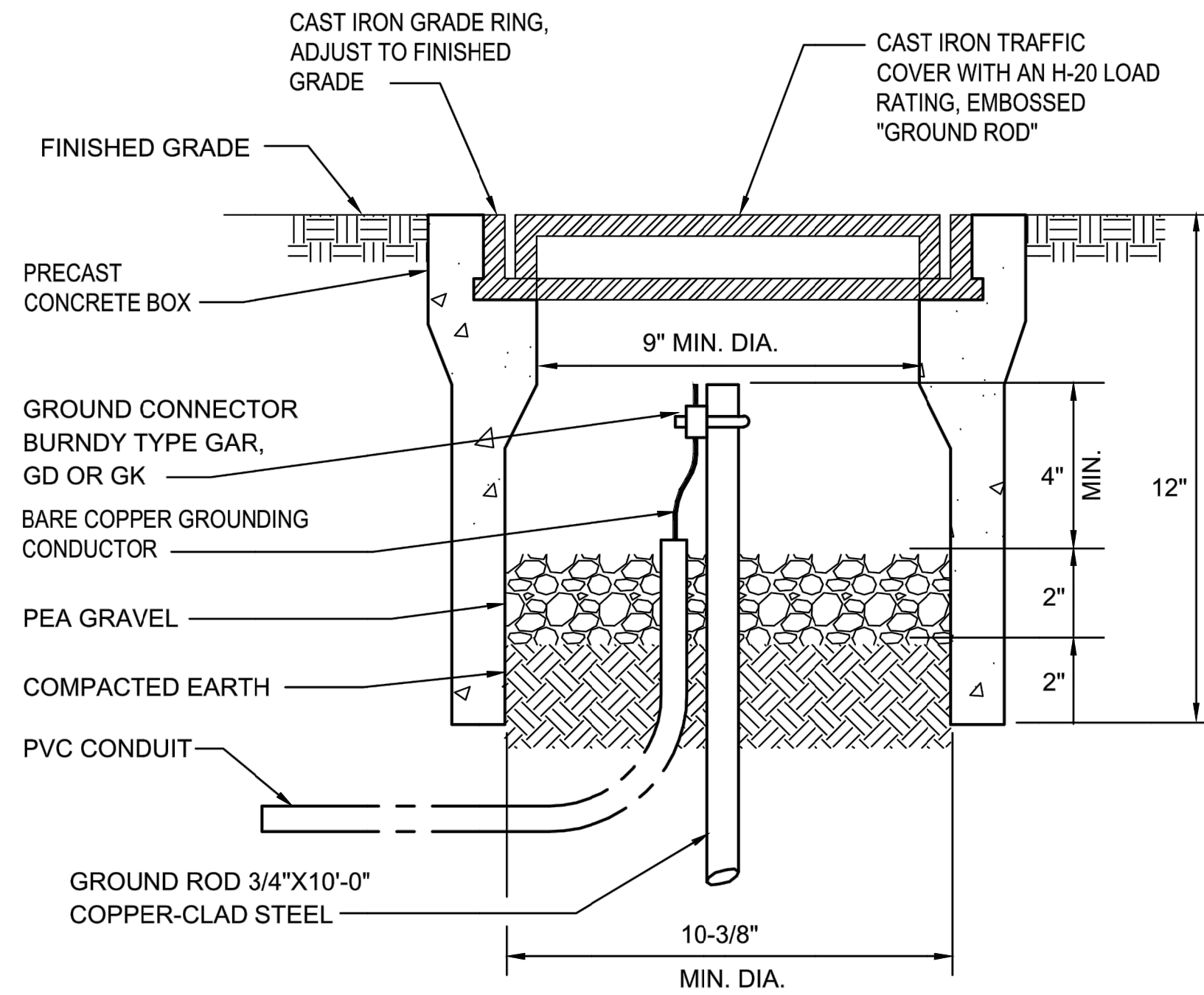
REVISIONS	DATE	BY

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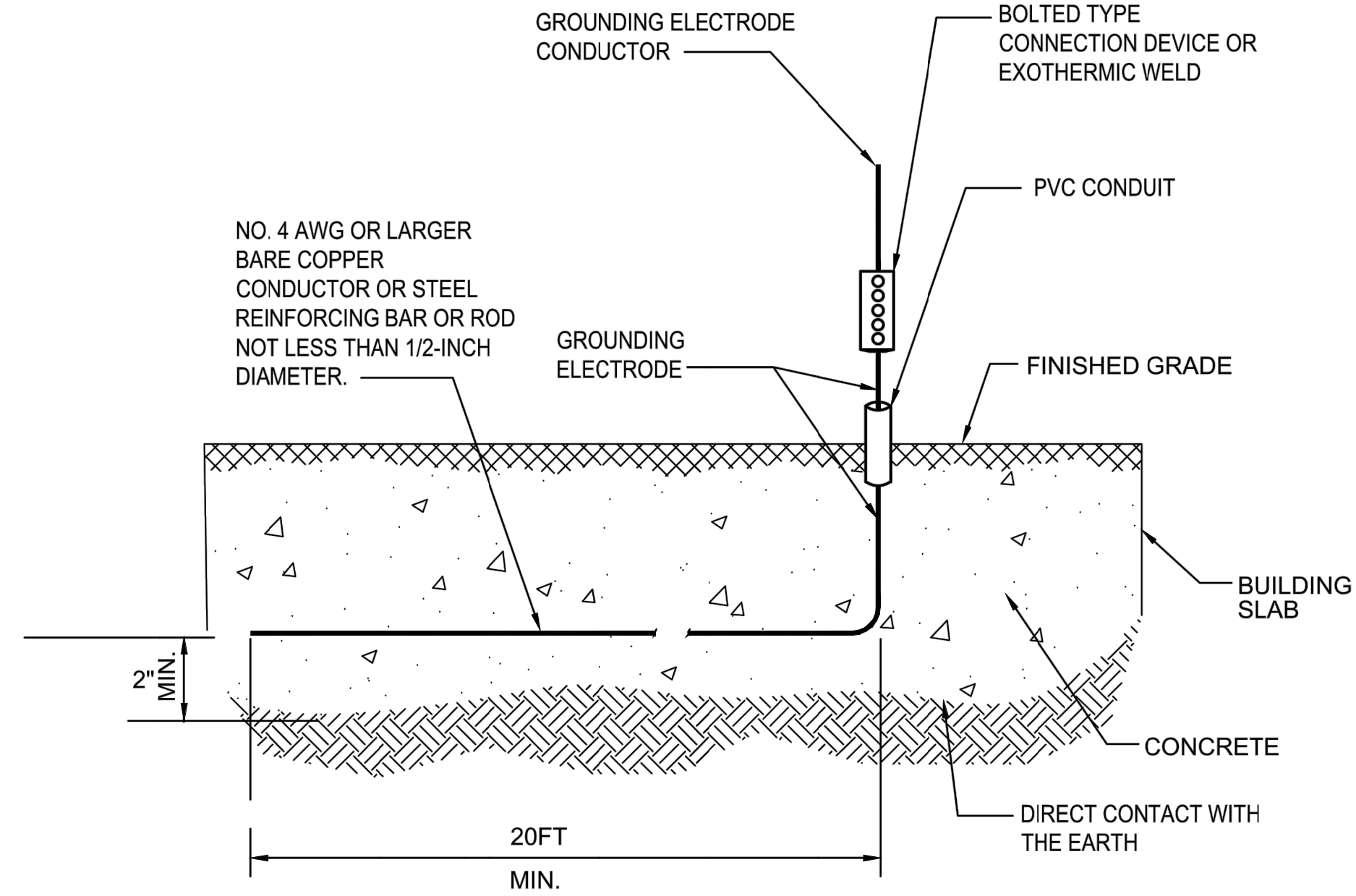
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WATER PLANT PUMP STATION
ELECTRICAL DESIGN AND SCADA / TELEMETRY PROGRAMMING



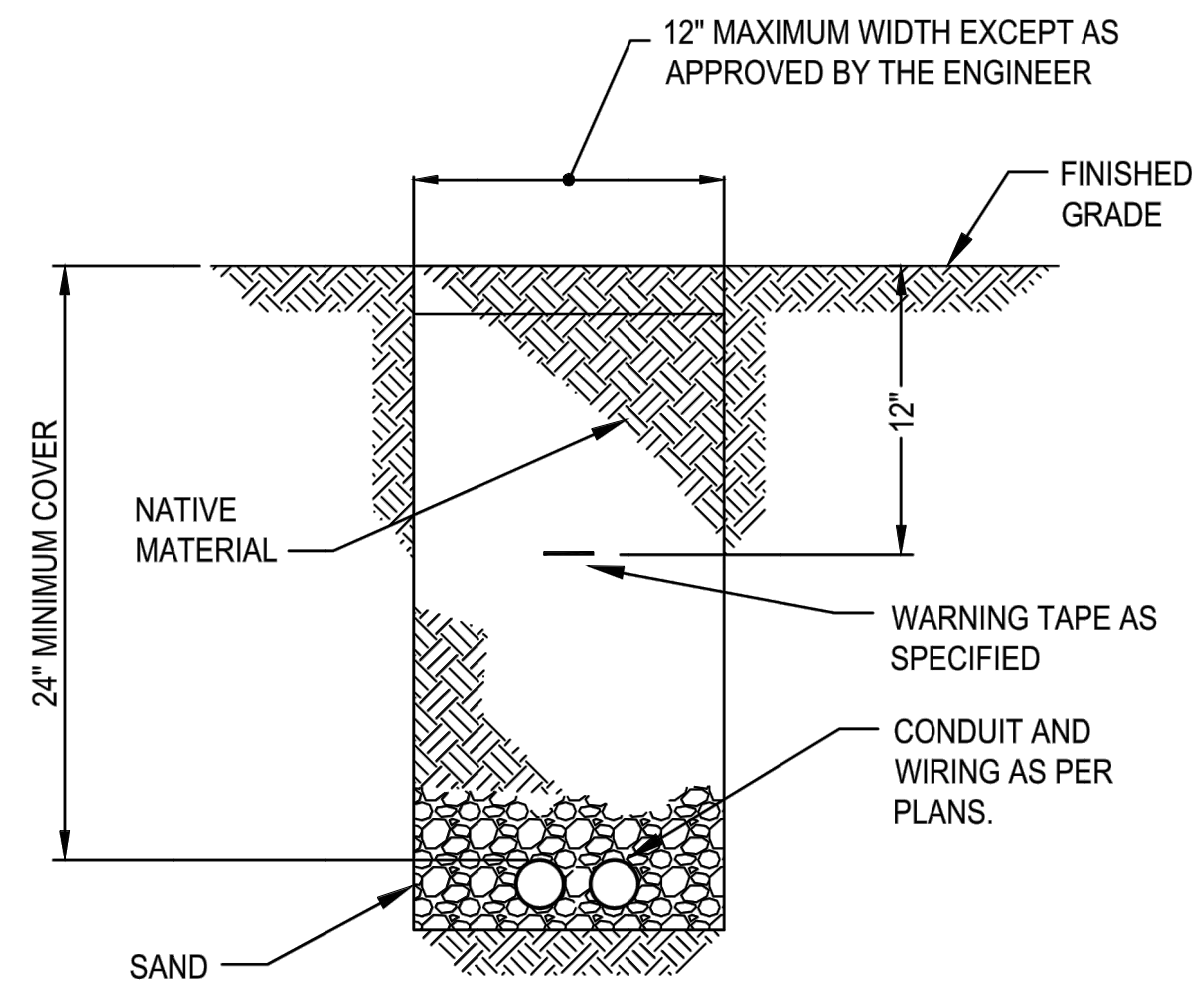
DESIGNER: A. STOKES
DRAWN BY: D. PETERSON
APPROVED BY:
DATE: SEPTEMBER 2019
JOB NO: 216-5491-021
DRAWING FILE NO: PS5491021-E3
DRAWING NO: E3
SHEET NO: 20 OF 25



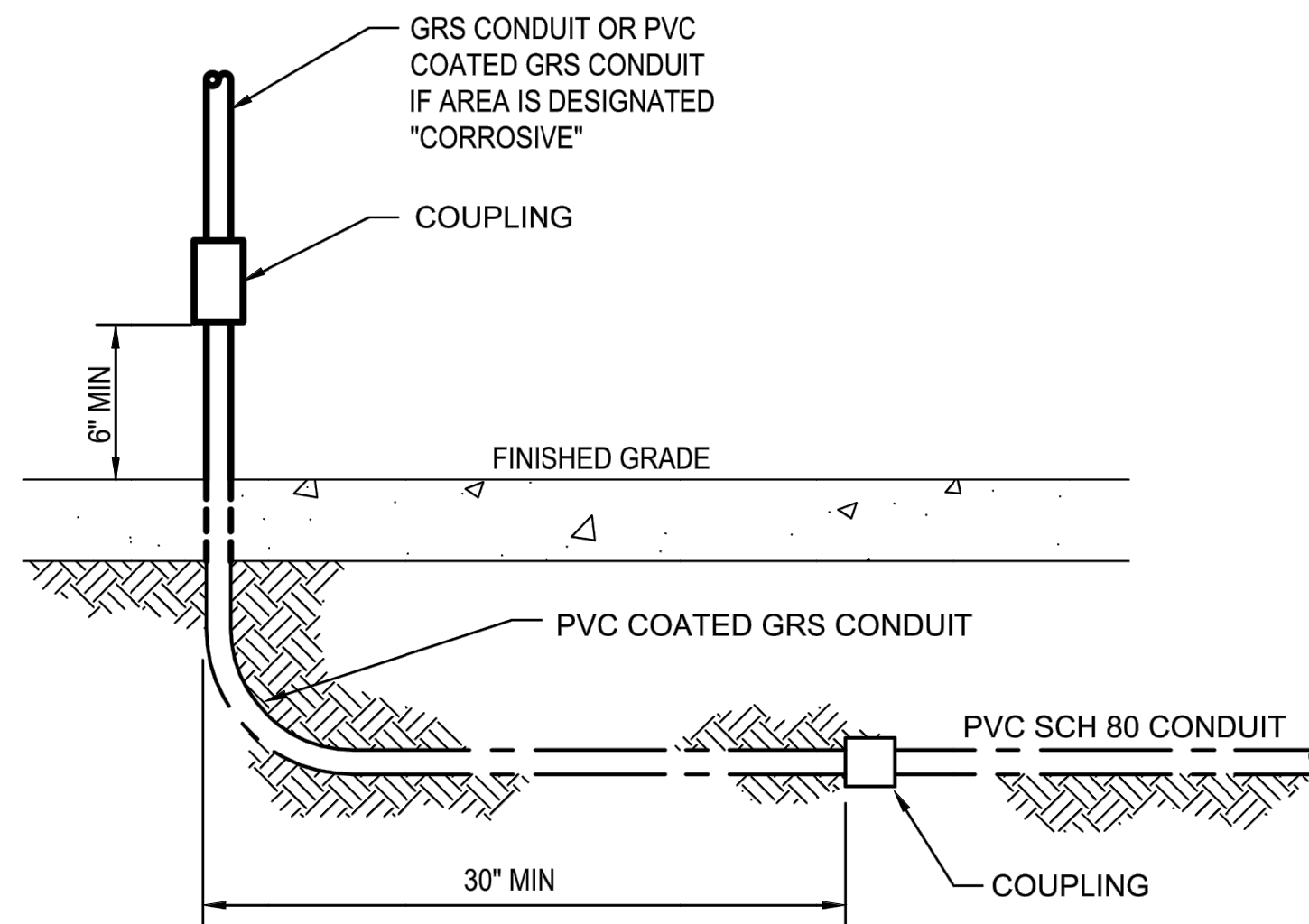
**TYPICAL GROUND ROD BOX
DETAIL**
SCALE: NONE E101



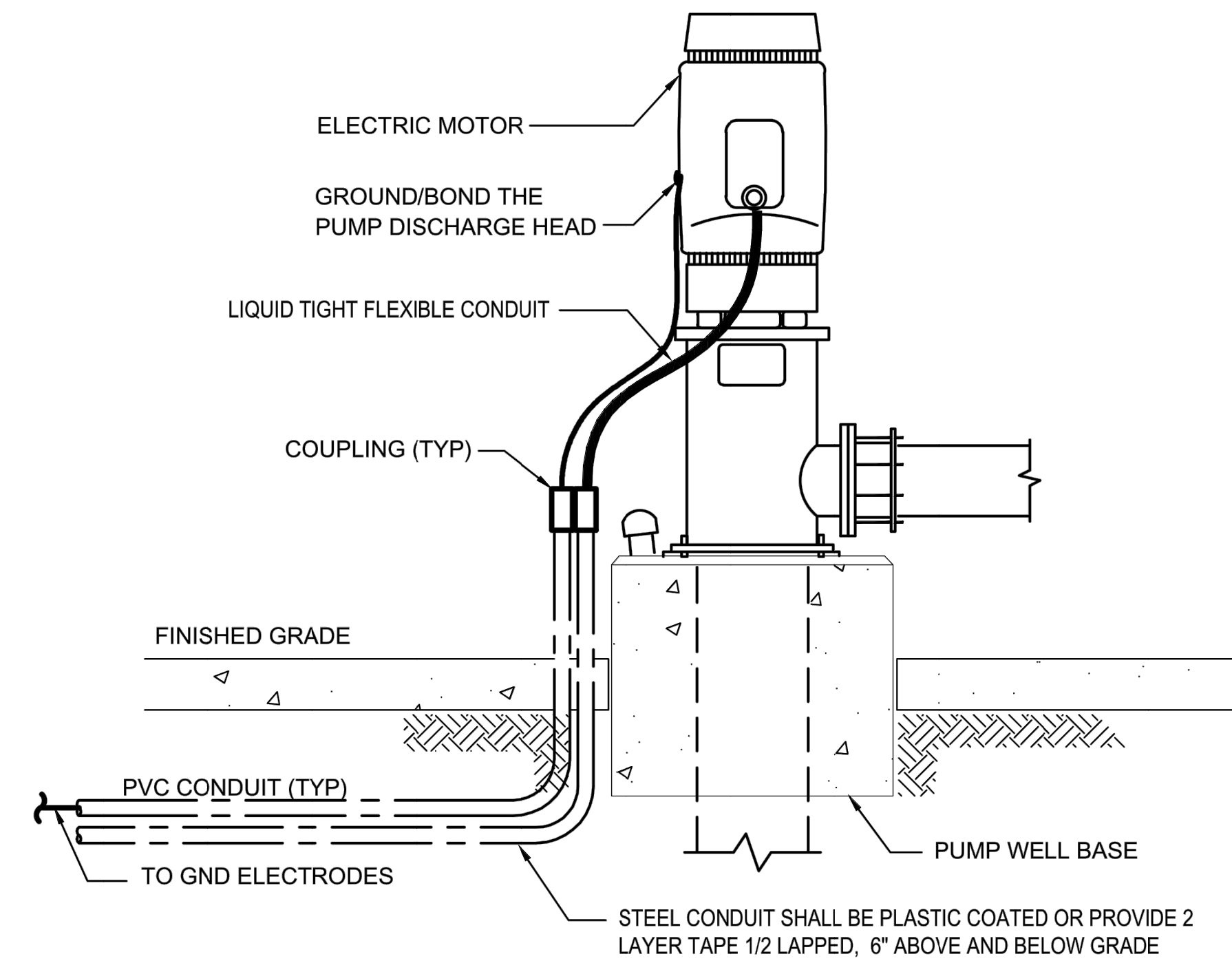
**CONCRETE ENCASED ELECTRODE
DETAIL**
SCALE: NONE E101



**TYPICAL CONDUIT AND WIRING IN TRENCH
DETAIL**
SCALE: NONE E100



**CONDUIT TRANSITION
DETAIL**
SCALE: NONE E101



**MOTOR CONNECTION
DETAIL**
SCALE: NONE E101

BY	DATE	REVISIONS

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

ELECTRICAL DETAILS
CITY OF CHEHALIS
WATER PLANT PUMP STATION
ELECTRICAL DESIGN AND SCADA / TELEMETRY PROGRAMMING



DESIGNER: A. STOKES
DRAWN BY: J. VONDERAHE
APPROVED BY: _____
DATE: SEPTEMBER 2019
JOB NO: 216-5491-021
DRAWING FILE NO: PSS491021-E4
DRAWING NO: E4
SHEET NO: 21 OF 25

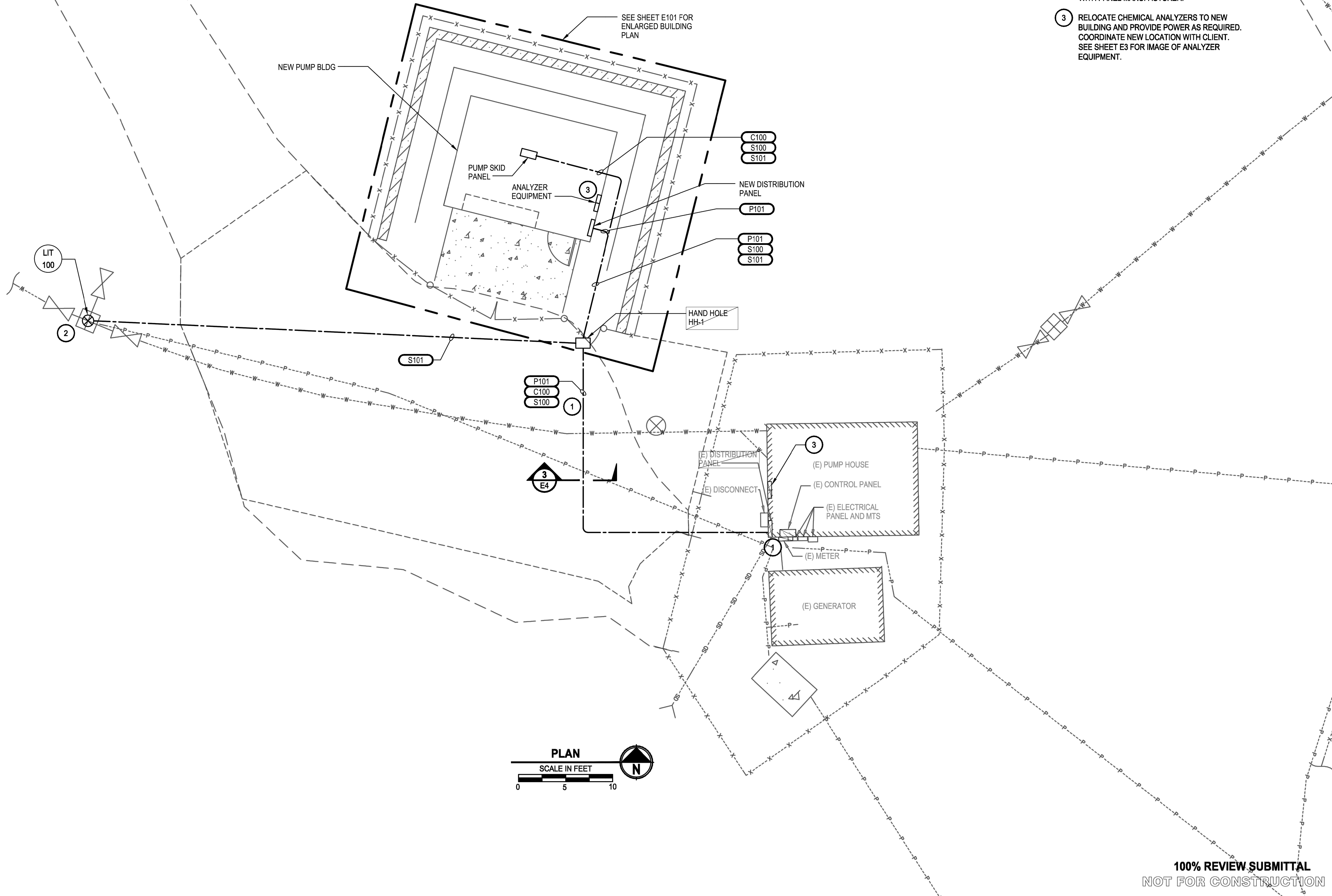
**100% REVIEW SUBMITTAL
NOT FOR CONSTRUCTION**

Sep 17, 2019 2:13:30pm User: scj\scj User: scj\scj
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Sep 27, 2019, 2:49:37pm - User: vcs@stj.com
 U:\PROJECTS\CLIENTS\9897-SCJ-ALLIANCE\216-5491-021-CHEHALIS DESIGN-SCADA\9897-SCJ-ALLIANCE\216-5491-021-CHEHALIS DESIGN-SCADA\9897-SCJ-ALLIANCE\216-5491-021-E100.DWG

NOTES:

- 1 CONTRACTOR TO FIELD ROUTE CONDUIT.
- 2 CONTRACTOR TO COORDINATE LOOP POWER WITH PANEL MANUFACTURER.
- 3 RELOCATE CHEMICAL ANALYZERS TO NEW BUILDING AND PROVIDE POWER AS REQUIRED. COORDINATE NEW LOCATION WITH CLIENT. SEE SHEET E3 FOR IMAGE OF ANALYZER EQUIPMENT.



REVISIONS	DATE	BY


SCJ ALLIANCE
 CONSULTING SERVICES
 8730 TALLON LANE NE, SUITE 200, LACEY, WA 98516
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 SCJALLIANCE.COM

SHEET TITLE: **ELECTRICAL SITE PLAN**
 PROJECT NAME: **CITY OF CHEHALIS WATER PLANT PUMP STATION ELECTRICAL DESIGN AND SCADA / TELEMETRY PROGRAMMING**

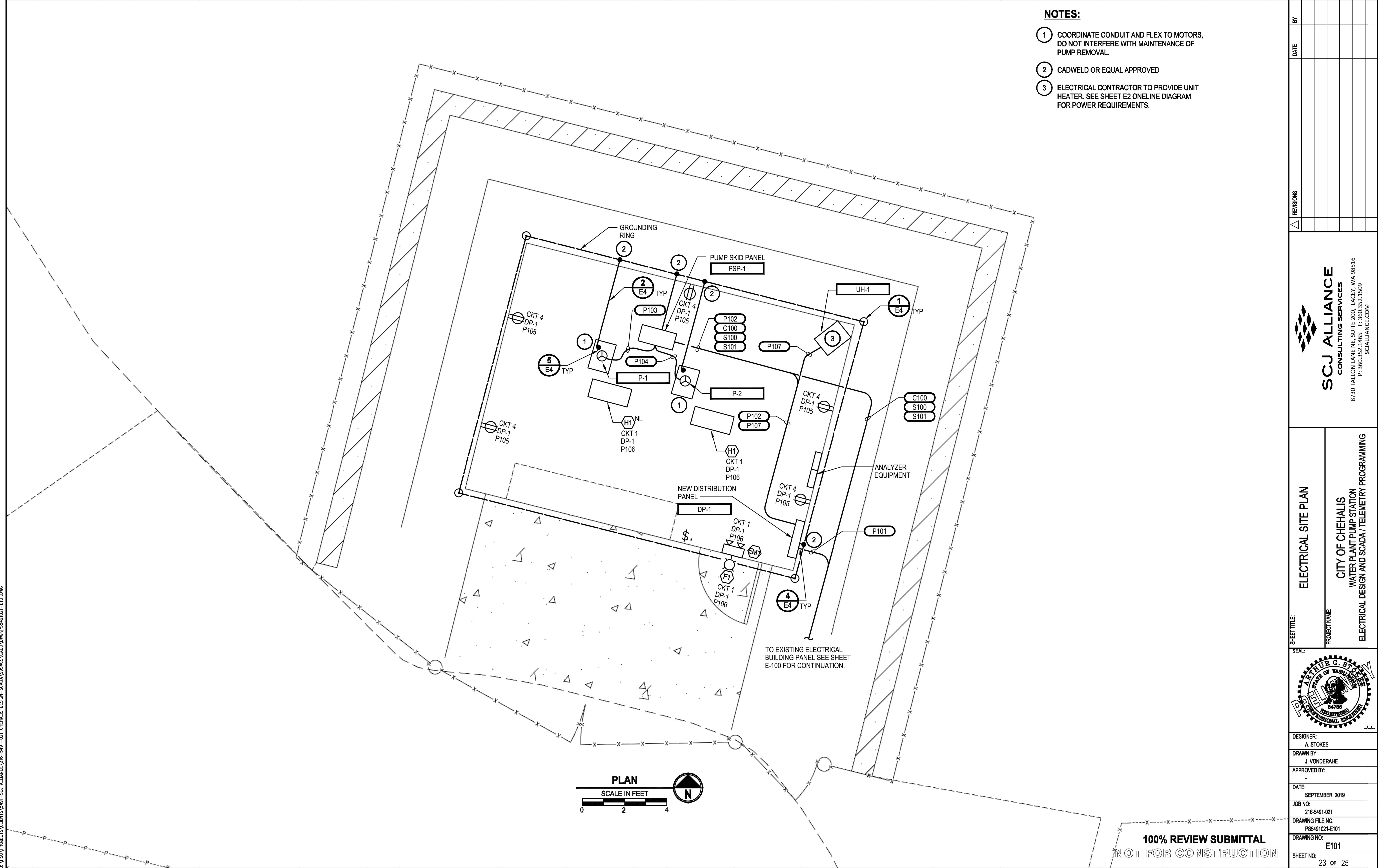


DESIGNER: A. STOKES
 DRAWN BY: J. VONDERAHE
 APPROVED BY: _____
 DATE: SEPTEMBER 2019
 JOB NO: 216-5491-021
 DRAWING FILE NO: PS5491021-E100
 DRAWING NO: E100
 SHEET NO: 22 OF 25

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NOTES:

- 1 COORDINATE CONDUIT AND FLEX TO MOTORS, DO NOT INTERFERE WITH MAINTENANCE OF PUMP REMOVAL.
- 2 CADWELD OR EQUAL APPROVED
- 3 ELECTRICAL CONTRACTOR TO PROVIDE UNIT HEATER. SEE SHEET E2 ON-LINE DIAGRAM FOR POWER REQUIREMENTS.

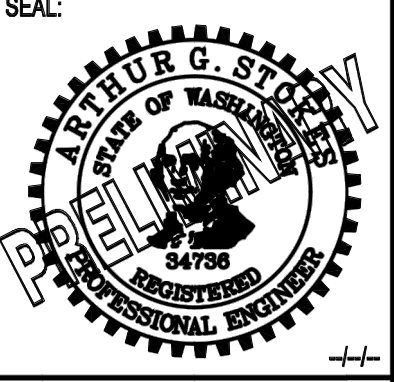


PLAN
SCALE IN FEET

REVISIONS	DATE	BY

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ELECTRICAL SITE PLAN
CITY OF CHEHALIS
WATER PLANT PUMP STATION
ELECTRICAL DESIGN AND SCADA / TELEMETRY PROGRAMMING

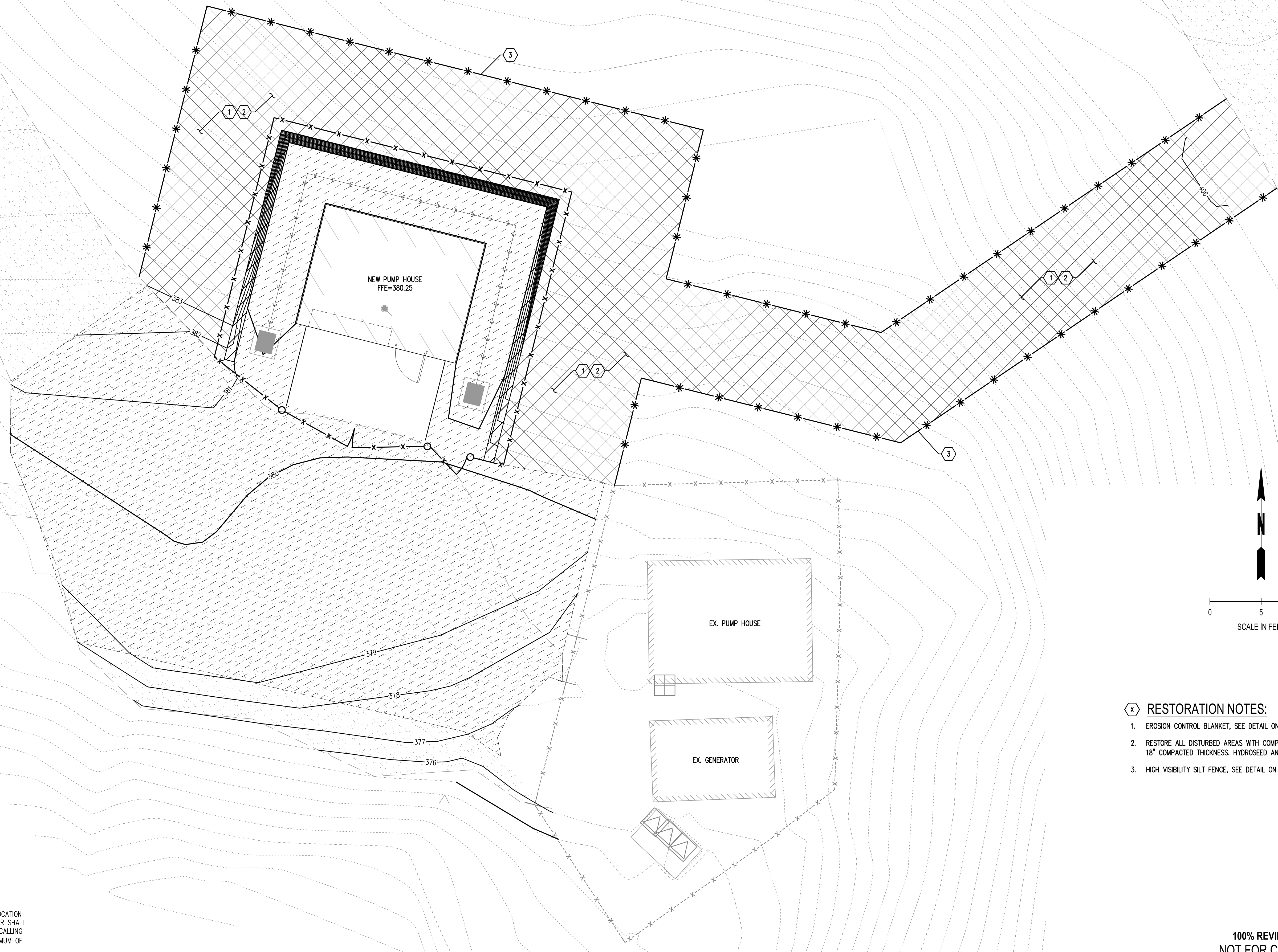


DESIGNER: A. STOKES
DRAWN BY: J. VONDERAHE
APPROVED BY: _____
DATE: SEPTEMBER 2019
JOB NO: 216-5491-021
DRAWING FILE NO: PS5491021-E101
DRAWING NO: E101
SHEET NO: 23 OF 25

100% REVIEW SUBMITTAL
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Sep 27, 2019, 3:00 PM - User: scj\scj - User: scj\scj
 U:\PSA\PROJECTS\CLIENTS\9491-SCJ ALLIANCE\216-5491-021 CHEHALIS DESIGN-SCADA\SERVICES\CADD\DWG\PS5491021-E101.DWG

SEC. 32, T14N., R2W., W.M.



- (X) RESTORATION NOTES:
1. EROSION CONTROL BLANKET, SEE DETAIL ON SHEET LS-02.
 2. RESTORE ALL DISTURBED AREAS WITH COMPOST AMENDED SOIL, 18" COMPACTED THICKNESS, HYDROSEED AND MULCH.
 3. HIGH VISIBILITY SILT FENCE, SEE DETAIL ON SHEET LS-02.

CALL BEFORE YOU DIG

THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT (800) 424-5555 A MINIMUM OF 48 HOURS PRIOR TO ANY EXCAVATION.

100% REVIEW SUBMITTAL
NOT FOR CONSTRUCTION

REVISIONS	DATE	BY

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE NE SUITE 200, LACEY, WA 98516
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SCJALLIANCE.COM

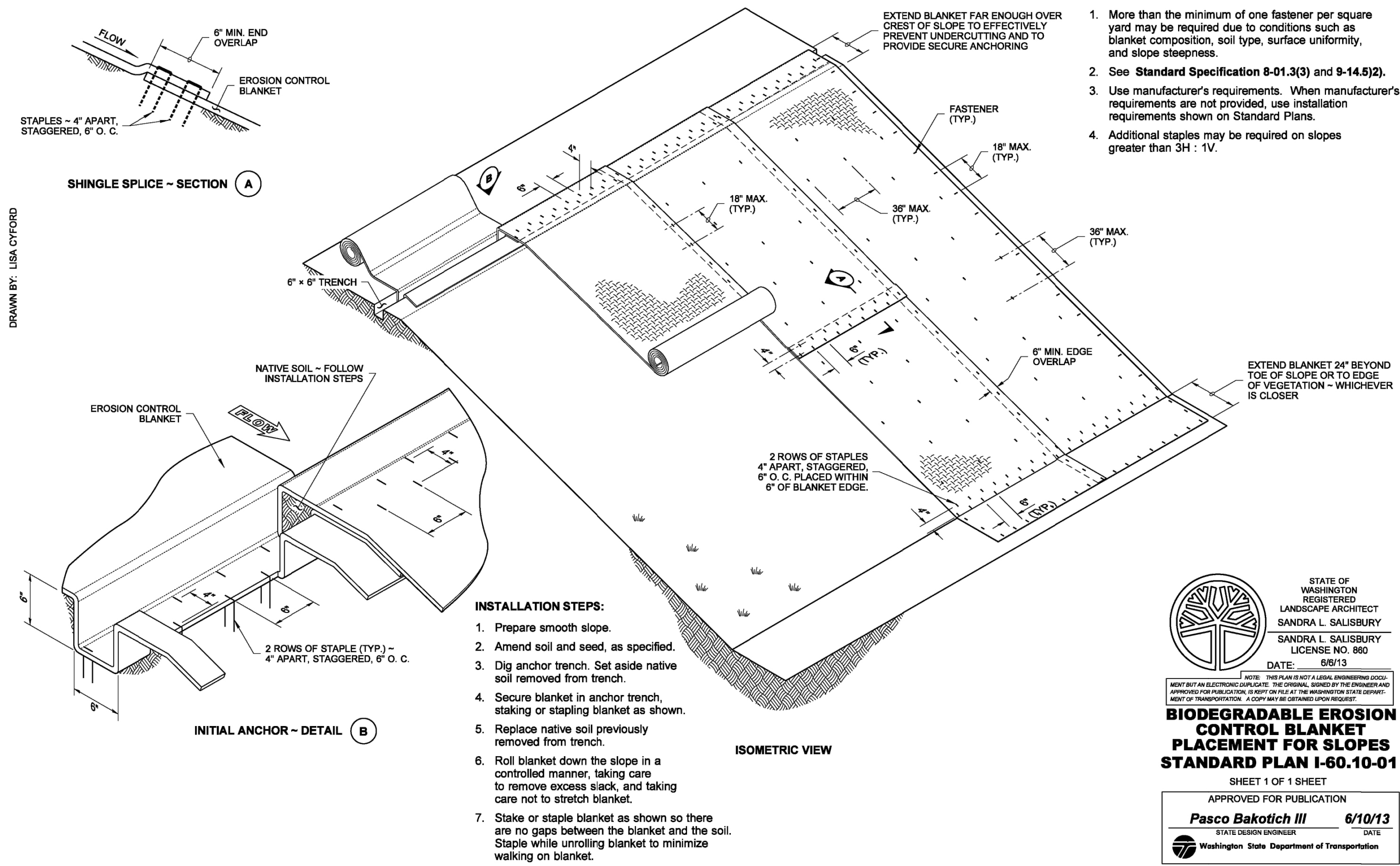
SHEET TITLE: **SITE RESTORATION PLAN**
PROJECT NAME: **CHEHALIS PUMP STATION**
CHEHALIS, WA

SEAL:

DESIGNER:	B. CONNOLLY
DRAWN BY:	S. EGAN
APPROVED BY:	B. CONNOLLY
DATE:	SEPT. 27, 2019
JOB NO:	1608.01
DRAWING FILE NO:	1608.01 RS-01
DRAWING NO:	LS-01
SHEET NO:	24 OF 25

Sep 27, 2019 7:50:06am - User: steve.egan
 P:\PROJECTS\1608 CITY OF CHEHALIS\1608.01 CHEHALIS PUMP STATION\PHASE 02 - SCHEMATIC DESIGN\CADD\1608.01 RS-01.DWG

DRAWN BY: LISA GYFORD



- NOTES**
1. More than the minimum of one fastener per square yard may be required due to conditions such as blanket composition, soil type, surface uniformity, and slope steepness.
 2. See **Standard Specification 8-01.3(3) and 9-14.5(2)**.
 3. Use manufacturer's requirements. When manufacturer's requirements are not provided, use installation requirements shown on Standard Plans.
 4. Additional staples may be required on slopes greater than 3H : 1V.

- INSTALLATION STEPS:**
1. Prepare smooth slope.
 2. Amend soil and seed, as specified.
 3. Dig anchor trench. Set aside native soil removed from trench.
 4. Secure blanket in anchor trench, staking or stapling blanket as shown.
 5. Replace native soil previously removed from trench.
 6. Roll blanket down the slope in a controlled manner, taking care to remove excess slack, and taking care not to stretch blanket.
 7. Stake or staple blanket as shown so there are no gaps between the blanket and the soil. Staple while unrolling blanket to minimize walking on blanket.

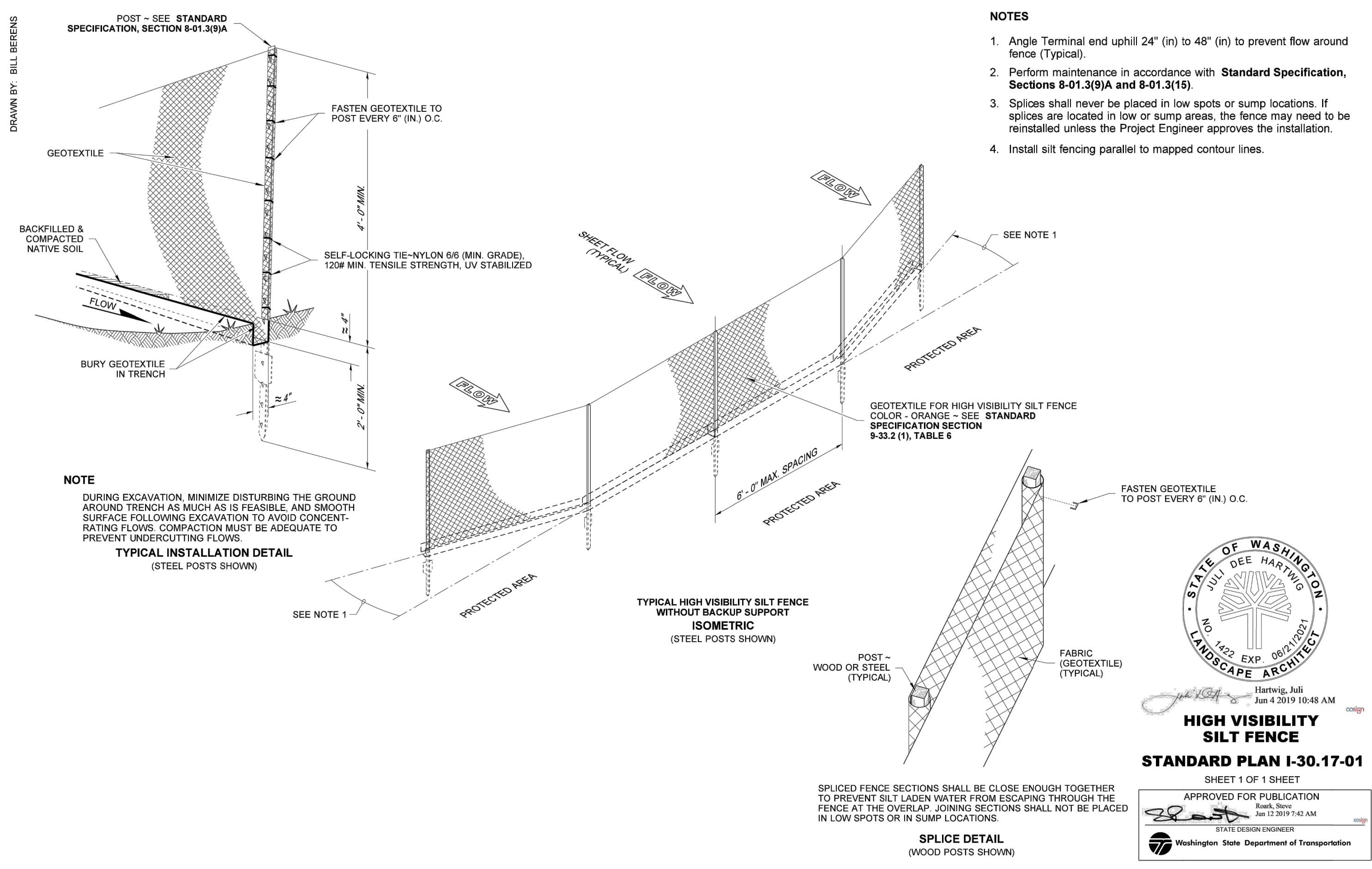
STATE OF WASHINGTON
REGISTERED
LANDSCAPE ARCHITECT
SANDRA L. SALISBURY
LICENSE NO. 980
DATE: 6/5/13

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT. ANY ELECTRICAL OR MECHANICAL WORK SHOWN ON THIS PLAN IS THE PROPERTY OF THE ENGINEER OR ARCHITECT. A COPY MAY BE OBTAINED UPON REQUEST.

BIODEGRADABLE EROSION CONTROL BLANKET PLACEMENT FOR SLOPES STANDARD PLAN I-60.10-01
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Pasco Bakotich III 6/10/13
STATE DESIGN ENGINEER DATE
Washington State Department of Transportation

DRAWN BY: BILL BERGENS



- NOTES**
1. Angle Terminal end uphill 24" (in) to 48" (in) to prevent flow around fence (Typical).
 2. Perform maintenance in accordance with **Standard Specification, Sections 8-01.3(9)A and 8-01.3(15)**.
 3. Splices shall never be placed in low spots or sump locations. If splices are located in low or sump areas, the fence may need to be reinstalled unless the Project Engineer approves the installation.
 4. Install silt fencing parallel to mapped contour lines.

NOTE
DURING EXCAVATION, MINIMIZE DISTURBING THE GROUND AROUND TRENCH AS MUCH AS IS FEASIBLE AND SMOOTH SURFACE FOLLOWING EXCAVATION TO AVOID CONCENTRATING FLOWS. COMPACTION MUST BE ADEQUATE TO PREVENT UNDERCUTTING FLOWS.

TYPICAL INSTALLATION DETAIL
(STEEL POSTS SHOWN)

STATE OF WASHINGTON
JULI DEE HARTWIG
LANDSCAPE ARCHITECT
NO. 4232 EXP. 09/21/2021

Hartwig, Juli
Jun 4 2019 10:48 AM

HIGH VISIBILITY SILT FENCE
STANDARD PLAN I-30.17-01
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Mark Shew
Jun 12 2019 7:43 AM

STATE DESIGN ENGINEER
Washington State Department of Transportation

BY	
DATE	
REVISIONS	

SCJ ALLIANCE
CONSULTING SERVICES
8730 TALLON LANE, NE SUITE 200, LACEY, WA 98516
P: 360.352.1465 F: 360.352.1509
SCJALLIANCE.COM

SHEET TITLE: RESTORATION DETAILS AND NOTES
PROJECT NAME: CHEHALIS PUMP STATION
CHEHALIS, WA

SEAL:

DESIGNER:	B. CONNOLLY
DRAWN BY:	S. EGAN
APPROVED BY:	B. CONNOLLY
DATE:	SEPT. 27, 2019
JOB NO.:	1608.01
DRAWING FILE NO.:	1608.01 RS-02
DRAWING NO.:	LS-02
SHEET NO.:	25 OF 25

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Sep 27, 2019 7:50:12am - User: stave.egon
X:\PROJECTS\1608 CITY OF CHEHALIS\1608.01 CHEHALIS PUMP STATION\PHASE 02 - SCHEMATIC DESIGN\CADD\1608.01 RS-02.DWG