

TECHNICAL SPECIFICATIONS



MCLEAN ROAD, WALL STREET TO BEST ROAD, PHASE II

Project # 3761

C.O. # 4829

DAISY LANE STREAM CROSSING

Project # 3733

C.O. # 5014

ISSUED FOR BIDDING

June 4, 2019

DISTRICT OFFICE

1415 Freeway Drive

Post Office Box 1436

Mount Vernon, WA 98273

(360) 424-7104 -- Telephone

(360) 424-8764 -- Facsimile

DISTRICT OFFICIALS

Commission

Eron Berg, President

Al Littlefield, Vice President

Joe Lindquist, Secretary

General Manager

George Sidhu, P.E.

Engineering Manager

Mark C. Handzlik, P.E.

Operations Manager

Mike Fox

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Specifications and Bid Documents

MCLEAN ROAD, WALL STREET TO BEST ROAD, PHASE II

Project # 3761

C.O. #4829

DAISY LANE STREAM CROSSING

Project # 3733

C.O. #5014

CERTIFICATION

These specifications and design drawings for the **McLean Road, Best Road to Beaver Marsh Road, Project** and **Daisy Lane Stream Crossing Project** have been prepared under the direction of the following Registered Professional Engineer.

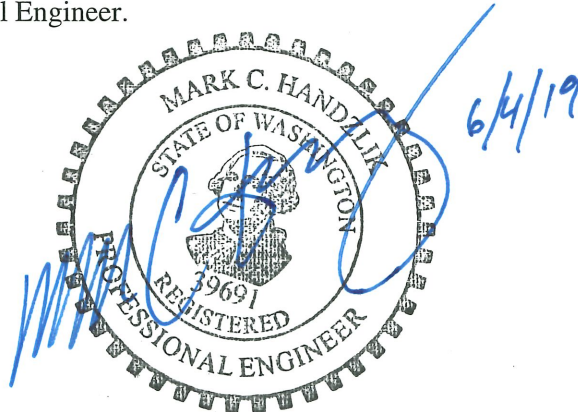


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INVITATION TO BID

INVITATION TO BID

Notice is hereby given that Public Utility District No. 1 of Skagit County (District) will receive sealed Bids for the **McLean Road, Wall Street to Best Road, Phase II Project and Daisy Lane Stream Crossing Project**. Each bid shall be placed in a sealed envelope and shall be mailed or delivered to the District office, 1415 Freeway Drive, Mount Vernon, Washington 98273, to arrive no later than 10:00 AM, June 18, 2019. All complete bids will be opened and publicly read aloud after 10:01 AM on the same day.

McLean Road, Wall Street to Best Road Phase II

Installation of approximately 10,053 linear feet (LF) of water distribution piping consisting of 12-inch, 8-inch, and 6-inch diameter AWWA C-900 water distribution piping, approximately 9,892 linear feet of 4-inch Schedule 40 PVC communications duct conduit for fiber optic cable and fiber optic vaults along McLean Road, from Best Road to Beaver Marsh Road, Skagit County, State of Washington. Work to include removal of existing wood stave pipe, removal and disposal of asbestos concrete pipe, installation of thrust blocks, service connections, fire hydrants, branch and mainline valves, dewatering, appurtenances and incidentals, pavement repair, temporary traffic control, temporary erosion control, disinfection, and pressure testing, and excavation for District connections, as shown on the plans in estimated quantities identified in the Bid Proposal.

Installation of approximately 339 LF of Contractor supplied 14-inch butt-fused HDPE pipe and 4-inch HDPE fiber optic conduit via directional drilling under an existing drainage ditch on McLean Road, Skagit County, State of Washington. In addition to installing the HDPE pipes, this scope of work includes all labor, material and equipment associated with butt-fusing the contractor supplied pipe, pressure testing, bacteriological disinfection and testing, erosion control, and permitting provisions.

Daisy Lane Stream Crossing.

Installation of approximately 327 LF of Contractor supplied 10-inch HDPE pipe via directional drilling across an existing stream along Daisy Lane, Skagit County, State of Washington. In addition to installing the HDPE pipe, this scope of work includes all labor, material and equipment associated with butt-fusing the contractor supplied pipe, capping each end of the HDPE pipe, pressure testing, bacteriological disinfection and testing, erosion control, and permitting provisions.

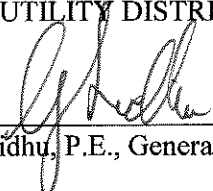
Work is divided between two (2) bid schedules under one contract.

A Pre-Bid Meeting will be held at 10:30 AM on Tuesday, June 11, 2019 in the Aqua Room of the District's Mount Vernon office complex at 1415 Freeway Drive, Mount Vernon, Washington.

Construction plans, specifications, and contract documents may be viewed at the District office located at 1415 Freeway Drive, Mount Vernon, Washington 98273. Construction plans, specifications, addenda, and plan holders list for this project can be viewed or purchased on-line through Builders Exchange of Washington, Inc., at <http://www.bxwa.com>; 2607 Wetmore Avenue, Everett, WA 98201-2929, (425) 258-1303, Fax (425) 259-3832. Click on: "bxwa.com"; "Posted Projects"; "Public Works"; "PUD #1 of Skagit County" and "Projects Bidding". *(Note: Bidders are encouraged to "Register as a Bidder" in order to receive automatic e-mail notification of future addenda and to be placed on the "Bidders List". This service is provided free of charge to Prime Bidders, Subcontractors and Vendors bidding this project. Contact Builders Exchange of Washington at (425) 258-1303, should you require further assistance.)* Contract documents will be available on or after June 4, 2019.

Point of Contact: Doug McConnell, Contract Administrator

PUBLIC UTILITY DISTRICT NO. 1 OF SKAGIT COUNTY



George Sidhu, P.E., General Manager

Published: June 4, 2019 and June 11, 2019 (Skagit Valley Herald)
June 4, 2019 (Daily Journal of Commerce)

INSTRUCTIONS TO BIDDERS

INSTRUCTIONS TO BIDDERS

1.01 GENERAL

The McLean Road, Wall Street to Best Road, Phase II and Daisy Lane Stream Crossing Project consists of the following:

McLean Road, Wall Street to Best Road Phase II

Installation of approximately 10,053 linear feet (LF) of water distribution piping consisting of 12-inch, 8-inch, and 6-inch diameter AWWA C-900 water distribution piping, approximately 9,892 linear feet of 4-inch Schedule 40 PVC communications duct conduit for fiber optic cable and fiber optic vaults along McLean Road, from Best Road to Beaver Marsh Road, Skagit County, State of Washington. Work to include removal of existing wood stave pipe, thrust blocks, service connections, fire hydrants, branch and mainline valves, dewatering, appurtenances and incidentals, pavement repair, temporary traffic control, temporary erosion control, disinfection, and pressure testing, and excavation for District connections, as shown on the plans in estimated quantities identified in the Bid Proposal.

Installation of approximately 339 LF of Contractor supplied 14-inch butt-fused HDPE pipe and 4-inch HDPE fiber optic conduit via directional drilling under an existing drainage ditch on McLean Road, Skagit County, State of Washington. In addition to installing the butt fused pipe, this scope of work includes all labor, material and equipment associated with butt-fusing the contractor supplied pipe, pressure testing, bacteriological disinfection and testing, erosion control, and permitting provisions.

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2.01 LOCATION

The location for the project is Daisy Lane and McLean Road within the County of Skagit, State of Washington as shown on the Contract Drawings.

3.01 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE

Bidders shall satisfy themselves as to construction conditions by personal examination of the Plans, Specifications, and other Bid Documents. Bidders shall carefully correlate their observations with the requirements of the Contract Documents, and shall otherwise satisfy themselves regarding the expense and difficulties associated with performing the Work, and shall fully account for it in their bids. The submission of a bid shall constitute a representation of compliance by the Bidder with this requirement.

3.03 BID DOCUMENTS

The Bid Documents for the Project include the following:

- Project Manual including general and technical specifications.
- Washington State Department of Transportation Standard Specifications.
- Contract Drawings.
- Skagit PUD Design Standards and Details.

4.01 BIDS

The project will be awarded based on the lowest responsive responsible Bidder to the total of Bid Schedules "A" and "B" combined.

Bids shall be made on the forms included herewith and shall be addressed to the Public Utility District No. 1 of Skagit County, Post Office Box 1436, 1415 Freeway Drive, Mount Vernon, WA 98273. Each Bid shall be placed in a sealed envelope and shall be mailed or delivered to the Public Utility District No. 1 of Skagit County, to arrive no later than 10:00 AM on June 18, 2019. All complete Bids will be opened and publicly read aloud after 10:01 AM the same day. No Bid may be withdrawn after the time set for the Bid opening or before award and execution of the contract unless the Owner does not award the contract within sixty (60) calendar days after the opening of Bids.

5.01 BID DEPOSIT

As a guarantee of good faith and as required by law, each Bid shall be accompanied by a Bid Deposit in the form of certified check, cashier's check, postal money order, or surety bond payable to the order of the "Public Utility District No. 1 of Skagit County" for an amount not less than 5 percent of the total amount of the Bid, including all potential additions and alternatives, but not including sales tax. If a surety bond is to be used as the bid deposit, the document included with the bid submission must have original signatures. The Bid Deposits of the three lowest Bidders will be retained until the Contract between the successful Bidder and the Owner have been entered into and a Performance and Payment Bond in an amount of one-hundred percent (100%) of the contract price has been filed as required under these Contract Documents. The Bid Deposits of each other Bidder will be returned as soon as it is determined that they are not one of the three lowest Bidders.

5.02 ESCROW BID DOCUMENTS

Within 24 hours after the time of the Bid opening, the three low Bidders shall submit one copy of all documentary information generated in preparation of Bid prices for this Project. This material is hereinafter referred to as "Escrow Bid Documents" (EBD). The EBD of the Successful Bidder will be held in escrow for the duration of the Contract; refer to Supplementary Conditions for further information.

Timely submission of complete EBD is an essential element of the Bidder's responsibility and a prerequisite to Contract award. Failure to provide the necessary EBD is cause for the Owner to reject the Bid.

Bidders may submit EBD in their usual cost-estimating format. It is not the intention of this provision to cause the Bidder extra work during the preparation of the proposal, but to ensure EBD will be adequate to enable complete understanding and proper interpretation for their intended use. The EBD shall be in the language (e.g., English) of the Specifications.

EBD shall clearly itemize the estimated costs of performing the Work to allow a detailed cost review. EBD shall include all quantity takeoffs, crew, equipment, calculations of rates of production and progress, copies of quotations from Subcontractors and Suppliers, and memoranda, narratives, consultant's reports, add/deduct sheets, and all other information used by the Bidder to arrive at the prices contained in the Bid Form. Estimated costs should be broken down into the Bidder's usual estimate categories such as direct labor, repair labor, equipment operation, equipment ownership, expendable materials, permanent materials, and subcontract costs as appropriate. Materials, equipment, and indirect costs should be detailed in the Bidder's usual format. Bidder's allocation of material, equipment, indirect costs, contingencies, markup, and other items to each Bid item shall be included. All costs shall be identified. For Bid items amounting to less than \$10,000, estimated unit costs are acceptable without a detailed cost estimate, providing labor, equipment, materials, and subcontracts, as applicable, are included and provided indirect costs, contingencies, and markup, as applicable, are allocated.

EBD shall be submitted in a sealed container. The container shall be clearly marked on the outside with the Bidder's name, date of submittal, Project name, and the words "Escrow Bid Documents."

EBD shall be accompanied by Escrow Bid Document Certificate form; signed by an individual authorized by Bidder to execute the Bid Form, stating material in the EBD constitutes all the documentary information used in the preparation of Bid and that the signatory has personally examined the contents of the container and has found the documents are complete. The Successful Bidder agrees, as a condition of the award of the Contract, the EBD constitutes all of the information used in preparation of its Bid, and that no other Bid preparation information shall be considered in resolving disputes.

Bid documents provided by the Owner should not be included in the EBD, unless needed to comply with the requirements of this Specification.

Prior to award, EBD of the apparent Successful Bidder will be examined, organized, and inventoried by representatives of the Owner, together with members of the Bidder's staff who are knowledgeable in how the Bid was prepared. This examination is to ensure the EBD are authentic, legible, and complete. It will not include review of, and will not constitute approval of, proposed construction methods, estimating assumptions, or interpretations of Contract Documents. Examination will not alter any condition(s) or term(s) of the Contract. EBD will not be used for pre-award evaluation of Bidder's anticipated methods of construction or to assess Bidder's qualifications for performing the Work. If all the documentation required herein has not been included in the original submission, additional documentation shall be submitted, at the Owner's discretion, prior to award of the Contract. The detailed breakdown of estimated costs shall be reconciled and revised, if appropriate, by agreement between the Bidder and Owner before making the award.

If Contract is not awarded to the apparent Successful Bidder, the EBD of the next Bidder to be considered for award shall be processed as described herein. Following award of the Contract, EBD submitted by unsuccessful Bidders will be returned unopened, unless opened as provided above.

If Bidder's proposal is based on subcontracting any part of the Work, each Subcontractor, whose total subcontract price exceeds 5 percent of the Total Contract Price proposed by the Bidder, shall provide EBD to be included with those of the Bidder. These documents will be opened and examined in the same manner and at the same time as the examination described above for the apparent Successful Bidder.

6.01 EVALUATION OF BIDS AND AWARD OF CONTRACT

The Owner will award the Bid to the lowest responsive, responsible Bidder based on the combined Total Bid Amount of Bid Schedules “A” and “B” as stated on the Bid Proposal Form. In the case of a conflict between the Total Bid Amount as stated numerically and as stated in words, the words shall take precedence.

In the case of a conflict between the quantity, unit price and unit price extension for a given bid item, the Owner will make adjustments to the unit price extensions based on the unit price. If the Bidder does not provide a unit price or a unit price extension for every bid item, the bid will be considered non-responsive.

The right is reserved by the Owner to waive any and all informality in the Bids, to reject any or all Bids, including nonresponsive, unbalanced, or conditional bids, to reject any or all schedules, to re-advertise for new Bids, or to otherwise carry out the Work. The Owner reserves the right to reject any bid that is materially unbalanced to the Owner’s potential detriment. The Owner further reserves the right to delete portions of the Work.

Bids which are incomplete, or which are conditioned in any way, or which contain erasures, alterations, or items not called for in the Bid Form, or which are not in conformity with the law or these Instructions, may be rejected as non-responsive

6.02 RESPONSIBILITY CRITERIA

Before the Owner awards the contract, state law is used to determine that responsible contractors and subcontractors perform the work. Bidder responsibility is determined by the Bidder successfully demonstrating its ability to satisfy the mandatory responsibility criteria and any project specific criteria established by the Owner.

To comply with the responsibility criteria for this bid, a Bidder must provide sufficient information as required. If the Bidder fails to provide the requested information within the time and manner specified in these bid documents, the Owner reserves the option to determine responsibility upon any available information related to any supplemental criteria and/or may find the Bidder not responsible. If the lowest Bidder is found not responsible, the Owner reserves the right to award to the next low Bidder without re-advertising or rebidding the project.

6.03 MANDATORY RESPONSIBILITY CRITERIA

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

1. Have a current certificate of registration as a contractor in compliance with chapter 18.27 RCW, which must have been in effect at the time of bid submittal;
2. Have a current Washington Unified Business Identifier (UBI) number;
3. If applicable:
 - a) Have Industrial Insurance (workers’ compensation) coverage for the bidder’s employees working in Washington, as required in Title 51 RCW;
 - b) Have a Washington Employment Security Department number, as required in Title 50 RCW;

- c) Have a Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;
4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3).
5. Until December 31, 2013, not have violated more than one time the off-site, prefabricated, non-standard, project specific items reporting requirements of RCW 39.04.370.
6. For public works projects subject to the apprenticeship utilization requirements of RCW 3.04.320, not have been found out of compliance by the Washington state apprenticeship and training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the first date of advertising for the project.

6.04 SUBCONTRACTOR RESPONSIBILITY CRITERIA

Before award, the Bidder shall verify responsibility criteria for each first tier subcontractor the Contractor hires and a subcontractor of any tier subcontractor that hires other subcontractors must verify responsibility criteria for each of its subcontractors. Verification shall occur at the time of subcontract execution and shall include that each subcontractor meets the responsibility criteria listed in Section 6.03 and possesses an electrical contractor license (if required by RCW Chapter 19.28) or an elevator contractor license (if required by RCW Chapter 70.87). These verification requirements, as well as the responsibility criteria, shall be included in each of the Contractor's subcontracts of any tier. The Contractor shall certify that this verification is complete prior to contract close-out.

6.05 PROTESTS

Any Bidders wanting to file a bid protest shall submit a formal protest consisting of a written letter signed by an authorized official of the company within 48 hours of the bid opening. The protest will be reviewed by the Owner and if warranted, a meeting will be held with the Owner, the low Bidder and the Bidder filing the protest within 4 Calendar days to review the protest. A decision on the protest will be made by the Owner within 7 Calendar days.

6.06 CONTRACT TIME

The Contract completion date is an essential part of the Contract, and it will be necessary for each Bidder to satisfy the Owner of its ability to complete the Work within the time allowed. Bidders shall base their bids on utilizing the full Contract Time of 70 consecutive Calendar Days for the Work, as specified.

7.01 FAILURE TO EXECUTE CONTRACT AND FURNISH BOND

In the event the successful Bidder fails to furnish a Payment and Performance Bond complying with this Invitation for Bids, and fails to sign the contract within ten (10) calendar days after notification by the Owner, an amount equal to 5 percent of the amount of the Bid shall be forfeited to the Owner as liquidated damages, and it is agreed that this said sum is a fair estimate of the amount of damages the Owner would sustain in the event that the Bidder failed to enter into the Contract or furnish the required Bond. Said liquidated damages shall be paid from the Bid Deposit submitted with the Bid. Other Bids will then be reconsidered for award by the Owner.

8.01 CORRECTIONS, INTERPRETATIONS, AND ADDENDA

If Bidders find or observe any omissions, discrepancies, or need for interpretations of the Bid Documents, they shall bring such facts in writing to the attention of the Owner. Written addenda to clarify questions which arise will then be issued. Interpretations or explanations of the Contract Documents will be in the form of written addenda only. Oral statements by the Owner, Engineer, or other representative of the Owner whether made before or after award of the Contract shall in no way modify the Contract Documents.

Any requests for information or interpretation of the Bid Documents shall be made by phone or email to Doug McConnell, Contract Administrator (360) 424-7104 or mcconnell@skagitpub.org. All such requests shall be received no later than 5:00 PM on Friday, June 14, 2019. After this date and time no additional questions will be answered.

10.01 SUBCONTRACTORS & SUPPLIERS

In compliance with RCW 39.30.060 for all projects estimated to cost \$1 million or more, all Bidders must complete and submit the Subcontractors List form provided in the Bid Proposal Forms. The Subcontractors List form must be submitted with the Bid. The failure of a Bidder to submit the names of such subcontractors, or to name itself to perform such work, or the naming of two or more firms (subcontractors or Bidders) to perform the same work shall render the Bidder's bid non-responsive and, therefore, void.

11.01 BIDDER QUALIFICATIONS

All Bidders shall submit with their bids evidence of sufficient qualifications and experience for the work as specified in Bid Proposal Forms. The Owner will utilize the information submitted for the purpose of determining the responsibility of the low Bidder for determining eligibility for award.

12.01 PERMITS

The Owner has obtained or will obtain the permits and approvals required for the Work as listed below. The Contractor shall comply with the provisions of all permits, approvals and easements. All other required permits or licenses shall be the responsibility of the Contractor. Below is a list of the Owner-obtained permits and approvals, which are included for reference in Appendix A.

State Environmental Policy Act (SEPA) Determination of Non-significance
Washington State Department of Fish and Wildlife Hydraulic Project Approval
Skagit County Right of Way Permit

Contractor procured permits include:

Electrical Permit for installation of conduit
Asbestos Removal Permit (NWCAA)

Should the Contractor procure additional formal or informal access easements, rights of entry, Work or storage areas, or enter private property, he/she shall obtain and file all such private property agreements with the Owner prior to such access. The Contractor shall provide to the Owner property release forms for all Work or access on private property.

13.01 PRE-BID MEETING

A Pre-Bid Meeting will be held at 10:30 AM on Tuesday, June 11, 2019, in the District's Aqua Room located at 1415 Freeway Drive, Mount Vernon, WA.

END OF SECTION

Mandatory Bidder Responsibility Checklist

The following checklist may be used by Owners in documenting that a Bidder meets the mandatory bidder responsibility criteria. It is suggested that Owners print a copy of documentation from the appropriate website to include with this checklist in the contract file.

General Information	
Project Name:	Project Number:
Bidder's Business Name:	Bid Submittal Deadline:
Contractor Registration – https://fortress.wa.gov/lni/bbip/	
License Number:	Status: Active: Yes <input type="checkbox"/> No <input type="checkbox"/>
Effective Date (must be effective on or before Bid Submittal Deadline):	Expiration Date:
Contractor Registration – https://fortress.wa.gov/lni/bbip/	
Is Bidder on Infraction List?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Current UBI Number – http://dor.wa.gov/content/doingbusiness/registermybusiness/brd/	
UBI Number:	Account Closed: Open <input type="checkbox"/> Closed <input type="checkbox"/>
Industrial Insurance Coverage – https://fortress.wa.gov/lni/crpsi/MainMenu.aspx	
Account Number:	Account Current: Yes <input type="checkbox"/> No <input type="checkbox"/>
Employment Security Department Number –	
Employment Security Department Number:	
• Has Bidder provided account number on the Bid Form?	Yes <input type="checkbox"/> No <input type="checkbox"/>
• And/or have you asked the Bidder for documentation from Employment Security Department on account number?	Yes <input type="checkbox"/> No <input type="checkbox"/>
State Excise Tax Registration Number – http://dor.wa.gov/content/doingbusiness/registermybusiness/brd/	
Tax Registration Number:	Account Closed: Open <input type="checkbox"/> Closed <input type="checkbox"/>
Not Disqualified from Bidding – http://www.lni.wa.gov/TradesLicensing/PrevWage/AwardingAgencies/DebarredContractors/default.asp	
Is the Bidder listed on the "Contractors Not Allowed to Bid" list of the Department of Labor and Industries?	
Yes <input type="checkbox"/> No <input type="checkbox"/>	
Checked by:	
Name of Employee:	Date:

Subcontractor Responsibility Checklist

The following checklist may be used by Contractors and Subcontractors in documenting that a subcontractor of any tier meets the subcontractor responsibility criteria. It is suggested that Contractors and Subcontractors print a copy of documentation from the appropriate website to include with this checklist in their contract file.

General Information	
Project Name:	Project Number:
Subcontractor's Business Name:	Subcontract Execution Date:
Contractor Registration – https://fortress.wa.gov/lni/bbip/	
License Number:	Status: Active: Yes <input type="checkbox"/> No <input type="checkbox"/>
Effective Date (must be effective on or before Subcontract Bid Submittal Deadline):	Expiration Date:
Current UBI Number – http://dor.wa.gov/content/doingbusiness/registermybusiness/brd/	
UBI Number:	Account Closed: Open <input type="checkbox"/> Closed <input type="checkbox"/>
Industrial Insurance Coverage – https://fortress.wa.gov/lni/crpsi/MainMenu.aspx	
Account Number:	Account Current: Yes <input type="checkbox"/> No <input type="checkbox"/>
Employment Security Department Number –	
Employment Security Department Number:	
<ul style="list-style-type: none"> • Has Subcontractor provided account number on the Bid Form? Yes <input type="checkbox"/> No <input type="checkbox"/> • And/or have you asked the Subcontractor for documentation from Employment Security Department on account number? Yes <input type="checkbox"/> No <input type="checkbox"/> 	
State Excise Tax Registration Number – http://dor.wa.gov/content/doingbusiness/registermybusiness/brd/	
Tax Registration Number:	Account Closed: Open <input type="checkbox"/> Closed <input type="checkbox"/>
Not Disqualified from Bidding – http://www.lni.wa.gov/TradesLicensing/PrevWage/AwardingAgencies/DebarredContractors/default.asp	
Is the Subcontractor listed on the "Contractors Not Allowed to Bid" list of the Department of Labor and Industries? Yes <input type="checkbox"/> No <input type="checkbox"/>	
Contractor Licenses – https://fortress.wa.gov/lni/bbip/	
<u>Electrical:</u> If required by Chapter 19.28 RCW, does the Subcontractor have an Electrical Contractor's License? Yes <input type="checkbox"/> No <input type="checkbox"/>	<u>Elevator:</u> If required by Chapter 70.87 RCW, does the Subcontractor have an Elevator Contractor's License? Yes <input type="checkbox"/> No <input type="checkbox"/>
Checked by:	
Name of Employee:	Date:

Certification of Compliance with Wage Payment Statutes

The bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date (**INSERT DATE**), the bidder is not a “willful” violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction.

I certify under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

Bidder

Signature of Authorized Official*

Printed Name

Title

Date

City

State

Check One:

Individual Partnership Joint Venture Corporation

State of Incorporation, or if not a corporation, State where business entity was formed:

If a co-partnership, give firm name under which business is transacted:

** If a corporation, proposal must be executed in the corporate name by the president or vice-president (or any other corporate officer accompanied by evidence of authority to sign). If a co-partnership, proposal must be executed by a partner.*

BID PROPOSAL FORMS

BID PROPOSAL FORM

BIDDER'S CHECKLIST

This Checklist has been prepared and furnished to aid Bidders in including all necessary supporting information with their Bid. Bidder's submittals shall include, but not be limited to, the following:

ITEM	CHECKED
1. Bid Schedules "A" and "B"	_____
2. Proposal Signature, Addenda Acknowledgement and Non-Collusion Declaration Sheet	_____
3. Subcontractor List	_____
4. Statement of Bidder's Qualifications	_____
5. Bid Deposit	_____
6. Certification of Compliance with Wage Payment Statutes	_____

BID TO COMMISSION

TO: Board of Commissioners
Public Utility District No. 1 of Skagit County, Washington

Gentlemen:

The undersigned has examined the site, specifications, plans, laws and ordinances covering the improvements contemplated. In accordance with the terms, provisions and requirements of the foregoing, the following lump sums and unit prices are tendered as an offer to perform the Work and furnish the labor, tools, equipment, materials, appurtenances, incidentals, and guarantees, where required, complete in place, in good working order.

As a guarantee of good faith and as required by law, a Bid Deposit in the form of a certified check, cashier's check, postal money order or surety bond made payable to the order of Public Utility District No. 1 of Skagit County ("District") is attached hereto. The undersigned understands and hereby agrees that, should this offer be accepted and the undersigned fail or refuse to enter into a Contract, furnish the required Payment and Performance Bond and required liability insurance, the undersigned shall forfeit to the District an amount equal to five percent (5%) of the amount Bid as liquidated damages, all as provided for in this Invitation for Bids.

The undersigned hereby proposes to undertake and complete the work embraced in this improvement, in accordance with the terms of the Specifications and Contract Documents, at the following lump sum and unit prices:

MCLEAN ROAD, WALL STREET TO BEST ROAD, PHASE II

BID SCHEDULE A

Item No.	Bid Schedule Description	Est. Qty	Unit	Unit Price	Total
A1	Mobilization	1	LS	\$	\$
A2	SPCC, TESC, Contractor's Accident Prevention Plan and Site-Specific Safety Plan	1	LS	\$	\$
A3	Contractor Furnished Electrical Permit	1	LS	\$	\$
A4	Contractor Furnished Asbestos Removal and Disposal Permit	1	LS	\$	\$
A5	ESC LEAD	1	LS	\$	\$
A6	Install and Maintain Temporary Erosion Control and Water Pollution Control Measures	1	LS	\$	\$
A7	Traffic Control Supervisor	1	LS	\$	\$
A8	Flaggers	1,500	HR	\$	\$
A9	Traffic Control Signs and Devices	1	LS	\$	\$
A10	Furnish Portable Changeable Message Sign (PCMS)	30	DAY	\$	\$
A11	Furnished and Installed Site and Trench Safety Systems in Accordance with Chapter 49.17 RCW	10,065	LF	\$	\$
A12	Sawcut Pavement for Permanent Patch	12,103	LF	\$	\$
A13	Furnish and Install Engineer-Ordered Trench Stabilization Material	100	TON	\$	\$
A14	Furnish Engineer-Ordered Over Excavation	50	CY	\$	\$
A15	Furnish and Place Crushed Surfacing Material, Top Course	2,400	TON	\$	\$
A16	Furnish, Place and Compact HMA Class ½-Inch, P.G. 64-22 for Permanent Patch	1,650	TON	\$	\$
A17	Furnish and Install 4-inch Sch 40 PVC Communications Ducting	9,941	LF	\$	\$
A18	Furnish and Install Pre-Cast Concrete Fiber Optic Vault with Deck and Aluminum Lid	5	EA	\$	\$
A19	Furnish and Install 12" C-900 PVC Pipe DR 18 DIPS	9,941	LF	\$	\$
A20	Furnish and Install 8" C-900 PVC Pipe DR 18 DIPS	84	LF	\$	\$
A21	Furnish and Install 6" C-900 PVC Pipe DR 18 DIPS	40	LF	\$	\$
A22	Furnish and Install 12" DI Butterfly Valve with Valve Box and Cover	10	EA	\$	\$
A23	Furnish and Install 12" x 8" DI Cross Fitting	1	EA	\$	\$
A24	Furnish and Install 12" x 6" DI Tee Fitting	1	EA	\$	\$

A25	Furnish and Install 12" DI Sleeve Coupling	2	EA	\$	\$
A26	Furnish and Install 14"x 12" DI Reducer Fitting	2	EA	\$	\$
A27	Furnish and Install 12" DI 11¼° Ell Fitting	2	EA	\$	\$
A28	Furnish and Install 12" DI 45° Ell Fitting	2	EA	\$	\$
A29	Furnish and Install 12" DI Foster Fitting	6	EA	\$	\$
A30	Replace 5/8-inch Water Service - Long	16	EA	\$	\$
A31	Replace 5/8-inch Water Service - Short	21	EA	\$	\$
A32	Replace 1½-inch Water Service - Long,	1	EA	\$	\$
A33	Replace 2-inch Water Service - Long,	1	EA	\$	\$
A34	Furnish and Install 6" DI Gate Valve with Valve Box and Cover	1	EA	\$	\$
A35	Furnish and Install 8" DI Gate Valve with Valve Box and Cover	2	EA	\$	\$
A36	Furnish and Install Fire Hydrant Assembly	8	EA	\$	\$
A37	Furnish and Install CMU Hydrant Wall	1	FA	\$ 5,000.00	\$ 5,000.00
A38	Furnish and Install 2-inch Combination Air Release/Vacuum Valve	3	EA	\$	\$
A39	Waterline Flushing, Pressure Testing, Disinfection and Bacteriological Testing	1	LS	\$	\$
A40	Connection Work for Tie-in at STA 3+25	1	LS	\$	\$
A41	Connection Work for Tie-in at STA 53+67, 45' LT	1	LS	\$	\$
A42	Connection Work for Tie-in at STA 53+67, 39' RT	1	LS	\$	\$
A43	Connection Work for Tie-in at STA 68+32	1	LS	\$	\$
A44	Connection Work for Tie-in at STA 104+68	1	LS	\$	\$
A45	Furnish and Install 14-inch HDPE 4710 DIPS DR 11 by Horizontal Directional Drill.	292	LF	\$	\$
A46	Furnish and Install 14-inch HDPE 4710 DIPS DR 11 Flanged End and Backing Ring	2	EA	\$	\$
A47	Horizontal Directional Drill Installation of Contractor Supplied 3-inch HDPE Fiber Communication Ducting.	292	LF	\$	\$
A48	Remove Existing Wood Stave Pipe	5,990	LF	\$	\$
A49	Remove and Dispose of Asbestos Concrete Pipe	1,418	LF	\$	\$
A50	Utility Replacement and Restoration Force Account	1	FA	\$ 5,000.00	\$ 5,000.00

Sub-Total Bid SCHEDULE "A" \$ _____

Sales Tax (8.5%) \$ _____

_____ **DOLLARS**
Total Bid Schedule "A" amount written out

DAISY LANE STREAM CROSSING

BID SCHEDULE B

Item No.	Bid Schedule Description	Est. Qty	Unit	Unit Price	Total
B1	Mobilization	1	LS		
B2	SPCC, TESC, Contractor's Accident Prevention Plan and Site-Specific Safety Plan	1	LS		
B3	ESC LEAD	1	LS		
B4	Install and Maintain Temporary Erosion Control and Water Pollution Control Measures	1	LS		
B5	Furnish and Install 10-Inch DIPS HDPE 4710 DR11 Pipe by Horizontal Directional Drill	279	LF		
B6	Furnish and Install 10-inch DIPS HDPE 4710 DR11 Flange End and Backing Ring	2	EA		
B7	Furnish and Install 10" Blind Flange with 2-inch Flushing Assembly	2	EA		
B8	HDPE Waterline Flushing, Pressure Testing, and Disinfection and Bacteriological Testing	1	LS		
B9	Furnished and Installed Site and Trench Safety Systems in Accordance with Chapter 49.17 RCW	1	LS		

Sub-Total Bid SCHEDULE "B" \$ _____

Sales Tax (8.5%) \$ _____

DOLLARS

Total Bid Schedule "B" amount written out

Total Bid SCHEDULE "A and B" including Sales Tax \$ _____

DOLLARS

Total Bid Schedule "A" and "B" amount written out

**PROPOSAL SIGNATURE, ADDENDUM ACKNOWLEDGEMENT
AND NON-COLLUSION DECLARATION**

The bidder is hereby advised that by signature of this proposal he/she is deemed to have acknowledged all requirements and signed all certificates contained herein. The undersigned hereby agrees to pay to labor not less than the prevailing rates of wages or less than the hourly minimum rate of wages as specified in the Specifications and Conditions for this project. A proposal guarantee in an amount of five percent (5%) of the total bid not including sales tax, based upon the approximate estimate of quantities at the above prices and in the form as indicated below, is attached hereto:

CASH \$ _____ CASHIER’S CHECK \$ _____
BID BOND \$ _____ CERTIFIED CHECK \$ _____

Receipt is hereby acknowledged of addendums(s) No(s). _____, _____, and _____

I, by signing the proposal, hereby declare, under penalty of perjury under the laws of the United States that the undersigned person(s), firm, association or corporation has (have) not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the project for which this proposal is submitted.

SIGNATURE OF AUTHORIZED OFFICIAL(S)

NOTE: Proposal must be signed

Signature _____

Firm Name _____

Address _____

Washington State Contractor’s License Number

Sworn to before me this _____ day of _____, 20_____

(SEAL)

NOTARY PUBLIC

SUBCONTRACTORS LIST – RCW 39.30.060 FORM

In compliance with RCW 39.30.060 for all projects estimated to cost \$1 million or more, all Bidders must complete and submit this Subcontractors List form with their Bid Proposal.

List of Subcontractors: The Bidder shall indicate on the Subcontractors List the names of the subcontractors with whom the Bidder, if awarded the contract, will 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.

List Bidder if Bidder Performing Work: If the Bidder will perform the work in any of the three areas required, the Bidder shall name itself for the work on the Subcontractors List.

Name Only One Form for Each Category of Work: The Bidder shall not list more than one firm (subcontractor or Bidder) for each category of work identified, unless subcontractors vary with bid alternates or additive, in which case the Bidder must indicate which firm will be used for which alternate or additive.

Substitution of Subcontractors: Substitution of any listed subcontractor may only be according to the procedure and parameters set forth in RCW 39.30.060.

Factors relating to Non-Responsiveness: Failure of the Bidder to submit the names of such subcontractors or to name itself to perform such work or the naming of two or more firms (subcontractor or Bidder) to perform the same work shall render the Bidder’s bid non-responsive and, therefore, void.

Applicable to Direct Subcontractors: The requirement of this section to name the Bidders’ proposed heating, ventilation and air conditioning, plumbing and electrical subcontractors applies only to proposed heating, ventilation and air conditioning, plumbing and electrical subcontractors who will contract directly with the Bidder.

Submission Requirements: The Subcontractors List must be submitted with the Bid Proposal.

Trade	Bidder must check one box for each Trade. If subcontracting the work, Bidder must name the subcontractor.
HVAC (Heating, Ventilation and Air Conditioning)	<input type="checkbox"/> N/A (this project does not include this work) <input type="checkbox"/> Bidder will self-perform this work <input type="checkbox"/> Name and address of subcontractor _____ _____
Plumbing	<input type="checkbox"/> N/A (this project does not include this work) <input type="checkbox"/> Bidder will self-perform this work <input type="checkbox"/> Name and address of subcontractor _____
Electrical	<input type="checkbox"/> N/A (this project does not include this work) <input type="checkbox"/> Bidder will self-perform this work <input type="checkbox"/> Name and address of subcontractor _____

STATEMENT OF BIDDER'S QUALIFICATIONS

COMPARABLE CONTRACT HISTORY

The following is a partial list of the last five jobs our organization completed which are similar in character to this project:

Year	Project Name	Pipe Diameter	Feet	Owner Rep.	Phone No.

Name of Company: _____

Address: _____

Telephone: _____

_____ Date

_____ Signature

_____ Title

_____ Contractor's License Number

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____

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 Washington as Surety, are held and firmly bound unto Public Utility District No. 1 of Skagit County, Washington (Obligee) in the full and penal sum of five percent (5%) of the total bid amount appearing on the bid proposal of said principal for the work hereinafter described, 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.

THE CONDITIONS OF THE ABOVE OBLIGATION ARE SUCH THAT WHEREAS, the Principal herein is herewith submitting his or its bid proposal for **MCLEAN ROAD, WALL STREET TO BEST ROAD, PHASE II AND DAISY LANE STREAM CROSSING.**

NOW THEREFORE, if the bid proposal submitted by the Principal is accepted, and the contract is awarded to said Principal, and if said Principal shall duly make and enter into and execute said contract and shall furnish the Performance and Payment Bond as required by the bidding and contract documents within a period of ten (10) days from and after said award, exclusive of the day of such award, then its obligation to pay the above-mentioned penal sum as liquidated damages shall be null and void, otherwise it shall remain and be in full force and effect.

Signed and sealed this _____ day of _____, 20____.

Contractor

Surety

By _____

By _____

Attorney-In-Fact

Title _____

Corporate Seal

Corporate Seal

The Attorney-In-Fact who executes this bond on behalf of the Surety must attach a copy of his Power of Attorney as evidence of his authority.

AGREEMENT

AGREEMENT
Project # 3761

THIS CONTRACT is made and entered into by and between the **PUBLIC UTILITY DISTRICT NO. 1 OF SKAGIT COUNTY** (District/Owner) and _____ (Contractor) whose names are subscribed hereto.

WITNESSETH:

WHEREAS the Owner has caused the preparation of certain Contract Documents entitled **MCLEAN ROAD WALL STREET TO BEST ROAD, PHASE II AND DAISY LANE STREAM CROSSING**.

WHEREAS the Owner has invited proposals, has received and analyzed said proposals, and has duly given notice of Acceptance of Proposal to the Contractor herein set forth and as stated more in detail in the Contract Documents which are defined in Section II General Conditions, all of which Contract Documents are made a part hereof and which constitute the whole Contract between the Owner and the Contractor.

NOW, THEREFORE, it is hereby agreed that:

1. The Contractor shall furnish the work, pay all costs, and perform all requirements of this Contract in the manner specified in the Contract Documents, and;
2. The Proposal calls for unit prices and lump sums in the Bid Schedule(s) set forth in (1) above. The Owner shall pay to the Contractor a corrected Total Contract Amount computed from the unit prices and lump sums in said Bid Schedule(s) set forth in the Contractor's Proposal and the actual quantities of units furnished. Based upon the lump sum and unit prices in said Bid Schedule(s) set forth in the Contractor's Proposal and upon the quantities estimated from the Contract Drawings for bidding purposes, the estimated Total Contract Amount is \$ _____ (\$ _____ .00), and;
3. In Washington State the Owner is required to pay state or local sales or use taxes included in the Total Contract Amount and the Contractor is required to receive the said taxes for payment to the state, the amount payable to the Contractor by the Owner shall be the Total Contract Amount as above specified including the amount of the said taxes, and;
4. It is further agreed that the Contractor will start work within ten (10) Calendar days after the date specified in the Owner's Notice to Proceed and shall be substantially complete within seventy (70) calendar days from the date of Notice to Proceed is issued, and;
5. In the event that the Contractor fails to substantially complete the Project by the date of substantial completion as specified above or as modified by Change Order, the Contractor shall be liable for liquidated damages of Five Hundred Dollars (\$500.00) per calendar day thereafter until the Owner determines the Project to be substantially complete, and;
6. The attached Indemnification Agreement is hereby made part of this agreement.

IN WITNESS WHEREOF, two (2) identical counterparts of this Contract, each of which shall for all purposes be deemed an original hereof, have been duly executed by the parties hereto.

(Contractor)

PUBLIC UTILITY DISTRICT NO. 1
OF SKAGIT COUNTY, WASHINGTON

By _____

By _____
George Sidhu, P.E., General Manager

Title _____

Date _____

Date _____

INDEMNIFICATION AGREEMENT

The Contractor agrees to defend, indemnify, and hold the District harmless from any and all claims, demands, losses, and liabilities to or by third parties arising from, resulting from, or connected with work performed or to be performed under this Contract by the Contractor, its agents, employees, and subcontractors, even though such claims may prove to be false, groundless or fraudulent, to the fullest extent permitted by law and subject to the limitations provided below.

The Contractor's duty to indemnify the District shall not apply to liability for damages arising out of bodily injury to persons or damage to property caused by or resulting from the sole negligence of the District or the District's agents or employees. The Contractor's duty to indemnify the District for liability for damages arising out of bodily injury to persons or damage to property caused by or resulting from the concurrent negligence of Contractor, its agents, employees, or subcontractors and/or the District or the District's agents or employees, shall apply only to the extent of negligence of Contractor, its agents, employees, or subcontractors.

With respect to claims against Contractor by the District pursuant to this Contract only, Contractor expressly waives any immunity that may be granted it under the Workers' Compensation, Industrial Insurance or like statutes and/or any administrative regulations issued pursuant thereto. This waiver does not include or extend to any claims by Contractor's employees directly against Contractor.

Further, Contractor's defense and indemnification obligations under this Contract shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable to or for any third party under Workers' Compensation, Industrial Insurance or like statutes and/or any administrative regulations issued pursuant thereto.

Contractor's duty to indemnify the District for liabilities or losses, other than for bodily injury to persons or damage to property caused by or resulting from negligence, shall apply only to the extent of the fault of Contractor, its agents, employees, or subcontractors, except in situations where fault is not a requirement for liability, in which case indemnity will be provided to the extent the liability or loss was caused by Contractor or its agents, employees, or subcontractors.

Contractor's duty to defend, indemnify and hold the District harmless shall include, as to all claims, demands, losses and liabilities to which it applies, the District's actual attorneys' fees and costs incurred in connection with defending such claim(s) including, without limitation, consultant and expert witness fees and expenses and personnel-related costs in addition to costs otherwise recoverable by statute or court rule.

THE UNDERSIGNED HEREBY CERTIFY THAT THIS AGREEMENT WAS MUTUALLY NEGOTIATED.

CONTRACTOR

PUBLIC UTILITY DISTRICT NO. 1
OF SKAGIT COUNTY

By: _____
Name, Title

By: _____
George Sidhu, P.E., General Manager

Dated: _____

Dated: _____

The Contractor shall cause each of its subcontractors (and suppliers to the extent any perform any work on the Project site) to execute an Indemnification Contract substantially in the form of the foregoing by which each such entity or person assumes to the District all obligations Contractor assumes to the District as set forth above.

PERFORMANCE AND 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 Washington as Surety, are held and firmly bound unto Public Utility District No. 1 of Skagit County, Washington 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 CONDITIONS OF THE ABOVE OBLIGATION ARE SUCH THAT:

WHEREAS, the Contractor has executed and entered into a certain Contract hereto attached, with the Owner, dated _____, 20____.

For: _____

IN WITNESS: NOW THEREFORE, if Contractor, its heirs, executors, administrators, successors, or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the said Contract for the duration thereof, including the one-year warranty period, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, at the time and in the manner therein specified and shall pay all laborers, mechanics, subcontractors or lower tier subcontractors, and material persons, and all persons who shall supply such person or persons, or subcontractors or lower tier subcontractors, with provisions and supplies for the carrying on of such work, on his or their part, and shall indemnify and save harmless Owner, its officers and agents, then this obligation shall become null and void; otherwise, it shall be and remain in full force and effect.

And Surety, for value received, hereby further stipulates and agrees that no change, extension of time, alteration or addition to the terms of Contract or to the work to be performed thereunder or the plans or specifications accompanying the same shall in any way affect its obligation of this Bond, and it does hereby waive notice of any change, extension of time, alterations or additions to the terms of the Contract, the plans or the specifications.

Surety hereby agrees that modifications and changes may be made in the terms and provisions of the Contract without notice to Surety, and any such modifications or changes increasing the total amount to be paid the Contractor shall automatically increase the obligation of the Surety on this Bond in a like amount.

The Surety expressly acknowledges that it shall be liable, under this Bond, for any liquidated damages assessed against the Contractor in accordance with the provisions of the Contract.

Any claim(s) relating to or against this Bond shall be subject to and decided by arbitration in accordance with the provisions of the Revised Code of Washington Chapter 7.04.

Any dispute relating to the performance or enforcement of the provisions of this Bond shall be governed by Washington State Law. Jurisdiction and venue shall be Skagit County Courts. If non-binding arbitration or mediation is conducted involving the Owner, the Contractor, the Surety, or any other party concerning or in any way relating the work required or alleged to be required by the Contract, the Contractor and Surety expressly consent to a consolidated or joint arbitration if and as called for by the Owner. The prevailing party in each such litigation shall be entitled to recover its attorneys' fees, in addition to any other relief granted.

IN WITNESS WHEREOF, the Contractor and the Surety have caused this bond and two (2) counterparts thereof to be signed and sealed by their duly authorized officers.

Signed and sealed this _____ day of _____, 20____.

Contractor

Surety

By _____

By _____

Attorney-In-Fact

Title _____

Corporate Seal

Corporate Seal

Address of local office and agent of Surety
Company:

Certificate of Owner's Attorney

I, the undersigned, **Peter Gilbert**, the duly authorized and acting legal representative of Public Utility District No. 1 of Skagit County, do hereby certify as follows

I have examined the attached contract(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements are adequate and have been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions, and provisions thereof.

Peter Gilbert, Attorney

Date: _____

GENERAL CONDITIONS

GENERAL CONDITIONS

NOTICE OF DISCLAIMER

TAKE NOTICE, that the General Conditions are the 2018 Edition of the Washington State Department of Transportation Standard Specifications for Road, Bridge and Municipal Construction.

TAKE NOTICE, that these General Conditions have been materially amended by certain additions, deletions or other modifications to meet the needs of the Public Utility District No.1 of Skagit County. These amendments are contained in the Supplementary General Conditions.

END OF SECTION

**SUPPLEMENTARY GENERAL
CONDITIONS**

SUPPLEMENTARY GENERAL CONDITIONS

The following provisions of the Washington State 2018 Standard Specifications for Road, Bridge, and Municipal Construction (WSDOT) Division 1 General Requirements is hereby amended, changed, or supplemented and superseded as follows. All other provisions which are not amended, changed, or supplemented remain in full force.

1	Order of Precedence	
2	Section 1-01.3	Definitions
3	Section 1-03	Award and Execution of Contract
3.1	Section 1-03.4	Contract Bond
3.2	Section 1-03.8	Award and Execution of Contract
4	Section 1-05	Control of Work
4.1	Section 1.05.0	General
4.2	Section 1-05.4	Conformance With and Deviations from Plans and Stakes
4.3	Section 1-05.10	Guarantees
5	Section 1-07	Legal Relations and Responsibilities to the Public
5.1	Section 1-07.1(1)	Laws to be Observed
5.2	Section 1-07.6	Permits and Licenses
5.3	Section 1-07.18(1)	Public Liability and Property Damage Insurance
5.4	Section 1-07.26	Personal Liability of Public Officers
6	Section 1-08	Prosecution and Progress
6.1	Section 1-08.5	Time for Completion (Contract Time)
6.2	Section 1.08.9	Liquidated Damages
6.3	Section 1.08.10(2)	Termination for Public Convenience
7	Section 1-09	Measurement and Payment
7.1	Section 1-09.4	Equitable Adjustment
7.2	Section 1-09.6	Force Account
7.3	Section 1-09.11(3)	Time Limitations and Jurisdiction
7.4	Section 1-09.13(3)	Claims Resolution
7.5	Section 1-09.14	Claims Against Contractor's Retainage and/or Public Contract Bond
8	Section 1-10	Temporary Traffic Control
8.1	Section 1-10.2(2)	Traffic Control Plans

1 ORDER OF PRECEDENCE. THE ORDER OF PRECEDENCE OF THE CONDITIONS OF THE CONTRACT ARE AS LISTED BELOW, FIRST IS THE HIGHEST AND LAST IS THE LOWEST:

Addenda
Bid Forms
Technical Specifications
Drawings
Special Provisions
Supplementary General Conditions
Division 1 General Requirements (WSDOT) 2018 Edition

2 SECTION 1-01.3 DEFINITIONS IS SUPPLEMENTED BY ADDING THE FOLLOWING DEFINITIONS:

Whenever these words are used in the Contract Documents, they shall have the following meanings:

"COMMISSION": Redefined to mean the three elected Commissioners of the District; substitute for "Commission" and "Washington State Transportation Commission" whenever cited.

"CONTRACTING AGENCY", "DISTRICT" or "OWNER": Public Utility District No. 1 of Skagit, Washington; substitute for "State," "Department," and "Department of Transportation" whenever cited.

"GENERAL MANAGER": The person appointed by the Commission per RCW 54.16.100 as the chief administrative officer of the District; substitute for "Secretary" and "Secretary of Transportation" whenever cited.

"ENGINEER": Public Utility District No. 1 of Skagit County and its sub consultants.

"STANDARD PLANS": Redefined to refer to the Standard Detail Sheets included with the Plans and Specifications as well as the 2018 WSDOT Standard Plans. The requirements of the Standard Detail Sheets shall be controlling in the case of any discrepancy between the Standard Details and the 2018 WSDOT Standard Plans.

3 SECTION 1-03 AWARD AND EXECUTION OF CONTRACT IS SUPPLEMENTED BY ADDING THE FOLLOWING:

3.1 Add the following to Section 1-03.4, Contract Bond:

Upon substantial completion of the Project, the Contractor shall provide a Utility Maintenance Bond for 25% of the Total Contract Amount on the form specified by the District that warrants all equipment, materials, and labor it furnishes or performs under the

Agreement against defects in design, materials, and workmanship for one (1) year after final acceptance as described in Section 1-05.10.

3.2 Add the following new Section 1-03.8 Award and Execution of Contract:

1-03.8 Award and Execution of Contract.

1-03.8(1) The Contract for the Project shall be awarded to the responsible Bidder submitting the lowest responsive Bid. The lowest responsive Bid shall be determined by the total of the amount of the base Bid of Bid Schedules “A” and “B” combined.

4 SECTION 1-05 CONTROL OF WORK IS REVISED AS FOLLOWS:

4.1 Insert the following new Section 1-05.0 General:

1-05.0 General

Where the Specifications, the Owner's instructions, laws, ordinances, or any government authority require any work to be specially tested, or inspected, the Contractor shall give the Owner timely notice that such test of completed work is ready for inspection. If the inspection is by another authority than the Owner, the Contractor shall give the Owner timely notice of the date fixed for such inspection. Required certificates of inspection by other authority than the Owner shall be secured by the Contractor.

4.2 Revise Section 1-05.4, Conformance With And Deviation From Plans And Stakes, as follows:

Delete the word “Engineer” and replace with “Contractor” throughout this section with reference to setting stakes, marks, lines, etc. for the layout and prosecution of the Work. All surveying and layout required for this Project shall be performed by the Contractor. The Engineer retains final authority for determination of conformity of the Work and shall be notified immediately of any errors found to cause deviations in the Work.

4.3 Delete Section 1-05.10, Guarantees, and replace with the following:

1-05.10 Guarantees

The Contractor shall furnish to the Contracting Agency any guarantee or warranty furnished as a normal trade practice in connection with the purchase of any equipment, materials, or items used in the construction of the project.

The Contractor shall be responsible for correcting all defects in workmanship and materials incurred within one year (365 days) after the date of final acceptance of the project. When corrections of defects are made, the Contractor shall be responsible for correcting all defects in workmanship and/or materials in the corrected Work for one year after acceptance of the correction by the Owner. The Contractor shall commence remedying

such defects within seven (7) days of receipt of notice of discovery thereof from the Owner and shall complete such Work within a reasonable time. In emergencies, where damage may result from delay or where loss of service may result, such corrections may be made by the Owner, in which case the cost shall be borne by the Contractor. In the event the Contractor does not complete corrections within a reasonable time, the Work shall be otherwise accomplished and the cost of same shall be paid by the Contractor.

The Contractor shall be liable for any costs, losses, expenses, or damages, including consequential damages, suffered by the Owner resulting from defects in the Contractor's Work including but not limited to costs, labor, materials, equipment and administration incurred by Owner in making emergency repairs of such defective Work and associated costs of engineering, inspection, and supervision by the Owner or Engineer. The Contractor shall defend, indemnify and hold the Owner harmless from any and all claims which may be made against the Owner as a result of Contractor's defective Work.

5 SECTION 1-07 LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC IS SUPPLEMENTED BY ADDING THE FOLLOWING:

5.1 Add the following Section 1-07.1(1) Owner Safe Access:

1-07.1(1) Owner Safe Access.

The Contractor shall provide safe access for the Owner and its inspectors to adequately inspect the quality of work and the conformance with Contract Documents. The Contractor shall provide adequate lighting, ventilation, ladders, and other protective facilities as may be necessary for the safe performance of inspections.

5.2 Add the following to Section 1-07.6, Permits And Licenses:

The Contractor shall comply with all requirements of all permits provided by the Owner for this project.

5.3 Add the following to Section 1-07.9, Wages, 1-07.9(1), General:

1-07.18(1) General Requirements

Current Washington State Department of Labor and Industries prevailing wage rates are available at :

<http://www.lni.wa.gov/tradeslicensing/prevwage/wagerates/>

Wage rates applicable for this project are those for Skagit County with an effective date of this Contract Bid Date.

5.4 Revise Section 1-07.18, Public Liability and Property Damage Insurance as follows:

All reference to the State or Department of Transportation shall be supplanted with Public Utility District No. 1 of Skagit County.

5.5 Revise Section 1-07.26, Personal Liability of Public Officers, as follows:

Neither the Owner nor any elected official, officer, or its employees shall be personally liable for any acts or failure to act in connection with the Contract, it being understood that in such manners, they are acting solely as agents of the Owner.

No right of action shall accrue upon or by reason of this Contract to or for the use or benefit of anyone other than the parties to this Contract. The parties to this Contract are the Contractor and the Owner.

6 SECTION 1-08, PROSECUTION AND PROGRESS, IS REVISED AS FOLLOWS:

6.1 Supplement Section 1-08.5, Time For Completion (Contract Time), with the following:

Contractor shall complete all work associated with the Bid Schedule within 70 consecutive Calendar Days after the issuance of the Notice to Proceed.

6.2 Section 1-08.9, Liquidated Damages replaced numbered paragraphs 1 and 2 with the following:

1. To pay liquidated damages for each working day beyond the number of days established for substantial completion, to authorize the Owner to deduct these liquidated damages from any money due or coming due to the Contractor.

6.3 Revise Section 1-08.10(2), Termination For Public Convenience, as follows:

Substitute "Resolution" for "Executive Order", substitute "Commission" for "President", and delete "or Governor".

7 SECTION 1-09, MEASUREMENT AND PAYMENT, IS REVISED AS FOLLOWS:

7.1 Supplement Section 1-09.4, Equitable Adjustment, with the following:

All bilateral agreements shall constitute a full accord and satisfaction and represent payment in full as to adjustments in both Contract price and time of completion for all costs, whether direct or indirect, arising out of, or incidental to, or otherwise attributable to, the changed work including any and all delays and impacts resulting from the change to the contract. Acceptance of payment by Contractor pursuant to such bilateral agreement shall constitute a waiver of any and all claims, known or unknown, arising out of, or incidental to, or otherwise attributable to the changed work.

7.2 Revise Section 1-09.6, Force Account, as follows:

Revise Item No. 1 as follows: Substitute “21 Percent” for “29 percent” for Contractor’s allowance for overhead and profit.

7.3 Revise Section 1-09.11(3), TIME LIMITATIONS AND JURISDICTION

Revise as follows: Substitute Public Utility District No.1 of Skagit County for State of Washington (six times). Substitute Superior Court of Skagit County for Superior Court of Thurston County.

7.4 Replace Sections 1-09.13(3), (3)A, (3)B and (4), Claims Resolution, with the following:

CLAIMS 1-09.13(3)

The Contractor and Contracting agency mutually agree that claims submitted in accordance with Section 1-09.11 and not resolved by nonbinding ADR process, shall be resolved by litigation unless the Contracting agency elects to resolve the claim through binding arbitration.

Venue. The venue of any Dispute Resolution Proceedings between the parties to this Agreement shall be Mount Vernon, Washington unless otherwise mutually agreed in writing.

Injunctive Proceedings. Notwithstanding any other provisions of these Dispute Resolution Procedures, any Disputes otherwise subject to submission to these Dispute Resolution Procedures may instead be first submitted, by any party having a legal interest therein, to the jurisdiction of the Superior Court for Skagit County, State of Washington, if and only to the extent necessary to secure injunctive relief reasonably necessary under the circumstances.

7.5 Add the following new Section 1-09.14 Claims Against Contractor’s Retainage and/or Public Contract Bond:

1-09.14 Claims Against Contractor’s Retainage and/or Public Contract Bond

The Contractor shall be liable for all costs incurred by the Owner, including, but not limited to, legal fees, salary/wage costs of Owner’s employees and litigation costs (whether or not recoverable by statute or court rule) arising out of claims against the retainage or the Contractor’s Public Contract Bond. Owner may deduct any such costs from funds otherwise due the Contractor, including the retention, by unilateral Change Order.

8 SECTION 1-10, TEMPORARY TRAFFIC CONTROL, IS REVISED AS FOLLOWS:

8.1 Revise Section 1-10.2(2), Traffic Control Plans, as follows:

Delete the first sentence of Section 1-10.2(2) and replace with the following:

The District is providing an approved traffic control plan for the project that the Contractor will implement to handle traffic safety during construction.

END OF SECTION

TECHNICAL SPECIFICATIONS

D I V I S I O N 1

GENERAL REQUIREMENTS

**SECTION - 01010
SUMMARY OF WORK**

PART 1 GENERAL

1.1 THE REQUIREMENT

- A. The Work to be performed under this Contract shall consist of furnishing tools, equipment, materials, supplies, and manufactured articles, and furnishing all labor, transportation, and services, including fuel, power, water, and essential communications, and performing all work or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The Work shall be complete, and all work, materials, and services not expressly indicated or called for in the Contract Documents which may be necessary for the complete and proper construction of the Work in good faith shall be provided by the Contractor as though originally so indicated, at no increase in cost to the Owner.

1.2 SCOPE OF WORK

- A. Work Included:

McLean Road, Wall Street to Best Road Phase II

Installation of approximately 10,053 linear feet (LF) of water distribution piping consisting of 12-inch, 8-inch, and 6-inch diameter AWWA C-900 water distribution piping, approximately 9,892 linear feet of 4-inch Schedule 40 PVC communications duct conduit for fiber optic cable and fiber optic vaults along McLean Road from Best Road to Beaver Marsh Road, Skagit County, State of Washington. Work to include removal of existing wood stave pipe, thrust blocks, service connections, fire hydrants, branch and mainline valves, dewatering, appurtenances and incidentals, pavement repair, temporary traffic control, temporary erosion control, disinfection, and pressure testing, and excavation for District connections, as shown on the plans in estimated quantities identified in the Bid Proposal.

Installation of approximately 339 LF of contractor supplied 14-inch butt fused HDPE pipe and 4-inch HDPE fiber optic conduit via directional drilling under an existing drainage ditch on McLean Road, Skagit County, State of Washington. In addition to installing the butt fused pipe, this scope of work includes all labor, material and equipment associated with butt-fusing the contractor supplied pipe, pressure testing, bacteriological disinfection and testing, erosion control, and permitting provisions.

Daisy Lane Stream Crossing.

Installation of approximately 327 LF of contractor supplied 10-inch HDPE pipe via directional drilling across an existing stream along Daisy Lane, Skagit County, State of Washington. In addition to installing the HDPE pipe, this scope of work includes all labor, material and equipment associated with butt-fusing the contractor supplied pipe, capping each end of the HDPE pipe, pressure testing, bacteriological disinfection and testing, erosion control, and permitting provisions.

1.3 CONTRACT METHOD

- A. The Work herein will be constructed under a single contract from the District's Small Works Roster.

1.4 WORK BY OTHERS

- A. The Contractor's attention is directed to the fact that work may be conducted along the project routes by other contractors during the performance of the Work under this Contract. The Contractor shall conduct its operations so as to cause a minimum of interference with the work of such other contractors, and

shall cooperate fully with such contractors to allow continued safe access to their respective portions of the Site, as required to perform work under their respective contracts.

- B. **Interference With Work On Utilities:** The Contractor shall cooperate fully with all utility forces of the Owner or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the Work, and shall schedule the Work so as to minimize interference with said relocation, altering, or other rearranging of facilities.

1.5 CONTRACTOR USE OF SITE

- A. The Contractor's use of the Site shall be limited to its construction operations, including on-site storage of materials, and equipment. All work shall be contained within existing rights-of-way, District easements, and any easements or permissible land encumbrances negotiated by the Contractor.

1.6 PROJECT MEETINGS

- A. Preconstruction Conference:

1. Prior to the commencement of Work at the Site, a preconstruction conference will be held at the District's Mount Vernon office, located at 1415 Freeway Drive, Mount Vernon, WA. The conference shall be attended by the Contractor's Project Manager, its superintendent, and its Subcontractors as the Contractor deems appropriate. Other attendees will be:
 - a. Owner and Owner representatives.
 - b. Governmental representatives as appropriate.
 - c. Others as requested by Contractor, or Owner.
2. The Contractor shall bring to the preconstruction conference submittals in accordance with Section 01300.
3. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to the Contractor prior to the meeting date. However, the Contractor should be prepared to discuss all of the items listed below.
 - a. Status of Contractor's insurance and bonds.
 - b. Contractor's tentative schedule.
 - c. Transmittal, review, and distribution of Contractor's submittals.
 - d. Processing applications for payment.
 - e. Maintaining record documents.
 - f. Critical work sequencing, proposed schedule, and proposed outage schedule.
 - g. Field decisions and Change Orders.
 - h. Use of Site, office and storage areas, security, housekeeping, and Owner's needs.
 - i. Major equipment deliveries and priorities.
 - j. Contractor's assignments for safety and first aid.
 - k. Contractor's Daily Report Form.
 - l. Submittal Transmittal Form
 - m. Request for Information (RFI) Form.
 - n. Deviation Request Form.
4. The Owner will preside at the preconstruction conference and will arrange for keeping and distributing the minutes to all persons in attendance.
5. The Contractor and its Subcontractors should plan on the conference taking no less than 2 hours. The meeting will cover the items listed in paragraphs 2 and 3, and review of the Drawings and Specifications, with the Owner.

- B. Progress Meetings:

1. The Contractor shall schedule and hold regular on-site progress meetings at least biweekly and at other times as requested by Owner or as required by progress of the Work. The Contractor and all Subcontractors active on the Site shall attend each meeting. Contractor may at its discretion request attendance by representatives of its Suppliers, manufacturers, and other Subcontractors.
2. The Owner will preside at the progress meetings and will arrange for keeping and distributing the minutes. The purpose of the meetings is to review the progress of the WORK, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems that may develop. During each meeting, the Contractor shall present any issues that may impact its progress with a view to resolving these issues expeditiously, and the Contractor shall discuss the timing and notification process for water service interruptions.

PART 2 PART 2 PRODUCTS (NOT USED)

PART 3 PART 3 EXECUTION (NOT USED)

END SECTION

**SECTION - 01025
MEASUREMENT AND PAYMENT**

PART 1 GENERAL

1.1 SCOPE

- A. Payment for the various items in the Proposal, as further specified herein, shall include all compensation to be received by the CONTRACTOR for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of work being described, as necessary to complete the various items of the WORK all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of permits and cost of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA) and the State of Washington, Division of Industrial Safety and Health (WISHA). No separate payment will be made for any item that is not specifically set forth in the Proposal or in this Section 01025, and all costs therefore shall be included in the prices named in the Proposal for the various appurtenant items of work.
- B. Payment shall only be made for items listed in the Proposal or as listed in executed change orders. References in the Contract Documents to the 2018 Standard Specifications (of the Washington State Department of Transportation) are for purposes of defining products or execution of the WORK, but payment provisions of the 2018 Standard Specifications do not apply unless specifically incorporated by reference in these Contract Documents.
- C. Contractor shall provide the District with Monthly Schedules prior to pay request approval.

1.2 ITEM A1, B1 – MOBILIZATION

- A. No measurement of Mobilization shall be made.
- B. Payment for Mobilization will be by the lump sum price named in the Proposal. Payment shall be made according to the schedule of payments stated in the 2018 Standard Specifications Section 1-09.7 in accordance with requirements of the Contract Documents.

1.3 ITEM A2, B2 – SPCC, TESC, CONTRACTOR’S ACCIDENT PREVENTION PLAN AND SITE SPECIFIC SAFETY PLAN

- A. No measurement of SPCC, TESC, Contractor’s Accident Prevention Plan and Site Specific Safety Plan shall be made.
- B. Payment for Spill Prevention Control and Countermeasures Plan (SPCC), Temporary Erosion and Sediment Control Plan (TESC), Contractor’s Accident Prevention Plan and Site Specific Safety Plan shall be by the lump sum price named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to incidentals necessary to implement the plan as specified in accordance with requirements of the Contract Documents.
- C. Payment will be made at 90 percent of the lump sum price after receipt and review of the plan and the remaining payment will be at substantial completion.

1.4 ITEM A3 – CONTRACTOR FURNISHED ELECTRICAL PERMIT

- A. No measurement will be made for Contractor Furnished Electrical Permit.
- B. Payment for Contractor Furnished Electrical Permit shall be at the Lump Sum Price named in the proposal which price shall constitute full payment for all tools, labor, materials, and equipment required to complete this work as specified, including all permit fees.

1.5 ITEM A4 – CONTRACTOR FURNISHED ASBESTOS REMOVAL PERMIT

- A. No measurement will be made for Contractor Furnished Asbestos Removal Permit.
- B. Payment for Contractor Furnished Asbestos Removal Permit shall be at the Lump Sum Price named in the proposal which price shall constitute full payment for all tools, labor, materials, and equipment required to complete this work as specified, including all permit fees.

1.6 ITEM A5, B3 – ESC LEAD

- A. No measurement will be made for ESC Lead.
- B. Payment for ECS Lead shall be by the Lum Sum unit price named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited performing inspections and a reporting in accordance with Section 8-01 WSDOT Standard Specifications in accordance with requirements of the Contract Documents.

1.7 ITEM A6, B4 – INSTALL AND MAINTAIN TEMPORARY EROSION CONTROL AND WATER POLLUTION CONTROL MEASURES

- A. No measurement of Install and Maintain Temporary Erosion Control and Water Pollution Control Measures shall be made.
- B. Payment for Install and Maintain Temporary Erosion Control and Water Pollution Control Measures shall be by the lump sum price named in the Proposal, which payment be considered full compensation for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to the establishment, maintenance, and removal of temporary erosion and water pollution control measures in accordance with requirements of the Contract Documents.
- C. Eighty percent of the lump sum unit price will be dispersed according to an agreed upon schedule of value earned, while the remaining twenty percent of the lump sum price will be paid after final site stabilization and removal of erosion control measures.

1.8 ITEM A7 – TRAFFIC CONTROL SUPERVISOR

- A. No measurement of Traffic Control Supervisor shall be made.
- B. Payment for Traffic Control Supervisor shall be by the Lump Sum price named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to completion of Contractor's Daily Report of Traffic Control – Summary and Traffic Control Logs in accordance with requirements of the Contract Documents.

1.9 ITEM A8 – FLAGGERS

- A. Measurement of Flaggers shall be by the number of hours traffic control setup and flagging is actually taking place.
- B. Payment for Flaggers shall be by the unit price per hour named in the Proposal, which payment shall be constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to traffic control in accordance with requirements of the Contract Documents.

1.10 ITEM A9 - TRAFFIC CONTROL SIGNS AND DEVICES

- A. No measurement of Traffic Control Signs and Devices shall be made.
- B. Payment for Traffic Control Signs and Devices shall be by the lump sum price named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to furnishing Class “A” & “B” Traffic Control Signs and Devices and take down of all Traffic Control Signs and Devices in accordance with requirements of the Contract Documents.
- C. Schedule of payment for Traffic Control Signs and Devices shall be based on percentage of project completion.

1.11 ITEM A10 – FURNISH PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

- A. Measurement of Furnish Portable Changeable Message Sign (PCMS) shall be by the number of days display is required, as determined by the Engineer, and in use. Measurement shall be to the nearest half-day. No measurement shall be made for mobilization of the sign on site or within the project limits or when the sign is not in use.
- B. Payment for PCMS shall be by the unit price per day named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein in accordance with requirements of the Contract Documents, including mobilization of PCMS.

1.12 ITEM A11, B9 – FURNISHED AND INSTALLED SITE AND TRENCH SAFETY SYSTEMS IN ACCORDANCE WITH CHAPTER 49.17 RCW

- A. Measurement of Furnished and Installed Site and Trench Safety Systems shall be by the number of linear feet of trench shoring actually installed as determined by horizontal measurement along the pipe centerline. Only one measurement will be made regardless of the number of faces shored.
- B. Payment for Furnished and Installed Site and Trench Safety System shall be by the unit price per linear foot named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to the setup and take down of all site and trench safety systems in accordance with requirements of the Contract Documents.

1.13 ITEM A12 – SAWCUT PAVEMENT FOR PERMANENT PATCH

- A. Measurement of Sawcut Pavement for Permanent Patch shall be by the unit price per linear foot as measured along each line of sawcut pavement, regardless of depth, for sawcuts made in preparation of HMA permanent patching; only one measurement will be made. All sawcuts shall be outside the existing painted fog line (shoulder) of the travel lane. The fog line shall be removed by contractor at the District’s discretion. No additional measurement shall be made for sawcutting in advance of pavement removal which shall be considered incidental to other units of work.

- B. Payment for Sawcut Pavement for Permanent Patch shall be by the unit price per linear foot named in the Proposal, which payment shall constitute full payment for all tools, labor, equipment, and materials required to complete this work as specified herein; including but not limited to compliance with storm water and environmental regulations in accordance with requirements of the Contract Documents.

1.14 ITEM A13 – FURNISH AND INSTALL ENGINEER-ORDERED TRENCH STABILIZATION MATERIAL

- A. Measurement of Furnish and Install Engineer-Ordered Trench Stabilization Material shall be by the number of tons placed in the trench, based on truck scale ticket weights.
- B. Payment for Furnish and Install Engineer-Ordered Trench Stabilization Material shall be by the unit price per ton named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to furnishing, placing and compacting the trench stabilization materials, and for filter fabric around the stabilization material in accordance with requirements of the Contract Documents.

1.15 ITEM A14 – FURNISH ENGINEER-ORDERED OVER EXCAVATION

- A. Measurement of Furnish Engineer-Ordered Over Excavation shall be by the number of cubic yards of engineer ordered over-excavated volume, based on field measurements.
- B. Payment for Furnish Engineer-Ordered Over Excavation shall be by the unit price per ton named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to excavating and removing unsuitable material below the bottom of the trench in accordance with requirements of the Contract Documents.

1.16 ITEM A15 – FURNISH AND PLACE CRUSHED SURFACING MATERIAL, TOP COURSE

- A. Measurement of Furnish and Place Crushed Surfacing Material, Top Course, shall be by the number of tons placed in the trench, based on truck scale ticket weights.
- B. Payment for Furnish and Place Crushed Surfacing Material, Top Course shall be by the unit price per ton named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to placing and compacting top course material in accordance with requirements of the Contract Documents.

1.17 ITEM A16 – FURNISH, PLACE, AND COMPACT HMA CLASS ½ INCH, P.G. 64-22 FOR PERMANENT PATCH

- A. Measurement of Furnish, Place, and Compact HMA Class ½ Inch, P.G. 64-22 for Permanent Patch shall be by the number of tons placed and compacted based on truck ticket weights.
- B. Payment for Furnish Place, and Compact HMA Class ½ Inch, P.G. 64-22 for Permanent Patch shall be by the unit price per ton named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to furnishing, placing and compacting hot mix asphaltic concrete permanent patch in accordance with requirements of the Contract Documents.
- C. Payment for all temporary patch work shall be included in the cost for pipeline installation.

1.18 ITEM A17 – FURNISH AND INSTALL 4-INCH SCH 40 PVC COMMUNICATIONS DUCTING

- A. Measurement of Furnish and Install 4-inch Sch 40 PVC Communications Ducting shall be by the linear feet of conduit actually installed.
- B. Payment for Furnish and Install 4-inch Sch 40 PVC Communications Ducting, shall be by the unit price named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to conduit installation, joint connection, orange tracer wire, dewatering, trenching, disposal of excess soils, bedding, backfill and compaction, transitions, and connection to the pre-cast concrete fiber vaults in accordance with requirements of the Contract Documents.

1.19 ITEM A18 – FURNISH AND INSTALL PRE-CAST CONCRETE FIBER OPTIC VAULTS WITH DECK AND ALUMINUM LID

- A. Measurement of Furnish and Install Pre-Cast Concrete Fiber Vaults with Deck and Aluminum Lid shall be by the number of vaults installed in place.
- B. Payment for Furnish and Install Pre-Cast Concrete Fiber Vaults with Deck and Aluminum Lid shall be by the unit price per each named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to installation of pre-cast concrete vault and lid, including survey, construction staking, excavation, dewatering, bedding, backfill and surface and site restoration in accordance with requirements of the Contract Documents.

1.20 ITEMS A19, A20 & A21 – FURNISH AND INSTALL “__”-INCH C-900 PVC PIPE, INCLUDING TRENCH EXCAVATION, BACKFILL AND COMPACTION

- A. Measurement of Furnish and Install “__”-inch C-900 PVC Pipe, including Trench Excavation, Backfill and Compaction, shall be by the number of linear feet of pipe actually installed as determined by horizontal measurement along the pipe centerline.
- B. Payment for Furnishing and Install “__”-inch C-900 PVC Pipe, including Trench Excavation, Backfill and Compaction, shall be by the unit price per linear foot named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to pipe installation, foster fittings, end caps or plugs, thrust blocking, installation of test stations, joint connections, copper blue tracer wire, dewatering, excavation of pavement and trench, disposal of excess soils, removal and disposal of asphalt, bedding, backfilling, compaction, survey and construction staking in accordance with requirements of the Contract Documents.

1.21 ITEM A22 – FURNISH AND INSTALL “__”-INCH DUCTILE IRON BUTTERFLY VALVE WITH VALVE BOX AND COVER

- A. Measurement of Furnish and Install “__”-inch Butterfly Valve with Valve Box and Cover shall be by the number of valves installed.
- B. Payment for Furnish and Install “__”-inch Butterfly Valve with Valve Box and Cover shall be made at the unit price per each named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to providing and installing valve boxes, covers, extension stems as needed, gaskets, bolt kits, poly wrap, thrust blocking, bonding, and copper blue tracer wire, installation of test stations, joint connections, dewatering, anti-corrosion wrap, excavation of pavement and trench, disposal of excess soils, removal and disposal of asphalt, bedding, backfilling, compaction, survey and construction staking in accordance with requirements of the Contract Documents.

1.22 ITEMS A23-A29 – FURNISH AND INSTALL “__”-INCH DUCTILE IRON “_” FITTINGS

- A. Measurement of Furnish and Install “__”-inch Ductile Iron “_” Pipe Fittings shall be by the number of each type of fitting actually installed, and not included in other lump sum bid items.
- B. Payment for Furnish and Install “__”-inch Ductile Iron “_” Pipe Fittings shall be by the unit price per each named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to joint connections, bonding pipe and fittings, installation of test stations, poly wrap, copper blue tracer wire, anti-corrosion wrap, dewatering, excavation of pavement and trench, disposal of excess soils, removal and disposal of asphalt, bedding, thrust blocking, backfilling, compaction, survey and construction staking in accordance with requirements of the Contract Documents.

1.23 ITEMS A30 – A33 - REPLACE “__”-INCH WATER SERVICE ”_”

- A. Measurement of Replace “__”-Inch Water Service “_” shall be by the number of water services replaced or established.
- B. Payment for Replace “__”-Inch Water Service “_” shall be by the unit price per each named in the Proposal, which payment shall be constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to supply and installation of saddle to the mainline pipe, service corporation, gate valves, anti-corrosion wrap, tracer wire, service line, excavation of trench and asphalt, backfill, compaction, road restoration, landscape restoration, culvert restoration, testing, and flushing in accordance with requirements of the Contract Documents

1.24 ITEM A34 & A35 – FURNISH AND INSTALL “__”-INCH DUCTILE IRON GATE VALVE WITH VALVE BOX AND COVER

- A. Measurement of Furnish and Install “__”-inch Ductile Iron Gate Valve with Valve Box and Cover shall be by the number of valves installed.
- B. Payment for Furnish and Install “__”-inch Ductile Iron Gate Valve with Valve Box and Cover shall be by the unit price per each named in the Proposal, which price shall constitute full compensation for payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to providing and installing valve boxes, covers, extension stems as needed, gaskets, bolt kits, thrust blocking, and copper blue tracer wire, joint connections, anti-corrosion wrap, dewatering, excavation of pavement and trench, disposal of excess soils, removal and disposal of asphalt, bedding, backfilling, compaction, survey and construction staking in accordance with requirements of the Contract Documents.

1.25 ITEM A36 – FURNISH AND INSTALL FIRE HYDRANT ASSEMBLY

- A. Measurement of Furnish and Install Fire Hydrant Assembly shall be by the number of fire hydrant assemblies installed.
- B. Payment for Furnish and Install Fire Hydrant Assembly shall be by the unit price per each named in the Proposal, which price shall constitute full payment for all tools, equipment, labor, materials required to complete this work as specified herein: including but not limited to excavation, backfill, thrust blocks, foundations, retaining walls, concrete collar, culvert extensions, culvert placement, connections including bolt kits, backer rings, mainline tees, hydrant valve, anti-corrosion wrap, joint restraint in accordance with requirements of the Contract Documents.

1.26 ITEM 37 – FURNISH AND INSTALL CMU HYDRANT WALL

- A. Measurement for CMU Hydrant Wall shall be by force account time and materials.

- B. Payment for Furnish and install CMU Hydrant Wall shall be made by force account time and materials for CMU hydrant wall installation as directed by the owner.

1.27 ITEM A38 – FURNISH AND INSTALL 2-INCH COMBINATION AIR RELEASE/VACUUM VALVE

- A. Measurement of Furnish and Install 2-Inch Combination Air Release/Vacuum Valve shall be by each valve furnished and installed.
- B. Payment for Furnish and Install 2-Inch Combination Air Release/Vacuum Valve shall be at the unit price named in the proposal, which price shall include all tools, equipment, labor and materials to complete this work as specified including but not limited to excavation, backfill, piping, vaults, and anti-corrosion wrap.

1.28 ITEM A39, B8 - WATERLINE FLUSHING, PRESSURE TESTING, DISINFECTION AND BACTERIOLOGICAL TESTING

- A. No measurement of Waterline Flushing, Pressure Testing, Disinfection and Bacteria Testing shall be made.
- B. Payment for Waterline Flushing, Pressure Testing, Disinfection and Bacteria Testing shall be by the lump sum price named in the Proposal, which price shall constitute full payment for all tools equipment, labor, and materials required to complete this work as specified herein; including but not limited to waterline pressure testing, flushing and disinfection and bacteria testing, including temporary blocking, temporary flushing assemblies required by the contract work or additional testing assemblies for the contractor's means and methods, connections, sample ports, and other appurtenant work, in accordance with the requirements of the Contract Documents.

1.29 ITEMS A40 – A44 – CONNECTION WORK FOR TIE-IN AT STA “__”

- A. Measurement of Connection Work for Tie-In at STA “__” shall be by the number of each type of fitting actually installed, and not included in other lump sum bid items.
- B. Payment for Connection Work for Tie-in at STA “__” shall be per each price named in the Proposal, which payment shall be constitute full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to excavation, backfill, thrust blocking, road and shoulder restoration, dewatering for District crew to make final connection to existing pipe lines, in accordance with the requirements of the Contract Documents. No additional measurement will be made for additional contractor tie-ins to facilitate means and methods.

1.30 ITEM A45, B5 – FURNISH AND INSTALL “__”-INCH HDPE 4710 DIPS DR 11 BY HORIZONTAL DIRECTIONAL DRILL

- A. Measurement of Furnish and Install “__”-inch HDPE 4710 DIPS DR 11 by Horizontal Directional Drill shall be by the linear foot of pipe installed.
- B. Payment of Furnish and install “__”-inch HDPE 4710 DIPS DR 11 by Horizontal Directional Drill shall be made at the unit price per foot named in the Proposal, which payment shall be considered full compensation for all tools, labor, equipment, non-owner supplied materials and incidentals required to complete this work as specified herein; including gaskets, bolts, copper tracer wire, dewatering, trenching, haul and disposal of excess soils and bore slurry, backfilling and compaction, in accordance with the Plans and requirements of the Contract Documents.

1.31 ITEM A46, B6 – FURNISH AND INSTALL “__”-INCH HDPE 4710 DIPS DR11 FLANGED END AND BACKING RING

- A. Measurement of Furnish and Install “__”-Inch HDPE 4710 DIPS DR11 Flanged End and Backing Ring shall be by each valve furnished and installed.
- B. Payment for Furnish and Install “__”-Inch HDPE 4710 DIPS DR11 Flanged End and Backing Ring shall be at the unit price named in the proposal, which price shall include all tools, equipment, labor and materials to complete this work as specified including but not limited to excavation, backfill, butt fusing or electro fusing, backing rings, and anti-corrosion wrap.

1.32 ITEM A47 - HORIZONTAL DIRECTIONAL DRILL INSTALLATION OF CONTRACTOR SUPPLIED 3-INCH HDPE FIBER COMMUNICATION DUCTING

- A. Measurement of Horizontal Directional Drill Installation of Contractor Supplied 3-Inch HDPE Pipe shall be by the linear foot of pipe installed.
- B. Payment for Horizontal Directional Drill Installation of Contractor Supplied 3-Inch HDPE Pipe shall be made at the unit price per foot named in the Proposal, which payment shall be considered full compensation for all tools, labor, equipment, materials and incidentals required to complete this work as specified herein; including HDPE joint connections, and copper tracer wire, dewatering, trenching, haul and disposal of excess soils and bore slurry, backfilling and compaction, in accordance with the Plans and requirements of the Contract Documents.

1.33 ITEMS A48 – REMOVE EXISTING WOOD STAVE PIPE

- A. Measurement of Remove Existing Wood Stave Pipe shall be made by the number of linear feet removed.
- B. Payment for Remove Existing Wood Stave Pipe shall be by the linear price per foot, which payment shall be considered full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to disposal of wood stave pipe, in accordance with requirements of the Contract Documents.

1.34 ITEMS A49 – REMOVE AND DISPOSE OF ASBESTOS CONCRETE PIPE

- A. Measurement of Remove and Dispose of Asbestos Concrete Pipe shall be made by the number of linear feet removed.
- B. Payment for Remove and Dispose of Asbestos Concrete Pipe shall be by the linear price per foot, which payment shall be considered full payment for all tools, equipment, labor, and materials required to complete this work as specified herein; including but not limited to disposal of asbestos pipe, in accordance with requirements of the Contract Documents.

1.35 ITEMS A50 - UTILITY REPLACEMENT AND RESTORATION FORCE ACCOUNT

- A. Measurement for Utility Replacement and Restoration Force Account shall be based on established rates and the quantities of labor, materials, and equipment that are used to complete the work.
- B. Payment for Utility Replacement and Restoration Force Account shall be made for all tools, equipment, labor and materials.

1.36 ITEMS B7-FURNISH AND INSTALL 10-INCH BLINDE FLANGE WITH 2-INCH FLUSHING ASSEMBLY

- A. Measurement of Furnish and Install 10-Inch Blind Flange with 2-Inch Flushing Assembly shall be by each assembly installed.
- B. Payment for Furnish and Install 10-Inch Blinde Flange with 2-Inch Flushing Assembly shall by the unit price per each named in the proposal, which price shall constitute full payment for all tools, equipment, materials, labor, and incidentals to complete this work as specified and shown on the plans.

Part 2 **PRODUCTS (NOT USED)**

Part 3 **EXECUTION (NOT USED)**

END OF SECTION

**SECTION - 01060
REGULATORY REQUIREMENTS**

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section describes the Contract applicable permits and easements. As shown in the vicinity map on the Contract Plans, work will occur within unincorporated Skagit County.

1.2 PERMITS

- A. Keep fully informed of all local ordinances, as well as state and federal laws, which in any manner affect the work herein specified. At all times comply with said ordinances, laws, and regulations, and protect and indemnify the OWNER and its officers and agents against any claim or liability arising from or based on the violation of such laws, ordinances, or regulations. Secure and pay for all permits, licenses, and inspection fees necessary for prosecution and completion of the work unless otherwise specified.
- B. Permits:
1. OWNER will provide and pay all fees for the permits shown in Appendix A. When applicable, the General Stormwater permit will be transferred into the Contractor's name after the contract is executed, all other permits will remain in the OWNER's name.
 2. Comply with all conditions attached to applicable federal, state, and local permits
 3. Obtain all other permits, not provided by the OWNER
 4. Copies of the issued permits are included in Appendix A
- C. Terms and conditions of the permits obtained by the OWNER prior to bid submittal are included in Appendix A. Comply with all applicable terms and conditions contained in such permits.
- D. Anticipated terms and conditions of permits not secured prior to bid submittal which are to be obtained by the OWNER are included in the specifications.

1.3 EASEMENTS

- A. The OWNER has or will obtain easements for portions of the work as required. These easement limits are shown on the Drawings. Copies of all easements are included in Appendix B. Easements provide for the use of private property for construction purposes or for access during construction to the extent indicated in the easements. It shall be the CONTRACTOR's responsibility to:
1. Determine the limitations in the easement obtained in every case and to abide by all requirements and provisions of the easement.
 2. Confine construction operations to within the easement limits or street right-of-way limits or make special arrangements with the property owner and appropriate public agency for the additional area required.
 3. Pay for any property use outside the prescribed limits and easements provided for in the Contract Documents.
 4. Repair to an equal to or better condition any property damaged either inside or outside the limits of the easements.
 5. Remove, protect, and reinstall all fences, mailboxes, paving, utilities or other items encountered on public or private property.
 6. If the CONTRACTOR makes "special arrangements" with property owner, then the CONTRACTOR shall inform the OWNER of these arrangements and provide written documents.
 7. CONTRACTOR may negotiate with the adjacent property owner if additional easements are required.
- B. CONTRACTOR shall comply with all applicable terms and conditions contained in such easements and additional easements that the CONTRACTOR may acquire.

1.4 PERMITS AND EASEMENTS OBTAINED AFTER BID SUBMITTAL

- A. If, after the bid submittal date, the OWNER obtains any permits or easements which require changes to the work hereunder and thereby cause an increase or decrease in the cost of, or the time required for, the performance of the work, submit information sufficient for the OWNER to determine the extent of the effects on the cost and/or schedule. If the OWNER agrees the cost and/or schedule will be affected by such changes, such effects will be handled in accordance with the General Conditions. The OWNER will provide CONTRACTOR with a copy of any such permits or easements. The CONTRACTOR shall comply with all applicable terms and conditions contained in such permits or easements.

1.5 PERMITS OBTAINED BY THE CONTRACTOR

- A. Electrical Permit for fiber optic communications conduit/ducts.
- B. Asbestos Abatement Permit from the Northwest Clean Air Agency

1.6 EASEMENTS AND AGREEMENTS TO BE OBTAINED BY THE CONTRACTOR

- A. Obtain all other easements, permits and agreements required to perform the work. Prepare and submit to the proper authority all information required for the issuance of such easements, permits and agreements and pay all costs thereof, including agency inspections unless specifically provided otherwise in these Contract Documents. Submit a copy of each such easement, permit and agreement to the OWNER.

1.7 POSTING PERMITS AND EASEMENTS

- A. Post permits at the site of the work if required.

1.8 HOURS OF WORK

- A. Comply with Section 01313 - Construction and Schedule Constraints.

1.9 LICENSES

- A. The CONTRACTOR is responsible for obtaining all required licenses including all required Business License(s).

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



Owner Release Form

To: _____

We (I), the undersigned, hereby acknowledge that _____
Contractor, has satisfactorily restored the surface of the property owned by us (me) upon, or
under which said contractor has performed work pursuant to contract with the _____

(Owner)

(Owner)

Address: _____

Date: _____ 2019

Attachment A

PUD No. 1 of Skagit County
Permits/Approvals

Attachment A

Public Utility District No. 1 of Skagit County McLean Road, Wall Street to Best Road, Phase II and Daisy Lane Stream Crossing Permits/Approvals					
Agency/Jurisdiction	Permit Name	Submitted	Permit #	Status⁽¹⁾	Issued Date ⁽²⁾
McLean Road					
State Environmental Policy Act (SEPA)	Determination of Non-significance		DNS	Issued	4/2/19
WDFW	Hydraulic Project Approval (HPA)		HPA 2018-4-816+01	Approved	5/28/19
A DAHP	NO SEPA Comments; Use IDP		2018-04-02851	Concur	7/2/18
Skagit County	Critical Areas Review		PL18-0136	Approved	3/19/18
Daisy Lane					
State Environmental Policy Act (SEPA)	Mitigated Determination of Non-significance		MDNS	Issued	12/5//18
WDFW	Hydraulic Project Approval (HPA)		HPA 2019-4-161+01	Approved	3/19/19
A DAHP	NO SEPA Comments; Use IDP		N/A	N/A	N/A
Skagit County	Critical Areas Review		PL18-0561	Approved	3/19/19

SECTION - 01070
ABBREVIATIONS OF INSTITUTIONS

PART 1 GENERAL

1.1 GENERAL

- A. Wherever in these Specifications references are made to the standards, specifications, or other published data of the various international, national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these Specifications, the following acronyms or abbreviations which may appear in these Specifications shall have the meanings indicated herein.

1.2 ABBREVIATIONS

AAMA	Architectural Aluminum Manufacturer's Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute, Inc.
API	American Petroleum Institute
APWA	American Public Works Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASQC	American Society for Quality Control
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
BBC	Basic Building Code, Building Officials and Code Administrators International
BNSF	Burlington Northern Santa Fe Railroad
BPA	Bonneville Power Administration
CRSI	Concrete Reinforcing Steel Institute
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
EPA	Environmental Protection Agency
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
ISA	Instrument Society of America
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
MSS	Manufacturers Standardization Society
NAAMM	National Association of Architectural Metal Manufacturer's
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NCCLS	National Committee for Clinical Laboratory Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PPI	Plastic Pipe Institute
PUD	Public Utility District No. 1
RWMA	Resistance Welder Manufacturer's Association

SAE	Society of Automotive Engineers
SAMA	Scientific Apparatus Makers Association
SMA	Screen Manufacturers Association
SPFA	Steel Plate Fabricators Association
SPR	Simplified Practice Recommendation
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
UPRR	Union Pacific Railroad
WCRSI	Western Concrete Reinforcing Steel Institute
WISHA	Washington Industrial Safety and Health Administration
WRI	Wire Reinforcement Institute, Inc.

Other acronyms or abbreviations may appear and shall be determined by the context in which they are used.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION - 01090
REFERENCE STANDARDS

PART 1 GENERAL

1.1 GENERAL

- A. **Titles of Sections and Paragraphs:** Captions accompanying specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.
- B. **Applicable Publications:** Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the WORK is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.
- C. **Specialists, Assignments:** In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the CONTRACTOR has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the WORK; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the CONTRACTOR.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of other requirements of the Specifications, all work specified herein shall conform to or exceed the requirements of applicable codes and the applicable requirements of the following documents.
- B. References herein to "Building Code" or "Uniform Building Code" shall mean Uniform Building Code of the International Conference of Building Officials (ICBO). Similarly, references to "Mechanical Code" or "Uniform Mechanical Code," "Plumbing Code" or "Uniform Plumbing Code," "Fire Code" or "Uniform Fire Code," shall mean Uniform Mechanical Code, Uniform Plumbing Code and Uniform Fire Code of the International Conference of the Building Officials (ICBO). "Electric Code" or "National Electric Code (NEC)" shall mean the National Electric Code of the National Fire Protection Association (NFPA). The latest edition of the codes as approved by the Municipal Code and used by the local agency as of the date that the WORK is advertised for bids, as adopted by the agency having jurisdiction, shall apply to the WORK herein, including all addenda, modifications, amendments, or other lawful changes thereto.
- C. In case of conflict between codes, reference standards, drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the OWNER for clarification and directions prior to ordering or providing any materials or furnishing labor. The CONTRACTOR shall bid for the most stringent requirements.
- D. The CONTRACTOR shall construct the WORK specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein.

- E. **Applicable Standard Specifications:** References in the Contract Documents to "Standard Specifications" shall mean the Standard Specifications for Road, Bridge, and Municipal Construction of the Washington State Department of Transportation and Washington State Chapter of American Public Works Association, 2012 edition, which applicable parts are incorporated herein and made a part of these Documents by specific reference thereto. If requirements contained in the Standard Specifications are modified by or are in conflict with supplemental information in these Contract Documents, the requirements of these Contract Documents shall prevail.
- F. References herein to "OSHA Regulations for Construction" shall mean **Title 29, Part 1926, Construction Safety and Health Regulations**, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
- G. References herein to "OSHA Standards" shall mean **Title 29, Part 1910, Occupational Safety and Health Standards**, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
- H. References herein to "WISHA Standards" shall mean **Chapter 296 - 24 WAC, General Safety and Health Standard**, State of Washington, Division of Industrial Safety and Health, (WISHA) including all changes and amendments thereto.
- I. References herein to "WISHA Standards for Construction" shall mean **Chapter 296 - 155 WAC, Safety Standards for Construction Work**, State of Washington, Division of Industrial Safety and Health, (WISHA) including all changes and amendments thereto.

1.3 REGULATIONS RELATED TO HAZARDOUS MATERIALS

- A. The CONTRACTOR is responsible that all work included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Federal, State, and Local Regulations governing the storage and conveyance of hazardous materials, including petroleum products.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

**SECTION - 01300
CONTRACTOR SUBMITTALS**

PART 1 GENERAL

1.1 GENERAL

- A. Wherever submittals are required hereunder, all such submittals by the CONTRACTOR shall be submitted to the OWNER.

1.2 DEFINITIONS

- A. Shop Drawings:
1. See General Conditions.
 2. Product data and samples are Shop Drawing information.
 3. Manufacturer Certification
- B. Miscellaneous Submittals:
1. Submittals other than Shop Drawings and O&M Manuals.
 2. Representative types of miscellaneous submittal items include but are not limited to:
 - a. Construction Stormwater Pollution Prevention Plan (SWPPP)
 - b. Spill Prevention Control and Countermeasure Plan
 - c. Accident Prevention Plan and Site Health and Site Specific Safety Plan
 - d. Instrumentation and control commissioning reports.
 - e. Warranties.
 - f. Construction photographs.

1.3 PRECONSTRUCTION CONFERENCE SUBMITTALS

- A. At the preconstruction conference referred to in Section 01010, Summary of Work, which shall be held within ten (10) days of Notice to Proceed, the CONTRACTOR shall submit the following items to the OWNER for review:
1. A preliminary schedule of Shop Drawings, Samples, and proposed Substitute ("Or-Equal") requests.
 2. A list of all submittals that will be prepared and a schedule for submission to the OWNER.
 3. A list of all permits and licenses the CONTRACTOR is obtaining per the requirements of these Contract Documents indicating the agency required to grant the permit, the expected date of submittal for the permit, and required date for receipt of the permit.
 4. A 30-day plan of operation in accordance with Section 01311 - Scheduling and Reporting.
 5. A Progress Schedule in accordance with Section 01311 - Scheduling and Reporting, which identifies critical activities to meet the project milestones.
 6. Erosion Control Plan for areas outside of the right-of-way and any alternative Traffic Control Plan.

1.4 PREPARATION OF SUBMITTALS

- A. General:
1. All submittals and all pages of all copies of a submittal shall be completely legible.
 2. Submittals which, in the Engineer's sole opinion, are illegible will be returned without review.
- B. Shop Drawings:
1. Wherever called for in the Contract Documents, or where required by the OWNER, the CONTRACTOR shall furnish to the OWNER for review, two copies, plus one reproducible copy, (When feasible an electronic copy may be substituted), of each shop drawing submittal. The term "Shop Drawings" as used herein shall be understood to include detailed design calculations, shop drawings, fabrication, and installation drawings, erection drawings, lists, graphs, catalog sheets, data sheets, and similar items. Whenever the CONTRACTOR is required to submit design calculations as part of a submittal, such calculations shall bear the signature and seal of an engineer registered in the appropriate branch in Washington State, unless otherwise directed.

2. All Shop Drawing submittals shall be accompanied by the OWNER's standard submittal transmittal form which is appended at the end of this section or the CONTRACTOR's standard transmittal form approved by the OWNER. Any submittal not accompanied by such a form, or where all applicable items on the form are not completed, will be returned for resubmittal.
3. Except as may otherwise be indicated herein, the OWNER will return prints of each submittal to the CONTRACTOR with its comments noted thereon, within 14 calendar days following their receipt by the OWNER. It is considered reasonable that the CONTRACTOR shall make a complete and acceptable submittal to the OWNER by the second submission of a submittal item. The OWNER reserves the right to withhold money due to the CONTRACTOR to cover additional costs of the submittal review beyond the second submittal. The OWNER'S maximum review period for each submittal, including all resubmittals, will be 14 days per submittal. In other words, for a submittal that requires two resubmittals before it is complete, the maximum review period for that submittal could be 28 days.
4. The OWNER's review of CONTRACTOR shop drawings submittals shall not relieve the CONTRACTOR of the entire responsibility for the correctness of details and dimensions. The CONTRACTOR shall assume all responsibility and risk for any misfits due to any errors in CONTRACTOR submittals. The CONTRACTOR shall be responsible for the dimensions and the design of adequate connections and details.
5. Numbering letter of transmittal:
 - a. Assign submittal numbers beginning with "001" and increasing sequentially with each additional transmittal.
6. Describing transmittal contents:
 - a. Provide listing of each component or item in submittal capable of receiving an independent review action.
 - b. Identify for each item:
 - 1) Manufacturer and Manufacturer's Drawing or data number.
 - 2) Contract Drawing Section or detail number if applicable.
 - 3) Specification Article/Paragraph number if applicable.
 - 4) Unique page numbers for each page of each separate item.
 - c. When submitting "or-equal" items that are not the products of named manufacturers, include the words "or-equal" in the item description.
7. Resubmittals:
 - a. Number with original root number and a suffix letter starting with "A" on a (new) duplicate transmittal form.
 - b. Do not increase the scope of any prior transmittal.
 - c. Account for all components of prior transmittal.
 - 1) If items in prior transmittal received "A" or "B" Action code, list them and indicate "A" or "B" as appropriate.
 - a) Do not include submittal information for items listed with prior "A" or "B" Action in resubmittal.
 - 2) Indicate "Outstanding-To Be Resubmitted at a Later Date" for any prior "C" or "D" Action item not included in resubmittal.
 - a) Obtain Engineer's approval to exclude items.
8. Contractor shall not use red color for marks on transmittals.
 - a. Duplicate all marks on all copies transmitted, and ensure marks are photocopy reproducible.
 - b. Outline Contractor marks on reproducible transparencies with a rectangular box.
9. Transmittal contents:
 - a. Coordinate and identify Shop Drawing contents so that all items can be easily verified by the Engineer.
 - b. Identify equipment or material use, Drawing detail reference, weight, and other Project specific information.
 - c. Provide sufficient information together with technical cuts and technical data to allow an evaluation to be made to determine that the item submitted is in compliance with the Contract Documents.
 - d. Submit items such as equipment brochures, cuts of fixtures, product data sheets or catalog sheets on 8½-x11-inch pages.

- 1) Indicate exact item or model and all options proposed.
- e. When a Shop Drawing submittal is called for in any Specification Section, include as appropriate, scaled details, sizes, dimensions, performance characteristics, capacities, test data, anchoring details, installation instructions, storage and handling instructions, color charts, layout Drawings, rough-in diagrams, wiring diagrams, controls, weights and other pertinent data in addition to information specifically stipulated in the Specification Section.
 - 1) Arrange data and performance information in format similar to that provided in Contract Documents.
 - 2) Provide, at minimum, the detail specified in the Contract Documents.
- f. If proposed equipment or materials deviate from the Contract Drawings or Specifications in any way, clearly note the deviation and justify the said deviation in detail in a separate letter immediately following transmittal sheet.

1.5 ENGINEER'S REVIEW ACTION

- A. Shop Drawings and Samples:
 - 1. Items within transmittals will be reviewed for overall design intent and will receive one of the following actions:
 - a. A - FURNISH AS SUBMITTED.
 - b. B - FURNISH AS NOTED.
 - c. C - REVISE AND RESUBMIT.
 - d. D - REJECTED.
 - e. E - ENGINEER'S REVIEW NOT REQUIRED.
 - 2. Submittals received will be initially reviewed to ascertain inclusion of Contractor's approval stamp.
 - a. Submittals not stamped by the Contractor or stamped with a stamp containing language other than that specified herein will not be reviewed for technical content and will be returned without any action.
 - 3. In relying on the representation on the Contractor's review and approval stamp, Owner and Engineer reserve the right to review and process poorly organized and poorly described submittals as follows:
 - a. Submittals transmitted with a description identifying a single item and found to contain multiple independent items:
 - 1) Review and approval will be limited to the single item described on the transmittal letter.
 - 2) Other items identified in the submittal will:
 - a) Not be logged as received by the Engineer.
 - b) Be removed from the submittal package and returned without review and comment to the Contractor for coordination, description and stamping.
 - c) Be submitted by the Contractor as a new series number, not as a re-submittal number.
 - b. Engineer, at Engineer's discretion, may revise the transmittal letter item list and descriptions, and conduct review.
 - 1) Unless Contractor notifies Engineer in writing that the Engineer's revision of the transmittal letter item list and descriptions was in error, Contractor's review and approval stamp will be deemed to have applied to the entire contents of the submittal package.
 - 4. Submittals returned with Action "A" or "B" are considered ready for fabrication and installation.
 - a. Three copies of said submittal will be returned to the Contractor.
 - b. If for any reason a submittal that has an "A" or "B" Action is resubmitted, it must be accompanied by a letter defining the changes that have been made and the reason for the resubmittal.
 - c. Destroy or conspicuously mark "SUPERSEDED" all documents having previously received "A" or "B" Action that are superseded by a resubmittal.
 - 5. Submittals with Action "A" or "B" combined with Action "C" (Revise and Resubmit) or "D" (Rejected) will be individually analyzed giving consideration as follows:
 - a. The portion of the submittal given "C" or "D" will not be distributed (unless previously agreed to otherwise at the Preconstruction Conference).
 - 1) One (1) copy or the one (1) transparency of the "C" or "D" Drawings will be marked up and returned to the Contractor.
 - a) Correct and resubmit items so marked.

- b. Items marked "A" or "B" will be fully distributed.
- c. If a portion of the items or system proposed are acceptable, however, the major part of the individual Drawings or documents are incomplete or require revision, the entire submittal may be given "C" or "D" Action.
 - 1) This is at the sole discretion of the Engineer.
 - 2) In this case, some Drawings may contain relatively few or no comments or the statement, "Resubmit to maintain a complete package."
 - 3) Distribution to the Owner and field will not be made (unless previously agreed to otherwise).
- 6. Failure to include any specific information specified under the submittal paragraphs of the Specifications will result in the submittal being returned to the Contractor with "C" or "D" Action.
- 7. Calculations required in individual Specification Sections will be received for information purposes only, as evidence calculations have been performed by individuals meeting specified qualifications, and will be returned stamped "E. Engineer's Review Not Required" to acknowledge receipt.
- 8. All costs associated with the Engineer's review of any Shop Drawing resubmitted more than once shall be borne by the Contractor with said costs being deducted from the Contract Price.
- 9. Transmittals of submittals which the Engineer considers as "Not Required" submittal information, which is supplemental to but not essential to prior submitted information, or items of information in a transmittal which have been reviewed and received "A" or "B" Action in a prior submittal, will be returned with Action "E. Engineer's Review Not Required."
- 10. Samples may be retained for comparison purposes.
 - a. Remove samples when directed.
 - b. Include in bid all costs of furnishing and removing samples.
- 11. Approved samples submitted or constructed, constitute criteria for judging completed work.
 - a. Finished work or items not equal to samples will be rejected.

1.6 SAMPLES

- A. Whenever in the Specifications samples are required, the CONTRACTOR shall submit not less than three samples of each item or material to the OWNER for acceptance at no additional cost to the OWNER.
- B. Samples, as required herein, shall be submitted for acceptance a minimum of 21 days prior to ordering such material for delivery to the jobsite, and shall be submitted in an orderly sequence so that dependent materials or equipment can be assembled and reviewed without causing delays in the WORK.
- C. All samples shall be individually and indelibly labeled or tagged, indicating thereon all specified physical characteristics and Manufacturer's name for identification and submitted to the OWNER for acceptance. Upon receiving acceptance of the OWNER, one set of the samples will be stamped and dated by the OWNER and returned to the CONTRACTOR, and one set of samples will be retained by the OWNER, and one set of samples shall remain at the job site until completion of the WORK.
- D. Unless indicated otherwise, all colors and textures of specified items presented in sample submittals shall be from the manufacturer's standard colors and standard materials, products, or equipment lines. If the samples represent non-standard colors, materials, products, or equipment lines and their selection will require an increase in contract time or price, the CONTRACTOR will clearly indicate same on the transmittal page of the submittal.

1.7 CONTRACTOR'S SCHEDULE SUBMITTAL

- A. See Section 01311 for CONTRACTOR's schedule submittal requirements.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



Contractor's Submittal Transmittal Form

For all contractor submittals, including shop drawings, samples calculation, data, or other

Date	Transmittal No.
------	-----------------

Project Name: Mclean Road, Wall Street to Best Road, Phase II and Daisy Lane Stream Crossing

Owner: Skagit PUD No. 1	Contractor:
-------------------------	-------------

Attention: Doug McConnell	Attention:
---------------------------	------------

Address: 1415 Freeway Drive PO Box 1436 Mount Vernon, WA 98273	Address:
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Action Legend: A – Furnish As Submitted B – Furnish As Noted C – Revise and Resubmit D – Rejected E – Engineer’s Review Not Required	This is: Check one <input type="checkbox"/> an original submittal <input type="checkbox"/> a 2nd submittal <input type="checkbox"/> a ____ submittal
--	--

Item No.	Description	Spec Section or Drawing No.	Action Taken

District Reviewer:

Contractor to complete either (a) or (b), following:

- (a) We have verified that the materials or equipment contained in this submittal meets all the requirements specified or shown (no exceptions)
- (b) We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown, except for the following deviations (List Deviations):

Contractor's Authorized Representative _____

SECTION - 01311

SCHEDULING AND REPORTING

PART 1 GENERAL

1.1 GENERAL

- A. The scheduling of the WORK under the Contract shall be performed by the CONTRACTOR in accordance with the requirements of this section. Where submittals are required hereunder, the CONTRACTOR shall submit four copies of each submittal item.
- B. Scheduling terms and practices shall conform to the standards established in "Construction Planning and Scheduling, Second Edition", published by the Associated General Contractors of America. Except for weekly look-ahead schedules, all schedules shall meet these general requirements and provide the following information:
 - 1. Include all activities necessary to physically complete the project.
 - 2. Show the planned order of WORK activities in a logical sequence.
 - 3. Show durations of WORK activities in working days.
 - 4. Show activity durations that are reasonable for the intended WORK.
 - 5. Show activity durations in sufficient detail to evaluate progress of individual activities on a daily basis.
 - 6. Show the completion of all work within the authorized contract time.

1.2 SCHEDULE SUBMITTALS

- A. The CONTRACTOR shall submit a schedule document at the Preconstruction Conference which shall serve as the CONTRACTOR's Plan of Operation for the initial 30-day period of the Contract Time and to identify the manner in which the CONTRACTOR intends to complete all work within the Contract Time. The CONTRACTOR shall submit a 30 day Plan of Operation bar chart for all work as indicated below. The schedule documents shall reflect the Construction and Schedule Constraints identified in Section 01313.
 - 1. **30-Day Plan of Operation:** During the initial 30 days of the Contract Time, the CONTRACTOR shall conduct Contract operations in accordance with the 30-day bar chart Plan of Operation. The bar chart so prepared and submitted shall show the accomplishment of the CONTRACTOR's early activities (mobilization, permits, submittals necessary for early material and equipment procurement, submittals necessary for long lead equipment procurement, initial site work and other submittals and activities required in the first 30 days).

1.3 CHANGE ORDERS

- A. Upon approval of a change order, or upon receipt by the CONTRACTOR of authorization to proceed with additional work, the change shall be reflected in the next submittal of the schedule by the CONTRACTOR.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

**SECTION - 01313
CONSTRUCTION AND SCHEDULE CONSTRAINTS**

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section identifies constraints on the construction schedule imposed by permits, environmental regulation, and other agency requirements. The CONTRACTOR is expected to use this information in preparing construction schedules. The purpose of this section is to ensure adequate planning and performance of the work by the CONTRACTOR in compliance with permits and other regulatory constraints.

1.2 SUBMITTALS

- A. Submittals for this section shall be in accordance with Section 01300 and Section 01311 of these Specifications.
- B. Construction schedule shall clearly show restricted portions of the project with respect to time and hours of work.

1.3 RELATED SECTIONS

- A. Section 01060 – Regulatory Requirements.
- B. Section 01311 – Scheduling and Reporting.

1.4 SCHEDULE CONSTRAINTS

- A. Some permits have specific restrictions on construction timing, work hours and type of construction activity allowed. The CONTRACTOR shall abide by all restrictions imposed by these permits.
- B. Refer to Permissible Construction Windows shown on the plan and profile drawings for schedule constraints. The Contractor shall note that many upland areas between wetland areas and/or stream crossings are also subject to schedule constraints.
- C. The CONTRACTOR shall prepare a construction schedule, which incorporates the schedule information shown on the drawings and in Table 1 at the end of this section. These constraints have been identified here for the convenience of the CONTRACTOR. However, all schedule constraints identified in permits, regulations, or elsewhere in the Specifications or Drawings shall be incorporated into the CONTRACTOR's schedule, whether included in Table 1 or not.
- D. The CONTRACTOR shall attend meetings with affected property owners to coordinate work activities.

1.5 PROPERTY CONSTRAINTS

- A. **Landowner Coordination Meetings:** The CONTRACTOR shall be available for periodic construction coordination meetings with landowners as the CONTRACTOR proceeds with work along the pipeline alignment. These meetings will ensure the proper coordination of protection for structures and utilities, temporary utility shutdowns (if necessary), traffic control, safety, minimizing impacts to business operations, etc.

1.6 TRAFFIC CONTROL CONSTRAINTS

A. Working hours for the project shall be from Table 1 at end of section.

1.7 PIPELINE SHUTDOWN CONSTRAINTS

- A. The interconnection to the existing pipelines will be completed during a shutdown of no more than 12 hours. Provide 3 Working Day Notice to the OWNER prior to start of any shutdown requirements.
- B. All connections to existing pipelines will be submitted to the OWNER for review as part of the submittal process, and they are required to include details regarding the shutdown timing.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

TABLE 1. CONSTRUCTION TIMING CONSTRAINTS SUMMARY		
Location/ Jurisdiction⁽¹⁾	Activity	Constraints⁽²⁾
Skagit County	Construction Hours	<ul style="list-style-type: none"> • 7 AM to 9 PM, Monday through Friday • 8 AM to 9 PM, Saturday and Sunday • To work outside of normal hours, a request must be submitted to the County. The County Official will review and issue written approval (administrative process).
Skagit County PUD No. 1	Connection to Existing Pipeline	<ul style="list-style-type: none"> • Provide 3 Working Days' Notice prior to start of work
Notes: (1) Per locations noted on plan/profile drawings. (2) Unless otherwise noted, a time period is when construction can occur. If there is a conflict between permits/approvals, the more restrictive constraint will apply.		

END OF SECTION

SECTION - 01350
SAFE WORKPLACE

PART 1 GENERAL

1.1 GENERAL

- A. CONTRACTOR warrants that before starting the job, it will develop and furnish the District with a copy of its written Accident Prevention Program (APP) and a site specific Health and Safety Plan (HSP), which identifies anticipated job safety hazards within the scope of its contract and for all phases of its contract and which addresses the specific means it will use to address each hazard. CONTRACTOR warrants that it's APP and HSP conforms to the requirements of the Washington Industrial Safety and Health Act. CONTRACTOR warrants it will ensure that its employees follow all APPs, HSPs and work rules. CONTRACTOR warrants that it will communicate all work rules to its employees and that it has a progressive disciplinary plan for safety or work rule violations which it consistently enforces and will continue to enforce throughout the length of this contract, no matter who discovers the violation. CONTRACTOR warrants that it will select and furnish to its employees all appropriate safety equipment and participate fully in coordination of all safety issues among all CONTRACTORs and SUBCONTRACTORs on the job. CONTRACTOR warrants that it will make its APP and HSP available and accessible at the site to all of its employees. CONTRACTOR agrees that it will have available in its job file weekly documentation relating to CONTRACTOR's safety compliance, identification of hazards or safety violations, actions taken to correct them, disciplinary action taken and safety training undertaken. CONTRACTOR warrants that it will provide safety training on a regular basis to all workers as required by WISHA, will conduct safety inspections as required by WISHA and will report all identified hazards. CONTRACTOR warrants and agrees that it and each of its employees will comply with all rules and regulations relating to safety, including but not limited to, the WISHA regulations. CONTRACTOR agrees to undertake any abatement actions required as a result of the discovery of violations. CONTRACTOR warrants and agrees to require each SUBCONTRACTOR to have its own APP and site specific HSP.

1.2 PLAN SUBMITTALS

- A. A written Accident Prevention Program (APP) and a site specific Health and Safety (HSP) Plan for the CONTRACTOR and each SUBCONTRACTOR which identifies anticipated job safety hazards within the scope of CONTRACTOR's and SUBCONTRACTOR's work for all phases of the CONTRACT, including the specific means used to address each hazard prior to starting the job. The APP and HSP must conform to the requirements of the Washington Industrial Safety and Health Act (WISHA). A copy of both the APP and the HSP shall be furnished prior to starting the job.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

- A. CONTRACTOR and all SUBCONTRACTORs shall:
- a. Select all appropriate safety equipment required to do the job and furnish it to workers.
 - b. Participate in coordination of all safety issues among all contractors on the job.
 - c. Make your APP and HSP available and accessible to your workers at the site.
 - d. Communicate to all workers the work rules and abide by said rules. Implement a progressive disciplinary plan for safety or work rule violations which is consistently enforced, no matter who discovers the violations.
 - e. Provide weekly documentation relating to your safety compliance, identification of hazards or safety violations, actions taken to correct them, disciplinary action taken and safety training undertaken.
 - f. Provide safety training on a regular basis to all workers as required by WISHA.
 - g. Conduct safety inspections as required by WISHA and report all identified hazards.

END OF SECTION

SECTION - 01400
QUALITY CONTROL

PART 1 GENERAL

1.1 DEFINITION

- A. Specific quality control requirements for the Work are indicated throughout the Contract Documents. The requirements of this Section are primarily related to performance of the Work beyond furnishing of manufactured products. The term "Quality Control" includes inspection, sampling and testing, and associated requirements.

1.2 INSPECTION AT PLACE OF MANUFACTURE

- A. Unless otherwise indicated, all products, materials, and equipment shall be subject to inspection by the OWNER at the place of manufacture at the OWNER's leisure.
- B. The presence or absence of the OWNER at the place of manufacture, however, shall not relieve the CONTRACTOR of the responsibility for furnishing products, materials, and equipment which comply with all requirements of the Contract Documents. Compliance is a duty of the CONTRACTOR, and said duty shall not be avoided by any act or omission on the part of the OWNER.

1.3 SAMPLING AND TESTING

- A. Unless otherwise indicated, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered; however, the OWNER reserves the right to use any generally-accepted system of sampling and testing which, in the opinion of the OWNER will ensure the OWNER that the quality of the workmanship is in full accord with the Contract Documents.
- B. Any waiver by the OWNER of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial Work, shall not be construed as a waiver of any requirements of the Contract Documents.
- C. Notwithstanding the existence of such waiver, the OWNER reserves the right to make independent investigations and tests, and failure of any portion of the Work to meet any of the requirements of the Contract Documents, shall be reasonable cause for the OWNER to require the removal or correction and reconstruction of any such work in accordance with the General Provisions.

1.4 INSPECTION AND TESTING LABORATORY SERVICE

- A. Inspection and testing laboratory service shall comply with the following:
 - 1. OWNER will appoint, employ, and pay for services of an independent firm to perform inspection and testing or will perform inspection and testing itself.
 - 2. The OWNER or independent firm will perform inspections, testing, and other services specified in individual specification sections and as required by the OWNER.
 - 3. Reports will be submitted by the independent firm to the OWNER in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
 - 4. The CONTRACTOR shall cooperate with the OWNER or independent firm and furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
 - 5. The CONTRACTOR shall notify OWNER 24 hours prior to the expected time for operations requiring inspection and laboratory testing services.

6. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the OWNER. The CONTRACTOR shall bear all costs for such retesting at no additional cost to the OWNER.
7. For samples and tests required for CONTRACTOR's use, the CONTRACTOR shall make arrangements with an independent firm for payment and scheduling of testing. The cost of sampling and testing for the CONTRACTOR's use shall be included in the Contract Price.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 INSTALLATION

- A. **Inspection:** The CONTRACTOR shall inspect materials or equipment upon the arrival on the jobsite and immediately prior to installation, and reject damaged and defective items.
- B. **Measurements:** The CONTRACTOR shall verify measurements and dimensions of the Work, as an integral step of starting each installation.
- C. **Manufacturer's Instructions:** Where installations include manufactured products, the CONTRACTOR shall comply with manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than applicable requirements indicated in Contract Documents.

END OF SECTION

**SECTION - 01505
MOBILIZATION**

PART 1 GENERAL

1.1 GENERAL

- A. Mobilization shall include the obtaining of all permits; moving onto the site of all equipment; furnishing and erecting plants, temporary buildings, and other construction facilities; and implementing security requirements; all as required for the proper performance and completion of the Work. Mobilization shall include the following principal items:
1. Moving on to the site of all CONTRACTOR's plant and equipment required for first month operations.
 2. Submittals for ordering long lead time materials and major equipment within ten (10) days of Notice to Proceed.
 3. Installing temporary construction power, wiring, and lighting facilities.
 4. Developing construction water supply.
 5. Providing all on-site communication facilities, including telephones.
 6. Providing on-site sanitary facilities and potable water facilities.
 7. Arranging for and erection of CONTRACTOR's work and storage yard.
 8. Obtaining all required permits.
 9. Having all OSHA required notices and establishment of safety programs.
 10. Having the CONTRACTOR's superintendent at the job site full time.
 11. Preparation and submitting of initial submittals
 12. Preparation of SWPPP, SPCC, APP, and Site Health and Site Specific Safety Plan
- B. Mobilization shall include demobilization of all equipment and facilities from the site and the restoration thereof.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

**SECTION - 01550
SITE ACCESS AND STORAGE**

PART 1 GENERAL

1.1 HIGHWAY LIMITATIONS

- A. The CONTRACTOR shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the Work. It shall be the CONTRACTOR's responsibility to construct and maintain any haul roads required for its construction operations.

1.2 TEMPORARY CROSSINGS

- A. **Temporary Bridges:** Wherever necessary, the CONTRACTOR shall provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the CONTRACTOR shall secure the written consent of the individuals or authorities concerned to omit such temporary bridges or steel plates, which written consent shall be delivered to the OWNER prior to excavation. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation. Temporary bridges or steel plates for street crossing shall conform to the requirements of the authority having jurisdiction in each case, and the CONTRACTOR shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required.
- B. **Street Use:** Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street or parking area during the performance of the Work hereunder, and it shall so conduct its operations as not to interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, or parking areas. Fire hydrants on or adjacent to the Work shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the CONTRACTOR to assure the use of sidewalks and the proper functioning of all gutters, storm drain inlets, and other drainage facilities.
- C. The CONTRACTOR shall take all necessary precautions for the protection of the WORK and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. All signs, signals, and barricades shall conform to the requirements of Subpart G, Part 1926, of the OSHA Safety and Health Standards for Construction.
- D. The CONTRACTOR shall remove traffic control devices when no longer needed, repair all damage caused by installation of the devices, and shall remove post settings and backfill the resulting holes to match grade.

1.3 PIPE AND MATERIAL STORAGE

- A. The CONTRACTOR shall not string pipe nor stockpile imported earth materials on streets or in places which interfere with vehicular traffic.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

**SECTION - 01560
ENVIRONMENTAL CONTROLS**

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section specifies temporary environmental controls required to be maintained during construction in addition to Section 02270 – Erosion and Sediment Control.
- B. The CONTRACTOR shall prepare a Spill Prevention, Control and Countermeasures Plan (SPCC) in conformance with Section 1-07.15(1) of the Standard Specifications.

1.2 SUBMITTALS

- A. SPCC Plan in conformance with Section 1-07.15(1) of the Standard Specifications.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 TEMPORARY DAMS

- A. Except in time of emergency, earth dams are not acceptable at catch basin openings, local depressions, or elsewhere. Temporary dams of sand bags, asphaltic concrete, or other acceptable material will be permitted when necessary to protect the work, provided their use does not create a hazard or nuisance to the public. Such dams shall be removed from the site as soon as they are no longer necessary.

3.2 AIR POLLUTION CONTROL

- A. The CONTRACTOR shall not discharge smoke, dust, and other contaminants into the atmosphere that violate the regulations of legally constituted authorities. Minimize dust nuisance by cleaning, sweeping, and sprinkling with water, or other means. The use of water, in amounts resulting in mud on public streets, is not acceptable as a substitute for sweeping or other methods.

3.3 NOISE CONTROL

- A. The CONTRACTOR shall perform all work in compliance with the local jurisdiction's Noise Ordinance, except where additional restrictions are applicable. The CONTRACTOR shall schedule noisy operations to minimize their duration.
- B. The CONTRACTOR shall use whatever means necessary to comply with the Noise Ordinance. The CONTRACTOR shall be responsible for all costs necessary to reduce noise levels to those specified in the Noise Ordinance or to obtain a variance from the specific levels.
- C. The CONTRACTOR shall provide the following noise abatement equipment or operate construction equipment in the following manner so as to avoid exceeding noise limitations:
 - 1. Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.
 - 2. Equipment that cannot meet the noise levels specified under the local Noise Ordinance shall be quieted by use of improved exhaust mufflers or other means.
 - 3. Noisy portable equipment, such as generators, compressors or pumps shall be located as far away from sensitive noise receptor areas as practicable. (Noise sensitive receptors include residences.)

4. Noise barriers shall be constructed around stationary construction equipment which has to be utilized at locations near sensitive noise receptors.
5. Idling equipment shall be shut off when not in active use.

3.4 WATER AND EROSION CONTROL

- A. **Temporary Drainage:** Conform to the regulations and requirements of legally authorized surface water management agencies.
- B. Keep trenches and areas of excavations free from water as required to permit continuous progress of, or to prevent damage to, the work or the work of others.
- C. Discharge dewatering waters and runoff or other waters collected in or intercepted by excavations under the work of this Contract in conformance with all permits. The CONTRACTOR must obtain approval from the appropriate local sewer authority or drainage authority, in writing, for any discharge to local sewers. The CONTRACTOR's operations shall be conducted in such a manner as to prevent sediment from reaching the storm drains and surface waters.
- D. Prevent solids or turbid runoff from entering waterways. No dirt, sediments, cement leachate or other material harmful to fish shall enter fish bearing waters. Cover and secure excavated area, spoils piles and imported or stored fill materials. Cut and cover techniques, storm drains filter socks, straw bales around construction sites, silt fencing and similar erosion control measures shall be employed as required to prevent contamination of local waterways.
- E. Erosion control measures shall be in accordance with Section 02270 – Erosion and Sediment Control Drawings and general notes, and shall be installed prior to excavation, clearing or grading activities.

3.5 PROGRESS CLEANING AND SITE MAINTENANCE

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove waste materials, debris and rubbish from the site immediately upon such materials becoming unfit for use in the work. In the event this material is not removed, the OWNER reserves the right to have the material removed and the expense charged to the CONTRACTOR.
- C. Prevent dirt and dust from escaping trucks departing the site by covering dusty loads, washing truck tires before leaving the site, or other methods as applicable.
- D. The CONTRACTOR is responsible for controlling dust and mud within the project limits. All streets outside the project limits used by the CONTRACTOR during the execution of this Contract shall be kept clean. The CONTRACTOR shall use watering trucks equipped with high-velocity water jets and low-head sprinkling devices, power sweepers, and any other pieces of equipment necessary to render the streets free of all mud, debris, and foreign materials. Any damage caused by dust or mud accumulation on the streets and in the storm drain system shall be the sole responsibility of the CONTRACTOR.
- E. Watering trucks may be used on paved streets with an adequate storm drainage system. Watering trucks shall not be used on streets where, in the opinion of the OWNER, mud could be created, causing a nuisance. Where water flushing is not allowed, street sweepers (not power brooms) shall be used.
- F. Sweep or flush all surface roadways upon completion of each day's activities. Equipment required for this operation shall be on the job site or available at all times. Failure to have this equipment on the job site or available may necessitate a shutdown of the project.
- G. Clean all roadways, streets, and appurtenances, including sidewalks and paths which are open for public use, of all material or debris which has been dropped or otherwise deposited thereon, as a result of

CONTRACTOR on- and off-site operations, at the conclusion of each working day, and at such other times as deemed necessary by the OWNER to ensure the safety of the traveling public and to prevent inconvenience to the public and owners of private property adjacent to the project.

- H. Any violation of the above requirements will be sufficient grounds for the OWNER to order the roadways, streets and appurtenances cleaned or sprinkled by others, and to deduct all costs of such cleaning or sprinkling from any money due, or to become due to the CONTRACTOR.

3.6 TREE AND PLANT PROTECTION

- A. Protect existing trees as directed by the OWNER. The CONTRACTOR shall be responsible for restoration of trees and plants damaged by the CONTRACTOR's operation or damaged as a result of insufficient or improper protection, as determined by the OWNER.

3.7 OIL SPILL PREVENTION AND CONTROL

- A. **Regulations:** The CONTRACTOR is advised that discharge of oil from equipment or facilities into state waters or onto adjacent land is not permitted under Washington State water quality regulations.
- B. **Responsibility:** The CONTRACTOR shall be responsible for prevention, containment, and cleanup of spilling of oil, fuel and other petroleum products used in the CONTRACTOR's operations. All such prevention, containment and cleanup costs shall be borne by the CONTRACTOR. The CONTRACTOR shall, at a minimum, take the following measures regarding oil spill prevention, containment and cleanup.
- C. **Minimum Precautions:**
1. Fuel hoses, lubrication equipment, hydraulically operated equipment, oil drums, and other equipment and facilities shall be inspected regularly for drips, leaks, or signs of damage, and shall be maintained and stored properly to prevent spills. Proper security shall be maintained to discourage vandalism.
 2. All land-based oil and products storage tanks shall be diked or located so as to prevent spills from escaping to the water. Diking and subsoils shall be lined with impervious material to prevent oil from seeping through the ground and dikes.
 3. All visible floating oils shall be immediately contained with booms, dikes, or other appropriate means and removed from the water prior to discharge into state waters. All visible oils on land shall be immediately contained using dikes, straw bales, or other appropriate means and removed using sand, ground clay, sawdust, or other absorbent material, which shall then be properly disposed of by the CONTRACTOR.
 4. In the event of any oil or product discharges into public waters, or onto land with a potential for entry into public waters, the CONTRACTOR shall immediately notify the following agencies at their listed 24-hour response numbers:
 - a. Washington DOE Northwest Regional Office, Telephone No. (425) 649-7000.
 - b. U.S. Coast Guard Telephone No. (206) 217-6232.
 - c. Maintain on the job site, in the vicinity of ongoing work, the following spill response and containment materials:
 - 1) Oil-absorbent booms: minimum four (4) each, five (5) feet long.
 - 2) Oil-absorbent pads or bulk material, adequate for coverage of 200 square feet of surface area, minimum.
 - 3) Straw bales.
 - 4) Dry all.
 - 5) Gloves.
 - 6) Plastic bags.

3.8 CULTURAL RESOURCES FINDINGS

A. References:

1. The CONTRACTOR shall adhere to the National Historic Preservation Act of 1966 and 36 CFR 800 which provide for the preservation of potential historical architectural, archaeological, or cultural resources (hereinafter called "cultural resources").
2. The CONTRACTOR shall conform to the applicable requirements of the National Historical Preservation Act of 1966 as it relates to the preservation of cultural resources and fair compensation to the CONTRACTOR for delays resulting from such cultural resources investigations.

B. Findings Procedures:

1. Attached in Appendix D is a copy of the Districts Inadvertent Discovery Plan. In the event of such a discovery the Contractor shall comply with the plan.

END OF SECTION

**SECTION - 01570
TRAFFIC CONTROL**

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. This section specifies furnishing, erecting, and maintaining, per the Approved Traffic Control Plans; temporary barricades, signs, flaggers, off duty police officers, lights, road surfaces, detours and other safeguards necessary to protect life, health and safety of the public and workers during performance of the work.
- B. Single lane, two-way traffic with flaggers may be used for project areas during normal work hours for road side work, shoulder construction and delivery of materials.
- C. Access to residences and businesses shall also be maintained. Temporary closure of driveways shall be minimized. Full driveway access shall be restored after work hours.
- D. Coordination of advanced notice to traveling public and adjacent residents and business shall be the responsibility of the CONTRACTOR.
- E. Furnishing, installing, programing, and maintaining Portable Changeable Message Signs.

1.2 CONTRACTOR RESPONSIBILITY

- A. The traffic control plan or plans appearing in the contract documents show a method of handling traffic. All flaggers are to be shown on the traffic control plan except for emergency situations. The CONTRACTOR shall designate and adopt in writing the specific traffic control plan or plans required for their method of performing the work. If the CONTRACTOR's methods differ from the contract traffic control plan(s), the CONTRACTOR shall propose modification of the traffic control plan(s) by showing the necessary construction signs, flaggers, and other traffic control devices required for the project. The CONTRACTOR's modified traffic control plan(s) shall be in accordance with the established standards for plan development as shown in the MUTCD, Part VI. The CONTRACTOR's letter designating and adopting the specific traffic control plan(s) or any proposed modified plan(s) shall be submitted to the OWNER for approval at least 30 calendar days in advance of the time the signs and other traffic control devices will be required. The CONTRACTOR shall be solely responsible for providing copies of the approved Traffic Control Plans to the Traffic Control Supervisor and jurisdictions.
- B. The OWNER will grant to the CONTRACTOR all traffic right-of-way and road crossing permits from the appropriate jurisdiction to accomplish the work.
- C. The CONTRACTOR and his surety shall be liable for injuries and damages to persons and property suffered by reason of the CONTRACTOR's operations or negligence.
- D. When ordered by the Engineer, the CONTRACTOR shall provide advanced notice of work through the use of Portable Changeable Message Signs (PCMS). Advance notice signs shall be placed 10 days in advance of commencement of earthwork or other operations requiring long duration lane closures. Advanced notice time shall include 2 consecutive weekends.
- E. Provide a Traffic Control Supervisor in accordance with Section 1-10.2(1)B of the Standard Specifications for the duration of the time when traffic control signs, devices, or flaggers and spotters are in use.

1.3 OWNER'S AUTHORITY

- A. If the CONTRACTOR fails or refuses to provide and maintain all traffic controls required by the Contract Documents or ordered by the OWNER, the OWNER may:
 - 1. Suspend all work without further notice to the CONTRACTOR or the CONTRACTOR's surety until the CONTRACTOR complies with requirements.
 - 2. At the CONTRACTOR's expense immediately obtain the services of a uniformed police officer.
 - 3. At the CONTRACTOR's expense provide, erect, maintain, and remove required traffic control devices.
- B. The OWNER will deduct all related costs from any payments due or coming due to the CONTRACTOR.
- C. If the CONTRACTOR fails or refused to complete and furnish Contractor's Daily Report of Traffic Control –Traffic Control Log and Contractor's Daily Report of Traffic Control – Summary, the OWNER shall engage a third party to complete the reports and deduct any excess cost over the Contract amount for Traffic Control Supervisor from payments due the CONTRACTOR. Upon the CONTRACTOR's receipt of three written notices, by the Engineer, of the CONTRACTOR's failure to fulfill these Contract obligations, the OWNER shall exercise its right to complete this work and withhold excess amounts from payments due the CONTRACTOR.
- D. The above options shall not bar the OWNER from exercising other remedies as a result of the CONTRACTOR's failure or refusal to comply with a contractual obligation.

1.4 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. MUTCD: U.S. Department of Transportation, Federal Highway Administration: Manual on Uniform Traffic Control Devices, Part VI, "Work Zone Traffic Control Standards and Guidelines"
 - 2. Washington State Department of Transportation Standard Plans

1.5 SUBMITTALS

- A. **Procedures:** Section 01300 - Contractor Submittals.
- B. Submit a Notification Plan within 10 days of the effective date of the Notice to Proceed and update for monthly coordination/progress meetings a notification procedure and plan to maintain access for adjacent or affected properties and businesses. Notification procedure and access plan should include:
 - 1. Advanced notice time
 - 2. Method of notice
 - 3. Detail of how access will be maintained
 - 4. A copy of a standard written notice with the CONTRACTOR's contact name and 24-hour phone number
 - 5. Estimated week of construction within 150 feet of affected property.
 - 6. Estimated number of days that construction will be fronting the property.
 - 7. Special issues for maintaining access.

1.6 CONSTRAINTS

- A. Multiple construction crews are allowed, however, two consecutive street intersections shall not be impacted at the same time.
- B. Maintain pedestrian and bicycle access at all times where practical.
- C. **Traffic Control Requirements:** Consider and include the following street and lane closure restrictions:

1. Vehicular and pedestrian routing on streets where the work is not being performed shall not be revised.
2. Annotate proposed location of barricades, lighting, signing, temporary striping and other traffic control devices.
3. All Flaggers directing traffic shall possess a current Flagger Certification Card
4. Make arrangements for emergency exiting from buildings within and immediately adjacent to the construction site.
5. At each site where a two-way roadway is restricted to one lane of two-way traffic, provide a minimum of two certified flaggers in order to insure safe and effective movement of traffic through the constricted zone. Provide three certified flaggers when the construction zone length causes sight distance or communication problems between a two member team of flaggers to operate safely.
6. Submit for approval any specific streets not addressed above which will have a traffic impact.
7. Maintain emergency access, access to businesses, public service buildings and residences at all times. Provide a minimum of one week notice when driveway access will be restricted or modified. Provide cleared residential driveway access at the end of every work day. Provide businesses, public service buildings, and industrial sites driveway access during their operating hours.
8. Provide local access to all businesses, industrial sites and residences. Provide a certified flagger to reduce conflicts between local access traffic and construction crews and/or heavy equipment whenever local access is required into/out of the construction zone.
9. Channel traffic flow into the work zone per approved Traffic Control Plan.

D. Refer to Construction Timing Constraints Summary at the end of Section 01313 for specific restrictions.

1.7 JOB COORDINATION

- A. Coordinate all construction to offer the least possible obstruction and inconvenience to public.
- B. Do not open areas of work and leave the area unfinished; finish work in process insofar as practical. All work areas must be filled or covered at the end of the work shift.
- C. Coordinate with property and business owners in order to maintain convenient access for local traffic to private properties along the line of work at all times and/or as specified in paragraph 01570-3.2 and on the Drawings.
- D. Coordinate revisions to existing traffic control with the affected agencies. Keep traffic controls in operation unless otherwise required by the OWNER for the benefit of the traveling public during progress of the work. As work progresses and as conditions permit, reset temporarily relocated or removed traffic and street name signs in their permanent location. Replace or repair signs and other traffic control devices damaged or lost. The option whether a sign can be repaired or is to be replaced is the OWNER's.
- E. Keep existing street lighting systems in operation during progress of the work.

1.8 NOTIFICATIONS

- A. Obtain written approval from the OWNER and the jurisdiction before scheduling to partially or completely close any street.
- B. Detail notification for the time of commencement, completion of the work, names of streets to be closed, schedule of operation, routes of detours, etc.
- C. To accommodate emergency vehicle rerouting, notify in writing, local fire and law enforcement authorities and other affected agencies not less than 72 hours prior to construction operations which deviate or delay traffic from the existing traffic patterns.
 1. Fire (Skagit County Fire District #2)
 - a. Station (360) 424-7296

- b. Deputy Fire Marshal (360) 416-1842
 - c. Deputy Fire Marshal (360) 416-1843
- 2. Skagit County Sheriff (360) 336-9450
- 3. Washington State Patrol
 - a. Burlington Office (360) 654-1204
- D. Notification of the residents living adjacent to the work will be by the CONTRACTOR a minimum of 48-hours in advance of the construction in the area of work. The notification procedure and access plan is used for the advance notice and contains a general description of the purpose of construction work and proposed schedule.
- E. Directly inform individual owners or household residents at least 48 hours in advance of beginning the work to minimize or eliminate inconveniences to the public. Inform owners of work which blocks the use of the property in any way by construction or equipment.
- F. Advanced notice of lane closure signs shall be placed 10 days in advance, including 2 consecutive weekends, of lane closures unless indicated otherwise on the drawings.
- G. Notify the local school district at least one week in advance of any construction that may disrupt school bus routes.

1.9 MEETINGS

- A. Prior to the beginning of hauling materials, hold an awareness meeting with truck drivers regarding traffic concerns discussed at the preconstruction meeting, including methods to reduce congestion, obeying speed limits, specific locations identified as safety hazards, and allowable haul times.
- B. During construction, discuss traffic safety and traffic concerns at the regularly scheduled progress meetings. Reinforce the importance of traffic safety and update the crews regarding safety in the particular area where construction is occurring at the time and communicate feedback received from the local jurisdictions.

PART 2 PRODUCTS

2.1 SPECIAL SIGNS

- A. Signs with special or non-standard messages may be included as part of the Traffic Control Plan as required to properly convey information to the motorist or pedestrian. Use signs in accordance with the requirements in paragraph 01570 - 1.2.
- B. All signs shall conform and meet the minimum standards established in the latest adopted edition of the "Manual on Uniform Traffic Control Devices" (MUTCD) U.S. Department of Transportation, Federal Highway Administration, or the accepted Standards of the governing agency.
- C. Portable Changeable Message Signs in accordance with Section 9-35.5 of the Standard Specifications.

PART 3 EXECUTION

3.1 GENERAL

- A. Comply with all requirements of the latest issue of the "Manual on Uniform Traffic Control Devices" for In-Street Work, local permits obtained by the CONTRACTOR, and the following permits obtained by the OWNER:
 - 1. Skagit County – Right-of-Way Use Permit

2. City of Mount Vernon – Right-of-Way Use Permit

- B. The CONTRACTOR shall comply with all local permits, conditions, and mitigation requirements related to the use of area roadways affected by construction activities. The CONTRACTOR shall haul only during permitted hours.
- C. Comply with the following:
 - 1. When the CONTRACTOR, OWNER, Police Department, Skagit County, determine it is necessary, additional flaggers shall be stationed within the construction area to mitigate congestion caused by construction.
 - 2. Construction equipment shall be parked off the traveled way with adequate barricades and flashers provided at night to lessen traffic hazards associated with construction activity.
 - 3. The CONTRACTOR shall have steel plate and steel beams available on the job site for bridging of trench cuts to mitigate safety hazards and problems associated with emergency and property access requirements.
 - 4. CONTRACTOR shall inspect and maintain the control site at least once per work shift.
 - 5. CONTRACTOR shall remove or cover all non-applicable signs when not in use.

3.2 TRAFFIC MAINTENANCE

- A. Take all necessary measures to maintain a normal flow of vehicular and pedestrian traffic to prevent accidents and to protect the work throughout the construction stages until completion of the work. Make the necessary arrangements to reroute traffic, provide and maintain barriers, cones, guards, barricades, and construction warning and regulatory signs. Make all regulatory devices suitable for nighttime operation. Take effective measures necessary to protect all other portions of the work during construction and until completion. This includes providing and maintaining all necessary barricade lights, construction signs, guards, temporary crossovers, and flaggers in accordance with the requirements referenced in paragraph 01570-1.2.
- B. Maintain emergency exiting from buildings within and immediately adjacent to the construction site.
- C. Maintain vehicular traffic at all locations to the greatest extent possible and reduce and reroute traffic only for the shortest time possible consistent with effective construction operations. Do not block required travel lanes including trucks delivering materials. Material deliveries and other related trucking activities to occur in the CONTRACTOR's protected work area. Upon completion of a segment of work in streets traffic shall be restored to normal flow as soon as possible. Maintain existing directional operation of street systems at all times.
- D. Access by emergency vehicles shall be maintained at all times in all roadways. Use temporary covers over cuts to accommodate traffic. Notification shall be given to the OWNER and the fire station chief prior to limitation of access in any section of the roadway.
- E. Maintain pedestrian movements through construction areas. Facilities for pedestrians include provisions for the safe movement of mobility and sight-impaired individuals. This includes temporary ramps.
- F. Coordinate traffic control plan with other contractor's traffic control plan for all work.
- G. Inspect the control area at least once per work shift. Reset and repair all traffic control devices immediately.

3.3 ACCESS

- A. Maintain access for emergency vehicles to private properties and businesses at all times. Access to private property shall be restored at the end of each work shift.

- B. Where, during some urgent stages of construction, the OWNER determines that temporary closure of an access to a property is unavoidable, coordinate the closure with the property and business owner.
- C. When the abutting business or owners' access across the right-of-way is to be temporarily closed and replaced by other access, place an interim surface to restore access. Arrange work so that access is available to all properties at all times work is not occurring. Provide unimpeded local access to properties during non-construction periods.

3.4 SAFETY

- A. Use adequate safeguards, safety devices and protective equipment. Take any actions needed to protect life, health and safety of the public and to protect property in connection with the performance of the work.
- B. Use such flaggers, signs and other devices, and erect and maintain all barricades, guards, standard construction signs, warning signs and detour signs, as are necessary to warn and protect the public at all times from injury or damage as a result of the construction operations.
- C. Where flaggers are employed to safeguard traffic, use flagger equipment in accordance with the referenced standards except for personal wearing apparel. This equipment must be used by flaggers while actually flagging traffic. All flaggers are required to possess a current flagging certification card.
- D. Furnish any standard signs as well as any other appropriate signs prescribed by the OWNER as applicable and necessary for the work. Erect signs on posts and supports and maintain them in a neat and safe condition until the necessity for them has ceased. When the need for any sign has ceased, upon approval by the OWNER, take down such sign. All control signs necessary for nighttime traffic control or remaining in place during the night shall be fully reflectorized.
- E. Safeguard and direct traffic after the existing signs have been removed. Preserve and maintain traffic control and street name signs. Signs and other traffic control devices damaged or lost by the CONTRACTOR shall be replaced or repaired. The option whether a sign can be repaired or be replaced shall be the OWNER's. Such decision shall be final and binding on the CONTRACTOR.
- F. Patrol traffic control areas and reset all disturbed signs and traffic control devices immediately. Remove or cover all non-applicable signs during periods not needed.
- G. Use flaggers, barricades, lights and signs for protection of the work and the public at all times.
- H. The OWNER may without further notice supply such material and equipment as necessary and deduct all of the costs thereof from any payments due, upon CONTRACTOR failure to immediately supply flaggers; erect, maintain and remove barricades and lights, and erect, maintain and remove standard signs when ordered to do so by the OWNER.
- I. During the hours of non-construction, maintain all existing traffic lanes safe for vehicular traffic. Leave all unfinished work in a safe, non-hazardous condition to the public in Accordance with "Safety Standards for Construction Work," Department of Labor and Industries, Chapter 296-155 WAC.

3.5 SIGNS

- A. Signs are required for the duration of construction from commencement of earth moving activities through substantial completion.
- B. Replace signs that are stolen, vandalized or damaged before work commences.

3.6 TRAFFIC CONTROL SUPERVISOR

- A. The Contractor shall have one (1) Traffic Control Supervisor on duty at for the period of time work is being conducted under traffic and traffic control measures are in place. No more than one Traffic Control Supervisor will be allowed.
- B. The Traffic Control Supervisor (TCS) shall fulfill all duties listed in Section 1-10.2(1)B of the Standard Specifications. No payment will be provided for any day in which a Contractor's Daily Report of Traffic Control – Summary and Traffic Control Log are not completed. A copy of each is attached hereto.
- C. Failure to complete the Contractor's Daily Report of Traffic Control -Traffic Control Log or the Contractor's Daily Report of Traffic Control – Summary will result in no measurement for this work.

END OF SECTION

Attachment A

Contractor's Daily Report of Traffic Control

Use separate sheets for each setup. (May be altered to record Class A signs.)

Page
Date

Contract Number	SR Number	Day	Date
-----------------	-----------	-----	------

Sta A	Setup				Sta B
	Station	Time	Station	Time	
◇	-		-		◇
◇	-		-		◇
◇	-		-		◇
◇	-		-		◇
◇	-		-		◇
Work Area					
◇	-		-		◇
◇	-		-		◇
◇	-		-		◇
◇	-		-		◇
◇	-		-		◇
Sta C	↑	One Way Traffic (one or more lanes)	↑		Sta D
	↓	Two Way Traffic (two or more lanes)	↑		

Legend

(List of Signs Used)

1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____

Cones Yes No
 Piloted Yes No

Per Approved Plan Yes No
 _____ Plan Title

Flagger/Spotter Sta	Start	End	Hours
Station A			
Station B			
Station C			
Station D			

Other Traffic Control Labor

Name	Start	End	Hours

Contractor

Contractor's Traffic Control Supervisor's Signature

Type of Traffic Control	Time Set Up	Time(s) Checked	Time Removed

To be Completed by Contractor's Traffic Control Supervisor (TCS)

DOT Form 421-040B EF
Revised 03/2008

Distribution: White - Contractor; Canary - Project Engineer

Contractor's Daily Report of Traffic Control - Summary

			Page One
Contract Number	SR Number	Day	Date

Photos / Videos taken today for record? Yes No
 If Yes, note locations:

Summary of TCS Activities

Contractor	Contractor's Traffic Control Supervisor's Signature
------------	---

For WSDOT Project Office Only

Comments

To be Completed by Contractor's Traffic Control Supervisor (TCS)

SECTION - 01600
PRODUCTS, MATERIALS, EQUIPMENT AND SUBSTITUTIONS

PART 1 GENERAL

1.1 DEFINITIONS

- A. The word "Products", as used herein, is defined to include purchased items for incorporation into the Work, regardless of whether specifically purchased for the project or taken from CONTRACTOR's stock of previously purchased products. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of work. The word "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items). Definitions in this paragraph are not intended to negate the meaning of other terms used in the Contract Documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.
- B. Neither "Products" nor "Materials" nor "Equipment" includes machinery and equipment used for preparation, fabrication, conveying and erection of the Work.

1.2 QUALITY ASSURANCE

- A. **Source Limitations:** To the greatest extent possible for each unit of work, the CONTRACTOR shall provide products, materials, and equipment of a singular generic kind from a single source.
- B. **Compatibility of Options:** Where more than one choice is available as options for CONTRACTOR's selection of a product, material, or equipment, the CONTRACTOR shall select an option which is compatible with other products, materials, or equipment. Compatibility is a basic general requirement of product, material and equipment selections.

1.3 PRODUCT DELIVERY AND STORAGE

- A. The CONTRACTOR shall deliver and store products in accordance with manufacturer's written recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of products at the site and overcrowding of construction spaces. In particular, the CONTRACTOR shall ensure coordination to ensure minimum holding or storage times for flammable, hazardous, easily damaged, or sensitive materials to deterioration, theft, and other sources of loss.

1.4 TRANSPORTATION AND HANDLING

- A. Products shall be transported by methods to avoid damage and shall be delivered in undamaged condition in manufacturer's unopened containers and packaging.
- B. The CONTRACTOR shall provide equipment and personnel to handle products, materials, and equipment by methods to prevent soiling and damage.
- C. The CONTRACTOR shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

1.5 STORAGE AND PROTECTION

- A. Products shall be stored in accordance with manufacturer's written instructions and with seals and labels intact and legible. Sensitive products shall be stored in accordance with manufacturer's recommendations.
- B. For exterior storage of fabricated products, products shall be placed on sloped supports above ground. Products subject to deterioration shall be covered with impervious sheet covering and ventilation shall be provided to avoid condensation.
- C. Loose granular materials shall be stored on solid flat surfaces in a well-drained area and shall be prevented from mixing with foreign matter.
- D. Storage shall be arranged to provide access for inspection. The CONTRACTOR shall periodically inspect to assure products are undamaged and are maintained under required conditions.

1.6 MAINTENANCE OF STORAGE

- A. The CONTRACTOR shall comply with manufacturer's product storage requirements and recommendations.
- B. The CONTRACTOR shall ensure that surfaces of products exposed to the elements are not adversely affected and that weathering of finishes does not occur.
- C. The CONTRACTOR shall maintain manufacturer-required environmental conditions continually.
- D. For mechanical and electrical equipment, the CONTRACTOR shall provide a copy of the manufacturer's service instructions with each item and the exterior of the package shall contain notice that instructions are included.
- E. Products shall be serviced on a regularly scheduled basis, and a log of services shall be maintained and submitted as a record document prior to acceptance by the OWNER in accordance with the Contract Documents.

1.7 PROPOSED SUBSTITUTES OR "OR APPROVED EQUAL" ITEM

- A. Whenever materials or equipment are indicated in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the naming of the item is intended to establish the type, function, and quality required. If the name is followed by the words "or approved equal" indicating that a substitution is permitted, materials or equipment of other suppliers may be accepted if sufficient information is submitted by the CONTRACTOR to allow the OWNER to determine that the material or equipment proposed is equivalent or equal to that named, subject to the following requirements:
 - 1. The burden of proof as to the type, function, and quality of any such substitute product, material or equipment shall be upon the CONTRACTOR.
 - 2. The OWNER will be the sole judge as to the type, function, and quality of any such substitute and the OWNER's decision shall be final.
 - 3. The OWNER may require the CONTRACTOR to furnish at the CONTRACTOR'S expense additional data about the proposed substitute.
 - 4. The OWNER may require the CONTRACTOR to furnish at the CONTRACTOR'S expense a special performance guarantee or other surety with respect to any substitute.
 - 5. Acceptance by the OWNER of a substitute item proposed by the CONTRACTOR shall not relieve the CONTRACTOR of the responsibility for full compliance with the Contract Documents and for adequacy of the substitute.
 - 6. The CONTRACTOR shall be responsible for resultant changes including design and construction changes and all additional costs resulting from the changes which the accepted substitution requires

in the CONTRACTOR's Work, the Work of its subcontractors and of other contractors, and shall effect such changes without cost to the OWNER.

- B. The procedure for review by the OWNER will include the following:
1. If the CONTRACTOR wishes to provide a substitute item, the CONTRACTOR shall make written application to the OWNER.
 2. Unless otherwise authorized in writing by the OWNER, the substitution request shall be submitted within the 30-day period after award of the Contract.
 3. Wherever a proposed substitute item has not been submitted within said 30-day period, or wherever the submission of a proposed substitute material or equipment has been judged to be unacceptable by the OWNER, the CONTRACTOR shall provide the material or equipment indicated in the Contract Documents.
 4. The CONTRACTOR shall certify that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, and be similar and of equal substance to that indicated, and be suited to the same use as that specified.
 5. The OWNER will evaluate each proposed substitute within a reasonable period of time.
 6. As applicable, no shop drawing submittals shall be made for a substitute item nor shall any substitute item be ordered, installed, or utilized without the OWNER'S prior written acceptance of the CONTRACTOR'S substitution request.
- C. The CONTRACTOR's substitution request transmitted with the OWNER's standard form, which is appended at the end of this section, or the CONTRACTOR's standard form approved by the OWNER, shall contain the following statements and information which shall be considered by the OWNER in evaluating the proposed substitution:
1. The evaluation and acceptance of the proposed substitute will not prejudice the CONTRACTOR's achievement of substantial completion on time.
 2. Whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents to adapt the design to the proposed substitute.
 3. Whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty.
 4. All variations of the proposed substitute from the items originally specified will be identified.
 5. Available maintenance, repair, and replacement service will be indicated. The manufacturer shall have a local service agency (within 50 miles of the site) which maintains properly trained personnel and adequate spare parts and is able to respond and complete repairs within 24 hours.
 6. Itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including cost of redesign and claims of other contractors affected by the resulting change.
 7. Itemized proposed savings which the OWNER will realize.
- D. OWNER reserves the right to require proposed product to comply with color and pattern of specified product if necessary to secure design intent.
- E. Substitutions will be rejected if:
1. Submittal is not through the Contractor with his stamp of approval.
 2. Requests are not made in accordance with this Section.
 3. In the OWNER's opinion, acceptance will require substantial revision of the original design.
 4. In the OWNER's opinion, substitution will not perform adequately the function consistent with the design intent.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



Substitution Request Form

To: PUD No. 1 of Skagit County

 1415 Freeway Drive, PO Box 1436

 Mount Vernon, WA 98273

Project: Mclean Road, Wall Street to Best Road,
 Phase II and Daisy Lane Stream Crossing

 Attention: Doug McConnell

Specified Item:

Section	Page	Paragraph	Description
---------	------	-----------	-------------

The undersigned requests consideration of the following:

Proposed Substitution: _____

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

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

1. The proposed substitution does not affect dimensions shown on Drawings and will not require a change in any of the Contract Documents.
2. The undersigned will pay for changes to the design, including Engineering design, detailing, and construction costs caused by the request substitution which is estimated to be \$_____.
3. The proposed substitution will have no adverse effect on other contractors, the construction schedule (specifically the date of substantial completion), or specified warranty requirements.
4. Maintenance and service parts will be locally available for the proposed substitution.
5. The incorporation or use of the substitute in connection with the work is not subject to payment of any license fee or royalty.

The undersigned further states that the function, appearance, and quality of the Proposed Substitution are equivalent or superior to the Specified item.

Submitted by **Contractor:** _____ Reviewed by **OWNER:** _____

Signature _____	<input type="checkbox"/> Accepted	<input type="checkbox"/> Accepted as Noted
Firm _____	<input type="checkbox"/> Not Accepted	<input type="checkbox"/> Received too Late
_____	By: _____	
_____	Title: _____	
Date: _____	Date: _____	
Telephone: _____	Remarks: _____	

Attachments:

**SECTION - 01700
PROJECT CLOSEOUT**

PART 1 GENERAL

1.1 FINAL CLEANUP

- A. The CONTRACTOR shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the WORK by the OWNER will be withheld until the CONTRACTOR has satisfactorily complied with the foregoing requirements for final cleanup of the project site.

1.2 CLOSEOUT TIMETABLE

- A. The CONTRACTOR shall establish dates for pipeline and equipment testing, acceptance periods, and on-site instructional periods (as required under the Contract). Such dates shall be established not less than one week prior to beginning any of the foregoing items, to allow the OWNER and their authorized representatives sufficient time to schedule attendance at such activities.

1.3 FINAL SUBMITTALS

- A. The CONTRACTOR, prior to requesting final payment, shall obtain and submit the following items to the OWNER:
1. Written guarantees, where required.
 2. Operating manuals and instructions, as required
 3. New permanent cylinders and key blanks for all locks.
 4. Bonds for maintenance, etc., as required.
 5. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
 6. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law, on the OWNER-furnished form appended at the end of this section, or on the CONTRACTOR's standard form as approved by the OWNER.
 7. Releases from property owners where the CONTRACTOR has secured an easement, permit or agreement for use of the property.

1.4 MAINTENANCE AND GUARANTEE

- A. The CONTRACTOR shall comply with the maintenance and guarantee requirements contained in Section 4.4 of the Supplementary General Conditions.
- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the CONTRACTOR which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless the CONTRACTOR shall have obtained a statement in writing from the affected private owner or public agency releasing the OWNER from further responsibility in connection with such repair or resurfacing.
- C. The CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order from the OWNER. If the CONTRACTOR fails to make such repairs or replacements promptly, the OWNER reserves the right to do the WORK and the CONTRACTOR and his surety shall be liable to the OWNER for the cost thereof.

1.5 BOND

- A. The CONTRACTOR shall provide a bond to guarantee performance of the provisions contained in Paragraph "Maintenance and Guarantee" above, and Section 3.1 of the Supplementary General Conditions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

D I V I S I O N 2

SITE WORK

**SECTION - 02100
SITE PREPARATION**

PART 1 GENERAL

1.1 THE REQUIREMENT

- A. The Work of this section includes measures required during the CONTRACTOR's initial move onto the site to protect existing fences, houses and associated improvements, streets, and utilities near the construction areas from damage and clearing, grubbing and stripping.

1.2 SITE INSPECTION

- A. Prior to moving onto the site, the CONTRACTOR shall inspect the Site conditions and review maps of the pipeline routes and facilities delineating the OWNER's property and right-of-way lines.
- B. The OWNER will document existing alignment conditions with video and photo records. These will be available to the CONTRACTOR if requested.

1.3 COORDINATION OF WORK

- A. The scheduling and performance of this work is dependent on meeting the requirements of the Erosion Control (EC). No ground disturbing activities shall be performed before approved EC measures are implemented for that area to the satisfaction of the OWNER.
- B. Comply with provisions on the Drawings and in Section 01060 – Regulatory Requirements, regarding restrictions on work within wetland areas and general environmental protection measures.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 SITE ACCESS

- A. The CONTRACTOR shall develop any necessary access to the pipeline route; including access barriers to prohibit entry of unauthorized persons.
- B. **Utility Interference:** Where existing utilities interfere with the WORK, notify the utility owner and the OWNER before proceeding.

3.2 CLEARING, GRUBBING, AND STRIPPING

- A. Construction areas shall be cleared of grass and weeds to at least a depth of six inches and cleared of structures, pavement, sidewalks, concrete or masonry debris, trees, logs, upturned stumps, loose boulders, and any other objectionable material of any kind which would interfere with the performance or completion of the WORK, create a hazard to safety, or impair the subsequent usefulness of the WORK, or obstruct its operation. Pavement, curbs, and sidewalk shall first be sawcut along neat lines before removal. Trees and other natural vegetation outside the actual limits of construction shall be protected from damage during construction, as directed by the OWNER.
- B. Within the limits of excavation, the areas below the natural ground surface shall be grubbed to a depth necessary to remove all stumps, roots, buried logs, and all other objectionable material. Septic tanks, drain fields, and connection lines and any other underground structures, debris or waste shall be removed

if found on the Site unless marked for protection by OWNER. All objectionable material from the clearing and grubbing process shall be removed from the Site and wasted in approved safe locations.

- C. In areas not covered with pavement or sidewalks, and outside of wetlands, the topsoil shall be removed to a depth of 6 inches below the stripping limits across the full width of the clearing limits. The stripped materials shall be stockpiled for later incorporation as the final backfill material for the trench and other disturbed areas as shown on the Drawings.
- D. Unless otherwise indicated, native trees larger than three inches in diameter at the base shall not be removed without the OWNER's approval. The removal of any trees, shrubs, fences, or other improvements outside of rights-of-way, if necessary for the CONTRACTOR's choice of means and methods, shall be arranged with the owner of the property, and shall be removed and replaced, at no additional cost to the OWNER.
- E. Backfill all holes and depressions resulting from tree root and stump removals.
 - 1. Use native material
 - 2. Compact by track-walking until no further settlement is noted under equipment weight.
 - 3. Grade to conform to the surrounding ground contours.
- F. Level all soil piles left from stump removal by rough grading.

END OF SECTION

**SECTION - 02140
DEWATERING**

PART 1 GENERAL

1.1 THE REQUIREMENT

- A. The CONTRACTOR shall provide all labor, materials, and equipment necessary to dewater trench and structure excavations, in accordance with the requirements of the Contract Documents.
- B. The CONTRACTOR shall make a judgment of the level of effort required based on his review of the project geotechnical data report and his own independent investigations and include costs of dewatering all other areas not specifically listed.
- C. The CONTRACTOR shall secure all other necessary permits to complete the requirements of this Section of the Specifications.
- D. Subsurface conditions at the sites are addressed in the “Geotechnical Evaluation, Mclean Road Directional Drill Project” by Aspect Consulting, dated May 16, 2019 and “Geotechnical Evaluation, Daisy Lane Stream Crossing” by Aspect Consulting, dated May 16, 2019. These reports provide information about explorations and tests of subsurface conditions at or contiguous to the site, are not part of the Contract Documents. The subsurface investigations made were for the sole purpose of furnishing data necessary for planning and design of the work. The OWNER's Consultants warrant that the data represents, with reasonable accuracy, the conditions and materials found in the specific borings at the time they were made. The OWNER and the OWNER's Consultants do not warrant the condition, materials, or proportions of materials between such borings.

The OWNER makes no representation or warranty, expressed or implied, that the Bidders' interpretations from the data are correct, that moisture conditions and indicated water tables will not vary substantially from those found at the time that the borings were made, and that the ground at the location of the borings has not been physically disturbed or altered after the tests were made. The availability of this subsurface information is solely for the convenience of the Bidder, and shall not relieve the Bidder or CONTRACTOR from any risks, or from any duty to make a separate examination and investigation, or any other responsibility under the terms and conditions of the Contract.

A copy of this report is included in Appendix E.

- E. The CONTRACTOR shall regularly monitor the quality of the water being pumped and discharged. If the water is determined to be unsuitable for disposal to receiving waters based on code and permit requirements, the CONTRACTOR shall provide appropriate treatment of the water to achieve minimum water quality levels to allow release.
- F. Costs for dewatering shall be included in the unit cost for furnishing and installing the pipe.

1.2 GENERAL REQUIREMENTS

- A. Where groundwater is encountered during construction, the CONTRACTOR shall immediately take measures to control the rate of flow into the work area, and quality of water discharged from the work area. The OWNER shall judge the adequacy of the CONTRACTOR's dewatering effort, determine whether construction can continue without violating terms of any permit, and direct a course of action.
- B. Areas of high groundwater may need to be dewatered with deep wells or well points prior to construction. In tight soil areas, where the rate of groundwater infiltration is slow, pumping directly from the trench may be feasible.

- C. Depending on the site, sediment-laden water from trenches shall be settled in temporary storage facilities, such as ponds or Baker Tanks, and only clean water meeting permit requirements shall be discharged to drainage channels.
- D. If the settling process does not adequately remove sediment such that water can be released to receiving waters, the CONTRACTOR shall employ mechanical or chemical treatment to meet water quality discharge requirements prior to release.
- E. To reduce sediment in water pumped directly from trenches, the following measure shall be implemented when site conditions allow.
 - 1. If possible, a depression in the down-gradient portion of the trench shall be excavated to collect water before removal.

1.3 QUALITY CONTROL

- A. It shall be the sole responsibility of the CONTRACTOR to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence.
- B. All dewatering operations shall be adequate to assure the integrity of the finished project and shall be the responsibility of the CONTRACTOR.
- C. The responsibility for conducting the dewatering operation in a manner which will protect adjacent structures and facilities rests solely with the CONTRACTOR. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the CONTRACTOR.
- D. In the event that dewatering is determined to be affecting an adjacent structure, the CONTRACTOR shall cease dewatering until satisfactory methods can be developed so as not to endanger the integrity of the existing facility or structure. If an existing facility or structure is damaged in any way or if the owner of such facility claims damage of any type, the CONTRACTOR shall be solely responsible for correcting the problem to the satisfaction of the owner of that structure or facility.

PART 2 PRODUCTS

2.1 EQUIPMENT AND MATERIALS

- A. Dewatering, where required, may include the use of wells, well points, sump pumps, temporary pipelines for water disposal, rock or gravel placement, and other means. Standby pumping equipment shall be maintained on the jobsite.
- B. If the water produced as a result of dewatering operations is not suitable for direct discharge to receiving waters, the water shall be treated. The CONTRACTOR is responsible for the selection of proper equipment, chemicals and process to successfully treat the water for discharge.

2.2 CONTINGENCY EQUIPMENT AND MATERIALS

- A. The CONTRACTOR shall have onsite, at all times, sufficient pumping equipment to dewater any open sections of trench, in good working condition, with spare pumps and other equipment for emergencies including, but not limited to, power outage. The CONTRACTOR shall have onsite, at all times, competent workers for the operation and repair of the pumping equipment.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. The CONTRACTOR shall provide all equipment necessary for dewatering. It shall have on hand, at all times, sufficient pumping equipment and machinery in good working condition and shall have available, at all times, competent workmen for the operation of the pumping equipment. Adequate standby equipment shall be kept available at all times to insure efficient dewatering and maintenance of dewatering operation during power failure.
- B. Dewatering for structures and pipelines shall commence when groundwater is first encountered, and shall be continuous until such times as water can be allowed to rise in accordance with the provisions of this Section or other requirements.
- C. At all times, site grading shall promote drainage. Surface runoff shall be diverted from excavations. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and be pumped or drained by gravity from the excavation to maintain a bottom free from standing water.
- D. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed subgrade soils at proposed bottom of excavation. Use of sumps for dewatering is acceptable if undisturbed subgrade soils are maintained. If undisturbed subgrade soils cannot be maintained by this method, then the groundwater table shall be lowered to a level at least 2 feet below the bottom of the excavation by other means. The groundwater table shall be lowered further as required for safety or other reasons.
- E. The groundwater control system shall be designed for continuous, 24-hour operation and shall not be shut down between shifts, on holidays, or weekends, or during work stoppage, without written permission from the OWNER.
- F. The groundwater control system shall be monitored continuously while in operation.
- G. The groundwater control system shall include a means for measuring the quantity of discharge.
- H. The quality and quantity of discharge water from the groundwater control and dewatering system shall be in conformance with all Federal, State, and local laws and regulations.
- I. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with foundation stabilization material at no additional cost to the OWNER.
- J. In general, the CONTRACTOR shall maintain the water level below the bottom of excavation in all work areas where groundwater occurs during excavation construction, backfilling, and up to acceptance.
- K. Flotation shall be prevented by the CONTRACTOR by maintaining a positive and continuous removal of water. The CONTRACTOR shall be fully responsible and liable for all damages which may result from failure to adequately keep excavations dewatered.
- L. Where well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sandpacked and/or other means used to prevent pumping of fine sands or silts from the subsurface. A continual check by the CONTRACTOR shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation.

3.2 SUMPS

- A. Open or cased sumps may be used provided they meet the requirements of paragraph 3.1.

- B. Sumps shall be designed and constructed to prevent the removal of native or other soils.

3.3 SYSTEM MODIFICATIONS

- A. If the system does not meet the above requirements as determined by the OWNER, the CONTRACTOR shall modify sumps or wells, add sumps or wells, or install additional alternative systems as needed at no additional cost to the OWNER. If during the course of construction, the system or a part thereof becomes inoperable, it shall be repaired or replaced at no additional cost to the OWNER.

3.4 SYSTEM PROTECTION

- A. Necessary precautions shall be taken, including, but not limited to, marking wells and pipes, protecting pipes at vehicular crossings, and routing vehicular traffic away from dewatering facilities to protect the groundwater control system from damage and ensure continued operation.

3.5 DISPOSAL OF WATER

- A. Pumped water shall be disposed of in such a manner so as not to cause damage to public or private property or adversely impact downstream receiving waters or facilities. Quality of discharge water will comply with all State and local regulations and with requirements of all applicable permits.
- B. Quality of discharge water shall comply with permit requirements specified in Section 01060 – Regulatory Requirements.
- C. The removal of natural, in-place soils during dewatering operations shall be prevented. In order to remove sand and fine sized soil particles before disposal into any drainage system, water shall be filtered or coagulated using an approved method or allowed to settle in a sediment trap designed to meet the requirements of the DOE Stormwater Management Manual for Western Washington. If filtration or coagulation methods are used, they shall be conducted to achieve a minimum of 90 percent reduction in total suspended solids. The OWNER may require submission of test results to a frequency of one per day to demonstrate adequate reduction in total suspended solids. No water shall be released directly to private property without written permission from the owner. Water released into any ditch, swale or water course shall be at such a rate so as to avoid any downstream flooding or channel erosion. The system shall be set up such that after initial development, the quantity and size of soil particles will decrease until no visible soil particles are present in water being pumped at any time after 24 hours from initial pumping.
- D. Pumped water shall not be disposed of in a manner which causes contamination of wells in the vicinity.

3.6 TERMINATING DEWATERING

- A. The pumping equipment shall be operated prior to complete shutdown in a manner that will allow the groundwater level to rise gradually to its static level. The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted backfill and prevent flotation or movement of structures, pipelines, and sewers.
- B. After the groundwater control system is deactivated, all wells, sumps and drains shall be removed and the ground shall be restored to a condition better than or equal to the condition prior to installation of the groundwater control system.
- C. The construction, permitting, and abandonment of all wells used in dewatering systems shall comply with Washington State Department of Ecology requirements (Chapter 173-160 WAC and Chapter 18.104 RCW).

END OF SECTION

SECTION - 02270
EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section covers the work necessary for Install and Maintain Temporary Erosion Control and Water Pollution Control Measures at all CONTRACTOR work and staging areas.
- B. The General Stormwater Permit was obtained by the OWNER, but will be transferred into the CONTRACTOR's name after contract execution, and the CONTRACTOR will be responsible for the preparation and implementation of all temporary erosion and sediment controls, plans, sampling, and reporting, and permit closeout.
- C. CONTRACTOR shall prepare a Construction Stormwater Pollution Prevention Plan (SWPPP) for the entire project in accordance with the requirements of the General Stormwater permit.
- D. CONTRACTOR shall prepare erosion control plans for staging areas used by the CONTRACTOR that are outside designated work area limits.

1.2 RELATED SECTIONS

- A. Division 1
- B. Section 01300 - Contractor Submittals
- C. Section 01560 – Environmental Controls
- D. Section 02100 - Site Preparation.
- E. Section 02140 - Dewatering.
- F. Washington State Department of Ecology – Stormwater Management Manual for Western Washington (SMMWW), current version.

1.3 GENERAL REQUIREMENTS

- A. All erosion and sediment control procedures shall conform to the current version of the Washington State Department of Ecology Stormwater Management Manual for Western Washington.
- B. The CONTRACTOR shall designate a person responsible as the Certified Erosion and Sediment Control Lead (CESCL). The CESCL shall hold a current certification with Washington State Department of Ecology or associated training programs as CESCL. The CESCL will have overall responsibility for implementation of the Contractor's ESC plan and implementation on site.
- C. The CONTRACTOR shall take all precautions to prevent the silting of streams or water impoundments during construction and to control water pollution during the life of the Contract through the use of sediment traps, silt fences, mulching, covering stored piles of soil and backfill, and other erosion control devices or methods. Also, wherever feasible, natural vegetation should be retained and protected.
- D. Prior to commencing work, a joint onsite inspection shall be held between representatives of the CONTRACTOR and CESCL, Skagit County, and the OWNER to review specific soil erosion and sediment control requirements to be employed during the Contract.

- E. CONTRACTOR shall prepare a Construction Stormwater Pollution Prevention Plan required to complete the project. The SWPPP will follow the guidelines set in the DOE Stormwater Management Manual for Western Washington.
- F. CONTRACTOR shall prepare an erosion and sediment control plan for facilities not shown on the Drawings that the CONTRACTOR requires to accomplish the work. Such facilities include, but are not limited to, staging areas, parking areas, truck washing areas, and waste storage/disposal areas.
- G. Perform no ground-disturbing activities on the project, unless specifically authorized in writing by the OWNER, until the ESC Plan has been approved and necessary ESC measures are completely in place and functional.
- H. CONTRACTOR shall have back-up equipment readily available in case emergency situations arise. This includes pumps, hoses, backhoes, and bulldozers. In addition, CONTRACTOR shall have a stockpile of extra ESC materials such as filter fence, gravel, and crushed rock for emergency situations.
- I. Clean water may be discharged into existing waterways or storm drains if the discharge points are sufficiently protected, or into vegetated areas within the construction area if the ground infiltration characteristics are adequate to handle the discharge over the period of pumping, as approved by the CESCL.
- J. Depending on the site, sediment-laden water from trenches shall be dispersed over vegetated areas outside of sensitive area buffers or the sediment shall be settled in temporary storage facilities, and only clean water discharged to drainage channels.

1.4 SUBMITTAL REQUIREMENTS AND PROCEDURES

- A. Submit in accordance with Section 01300 a SWPPP for the project an erosion and sediment control plan to the OWNER for approval. No work may begin before the SWPPP and the ESC Plan is approved by the OWNER.
- B. Erosion control measures in addition to those shown on the Drawings may be required to meet discharge water quality criteria, depending on the CONTRACTOR's methods, equipment and operations. Where such measures are necessary, they shall be designed in accordance with the current version of the Washington State Department of Ecology Stormwater Management Manual for Western Washington and all other relevant regulations and design standards, and shall be stamped by a Civil Engineer licensed in the State of Washington and submitted for the OWNER's approval.
- C. ESC Plans:
 - 1. The CONTRACTOR shall describe how it intends to construct, inspect, operate, and maintain ESC measures shown on the Drawings or CONTRACTOR facilities such as stockpile areas or waste disposal sites.
 - 2. Except for cut-and-fill areas where ESC work depends on completion of earthwork, show that all ESC work is to be completed before any other work in a segment begins. The CONTRACTOR may schedule the ESC work in phases, providing no construction activity, including truck traffic, occurs in a segment with incomplete ESC work.
 - 3. The ESC Plan shall be coordinated with, and in no way contradict, the progress schedule required in Section 01311.
- D. The CONTRACTOR shall revise and bring the ESC Plan up to date whenever the OWNER makes written request for revisions and whenever the CONTRACTOR proposes to change the sequence of work. All revisions shall be coordinated with the current approved progress schedule.

- E. The CONTRACTOR's proposed ESC Plan shall include:
1. Scheduling and timing of ESC installations, with ESC installation schedules referenced to the progress schedule required.
 2. Manufacturer's data and detailed plans for the products specified in this section.
 3. Plans for diverting, collecting, pumping, and piping surface stormwater runoff, process water and seepage from source to the treatment/disposal facilities. The plan shall include the provisions for operating and maintaining the system during periods of inactivity. The plan shall include:
 - a. Layout and details of the system.
 - b. Flow calculations for stormwater, seepage, and dewatering pump discharge. Sketch of location and sizing calculations for dewatering systems.
 - c. Information on pumps, including flow/head, power (gas, diesel, electric), and placement. See Section 01560 for requirements and restrictions on gas and diesel powered equipment.
 4. Plans for all work not shown on the Drawings, including:
 - a. Additional earthwork proposed by CONTRACTOR.
 - b. Temporary access or haul roads.
 - c. CONTRACTOR-provided waste disposal areas.
 - d. Staging, CONTRACTOR's field office, and parking sites.
 - e. Storage of pipe and other trench materials along the right-of-way.
 - f. Stockpile and material processing areas.
 5. Plans and schedules for operating, inspecting, and maintaining ESC facilities and equipment.
 6. The name and 24-hour-a-day phone number and alternate contacts for responsible CONTRACTOR personnel.
 7. Plans for site restoration of the following areas:
 - a. Work areas.
 - b. Office and parking areas.
 - c. Waste areas.
 - d. Temporary access roads.
 8. A designated individual who will have primary responsibility for the installation and maintenance of the ESC facilities, as well as a designated group of work personnel who will report to the designated lead.
 9. A description of training that will be provided to all construction personnel to establish the importance of and the mechanics of the ESC measures on the project, including the individual expectations for following the ESC Plan.
 10. A plan for the locations and outlets of dewatering systems shall be required.
- F. Shop Drawings, Samples, and Product Data:
1. Samples of all fabrics.
 2. Manufacturer's data on all products.
 3. Stone filter material gradation.
 4. Riprap gradation.
 5. Rock gradation for check dams.
- G. Submission of ESC Plan: All submissions shall meet the requirements of Section 01300.
- H. Prepare a schedule of value earned on which to base payment.

1.5 OPERATION AND MAINTENANCE OF ESC FACILITIES

- A. Requirements:
1. The CONTRACTOR shall be directly responsible for the operation and maintenance of all ESC facilities, equipment, and treatment.
 2. Provide to the OWNER the name and emergency phone number of one person who can be contacted on a 24-hour-a-day, 7-day-a-week basis. This person shall have the authority to implement maintenance of ESC facilities.
 3. The CONTRACTOR shall respond with adequate personnel, equipment, and material immediately when notified of an emergency situation.

4. Adhere to approved schedules for inspection and maintenance.
- B. Noncompliance:
1. After notification by the OWNER, in writing, of noncompliance with the requirements of this section, the OWNER may have the work required to restore compliance performed immediately by OWNER's forces or by such other means as the OWNER may deem necessary.
 2. For the purpose of this section, "compliance" shall be agreed to include all items of work shown in the plans, specifications, the approved ESC Plan, and any additional items of work directed by the OWNER to meet the requirements of representatives of other agencies charged with enforcement of these requirements.
 3. Direct and indirect costs incurred by the OWNER attributable to correcting noncompliance with this section shall be paid by the CONTRACTOR. Payment will be deducted by the OWNER from monies due, or to become due, the CONTRACTOR. Such direct or indirect cost shall include, but not be limited to, compensation for additional professional services required, all fines or penalties levied against the OWNER for damages relating to this section, corrections, repair and replacement of damaged work, and compensation for OWNER overhead cost related to these activities.
 4. The rights exercised under the provisions of this section shall not diminish the OWNER's ability to pursue any other avenue for additional remedy of damages with respect to the CONTRACTOR's failure to perform the work as required.

PART 2 PRODUCTS

2.1 SILT FABRIC FENCE

- A. Filter Fabric Type 1: Woven polypropylene, monofilament yarn. The fabric shall be inert to biological degradation and shall be resistant to alkalis and acids found in soils. The base plastic shall contain stabilizers and inhibitors to make the fabric resistant to ultraviolet radiation. Filter Fabric Type 1 shall also meet the following physical properties:

Description	Test	Result
Minimum thickness	ASTM D1777	13 mils
Minimum weight	ASTM D3776	6.5 oz/sy
Grab tensile strength	ASTM D4632	415 lbs x 250 lbs
Mullen burst strength	ASTM D3786	510 psi
Equivalent opening size	ASTM D4751	70-100 U.S. Std Sieve
Permeability (cm/sec)	ASTM D4991	0.015
Permittivity (1/sec)	ASTM D4991	0.2
Water Flow Rate (gpm/sf)	ASTM D4991	20

1. Filter Fabric Type 1 shall be Mirafi 700X Synthetic Industries Erosion 1, or approved equal.
- B. Posts shall be either 2-inch by 4-inch standard grade lumber or steel fence posts. The posts shall be spaced no further apart than 6 feet. Closer spacing may be required if the fabric begins to sag and allow leakage over the top.
- C. Washed gravel for backfilling the trench shall have a minimum diameter of 3/4 inch and a maximum diameter of 1-1/2 inches.

2.2 MULCHING

- A. Straw shall be used as the mulching material. The straw shall conform to the requirements in the Stormwater Manual.

2.3 PLASTIC COVERING

- A. Plastic covering shall meet the requirements of the ASTM D4397 and have a minimum thickness of 6 mils.

2.4 PIPE SLOPE DRAIN

- A. Flexible corrugated high density polyethylene (HDPE) pipe shall be used for the pipe slope drains.
- B. A flared entrance section made of HDPE shall be used at the upstream end of each pipe slope drain. The entrance shall transition to a corrugated HDPE pipe with diameter equal to the diameter of the diversion pipe as shown on the Drawings.
- C. Pipe sections shall be joined using HDPE external split couplers with neoprene gaskets. The external split couplers shall be tightened with plastic locking cable ties or wire ties.

2.5 CHECK DAMS

- A. Material for rock check dams shall be 4-inch minus rock spalls.
- B. Material for sandbag check dams shall be approved by the OWNER.
- C. Triangular silt dikes may be used as approved by the OWNER.

2.6 RIPRAP PROTECTION

- A. Riprap material used as energy dissipating rock for the outlets of the stormwater diversion pipes shall be quarry spalls conforming to Washington State Department of Transportation (WSDOT) Standard Specification Section 9-13 and meeting the following requirements for grading:

Sieve Size	Percent Passing
8-inch	100
6-inch	40 - 60
2-inch	0 - 10

2.7 WIRE FABRIC FOR SILT FENCE

- A. 2-inch x 4-inch mesh, 14 gage, or approved equal.
- B. Hot-dip galvanized, ASTM A392, Class 2.
- C. Height: As shown on Drawings.

2.8 STONE FILTER OVERFLOW WEIR FOR SEDIMENT TRAP

- A. As shown on the Drawings.

2.9 HOLD DOWNS FOR PLASTIC SHEETING

- A. As approved by the OWNER.
- B. Hold downs to consist of sandbags secured with 1/4-inch polypropylene rope at 10 feet on center maximum each way.
- C. Anchor rope with 2-inch x 4-inch stake fir, standard or better.

2.10 STABILIZED CONSTRUCTION ENTRANCES

- A. Quarry spalls shall meet the requirements of Section 9-13.6 of the WSDOT Standard Specifications.

2.11 STORM DRAIN INLETS

- A. As shown on the Drawings.

PART 3 EXECUTION

3.1 GENERAL

- A. All construction procedures shall conform to the approved erosion and sediment control plans and the requirements of the respective jurisdictions and as shown on the Drawings.
- B. All excavated materials shall be stockpiled at the CONTRACTOR staging area or at a site designated by the CONTRACTOR and approved by the OWNER.
- C. During the period of October 1 to April 30, any stockpiled material that is left unworked for more than 12 hours shall be protected with plastic covering. In addition, any stock piled material near sensitive areas left unworked for 12 hours during the period May 1 to September 30 shall be protected with plastic.
- D. Stockpiled material shall be covered during rain storms.
- E. During the period of October 1 to April 30, plastic covering shall be placed on bare soil slopes.
- F. Where spoil is placed on the downhill side of the trench, it shall be backsloped to drain toward the trench.
- G. CONTRACTOR shall not side cast, push, sluice or cause foreign, waste, or excavated material to enter surface waters. Materials shall be carefully excavated and moved to an approved spoil or waste area. Provide and maintain erosion and sediment control measures.
- H. Sediment shall be trapped onsite using filter fabric fences, sedimentation ponds, sediment traps, and other appropriate methods.
- I. All erosion and sediment control measures and facilities provided shall be maintained in proper condition so that they will individually and collectively perform the functions for which they were provided. In order to ensure the efficiency and proper maintenance of the measures and facilities, inspections shall be made daily to detect any impairment of the structural stability, adequate capacity or other requisites of the measures and facilities which might impair their effectiveness, and the CONTRACTOR shall take immediate steps to correct any such impairment found to exist.
- J. All erosion and sediment control devices shall be removed immediately after the disturbed areas are brought to their final, completed condition. Removal of ESC devices shall be approved by the OWNER and/or the jurisdiction.
- K. Runoff, stormwater and wastewater flows shall be controlled and treated during construction to minimize water quality impacts. Runoff from undisturbed areas shall be diverted from areas of construction activity by utilizing existing road drainage ditches and drainage ways as much as possible. Where this is not possible, and as practical, diversion dikes and swales shall be constructed so runoff from undisturbed areas will not be contaminated by construction activity. Construction and grading materials shall not be stored within 50 feet of the Ordinary High Water Level of streams, dry or flowing; and shall not be deposited or stored in or alongside wetlands, wetland buffers, streams, rivers, lakes, or watercourses where the materials can be eroded by high water or storm runoff. The OWNER shall approve all stockpile locations.

- L. Water from runoff, dewatering and process wastewater shall be treated and disposed by dispersing it across vegetated (grassy) areas. The method of disposing of water shall be approved by the OWNER. Water with pollutants will require other disposal methods in accordance with local, State, and Federal law.
- M. Stormwater runoff from disturbed areas within the limits of construction and from CONTRACTOR staging and laydown areas shall be collected and treated before releasing. The extent of erosion and sediment control measures required will depend on the extent of the CONTRACTOR's earthwork and ground cover disturbance and resulting erosion potential. The CONTRACTOR is responsible for meeting specified water quality criteria for all stormwater runoff discharge from construction areas.
- N. The CONTRACTOR shall comply with the water quality criteria stated in the permits if sediment-laden flow from the disturbed area enters any streams.

3.2 SILT FENCE

- A. The silt fabric shall be one piece or continuously sewn to make one piece for the full height of the fence including the portion buried in the toe trench. Care shall be taken not to puncture the fabric during installation. Any damaged area shall be repaired or replaced. All joints shall have a 1.5-foot minimum overlap and shall be made in a manner that will not allow soil materials to pass through the joint. Posts shall be embedded a minimum of 1.5 feet. Minimize disturbance of native soils and vegetation when installing filter fabric fences. Side casting soils on the downhill side will not be allowed. Filter fabric material must be toed in as shown on the Drawings for fences to function. Bury filter fabric using washed gravel as shown on the Drawings. Monitor the condition of the filter fabric fences, remove accumulated sediments and keep the filter fabric fence in good condition. Completely remove all fabric and posts at completion of construction.
- B. Wire Fabric:
 - 1. Install wire fabric for attachment of filter fabric for sediment fence.
 - 2. Secure wire fabric to posts with aluminum alloy wire, minimum 10 gage. Secure at top, middle, and bottom.
 - 3. Bury 4-inch minimum of wire fabric in trench upslope and adjacent to the wood post for the full length.
 - 4. Set posts at 6 feet maximum per Drawings.
 - 5. Wire fabric to extend not more than 24 inches above the ground surface unless otherwise noted on Drawings.

3.3 GROUND COVER

- A. Do not clear any areas until construction is ready to begin. Disturb only the minimum area necessary to accomplish the work. The summer construction season is defined as May 1 to September 30. If construction extends beyond the summer construction season, permanent seeding erosion control measures shall be installed in areas unworked for more than 15 consecutive days. In addition, all disturbed areas shall be covered with plastic sheeting when work has stopped for more than 12 hours. If seasonal cover and erosion control practices have already been placed, plastic sheeting is required during the winter season until plant growth is firmly established. If construction has stopped for more than 15 consecutive days during the summer season, temporary cover measures shall be applied to the affected cleared areas. All temporary measures (Summer and Winter) must be inspected and repaired daily.
- B. Protect all disturbed areas, including cleared, cut, fill, or other areas of reduced plant cover or exposed soil caused by work in this contract from erosion until permanent erosion control measures are established. Protection shall include plastic sheeting, organic or inorganic erosion control matting, riprap, temporary seeding, or straw mulch.

- C. Temporary seeding shall be done in accordance with the provisions of Section 02935. Erosion control matting shall be applied according to the manufacturer's printed instructions and Section 02935. Temporary erosion control measures shall be removed prior to installing permanent seeding erosion control only if the temporary facilities interfere with proper installation of permanent seeding (e.g., plastic on slopes to be seeded).
- D. All work areas that are disturbed shall receive temporary or permanent cover measures. The table and text below lists required cover measures by slope and season.

Season	Slope 3:1 or Flatter
Temporary, May 1 to September 30 (Dry Season)	3,000 lb/acre straw mulch if unworked for more than 15 consecutive days; temporary hydroseed mix if future earthwork delayed more than 30 days.
Temporary, October 1 to April 30 (Wet Season)	Plastic on all slopes and stockpiles, with more than 10 feet of vertical relief, if unworked for more than 12 hours. Permanent measures (except hydroseeding, which must be performed in the next growing season) if unworked for more than 15 consecutive days.
Permanent Measures (After Construction)	Hydroseed. Erosion control matting required at critical steeper areas as indicated on the Drawings.

- 1. Slopes steeper than 3:1 and with more than 10 feet of vertical relief, require erosion control matting, as shown on the Drawings, in addition to the measures in the above table.
- E. Areas receiving temporary treatments other than seeding shall be hydroseeded at the beginning of the following seeding season.
- F. Temporary stockpile slopes shall not exceed 2:1. Stockpiles shall be covered with plastic sheeting.
- G. Plastic covering shall be installed and maintained tightly in place by using sandbags or tires on ropes with a maximum 10-foot grid spacing in all directions. All seams shall be overlapped 12 inches and taped or weighted down for the full length. Plastic covering sheets shall be toed in a minimum of 2 feet at the top of slopes in order to prevent surface water flow beneath the sheets.
- H. Areas requiring mulching will be determined by the OWNER based on weather and site conditions. Mulching techniques and rates shall conform to the 1992 Puget Sound Stormwater Manual and the Washington State Department of Ecology Stormwater Management Manual for the Puget Sound Basin.

3.4 CHECK DAMS

- A. Construct check dams in ditches where shown on the Drawings and in locations where excessive flow velocity may cause erosion.
- B. Check dams shall be placed by hand or mechanical placement and shall cover the entire section of the ditch. Placing the rock or sandbags by end dumping is not permissible. The top of the dam shall be lower than the existing ground surface adjacent to the ditch.
- C. Spacing where not shown on the Drawings, shall be such that the crest of a dam is the same elevation as the toe of the upstream dam.
- D. Remove temporary check dams after site has stabilized and as approved by the OWNER.

3.5 TEMPORARY CULVERTS

- A. Construct temporary culverts in accordance with Section 7-02 of the Standard Specifications.

3.6 STABILIZED CONSTRUCTION ENTRANCE

- A. This work shall consist of constructing access points to public roads in order to minimize the tracking of material onto the roadway. Quarry spalls shall be used to construct the stabilized construction entrance.
- B. The CONTRACTOR shall place and maintain the quarry spalls as shown in the Plans or as designated by the OWNER.

3.7 FLOW ROUTING

- A. To the extent practical, install filter fabric and construct swales, berms, and ditches as required to route surface water from offsite around the areas disturbed by construction. In locations where the offsite flow must cross the disturbed areas, install temporary culvert pipe as required to convey the water across the disturbed areas.

3.8 OTHER EROSION CONTROL MEASURES

- A. Construction of other erosion control measures, in addition to those detailed in these specifications, shall be in accordance with the current Washington State Department of Ecology Stormwater Manual for Western Washington.

3.9 MAINTENANCE DURING CONSTRUCTION

- A. Inspect all erosion control facilities daily or more frequently if necessary, to ensure that they are in good condition and operating properly. Repair or replace damaged or missing items immediately.
- B. Clean, repair, and replace filter fabric fences, straw bale barriers, stormwater diversion pipe sections, check dams, and rip rap pads as necessary to maintain their effectiveness and proper operation.
- C. Maintain seeded surfaces throughout construction including watering and mowing.
- D. Maintain an inspection report file.
- E. Remove and properly dispose of trapped sediment, debris, trash, and all other material from measures designed to retain sediment.
- F. After excavation and/or grading construct slope protection where required or as instructed by the OWNER.
- G. Construct and replace existing storm drains and inlets as soon as possible or as directed by the OWNER.
- H. Provide necessary ditches, swales and dikes to direct all water towards and into sediment ponds or traps.
- I. Excavate sediment out of basins, catch basins, check dams, and traps when capacity has been reduced by 50 percent or when more than 1 foot of sediment has accumulated.
 - 1. Remove sediment from behind sediment fence to prevent overtopping.
 - 2. Prevent sediments from being flushed to the downstream system during cleaning.
 - 3. Check dams shall be replaced before the pore spaces are filled with sediment.

3.10 HEAVY RAIN EVENTS

- A. During periods of heavy rain storms, as determined by the OWNER, construction work on the pipeline shall be discontinued. The CONTRACTOR's equipment and personnel shall be available to construct and maintain the erosion control facilities.

- B. A "Heavy Rain Event" is defined as a rain storm that, in the opinion of the OWNER, is of sufficient duration and intensity that excavation activities must be stopped, and the personnel and equipment from the excavation work are needed to maintain the erosion control facilities.

3.11 SITE RESTORATION

- A. As soon as practical after completion of a portion of the work, or when a work or waste area is no longer required, commence site restoration and install permanent erosion control measures. Temporary erosion and sedimentation control methods shall be kept in effect until the permanent erosion control is established, and the OWNER approves removal of designated temporary facilities. The time period between clearing/grubbing and final ground restoration shall be no more than 4 months in duration.
- B. All disturbed areas shall be properly cleared of temporary structures, rubbish and waste materials upon completion of the Project.
- C. All designated temporary water diversion and treatment areas or devices shall be removed and the areas restored to a permanent protected condition and drainage configuration after completion of work.
- D. Work, staging, laydown, office and other disturbed areas shall be returned to their original condition. Contaminated material shall be removed from the site and disposed of in an approved location.

END OF SECTION

SECTION - 2300
TRENCHING, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavation, trenching, backfilling and compacting, trench safety, removal of pavement and concrete, and haul and disposal of trench material for all underground utilities.

- B. Related Sections include but are not necessarily limited to:
 - 1. Skagit Public Utility District No. 1 General Conditions
 - 2. Division 1 - General Requirements.
 - 3. Section 02100 - Site Preparation.
 - 4. Section 02210 - Controlled Low Strength Material.
 - 5. Section 02515 - Precast Concrete Manholes and Vaults.
 - 6. Section 02700 – Bases, Ballasts, Pavement and Appurtenances
 - 7. Section 15000 – Piping: General

- C. No subsurface investigation was performed for this project

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. ASTM International (ASTM):
 - a. C33, Standard Specification for Concrete Aggregates.
 - b. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - c. D2487, Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - d. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 - e. D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.

1.3 DEFINITIONS

- A. Excavation for trenches shall be structure excavation in accordance Section 2-09 of the Standard Specifications.

- B. Removal of Pavement and Concrete Panels refers to the removal of Bituminous Surface Treatments (BST) and asphalt occurring at the surface, and existing concrete pavement panels overlain with asphalt located at unspecified depth below the existing surface layer and layer of aggregate base.

- C. Relative Compaction: The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D1557. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the ENGINEER.

- D. Optimum Moisture Content: Determined by the ASTM standard specified to determine the maximum dry density for relative compaction. Field moisture content shall be determined on the basis of the fraction passing the ¾-inch sieve.

- E. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes. Well-graded does not define any numerical value that must be placed on the coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters. Well-graded is used to define a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.
- F. Unsuitable Material: The term “Unsuitable Material” refers to (1) in-situ or site soils that are unsuitable as foundation or subgrade materials because of their density, moisture content, organic content, plasticity, or gradation; and (2) soil (onsite or imported) that is not suitable as fill or backfill because it does not meet the requirements of the Specifications.
- G. Imported Material: Material obtained by the CONTRACTOR from sources off the site.

1.4 SUBMITTALS

- A. Miscellaneous Submittals:
 - 1. Trench safety plan and/or trench shoring drawing including current certification of trench shields (trench boxes) if employed.
 - 2. Haul Routes: Submit planned haul routes for material disposal and importation. Include the planned number and frequency of trips.
 - 3. Copies of reclamation permits or fill permit where surface and trenching materials are being disposed.
 - 4. Backfill material gradation testing.

1.5 IMPORTED MATERIAL ACCEPTANCE

- A. Tests necessary for the CONTRACTOR to locate an acceptable source of imported material shall be made by the CONTRACTOR. Certification that the material conforms to the Specification requirements along with copies of the test results from a qualified commercial testing laboratory shall be submitted to the OWNER for approval as stated in 1.4.A. All sieve analysis testing shall be at the CONTRACTOR’s sole expense.
- B. No imported materials shall be delivered to the site until the proposed source and materials tests have been accepted by the OWNER.

1.6 PROTECTION OF EXISTING UTILITIES AND STRUCTURES

- A. Existing Utilities: Protect existing utilities in accordance with Section 1-07.17 of the Standard Specifications.
- B. Damage to Existing Improvements: The CONTRACTOR shall be responsible for damage in accordance with Section 1-07.17 of the Standard Specifications.

1.7 BACKFILL AND COMPACTION CONTROL TESTS

- A. Backfill of all signs, mailboxes, trench excavations and behind walls is incidental to other work under the contract. Material shall be in conformance with the Plans and these specifications.
- B. Laboratory densities will be determined by ASTM D1557, Moisture-Density Relations of Soils and Soil-Aggregate Mixtures. For imported materials (e.g., sand, aggregate backfill), CONTRACTOR shall provide current laboratory density test results and pay for same for each source of backfill material to be used.
- C. Density sampling of backfill placed by the CONTRACTOR will be performed by OWNER.

- D. In-place density will be determined by one or more of the following methods:
 - 1. ASTM D1556, Test for Density of Soil In-place by the sand cone method.
 - 2. ASTM D2167, Test for Density of Soil In-place by the rubber balloon method.
 - 3. ASTM D2922, Test for Density of Soil In-place by the nuclear method.
- E. The CONTRACTOR shall assist with this testing work by leveling small test areas and excavating and shoring test pits when and where designated by the OWNER. Backfill the test areas and test pits after the test is complete at the CONTRACTOR's sole expense. The frequency and location of testing shall be determined solely by the OWNER. The OWNER may test any lift of backfill at any time, location, or elevation.

1.8 TYPE OF SURFACE RESTORATION

- A. Surface restoration and backfill above the pipe zone is indicated on the Drawings. The OWNER reserves the right to modify the use, location, and quantities of the various types of restoration during construction as the OWNER considers to be in the best interest of the OWNER.

1.9 SITE CONDITIONS

- A. Avoid overloading or surcharge a sufficient distance back from edge of excavation to prevent slides or caving.
 - 1. Maintain and trim excavated materials in such manner to be as little inconvenience as possible to public and adjoining property owners.
- B. Provide full access to public and private premises and fire hydrants, at street crossings, sidewalks and other points as designated by OWNER to prevent serious interruption of travel.
- C. Protect and maintain bench marks, monuments or other established points and reference points and if disturbed or destroyed, replace items to full satisfaction of OWNER and controlling agency.
- D. Verify location of existing underground utilities.

PART 2 PRODUCTS

2.1 SUITABLE FILL AND BACKFILL MATERIAL REQUIREMENTS

- A. General:
 - 1. Fill, backfill, and embankment materials shall be suitable processed select clean, fine earth, rock, or sand, free from grass, roots, brush, trash, organic matter, debris, and other deleterious material.
 - 2. Backfill within 6-inches of finish grade between the shoulder edge and Fire Hydrant walls may consist of native backfill upon approval by the Engineer.
- B. Fill and backfill materials to be placed within 6 inches of any structure or pipe shall be free of rocks or unbroken masses of earth materials having a maximum dimension larger than 1 1/2 inches.
- C. Suitable Materials: Materials not defined as unsuitable in Article 2.2 below are defined as suitable materials and may be used in fills, backfilling, and embankment construction subject to the indicated limitations. In addition, when acceptable to the OWNER, some of the material listed as unsuitable may be used when thoroughly mixed with suitable material to form a stable composite provided it is capable of being compacted to the specified relative compaction.
- D. See Section 02700-Bases, Ballasts, Pavements, and Appurtenances for additional information regarding backfill aggregate requirements.

2.2 UNSUITABLE MATERIAL

- A. Unsuitable materials include the materials listed below.
 - 1. In-situ or site soils that are unsuitable as foundation or subgrade materials because of their density, moisture content, organic content (including coal), plasticity, or gradation.
 - 2. Soils (onsite or imported) that are not suitable as fill because they cannot be compacted sufficiently to achieve the density specified for the intended use according to the requirements of the Specifications.
 - 3. Materials that contain hazardous or designated waste materials including petroleum hydrocarbons, pesticides, heavy metals, and any material which may be classified as hazardous or toxic according to applicable regulations.

2.3 USE OF BACKFILL MATERIAL TYPES

- A. The CONTRACTOR shall use the types of materials as shown on the Drawings for all required backfill construction hereunder.
- B. Where these Specifications conflict with the requirements of any local agency having jurisdiction or with the requirements of a pipe material manufacturer, the OWNER shall be immediately notified. In case of conflict between types of pipe embedment backfills, the CONTRACTOR shall use the agency-specified backfill material if that material provides a greater degree of structural support to the pipe, as determined by the OWNER. In case of conflict between types of trench or final backfill types, the CONTRACTOR shall use the agency-specified backfill material if that material provides the greater in-place density after compaction.
- C. Backfill types shall be consistent with Section 02700 – Bases, Ballasts, Pavement and Appurtenances.
- D. Engineer Ordered Trench Stabilization material shall consist of Quarry Spalls meeting Section 9-16.3 of the Standard Specifications.

2.4 FILTER FABRIC

- A. Geotextile used for Trench Stabilization shall conform to Section 9-33.1, Table 3, of the Standard Specifications for “Soil Stabilization” fabric.

PART 3 EXECUTION

3.1 EXCAVATION - GENERAL

- A. General: Except when specifically provided to the contrary, excavation shall include the removal of all materials of whatever nature encountered, including all obstructions of any nature that would interfere with the proper execution and completion of the WORK. The removal of said materials shall conform to the lines and grades indicated or ordered. Unless otherwise indicated, the entire construction site shall be stripped of all vegetation and debris, and such material shall be removed from the site prior to performing any excavation or placing any fill. The CONTRACTOR shall furnish, place, and maintain all supports and shoring that may be required for the sides of the excavations. Excavations shall be sloped or otherwise supported in a safe manner in accordance with applicable State safety requirements and the requirements of OSHA Safety and Health Standards for Construction (29CFR1926).
- B. Removal of Bituminous Surface Treatment, Pavement, and/or Concrete Panels to accommodate the new pipe shall be in accordance with the work shown on the plans and detail for Typical Trench Restoration. Work shall be in accordance with Section 2-02.3(3) and shall include haul and disposal of removed pavement.

- C. Removal and Exclusion of Water:
1. The CONTRACTOR shall remove and exclude water, including stormwater, groundwater, irrigation water, and wastewater, from all excavations unless specifically stated herein. Dewatering shall conform to Section 02140 – Dewatering. Water shall be removed and excluded until backfilling is complete and all field soils testing has been completed.

3.2 PIPELINE AND UTILITY TRENCH EXCAVATION

- A. Pothole Existing Utility Location:
1. The CONTRACTOR shall excavate and expose existing utilities where indicated on the Drawings (typically noted as “verify elevation and location”). Excavation shall be performed in advance of pipeline laying in order to allow time for resolution of utility conflicts by the OWNER.
 2. Data, including dates, locations excavated, sketches and photos, depths to existing ground, and horizontal distances shall be submitted to the OWNER as soon as possible in order to minimize delays.
 3. Damage to utilities from excavation activities shall be repaired by the CONTRACTOR at no additional cost to the OWNER.
- B. General: Only where indicated on the Drawings, excavation for pipelines and utilities shall be open-cut trenches with widths as indicated, all other locations will be by pipe bursting method.
- C. Furnish and Install Adequate Site and Trench Safety Systems in Accordance with RCW 49.17:
1. Install and maintain shoring, sheeting, bracing and sloping necessary to support the sides of the excavation and to prevent any movement that may damage adjacent facilities, delay the work, endanger life and health, or pose a threat to the environment. Conform to the requirements of WISHA and other applicable governmental regulations and agencies.
 2. All cribbing, sheeting, and shoring shall be designed by a licensed professional engineer in the State of Washington and meet the requirements of W.A.C. 296-155 (Safety Standards for Construction Work, Part N, Excavation, Trenching, and Shoring).
 3. The CONTRACTOR shall familiarize themselves with, and comply with, all other applicable codes, ordinances and statutes, and bear sole responsibility for the penalties imposed for noncompliance.
 4. The CONTRACTOR shall be solely responsible for making and maintaining all excavations in a safe manner.
 5. Use any combination of shoring and overbreak, tunneling, boring, sliding trench shield, or other method allowed by the applicable local, state, and federal safety codes.
 6. Carefully reconsolidate the bedding and side support behind a trench shield prior to placing backfill.
 7. Leave in place those portions of cribbing and sheeting extending below the crown elevation of the pipe, unless the bedding and side support can be reconsolidated to the satisfaction of the OWNER.
 8. Where removal of sheeting would result in damage to adjacent utilities or other property, the OWNER may order all or a portion of sheeting to be cut off and left in place.
 9. Do not use horizontal strutting below the barrel of a pipe.
 10. Do not use the pipe as support for trench bracing.
 11. Damages resulting from improper shoring and failure to shore shall be the sole responsibility of the CONTRACTOR.
- D. Contaminated Soil and/or Water:
1. There are no known locations of soil contamination at the project site. However, contaminated material may exist within the work area.
 2. Activities involving contaminated materials, should they be encountered, shall be in accordance with:
 - a. Washington State Department of Health Regulations.
 - b. Federal Resources Conservation and Recovery Act (RCRA), 42 USC, Sections 6901 through 6987.
 - c. Federal Hazardous and Solid Waste Amendments (HSWA), PL 98-616.
 - d. Other codes and regulations related to the scope of work.
 3. If contaminated materials are encountered during construction, the CONTRACTOR shall stop work immediately in this area, and shall sufficiently secure the work area such that contaminated materials

or potentially contaminated materials are not exposed to public. This shall be accomplished through temporary backfilling, trench plating, covering the exposed areas with plastic sheeting, or other means. The CONTRACTOR shall immediately notify the OWNER of his findings, shall secure the area, and then shall continue work in another area away from the area in question. The CONTRACTOR shall not continue work in the potentially contaminated area until directed by the OWNER. Stopping work in a potentially contaminated area, and moving to another work area, shall be considered part of the work and no additional payment will be made. Payment for work within contaminated areas will be paid in accordance with that specified later in this section.

4. If contaminated materials are encountered, and if directed by the OWNER, the CONTRACTOR shall prepare a site-specific Health and Safety Plan (HSP), subject to review by the OWNER, which details how the CONTRACTOR intends to protect workers while working in the presence of contaminated soils and groundwater.
 5. The HSP shall be prepared, signed, and stamped by a Certified Industrial Hygienist employed by the CONTRACTOR. The HSP shall be reviewed and signed by the CONTRACTOR and all personnel who will be overseeing work in the contaminated construction zones, including subcontractors.
 6. A copy of the HSP shall be provided to all personnel working in the contaminated areas. All CONTRACTOR personnel performing work in the identified contaminated areas shall be required to read the HSP and shall be required to sign an acknowledgement that he/she has obtained and read a copy of the HSP. No worker shall be allowed in the identified contaminated areas until a copy of his/her signed acknowledgement has been submitted to the OWNER by the CONTRACTOR.
 7. The HSP shall conform to the requirements of all local, state, and federal ordinances, rules, regulations, and guidelines concerning occupational health and safety issues. Included as part of the HSP is the requirement for and the implementation of ongoing monitoring of the project by the CONTRACTOR for contaminated materials. This monitoring shall, at a minimum, include visual observation and odor detection by personnel with appropriate hazardous materials training, including 40 hours of EPA-approved Health and Safety training.
 8. The excavation or exposure of soil within 300 feet of the described locations shall be monitored by the CONTRACTOR for subsurface contamination in compliance by personnel with appropriate hazardous materials training, including 40 hours of EPA-approved Health and Safety training.
 9. Analysis of contamination of soil and water samples will be provided by the OWNER through a certified hazardous waste laboratory using U.S. EPA approved analytical methods.
 10. Implementation of the HSP for the project, beyond the monitoring which is included with the HSP, requires: first, detection of contaminated materials; second, a written request by the CONTRACTOR to the OWNER; and third, approval by the OWNER in writing that the HSP shall be implemented.
 11. Stockpiling of contaminated material will be allowed only at locations approved by the OWNER and shall comply with all regulatory requirements. Unless otherwise indicated on the plans, CONTRACTOR shall provide temporary site or sites for stockpiling, and no stockpiling of contaminated material shall be allowed within or adjacent to the pipeline alignment.
 12. In the event that groundwater contamination is encountered, CONTRACTOR shall comply with all applicable federal, state, and local laws and regulations pertaining to the work performed during the dewatering and disposal of contaminated groundwater.
 13. Payment for furnishing the HSP and for removing, storing, and disposing of contaminated soil and/or groundwater will be made in accordance with an agreed price. If agreement cannot be reached, payment will be made by force account in accordance with Section 7.2 of the Supplementary General Provisions.
- E. Trench Bottom: The bottom of the trench shall be excavated uniformly to the grade of the bottom of the pipe bedding. Excavations for pipe bells shall be made as required.
- F. Open Trench:
1. Except for work in roadways, the maximum amount of open trench permitted in any one location shall be 250 feet, or the length necessary to accommodate the amount of pipe installed in a single day, whichever is greater.
 2. In roadways, the open trench length shall be held to the minimum length necessary for pipe installation.

3. All trenches shall be fully backfilled at the end of each day or, in lieu thereof, shall be covered by heavy steel plates adequately braced and capable of supporting vehicular traffic in those locations where it is impractical to backfill at the end of each day.
 4. The above requirements for backfilling or use of steel plate will be waived in cases where the trench is located further than 100 feet from any traveled roadway or occupied structure. In such cases, however, barricades and warning lights meeting safety requirements shall be provided and maintained.
- G. Over-Excavation: When ordered by the OWNER, trenches shall be over-excavated beyond the depth and/or width shown. Such over-excavation shall be to the dimensions ordered. The trench shall then be backfilled to the grade of the bottom of the pipe bedding. Over-excavation less than 6 inches below the limits on the Drawings shall be done at no increase in cost to the OWNER. When the over-excavation ordered by the OWNER is 6 inches or greater below the limits shown, or wider, additional payment will be made to the CONTRACTOR. Said additional payment will be made under the unit price bid item for over-excavation and trench stabilization material.
- H. Where pipelines are to be installed in embankments, fills, or structure backfills, the fill shall be constructed to a level at least one foot above the top of the pipe before the trench is excavated.
- I. If a moveable trench shield is used during excavation operations, the trench width shall be wider than the shield so that the shield is free to be lifted and then moved horizontally without binding against the trench sidewalls. If the trench walls cave in or slough, the trench shall be excavated as an open excavation with sloped sidewalls or with trench shoring, as indicated and as required by the pipe structural design.

3.3 TRENCH STABILIZATION

- A. When, in the opinion of the OWNER, the existing material in the bottom of the trench is unsuitable for supporting the pipe, excavate below the bottom of the pipe, as shown on the Drawings or as directed by the OWNER.
- B. Install Geotextile across full width of trench and up the trench sides to a height adequate to form a 2-foot-minimum lap of fabric over the installed trench stabilization material.
- C. Backfill the trench to subgrade of pipe base with trench stabilization material specified herein. Place the trench stabilization material over the full width of the trench to the required grade. Compact material to provide a firm, non-yielding surface as approved by the OWNER. Providing a minimum 2-foot lap at seams.
- D. At the CONTRACTOR's option, trench stabilization may be constructed to aid dewatering, at no additional cost to the OWNER.

3.4 OVER-EXCAVATION NOT ORDERED OR INDICATED

- A. Any over-excavation carried below the grade ordered or indicated, shall be backfilled to the required grade with the indicated material and compacted. Such work shall be performed by the CONTRACTOR at no additional cost to the OWNER.

3.5 PRESERVATION AND RESTORATION OF ADJACENT LANDSCAPE AND SHOULDER

- A. Where excavation occurs in landscaped or lawn areas the Contractor shall repair areas damaged through the course of the work to substantially similar condition on completion of the work.
- B. CONTRACTOR shall restore City and County Roads and shoulders to substantially the same condition as prior to the work, with Crushed Surfacing Top Course meeting City and Washington's specifications, at the CONTRACTOR's expense.

3.6 EXCAVATION IN VICINITY OF TREES

- A. Except where trees are indicated to be removed, trees shall be protected from injury during construction operations. Conform to applicable portions of Section 02100 – Site Preparation regarding tree preservation. No tree roots over 2 inches in diameter shall be cut without express permission of the OWNER. Trees shall be supported during excavation by any means previously reviewed by the OWNER.

3.7 BACKFILL - GENERAL

- A. Backfill shall not be dropped directly upon any structure or pipe. Backfill shall not be placed around or upon any structure until the concrete has attained sufficient strength to withstand the loads imposed.
- B. Backfill shall be placed after all water is removed from the excavation, and the trench sidewalls and bottom have been dried to a moisture content suitable for compaction.
- C. If a moveable trench shield is used during excavation, pipe installation, and backfill operations, the shield shall be moved by lifting the shield free of the trench bottom or backfill and then moving the shield horizontally. The CONTRACTOR shall not drag trench shields along the trench causing damage or displacement to the trench sidewalls, the pipe, or the bedding and backfill.
- D. Immediately prior to placement of imported backfill materials, the bottoms and sidewalls of trenches and structure excavations shall have all loose sloughing, or caving soil and rock materials removed. Trench sidewalls shall consist of excavated surfaces that are in a relatively undisturbed condition before placement of backfill materials.

3.8 PLACING AND SPREADING OF BACKFILL MATERIALS

- A. Backfill materials shall be placed and spread evenly in layers. When compaction is achieved using mechanical equipment, the layers shall be evenly spread so that when compacted, each layer shall not exceed 6 inches in thickness.
- B. During spreading, each layer shall be thoroughly mixed as necessary to promote uniformity of material in each layer. Pipe zone backfill materials shall be spread around the pipe so that when compacted the pipe zone backfill will provide uniform bearing and side support.
- C. Where the backfill material moisture content is below the specified moisture content, water shall be added before or during spreading until the proper moisture content is achieved.
- D. Where the backfill material moisture content is too high to permit the specified degree of compaction the material shall be dried until the moisture content is satisfactory.

3.9 COMPACTION OF BACKFILL MATERIALS

- A. Pipe Bedding: When laying the pipe, not less than six inches of specified bedding shall be provided below the bottom of the pipe. An additional six inches of bedding shall be carefully screeded by means of a template shaped to the outside radius of the pipe to provide firm bearing for the full length of each pipe section except at bell holes. A string and/or laser beam must be used to guide the template.
- B. Pipe Zone Backfill: Backfill up to a minimum 6 inches above the top of pipe shall be specified pipe zone material, which is tamped as specified herein. Backfill shall consist of a minimum of two steps, with the first step consisting of backfill and compaction to the springline, and the second step including backfill and compaction to 6 inches above the top of the pipe.

1. After the pipe has been laid and adjusted to specified line and grade, it shall be carefully cradled. Cradling shall be carried on, on both sides of the pipe simultaneously and thoroughly tamped under and around the pipe to secure a uniform bedding for the lower one-half of the pipe. Great care shall be exercised not to damage the protective coating. Backfilling shall be continued when necessary to prevent movement and/or flotation of the pipe.
 2. After the pipe in the trench has been assembled, the CONTRACTOR shall backfill all bell holes in the same manner as specified for cradling pipe.
 3. The CONTRACTOR shall place a protective covering of pipe zone material not less than 6 inches in thickness to cover the entire upper half of the pipe before the trench is backfilled by mechanical equipment. Conform to Standard Detail for "Typical Trench Section" on the Drawings.
- C. Equipment weighing more than 10,000 pounds shall not be used closer to walls than a horizontal distance equal to the depth of the fill at that time. Hand operated power compaction equipment shall be used where use of heavier equipment is impractical or restricted due to weight limitations.
- D. Compaction Requirements: The following compaction test requirements shall be in accordance with ASTM D1557 - Test Method for Laboratory Compaction Characteristics of Soils Using Modified Effort (56,000 ft - lbf/ft³) (2,700 kN-m/m³) for fine-grained materials (sand and select trench backfill) materials; and in accordance with ASTM D4253 - Standard Test Method for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table, and D4254 - Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density, for coarse materials (4-inch-minus gravel and coarse drain rock). Where agency or utility company requirements govern, the highest compaction standards shall apply.

Location or Use of Fill	Relative Compaction	Moisture Content
Pipe zone backfill	90	Within ±2% of optimum
Trench backfill, beneath paved or gravel areas, and beneath structures	95	Within ±2% of optimum
Trench backfill, not beneath paved or gravel areas or structures	80	Within ±2% of optimum
Backfill around structures	90	Within ±2% of optimum
Backfill beneath structures	95	Within ±2% of optimum
Embankment fill for road	95	Within ±2% of optimum
Embankment supporting pipe	95	Within ±2% of optimum
Roadway Gravel Subbase	95	Within ±2% of optimum
Base course and top course	95	Within ±2% of optimum
Overexcavation Backfill	95	Within ±2% of optimum
Topsoil	Lightly rolled, suitable for seeding	—

3.10 DISPOSAL OF EXCESS EXCAVATED MATERIALS

- A. Excess excavated materials not required or not suitable for backfill or fill material shall be removed from the site. Material may not be placed on the right-of-way other than specifically shown on the grading and drainage plans. Make all arrangements hauling and disposal of the excavated material and conform to the requirements of the local agency having jurisdiction.

3.11 TOPSOIL REPLACEMENT

- A. Upon completion of trench backfill, embankment fills and finished grading, previously stockpiled topsoil shall be placed and spread evenly over the disturbed areas. CONTRACTOR shall not operate vehicles and equipment resulting in compaction of topsoil after placement. All topsoil shall be retained and used on site where regrading occurs. Additional topsoil may need to be imported to provide the required top soil depth.

3.12 SURFACE RESTORATION

- A. Conform to the requirements of Section 02700 – Bases, Ballasts, Pavement and Appurtenances.

3.13 FIELD QUALITY CONTROL

- A. Testing:
 - 1. Perform in-place moisture-density tests as directed by the Owner.
 - 2. Perform tests through recognized testing laboratory approved by Owner.
 - 3. Costs of "Passing" tests paid by Owner.
 - 4. Perform additional tests as directed until compaction meets or exceeds requirements.
 - 5. Cost associated with "Failing" tests shall be paid by Contractor.
 - 6. Reference to Engineer in this section will imply Soils Engineer when employed by Owner and directed by Engineer to undertake necessary inspections as approvals as necessary.
 - 7. Assure Owner has immediate access for testing of all soils related work.
 - 8. Ensure excavations are safe for testing personnel.

END OF SECTION

**SECTION - 02350
ASBESTOS CONCRETE PIPE REMOVAL**

PART 1 GENERAL

1.1 GENERAL

- A. Furnish all labor, materials, tools, equipment, certified personnel, permits for removal and disposal, and work plans for the removal of asbestos concrete pipe from the trench and transporting and disposing of the material in an approved and permitted site.
- B. Work includes removal of approximately 1,500 linear feet of asbestos containing concrete pipe. Asbestos content is up to 20% chrysotile and crocidolite asbestos.
- C. Pipe to be removed has been out of service for 44 years.

1.2 RELATED SECTIONS

- A. Section 01060 Regulatory Requirements
- B. Section 01300 Contractor Submittals
- C. Section 01350 Safe Workplace

1.3 QUALITY ASSURANCE

- A. Qualification Requirements:
 - a. All personnel having direct contact with asbestos containing cementitious pipe shall be certified Asbestos Workers through the Washington State Department of Labor and Industries.
 - b. Personnel preparing removal plans and reporting shall have Asbestos Supervisory level certifications through the Washington State Department of Labor and Industries. A minimum of one Asbestos Abatement Supervisor will be required on site while asbestos pipe is anticipated to be encountered as shown on the plans.
 - c. All Contractors performing asbestos abatement shall be licensed as Asbestos Contractors through the Washington State Department of Labor and Industries.

1.4 SUBMITTAL

- A. Asbestos Removal Plan:
 - a. The Contractor shall submit an Asbestos Removal Plan in accordance with Section 01300. The plan shall have been prepared under the direction of an Asbestos Supervisor at a minimum. The plan shall list the personnel, their certifications, and work plan including procedures for excavating to remove the pipe, how to handle it, equipment used, haul routes and location of disposal.
 - b. Asbestos Removal Plans or Safe Workplace plans shall address the required Personal Protective Equipment to be used.

1.5 PERMITS

- A. The Contractor is responsible for obtaining a Northwest Clean Air Agency Asbestos Removal and Disposal Permit and any other permits required for the removal and disposal of the asbestos containing materials.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION - 02400
HORIZONTAL DIRECTIONAL DRILLING

PART 1 GENERAL

1.1 GENERAL

- A. Furnish all labor, materials, tools, and equipment required to install a new water main using the directional drilling method to the sizes and limits as shown on the plans, and as specified by these technical specifications herein. Work includes, but not limited to, proper installation, testing, restoration of underground utilities and environmental protection and restoration.
- B. The directional drilling method involves first drilling a pilot hole as shown on the approved bore plan, and then enlarging the pilot hole no larger than 1.5 times the outer diameter of the pull-in pipe, pipe joint or coupling and pull back the pipe through the enlarged hole.

1.2 RELATED SECTIONS

- A. Division 1
- B. Section 02100 Site Preparation
- C. Section 02140 Dewatering
- D. Section 02270 Erosion Control
- E. Section 15000 Piping: General
- F. Section 15062 Pipe: Fusible Polyvinyl Chloride Pipe
- G. Section 15950 Water Pipeline Testing and Disinfection

1.3 QUALITY ASSURANCE

- A. Qualification Requirements:
 - a. All directional drilling operations shall be performed by a qualified directional drilling company and personnel who has at least two (2) years of experience involving work of a similar nature. The company must have installed a minimum of 10,000 linear feet of pipe (6-inch diameter or greater) using directional drilling operations in the last three years.
 - b. Schedule all work through the Owner. Notify the Owner a minimum of ten (10) working days in advance of the start of work.
 - c. Perform all work in the presence of the Owner, or his representative.
 - d. All applicable permits and applications must be in place prior to start of work.
- B. Site Review: Contours, topography and profiles of the ground as may be shown on the Contract Drawings are believed to be reasonably correct, but are not guaranteed to be absolutely so and are presented only as an approximation. It is the Contractor's responsibility to verify all elevations required to successfully complete the Horizontal Directional Drill operation.

1.4 SUBMITTALS

- A. Contractor's Experience Record: Furnish document(s) supporting the directional drilling Contractor's qualifications and experience.
- B. Materials: Submit all applicable pre and post-construction pipe submittals as per applicable technical specifications of the pipe to be used for this project. Additional borings performed by the Subcontractor and analysis of soils along the path of the proposed crossing. The Subcontractor shall be responsible for obtaining and including in his bid price the cost of any additional borings along the pipe alignment which may be necessary to design the proposed directionally drilled crossing.

- C. Work Plan: Prior to beginning work, submit a work plan detailing the procedure and schedule to be used to execute the project. The Work plan is to include a description of all equipment to be used, down-hole tools, a list of personnel and their qualification and experience (including backup personnel in the event that an individual is unavailable), list of subcontractors, a schedule of work activity, a safety plan (including MSDS of any potentially hazardous substances to be used), an environmental protection plan, and contingency plans for possible problems. Work plan should be comprehensive, realistic and based on actual working conditions for this particular project. The plan should document the thoughtful planning required to successfully complete the project. This shall include, but not be limited to, entry and exit pits; settlement pit; size, capacity and arrangement of drilling and pulling equipment; layout of carrier pipe; details and spacing of pipe rollers; type of current head; method of monitoring and controlling line and grade; method of detection of surface movement; and layout of any proposed construction staging areas.
- D. Bore Plan: Prior to beginning work, submit a signed and sealed, scaled drawing of the pilot bore plan for review (Max. Vertical Scale 1" = 2' and Max. Horizontal Scale 1" = 20'). Show finished grade, deflection and radiuses of the pilot bore, all existing utilities with minimum vertical and horizontal clearances. Address the location of the drill rig setups and for multiple bores, the lengths of each bore based on soil condition, equipment used, topography, etc. The proposed vertical and horizontal clearances between the bored pipe and any existing/proposed conflicting pipes, conduits or obstructions cannot exceed the guidance system accuracy tolerance by a minimum of 100%.
- E. Equipment: Submit specifications on directional drilling equipment to be used to ensure that the equipment will be adequate to complete the project. Equipment list is to include but not be limited to: drilling rig, mud system, mud motors (if applicable), down-hole tools, guidance system, and rig safety systems. Include calibration records for guidance equipment. Submit any specifications for any drilling fluid additives that might be used.

PART 2 PRODUCTS

2.1 PIPE AND TRACER WIRE

- A. Pipe and tracer wire shall comply with Section 15000 Piping General and Section 15070 Pipe: High Density Polyethylene (PE4710)

2.2 DRILLING EQUIPMENT

- A. General: The directional drilling equipment is to consist of a directional drilling rig of sufficient capacity to perform the bore and pull back the pipe, a drilling, fluid mixing, delivery and recovery system of sufficient capacity to successfully complete the installation, a Magnetic Guidance System (MGS) or "walkover" system to accurately guide boring operations, a vacuum truck of sufficient capacity to handle the drilling fluid volume, and trained and competent personnel to operate the system. All equipment must be in good, safe condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.
- B. Drilling Rig: The drilling shall consist of a hydraulically powered system to rotate and push hollow drilling pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. Anchor the machine to the ground sufficiently to withstand the pulling, pushing and rotating pressure required to complete the installation. The hydraulic power system must be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system must be free of leaks. The rig is to have a system to monitor and record maximum pullback pressure during pull-back operations.
- C. Drill Head: The drill head shall be steerable by changing its rotation with the necessary cutting surfaces and drilling fluid jets.

D. Mud Motors (if required): The mud motor shall have adequate power to turn the required drilling tools.

2.3 GUIDANCE SYSTEM

- A. General: Use an electronic "walkover" tracking system or a Magnetic Guidance System (MGS) probe or proven (non-experimental) gyroscopic probe and interface for a continuous and accurate determination of the location of the drill head during the drilling operation. The guidance system must be capable of tracking at all depths up to fifty feet and in any soil condition, including hard rock. It should enable the driller to guide the drill head by providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction). The guidance system has to be accurate and calibrated to manufacturer's specifications of the vertical depth of the borehole at sensing position at depths up to fifty feet and accurate to 2-feet horizontally.
- B. Components: Supply all components and materials to install, operate, and maintain the guidance system.
- C. Operation: Set up and operate the Magnetic Guidance System (MGS) with personnel trained and experienced with the system. Be aware of any geo-magnetic anomalies and consider such influences in the operation of the guidance system.

2.4 DRILLING FLUID (MUD) SYSTEM

- A. Mixing System: A self-contained, closed, drilling fluid mixing system of sufficient size to mix and deliver drilling fluid composed of bentonite clay, potable water, and appropriate additives. The mixing system must be able to molecularly shear individual bentonite particles from the dry powder to avoid clumping and ensure thorough mixing. The mud-mixing and recycle unit shall be a self-contained system designed to provide a supply of high-pressure bentonite based cutting fluid to the drill unit. It shall contain a fluid storage tank and a complete bentonite and drilling fluid additive(s) mixing system. The cutting fluid is to be mixed on site. The cutting fluid shall be formulated for this specific project and anticipated conditions. It shall permit changes to be made to the bentonite and drilling fluid additive(s) concentrations during drilling in response to changing soil conditions. The field power unit shall contain the power-taken off-driven high pressure cutting fluid pumping system. The recycle units shall be of a capacity to minimize the production of new cutting fluid and maximize the reuse and recirculation of original cutting fluid produced.
- B. Drilling Fluids: Use drilling fluid composed of potable water and bentonite clay. Supply water from an authorized source with a pH of 8.5-10. Treat any water of a lower pH or with excessive calcium with the appropriate amount of sodium carbonate or equal. No additional material may be used in drilling fluid without prior approval from the Owner. The bentonite mixture used must have the minimum viscosities as measured by a March funnel:

Rocky Clay	60 seconds
Hard Clay	40 seconds
Soft Clay	45 seconds
Sandy Clay	90 seconds
Stable Sand	80 seconds
Loose Sand	110 seconds
Wet Sand	110 seconds

These viscosities may be varied to best fit the soil conditions encountered, or as determined by the operator. No additional fluid shall be used without prior approval from the Owner.
- C. Spoils Equipment: The cutting fluid removal system shall include a self-contained vacuum truck which has sufficient vacuum and tank capacity to remove excess cutting fluid mixture and cuttings from the project site as required or as directed by the Engineer. Spoils are not to be discharged into sewers or storm drains. The Contractor will contain all drilling and pipe lubricating mud by taking special

measures to prevent run-off onto adjacent properties and/or waterways. All surplus drilling and pipe lubricating mud will be removed from the site and properly disposed of by the Contractor at no cost to the Owner. The Contractor will also be responsible for all required erosion control measures at no cost to the owner.

2.5 OTHER EQUIPMENT

- A. Pipe Rollers: During pipe insertion (pullback) the pipe shall be fully supported to prevent marring of the exterior of the pipe.
- B. Restrictions: Do not use other devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections unless approved by the Owner prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated by the Owner without undue delay and maintain line and grade within the tolerances prescribed by the particular conditions of the project.

PART 3 EXECUTION

3.1 GENERAL

- A. Notify the Owner a minimum of ten (10) working days in advance of starting work. All necessary permits and approvals must be in place prior to commencement of work. Do not begin the directional drilling until the Owner is present at the job site and agrees that proper preparations for the operation have been made. The Owner's approval for beginning the installation does not in any way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the work as authorized under the Contract.
- B. All equipment used on the Owner's property and right-of-ways may be inspected by the Owner or his representatives and removed if considered unsatisfactory.

3.2 DIRECTIONAL DRILLING OPERATION

- A. Provide all material, equipment, and facilities required for directional drilling. Maintain proper alignment and elevation of the borehole throughout the directional drilling operation. The method used to complete the directional drill must conform to the requirements of all applicable permits.
- B. Protect adjacent wetlands, creeks, surface waters, and property from release of drilling fluids, spills, turbid discharge, or waste.
- C. Record readings after advancement of each successive drill pipe (no more than 10'), and plot on a scaled drawing of 1" = 4' vertical and 1" = 20' horizontal. Make all recorded readings and plan and profile information available at all times. At no time can the deflection radius of the drill pipe exceed the deflection limits of the carrier pipe as specified herein.
- D. Submit a complete list of all drilling fluid additives and mixtures to be used in the directional operation, along with their respective Material Safety Data Sheets. Contain all drilling fluids and loose cuttings in pits or holding tanks for recycling or disposal, no fluids should be allowed to enter any unapproved areas or natural waterways. Dispose of all the drilling mud and cuttings after job completion at an approved dumpsite. Hazardous fluids and accidental release are to be addressed in the Spill Prevention Control and Countermeasure Plan.
- E. Drill the pilot hole on the bore path with no deviations greater than 5% of depth over the length of the bore unless previously agreed to by the Owner. In the event that pilot does deviate from the bore path more than 5% of depth over the length of the bore, the pilot must be pulled back and re-drilled from the location along bore path before the deviation. In the event of a drilling fluid fracture, inadvertent returns, or returns loss during pilot hole drilling operations, stop drilling, wait at least 30 minutes,

inject a quantity of drilling fluid with a viscosity exceeding 120 seconds as measured by a March funnel and wait another 30 minutes. If mud fracture or returns loss continues, notify the Owner.

- F. Upon completion of pilot hole phase of the operation, submit a complete set of "as-built" records. Include in these records copies of the pilot bore path plan and profile record drawing, as well as directional survey reports as recorded during the drilling operation.
- G. Upon approval of the pilot hole location, begin the hole opening or enlarging phase. Increase the bore hole diameter to accommodate the pullback operation of the required size of carrier pipe. The type of hole opener or back reamer to be utilized in this phase is to be determined by the types of subsurface soil conditions that have been encountered during the pilot hole drilling operation. Select the proper reamer type with the final hole opening being a maximum of 1.5 times the largest outside diameter pipe system component to be installed in the bore hole.
- H. Stabilize the open bore hole by means of bentonite drilling slurry pumped through the inside diameter of the drill rod and through openings in the reamer. The drilling slurry must be in a homogenous/flowable state serving as an agent to carry the loose cuttings to the surface through the annulus of the borehole. Calculate the volume of bentonite mud required for each pullback based on soil conditions, largest diameter of the pipe system component, capacity of the bentonite mud pump, and the speed of pullback as recommended by the bentonite drilling fluid manufacturer. Contain the bentonite slurry at the exit or entry side of the directional bore in pits or holding tanks. The slurry may be recycled at this time for reuse in the hole opening operation or hauled off to an approved dumpsite for proper disposal.
- I. Fuse or join all pipe sections together according to manufacturer's specifications as applicable. The pipe must be free of any chips, scratches, or scrapes.
- J. All piping shall be installed with a continuous, insulated tracer wire. Tracer wire shall be installed simultaneously with pullback of the pipe. Wire shall either be wrapped around the pipe or taped to the pipe at 10 foot minimum intervals before installation.

3.2 HANDLING PIPE

- A. Take care during transportation of the pipe such that it will not be cut, kinked or otherwise damaged.
- B. Use ropes, fabrics or rubber protected slings and straps when handling pipes. Do not use chains, cables or hooks inserted into the pipe ends. Use two slings spread apart for lifting each length of pipe. Do not drop pipe or fittings into rocky or unprepared ground.
- C. Store pipe on level ground, preferably turf or sand, free of sharp objects that could damage the pipe. Limit the stacking of the pipes to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature conditions. Where necessary due to ground conditions store the pipe on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between supports.
- D. Handle assembled pipe in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. Position slings for handling at pipe joints. Remove sections of the pipes with cuts and gouges or excessive deformation and replace.

3.3 PERSONNEL REQUIREMENTS

- A. All personnel must be fully trained in their respective duties as part of the directional drilling crew and in safety.
- B. Supply references of previous projects using this type of installation process that this directional drilling crew has been involved.

- C. A competent and experienced supervisor of the Contractor must be present at all times during the actual drilling operations. A responsible representative who is thoroughly familiar with the equipment and type of work to be performed must be in direct charge and control of the operation at all times. In all cases, the supervisor must be continually present at the job site during the actual directional drilling operation. Furnish a sufficient number of competent workers on the job at all times to insure the directional drilling is made in a timely and satisfactory manner.
- D. Remove any personnel who are unqualified, incompetent or otherwise not suitable for the performance of this project from the job site and replace with suitable personnel.

3.4 TESTING

- A. Testing of pipe shall comply with Section 15950 Water Pipeline Testing and Disinfection.

3.5 RESTORATION

- A. Following drilling operations de-mobilize equipment and restore the work site to the original conditions or better. Backfill and compact all excavations according to these specifications.

3.6 RECORD KEEPING

- A. Maintain a daily project log of drilling operations and a guidance system log with a copy available to the Owner at the completion of project.
- B. Record the guidance system data during the actual crossing operation. Furnish "as-built" plan and profile drawings based on these recordings showing the actual location horizontally and vertically of the installation, and all utility facilities found during the installation. Certify the guidance data to the capability of the guidance System.

END OF SECTION

SECTION - 02515
PRECAST CONCRETE MANHOLE AND VAULT STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Precast concrete manhole and vaults (chambers) structures and appurtenant items, complete and in place.
- B. Related Sections include but are not necessarily limited to:
1. Skagit PUD No. 1 General Conditions
 2. Division 1 -General Requirements.
 3. Section 02300 - Trenching, Backfilling, and Compaction for Utilities
 4. Section 03002 - Concrete
 5. Section 03600 - Grout.
 6. Section 05500 - Miscellaneous Metalwork and Castings.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
1. ASTM International (ASTM):
 - a. A48, Standard Specification for Gray Iron Castings.
 - b. A536, Standard Specification for Ductile Iron Castings.
 - c. C150, Standard Specification for Portland Cement.
 - d. C478, Precast Reinforced Concrete Manhole Sections.
 - e. C923, Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes.
 2. Occupational, Health and Safety Administration (OSHA).

1.3 SUBMITTALS

- A. Shop Drawings:
1. See Section 01300 for requirements for the mechanics and administration of the submittal process.
 2. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 3. Fabrication and/or layout drawings:
 - a. Include complete Shop Drawing for precast manhole sections, precast vaults, cast iron frames and covers, and appurtenances showing typical components and dimensions, reinforcements and other details.
 - b. Itemize, on separate schedule, sectional breakdown of each manhole structure with all components and refer to drawing identification number or notation.
 - c. Indicate knockout elevations for all piping entering each manhole.
 - d. Design of Panel Vaults: Design of Panel Vaults shall be stamped and signed by a structural engineer licensed in the State of Washington.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Vaults: Vaults shall be precast concrete, of the dimensions shown on the Drawings, and in general conformance with ASTM C478. Base shall be precast with integral riser. The top slab shall be designed

to carry and HS-20 load transmitted through the entry riser. If the vault has more than one section, the joint shall be formed and caulked as specified herein for Manholes.

- B. Vault Manufacturers, or approved equal
 - 1. Utility Vault Co.
 - 2. Hanson Pipe and Products
 - 3. Granite Precast

- C. Hatches: Hatches shall conform to the requirements of Section 05500.

PART 3 EXECUTION

3.1 WORKMANSHIP

- A. All precast concrete manholes and vaults shall be installed in strict conformance with the manufacturer's written instruction, on a well compacted gravel foundation. Manholes and vaults shall be installed plumb.

- B. Entry risers and manhole frames shall be set in mortar of one part cement to 2-1/2 parts of sand by volume.

END OF SECTION

SECTION - 02567
INTERFERING UTILITY PROTECTION

PART 1 GENERAL

1.1 THE REQUIREMENT

- A. The CONTRACTOR shall protect and keep in service water pipelines and services, stormwater drains, underground power lines, telephone lines, cable TV lines, fiber optic lines, natural gas lines, oil pipelines and shall perform water main relocations and cutting and replacement of other utilities that interfere with the pipeline alignment, complete and in place, in accordance with the Contract Documents.

PART 2 PRODUCTS

2.1 UTILITY REPLACEMENT PIPING

- A. Utility lines that are cut or otherwise damaged during installation of the new water pipeline shall be replaced with new pipe of the same type material (e.g. reinforced concrete, ductile iron, copper, etc.) as that removed unless otherwise shown on the Drawings or as otherwise specified herein. New materials shall conform to the requirements of this Section.

2.2 WATER PIPE

- A. Pipe materials shall conform to Section 15062 of these specifications and shall be compatible with existing pipe materials.

PART 3 EXECUTION

3.1 GENERAL

- A. The CONTRACTOR shall protect from damage and keep in service private and public utilities encountered during the work. Utilities shall include, but are not limited to, storm drain systems, water distribution systems, electrical distribution systems, telephone, fiberoptics and CATV systems, power lines and appurtenances, natural gas lines, oil pipelines, and similar facilities and systems.
- B. The CONTRACTOR shall, a minimum of 2 working days before an excavation, call the Utilities Underground Location Center at 811. In the case of the high pressure gas pipelines and the oil pipelines that are noted on the drawings, provide a minimum of 10 days advance notice before excavation and crossing of the pipeline.
- C. The right is reserved to the OWNER and the owners of utilities, or their authorized agents, to enter upon the CONTRACTOR's work area for the purpose of making changes, connections, or repairs to their facilities. The CONTRACTOR shall cooperate with forces engaged in this work and shall avoid any unnecessary delay or hindrance to work being performed by other forces.
- D. It shall be the CONTRACTOR's responsibility to make whatever notifications and applications as may be necessary in coordinating utility and CONTRACTOR work. Directly inform individual owners or household residents at least 48 hours in advance of beginning the work to minimize or eliminate inconveniences to the public. Inform owners of work which blocks the use of the property in any way by construction or equipment or which interferes with water or sewer service.
- E. In the event any existing utility lines are cut or otherwise disrupted per requirements of the Work, or unintentionally cut or disrupted, the CONTRACTOR shall coordinate directly with the utility affected to restore service as quickly as possible without delay. CONTRACTOR shall bear all costs associated with

removal and replacement of interfering utilities, which CONTRACTOR intentionally or unintentionally cuts, damages, or disrupts, that are not required to be cut and replaced as part of Work.

3.2 LOCATIONS OF UTILITIES

- A. The locations shown on the Drawings for existing utilities are in accordance with available information obtained, for the most part, without uncovering, measuring or other verification. It is the CONTRACTOR's responsibility to call the Utilities Underground Location Center and make every effort to identify the location of existing utilities before digging. The CONTRACTOR shall make necessary arrangements for removal and replacement or repair of these utilities as necessary to facilitate pipeline construction, and the CONTRACTOR shall bear all related costs.
- B. The locations of the high pressure gas pipelines and the oil pipelines are shown on the Drawings after consultation with the utility owners, without uncovering, measuring or other verification. Per the notes on the Drawings, it is the CONTRACTOR's responsibility to contact the utility owners 10 days in advance of excavation near the pipeline so a representative can be present.
- C. Attention is directed to the possible existence of other underground facilities, such as below-grade vaults, which are not shown on the Drawings. When the removal and/or relocation of these facilities is necessary to accommodate the Work, the OWNER will provide for this additional work by other forces, or this additional work shall be performed by the CONTRACTOR as extra work pursuant to a Change Order. Notify OWNER if utilities not shown on the Drawings are encountered.
- D. It is anticipated that the CONTRACTOR will encounter water, sewer, and electric utilities (service lines running between street mains and private residences and businesses) during work operations. Records of these utility locations may be incomplete and therefore do not appear on the Drawings and will not be field located by the owning utilities. The locations of these services can usually be ascertained by relative meter location, residence location, or through discussion with various private property owners. It shall be the CONTRACTOR's responsibility to locate and protect these private services from damage.

3.3 UTILITY POLE AND GUY WIRE INTERFERENCE

- A. Where trenching is close to power poles or if guys must be removed temporarily during construction, the CONTRACTOR shall coordinate with PSE to provide temporary supports, as necessary, to support electric power poles during construction. Replace permanent guys in original locations unless directed otherwise by PSE or the OWNER. All costs for temporary supports and guy relocation will be paid for by the OWNER.

3.4 INTERFERING WATER SERVICES INTERRUPTIONS AND REPLACEMENT

- A. Individual water services shall be maintained during construction. The CONTRACTOR shall coordinate with the OWNER to relocate and/or replace the interfering services.

3.5 INSTALLATION OF REPLACEMENT UTILITY PIPELINES (IF NECESSARY BECAUSE OF INADVERTENT DAMAGE BY CONTRACTOR OR IF AC WATER MAIN)

- A. Install replacement storm drains, water lines, and sewer line connections, in accordance with Section 7-08.3 of the Standard Specifications, except that trench excavation, bedding, and backfill shall conform to this Section.
- B. Storm drain replacement shall conform to Section 7-04.3 of the Standard Specifications, except that infiltration / exfiltration testing will not be required.
- C. Waterline replacement shall conform to Section 7-11 of the Standard Specifications, including the requirements of hydrostatic testing and disinfection.

- D. The CONTRACTOR shall provide temporary pumps and piping as required to maintain storm and sanitary sewer flows past reaches of sewers temporarily interrupted by the water transmission main construction.

3.6 TRENCH EXCAVATION, BEDDING, AND BACKFILL

- A. Excavation, bedding and backfill shall conform to Section 02300.
- B. Backfill materials at the location of the utility crossing shall be as specified for the adjacent trench condition identified on the Drawings for the new water transmission main.

3.7 MINIMUM CLEARANCES

- A. Where possible, minimum clearance between the new water transmission main and existing utilities shall be 12 inches. Where grades of existing gravity sewers or storm drains must be maintained, resulting in a clearance of less than 12 inches, notify the OWNER for direction.
- B. Where clearance between the new water transmission main and an existing utility is less than 12 inches a two-inch thick neoprene pad shall be placed between the pipes.

3.8 DISSIMILAR PIPE ENDS

- A. Where cut ends of existing sewer or storm drain pipes will not fit the standard factory integral fitting of the replacement pipe, CONTRACTOR shall join pipe with a factory-fabricated adapter coupling or a rubber sleeve type coupling (Fernco, Calder, or approved equal). Similarly, in the case of waterline replacement, CONTRACTOR shall use an appropriately sized transition coupling.

END OF SECTION

SECTION - 02700
BASES, BALLASTS, PAVEMENT AND APPURTENANCES

PART 1 GENERAL

1.1 THE REQUIREMENT

- A. The CONTRACTOR shall furnish aggregates, HMA Class ½-inch, P.G. 64-22, Bituminous Surface Treatment (Seal Coat), and appurtenances or other surfacing as directed by the OWNER, complete and in place, in accordance with the Contract Documents and Plans.
- B. Material placement shall be as designated on the Plans and as described in these or referenced specifications.
- C. Supply and placement of backfill for of all sign posts, mail box supports, trench excavations, bore pit excavations, valves, and hydrant wall is considered incidental work.
- D. Appurtenances include Pavement Markings, Beam Guardrail, Remove and Replace Mailbox, and Remove and Replace Permanent Sign and Post.

1.2 CONTRACTOR SUBMITTALS

- A. Submittals shall be in accordance with Section 01300. Include materials testing reports for aggregates and asphalt concrete mixes, and emulsified asphalt for chip seal BST.

1.3 RELATED SECTIONS

- A. Public Utility District General Notes
- B. Division 1
- C. Section 02300 – Trenching, Backfilling, and Compactions for Utilities
- D. Section 04200 – Masonry Units
- E. Division 15 - Mechanical

1.4 QUALITY ASSURANCE

- A. Settlement of replaced pavement over trenches within the warranty period shall be considered the result of improper or inadequate compaction of the subbase, base materials, or trench backfill. The CONTRACTOR shall promptly repair all pavement deficiencies noted during the warranty period at the CONTRACTOR's sole expense.

PART 2 PRODUCTS

2.1 TOPSOIL

- A. Topsoil shall be Topsoil Type B according to WSDOT Standard Specifications Section 9-14. Topsoil required to conduct surface restoration in the vicinity of the Pressure Reducing Valve and where pipelines run through and along vegetated areas, shall be harvested from the immediate area where the improvements are installed.

2.2 CRUSHED SURFACING TOP COURSE

- A. Materials shall conform to Section 9-03.9(3) of the Standard Specifications.

2.3 TRENCH BACKFILL

- A. Bedding shall consist of Gravel Backfill for Pipe Zone Bedding meeting Section 9-03.12(3) of the Standard Specifications
- B. Trench backfill material above the pipe zone shall consist of Gravel Borrow, Section 9-03.14(1) of the Standard Specifications.

2.4 ENGINEER ORDERED TRENCH STABILIZATION MATERIAL

- A. Material shall consist of Quarry Spalls meeting Section 9-13.6 of the Standard Specifications.

2.5 ASPHALT CONCRETE

- A. Materials shall conform to the requirements of Section 5-04 of the Standard Specifications for the manufacturing, supply, placement, and compaction of HMA Class ½-Inch with Performance Graded Binder 64-22, and therein referenced WSDOT Standard Specifications Section 9 material specifications using asphalt binder as indicated on the Drawings.

2.6 BITUMINOUS SURFACE TREATMENT

- A. Emulsified asphalt for Bituminous Surface Treatments (BST) shall be Cationic Emulsified Asphalt CRS-Rapid Setting Low Temperature in conformance with section 9-02.1(6) of the Standard Specifications.
- B. Aggregate shall be 3/8 – inch through No. 4. and shall comply with Section 9-03.4 of the Standard Specifications.

2.7 PAVEMENT MARKING PAINT

- A. Pavement markings (materials, colors, marking descriptions) shall conform to Section 8-22 of the Standard WSDOT Specifications. Pavement marking paint shall be a product specifically formulated for use on asphalt concrete pavement and shall have a proven record of performance and durability.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

- A. The subgrade shall be prepared in accordance with Section 02300, as applicable to roadways. For paved or gravel areas, the surface of the subgrade after compaction shall be hard, uniform, smooth and true to grade and cross-section. Subgrade for pavement shall not vary more than 0.02-foot from the indicated grade and cross section. Subgrade for base material shall not vary more than 0.04-foot from the indicated grade and cross section.

3.2 SURFACE RESTORATION – INSTALLATION OF CRUSHED SURFACING MATERIAL

- A. Install compacted crushed surfacing material as shown on the Drawings and in accordance with Section 02300 and Section 4-04 of the Standard WSDOT Specifications.

3.3 SURFACE RESTORATION – INSTALLATION OF ASPHALT CONCRETE PAVEMENT

- A. Install materials as shown on the Drawings immediately following trench backfill operations, and in accordance with Section 02300, Section 5-04.3(5)E of the Standard WSDOT Specifications, and the following:
 - 1. Base Course: Install in accordance with Section 4-04 of the Standard WSDOT Specifications.
 - 2. Asphalt Concrete: Install in accordance with Section 5-04 of the Standard WSDOT Specifications.

3.4 SURFACE RESTORATION – INSTALLATION OF BITUMINOUS SURFACE TREATMENT

- A. Placement of Bituminous Surface Treatment (BST) shall be in accordance with Section 5-02 of the Standard Specifications for Seal Coats. Prior to placing BST the HMA patch shall be fog sealed in accordance with Section 5-02 of the Standard Specifications.

3.5 TEMPORARY PAVEMENT ALTERNATIVE FOR ASPHALT CONCRETE PAVEMENT AREAS

- A. In lieu of placing hot mix asphalt concrete, CONTRACTOR may place cold-mix asphalt concrete as a temporary pavement prior to placing final hot-mix pavement. Cold-mix shall be installed immediately following trench backfill operations. Permanent hot-mix pavement shall be installed in place of cold-mix as soon as possible. Until permanent pavement is installed, maintain temporary cold mix to provide a suitable driving surface.
- B. CONTRACTOR shall completely remove temporary pavement material and replace with specified hot-mix asphalt concrete prior to project completion. No additional compensation shall be allowed for temporary paving materials or the placement thereof.

3.6 SURFACE SMOOTHNESS

- A. The completed surface shall meet the tolerances of Section 5-04.3(13) of the Standard WSDOT Specifications. Corrective measures for out-of-compliance work will be taken as specified therein at no expense to the OWNER.
- B. Replacement paving shall match the lines and grades of the adjacent paving. In areas where curb and gutter is to be removed, CONTRACTOR shall contact the OWNER in advance, who will survey the top of curb grades in order to replace this section of roadway to the pre-project lines and grades.

3.7 PAVEMENT MARKING

- A. Replace all pavement markings in kind that are damaged by construction. This work is considered incidental to other work under the Contract.
- B. Pavement marking paint shall be applied where pavement paint was removed by construction operations. It shall be applied when the pavement surface is dry and clean, and when the air temperature is above 40 degrees F. All equipment used in the application of pavement marking shall produce stripes and markings of uniform quality with clean and well-defined edges that conform to the details and dimensions of adjacent striping. Drips, overspray, improper markings, and paint material tracked by traffic shall be immediately removed from the pavement surface.
- C. Pavement marking shall conform to Section 8-22 of the Standard WSDOT Specifications.

3.8 BEAM GUARDRAIL REMOVAL AND INSTALLATION

- A. Removal and reinstallation of guard rails shall conform to Section 8-11 of the Standard WSDOT Specifications for Galvanized Rail.

3.9 REMOVAL AND REINSTALLATION OF PERMANENT SIGNAGE

- A. Removal and reinstallation of permanent signage shall conform to Section 8-21 of the Standard WSDOT Specifications.

3.10 REMOVAL AND REPLACEMENT OF MAILBOX

- A. Removal and replacement of mailboxes shall conform to Section 8-18 of the Standard WSDOT Specifications.

3.11 REMOVAL OF EXISTING STRUCTURES

- A. Removal of existing structures as indicated on the Drawings shall conform to Section 2-02 of the Standard WSDOT Specifications.

3.12 PRESERVATION AND RESTORATION OF ADJACENT LANDSCAPE AND SHOULDER

- A. Where excavation occurs in landscaped or lawn areas the Contractor shall repair areas damaged through the course of the work to substantially similar condition on completion of the work.
- B. Contractor shall repair County Road shoulders to substantially the same condition as prior to the work with Crushed Surfacing Top Course meeting Skagit County, Washington's specifications, at the Contractor's expense.

END OF SECTION

**SECTION - 02935
HYDROSEEDING**

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section covers the work necessary for hydroseeding areas disturbed by construction.
- B. Except as otherwise designated by the OWNER during construction, all areas disturbed by construction which are not paved, graveled, or landscaped, shall be permanently seeded.
- C. Sensitive areas subject to soil erosion, as determined by the OWNER, shall be seeded for erosion control prior to being permanently seeded.

1.2 RELATED SECTIONS

- A. Section 01300 - Contractor Submittals.
- B. Section 02270 - Erosion and Sediment Control.

1.3 SUBMITTALS

- A. Submit copies of delivery invoices or other proof of quantities of mulch and fertilizer, and composition of the seed mix.
- B. Submit samples and literature describing soil mixes, tackifier, netting, and wood fiber mulches.

PART 2 PRODUCTS

2.1 SEED

- A. Seed shall be clean, delivered in original unopened packages and bearing an analysis of the contents. Guaranteed 95 percent pure with minimum germination rate of 85 percent.
- B. Grass and legume seed of the type herein specified shall conform to the standards for "Certified" grade seed or better as outlined by the State of Washington Department of Agriculture "Rules for Seed Certification," latest edition. Seed shall be furnished in standard containers on which shall be shown the following information:
 - 1. Common name of seed.
 - 2. Lot number.
 - 3. Net weight.
 - 4. Percentage of purity.
 - 5. Percentage of germination (in case of legumes percentage of germination to include hard seed).
 - 6. Percentage of weed seed content and inert material clearly marked for each kind of seed in accordance with applicable state and Federal laws.
- C. Upon request, the CONTRACTOR shall furnish to the OWNER duplicate copies of a statement signed by the vendor certifying that each lot of seed has been tested by a recognized seed testing laboratory within six months before the date of delivery on the project. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be accepted.

2.2 SEED MIXTURE

A. Seed mix shall be of the following composition, proportion and quality or OWNER-approved equivalent:

Kind and Variety of Seed in Mixture	Percent by Weight	Minimum Percent Pure Seed	Minimum Percent Germination
Lawn Mix			
Ryegrass	70	98	90
Fescue	30	98	90
TOTAL	100%		

2.3 FERTILIZER

- A. Fertilizer shall be commercial, chemical type, uniform in composition, free-flowing conforming to state and Federal laws, and suitable for application with equipment designed for that purpose.
- B. Fertilizer containing phosphorus shall not be applied within 200 feet of flowing streams or wetlands.
- C. Dolomitic lime shall be of the type suitable for lawns and landscaped areas.

2.4 WOOD FIBER

- A. Wood fiber mulch for hydroseeding shall be derived from fresh wood chips, defibrated into fibers and fiber bundles, as manufactured under the trade name EcoFibre, or approved equal, and shall contain no germination or growth inhibiting factor. Mulch shall hydrate quickly in water to form a homogenous slurry together with seed, fertilizer and tackifier and shall be dyed a suitable color facilitate observation of the placement of the material. When hydraulically sprayed on the ground, the material shall allow the absorption and percolating of water.

2.5 TACKIFIER

- A. The tackifier shall consist of a blend of at least three different but complimentary hydrocolloids from natural plant sources, two of these shall be *Plantago ovata* (psyllium) and *Cyamopsis tetragonolobus* (guar), which shall make up 65 percent of the total formulation, as manufactured under the trade name J-tac; EcoFibre as manufactured by Canfor Corp., New Westminster, B.C.; or approved equal, and shall have no growth or germination inhibiting factors.
- B. Mulch shall be packaged in wet-strength craft or plastic bags containing 100 pounds maximum weight. The package shall contain current labels, the manufacturer's name, and net weight.

2.6 EROSION CONTROL MATTING

- A. Erosion control netting shall be a biodegradable product coconut fiber matting, GeoJute Anti-Wash manufactured by Belton Industries or approved equivalent, 12-foot wide rolls.

2.7 WATER

- A. Water free from substances harmful to grass or sod growth.
- B. Provide water from source approved prior to use.

PART 3 EXECUTION

3.1 MOBILIZATION

- A. In order to minimize soil erosion, disturbed areas shall be hydroseeded as soon as possible within the guidelines and conditions specified. Begin hydroseeding areas ready to be seeded when the area exceeds two acres or as approved by the OWNER. Continue hydroseeding as construction work in areas approximately two acres in size is completed. Several mobilizations will be required.

3.2 SOIL PREPARATION

- A. General:
 - 1. Limit preparation to areas which will be planted soon after.
 - 2. Provide facilities to protect and safeguard all persons on or about premises.
 - 3. Protect existing trees designated to remain.
 - 4. Verify location and existence of all underground utilities.
 - a. Take necessary precaution to protect existing utilities from damage due to construction activity.
 - b. Repair all damages to utility items at sole expense.
 - 5. Provide facilities such as protective fences and/or watchmen to protect work from vandalism.
 - a. Contractor to be responsible for vandalism until acceptance of work in whole or in part.
- B. Preparation for Lawn-Type Seeding, Sprigging, Plugging or Sodding:
 - 1. Loosen surface to minimum depth of 4 IN.
 - 2. Remove stones over 1 IN in any dimension and sticks, roots, rubbish, and other extraneous matter.
 - 3. Prior to applying fertilizer, loosen areas to be seeded with a double disc or other suitable device if the soil has become hard or compacted.
 - 4. Correct any surface irregularities in order to prevent pocket or low areas which will allow water to stand.
 - 5. Distribute fertilizer uniformly over areas to be seeded:
 - 6. Incorporate fertilizer into soil to a depth of at least 2 IN by disking, harrowing, or other approved methods.
 - 7. Remove stones or other substances from surface which will interfere with turf development or subsequent mowing operations.
 - 8. Grade lawn areas to a smooth, even surface with a loose, uniformly fine texture.
 - a. Roll and rake, remove ridges and fill depressions, as required to meet finish grades.
 - b. Limit fine grading to areas which can be planted soon after preparation.
 - 9. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and before planting.

3.3 EROSION CONTROL NETTING

- A. In areas of unstable surface soil as defined by the OWNER, prepare soil for hydroseeding before placing netting. Spread erosion control netting and secure the netting per the manufacturer's instructions. Netting shall be placed over disturbed soil and laid paralleling the direction of drainage. Hydroseeding shall be done under the netting.

3.4 PERMANENT SEEDING AND EROSION CONTROL SEEDING

- A. The CONTRACTOR shall notify the OWNER not less than 24 hours in advance of any seeding operation and he shall not begin the work until areas prepared or designated for seeding have been approved. Following the OWNER's approval, seeding of the approved areas shall begin immediately.
- B. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise untillable. When in the opinion of the OWNER environmental conditions are not conducive to satisfactory result from seeding operations, suspend the work and resume it only when desirable results

are likely to be obtained. Unfavorable environmental conditions include wind strong enough to carry the seed/slurry mix away and rain that will wash seed from slopes.

- C. In order to minimize erosion, begin seeding as soon as conditions are acceptable to the OWNER.
- D. Seed, mulch, and fertilizer shall be applied together by a hydroseeder that uses water as the carrying agent and maintains continuous agitation through paddle blades. The seeder shall have an operating capacity sufficient to agitate, suspend, and mix into a homogeneous slurry the specified amount of seed, mulch, fertilizer and water. Distribution and discharge lines shall be large enough to prevent stoppage and shall be equipped with a set of hydraulic discharge spray nozzles which will provide a uniform distribution of the slurry. The fertilizer shall be placed in the hydroseeder tank no more than 30 minutes prior to application.
- E. Application rates shall be as follows:
 - 1. Seed Mix:
 - a. Lawn 200 pounds per acre
 - 2. Fertilizer:
 - a. Calcium Nitrate 176 pounds per acre
 - b. Calcium Carbonate (Agricultural Lime) 1,320 pounds per acre
 - c. Dolomite Limestone (Kaiser AG-65 or equal) 1,320 pounds per acre
 - 3. Mulch: 1,000 pounds per acre
 - 4. Tackifier:
 - a. Slopes 2 horizontal to 1 vertical and flatter 40 pounds per acre
 - b. Slopes steeper than 2 horizontal to 1 vertical 80 pounds per acre
 - c. Ravelling or highly erosive steep slopes 120 pounds per acre
- F. Prevent drift and displacement of mixture outside areas to be seeded. Remove seed mix from road surfaces and other areas not to be seeded.
- G. After seeding, irrigate the area every three days, or as approved by the OWNER, until the grass is established. Seeding is best performed in spring (mid-March to June) or fall (late September through October). For summer seeding, sprinkler systems or other measures for watering the grass seed may be required.
- H. The CONTRACTOR shall be responsible for restoring eroded areas and cleaning up eroded materials. In areas designated for permanent hydroseeding, the CONTRACTOR shall be responsible for any reseeding, fertilizing, and mulching of the areas failing to show a satisfactory stand of grass. Restoration, reseeding, fertilizing, and mulching shall be performed at no additional cost to the OWNER.
- I. A satisfactory stand of grass for permanent hydroseeding is defined as grass or section of grass of 10,000 square feet or larger that has:
 - 1. No bare spots larger than 3 square feet.
 - 2. Not more than 10 percent of total area with bare spots larger than 1 square foot.
 - 3. Not more than 15 percent of total area with bare spots larger than 6 inches square.
- J. Inspection for Acceptance in Areas Designated for Permanent Hydroseeding: Eight weeks after seeding the last section of completed grass and on written notice from the CONTRACTOR, the OWNER will, within 15 days of such written notice, make an inspection to determine if a satisfactory stand has been produced.
- K. Care and Protection of Seeded Areas:
 - 1. Protect areas that have been hydroseeded against vehicle and pedestrian traffic.
 - 2. Areas that have been damaged prior to final inspection and areas failing to receive a uniform application at the specified rate shall be hydroseeded again at no cost to the OWNER.

END OF SECTION

D I V I S I O N 3

CONCRETE

**SECTION - 03002
CONCRETE**

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Cast-in-place concrete and grout.

- B. Related Sections include but are not necessarily limited to:
 - 1. Section 03600 - Grout
 - 2. Section 02515 - Precast Manholes and Vaults

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Concrete Institute (ACI):
 - a. 116R, Cement and Concrete Terminology.
 - b. 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
 - c. 212.3R, Chemical Admixtures for Concrete.
 - d. 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
 - e. 304.2R, Placing Concrete by Pumping Methods.
 - f. 305R, Hot Weather Concreting.
 - g. 306R, Cold Weather Concreting.
 - h. 318, Building Code Requirements for Structural Concrete.
 - i. 347R, Recommended Practice for Concrete Formwork.
 - 2. ASTM International (ASTM):
 - a. A82, Standard Specification Steel Wire, Plain, for Concrete Reinforcement.
 - b. A185, Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
 - c. A615, Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement (Including Supplementary Requirements S1).
 - d. A775, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
 - e. C31, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - f. C33, Standard Specification for Concrete Aggregates.
 - g. C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - h. C94, Standard Specification for Ready-Mixed Concrete.
 - i. C138, Standard Method of Test for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
 - j. C143, Standard Test Method for Slump of Hydraulic Cement Concrete.
 - k. C150, Standard Specification for Portland Cement.
 - l. C157, Standard Test Method for Length Change of Hardened Hydraulic Cement Mortar and Concrete.
 - m. C171, Standard Specification for Sheet Materials for Curing Concrete.
 - n. C172, Standard Practice for Sampling Freshly Mixed Concrete.
 - o. C173, Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
 - p. C231, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
 - q. C260, Standard Specification for Air Entraining Admixtures for Concrete.
 - r. C289, Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).
 - s. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - t. C494, Standard Specification for Chemical Admixtures for Concrete.
 - u. C595, Standard Specification for Blended Hydraulic Cements.
 - v. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
 - w. C1315, Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.

- x. D994, Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
 - y. D1056, Standard Specification for Flexible Cellular Materials Sponge or Expanded Rubber.
 - z. D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - aa. E329, Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
3. United States Army Corps of Engineers (COE):
- a. CRD-C572, Polyvinyl Waterstops.
- B. Quality Control:
- 1. Concrete testing agency:
 - a. Contractor to employ and pay for services of a testing laboratory to:
 - 1) Perform materials evaluation.
 - 2) Design concrete mixes.
 - b. Concrete testing agency to meet requirements of ASTM E329.
 - 2. Do not begin concrete production until proposed concrete mix design has been approved by Engineer.
 - a. Approval of concrete mix design by Engineer does not relieve Contractor of his responsibility to provide concrete that meets the requirements of this Specification.
 - 3. Adjust concrete mix designs when material characteristics, job conditions, weather, strength test results or other circumstances warrant.
 - a. Do not use revised concrete mixes until submitted to and approved by Engineer.
 - 4. Perform structural calculations as required to prove that all portions of the structure in combination with remaining forming and shoring system has sufficient strength to safely support its own weight plus the loads placed thereon.
- C. Qualifications:
- 1. Ready mixed concrete batch plant certified by National Ready Mixed Concrete Association (NRMCA).
 - 2. Formwork, shoring and reshoring for slabs and beams except where cast on ground to be designed by a professional engineer currently registered in the state where the project is located.

1.3 DEFINITIONS

- A. Per ACI 116R except as modified herein:
- 1. Concrete fill: Non-structural concrete.
 - 2. Concrete Testing Agency: Testing agency employed to perform materials evaluation, design of concrete mixes or testing of concrete placed during construction.
 - 3. Exposed concrete: Exposed to view after construction is complete.
 - 4. Indicated: Indicated by Contract Documents.
 - 5. Lean concrete: Concrete with low cement content.
 - 6. Nonexposed concrete: Not exposed to view after construction is complete.
 - 7. Required: Required by Contract Documents.
 - 8. Specified strength: Specified compressive strength at 28 days.
 - 9. Submitted: Submitted to Engineer.

1.4 SUBMITTALS

- A. Shop Drawings:
- 1. See Section 01300.
 - 2. Concrete mix designs proposed for use. Concrete mix design submittal to include the following information:
 - a. Sieve analysis and source of fine and coarse aggregates.
 - b. Test for aggregate organic impurities.
 - c. Test for deleterious aggregate per ASTM C289.
 - d. Proportioning of all materials.
 - e. Type of cement with mill certificate for cement.
 - f. Type of fly ash with certificate of conformance to specification requirements.
 - g. Slump.

- h. Air content.
- i. Brand, type, ASTM designation, and quantity of each admixture proposed for use.
- j. 28-day cylinder compressive test results of trial mixes per ACI 318 and as indicated herein.
- k. Shrinkage test results.
- l. Standard deviation value for concrete production facility.
- 3. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Manufacturers and types:
 - 1) Joint fillers.
 - 2) Curing agents.
 - 3) Chemical sealer.
 - 4) Bonding and patching mortar.
 - 5) Construction joint bonding adhesive.
 - 6) Non-shrink grout with cure/seal compound.
 - 7) Waterstops.
- 4. Reinforcing steel: Show grade, sizes, number, configuration, spacing, location and all fabrication and placement details.
 - a. In sufficient detail to permit installation of reinforcing without having to make reference to Contract Drawings.
 - b. Obtain approval of Shop Drawings by Engineer before fabrication.
 - c. Mill certificates.
- 5. Strength test results of in place concrete including slump, air content and concrete temperature.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage of Material:

- 1. Cement and fly ash:
 - a. Store in moistureproof, weathertight enclosures.
 - b. Do not use if caked or lumpy.
- 2. Aggregate:
 - a. Store to prevent segregation and contamination with other sizes or foreign materials.
 - b. Obtain samples for testing from aggregates at point of batching.
 - c. Do not use frozen or partially frozen aggregates.
 - d. Do not use bottom 6 IN of stockpiles in contact with ground.
 - e. Allow sand to drain until moisture content is uniform prior to use.
- 3. Admixtures:
 - a. Protect from contamination, evaporation, freezing, or damage.
 - b. Maintain within temperature range recommended by manufacturer.
 - c. Completely mix solutions and suspensions prior to use.
- 4. Reinforcing steel:
 - a. Support and store all rebars above ground.

B. Delivery:

- 1. Concrete:
 - a. Prepare a delivery ticket for each load for ready-mixed concrete.
 - b. Truck operator shall hand ticket to Owner's Representative at the time of delivery.
 - c. Ticket to show:
 - 1) Mix identification mark.
 - 2) Quantity delivered.
 - 3) Amount of each material in batch.
 - 4) Outdoor temp in the shade.
 - 5) Time at which cement was added.
 - 6) Numerical sequence of the delivery.
 - 7) Amount of water added.
- 2. Reinforcing steel:
 - a. Ship to jobsite with attached plastic or metal tags with permanent mark numbers.
 - b. Mark numbers to match Shop Drawing mark number.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
1. Nonshrink, nonmetallic grout:
 - a. Sika "SikaGrout 212."
 - b. Gifford Hill "Supreme Grout."
 - c. Master Builders "Masterflow 713."
 2. Epoxy grout:
 - a. Master Builders "Brutem MPG."
 - b. Euclid Chemical Company, "High Strength Grout."
 - c. Fosroc, "Conbextra EPHF".
 3. Expansion joint fillers:
 - a. Permaglaze Co.
 - b. Rubatex Corp.
 - c. Williams Products, Inc.
 4. Waterstops, PVC:
 - a. Greenstreak Plastic Products, Inc.
 - b. W.R.Meadows, Inc.
 - c. Burke Company.
 5. Form coating:
 - a. Richmond "Rich Cote."
 - b. Industrial Lubricants "Nox-Crete Form Coating."
 - c. Protex "Pro-Cote."
 6. Prefabricated forms:
 - a. Simplex "Industrial Steel Frame Forms."
 - b. Symons "Steel Ply."
 - c. Universal "Uniform."
 7. Chemical sealer:
 - a. L & M Construction Chemicals, Inc.
 - b. Euclid Chemical Co.
 - c. Dayton Superior.

2.2 MATERIALS

- A. Portland Cement: Conform to ASTM C150 Type II
- B. Fly Ash:
1. ASTM C618, Class F or Class C.
 2. Nonstaining.
 3. Hardened concrete containing fly ash to be uniform light gray color.
 4. **Maximum loss on ignition:** 4 percent.
 5. Compatible with other concrete ingredients.
 6. Obtain proposed fly ash from a source approved by the State Highway Department in the state where the Project is located for use in concrete for bridges.
- C. Admixtures:
1. Air entraining admixtures: ASTM C260.
 2. Water reducing, retarding, and accelerating admixtures:
 - a. ASTM C494 Type A through E.
 - b. Conform to provisions of ACI 212.3R.
 - c. Do not use retarding or accelerating admixtures unless specifically approved in writing by Engineer and at no cost to Owner.
 - d. Follow manufacturer's instructions.
 - e. Use chloride free admixtures only.
 3. Maximum total water soluble chloride ion content contributed from all ingredients of concrete including water, aggregates, cementitious materials and admixtures by weight percent of cement:
 - a. 0.10 all concrete.
 4. Do not use calcium chloride.

5. Pozzolanic admixtures: ASTM C618.
 6. Provide admixtures of same type, manufacturer and quantity as used in establishing required concrete proportions in the mix design.
- D. Water: Potable, clean, free of oils, acids and organic matter.
- E. Aggregates:
1. Normal weight concrete: ASTM C33, except as modified below.
 2. Fine aggregate: Clean natural sand.
 - a. No manufactured or artificial sand.
 3. Coarse aggregate: Crushed rock, natural gravel, or other inert granular material.
 - a. Maximum amount of clay or shale particles: 1 percent.
 4. Gradation of coarse aggregate:
 - a. Lean concrete and concrete topping: Size #7.
 - b. All other concrete: Size #57 or #67.
- F. Concrete Grout:
1. Nonshrink nonmetallic grout:
 - a. Nonmetallic, noncorrosive, nonstaining, premixed with only water to be added.
 - b. Grout to produce a positive but controlled expansion.
 - c. Mass expansion not to be created by gas liberation.
 - d. Minimum compressive strength of nonshrink grout at 28 days: 6500 psi.
 2. Epoxy grout:
 - a. 3-component epoxy resin system.
 - 1) Two liquid epoxy components.
 - 2) One inert aggregate filler component.
 - b. Each component packaged separately for mixing at jobsite.
- G. Reinforcing Steel:
1. Reinforcing bars: ASTM A615, Grade 60.
 2. Welded wire fabric: ASTM A185.
 - a. Minimum yield strength: 60,000 psi.
 3. Column spirals: ASTM A82.
- H. Forms:
1. Prefabricated or job built.
 2. Wood forms:
 - a. New 5/8 or 3/4 IN 5-ply structural plywood of concrete form grade.
 - b. Built-in-place or prefabricated type panel.
 - c. 4 x 8 FT sheets for built-in-place type except where smaller pieces will cover entire area.
 - d. When approved, plywood may be reused.
 3. Metal forms:
 - a. Metal forms excluding aluminum may be used.
 - b. Forms to be tight to prevent leakage, free of rust and straight without dents to provide members of uniform thickness.
 4. Chamfer strips: Clear white pine, surface against concrete planed.
 5. Form ties: Removable end, permanently embedded body type with cones on outer ends not requiring auxiliary spreaders.
 - a. Cone diameter: 3/4 IN minimum to 1 IN maximum.
 - b. Embedded portion 1 IN minimum back from concrete face.
 - c. If not provided with threaded ends, constructed for breaking off ends without damage to concrete.
 - d. Provide ties with built-in waterstops at all walls that will be in contact with process liquid during plant operation.
 6. Form release: Nonstaining and shall not prevent bonding of future finishes to concrete surface.
- I. Waterstops:
1. Plastic: Corp of Engineers Specification CRD-C572.
 2. Serrated with center bulb.
 3. Thickness: 3/8 IN.

4. Length (general use): 6 IN unless indicated otherwise.
 5. Expansion joints:
 - a. Length: 9 IN.
 - b. Center bulb: 1 IN OD x 1/2 IN ID.
 6. Provide hog rings or grommets spaced at maximum 12 IN OC along the length of the water stop.
 7. Provide factory made waterstop fabrications at all changes of direction, intersections and transitions leaving only straight butt splices for the field.
- J. Chairs, Runners, Bolsters, Spacers, and Hangers:
1. Stainless steel, epoxy coated, or plastic coated metal.
 - a. Plastic coated: Rebar support tips in contact with the forms only.
- K. Chemical Floor Sealer:
1. Colorless low VOC water-based solution containing acrylic copolymers.
 - a. ASTM C1315, Class B, minimum 30 percent solids.
 2. Similar to L & M Construction Chemicals Inc. Dress & Seal WB 30.
- L. Vapor Retarder:
1. Vapor transmission not exceeding 0.1 perm.
 2. Tear strength: 15 psi.
 3. Similar to:
 - a. Alumiseal "Zero Perm".
- M. Membrane Curing Compound: ASTM C309, Type I-D.
1. Resin based, dissipates upon exposure to UV light.
 2. Curing compound shall not prevent bonding of any future coverings, coatings or finishes.
 3. Curing compounds used in water treatment plant construction to be nontoxic and taste and odor free.
- N. Expansion Joint Filler:
1. In contact with water or sewage:
 - a. Closed cell neoprene.
 - b. ASTM D1056, Class SC (oil resistant and medium swell) of 2 to 5 psi compression deflection (Grade SCE41).
 2. Exterior driveways, curbs and sidewalks:
 - a. Asphalt expansion joint filler.
 - b. ASTM D994.
 3. Other use:
 - a. Fiber expansion joint filler.
 - b. ASTM D1751.

2.3 CONCRETE MIXES

- A. General:
1. All concrete to be ready mixed concrete conforming to ASTM C94.
 2. Provide concrete of specified quality capable of being placed without segregation and, when cured, of developing all properties required.
 3. All concrete to be normal weight concrete {except where lightweight concrete is indicated on Drawings}.

B. Strength:

1. Provide specified strength and type of concrete for each use in structure(s) as follows:

TYPE	WEIGHT	SPECIFIED STRENGTH*
Concrete fill	Normal weight	3000 psi
Lean concrete	Normal weight	3000 psi
Concrete topping	Normal weight and lightweight	4000 psi
Precast concrete	Normal weight and lightweight	5000 psi
All other general use concrete	Normal weight	4000 psi

* Minimum 28-day compressive strength.

C. Air Entrainment:

1. Provide air entrainment in all concrete resulting in a total air content percent by volume as follows:

MAX AGGREGATE SIZE	TOTAL AIR CONTENT PERCENT
1 IN or 3/4 IN	5 to 7
1/2 IN	5 1/2 to 8

2. Air content to be measured in accordance with ASTM C231, ASTM C173, or ASTM C138.

D. Slump - 4 IN maximum, 1 IN minimum:

1. Measured at point of discharge of the concrete into the concrete construction member.
2. Concrete of lower than minimum slump may be used provided it can be properly placed and consolidated.
3. Pumped concrete:
 - a. Provide additional water at batch plant to allow for slump loss due to pumping.
 - b. Provide only enough additional water so that slump of concrete at discharge end of pump hose does not exceed maximum slump specified above.
4. Determine slump per ASTM C143.

E. Selection of Proportions:

1. General:
 - a. Proportion ingredients to:
 - 1) Produce proper workability, durability, strength, and other required properties.
 - 2) Prevent segregation and collection of excessive free water on surface.
2. Minimum cement contents and maximum water cement ratios for concrete to be as follows:

SPECIFIED STRENGTH	MINIMUM CEMENT, LB/CY			MAXIMUM WATER CEMENT RATIO BY WEIGHT
	MAXIMUM 1/2	AGGREGATE 3/4	SIZE, IN 1	
3000	---	517	517	0.45
4000	611	611	611	0.45
5000	---	686	665	0.40

3. Substitution of fly ash:
 - a. Maximum of 25 percent by weight of cement at rate of 1 LB fly ash for 1 LB of cement.
4. Sand cement grout:
 - a. Three parts sand.
 - b. One part Portland cement.
 - c. Entrained air: Six percent plus or minus one percent.
 - d. Sufficient water for required workability.
 - e. Minimum 28-day compressive strength: 3,000 psi.
5. Pan stair fill:
 - a. Coarse aggregate: 100 percent passing a 1/2 IN sieve.
 - b. Proportions:
 - 1) 1 sack cement.
 - 2) 150 LBS coarse aggregate.
 - 3) 150 LBS fine aggregate (sand).
 - c. Adjust mix to obtain satisfactory finishing.
6. Normal weight concrete:
 - a. Proportion mixture to provide desired characteristics using one of methods described below:
 - 1) Method 1 (Trial Mix): Per ACI 318, Chapter 5, except as modified herein.
 - a) Air content within range specified above.
 - b) Record and report temperature of trial mixes.
 - c) Proportion trial mixes per ACI 211.1.
 - 2) Method 2 (Field Experience): Per ACI 318, Chapter 5, except as modified herein:
 - a) Field test records must be acceptable to Engineer to use this method.
 - b) Test records shall represent materials, proportions and conditions similar to those specified.

7. Required average strength to exceed the specified 28-day compressive strength by the amount determined or calculated in accordance with the requirements of Paragraph 5.3 of ACI 318 using the standard deviation of the proposed concrete production facility as described in Paragraph 5.3.1 of ACI 318.

F. Allowable Shrinkage: 0.048 percent per ASTM C157.

PART 3 EXECUTION

3.1 FORMING AND PLACING CONCRETE

A. Formwork:

1. Contractor is responsible for design and erection of formwork.
2. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation and position.
 - a. Allowable tolerances: As recommended in ACI 347R.
3. Provide slabs and beams of minimum indicated depth when sloping foundation base slabs or elevated floor slabs to drains.
 - a. For slabs on grade, slope top of subgrade to provide floor slabs of minimum uniform indicated depth.
 - b. Do not place floor drains through beams.
4. Openings: Provide openings in formwork to accommodate work of other trades.
 - a. Accurately place and securely support items built into forms.
5. Chamfer strips: Place 3/4 IN chamfer strips in forms to produce 3/4 IN wide beveled edges on permanently exposed corners of members.
6. Clean and adjust forms prior to concrete placement.
7. Tighten forms to prevent mortar leakage.
8. Coat form surfaces with form release agents prior to placing reinforcing bars in forms.

B. Reinforcement:

1. Position, support and secure reinforcement against displacement.
2. Locate and support with chairs, runners, bolsters, spacers and hangers, as required.
3. Set wire ties so ends do not touch forms and are directed into concrete, not toward exposed concrete surfaces.
4. Lap splice lengths: ACI 318 Class B top bar tension splices unless indicated otherwise on the Drawings.
5. Extend reinforcement to within 2 IN of concrete perimeter edges.
 - a. If perimeter edge is earth formed, extend reinforcement to within 3 IN of the edge.
6. Minimum concrete protective covering for reinforcement: As shown on Drawings.
7. Do not weld reinforcing bars.
8. Welded wire fabric:
 - a. Install welded wire fabric in maximum practical sizes.
 - b. Splice sides and ends with a splice lap length measured between outermost cross wires of each fabric sheet not less than:
 - 1) One spacing of cross wires plus 2 IN.
 - 2) 1.5 x development length.
 - 3) 6 IN.
 - c. Development length: ACI 318 basic development length for the specified fabric yield strength.

C. Construction, Expansion, and Contraction Joints:

1. Provide at locations indicated.
2. Locate wall vertical construction joints at 30 FT maximum centers and wall horizontal construction joints at 10 FT maximum centers.
3. Locate construction joints in floor slabs and foundation base slabs so that concrete placements are approximately square and do not exceed 2500 SF.
4. Locate construction joints in columns and walls:
 - a. At the underside of beams, girders, haunches, drop panels, column capitals, and at floor panels.
 - b. Haunches, drop panels, and column capitals are considered part of the supported floor or roof and shall be placed monolithically therewith.

- c. Column based need not be placed monolithically with the floor below.
- 5. Locate construction joints in beams and girders:
 - a. At the middle of the span, unless a beam intersects a girder at that point.
 - b. If the middle of the span is at an intersection of a beam and girder, offset the joint in the girder a distance equal to twice the beam width.
 - c. Provide satisfactory means for transferring shear and other forces through the construction joint.
- 6. Locate construction joints in suspended slabs:
 - a. At or near the center of span in flat slab or T-beam construction.
 - b. Do not locate a joint between a slab and a concrete beam or girder unless so indicated on Drawings.
- 7. In pan-formed joists:
 - a. At or near span center when perpendicular to the joists.
 - b. Centered in the slab, midway between joists, when parallel to the joists.
- 8. Install construction joints perpendicular to main reinforcement with all reinforcement continued across construction joints.
- 9. At least 48 HRS shall elapse between placing of adjoining concrete construction.
- 10. Thoroughly clean and remove all laitance and loose and foreign particles from construction joints.
- 11. Before new concrete is placed, coat all construction joints with an approved bonding adhesive used and applied in accordance with manufacturer's instructions.

D. Embedments:

- 1. Set and build in anchorage devices and other embedded items required for other work that is attached to, or supported by concrete.
- 2. Use setting diagrams, templates and instructions for locating and setting.
- 3. Secure waterstops in correct position using hog rings or grommets spaced along the length of the waterstop and wire tie to adjacent reinforcing steel.

E. Placing Concrete:

- 1. Place concrete in compliance with ACI 304R and ACI 304.2R.
- 2. Place in a continuous operation within planned joints or sections.
- 3. Begin placement when work of other trades affecting concrete is completed.
- 4. Place concrete by methods which prevent aggregate segregation.
- 5. Do not allow concrete to free fall more than 4 FT.
- 6. Where free fall of concrete will exceed 4 FT, place concrete by means of tremie pipe or chute.

F. Consolidation:

- 1. Consolidate all concrete using mechanical vibrators supplemented with hand rodding and tamping, so that concrete is worked around reinforcement and embedded items into all parts of forms.

G. Protection:

- 1. Protect concrete from physical damage or reduced strength due to weather extremes.
- 2. In cold weather comply with ACI 306R except as modified herein.
 - a. Do not place concrete on frozen ground or in contact with forms or reinforcing bars coated with frost, ice or snow.
 - b. Minimum concrete temperature at the time of mixing:

OUTDOOR TEMPERATURE AT PLACEMENT (IN SHADE)	CONCRETE TEMPERATURE AT MIXING
Below 30 DegF	70 DegF
Between 30-45 DegF	60 DegF
Above 45 DegF	50 DegF

- c. Do not place heated concrete that is warmer than 80 DegF.
- d. If freezing temperatures are expected during curing, maintain the concrete temperature at or above 50 DegF for 7 days or 70 DegF for 3 days.
- e. Do not allow concrete to cool suddenly.
- 3. In hot weather comply with ACI 305R except as modified herein.
 - a. At air temperature of 90 DegF and above, keep concrete as cool as possible during placement and curing.
 - b. Do not allow concrete temperature to exceed 90 DegF at placement.

- c. Prevent plastic shrinkage cracking due to rapid evaporation of moisture.
- d. Do not place concrete when the actual or anticipated evaporation rate equals or exceeds 0.2 LBS/SF/HR as determined from ACI 305R, Figure 2.1.5.

H. Curing:

1. Begin curing concrete as soon as free water has disappeared from exposed surfaces.
2. Cure concrete by use of moisture retaining cover, burlap kept continuously wet or by membrane curing compound.
3. Provide protection as required to prevent damage to concrete and to prevent moisture loss from concrete during curing period.
4. Provide curing for minimum of 7 days.
5. Form materials left in place may be considered as curing materials for surfaces in contact with the form materials except in periods of hot weather.
6. In hot weather follow curing procedures outlined in ACI 305R.
7. In cold weather follow curing procedures outlined in ACI 306R.
8. If forms are removed before 7 days have elapsed, finish curing of formed surfaces by one of above methods for the remainder of the curing period.
9. Curing vertical surfaces with a curing compound: Cover vertical surfaces with a minimum of two coats of the curing compound.
 - a. Allow the preceding coat to completely dry prior to applying the next coat.
 - b. Apply the first coat of curing compound immediately after form removal.
 - c. Vertical surface at the time of receiving the first coat shall be damp with no free water on the surface.
 - d. A vertical surface is defined as any surface steeper than 1 vertical to 4 horizontal.

I. Form Removal:

1. Remove forms after concrete has hardened sufficiently to resist damage from removal operations or lack of support.
2. Where no reshoring is planned, leave forms and shoring used to support concrete until it has reached its specified 28-day compressive strength.
3. Where reshoring is planned, supporting formwork may be removed when concrete has sufficient strength to safely support its own weight and loads placed thereon.
 - a. While reshoring is underway, no superimposed loads shall be permitted on the new construction.
 - b. Place reshores as soon as practicable after stripping operations are complete but in no case later than the end of working day on which stripping occurs.
 - c. Tighten reshores to carry their required loads.
 - d. Leave reshores in place until concrete being supported has reached its specified 28-day compressive strength.

3.2 CONCRETE FINISHES

A. Tolerances:

1. Class A: 1/8 IN in 10 FT.
2. Class B: 1/4 IN in 10 FT.

B. Surfaces Exposed to View:

1. Provide a smooth finish for exposed concrete surfaces and surfaces that are:
 - a. To be covered with a coating or covering material applied directly to concrete.
 - b. Scheduled for grout cleaned finish.
2. Remove fins and projections, and patch voids, air pockets, and honeycomb areas with cement grout.
3. Fill tie holes with nonshrink nonmetallic grout.

C. Surfaces Not Exposed to View:

1. Patch voids, air pockets and honeycomb areas with cement grout.
2. Fill tie holes with nonshrink nonmetallic grout.

- D. Grout Cleaned Finish:
1. Mix one part Portland cement and 1-1/2 parts fine sand with sufficient bonding agent/water mixture to produce a grout with the consistency of thick paint.
 - a. White Portland cement shall be substituted for gray Portland cement to produce a color that matches color of surrounding concrete as determined by trial patch for areas not to be painted.
 2. Wet surface of concrete to prevent absorption of water by grout and uniformly apply grout with brushes or spray gun.
 3. Immediately scrub the surface with a cork float or stone to coat and fill air bubbles and holes.
 4. While grout is still plastic, remove all excess grout by working surface with rubber float, sack or other approved means.
 5. After the surface whitens from drying, rub vigorously with clean burlap.
 6. Keep final finish damp for a minimum of 36 HRS after final rubbing.
- E. Slab Float Finish:
1. After concrete has been placed, consolidated, struck off, and leveled, do no further work until ready for floating.
 2. Begin floating when water sheen has disappeared and surface has stiffened sufficiently to permit operation.
 3. During or after first floating, check planeness of entire surface with a 10 FT straightedge applied at not less than two different angles.
 4. Cut down all high spots and fill all low spots during this procedure to produce a surface within Class B tolerance throughout.
 5. Refloat slab immediately to a uniform sandy texture.
- F. Troweled Finish:
1. Float finish surface.
 2. Next power trowel, and finally hand trowel.
 3. Produce a smooth surface which is relatively free of defects with first hand troweling.
 4. Perform additional trowelings by hand after surface has hardened sufficiently.
 5. Final trowel when a ringing sound is produced as trowel is moved over surface.
 6. Thoroughly consolidate surface by hand troweling.
 7. Leave finished surface essentially free of trowel marks, uniform in texture and appearance and plane to a Class A tolerance.
 8. On surfaces intended to support floor coverings remove any defects of sufficient magnitude that would show through floor covering by grinding.
- G. Broom Finish: Immediately after concrete has received a float finish as specified, give it a transverse scored texture by drawing a broom across surface.
- H. Apply chemical floor hardener to permanently exposed interior concrete floor slab surfaces where indicated.
1. Apply in accordance with manufacturer's instructions.

3.3 GROUT

- A. Preparation:
1. Nonshrinking nonmetallic grout:
 - a. Clean concrete surface to receive grout.
 - b. Saturate concrete with water for 24 HRS prior to grouting.
 2. Rock anchors:
 - a. Clean rock anchors of all loose material.
 - b. Orient hook or bends in anchor bars to clear anchor bolts, reinforcements, and other embedments to be installed later.
 3. Epoxy grout: Apply only to clean, dry, sound surface.
- B. Application:
1. Nonshrinking nonmetallic grout:
 - a. Mix in a mechanical mixer.
 - b. Use no more water than necessary to produce flowable grout.
 - c. Place in accordance with manufacturer's instructions.

- d. Completely fill all spaces and cavities below the bottom of baseplates.
 - e. Provide forms where baseplates and bedplates do not confine grout.
 - f. Where exposed to view, finish grout edges smooth.
 - g. Except where a slope is indicated on Drawings, finish edges flush at the baseplate, bedplate, member, or piece of equipment.
 - h. Protect against rapid moisture loss by covering with wet rags or polyethylene sheets.
 - i. Wet cure grout for 7 days, minimum.
- 2. Rock anchors:
 - a. See Item 1 above.
 - b. If rodded:
 - 1) Fill each hole so that it overflows when anchor bar is inserted.
 - 2) Force anchor bars into place.
 - c. If pressure placed, set anchor bar before grouting.
 - d. Take special care to avoid any movement of anchors that have been placed.
 - 3. Epoxy grout:
 - a. Mix and place in accordance with manufacturer's instructions.
 - b. Completely fill all cavities and spaces around dowels and anchors without voids.
 - c. Obtain manufacturer's field technical assistance as required to ensure proper placement.

3.4 FIELD QUALITY CONTROL

- A. Owner will employ and pay for services of a concrete testing laboratory to perform testing of concrete placed during construction.
 - 1. Contractor to cooperate with Owner in obtaining and testing samples.
- B. Tests During Construction:
 - 1. Strength test - procedure:
 - a. Three cylinders, 6 IN DIA x 12 IN high, will be taken from each sample per ASTM C172 and ASTM C31.
 - b. Cylinders will be tested per ASTM C39:
 - 1) One at 7 days.
 - 2) Two at 28 days.
 - 2. Strength test - frequency:
 - a. Not less than one test each day concrete placed.
 - b. Not less than one test for each 50 CY or major fraction thereof placed in one day.
 - c. Not less than one test for each type of concrete poured.
 - d. Not less than one test for each concrete structure exceeding 2 CY volume.
 - 3. Slump test: Per ASTM C143.
 - a. Determined for each strength test sample.
 - b. Additional slump tests may be taken.
 - 4. Air content: Per ASTM C231, ASTM C173, and ASTM C138.
 - a. Determined for each strength test sample.
 - 5. Temperature: Determined for each strength test sample.
- C. Evaluation of Tests:
 - 1. Strength test results: Average of 28-day strength of two cylinders from each sample.
 - a. If one cylinder manifests evidence of improper sampling, molding, handling, curing or testings, strength of remaining cylinder will be test result.
 - b. If both cylinders show any of above defects, test will be discarded.
- D. Acceptance of Concrete:
 - 1. Strength level of each type of concrete shall be considered satisfactory if both of the following requirements are met:
 - a. Average of all sets of three consecutive strength tests equals or exceeds the required specified 28-day compressive strength.
 - b. No individual strength test falls below the required specified 28-day compressive strength by more than 500 psi.
 - 2. If tests fail to indicate satisfactory strength level, perform additional tests and/or corrective measures as directed by Engineer.
 - a. Perform additional tests and/or corrective measures at no additional cost to Owner.

3.5 SCHEDULES

- A. Form Types:
 - 1. Surfaces exposed to view:
 - a. Prefabricated or job-built wood forms.
 - b. Laid out in a regular and uniform pattern with long dimensions vertical and joints aligned.
 - c. Produce finished surfaces free from offsets, ridges, waves, and concave or convex areas.
 - d. Construct forms sufficiently tight to prevent leakage of mortar.
 - 2. Surfaces normally submerged or not normally exposed to view:
 - a. Wood or steel forms sufficiently tight to prevent leakage of mortar.
 - 3. Other types of forms may be used:
 - a. For surfaces not restricted to plywood or lined forms.
 - b. As backing for form lining.

- B. Grout:
 - 1. Nonshrinking nonmetallic grout: General use.
 - 2. Epoxy grout:
 - a. Grouting of dowels and anchor bolts into existing concrete.
 - b. Other uses indicated on Drawings.
 - 3. Sand cement grout: Keyways of precast members.

- C. Concrete:
 - 1. Precast concrete: Where indicated on Drawings.
 - 2. Lean concrete: Where indicated on Drawings.
 - 3. Concrete fill: Where indicated on Drawings.
 - 4. Lightweight concrete: Where indicated on Drawings.
 - 5. Normal weight concrete: All concrete.
 - 6. Concrete pan fill: Stair and landings where indicated on Drawings.
 - 7. General use concrete: All other locations.

- D. Concrete Finishes:
 - 1. Grout cleaned finish: Where indicated on Drawings.
 - 2. Slab finishes:
 - a. Use following finishes as applicable, unless otherwise indicated:
 - 1) Floated finish: Surfaces intended to receive roofing, concrete topping, lean concrete, concrete fill and waterproofing.
 - 2) Troweled finish: Interior floor slabs, exposed roof slabs and base slabs of structures, equipment bases, and column bases.
 - 3) Broom finish: Sidewalks, docks, concrete stairs, and ramps.

END OF SECTION

**SECTION - 03600
GROUT**

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Grouting of precast vaults and manholes.
- B. Related Sections include but are not necessarily limited to:
 - 1. Section 02515 - Precast Manholes and Vaults.

1.2 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Society for Testing and Materials (ASTM):
 - a. C230, Standard Specification for Flow Table for Use in Tests of Hydraulic Cement.
 - b. C1107, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
 - 2. Corps of Engineers (COE):
 - a. CRD-C611, Flow of Grout for Preplaced Aggregate Concrete.
 - b. CRD-C621, Specification for Nonshrink Grout

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Product data of grouts.
 - 2. Proposed method for keeping existing concrete surfaces wet prior to placing grout.
 - 3. Forming method for fluid grout placements.
 - 4. Curing method for grout.
- B. Quality Control Submittals:
 - 1. Manufacturer's Written Instructions:
 - a. Adding fiber reinforcing to batching.
 - b. Mixing of grout.
 - 2. Manufacturer's proposed training schedule for grout work.
 - 3. Manufacturer's Certificate of Compliance:
 - a. Grout free from chlorides and other corrosion-causing chemicals.
 - b. Nonshrink grout properties of Categories II and III, verifying expansion at 3 or 14 days will not exceed the 28-day expansion and nonshrink properties are not based on gas or gypsum expansion.
 - 4. Manufacturer's Certificate of Proper Installation.
 - 5. Statements of Qualification: Nonshrink grout manufacturer's representative.
 - 6. Test Reports:
 - a. Test report for 24-hour evaluation of nonshrink grout.
 - b. Test results and service report from demonstration and training session.
 - c. Field test reports and laboratory test results for field-drawn samples.

1.4 QUALIFICATIONS

- A. Nonshrink Grout Manufacturer's Representative: Authorized and trained representative of grout manufacturer. Minimum of 1-year experience that has resulted in successful installation of grouts similar to those for this Project.

- B. For grout suppliers not listed herein, provide completed 24-hour Evaluation of Nonshrink Grout Test Form, attached at the end of this section. Independent testing laboratory to certify that testing was conducted within last 18 months.

1.5 GUARANTEE

- A. Manufacturer's guarantee shall not contain disclaimer on the product data sheet, grout bag, or container limiting responsibility to only the purchase price of products and materials furnished.
- B. Manufacturer guarantees participation with CONTRACTOR in replacing or repairing grout found defective due to faulty materials, as determined by industry standard test methods.

PART 2 PRODUCTS

2.1 NONSHRINK GROUT SCHEDULE

- A. Furnish nonshrink grout for applications in grout category in the following schedule:

Application	Temperature Range	Max. Placing Time	
	40 to 100 deg F	20 min	Greater than 20 min
Post and pipe support baseplates	I or II		II
Machine bases 25 hp or less	II	II	II
Through-bolt openings	II	II	II
Machine bases 26 hp and up	III	III	III
Baseplates and/or soleplates with vibration, thermal movement, etc.	III	III	III
Vault penetrations	I	I	I
Box culvert joints	I	I	I

2.2 NONSHRINK GROUT

- A. Category I:
1. Nonmetallic and nongas-liberating.
 2. Prepackaged natural aggregate grout requiring only the addition of water.
 3. Test in accordance with ASTM C1107:
 - a. Flowable consistency 140 percent, five drops in 30 seconds, in accordance with ASTM C230.
 - b. Flowable for 15 minutes.
 4. Grout shall not bleed at maximum allowed water.
 5. Minimum strength of flowable grout, 3,000 psi at 3 days, 5,000 psi at 7 days, and 7,000 psi at 28 days.
 6. Manufacturers and Products:
 - a. Chemrex, Inc., Shakopee, MN; Set Grout.
 - b. Euclid Chemical Co., Cleveland, OH; NS Grout.
 - c. Dayton Superior Corp., Miamisburg, OH; 1107 Advantage Grout.
 - d. US MIX Products, Denver, CO; US Spec Multi-Purpose Grout.
 - e. L & M Construction Chemicals, Inc., Omaha, NE; Duragrout.

- B. Category II:
1. Nonmetallic, nongas-liberating.
 2. Prepackaged natural aggregate grout requiring only the addition of water.
 3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
 4. Test in accordance with COE CRD-C621 and ASTM C1107, Grade B:
 - a. Fluid consistency 20 to 30 seconds in accordance with COE CRD-C611.
 - b. Temperatures of 40, 80, and 100 degrees F.
 5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
 6. Minimum strength of fluid grout, 3,500 psi at 1 day, 4,500 psi at 3 days, and 7,500 psi at 28 days.
 7. Maintain fluid consistency when mixed in 1 to 9 yard loads in ready-mix truck.
 8. Manufacturers and Products:
 - a. Chemrex, Inc., Shakopee, MN; Master Flow 928.
 - b. Five Star Products Inc., Fairfield, CT; Five Star 100.
 - c. Euclid Chemical Co., Cleveland, OH; Hi Flow Grout.
 - d. Dayton Superior Corp., Miamisburg, OH; Sure Grip High Performance Grout.
 - e. L & M Construction Chemicals, Inc., Omaha, NE; Crystex.
- C. Category III:
1. Metallic and nongas-liberating.
 2. Prepackaged aggregate grout requiring only the addition of water.
 3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
 4. Test in accordance with COE CRD-C621 and ASTM C1107, Grade A:
 - a. Fluid consistency 20 to 30 seconds in accordance with COE CRD-C611.
 - b. Temperatures of 40 and 100 degrees F.
 5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
 6. Minimum strength of fluid grout, 4,000 psi at 1 day, 5,000 psi at 3 days, and 9,000 psi at 28 days.
 7. Maintain fluid consistency when mixed in 1 to 9 yard loads in ready-mix truck.
 8. Manufacturer and Product:
 - a. Chemrex, Inc., Shakopee, MN; EMBECO 885.
 - b. L & M Construction Chemicals, Inc., Omaha, NE; Ferrogrout.

PART 3 EXECUTION

3.1 NONSHRINK GROUT

- A. General: Mix, place, and cure nonshrink grout in accordance with grout manufacturer's representative's training instructions.
- B. Grouting Machinery Foundations:
1. Block out original concrete or finish off at distance shown below bottom of machinery base with grout. Prepare concrete surface by sandblasting, chipping, or by mechanical means to remove any soft material.
 2. Set machinery in position and wedge to elevation with steel wedges, or use cast-in leveling bolts.
 3. Form with watertight forms at least 2 inches higher than bottom of plate.
 4. Fill space between bottom of machinery base and original concrete in accordance with manufacturer's representative's training instructions.

3.2 FIELD QUALITY CONTROL

- A. Evaluation and Acceptance of Nonshrink Grout:
1. Provide a flow cone and cube molds with restraining plates onsite. Continue tests during Project as demonstrated by grout manufacturer's representative.

2. Perform flow cone and bleed tests, and make three 2-inch by 2-inch cubes for each 25 cubic feet of each type of nonshrink grout used. Use restraining caps for cube molds in accordance with COE CRD-C621.
3. For large grout applications make three additional cubes and one more flow cone test. Include bleed test for each additional 25 cubic feet of nonshrink grout placed.
4. Consistency: As specified in Article NONSHRINK GROUT. Grout with consistencies outside range requirements shall be rejected.
5. Segregation: As specified in Article NONSHRINK GROUT. Grout when aggregate separates shall be rejected.
6. Nonshrink grout cubes shall test equal to or greater than minimum strength specified.
7. Strength Test Failures: Nonshrink grout work failing strength tests shall be removed and replaced.
8. Perform bleeding test to demonstrate grout will not bleed.
9. Store cubes at 70 degrees F.
10. Independent testing laboratory shall prepare, store, cure, and test cubes in accordance with COE CRD-C621.

3.3 MANUFACTURER'S SERVICES

A. General:

1. Coordinate demonstrations, training sessions, and applicable site visits with grout manufacturer's representative.
2. Provide and conduct onsite, demonstration and training sessions for bleed tests, mixing, flow cone measurement, cube testing, application, and curing for each category and type of nonshrink grout.
3. Necessary equipment and materials shall be available for demonstration.

B. Training:

1. Training is required for all Type II and Type III grout installations.
2. Grout manufacturer's representative shall train CONTRACTOR to perform grout work.
3. Establish location at site and schedule time for grout manufacturer's demonstration and training session of proposed nonshrink grouts. Mix nonshrink grouts to required consistency, test, place, and cure on actual Project, e.g., baseplates and tie holes to provide actual on-the-job training.
4. Use minimum of three bags for each grout Category II and Category III. Mix grout to fluid consistency and conduct flow cone and two bleed tests, make a minimum of six cubes for testing of two cubes at 1, 3, and 28 days. Use remaining grout for final Work.
5. Training shall include methods for curing grout.
6. Transport test cubes to independent test laboratory and obtain test reports.

END OF SECTION

D I V I S I O N 4

MASONRY

**SECTION - 04200
MASONRY UNITS**

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Furnishing and installation of CMU Hydrant Wall as detailed in the Plans and as specified herein.
 - 2. Furnishing and installing Bank Run Gravel for Trench Backfill and Crushed Surfacing Top Course.

- B. Related Sections include but are not necessarily limited to:
 - 1. Division 1 - General Requirements.
 - 2. Section 02300 – Earthwork
 - 3. Section 02700 – Bases, Ballasts, Pavement and Appurtenances
 - 4. Division 15

PART 2 PRODUCTS

2.1 CEMENT CONCRETE MASONRY UNITS

- A. Split-face Cornerstone F-100 blocks and capstones or approved equal.

2.2 AGGREGATES FOR BACKFILL

- A. Bank Run Gavel for Trench Backfill, Section 02700

- B. Crushed Surfacing Top Course, Section 02700

- C. Upon approval of the Engineer, select native backfill may be used to backfill within 6 inches of finish grade between the road shoulder and the fire hydrant wall.

PART 3 EXECUTION

3.1 EXCAVATION - GENERAL

- A. Excavation for wall foundation shall be structure excavation.

- B. Where excavation occurs in lawn areas, the sod shall be carefully removed, dampened, and stockpiled to preserve it for replacement. Excavated material may be placed on the lawn; provided, that a drop cloth or other suitable method is employed to protect the lawn from damage. The lawn shall not remain covered for more than 72 hours. Immediately after completion of backfilling, the sod shall be replaced and lightly rolled in a manner so as to restore the lawn as near as possible to its original condition.

- C. Removal and Exclusion of Water:
 - 1. The CONTRACTOR shall remove and exclude water, including stormwater, groundwater, irrigation water, and wastewater, from all excavations unless specifically stated herein. Dewatering shall conform to Section 02140 – Dewatering. Water shall be removed and excluded until backfilling is complete and all field soils testing has been completed.

3.2 DISPOSAL OF EXCESS EXCAVATED MATERIALS

- A. Excess excavated materials not required or not suitable for backfill or fill material shall be removed from the site. Material may not be placed on the right-of-way other than specifically shown on the grading and drainage plans. Make all arrangements hauling and disposal of the excavated material and conform to the requirements of the local agency having jurisdiction.

3.3 BACKFILL

- A. Backfill material shall be in accordance with plan details and shall be compacted in 6-inch lifts to 95% of maximum density.

3.4 SURFACE RESTORATION

- A. Existing ditches and adjacent land shall be shaped to match wall.
- B. Existing decorative landscape features removed beyond the limits of the CMU wall and backfill shall be restored with like materials.

END OF SECTION

D I V I S I O N 5

METALS

SECTION - 05500
MISCELLANEOUS METALWORK AND CASTINGS

PART 1 GENERAL

1.1 THE REQUIREMENT

- A. The CONTRACTOR shall provide miscellaneous metalwork and appurtenances, complete and in place, in accordance with the Contract Documents.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Federal Specifications:

- MIL-G-18015 A (3) (Ships) Aluminum Planks. (6063-T6)
MIL-A-907E Antiseize Thread Compound, High Temperature

B. Commercial Standards:

- AA-M32C22A41 Aluminum Assn.
AASHTO HS-20 Truck Loading
AISC Manual of Steel Construction
AISI Design of Light Gauge, Cold-Formed Steel Structural Members
ASTM A36 Carbon Structural Steel
ASTM A48 Gray Iron Castings
ASTM A53 Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A193 Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service
ASTM A194 Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service

ASTM A307 Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
ASTM A325 Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A500 Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

ANSI/AWS D1.1 Structural Welding Code - Steel
ANSI/AWS D1.2 Structural Welding Code - Aluminum
ANSI/AWS QC1 Qualification and Certification of Welding Inspectors

1.3 CONTRACTOR SUBMITTALS

- A. **Shop Drawings:** Shop Drawings of all miscellaneous metalwork shall be submitted in accordance with Section 01300.
- B. An ICBO report listing the ultimate load capacity in tension and shear for each size and type of concrete anchor shall be submitted. CONTRACTOR shall submit manufacturer's recommended installation instructions and procedures for adhesive anchors. Upon review, by OWNER, these instructions shall be followed specifically.
- C. No substitution for the indicated adhesive anchors will be considered unless accompanied with ICBO report verifying strength and material equivalency, including temperature at which load capacity is reduced to 90 percent of that determined at 75 degrees F.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. **Steel:**
 - 1. **Shapes, Plates, Bars:** ASTM A36.
 - 2. **Pipe Columns, Bollards:** ASTM A53, Type E or S, Grade B standard weight unless noted otherwise.
 - 3. **Tubes:** ASTM A500 Grade B.
- B. **Corrosion Protection:** Unless otherwise indicated, fabricated steel metalwork shall be hot-dip galvanized after fabrication.
- C. **Stainless Steel:** Unless otherwise indicated, stainless steel metalwork and bolts shall be of Type 316 stainless steel.
- D. **Aluminum:** Unless otherwise indicated, aluminum metalwork shall be of Alloy 6061-T6. Aluminum in contact with concrete, masonry, wood, porous materials, or dissimilar metals shall have contact surfaces coated with two coats of bituminous coating, total thickness 8 mils.
- E. **Cast Iron:** Unless otherwise indicated, iron castings shall conform to the requirements of ASTM A48, Class 50B or better.

2.2 VAULT HATCHES

- A. Where access hatches are mounted in a vault slab or on a concrete curb, the hatch shall be a flush type as indicated herein.
- B. Hatches shall be fabricated from 1/4" aluminum, unless otherwise indicated. Hatch hardware shall be Type 316 stainless steel. Hatches shall be gutter-type; Bilco Type "J-AL" or approved equal.
- C. Hatch opening sizes, number and swing direction of door leaves, and locations, shall be as indicated. Sizes are for the clear opening.
- D. **Performance Characteristics:**
 - 1. Cover(s) shall be reinforced to support a minimum AASHTO HS-20 live load with a maximum deflection of 1/150th of the span.
 - 2. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
 - 3. Entire door, including all hardware components, shall be highly corrosion resistant.
 - 4. Operation of cover shall not be affected by temperature.
- E. **Cover:** Shall be 1/4-inch (6.3-mm) diamond pattern aluminum.
- F. **Channel Frame:** Shall be 1/4-inch (6.3-mm) extruded aluminum with bend down anchor tabs around the perimeter and have a minimum cross-sectional area of 7.0 square inches for proper drainage. A continuous EPDM gasket shall be mechanically attached to the aluminum frame to create a barrier around the entire perimeter of the cover and significantly reduce the amount of dirt and debris that may enter the channel frame.
- G. **Hinges:** Shall be specifically designed for horizontal installation and shall be through bolted to the cover and frame with tamperproof Type 316 stainless fasteners.
- H. **Drain Coupling:** Provide a 1-1/2-inch (38-mm) drain coupling located as shown on the Drawings.

- I. **Lifting Mechanisms:** Manufacturer shall provide the required number and size of compression spring operators enclosed in telescopic tubes to provide smooth, easy, and controlled cover operation throughout the entire arc of opening and to act as a check in retarding downward motion of the cover when closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a support bracket welded to a formed 1/4-inch gusset support plate.
- J. A removable exterior turn/lift handle with a spring-loaded ball detent shall be provided to open the cover, and the latch release shall be protected by a flush, gasketed, removable screw plug.
- K. **Hardware:**
 - 1. Heavy forged aluminum hinges, each having a minimum 1/4-inch (6.3-mm) diameter Type 316 stainless steel pin, shall be provided and shall pivot so the cover does not protrude into the channel frame.
 - 2. Cover(s) shall be equipped with a hold-open arm that automatically locks the cover in the open position.
 - 3. Cover(s) shall be fitted with the required number and size of compression spring operators. Springs shall have an electrocoated acrylic finish. Spring tubes shall be constructed of a reinforced nylon 6/6 based engineered composite material.
 - 4. A Type 316 stainless steel snap lock with fixed handle shall be mounted on the underside of the cover.
 - 5. Provide locking device for padlock.
- L. **Finishes:** Factory finish shall be mill finish aluminum with bituminous coating applied to the exterior of the frame.

2.3 BOLTS AND ANCHORS

- A. **Standard Service (Non-Corrosive Application):** Bolts, anchor bolts, washers, and nuts shall be steel as indicated herein. Threads on galvanized bolts and nuts shall be formed with suitable taps and dies such that they retain their normal clearance after hot-dip galvanizing. Except as otherwise indicated, steel for bolts, anchor bolts and cap screws shall be in accordance with the following:
 - 1. All bolts used in buried flanges shall be ASTM A325 Type 3 (corten steel) unfinished, with nuts to ASTM A563C3 or A563DH3 and washers to ASTM F436-1. All bolts, nuts and washers used in exposed or aboveground locations shall be ASTM/A307, hot-dip galvanized.
- B. **Corrosive Service:** All bolts, nuts, and washers in the locations listed below shall be stainless steel as indicated below.
 - 1. All chemical handling areas.
 - 2. Locations indicated by the Contract Documents or designated by the OWNER to be provided with stainless steel bolts.
- C. Stainless steel bolts, anchor bolts, nuts, and washers shall be Type 316 stainless steel, class 2, conforming to ASTM A193 for bolts and to ASTM A194 for nuts. All threads on stainless steel bolts shall be protected with an anti-seize lubricant suitable for submerged stainless steel bolts, to meet government specification MIL-A-907E. Buried bolts in poorly drained soil shall be coated the same as the buried pipe.
 - 1. Antiseize lubricant shall be classified as acceptable for potable water use by the NSF.
 - 2. Antiseize lubricant shall be "PURE WHITE" by Anti-Seize Technology, Franklin Park, IL, 60131; AS-470 by Dixon Ticonderoga Company, Lakehurst, NJ, 08733, or approved equal.
- D. **Bolt Requirements:**
 - 1. The bolt and nut material shall be free-cutting steel.
 - 2. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads. All bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series.

3. Bolts and nuts shall be installed with washers fabricated of material matching the base material of bolts, except that hardened washers for high strength bolts shall conform to the requirements of the AISC Specification. Lock washers fabricated of material matching the bolts shall be installed with washers where indicated.
4. The length of each bolt shall be such that after the joint is made up, the bolt extends through the entire nut, but in no case more than 1/2-inch beyond the nut.

E. Sleeve Anchors:

1. Manufacturers and Products:

- a. ITW Ramset/Red Head, Wood Dale, IL; Dynabolt Hex Nut Sleeve Anchor.
- b. Powers Rawl, New Rochelle, NY; Hex Head Power-Bolt Anchor.
- c. Simpson Strong-Tie Co., Inc., Pleasanton, CA; Sleeve-All Hex Head Anchor.
- d. Wej-It Corp., Tulsa, OK; Wej-It Sleeve Anchor.

F. Adhesive Anchors: Unless otherwise indicated, all drilled, concrete or masonry anchors shall be adhesive anchors. No substitutions will be considered unless accompanied with ICBO report verifying strength and material equivalency.

1. Threaded Rod:

- a. ASTM F593 stainless steel threaded rod, diameter as shown on Drawings.
- b. Length as required, to provide minimum depth of embedment.
- c. Clean and free of grease, oil, or other deleterious material.
- d. For hollow-unit masonry, provide galvanized or stainless steel wire cloth screen tube to fit threaded rod.

2. Adhesive:

- a. Two-component, designed to be used in adverse freeze/thaw environments, with gray color after mixing.
- b. Cure Temperature, Pot Life, and Workability: Compatible for intended use and environmental conditions.
- c. Nonsag, with selected viscosity base on installation temperature and overhead application where applicable.

3. Packaging and Storage:

- a. Disposable, self-contained cartridge system capable of dispensing both components in the proper mixing ratio and fitting into a manually or pneumatically operated caulking gun.
- b. Store adhesive cartridges on pallets or shelving in covered storage area, in accordance with manufacturer's written instructions.
- c. Cartridge Markings: Include manufacturer's name, product name, material type, batch or serial number, and adhesive expiration date.
- d. Dispose of cartridges if shelf life has expired.

4. Manufacturers and Products:

- a. ITW Ramset/Red Head, Wood Dale, IL; Epcon Ceramic 6 Epoxy or A7 Adhesive Anchor System. (Use only Epcon A7 Adhesive System for hollow masonry.)
- b. Hilti, Inc., Tulsa, OK; HIT Doweling Anchor System, HIT HY 150 (HIT HY 20 for hollow masonry).
- c. Powers Rawl, New Rochelle, NY; Power Fast Epoxy Injection Gel Cartridge System.
- d. Simpson Strong-Tie Co., Inc., Pleasanton, CA; Epoxy-Tie Adhesive ET or Acrylic-Tie Adhesive. (Use only Acrylic-Tie Adhesive for temperatures below 40 degrees F.)
- e. Covert Operations, Inc., Long Beach, CA; CIA-Gel 7000 Epoxy Anchors.
- f. U.S. Anchor, Pompano Beach, FL; Ultrabond 1.
- g. Unitex, Kansas City, MO; Pro-Poxy 300 and Pro-Poxy 300 Fast Epoxy Adhesive Anchors.

PART 3 EXECUTION

3.1 FABRICATION AND INSTALLATION REQUIREMENTS

- A. **Fabrication and Erection:** Except as otherwise indicated, the fabrication and erection of structural steel shall conform to the requirements of the American Institute of Steel Construction "Manual of Steel Construction."

3.2 WELDING

- A. **Method:** Welding shall be by the metal-arc method or gas-shielded arc method as described in the American Welding Society's "Welding Handbook" as supplemented by other pertinent standards of the AWS. Qualification of welders shall be in accordance with the AWS Standards governing same.
- B. **Quality:** In assembly and during welding, the component parts shall be adequately clamped, supported and restrained to minimize distortion and for control of dimensions. Weld reinforcement shall be as indicated by the AWS Code. Upon completion of welding, weld splatter, flux, slag, and burrs left by attachments shall be removed. Welds shall be repaired to produce a workmanlike appearance, with uniform weld contours and dimensions. All sharp corners of material that is to be painted or coated shall be ground to a minimum of 1/32-inch on the flat.

3.3 GALVANIZING

- A. Structural steel plates shapes, bars, and fabricated assemblies required to be galvanized shall, after the steel has been thoroughly cleaned of rust and scale, be galvanized in accordance with the requirements of ASTM A123. Any galvanized part that becomes warped during the galvanizing operation shall be straightened. Bolts, anchor bolts, nuts and similar threaded fasteners, after being properly cleaned, shall be galvanized in accordance with the requirements of ASTM A153. Field repairs to galvanizing shall be made using "Galvinox," "Galvo-Weld," or approved equal.

3.4 DRILLED ANCHORS

- A. Drilled anchors and reinforcing bars shall be installed in strict accordance with the manufacturer's instructions. Holes shall be roughened with a brush on a power drill, cleaned and dry. Drilled anchors shall not be installed until the concrete has reached the required 28-day compressive strength. Adhesive anchors shall not be loaded until the adhesive has reached its indicated strength in accordance with the manufacturer's instructions.

END OF SECTION

D I V I S I O N 1 5

Mechanical

**SECTION - 15000
PIPING: GENERAL**

PART 1 GENERAL

1.1 THE REQUIREMENT

- A. The CONTRACTOR shall supply and install the piping systems, complete and operable, as indicated on the Plan and Profile drawings, in accordance with the Contract Documents.
- B. The Contractor shall provide fabrication and layout drawings for all piping systems. It is the CONTRACTOR's responsibility to construct the piping system according to the fabrication drawings for a complete and functional system.
- C. The mechanical or Plan and Profile drawings define the general layout, configuration, routing, method of support, pipe size, and pipe type. These drawings are not pipe construction or fabrication drawings. It is the CONTRACTOR's responsibility to develop the details necessary to construct the mechanical piping systems to accommodate the specific equipment provided, and to provide and install all spools, spacers, adapters, and connectors for a complete and functional system.
- D. The provisions of this Section shall apply to all piping sections in Division 15.

1.2 CONTRACTOR SUBMITTALS

- A. **General:** Submittals shall be furnished in accordance with Section 01300.
- B. **Samples:** All expenses incurred in making samples for certification of tests shall be borne by the CONTRACTOR at no increase in cost to the OWNER.
- C. **Certifications:**
 - 1. All necessary certificates, test reports, and affidavits of compliance shall be obtained by the CONTRACTOR.
 - 2. **Fabricator Statement:** A statement from the pipe fabricator certifying that all pipes will be fabricated subject to a recognized Quality Control Program. An outline of the program shall be submitted to the OWNER for review prior to the fabrication of any pipe.
- D. **Bolting Torque for Gaskets:** Provide bolting torques from gasket supplier for proper seating of flange gaskets for each size and pressure rating required.
- E. **Product Technical Data Including:**
 - 1. Copies of manufacturer's written directions regarding material handling, delivery, storage, and installation.
 - 2. Separate schedule sheet for each piping system scheduled in this Section showing compliance of all system components. Attach technical product data on gaskets, pipe fittings, and other components.
- F. **Miscellaneous Submittals:**
 - 1. Test reports:
 - a. Copies of pressure test results on all piping systems.
 - b. Notification of time and date of piping pressure tests.

PART 2 PRODUCTS

2.1 GENERAL

- A. **Extent of Work:** All pipes, fittings, and appurtenances shall be provided in accordance with the requirements of the applicable Sections of Division 15 and as indicated.
- B. **Pipe Supports:** All pipes shall be adequately supported, as indicated in the drawings.
- C. **Pressure Rating:** All piping systems shall be designed for the maximum expected pressure as defined in Section 15950.
- D. **Inspection:** All pipe may be subject to inspection at the place of manufacture. During the manufacture of the pipe, the OWNER shall be given access to all areas where manufacturing is in progress and shall be permitted to make all inspections necessary to confirm compliance with requirements.
- E. **Tests:** Except where otherwise indicated, all materials used in the manufacture of the pipe shall be tested in accordance with the applicable specifications and standards. Welds shall be tested as indicated. The CONTRACTOR shall perform all tests at no additional cost to the OWNER.

2.2 PIPE FLANGES

- A. **Flanges:** Metallic (including stainless steel), convoluted or flat-plate, back-up rings and bolt materials shall follow the guidelines of Plastic Pipe Institute Technical Note # 38, and shall have the bolt-holes and bolt-circles conforming to one of these standards: ASME B-16.5 Class 150, ASME B-16.47 Series A Class 150, ASME B-16.1 Class 125, or AWWA C207 Class 150 Series B, D, or E. The back-up ring shall provide a long-term pressure rating equal to or greater than the pressure-class of the pipe with which the flange adapter assembly will be used, and such pressure rating shall be marked on the back-up ring. The back-up ring, bolts, and nuts shall be protected from corrosion by a system such as paint, coal-tar epoxy, galvanization, polyether or polyester fusion bonded epoxy coatings, anodes, or cathodic protection, as specified.
- B. **Blind Flanges:** Blind flanges shall be in accordance with ANSI/AWWA C207, or with the standards for miscellaneous small pipes. All blind flanges for pipe sizes 12 inches and over shall be provided with lifting eyes in the form of welded eye bolts.
- C. **Flange Coating:** All machined faces of metal blind flanges and pipe flanges shall be coated with a temporary rust-inhibitive coating to protect the metal until the installation is completed.
- D. **Flange Bolts:** Studs and bolts shall extend through the nuts a minimum of 1/4-inch. All-thread studs shall be used on all valve flange connections, where space restrictions preclude the use of regular bolts.
- E. **Insulating Flanges:** Insulated flanges shall have bolt holes 1/4-inch diameter greater than the bolt diameter.
- F. **Flange Gaskets:** Gaskets for flanged joints shall be full-faced, 1/8-inch thick compressed sheets of aramid fiber base, with nitrile binder and non-stick coating, suitable for temperatures to 700 degrees F, a pH of one to eleven, and pressures to 1000 psig. Blind flanges shall have gaskets covering the entire inside face of the blind flange and shall be cemented to the blind flange. Ring gaskets shall not be permitted, unless otherwise indicated. Provide bolting torques from gasket supplier for proper seating of flange gaskets for each size and pressure rating required.
- G. Flange gasket manufacturers, or approved equal:
 - 1. John Crane, Style 2160.
 - 2. Garlock, Style 3000.

2.3 THREADED INSULATING CONNECTIONS

- A. **General:** Threaded insulating bushings, unions, or couplings, as appropriate, shall be used for joining threaded pipes of dissimilar metals and for piping systems where corrosion control and cathodic protection are involved.
- B. **Materials:** Threaded insulating connections shall be of nylon, Teflon, polycarbonate, polyethylene, or other non-conductive materials, and shall have ratings and properties to suit the service and loading conditions.

2.4 MECHANICAL-TYPE COUPLINGS (GROOVED OR BANDED PIPE)

- A. **General:** Cast mechanical-type couplings shall be provided where indicated. The couplings shall conform to the requirements of ANSI/AWWA C606 - Grooved and Shouldered Joints. Bolts and nuts shall conform to the requirements of Section 05500. All gaskets for mechanical-type couplings shall be compatible with the piping service and fluid utilized, in accordance with the coupling Manufacturer's recommendations. The wall thickness of all grooved piping shall conform with the coupling manufacturer's recommendations to suit the highest expected pressure. All mechanical-type couplings on buried piping shall be bonded. The CONTRACTOR shall have the coupling Manufacturer's service representative verify the correct choice and application of all couplings and gaskets, and the workmanship, to assure a correct installation.

2.5 SLEEVE-TYPE COUPLINGS

- A. **Construction:** Sleeve-type couplings shall be provided where indicated, in accordance with ANSI/AWWA C219 - Standard for Bolted Sleeve-Type Couplings for Plain-End Pipe, and shall be of steel with steel bolts, without pipe stop, and be of sizes to fit the pipe and fittings indicated. Sleeve couplings shall be rated for 200 psi working pressure and 285 psi transient pressure. Couplings shall be hydraulically tested per AWWA C219. The middle ring shall be not less than 1/4-inch in thickness and shall be either 5 or 7 inches long for sizes up to and including 30 inches and 10 inches long for sizes greater than 30 inches, for standard steel couplings, and 16 inches long for long-sleeve couplings. The followers shall be single-piece contoured mill sections welded and cold-expanded as required for the middle rings and of sufficient strength to accommodate the number of bolts necessary to obtain adequate gasket pressures without excessive rolling. The shape of the follower shall be of such design as to provide positive confinement of the gasket. Bolts and nuts shall conform to the requirements of Section 05500. Buried sleeve-type couplings shall be epoxy-coated at the factory as indicated.
- B. **Pipe Preparation:** The ends of the pipe where indicated, shall be prepared for flexible steel couplings. Plain ends for use with couplings shall be smooth and round for a distance of 12 inches from the ends of the pipe, with outside diameter not more than 1/64-inch smaller than the nominal outside diameter of the pipe. The middle ring shall be tested by cold-expanding a minimum of one percent beyond the yield point, to proof-test the weld to the strength of the parent metal. The weld of the middle ring shall be subjected to air test for porosity.
- C. **Gaskets:** Gaskets for sleeve-type couplings shall be rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions.
 - 1. The rubber in the gasket shall meet the following specifications:
 - a. Color: Jet Black.
 - b. Surface: Non-blooming.
 - c. Durometer Hardness: 74 ± 5.
 - d. Tensile Strength: 1,000 psi minimum.
 - e. Elongation: 175 percent minimum.
 - 2. The gaskets shall be immune to attack by impurities normally found in water or wastewater. All gaskets shall meet the requirements of ASTM D 2000 - Classification System for Rubber Products in Automotive Applications, AA709Z, meeting Suffix B13 Grade 3, except as noted above. All gaskets shall be compatible with the piping service and fluid utilized.

- D. **Insulating Couplings:** Where insulating couplings are required, both ends of the coupling shall have a wedge-shaped gasket which assembles over a rubber sleeve of an insulating compound in order to obtain insulation of all coupling metal parts from the pipe.
- E. **Restrained Joints:** All sleeve-type couplings on pressure lines shall be harnessed unless thrust restraint is provided by other means. Harnesses shall be in accordance with the appropriate reference standard, or as indicated.
- F. Manufacturers, or approved equal:
 - 1. Dresser, Style 38.
 - 2. Ford Meter Box Co., Inc., Style FC1 or FC3.
 - 3. Smith-Blair, Style 411.

2.6 FLANGED COUPLING ADAPTERS

- A. **Flange Couplings Adaptors:** Shall conform to requirements for sleeve type couplings as applicable, shall meet ANSI/AWWA C219 and shall be hydrostatically tested.
- B. **Body:** Shall be made of either ductile iron per ASTM A536 or steel per ASTM A53 or ASTM A512 to match the adjoining pipe material. Bolt circle, bolt size and spacing shall conform to the drilling pattern of an ANSI/ASME B16.5 Class 150 drilling. Body shall be rated for 200 psi working pressure and 285 psi transient pressure.
- C. **Follower:** Follower shall be ductile iron per ASTM A536 for sizes 3-12 inches. For sizes 14-inch and greater, follower shall be heavy rolled steel per AISI C1018.
- D. **Gasket:** Grade 30 – standard – specially compounded rubber of all new materials with ingredients to produce superior storage characteristics, permanence and resistance to set after installation. Recommended for water, salt solutions, mild acids and bases.
- E. **Bolts and Nuts:** Type 304 stainless steel.
- F. **Painting:** Finish shall be enamel with an epoxy coating.
- G. Manufacturers, or approved equal:
 - 1. Smith-Blair, Inc.
 - 2. Baker.

2.7 EXPANSION JOINTS

- A. Expansion joints shall be Guardian “200” FEP-Lined Expansion Joints by Garlock or approved equal.

2.8 PIPE THREADS

- A. All pipe threads shall be in accordance with ANSI/ASME B1.20.1 - Pipe Threads, General Purpose (inch), made up with Teflon tape, unless otherwise indicated.

PART 3 EXECUTION

3.1 MATERIAL DELIVERY, STORAGE, AND PROTECTION

- A. All piping materials, fittings, valves, and accessories shall be delivered in a clean and undamaged condition and stored off the ground for protection against oxidation caused by ground contact. All defective or damaged materials shall be replaced with new materials.

3.2 GENERAL

- A. All pipes, fittings, and appurtenances shall be installed in accordance with the requirements of the applicable Sections of Divisions 2 and 15.
- B. **Lined Piping Systems:** The lining manufacturer shall take full responsibility for the complete, final product and its application. All pipe ends and joints of lined pipes at screwed flanges shall be epoxy-coated to assure continuous protection.
- C. **Core Drilling:** Where core drilling is required for pipes passing through existing concrete, core drilling locations shall be determined by radiograph of concrete construction to avoid damage to embedded raceways and rebars.
- D. **Cleanup:** After completion of the work, all remaining pipe cuttings, joining and wrapping materials, and other scattered debris, shall be removed from the site. The entire piping system shall be handed over in a clean and functional condition.
- E. **Testing and Disinfection:** Pipelines shall be tested and disinfected in accordance with Section 15950.

3.3 EXPOSED PIPING

- A. Install exposed piping in straight runs parallel to the axes of structures, unless indicated otherwise.
 - 1. Install piping runs plumb and level, unless otherwise indicated on the Drawings.
- B. Assemble piping without distortion or stresses caused by misalignment.
 - 1. Match and properly orient flanges, unions, flexible couplings, and other connections.
 - 2. Do not subject piping to bending or other undue stresses when fitting piping. Do not correct defective orientation or alignment by distorting flanged joints or subjecting flange bolts to bending or other undue stresses.
 - 3. Flange bolts, union halves, flexible connectors, and other connection elements shall slip freely into place.
 - 4. Alter piping assembly to fit when proper fit is not obtained.

3.4 BURIED PIPING

- A. Bury piping with minimum 3-foot cover without air traps, unless otherwise indicated on the Drawings.
- B. Laying Piping:
 - 1. Lay piping in finished trenches free from water or debris.
 - 2. Place piping with top or bottom markings with markings in proper position.
 - 3. Lay piping on an unyielding foundation with uniform bearing under the full length of barrels.
 - 4. At the end of each day's construction, plug open ends of piping temporarily to prevent entrance of debris or animals.

END OF SECTION

SECTION - 15070
PIPE: HIGH DENSITY POLYETHYLENE (PE 4710)

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Polyethylene pipe.
 - 2. Polyethylene fittings
 - 3. Pipe support systems
- B. Related Sections include but are not necessarily limited to:
 - 1. Skagit PUD No. 1 General Conditions.
 - 2. Division 1 - General Requirements.
 - 3. Section-02140
 - 4. Section-02300
 - 5. Section-02700

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. ASTM International (ASTM):
 - 2. D638, Specifications for Tensile Properties of Plastics.
 - 3. D1248, Specification for Polyethylene.
 - 4. D1693, Specification for Environmental Stress Cracking of Ethylene Plastics.
 - 5. D2240, Standard Test Method for Rubber Property-Durometer Hardness.
 - 6. D3261, Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
 - 7. D3350, Specification for Polyethylene Plastics Pipe and Fittings Materials.
- B. Society for Protective Coatings (SSPC):
 - 1. SP-3, Power Tool Cleaning.
- C. ANSI/AWWA
 - 1. ANSI/AWWA C901-08 Polyethylene (PE) Pressure Pipe and Tubing, ½ In. (13 mm) Through 3 In. (76 mm) for Water Service
 - 2. ANSI/AWWA C906-07 Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) through 63 In. (1,600 mm), for Water Distribution and Transmission
 - 3. ANSI/AWWA C651 Standard for Disinfecting Water Mains
 - 4. AWWA M55 Manual of Water Supply Practices, PE Pipe–Design and Installation
 - 5. ANSI/MSS SP-69 and MSS SP-58
- D. Plastics Pipe Institute, PPI
 - 1. PPI Handbook of Polyethylene Pipe – 2009 (2nd PPI TR-33 Generic Butt Fusion Joining Procedure for Polyethylene Gas Pipe Edition)
 - 2. PPI TR-34 Disinfection of Newly Constructed Polyethylene Water Mains
 - 3. PPI TR-41 Generic Saddle Fusion Joining Procedure for Polyethylene Gas Piping
 - 4. PPI TN-42 Recommended Minimum Training Guidelines for PE Pipe Butt Fusion Joining Operators for Municipal and Industrial Projects (2009)
- E. NSF
 - 1. NSF / ANSI 61 Drinking Water System Components–Health Effects

F. ASTM

1. ASTM F 714 Standard Specification for Polyethylene (PE) Plastic Pipe (SDRPR) Based on Outside Diameter
2. ASTM F905 Standard Practice for Qualification of Polyethylene Saddle-Fused Joints
3. ASTM F 1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing
4. ASTM F 1290 Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings
5. ASTM F 1412 Standard Specification for Polyolefin Pipe and Fittings for Corrosive Waste Drainage Systems
6. ASTM F1417 Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air

1.3 SUBMITTALS

A. Certification of Manufacturer:

1. Affirmation that product shipped meets or exceeds the standards set forth in this specification. This shall be in the form of a written document from the manufacturer attesting to the manufacturing process meeting the standards and affirmation that the resin used is as required.
2. Manufacturers recommended fusion procedures for the products.

PART 2 PRODUCTS

2.1 PIPE

- A. Polyethylene pipe shall be made from HDPE material having a material designation code of PE4710 or higher. The material shall meet the requirements of ASTM D 3350 and shall have a minimum cell classification of PE445574C/E. In addition, the material shall be listed as meeting NSF-61.
- B. The pipe and fittings shall meet the requirements of AWWA C906 for the appropriate size, diameter, diameter ratio, and resin classification.
- C. HDPE pipe shall be DR 11 and rated for use at a pressure class of 200 psi. The outside diameter of the pipe shall be IPS sizing system.
- D. Approved manufacturers:
 1. Chevron Phillips Chemical Company (CPCHEM).
 2. Plexco.
 3. Polypipe.
 4. JM-Eagle.
 5. Approved Equal

2.2 FITTINGS

- A. Butt Fusion Fittings - Fittings shall be made of HDPE material with a minimum material designation code of PE4710 or higher and a Diameter Ratio of 11 and with a minimum Cell Classification of PE445574C/E. Butt Fusion Fittings shall meet the requirements of ASTM D3261. Molded and fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. All fittings shall meet the requirements of AWWA C906. Markings for molded fittings shall comply with the requirements of ASTM D 3261. Fabricated fittings shall be marked in accordance with ASTM F 2206. Socket fittings shall meet ASTM D 2683.
- B. Electrofusion Fittings - Fittings shall be made of HDPE material with a minimum material designation code of PE 4710 and with a minimum Cell Classification of PE445574C/E. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. All electrofusion fittings shall be suitable for use as pressure

conduits, and have nominal burst values of four times the Working Pressure Rating (WPR) of the fitting. Markings shall be according to ASTM F 1055.

- C. Flanges and Mechanical Joint Adapters (MJ Adapters) – Flanges and Mechanical Joint Adapters shall have a material designation code of PE4710 or higher and a minimum Cell Classification as noted in 2B.01A. Flanged and Mechanical Joint Adapters can be made to ASTM D 3261 or if machined, must meet the requirements of ASTM F 2206. Flanges and MJ Adapters shall have a pressure rating equal to the pipe unless otherwise specified on the plans. Markings for molded or machined flange adapters or MJ Adapters shall be per ASTM D 3261. Fabricated (including machined) flange adapters shall be per ASTM F 2206. Van-Stone style, metallic (including stainless steel), convoluted or flat-plate, back-up rings and bolt materials shall follow the guidelines of Plastic Pipe Institute Technical Note # 38, and shall have the bolt-holes and bolt-circles conforming to ASME B-16.1 Class 125. The back-up ring shall provide a long-term pressure rating equal to or greater than the pressure-class of the pipe with which the flange adapter assembly will be used, and such pressure rating shall be marked on the back-up ring. The back-up ring, bolts, and nuts shall be protected from corrosion by a system such as paint, coal-tar epoxy, galvanization, polyether or polyester fusion bonded epoxy coatings, anodes, or cathodic protection, as specified by the project engineer.
- D. Service connections shall be electrofusion saddles with a brass threaded outlet. For electrofusion saddles with threaded outlet the size of the outlet shall be one inch IPS unless a larger size is shown on the plans. Electrofusion saddles shall be made from PE 4710

2.3 PIPE MARKING

- A. The pipe shall be marked in accordance with the standards to which it is manufactured. Only one material designation is to be stamped on pipe.
- B. Tracing wire shall be placed parallel and above, but separate from the pipe and shall be 10 AWG or solid copper with blue insulation.

2.4 FLANGE BOLTS

- A. All bolts used in buried flanges shall be ASTM A325 Type 3 (corten steel) unfinished, with nuts to ASTM A563C3 or A563DH3 and washers to ASTM F436-1. All bolts, nuts and washers used in exposed or above ground locations shall be ASTM/A307, hot-dip galvanized.

2.5 RUBBER GASKETS

- A. Rubber gaskets shall be 1/8 thick full face NBR.

PART 3 INSTALLATION OF PIPE

3.1 INSTALLATION:

1. Install buried pipe as indicated on Drawings.
2. The Contractor shall insure that kinking or excessive bend diameters of the pipe do not occur during the installation process.
3. The Contractor shall insure that the pipe installed in the trench is firmly supported.
4. The Contractor shall cap all open pipe ends at the end of the work day.
5. All installed valves shall be tested in the presence of the Owner.
6. All repairs deemed necessary by the Owner or Engineer shall be made by the Contractor.
7. Contractor shall remove any cave-in portions of the trench prior to placing bedding around the pipe.
8. HDPE pipe and fittings shall be by the same manufacturer.
9. The minimum strength of the fittings shall not be less than that of the pipe.
10. Changes in direction of PE Pipe:
 - a. Pipe may be cold-bent to minimum radius of 20 times the pipe diameter as it is installed.

- b. If fittings or fusions are present in the bend, the minimum recommended cold bending radius is 125 times the outside diameter of the pipe.
- 11. Remove cutting and threading burrs.
- 12. After installation of the pipe, it is to be flushed, hydrostatically tested, chlorinated and sampled for bacteriological testing that must be acceptable prior to placing the pipe in service per Section 15950.

3.2 JOINING

- A. Flanged Joints: Install in accordance with AWWA C115.
 - 1. Make flange faces flat and perpendicular to pipe centerline.
 - 2. When bolting flange joints, exercise extreme care to ensure that there is no restraint on opposite end of pipe or fitting which would prevent uniform gasket compression or would cause unnecessary stress, bending or torsional strains to be applied to cast flanges or flanged fittings.
 - 3. Allow one flange free movement in any direction while bolts are being tightened.
 - 4. Gradually tighten flange bolts uniformly to permit even gasket compression.
- B. Butt Fusion: The pipe shall be joined by the butt fusion procedure outlined in ASTM F 2620 or PPI TR-33. All fusion joints shall be made in compliance with the pipe or fitting manufacturer's recommendations. Fusion joints shall be made by qualified fusion technicians per PPI TN-42.
- C. Electrofusion: Electrofusion joining shall be done in accordance with the manufacturers recommended procedure. Other sources of electrofusion joining information are ASTM F 1290 and PPI TN 34. The process of electrofusion requires an electric source, a transformer, commonly called an electrofusion box that has wire leads, a method to read electronically (by laser) or otherwise input the barcode of the fitting, and a fitting that is compatible with the type of electrofusion box used. The electrofusion box must be capable of reading and storing the input parameters and the fusion results for later download to a record file. Qualification of the fusion technician shall be demonstrated by evidence of electrofusion training within the past year on the equipment to be utilized for this project.

3.3 TESTING

- A. Testing piping systems in accordance with Section 15950.
- B. Following approved testing and disinfection of pipe and service transfers, make connections to existing pipeline as shown on the Drawings. Conform to applicable portions of Section 15950.

END OF SECTION

SECTION - 15080
PIPE: PLASTIC CROSSLINKED POLYETHYLENE
(REHAU MUNICIPEXU PIPE)

PART 1 GENERAL

1.1 SUMMARY

- A. Municipal water service piping system, where shown on the Drawings and Schedules, shall be crosslinked polyethylene pipe, and shall include the following:
1. Crosslinked polyethylene (PEXa) piping
 - a. Produced in accordance with AWWA C904
 - b. Required 200 psi pressure rating at 73.4°F (23°F) when using a 0.63 design factor
 - c. Required 1 year UV resistance rating in accordance with ASTM F876
 2. Approved AWWA C800 compression joint valves and fittings, suitable for buried applications, using stainless steel or plastic support liners inside pipe at each joint and/or cold-expansion and compression-sleeve fittings.
 3. Supervision and field engineering required for the complete and proper function of the system as deemed necessary per specifying engineer.

1.2 REFERENCE

- A. Publications listed here are part of this specification to the extent they are referenced. Where no specific edition of the standard or publication is identified, the current edition shall apply.
- B. ASTM – American Society for Testing and Materials
1. ASTM F876 – Standard Specification for Crosslinked Polyethylene (PEX) Tubing
 2. ASTM F877 – Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems
 3. ASTM F2023 – Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water
 4. ASTM F2080 – Standard Specification for Cold-Expansion Fittings with Metal Compression-Sleeves for Crosslinked Polyethylene (PEX) Pipe
- C. AWWA – American Water Works Association
1. AWWA C904 – Crosslinked Polyethylene (PEX) Pressure Pipe, 1/2 in.(12 mm) Through 3 in. (76 mm), for Water Service
 2. AWWA C800 – Underground Service Line Valves and Fittings
- D. CSA Canadian Standards Associations
1. CSA B137.5 – Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications
- E. ICC – International Code Council
- F. ISO – International Organization for Standardization
1. ISO 9001 – Quality Management Systems – Requirements
- G. NSF International
1. NSF/ANSI 14 – Plastic Piping System Components and Related Materials
 2. NSF/ANSI 61 – Drinking Water System Components – Health Effects
- H. Plastic Pipe Institute
1. PPI TR-3 – Policies and Procedures for Developing Hydrostatic Design Basis (HDB), pressure Design Basis (PDB), Strength Design Basis (SDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe

1.3 DEFINITIONS

- A. Crosslinked polyethylene, commonly abbreviated PEX, is made from high-density polyethylene (HDPE). Crosslinking is accomplished during manufacturing. Crosslinking enhances the physical and mechanical properties of the polymer. The high-temperature properties are improved. Chemical resistance is enhanced by resisting dissolution. Low temperature properties are also improved. Impact and tensile strength, scratch resistance and resistance to brittle fracture are enhanced. The required degree of crosslinking, according to ASTM Standard F876, is between 70-89%. This specification requires PEX to be designated as PEXa and be manufactured by the high-pressure peroxide method.

1.4 SYSTEM DESCRIPTOIN

- A. Design Requirements
 - 1. Standard grade hydrostatic pressure ratings from Plastics Pipe Institute in accordance with PPI TR-3. The following three standard-grade hydrostatic ratings are required:
 - a. 100 psi (690 kPa) at 180°F (82°C)
 - b. 160 psi (1105 kPa) at 73.4°F (23°C)
 - c. 200 psi (1378 kPa) at 73.4°F (23°C) when using a 0.63 design factor.
- B. Performance Requirements: To provide a municipal water piping system, which is manufactured, fabricated and installed to comply with regulatory agencies and to maintain performance criteria stated by the PEXa pipe manufacturer without defects, damage or failure.
- C. Compliant to the following standards:
- D. AWWA C904
 - 1. NSF/ANSI Standard 14
 - 2. NSF/ANSI Standard 61
 - 3. ASTM F876
 - 4. CSA B137.5

1.5 SUBMITTALS

- A. Comply with Section 01300 and Manufacturers Certifications as set forth in this specification.
- B. Product Data: Submit manufacturer's Technical Manual, submittal forms, catalog cuts, brochures, specifications and installation instructions. Submit data in sufficient detail to indicate compliance with the contract documents.
 - 1. Submit manufacturer's instructions for installation.
 - 2. Submit data for equipment, fittings, fasteners and associated items necessary for the installation of the piping and manifolds.
- C. Submit computer-generated system design indicating pipe sizing, flow rates and temperatures.
- D. Shop Drawings: Provide plans drawn to scale for all installation areas.
 - 1. Indicate dimensions, descriptions of materials, general construction, component connections and installation procedures.
 - 2. Indicate design, schematic layout of system, including equipment and critical dimensions as well as details for protecting exposed PEXa piping.
- E. Certification:
 - 1. Fittings shall be third-party as approved by the manufacturer's PEXa piping system with applicable plumbing and mechanical code certifications.

- F. Maintenance Instructions: Submit instructions for any maintenance required or recommended by manufacturer.

1.6 QUALITY ASSURANCE

- A. Comply with Section 01400, Quality Assurance.
- B. Manufacturer: Must be a company specializing in the Work of this Section with a minimum of 5 years documented experience.
- C. Pipe shall be manufactured in a facility whose quality management system is ISO 9001 certified.
- D. Crosslinked polyethylene (PEXa) pipe shall conform and be certified to AWWA C904, ASTM F876, F877 and CSA B137.5. Fittings shall conform and be certified to AWWA C800, or ASTM F877, F2080 and CSA B137.5.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Comply with Section 01600, Product Requirements.
- B. Deliver and store pipe and equipment in shipping containers with labeling in place.
 - 1. Pipe shall be kept in original shipping boxes until required for installation.
- C. Store pipe and equipment in a safe place, dry, enclosed, under cover, in a well-ventilated area.
 - 1. Do not expose pipe to ultraviolet light beyond exposure limits recommended by manufacturer.
 - 2. Protect pipe from entry of contaminating materials. Install suitable plugs in open pipe ends until installation.
 - 3. Pipe shall not be dragged across the ground or other surfaces, and shall be stored on a flat surface with no sharp edges.
- D. Protect materials from damage by other trades.
- E. Pipe shall be protected from oil, grease, paint, direct sunlight and other elements as recommended by manufacturer.

1.8 WARRANTY

- A. Provide manufacturer's standard written warranty.
 - 1. The warranty shall include as a minimum, provisions to repair defects from faulty materials or workmanship developed during the guarantee period, or provide for replacement with new materials, at no expense to Owner.
 - 2. The pipe manufacturer shall warrant the crosslinked polyethylene pipe to be free from defects in material and workmanship for a minimum period of one (1) years starting at completion and acceptance of the project by the District Board of Directors.
 - 3. All fittings and hardware shall be warranted to be free from defects in material and workmanship for a period of one (1) years starting at completion and acceptance of the project by the District Board of Directors.
- B. Provide installer's guarantee as appropriate.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. REHAU Construction LLC, 1501 Edwards Ferry Road, NE; Leesburg, VA 20176; email: rehau_mailbox@rehau.com; website: na.rehau.com; upon whose products and equipment these specifications are based.
- B. No Substitutions allowed.

2.2 COMPONENTS

- A. Piping
 1. All pipe shall be high-density crosslinked polyethylene manufactured using the high-pressure peroxide method of crosslinking (PEXa). Pipe shall conform to AWWA C904, ASTM F876, ASTM F877, CSA B137.5, NSF/ANSI 14 and NSF/ANSI 61.
 2. Pipe shall be rated for continuous operation of 100 psi gauge pressure at 180°F temperature (690 kPa @ 82°C), and 160 psi gauge pressure at 73.4°F temperature (1105 kPa @ 23°C).
 3. Pipe shall be rated for continuous operation at 200 psi gauge pressure at 73.4°F temperature (1378 kPa @ 23°C) when using a 0.63 design factor.
 4. Pipe shall be listed by PPI to standard TR-3, with applicable plumbing and mechanical code certifications.
 5. Pipe to be manufactured using a high-pressure peroxide method with a minimum degree of crosslinking of 70-89% when tested in accordance with ASTM D2765, Method B.
 6. Pipe to be tested for resistance to hot chlorinated water in accordance with ASTM F2023. Pipe to have a minimum extrapolated time-to-failure of 50 years, calculated in accordance with section 13.3 of F2023 and listed as “3306” per the ASTM F876 standard.
 7. Pipe to have a co-extruded UV Shield made from UV-resistant high-density polyethylene, color blue. Pipe to have minimum recommended UV exposure time of one year when tested in accordance with ASTM F2657.
 8. Pipe shall be manufactured in a facility whose quality management system is ISO 9001 certified.
 9. Bend Radius: The minimum bend radius for cold bending of pipe shall be not less than five (5) times the outside diameter.
- B. Pipe Fittings
 1. Mechanical fittings to be of compression joint or compression-sleeve style, manufactured of metal suitable for the fluid application, in a size suitable for the PEXa pipe dimensions.
 2. Compression joint fittings shall be manufactured in accordance with AWWA C800. Fittings must meet the pressure requirements of the PEXa pipe at 73.4°F (23°C)
 3. Compression-sleeve fittings shall be manufactured of brass and shall be supplied by the pipe manufacturer as part of a proven cataloged system.
 4. Where fittings are encased in concrete or buried underground, fittings shall be wrapped as per manufacturer’s recommendation to protect the material.

2.3 PIPE MARKING

- A. Pipe shall carry the following markings every three (3) feet (0.9 meters): Manufacturer’s name or trademark, nominal size, PEXa 3306 (material designation) SDR9 (standard dimension ratio), POTABLE TUBING, ASTM F876/ F877 / F2080, CSA B137.5, NSF-pw, UP Code 200psi/73.4°F at 0.63 design factor 160psi/73.4°F 100psi/180°F, POTABLE TUBING, manufacturing date and footage mark.

2.4 PACKAGING

- A. Coiled pipe shall be shipped in protective cardboard boxes marked with product name and size.

- B. Straight lengths shall be packed in plastic bags.

PART 3 INSTALLATION OF PIPE

3.1 INSTALLATION:

- A. Install in accordance with manufacturer's published installation manual and/or published guidelines and final shop drawings.
- B. At connections and fittings, use a plastic pipe cutter to ensure square (90°) and clean cuts, and join pipes immediately or cap ends of pipe to seal from contaminants.
- C. Pipe shall be dispensed using a suitable uncoiling device. Remove twists prior to securing pipe. Pipe shall lie flat on an even plane.
- D. Pipe that passes through expansion joints or walls shall be covered in protective polyethylene convoluted sleeving (flexible conduit) extending 15 in (38 cm) on each side of the joint. Sleeving shall be secured on pipe to prevent movement during installation.
- E. Where pipe enters or exits a wall, a protective conduit shall be placed around the pipe, with the conduit extending a minimum of 6 inches (15 cm) into the floor and exiting by a minimum of 6 in. (15 cm). For penetrations at manifolds, use rigid PVC bend guides secured in place to prevent movement.

3.2 TESTING

- A. Testing piping systems in accordance with Section 15950.
- B. Following approved testing and disinfection of pipe and service transfers, make connections to existing pipeline as shown on the Drawings. Conform to applicable portions of Section 15950.

END OF SECTION

SECTION 15090
PVC C-900 PRESSURE PIPE

PART 1 -- GENERAL

1.1 THE REQUIREMENT

- A. Provide polyvinyl chloride (PVC) pressure pipe, complete in place, as indicated in accordance with the Contract Documents.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards

AWWA C104/A21.5	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C110/A21.10	Ductile-Iron and Gray-Iron Fittings 3-in Through 48-in for Water and Other Liquids
AWWA C111/A21.11	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C600	Installation of Ductile-Iron Water Mains and Appurtenances
AWWA C900	Polyvinyl Chloride (PVC) Pressure Pipe 4-in Through 12-in for Water Distribution
ASTM D 2584	Test Method for Ignition Loss of Cured Reinforced Resins
PPI Technical Report TR 3/4	Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials
AWWA Manual M23	PVC Pipe - Design and Installation

1.3 CONTRACTOR SUBMITTALS

- A. Furnish submittals in accordance with the requirements of Section 01300 – Contractor Submittals.
- B. Shop Drawings
 - 1. Submit drawings of pipe, fittings, and appurtenances.
 - 2. Submit design calculations in order to demonstrate compliance of pipe and fittings with the requirements of this Section.
 - 3. Furnish manufacturer's literature for metallic locating tape.
- C. Certifications
 - 1. Furnish a certified affidavit of compliance for pipe and other products or materials under this Section and the following supplemental requirements:
 - a. hydrostatic proof test reports;
 - b. sustained pressure test reports; and,
 - c. burst strength test reports.
- D. Perform and pay for sampling and testing as necessary for the certifications.

1.4 QUALITY ASSURANCE

- A. Testing
 - 1. Additional Samples

- a. In addition to those tests specifically required, the ENGINEER may request additional samples of any material for testing by the OWNER.
- b. Furnish the additional samples as a part of the WORK.

PART 2 -- PRODUCTS

2.1 GENERAL

- A. Provide PVC pressure pipe (4-inch through 12-inch) conforming to the requirements of AWWA C900, and the requirements indicated in this Section.

2.2 PIPE DESIGN CRITERIA

A. General

1. Design PVC pressure pipe wall thickness for internal pressure in accordance with the requirements of AWWA M23, as applicable, and the requirements indicated in this Section.

B. Deflection Control

1. The deflection of the pipe after installation, as determined from the Modified Iowa Formula outlined in AWWA M23, shall not exceed 0.03 times the outside diameter.
2. If the calculated deflection exceeds 0.03 times the outside diameter, increase the pipe class or improve the quality of the pipe zone backfill in order to achieve a higher modulus of soil reaction, E'.
3. For purposes of calculation, values of E' shall be 1100 psi at 90 percent Standard Proctor; 1500 psi at 95 percent Standard Proctor; and 2500 psi at 100 percent Standard Proctor, and the deflection lag factor shall be 1.5.

2.3 PIPE

- A. Provide pipe of the indicated diameter and pressure class, complete with rubber gaskets.

- B. Provide specials and fittings as indicated.

- C. The dimensions and pressure classes for Dimension Ratios for large PVC pressure pipe with Cast-Iron Pipe Equivalent O.D.s shall conform to the requirements of AWWA C900.

D. Joints

1. Joints for the buried PVC pipe shall be either an integral bell manufactured on the pipe, a separate coupling both employing a rubber ring joint, or fused.
2. Provide the bell and coupling of the same thickness as of the pipe barrel, or greater thickness.
3. Provide the sealing ring groove in the coupling of the same design as the groove in cast iron fittings and valves available from local water works supply distributors.
4. Where restrained pipe joints are indicated on the plans provide fused PVC C-900 in equivalent pressure class or another suitable means of joint restraint.

E. Joint Deflection

1. Deflection at the joint shall not exceed one half the maximum deflection recommended by the manufacturer.
2. No deflection of the joint will be accepted for joints that are over-belled or not belled to the stop mark.

2.4 FITTINGS

- A. Provide ductile iron fittings conforming to Section 15110 Ductile-Iron Fittings and Hydrants.

- B. PVC pipe fittings shall be mechanical joint, or fused sweeps and bends.

- C. Restrained joints shall utilize a circumferential restraint method. Restrained joints using friction restraint such as setscrews, anchor lugs, wedges, exposed bolts in the thrust restraint assembly, or other friction devices or teeth are unacceptable.

PART 3 -- EXECUTION

3.1 GENERAL

- A. Installation shall conform to the requirements of AWWA M23, instructions furnished by the pipe manufacturer, and to the supplementary requirements indicated herein.
- B. Wherever the provisions of this Section and the aforementioned requirements are in conflict, the more stringent provision shall apply.

3.2 HANDLING AND STORAGE

A. Handling

- 1. Carefully inspect pipe, fittings, and accessories before and after installation, and reject those found to be defective.
- 2. Pipe and fittings shall be free from fins and burrs.
- 3. Before being placed in position, clean the pipe, fittings, and accessories and maintain them in a clean condition.
- 4. Provide proper facilities for lowering sections of pipe into trenches.
- 5. Under no circumstances drop or dump pipe, fittings, or any other material into trenches.

B. Storage

- 1. Store pipe, if possible, at the Site in unit packages provided by the manufacturer.
- 2. Exercise caution to avoid compression damage or deformation to bell ends of the pipe.
- 3. Store pipe in such a way as to prevent sagging or bending, and protect pipe from exposure to direct sunlight by covering with an opaque material while permitting adequate air circulation above and around the pipe.
- 4. Store gaskets in a cool, dark place out of the direct rays of the sun, preferably in original cartons.

3.3 TRENCHING AND BACKFILL

- A. Trench excavation and backfill shall conform to the requirements of Section 2300 – Trenching, Backfilling and Compaction for Utilities.

3.4 INSTALLATION

- A. Lay bell-and-spigot pipe with the bell end pointing in the direction of laying.
- B. Grade the pipe in straight lines, taking care to avoid the formation of any dips or low points.
- C. Do not lay pipe when the conditions of trench or weather are unsuitable.
- D. At the end of each day's WORK, temporarily close the open ends of pipe with wood blocks or bulkheads.
- E. Supports
 - 1. Support pipe at its proper elevation and grade, taking care to provide firm and uniform support.
 - 2. Wood support blocking will not be accepted.
 - 3. The full length of each section of pipe and fittings shall rest solidly on the pipe bed, with a recessed excavation in order to accommodate bells, joints, and couplings.
 - 4. Provide anchors and supports where indicated and where necessary for fastening WORK into place.
 - 5. Independently support fittings.
- F. Replace piping that does not allow sufficient space for proper installation of jointing material with piping of proper dimensions.
- G. Blocking or wedging between bells and spigots will not be accepted.

- H. Install joints in accordance with the manufacturer's recommendations.
- I. Keep trenches free of water until joints have been properly made.
- J. The maximum combined deflection at couplings shall be in accordance with the manufacturer's recommendations.
- K. Cutting
 - 1. Cut the pipe by means of saws, power-driven abrasive wheels, or pipe cutters, which will produce a square cut.
 - 2. Cuts by wedge-type roller cutters will not be accepted.
 - 3. After cutting, bevel the end of the pipe using a beveling tool, portable type sander, or abrasive disc.

3.5 INSTALLATION OF COPPER WIRE

- A. Polyvinyl chloride pipelines shall be provided with No. 10 AWG solid core insulated copper wire laid along the top of the pipe and held in place with ties or hitches of the same kind of wire spaced not more than 13-feet apart.

3.6 SERVICE CONNECTIONS

- A. Direct tapping will not be accepted.
- B. Use double-strap bronze service clamps for service connections.
- C. Provide service clamps with a bearing area of sufficient width along the axis of the pipe such that the pipe will not be distorted when the saddle is made tight.
- D. Cutting
 - 1. Use an internal shell cutter to drill through the corporation stop in order to minimize PVC shavings, retain the coupon, and reduce stress.
 - 2. Cuts by single-fluted shell cutters or twist drills will not be accepted.
 - 3. Lubricate the cutting and tapping edges of the tool with cutting lubricant.
 - 4. Make the cuts slowly, use the follower very lightly, and do not force the cutter through pipe wall.
 - 5. Provide the shell cutter with sufficient throat depth to handle the heavy-wall PVC pipe.
 - 6. Maximum outlet size permitted with service clamps or saddle is 2-inches.
- E. Tapping Sleeves
 - 1. Use tapping sleeves for outlet sizes greater than 2 inches in diameter.
 - 2. Assemble and install tapping sleeves in accordance with the manufacturer's recommendations.

3.7 CONNECTIONS TO EXISTING WATERLINES

- A. Locate underground improvements and install the pipelines to match proposed line and existing grade.
- B. Where the new WORK is to be connected to existing pipelines, make arrangements with the serving utility well in advance of the connections in order to allow adequate time for dewatering of the existing line, if necessary, and expedite the WORK in order to minimize water outages to the users.
- C. Coordinate with owner to make final connections and shown on the plans.

3.8 FIELD TESTING AND DISINFECTION

- A. Field testing and disinfection of water mains shall conform to the requirements of Section 15950 – Water Pipeline Testing and Disinfection.

- END OF SECTION -

SECTION - 15100
VALVES: BASIC REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Valving, actuators, and valving appurtenances.

- B. Related Sections include but are not necessarily limited to:
 - 1. Skagit Public Utility District No. 1 General Conditions.
 - 2. Division 1 - General Requirements.
 - 3. Section 15000 - Piping General.

- C. Unit Responsibility: For the piping systems that are required to be provided by the CONTRACTOR, a single manufacturer shall be made responsible for coordination of design, assembly, testing, and furnishing of each valve; however, the CONTRACTOR shall be responsible to the OWNER for compliance with the requirements of each valve section. Unless indicated otherwise, the responsible manufacturer shall be the manufacturer of the valve.

- D. Single Manufacturer: Where two or more valves of the same type or size are required, the valves shall be furnished by the same manufacturer.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American National Standards Institute (ANSI):
 - a. B1.20.1, Pipe Threads, General Purpose.
 - b. B16.1, Cast Iron Pipe Flanges and Flanged Fittings.
 - c. B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
 - d. B16.34, Valves-Flanged, Threaded and Welding End.
 - 2. ASTM International (ASTM):
 - a. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - b. D256, Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
 - c. D638, Standard Test Method for Tensile Properties of Plastics.
 - d. D648, Standard Test Method for Deflection Temperature of Plastics Under Flexural Load.
 - e. D695, Standard Test Method for Compressive Properties of Rigid Plastics.
 - f. D2240, Standard Test Method for Rubber Property-Durometer Hardness.
 - 3. American Water Works Association (AWWA):
 - a. C111, Rubber-Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.
 - b. C207, Steel Pipe Flanges for Waterworks Service - Sizes 4 IN through 144 IN.
 - c. C500, Gate Valves for Water and Sewerage Systems.
 - d. C504, Rubber-Seated Butterfly Valves.
 - e. C507, Ball Valves, 6 IN through 48 IN (150 MM through 1200 MM).
 - f. C509, Resilient-Seated Gate Valves 3 through 12 NPS, for Water and Sewage Systems.
 - g. C540, Power-Actuating Devices for Valves and Sluice Gates.
 - h. C550, Protective Epoxy Interior Coatings for Valves and Hydrants.
 - i. C606, Grooved and Shouldered Joints.
 - 4. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.(MSS).
 - 5. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volt Maximum).
 - b. MG 1, Motors and Generators.

1.3 DEFINITIONS

- A. The following are definitions of abbreviations used in this section or one of the individual valve sections:
 - 1. CWP: Cold water working pressure.
 - 2. WWP: Water working pressure.

1.4 CONTRACTOR SUBMITTALS

- A. General: Submittals shall be furnished in accordance with Section 01300.
- B. Shop Drawings: Shop Drawings for the valves that are within the CONTRACTOR's scope of supply and responsibility shall contain the following information:
 - 1. Valve name, size, valve flow coefficient (Cv factor), pressure rating, identification number (if any), and specification section number.
 - 2. Complete information on valve actuator, including size, manufacturer, model number, limit switches, and mounting.
 - 3. Cavitation limits for all control valves.
 - 4. Assembly drawings showing part nomenclature, materials, dimensions, weights, special linings, and relationships of valve handles, handwheels, position indicators, limit switches, integral control systems, needle valves, and control systems.
 - 5. Complete wiring diagrams and control system schematics.
 - 6. Valve Labeling: A schedule of valves to be labeled, indicating in each case the valve location and the proposed working for the label.
 - 7. Acknowledgement that products submitted meet requirements of standard referenced.
- C. Spare Parts List: A Spare Parts List shall contain the required information for each valve assembly, where indicated.
- D. Factory Test Data: Where indicated, signed, dated, and certified factory test data for each valve requiring certification shall be submitted before shipment of the valve. The data shall also include certification of quality and test results for factory-applied coatings.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Refer to individual valve Specification Sections.

2.2 MATERIALS

- A. General: All materials shall be suitable for the intended application. Materials not specified shall be high-grade standard commercial quality, free from all defects and imperfections that might affect the serviceability of the product for the purpose for which it is intended. Unless otherwise specified, valve and actuator bodies shall conform to the following requirements:
 - 1. Cast Iron: Close-grained gray cast iron, conforming to ASTM A48 – Specification for Gray Iron Castings, Class 30, or to ASTM A126 – Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - 2. Ductile Iron: ASTM A536 – Specifications for Ductile Iron Castings, or to ASTM A395 – Specifications for Ferric Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
 - 3. Steel: ASTM A216 – Specification for Steel Castings, Carbon Suitable for Fusion Welding for High-Temperature Service, or to ASTM A515 – Specification for Pressure Welding for Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service.
 - 4. Bronze: ASTM B62 – Specification for Composition Bronze or Ounce Metal Castings, and valve stems not subject to dezincification shall conform to ASTM B584 – Specification for Copper Alloy Sand Castings for General Applications.

5. Stainless Steel: Stainless steel valve and operator bodies and trim shall conform to ASTM A351 – Specification for Steel Castings, Austenitic, for High-Temperature Service, Grade CF8M, or shall be Type 316 stainless steel.

2.3 VALVE CONSTRUCTION

- A. Unless otherwise noted valves shall be rated for 250 PSI working pressure.
- B. Bodies: Valve bodies shall be cast, forged, or welded of the materials indicated, with smooth interior passages. Wall thicknesses shall be uniform in agreement with the applicable standards for each type of valve, without casting defects, pinholes, or other defects that could weaken the body. All welds on welded bodies shall be done by certified welders and shall be ground smooth. Valve ends shall be as indicated, and be rated for the maximum temperature and pressure to which the valve will be subjected.
- C. Bonnets: Valve bonnets shall be clamped, screwed, or flanged to the body and shall be of the same material, temperature, and pressure rating as the body. The bonnets shall have provision for the stem seal with the necessary glands, packing nuts, or yokes.
- D. Stems: Valve stems shall be of the materials indicated, or , if not indicated, of the best commercial material for the specific service, with adjustable stem packing, O-rings, Chevron V-type packing, or other suitable seal. Where subject to dezincification, bronze valve stems shall conform to ASTM B62, containing not more than 5 percent of zinc or more than 2 percent of aluminum, with a minimum tensile strength of 60,000 psi, a minimum yield strength of 40,000 psi, and an elongation of at least 10 percent in 2 inches. Where dezincification is not a problem, bronze conforming to ASTM B584 may be used.
- E. Internal Parts: Internal parts and valve trim shall be as indicated for each individual valve. Where not indicated, valve trim shall be of Type 316 stainless steel or other best suited material.
- F. All bolts used in buried flanges shall be ASTM A307 Grade B unfinished with nuts to ASTM A563 Grade A and washers to ASTM F8444 or ASTM A325 Type 3 (corten steel) unfinished, with nuts to ASTM A563C3 or A563DH3 and washers to ASTM F436-1. All bolts, nuts and washers used in exposed or above ground locations shall be ASTM/A307 Grade B unfinished or hot-dip galvanized.

2.4 VALVE ACCESSORIES

- A. All valves shall be furnished complete with the accessories required to provide a function system.

2.5 SPARE PARTS

- A. Where indicated, the CONTRACTOR shall furnish the required spare parts suitably packaged and labeled with the valve name, location, and identification number. The CONTRACTOR shall also furnish the name, address, and telephone number of the nearest distributor for the spare parts of each valve. All spare parts are intended for use by the OWNER, only, after expiration of the guarantee period.

2.6 VALVE ACTUATORS

- A. Valve Actuators - General:
 1. Unless otherwise indicated, valves shall be furnished with manual actuators.
 2. Provide actuators as shown on Drawings or specified.
 3. Counter clockwise opening as viewed from the top.
 4. Direction of opening and the word OPEN to be cast in handwheel or valve bonnet.
 5. Size actuator to produce required torque with a maximum pull of 80 LB at the maximum pressure rating of the valve provided and withstand without damage a pull of 200 LB on handwheel or chainwheel or 300 foot-pounds torque on the operating nut.

6. Unless otherwise specified, actuators for valves to be buried, or installed in vaults or manholes shall be sealed to withstand at least 20 FT of submergence.
 7. Extension Stem:
 - a. Install where shown or specified.
 - b. Solid steel with actuator key and nut, diameter not less than stem of valve actuator shaft.
 - c. Pin all stem connections.
 - d. Center in valve box or grating opening band with guide bushing.
- B. Buried Valve Actuators:
1. Provide screw or slide type adjustable cast iron valve box, 5 IN minimum diameter, 3/16 IN minimum thickness, and identifying cast iron cover.
 2. Box base to enclose buried valve gear box or bonnet.
 3. Provide 2 IN standard actuator nuts complying with Section 3.16 of AWWA C500.
 4. Provide at least two tee-handle keys for actuator nuts, with 5 FT extension between key and handle.
 5. Extension Stem:
 - a. Provide for buried valves greater than 4 FT below finish grade.
 - b. Extend to within 6 IN of finish grade.
 6. Provide concrete pad encasement of valve box as shown for all buried valves unless shown otherwise.
- C. Exposed Valve Manual Actuators:
1. Provide for all exposed valves not having electric or cylinder actuators.
 2. Provide handwheels for gate and globe valves.
 - a. Size handwheels for valves in accordance with AWWA C500.
 3. Provide lever actuators for plug valves, butterfly valves and ball valves 3 IN DIA and smaller.
 - a. Lever actuators for butterfly valves shall have a minimum of 5 intermediate lock positions between full open and full close.
 - b. Provide at least two levers for each type and size of valve furnished.
 4. Gear actuators required for butterfly valves, and ball valves 4 IN DIA and larger.
 5. Gear actuators to be totally enclosed, permanently lubricated and with sealed bearings.
 6. Provide chain actuators for valves 6 FT or higher from finish floor to valve centerline.
 - a. Cadmium-plated chain looped to within 3 FT of finish floor.
 - b. Equip chain wheels with chain guides to permit rapid operation with reasonable side pull without "gagging" the wheel.
 7. Provide cast iron floor stands where shown on Drawings. Stands to be furnished by valve manufacturer with actuator.
 - a. Stand or actuator to include thrust bearings for valve operation and weight of accessories.

2.7 FABRICATION

- A. End Connections:
1. Provide the type of end connections for valves as required in the Piping Schedules presented in Section 15062 and 15070 or as shown on the Drawings.
 2. Comply with the following standards:
 - a. Threaded: ANSI B1.20.1.
 - b. Flanged: ANSI B16.1 Class 125 unless otherwise noted or AWWA C207.
 - c. Bell and spigot or mechanical (gland) type: AWWA C111.
 - d. Soldered: ANSI B16.18.
 - e. Grooved: Rigid joints per Table 5 of AWWA C606.
- B. Refer to individual valve sections for specifications of each type of valve on Project.
- C. Nuts, Bolts, and Washers:
1. Wetted or internal to be bronze or stainless steel. Exposed to be zinc or cadmium plated.

- D. On Insulated Piping: Provide valves with extended stems to permit proper insulation application without interference from handle.
- E. Protective Coating and Lining:
 - 1. In accordance with AWWA C550 unless otherwise specified.
 - 2. Either two-part liquid material or heat-activated (fusion) material except only heat-activated material if specified as “fusion” or “fusion-bonded” epoxy.
 - 3. Minimum 7-mil dry film thickness except where limited by valve operating tolerances.
 - 4. The valve manufacturer shall certify in writing that the required coating has been applied and tested in the manufacturing plant prior to shipment, in accordance with these Specifications. Alternatively, if required coatings are applied outside of manufacturing plant, the manufacturer shall warrant the valve to the same standard provided for factory coated valves.
 - 5. Flange faces of valves shall not be epoxy coated.
 - 6. Lining shall be NSF approved.
- F. Valve Testing: As a minimum, unless otherwise indicated, each valve body 4 inches and larger shall be tested hydrostatically to 1.5 times its rated 100 degrees F design water-working pressure. In addition, each valve 4 inches and larger shall undergo a functional test to demonstrate satisfactory operation throughout its operating cycle, and a closure test at rated 100 degrees F water-working pressure for a period of 5 minutes to demonstrate tight shut-off. Stem seal leakage shall not be a cause for rejection. All valves 3 inches and smaller shall undergo the manufacturer’s standard test.
- G. Certification: Prior to shipment, the CONTRACTOR shall submit for all valves over 12 inches in size, certified, notarized copies of the hydrostatic factory tests, showing compliance with the applicable standards of AWWA, ANSI, and ASTM.
- H. Valve Marking: All valve bodies shall be permanently marked in accordance with MSS SP25 – Standard Marking Systems for Valves, Fittings, Flanges, and Unions.
- I. Underground Valves: Provide underground metallic valves with flanged, mechanical, or other type of joint required for the type of pipe to which the valve is to be connected. Plastic pipe shall be heat welded when buried and shall be flanged within any underground vaults and metering or valve boxes. Flanges attached to all plastic valves 2-inches in diameter and larger, shall meet the outside diameter and bolt hole dimensional requirements of ANSI/ASME B16.5.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Setting Buried Valves:
 - 1. Locate valves installed in pipe trenches where buried pipe indicated on Drawings.
 - 2. Set valves and valve boxes plumb.
 - 3. Place valve boxes directly over valves with top of box being brought to surface of finished grade.
 - 4. Install in closed position.
 - 5. Place valve on firm footing in trench to prevent settling and excessive strain on connection to pipe.
 - 6. After installation, backfill up to top of box for a minimum distance of 4 FT on each side of box.
- C. Support exposed valves and piping adjacent to valves independently to eliminate pipe loads being transferred to valve and valve loads being transferred to the piping.
- D. For grooved coupling valves, install rigid type couplings {or provide separate support to prevent rotation of valve from installed position}.

- E. Install electric or cylinder actuators above or horizontally adjacent to valve and gear box to optimize access to controls and external handwheel.
- F. For threaded valves, provide union on one side within 2 FT of valve to allow valve removal.
- G. Install valves accessible for operation, inspection, and maintenance.
- H. Valve Accessories: Where combinations of valves, sensors, switches, and controls are indicated, the CONTRACTOR shall properly assemble and install such items so that all systems are compatible and operating properly. The relationship between interrelated items shall be clearly noted on shop drawing submittals.
- I. **Petrolatum/Wax Tape:** The exterior of all valve bodies shall be wrapped with a petrolatum/wax tape manufactured by Denso (Densyl Tape), Trenton Wax Tape, or equal

END OF SECTION

**SECTION - 15101
GATE VALVES**

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Gate valves.

- B. Related Sections include but are not necessarily limited to:
 - 1. Skagit PUD No. 1 General Conditions.
 - 2. Division 1 - General Requirements.
 - 3. Section 15100 - Valves: Basic Requirements.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American Water Works Association (AWWA):
 - a. C515, Resilient-Seated Gate Valves for Water Supply Service.

1.3 SUBMITTALS

- A. Manufacturer's certification material is in compliance with material requirements.

PART 2 PRODUCTS

2.1 RESILIENT WEDGE GATE VALVES:

- A. Gate valves shall be manufactured in accordance with the latest revision of AWWA C515. Valves shall be certified to NSF Standard 61 and be manufactured to meet the following:
 - 1. All valves shall be of the inside screw, non-rising stem type, with O-ring stem seal.
 - 2. The valve actuators shall have counter-clockwise opening stems.
 - 3. Valves shall be resilient wedge type rated for 250 psi working pressure.
 - 4. Bubble-tight with rated pressure applied from either side.
 - 5. Body flanged end, flange drilling in accordance with ANSI B16.1, Class 125.

- B. Materials:
 - 1. Valve body/cover: ASTM A536 Grade 65-45-12 ductile iron.
 - 2. Valve wedge: ASTM A536 Grade 65-45-12 ductile iron totally encapsulated with rubber.
 - 3. Stem, stem nut: Bronze or stainless steel.
 - 4. Nuts and Bolts: Type 304, stainless steel to ASTM F593/A193 for bolts and F594/A194 for nuts.
 - 5. Coating System: Fusion bonded epoxy in accordance with AWWA C550.

- C. Other:
 - 1. 2-inch square AWWA operating nut.
 - 2. Valves 12-inch and larger shall be equipped with gear actuator.

- D. Design requirements:
 - 1. 250-psi working pressure.
 - 2. NRS O-ring stem seal.
 - 3. Provide gear actuator, 12 IN and larger valves.
 - 4. Provide roller tracks and scrapers for horizontal valves size 16 IN and larger.
 - 5. Provide bypass valve sized per AWWA C500.

- E. Actuators: Unless otherwise indicated, gate valves shall have cast iron or ductile iron handwheels with 2-inch square operating nuts, in accordance with Section 15100.

2.2 FABRICATION

- A. General:
 - 1. Provide valves with clear waterways the full diameter of the valve.
- B. Support valves in accordance with MSS SP-9.

PART 3 EXECUTION

3.1 INSTALLATION

- A. See Section 15100.
- B. Where larger buried valves utilize smaller bypass valves, provide a second valve box installed over the bypass valve operating nut.
- C. Do not install gate valves inverted or with the stems sloped more than 45 degrees from the upright unless the valve was ordered and manufactured specifically for this orientation.
- D. **Petrolatum/Wax Tape:** The exterior of all valve bodies shall be wrapped with a petrolatum/wax tape manufactured by Denso (Densyl Tape), Trenton Wax Tape, or equal

END OF SECTION

**SECTION - 15103
BUTTERFLY VALVES**

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Butterfly valves.

- B. Related Sections include but are not necessarily limited to:
 - 1. Skagit PUD No. 1 General Conditions.
 - 2. Division 1 - General Requirements.
 - 3. Section 15000 - Piping, General.
 - 4. Section 15100 - Valves: Basic Requirements.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American National Standards Institute (ANSI):
 - a. B16.1, Pipe Flanges and Flanged Fittings.
 - b. B16.5, Pipe Flanges and Flanged Fittings.
 - 2. ASTM International (ASTM):
 - a. A48, Standard Specifications for Gray Iron Castings.
 - b. A126, Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - c. A276, Standard Specification for Stainless Steel Bars and Shapes.
 - d. A395, Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for use at Elevated Temperatures.
 - e. A436, Austenitic, Gray Iron Castings.
 - f. A536, Standard Specification for Ductile Iron Castings.
 - 3. American Water Works Association (AWWA):
 - a. C504, Rubber Seated Butterfly Valves.
 - 4. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS):
 - a. SP-67, Butterfly Valves.

1.3 SUBMITTALS

- A. Manufacturers Certification:

- B. Shop Drawings:
 - 1. See Section 01300 for requirements for the mechanics and administration of the submittal process.
 - 2. Include certified drawings and material specifications in accordance with AWWA C504, Sections 1.4 and 1.5.
 - a. Include description of the method of attachment of the edge to the valve disc.
 - 3. Product Data: Include manufacturer's published recommendations for seating and unseating torque coefficient, dynamic torque, and bearing friction for calculation of maximum operating torque.
 - 4. Test Reports: Records of test performed in accordance with AWWA C504 requirements from valve manufacturer.
 - 5. Certifications: Affidavit of compliance specified in AWWA C504, Section 1.7.
 - 6. Valve port diameter.
 - 7. Certification that valves have been subjected to performance, leakage, and hydrostatic testing in accordance with AWWA and other applicable criteria.

- C. Operation and Maintenance Manuals:
 - 1. See Section 01300 for requirements for:

- a. The mechanics and administration of the submittal process.
- b. The content of Operation and Maintenance Manuals.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
1. DeZurik.
 2. Clow.
 3. Dresser.
 4. Mueller.
 5. Pratt.

2.2 RUBBER SEATED BUTTERFLY VALVES (AWWA C504)

- A. Butterfly valves shall be manufactured in accordance with the latest revision of AWWA C504 Class 250B (working pressures up to 250 psi) Valves shall be certified to NSF Standard 61 and be manufactured to meet the following:
1. Suitable for throttling operations and infrequent operations after periods of inactivity.
 2. All seats shall be of a synthetic rubber compound. Seats shall be retained in the valve body by mechanical means without retaining rings, segments, screws, or hardware of any kind in the flow stream. Seats shall be a full 360 degrees without interruption.
 3. Bubble-tight with rated pressure applied from either side.
 4. No travel stops for the disc or interior of the body.
 5. Self-adjusting V-type or O-ring shaft seals.
 6. Isolate metal-to-metal thrust bearing surfaces from flowstream.
 7. Working Pressure: Rated for 250 psi cold water at 16 fps flow velocity, nonshock, watertight shutoff.
 8. Body Type: Short body flange.
 9. Body flanged end, flange drilling in accordance with ANSI B16.1, Class 125.
- B. Materials:
1. Valve bodies:
 - a. ASTM A126, Class B or ASTM A536 Grade 65-45-12 ductile iron.
 2. Valve shafts:
 - a. Stainless steel, ASTM A564, Type 632, Condition H-1100.
 3. Valve discs:
 - a. Potable and nonpotable water:
 - 1) ASTM A536, Grade 65-45-12 ductile iron.
 - 2) ASTM A436, Type 1 alloy cast iron.
 - 3) Bronze in accordance with AWWA C504.
 - 4) Bronze in accordance with AWWA C504.
 4. Valve seats:
 - a. Potable and nonpotable water below 150 DegF:
 - 1) Natural rubber.
 5. Mating surfaces:
 - a. Type 316, stainless steel.
 6. Brass and bronze valve components and accessories that have surfaces in contact with water shall be alloys containing less than 16 percent zinc and 2 percent aluminum.
 7. Approved alloys are of the following ASTM designations:
 - a. B61, B62, B98 (Alloy UNS No. C65100, C65500, or C66100), B139 (Alloy UNS No. C51000), B584 (Alloy UNS No. C90300 or C94700), B164, B194, and B127.
 - b. Stainless steel Alloy 18-8 may be substituted for bronze.

- C. General:
1. Valve to include necessary accessories such as operator, actuator, hand wheel, chain wheel, extension stem, floor stand, worm and gear operator, operating nut, chain, and wrench for a complete operation. Valve position indication shall be provided at the valves installed in chambers.
 2. Valve to be suitable for intended service. Renewable parts not to be of a lower quality than specified.
 3. Valve same size as adjoining pipe unless otherwise shown.
 4. Valve ends to suit adjacent piping.
 5. Size operator to operate valve for the full range of pressures and velocities.
 6. Valve to open by turning counterclockwise.
 7. Factory mount operator, actuator, and accessories on all valves.
- D. Manual Operator:
1. General:
 - a. Operator force not to exceed 40 pounds under any operating condition, including initial breakaway. Gear reduction operator required when force exceeds 40 pounds.
 - b. Operator self-locking type or equipped with self-locking device.
 - c. Position indicator on quarter-turn valves.
 - d. Worm and gear operators one-piece design worm-gears of gear bronze material. Worm hardened alloy steel with thread ground and polished. Traveling nut type operators threaded steel reach rods with internally threaded bronze or ductile iron nut. Valves 30-inch and larger shall be equipped with worm gear actuators lubricated and sealed to prevent entry of dirt or water into the housing.
 - e. Valves shall have extension stems, bonnets, and valve or floor boxes as shown on the Drawings.
 - f. Valve position indicators shall be provided at the valve operator for valves installed in vaults.
 2. Exposed Operator:
 - a. Galvanized and painted hand wheels with 2-inch AWWA operating nuts as shown on Drawings.
 - b. Valve handles to take a padlock, and wheels a chain and padlock.
 3. Buried Operator:
 - a. Buried service operators on valves larger than 2-1/2 inches shall have a 2-inch AWWA operating nut. Enclose moving parts of valve and operator in housing to prevent contact with the soil.
 - b. Design buried service operators for quarter-turn valves to withstand 450 foot-pounds of input torque at the FULLY OPEN or FULLY CLOSED positions, grease packed and gasketed to withstand a submersion in water to 10 psi.
- E. Limit Switches:
1. Provide limit switches (supervisory switch) where required as shown on the drawings.
 - a. Contacts:
 - 1) Closed when the valve is 100 percent open.
 - 2) Open when the valve is less than 100 percent open.
 - 3) Suitable for use with 24 Volt DC.
 - b. NEMA 4 enclosure.
- F. Coatings shall be per Section 15100.

PART 3 EXECUTION

3.1 INSTALLATION

- A. All exposed butterfly valves shall be installed with a means of removing the complete valve assembly without dismantling the valve or operator. The installation shall be in accordance with Section 15100.
- B. Flanged valve boltholes shall straddle vertical centerline of pipe. Clean flanged faces, insert gasket and bolts, and tighten nuts progressively and uniformly.

- C. Valve Orientation: Orient butterfly valve shaft so that unbalanced flows or eddies are equally divided to each half of the disc, i.e., shaft is in the plane of rotation of the eddy.
- D. Extension Stem for Operator: Where shown on the Drawings, furnish an operating extension stem with 2-inch operating nut to bring the operating nut to a point 12 inches below the surface of the ground and/or box cover.
- E. Stem: Steel extension stem length shall locate operating nut in valve box where shown on the Drawings.
- F. **Petrolatum/Wax Tape:** The exterior of all valve bodies shall be wrapped with a petrolatum/wax tape manufactured by Denso (Densyl Tape), Trenton Wax Tape, or equal

3.2 TESTS AND INSPECTION

- A. Valve may be either tested while testing pipelines, or as a separate step.
- B. Test that valves open and close smoothly with operating pressure on one side and atmospheric pressure on the other, in both directions for two-way valve and applications.
- C. Count and record number of turns to open and close valve; account for any discrepancies with manufacturer's data.

END OF SECTION

SECTION - 15110
DUCTILE - IRON FITTINGS AND HYDRANTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Ductile iron fittings.
 - 2. Polyethylene Encasement for ductile iron pipe fittings.
 - 3. Hydrants

- B. Related Sections include but are not necessarily limited to:
 - 1. Skagit PUD No. 1 General Conditions.
 - 2. Division 1 - General Requirements.
 - 3. Section-02300
 - 4. Section-02700
 - 5. Division 15

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American National Standards Institute (ANSI):
 - a. B1.1, Unified Inch Screw Threads (UN and UNR Thread Form).
 - b. B16.1, Cast-Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800.
 - c. B16.21, Nonmetallic Flat Gaskets for Pipe Flanges.
 - 2. ASTM International (ASTM):
 - a. A183, Carbon Steel Track Bolts.
 - b. A193, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
 - c. A194, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.
 - d. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - e. B695, Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
 - f. C150, Specification for Portland Cement.
 - g. D1330, Rubber Sheet Gaskets.
 - 3. American Water Works Association (AWWA):
 - a. C104, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
 - b. C105, Polyethylene Encasement for Gray and Ductile Cast-Iron Piping for Water and Other Liquids.
 - c. C110, Ductile Iron and Gray Iron Fittings, 3 IN through 48 IN for Water and Other Liquids.
 - d. C111, Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings.
 - e. C115, Flanged Ductile Iron Pipe with Threaded Flanges.
 - f. C150, Thickness Design of Ductile Iron Pipe.
 - g. C151, Ductile Iron Pipe, Centrifugally Cast-In-Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
 - h. C153, Ductile-Iron Compact Fittings, 3 in. through 16 in. for Water and Other Liquids.
 - i. C501
 - j. C600, Installation of Ductile Iron Water Main and Their Appearances.
 - k. C606, Grooved and Shouldered Joints.

1.3 SUBMITTALS

- A. Manufacturer Certification:
 - 1. Certification materials supplied meet criteria as specified.

PART 2 PRODUCTS

2.1 GENERAL

- A. Fittings shall be of the diameter and class shown, shall be furnished complete with rubber gaskets.

2.2 SPECIALS AND FITTINGS

- A. Fittings for ductile iron pipe shall conform to the requirements of ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10 for diameters 3-inch through 48-inch and shall have a minimum test pressure rating of 225 psi and working pressure rating of 150 psi.
- B. Fittings shall be furnished inclusive of mortar-lined and seal coated in accordance with ANSI/AWWA C104/A21.4.
- C. The fittings shall be of the diameter and class shown.
- D. **Joint Design:** Ductile iron pipe and fittings shall be furnished with mechanical joints, push-on joints, flanged joints, and restrained joints as required.
 - 1. Mechanical and push-on joints shall conform to ANSI/AWWA C111/A21.11.
 - 2. Flanged joints shall conform to ANSI/AWWA C110/A21.10-12, flange drilling in accordance with ANSI B16.1, Class 125.
 - 3. Restrained joints shall utilize a positive restraint method, such as "Flex-Ring" or "Lok-Ring" Restrained Joint by American Ductile Iron Pipe, "TR FLEX" Restrained Joint by U.S. Pipe, or approved equal, "Field Flex-Ring" or "Fast Grip" by American Ductile Iron Pipe or the "TR Flex-Gripper Ring" or "Field Lock Gasket" by U.S. Pipe, or Megalug by EBAA Foundry. Restrained joints using friction restraint such as set screws, anchor lugs, exposed bolts in the thrust restraint assembly are unacceptable
- E. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket itself, will provide watertight joints under all operating conditions when properly installed. The CONTRACTOR shall require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted.

2.3 CEMENT-MORTAR LINING

- A. **Cement-Mortar Lining for Shop Application:** Except as otherwise provided herein, interior surfaces of all ductile iron fittings shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with ANSI/AWWA C104/21.4. During the lining operation and thereafter, the fittings shall be maintained in a round condition by suitable bracing or strutting. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found faulty at delivery site, the damaged or unsatisfactory portions shall be replaced with lining conforming to these Specifications.

2.4 EXTERIOR COATING

- A. **Exterior Coating of Fittings:** The exterior coating shall be an asphaltic coating approximately 1 mil thick.
- B. **Petrolatum/Wax Tape:** The exterior of all ductile iron fittings shall be wrapped with a petrolatum/wax tape manufactured by Denso (Densyl Tape), Trenton Wax Tape, or equal

2.5 HYDRANTS

- A. All Fire Hydrants shall conform to AWWA C502 with Storz adaptors and rain caps.
- B. Acceptable fire hydrants include American AVK Nostalgic, Clow Medallion, Mueller Centurion or Super Centurion, and American Darling B62B.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPE FITTINGS

- A. **Handling and Storage:** All pipe fittings shall be carefully handled and protected against damage, impact shocks, and free fall. All handling equipment shall be acceptable to the OWNER. Fittings shall be protected against injury whenever stored at the trench site or elsewhere. No fitting shall be installed where the lining or coating show defects that may be harmful as determined by the OWNER. Such damaged lining or coating shall be repaired or a new undamaged fitting shall be furnished and installed.
- B. All fittings damaged prior to Substantial Completion shall be repaired or replaced by the CONTRACTOR.
- C. The CONTRACTOR shall inspect each fitting prior to installation to insure that there are no damaged portions.
- D. Before placement each fitting shall be thoroughly cleaned of any foreign substance, which may have collected thereon and shall be kept clean at all times thereafter. For this purpose, the openings of all pipes and fittings in the trench shall be closed during any interruption to the WORK.
- E. The openings of all pipe and specials shall be protected with suitable bulkheads to prevent unauthorized access by persons, animals, water or any undesirable substance. At all times, means shall be provided to prevent the pipe from floating.

END OF SECTION

**SECTION - 15120
MISCELLANEOUS VALVES**

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Air release and vacuum relief valves.
 - 2. Automatic control valves:
 - a. Pressure relief and pressure-sustaining valves.
 - b. Pressure-reducing valves.

- B. Related Sections include but are not necessarily limited to:
 - 1. Skagit PUD No. 1 General Conditions.
 - 2. Division 1 - General Requirements.
 - 3. Section 15100 - Valves: Basic Requirements.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American National Standards Institute (ANSI):
 - a. B16.1, Cast-Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800.
 - 2. American Water Works Association (AWWA):
 - a. C512, Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
 - b. C550, Protective Epoxy Interior Coatings for Valves and Hydrants.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. See Section 01300 for requirements for the mechanics and administration of the submittal process.
 - 2. See Section 15100.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the manufacturers listed under the specific valve types are acceptable.

- B. Submit request for substitution in accordance with Specification Section 01600.

2.2 AIR RELEASE AND VACUUM RELIEF VALVES

- A. General:
 - 1. Conform to AWWA C512.

- B. Air Release Valve (Air):
 - 1. Air release valves shall vent accumulating air while system is in service and under pressure and be of the size indicated.
 - 2. Acceptable manufacturers:
 - a. APCO.
 - b. Golden-Anderson.
 - c. Val-Matic (Valve and Manufacturing Corporation)

- d. Crispin (Multiplex Manufacturing Company)
 - e. Or approved equal.
3. Materials:
 - a. Body and cover: Cast iron or semi-steel.
 - b. Float: Stainless steel.
 - c. Linkage and trim: Stainless steel.
 4. Design requirements:
 - a. Working pressure: 250 psi.
 - b. Release 40 cfm at 10 psi differential at 250 psi line pressure.
- C. Air Vacuum Valve (AV):
1. Air and vacuum valves shall be capable of venting large quantities of air while pipelines are being filled, and allowing air to re-enter while pipelines are being drained. They shall be of the size indicated, furnished with hoods and flanged or screwed ends to match piping.
 2. Acceptable manufacturers:
 - a. APCO.
 - b. Golden-Anderson.
 - c. Val-Matic
 - d. Crispin (Multiplex Manufacturing Company)
 - e. Or approved equal.
 3. Materials:
 - a. Body and cover: High strength cast iron.
 - b. Float: Stainless steel, type 316.
 - c. Seat: Stainless steel, type 316.
 - d. All other moving parts: Stainless steel, type 316.
 - e. Seat washers and gaskets shall be of a material insuring water tightness with a minimum of maintenance.
 - f. All flanges shall match drilling of an ANSI/ASME B16.1, Class 125 or 250 as indicated on the plans.
 4. Design requirements:
 - a. Working pressure: 250 psi.
 - b. Capacity 5 scfm at 2 psi differential, exhausting air; 9 scfm at 5 psi differential, admitting air.
 - c. Provide gate or ball isolation valve.
 - d. Flush accessories:
 - 1) Blow-off valve.
 - 2) Clear water inlet valve.
 - 3) Hose and quick connect coupling.
- D. Combination Air Release Valves (AVAR) shall be manufactured in accordance with the latest revision of AWWA C512. Valves shall be manufactured to meet the following:
1. Combine the characteristics of air and vacuum valves and air-release valves by exhausting accumulated air in systems under pressure and releasing or re-admitting large quantities of air while a system is being filled or drained, respectively.
 2. The cross sectional area of the discharge orifice must be equal to the cross sectional area of the valve inlet size.
 3. Working pressure of 300 psi.
 4. Release 10 cfm at 10 psi differential at 250 psi line pressure.
 5. Air vacuum capacity 9 scfm at 5 psi differential from atmospheric.
 6. Valves shall be combination body.
 7. All flanges shall match an ANSI/ASME B16.1 Class 125 or 250 drilling pattern as indicated on the plans.
- E. Materials
1. Body and cover: ASTM A126 Gr. B cast iron
 2. Needle and Seat: Buna-N
 3. Float, linkage and hardware: Type 316 or 304 Stainless steel

- 4. Plug: Brass
- 5. Coating: Paint exterior with corrosion resistant primer

2.3 ACCESSORIES

- A. Furnish any accessories required to provide a completely operable valve.

2.4 CORPORATION STOPS

- A. HDPE pipe saddles for corporation stops for services and combination air valves shall be HDPE electrofused transition saddles.
- B. Unless otherwise indicated, corporation stops shall be made of solid (no lead) brass for key operation, with screwed ends with corporation thread or iron pipe thread, as required. Corporation stops shall be suitable for pressure of 250 psi minimum unless otherwise shown.
- C. Manufactures, or approved equal:
 - 1. Ford Meter Box Company, Inc.
 - 2. James Jones Company (Watts, ACV).
 - 3. Mueller Company (Grinnell Corporation).

2.5 FABRICATION

- A. Completely shop assemble unit including any interconnecting piping, speed control valves, control isolation valves and electrical components.
- B. Provide internal epoxy coating suitable for potable water for all iron body valves in accordance with AWWA C550.

2.6 MAINTENANCE MATERIALS

- A. Provide one set of any special tools or wrenches required for operation or maintenance for each type valve.

PART 3 EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. All valves shall be installed in accordance with manufacturer's printed installation instructions and with provisions of Section 15100.
- B. Air Release, Vacuum Relief, Pressure Reducing, and Pressure Relief Valves:
 - 1. Pipe exhaust to a suitable disposal point.
 - 2. Where exhausted to a trapped floor drain, terminate exhaust line 6 IN minimum above floor.

3.2 FIELD QUALITY CONTROL

- A. Clean, inspect, and operate valve to ensure all parts are operable and valve seats properly.
- B. Check and adjust valves and accessories in accordance with manufacturer's instructions and place into operation.

END OF SECTION

**SECTION - 15950
WATER PIPELINE TESTING AND DISINFECTION**

PART 1 GENERAL

1.1 THE REQUIREMENT

- A. The Contractor shall perform flushing, testing and disinfection of all pipelines and appurtenant piping for potable water, complete, in accordance with the Contract Documents.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Commercial Standards:
- | | |
|-------------------|-----------------------------------|
| 1. ANSI/AWWA B300 | Hypochlorites |
| 2. ANSI/AWWA B301 | Liquid Chlorine |
| 3. ANSI/AWWA C651 | Disinfecting Water Mains |
| 4. AWWA M55 | PE Pipe – Design and Installation |

1.3 CONTRACTOR SUBMITTALS

- A. Submit in accordance with Section 01300.
- B. A proposed plan and schedule for water conveyance, cleaning, pressure testing, with disinfection, and water disposal. The plan shall include qualifications of personnel performing this work.

PART 2 PRODUCTS

2.1 MATERIALS REQUIREMENTS

- A. All test equipment, temporary valves, bulkheads, pipes or other water control equipment and materials shall be selected and furnished by the Contractor subject to the Owner's review. No materials shall be used which would be injurious to the construction or its future function.
- B. The Contractor shall provide hypochlorite and other chlorination chemicals for disinfection. The Owner will provide personnel to supervise disinfection of the pipelines. The Contractor shall safely treat and dispose of disinfecting wastewater.

2.2 MIXING DISINFECTANT

- A. Prepare "stock" solution by mixing in Contractor-supplied vessels any of the following as described below. The purpose of the stock solution is to facilitate mixing and dilution to ensure a uniform disinfecting solution. The Contractor will be required to mix a stock solution of chlorine to mix a final (dilute) disinfecting solution.
1. The Contractor may provide calcium hypochlorite conforming to AWWA B300 or sodium hypochlorite conforming to AWWA B303 powder or liquid and water mixture.
- B. Use following portions of hypochlorite or chlorine to water:
1. Calcium Hypochlorite (65 to 70 Percent Cl): 1 pound per 7.5 gallons water.
 - a. If calcium hypochlorite is used, first mix dry powder with water to make a thick paste, and then thin to a 1 percent solution (10,000 ppm chlorine).
 2. Sodium Hypochlorite (5.25 Percent Cl): 1 gallon per 4.25 gallons water.
 - a. If sodium hypochlorite procedure is used, dilute the liquid with water to obtain a 1 percent solution.

PART 3 EXECUTION

3.1 GENERAL

- A. The Contractor shall pressure test and disinfect the pipeline.
- B. Unless otherwise indicated, water for testing and disinfecting water pipelines will be furnished by the Owner from existing water lines; however, the Contractor shall make all necessary provisions for conveying the water from the Owner-designated source to the points of use.
- C. Prior to pressure testing and disinfection, all pipelines shall be cleaned and washed or flushed.
- D. All pressure pipelines and valves shall be tested.
- E. Disinfection shall be accomplished by chlorination. All chlorinating and testing operations shall be performed in the presence of the Owner.
- F. Disinfection operations shall be scheduled by the Contractor as late as possible during the contract time period so as to assure the maximum degree of sterility of the facilities at the time the Work is accepted by the Owner. Bacteriological sampling will be performed by the Contractor and the samples furnished to the Owner for testing. Results of the bacteriological testing shall be satisfactory to the State Department of Health or other appropriate regulatory agency.
- G. Corporation stops with copper pipe stubs shall be installed at selected points along the pipeline for use as sampling stations and points to apply test pressure. The sampling stations shall be removed after bacterial tests and pressure tests are completed unless the station will be used for a new water service lateral. The Contractor shall complete any excavating required for removal of the sample stations.

3.2 FLUSHING AND CLEANING OF PIPELINES

- A. The Contractor shall keep pipelines as clean as possible during all phases of construction and every effort shall be made to keep animals and trench water out and prevent material from falling, washing, or blowing into the pipelines. All openings to the pipelines shall be plugged when not in use.
- B. Prior to application of disinfectants, clean pipelines of loose and suspended material.
- C. The pipelines shall be flushed with potable water until clear of suspended solids and color.

3.3 HYDROSTATIC TESTING OF PIPELINES

- A. The Contractor shall furnish and assemble all testing equipment including measuring devices and shall furnish all labor required for testing. The Owner will furnish duplicate test gages and water.
- B. The Contractor shall test all pipelines either in sections or as a unit not to exceed 3,000 lineal feet, not including branches for hydrant runs.
- C. No section of the pipeline shall be tested until all field-placed concrete has attained an age of 14 days. The test shall be made by closing valves when available, or by placing temporary bulkheads in the pipe and filling the line slowly with water. The Contractor shall be responsible for ascertaining that all test bulkheads are suitably restrained to resist the thrust of the test pressure without damage to, or movement of, the adjacent pipe. Any unharnessed sleeve-type couplings, expansion joints, or other sliding joints shall be restrained or suitably anchored prior to the test, to avoid movement and damage to piping and equipment. The Contractor shall provide sufficient temporary air tappings in the pipelines to allow for evacuation of all entrapped air in each pipe segment to be tested. After completion of the tests, such taps shall be permanently plugged. Care shall be taken to see that all air vents are open during filling.

- D. The pipeline shall be filled at a rate which will not cause any surges or exceed the rate at which the air can be released through the air valves at a reasonable velocity and all the air within the pipeline shall be properly purged. After the pipeline or section thereof has been filled, it shall be allowed to stand under a slight pressure for at least 4 hours to allow the escape of air from any air pockets. During this period, bulkheads, valves, and connections shall be examined for leaks. If leaks are found, corrective measures satisfactory to the Owner shall be taken.
- E. Hydrostatic Testing of PE Pipe:
1. Before any section of the pipe is filled with water, the Contractor shall inspect the piping and shall remove all foreign material.
 2. The Contractor shall notify the Owner 10 working days prior to testing.
 3. The Contractor shall not operate any valves on the Owner's existing system.
 4. The Contractor shall furnish the necessary pumps, shutoff valves, check valves, plumbing, meter, two pressure gages with petcocks, and other equipment necessary to complete the hydrostatic testing. The Contractor shall also furnish and install any temporary bulkheads, blocking or anchorage necessary to hold the pipe in position during the test. The Owner will furnish a pressure recorder. No direct connections to active water mains will be allowed for supplying makeup water.
 5. The Contractor shall open the valves at the high points to release air.
 6. The hydrostatic test shall consist of holding the test pressure on the pipeline for a specified period of time. All visible leaks shall be repaired in a manner acceptable to the Owner.
 7. Leakage testing shall be in accordance with AWWA M55 and ASTM F2164.
 8. Test pressure shall be 1.5 times the working pressure. The pipeline shall be filled and pressurized for a period of 4 to 6 hours to allow the pipe to expand. After this expansion period, the one hour pressure test may begin at a minimum pressure of 1.5 times the working pressure. The combined expansion and testing phases shall not exceed 8 hours.
 9. Acceptance Criteria: If the pressure remains steady (within 5 percent of the target value) for one hour, leakage is not indicated.
- F. Pipelines that fail to pass the prescribed leakage test will be considered defective Work, and the Contractor shall determine the cause of the leakage, shall take corrective measures necessary to repair the leaks, and shall retest the pipelines. All leaks and defects shall be corrected by the Contractor to the satisfaction of the Owner at no cost to the Owner. Any exposed joint showing visible leakage shall be repaired to zero leakage regardless of test results.
- G. Notify the Owner at least 48 hours in advance of draining test water from pipelines into a sanitary sewer or storm drain. The Contractor will notify the proper agencies to obtain permission for use of the sewer or storm drain system.

3.4 DISINFECTING PIPELINES

- A. General: All potable water pipelines shall be disinfected in accordance with the requirements of ANSI/AWWA C651. Pipelines shall be disinfected using the Continuous-Feed Method as modified herein.
- B. Chlorination: A chlorine-water solution shall be uniformly introduced into the pipeline by means of a solution-feed chlorinating device. Contractor will provide and operate the chlorine feed equipment. The chlorine solution shall be introduced at one end of the pipeline through a tap in such a manner that as the pipeline is filled with water, the concentration in the water entering the pipe is approximately 50 mg/l. Care shall be taken to prevent the strong chlorine solution in the pipeline being disinfected from flowing back into the line supplying the water.
- C. Retention Period: Chlorinated water shall be retained in the pipeline long enough to destroy all non-spore-forming bacteria. This period shall be at least 24 hours. After the chlorine-treated water has been retained for the required time, the free chlorine residual at the pipeline extremities and at other representative points shall be at least 25 mg/l.

- D. Chlorinating Valves: During the process of chlorinating the pipelines, all valves and other appurtenances shall be operated while the pipeline is filled with the heavily-chlorinated water.
- E. Sampling Ports: The Contractor shall provide sampling ports along the pipeline as defined on AWWA C651. Taps may be made at blind flanges attached to blowoffs, manways and air valves to help facilitate the spacing requirement.
- F. Final Flushing: After the applicable retention period, the heavily chlorinated water shall be flushed from the pipeline until chlorine measurements show that the concentration in the water leaving the pipeline is no higher than that generally prevailing in the system or is acceptable for domestic use. A reducing agent will be applied to the water by the Contractor to neutralize thoroughly the chlorine residual remaining in the water prior to discharge. The Contractor shall pay particular attention to the requirements for neutralizing and the proper disposal of treated (chlorinated) water. Contractor shall prepare and submit to the Owner for favorable review a plan for disposing of treated water prior to performing any disinfection. The Owner has found dechlorination with ascorbic acid (Vitamin C) to be effective. The Contractor shall not dispose of treated water directly to any water course or natural drainage channel.
- G. Bacteriological Testing: After final flushing and before the pipeline is placed in service, a sample, or samples will be collected by the Contractor from the end of the line or at other point(s) as determined by the Owner, and will be provided to the Owner for testing for bacteriological quality in accordance with the requirements of the State Department of Health or other appropriate regulatory agency. For this purpose the pipe shall be re-filled with fresh potable water and left for a period of 24 hours before any sample is collected. Should the initial disinfection treatment fail to produce satisfactory bacteriological test results, the disinfection procedure shall be repeated until acceptable results are obtained. The Contractor shall allow 3 days in his schedule for the Owner's water analysis.

3.5 CONNECTIONS TO EXISTING SYSTEM

- A. Pipe systems meeting disinfection and testing requirements will be approved for connection to existing systems in use. Approved systems shall be connected by District crews following a 3-day notice to make requested connections.

END OF SECTION

D I V I S I O N 1 6

ELECTRICAL / COMMUNICATIONS

SECTION - 16742
PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

- A. The Contractor shall provide and install PVC conduit, for the installation of the fiber optic cable.

1.2 RELATED DOCUMENTS

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

1.3 REFERENCED PUBLICATIONS

- A. The publications listed below, including addenda, revisions, updates and errata, form at part of this Specification to the extent they are referenced. Materials are only referenced by their basic designations.
1. Underwriters Laboratories 6-97 - Rigid Metal Conduit
 2. Underwriters Laboratories 5-96 - Surface Metal Raceway and Fittings
 3. Underwriters Laboratories 514A-96 - Metallic Outlet Boxes
 4. Underwriters Laboratories 6-97 - Rigid Metal Conduit
 5. Underwriters Laboratories 514B-97 - Fittings for Conduit
 6. Underwriters Laboratories 651-95 - Schedule 40 and Schedule 80 Rigid PVC Conduit
 7. Underwriters Laboratories 651A-95 - Type EB and A Rigid PVC Conduit
 8. Underwriters Laboratories 797-93 - Electrical Metallic Tubing

1.4 REGULATORY REQUIREMENTS

- A. All Work shall conform to the requirements of all Federal, State and Local Electrical and Telecommunications Regulations.

1.5 REFERENCES

- A. The publications listed below form a part of this specification to the extent that they apply or are referenced:

ANSI/NFPA 70	National Electrical Code
ANSI/TIA/EIA-568-B (Parts 1, 2, and 3)	Commercial Building Telecommunication Cabling Standard (April 2001) (AND ALL ADDENDA)
ANSI/TIA/EIA-569-A	Commercial Building Standards for Telecommunications Pathways and Spaces
ANSI/TIA/EIA-606	Administration Standard for the Telecommunications Infrastructure of Commercial Buildings(May 2002 or newest)
ANSI/TIA/EIA-607	Commercial Building Grounding and Bonding Requirements for Telecommunications
ANSI/TIA/EIA-758	Customer-Owned Outside Plant Telecommunications Cabling Standard

BICSI	Telecommunications Distribution Methods Manual
ASTM B633	Specification for Electrodeposited Coatings of Zinc on Iron and Steel
ASTM A653	Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process
ASTM A123	Specification for Zinc (Hot Galvanized) Coatings on Iron and Steel
ASTM A510	Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel
NEMA VE 2-2000	Cable Tray Installation Guidelines

1.6 DESCRIPTION AND GENERAL SPECIFICATIONS

- A. Provide all labor, materials, tools, equipment and services required to complete the work described herein and shown on the drawings and as required to provide a fully operational system.
- B. Raceways, cable tray, hangars and other materials and appurtenances shall be UL listed, approved and suitable for the environment where installed.
- C. The drawings, which constitute a part of these specifications, indicate the general route of the pathway systems. Contractor shall verify existing field conditions and coordinate exact routing, location, distance and levels and other work of this Section with other trades prior to installation.
- D. Notify the OWNER of any changes due to conflicts with other trades work, or due to any other reason other than of a minor nature prior to proceeding with work.
- E. Make necessary provisions for storage of materials and equipment at the site to ensure the quality and condition of the product to be installed. Use only materials and products that are new, free of defect, and which arrive unopened and in the original container at the jobsite.

1.7 SUBMITTALS

- A. Submittals shall be prepared and delivered in accordance with Section 01300 in sufficient detail to show full compliance with the specification.
- B. Manufacturer's Catalog Data shall be submitted for the following items at minimum:
 1. Cable hooks and hangars.
 2. Metallic and nonmetallic conduit, fittings and hangars.
 3. Outlet, pull and junction boxes.
 4. Fire-rated sleeve assemblies.
 5. Support materials and hardware for products specified in this Section.
- C. Data shall include a complete list of parts, special tools, and supplies with source of supply.
- D. Provide the number of copies of submittals required under the general provisions of these specifications. Submittals shall consist of neatly bound copies of catalog cuts, data sheets, manufacturers' installation recommendations, and other descriptive information, for all specified materials, assembled in accordance with the requirements of Section 01300.

PART 2 PRODUCTS

2.1 CONDUITS

- A. Rigid Non-Metallic Conduit (RNC)
 - 1. Type: U.L. 651 listed, NEMA TC-2, Schedule 40 rigid polyvinyl chloride (PVC) approved for burial in concrete encasement.
 - 2. Size: 4", or as specified on Plans.
 - 3. Construction: Shall meet NEMA TC-2 and U.L. 651 Schedule 40 standards.
 - 4. Fittings: NEMA TC3 and U.L. 514b matched to conduit and material. Includes conduit fittings, conduit couplings, junction box adapters, female adapters, male terminal adapters, reducers, caps, and end bells. Utilize appropriate cement as recommended by conduit and fitting manufacturer.
 - 5. PVC conduit sweeps shall not be used.
 - 6. Conduit, fittings and cement shall be produced by the same manufacturer to assure system integrity.

- B. Non-Rigid Non-Metallic Conduit
 - 1. Type: U.L. 1660 Listed, meeting SDTM F2160, Non –Pressure Rated Conduit
 - 2. Size 3" or as specified on plans.
 - 3. Fittings: U.L. 514B matched to conduit and material. Includes conduit fittings, conduit couplings, junction box adapters, female adapters, male terminal adapters, reducers, caps, and end bells. Utilize appropriate cement as recommended by conduit and fitting manufacturer.
 - 4. Conduit, fittings and cement shall be produced by the same manufacturer to assure system integrity.

- C. Fiberglass Conduit (FC)
 - 1. Type: U.L. 1684 listed, NEMA TC-14, Fiberglass conduit with IPS dimensions approved for burial in concrete encasement.
 - 2. Size: 4", or as specified on Plans.
 - 3. Construction: Shall meet NEMA TC-14 and U.L. 1684 standards.
 - 4. Fittings: NEMA TC-14 and U.L. 1684 matched to conduit and material. Includes conduit fittings, conduit couplings, junction box adapters, female adapters, male terminal adapters, reducers, caps, end bells, and sweeps/elbows. Utilize appropriate cement as recommended by conduit and fitting manufacturer.
 - 5. Factory manufactured conduit sweeps shall be of a single arc with a minimum radius of 36-inches.
 - 6. Conduit, fittings and cement shall be produced by the same manufacturer to assure system integrity.

- D. Conduit and Fitting Manufacturers, or approved equal:
 - 1. Carlon.
 - 2. Champion Fiberglass.
 - 3. JM Eagle

- E. Expansion and deflection couplings:
 - 1. Provide in accordance with Underwriters Laboratories (UL) 467 and 514B.
 - 2. Accommodate at a minimum 0.75" deflection, expansion and contraction in any direction.
 - 3. Accommodate at a minimum 30 degrees of angular deflection in any direction.
 - 4. Provide with an internal flexible braid sized to guarantee conduit ground in accordance with UL 467.

2.2 UNSPECIFIED EQUIPMENT AND MATERIAL

- A. Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete and functional TDS installation shall be provided in a level of quality consistent with other specified items.

PART 3 EXECUTION

3.1 GENERAL

- A. Install all pathways and raceway systems as shown on the drawings and as required in other sections of the Contract Documents.
- B. Install pathways and raceways in accordance with UL, NEC, and manufacturer's recommendations, as shown and as hereinafter specified.
- C. Raceway and pathway routing is conceptual, unless specifically directed otherwise. Install pathways and raceways as to comply with field conditions. Where shown on drawings, install as shown. Deviations are approved only to avoid interferences and only after drawings showing such proposed deviations have been submitted to and approved by the Owner's Representative.
- D. Coordinate installation with other trades. Provide conduit, raceways bending, fittings, supports, junction boxes, supports and all incidentals necessary for a complete installation.
- E. Cut all raceways square with a hacksaw or bandsaw, remove burrs and draw up tight.
- F. Where drilling is required for vertical pathways or conduits, locate holes so as not affect structural section such as ribs or beams.

3.2 CONDUITS

- A. General
 - 1. Support raceways by straps, suitable clamps or hangars to provide a rigid installation
 - 2. Perforated strap hangars or twisted wire attachments are not permitted.
 - 3. Do not support or fasten raceways to other pipe or in a manner to prevent the ready removal of either pipe.
 - 4. All conduit ends shall be provided with insulated bushings.
 - 5. Carefully form bends to avoid flattening raceway. Use factory bends or field bend with standard conduit bending equipment. Bending with a pipe vise, or any device other than standard equipment is prohibited. Flattened, deformed or dented conduit is not permitted. Remove and replace damaged conduit with new undamaged material.
 - 6. Conduits shall contain no more than three quarter bends (270 cumulative degrees) between pull boxes or backboards. The minimum bend radius of any conduit bend shall be 36-inches.
- B. Rigid Non-Metallic Conduit (RNC)
 - 1. Use of RNC permitted for underground installation for telecommunication raceways and in contact with earth only if allowed by local codes or as indicated on Plans.
 - 2. Use wide radius sweep bends only with minimum bend radius 10 times outside conduit diameter or as indicated on Plans.
 - 3. Use of RNC conduit not allowed for above-ground installations unless otherwise noted or approved.
 - 4. Provide minimum trade size 4" for underground installations unless indicated otherwise herein or on Plans, or with written approval of the Designer or Owner's Representative.

END OF SECTION

**SECTION 16750
HDPE COMMUNICATION DUCT**

PART 1 - GENERAL

1.01 SUMMARY

- A. This section specifies HDPE Communication Duct for telecommunications, including standards for dimensionality, testing, quality, acceptable installation practice, safe handling and storage.
- B. CONTRACTOR shall furnish all supervision, labor, equipment, materials and supplies to perform the work necessary to install HDPE Communication Duct in casing pipe in accordance with the project Drawings, Specifications, Contract Documents, and this specification.

1.02 RELATED SECTION

- A. Section 01 33 00 – Submittal Procedure
- B. Section 02 40 00 – Horizontal Directional Drilling

1.03 QUALITY ASSURANCE

- A. References:
 - 1. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those other standards are included as references under this section as if referenced directly. In the event of a conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.
 - 2. Unless otherwise specified, references to documents shall mean the documents in effect at the time of design, bid, or construction, whichever is earliest. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued.
 - 3. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.
 - a. WSDOT Standard Specifications for Road, Bridge and Municipal Construction, 2018 Manual M41-10
 - b. Underwriters Laboratory [U.L.] 1660 and 514B
 - c. American Society for Testing and Materials [ASTM] F2160
- B. Warranty
 - 1. The duct shall be warranted for one year per the pipe supplier's standard terms.

1.04 SUBMITTAL REQUIREMENTS

- A. Pre-Construction Submittals:
 - 1. The following PRODUCT DATA is required from the duct supplier:
 - a. Duct Size
 - b. Dimensionality
 - c. Color

- d. Recommended Minimum Bending Radius
- e. Recommended Maximum Safe Pull Force

1.05 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Offloading:
 - 1. Duct shall be on a continuous reel and packaged in such a manner as to provide adequate protection during transportation to the site.
 - 2. Duct damaged in shipment shall be replaced as directed by the OWNER.
 - 3. The duct shipment should be inspected prior to unloading to see if the load has shifted or otherwise been damaged. Notify OWNER immediately if more than immaterial damage is found. The duct shipment should be checked for quantity and proper pipe size, color, and type.
 - 4. Duct should be loaded, off-loaded, and otherwise handled in accordance with the duct supplier's guidelines.
 - 5. Off-loading devices such as chains, wire rope, chokers, or other lift handling implements that may scratch, nick, cut, or gouge the duct are strictly prohibited.
 - 6. During removal and handling, be sure that the duct does not strike anything. Significant impact could cause damage, particularly during cold weather.
- B. Handling and Storage:
 - 1. Any length of duct showing a crack, or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of duct shall be determined by the OWNER.
 - 2. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the OWNER.
 - 3. Duct reel should be stored and placed on level ground. Duct reel should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the duct, as well as all end surfaces, should be kept free from dirt and foreign matter.
 - 4. Duct shall be handled and supported with the use of woven fiber slings or approved equal. Care shall be exercised when handling the duct to not cut, gouge, scratch or otherwise abrade in any way.
 - 5. If duct reel is to be stored for periods of 1 year or longer, the pipe should be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature build-up is strictly prohibited. Duct reel should be covered with an opaque material while permitting adequate air circulation above and around to prevent excess heat accumulation.
 - 6. Duct reel shall be stored and per the pipe supplier's guidelines.

PART 2 - PRODUCTS

2.01 OWNER-SUPPLIED PRODUCTS

- A. None.

2.02 HDPE COMMUNICATION DUCT

- A. Duct supplier shall furnish HDPE communication duct conforming to all standards and procedures and meeting all testing and material properties as described in this specification.

- B. Non-Rigid Non-Metallic Duct Conduit
 - 1. Manufacturer: JM Eagle or equal.
 - 2. Type: U.L. 1660 Listed, meeting requirements outlined in ASTM F2160, Non-Pressure Rated HDPE
 - 3. Material: 3408/3608 resin.
 - 4. Dimensionality: DR-11
 - 5. Color: Orange.
 - 6. Size: 3” or as specified on plans.
 - 7. Configuration: continuous reel.
 - 8. Fittings: U.L. 514B matched to conduit and material. Includes conduit fittings, conduit couplings, junction box adapters, female adapters, male terminal adapters, reducers, caps, and end bells. Utilize appropriate cement as recommended by conduit and fitting manufacturer.
 - 9. Conduit, fittings and cement shall be produced by the same manufacturer to assure system integrity.

PART 3 - EXCECUTION

3.01 GENERAL INSTALLATION

- A. Installation guidelines from the duct supplier shall be followed for all installations.
- B. The HDPE duct will be installed in a manner so as not to exceed the recommended bending radius.
- C. Where HDPE duct is installed by pulling in tension, the recommended Safe Pulling Force established by the duct supplier shall not be exceeded.
- D. Install a pull cord inside the duct for fiber optic cable.
 - 1. Certified Type III Nylon Paracord
 - 2. 550 lb. tensile strength
 - 3. 4 mm diameter
 - 4. 7 Inner strands

END OF SECTION

APPENDIX A
PERMITS



HYDRAULIC PROJECT APPROVAL

Washington Department of
Fish & Wildlife
PO Box 43234
Olympia, WA 98504-3234
(360) 902-2200

Issued Date: March 19, 2019
Project End Date: September 30, 2019

Permit Number: 2019-4-161+01
FPA/Public Notice Number: N/A
Application ID: 16523

PERMITTEE	AUTHORIZED AGENT OR CONTRACTOR
Public Utility District No. 1 of Skagit County ATTENTION: Mark Handzlik PO Box 1436 Mount Vernon, WA 98273	Public Utility District No. 1 of Skagit County ATTENTION: Wendy LaRocque 1415 Freeway Dr, PO Box 1436 Mount Vernon, WA 98273-2429

Project Name: Daisy Lane Stream Crossing

Project Description: This Project will involve replacement of approximately 327 linear feet (LF) of 6-Inch Ductile Iron waterline with 10-inch PVC waterline via directional drilling beneath Bulson Creek along Daisy Lane. Construction of the Project is proposed to occur in the May of 2019 and is anticipated to last for approximately one month. The existing waterline was exposed in winter of 2018. This exposed portion will be removed from the Bulson Creek streambed at a later time when the water level is at its lowest (summer/fall 2019). District staff will cut and remove approximately 10-20 ft of exposed 6-inch Ductile Iron (DI) from the Bulson Creek bed (upstream side of bridge). The ends of the pipe will be filled with concrete just before the creek bank on either side. The site will be accessed via the existing access road (Daisy Lane). No large equipment will be used. The pipe will be cut by hand using a pipe saw. The pipe ends will be plugged via bag cement mixed by hand onsite when the Creek is low to dry. The work area will be isolated by first removing fish and then dewatering the area using a bypass system.

PROVISIONS

- 1. TIMING LIMITATION:** Work may start immediately, and you must complete the work by September 30, 2019.
- 2. APPROVED PLANS:** You must accomplish the work per plans and specifications submitted with the application and approved by the Washington Department of Fish and Wildlife, entitled Standard Application, dated January 10, 2019, and attached E-mails from Wendy LaRocque, received on January 30, 2019 and March 12, 2019 (with revised plans and project description attached), except as modified by this Hydraulic Project Approval. You must have a copy of these plans available on site during all phases of the project construction.
- 3. INVASIVE SPECIES CONTROL:** Thoroughly clean all equipment and gear before arriving and leaving the job site to prevent the transport and introduction of aquatic invasive species. Properly dispose of any water and chemicals used to clean gear and equipment. You can find additional information in the Washington Department of Fish and Wildlife's Invasive Species Management Protocols (November 2012), available online at <http://wdfw.wa.gov/publications/01490/wdfw01490.pdf>.
- 4. FISH KILL/ WATER QUALITY PROBLEM NOTIFICATION:** If a fish kill occurs or fish are observed in distress at the job site, immediately stop all activities causing harm. Immediately notify the Washington Department of Fish and Wildlife of the problem. If the likely cause of the fish kill or fish distress is related to water quality, also notify the Washington Military Department Emergency Management Division at 1-800-258-5990. Activities related to the fish kill or fish distress must not resume until the Washington Department of Fish and Wildlife gives approval. The Washington Department of Fish and Wildlife may require additional measures to mitigate impacts.
- 5. NOTIFICATION:** You, your agent, or contractor must contact the Washington Department of Fish and Wildlife by e-mail at HPAapplications@dfw.wa.gov; mail to Post Office Box 43234, Olympia, Washington 98504-3234; or fax to (360)



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902-2946 at least three business days before starting work. The notification must include the permittee's name, project location, starting date, and the Hydraulic Project Approval permit number.

6. STAGING, JOB SITE ACCESS, AND EQUIPMENT

7. Establish staging areas (used for equipment storage, vehicle storage, fueling, servicing, and hazardous material storage) in a location and manner that will prevent contaminants such as petroleum products, hydraulic fluid, fresh concrete, sediments, sediment-laden water, chemicals, or any other toxic or harmful materials from entering waters of the state.

8. Retain all natural habitat features on the bed or banks including large woody material and boulders. You may move these natural habitat features during construction but you must place them near the preproject location before leaving the job site.

9. CONSTRUCTION-RELATED SEDIMENT, EROSION AND POLLUTION CONTAINMENT

10. If wet or muddy conditions exist, in or near a riparian zone or wetland area, use equipment and tools such as timber mats, etc. that reduce ground pressure.

11. Check equipment daily for leaks and complete any required repairs in an upland location before using the equipment in or near the water.

12. Stop all hydraulic project activities except those needed to control erosion and siltation, if flow or precipitation conditions arise that will result in erosion or siltation of waters of the state.

13. Prevent project contaminants, such as petroleum products, hydraulic fluid, fresh concrete, sediments, sediment-laden water, chemicals, or any other toxic or harmful materials, from entering or leaching into waters of the state.

14. Use environmentally acceptable lubricants composed of biodegradable base oils such as vegetable oils, synthetic esters, and polyalkylene glycols in equipment operated near the water.

15. When working below the Ordinary High Water Mark, work in the dry watercourse (when no natural flow is occurring in the channel, or when flow is diverted around the job site).

16. Protect all disturbed areas from erosion. Maintain erosion and sediment control until all work and cleanup of the job site is complete.

17. Straw used for erosion and sediment control, must be certified free of noxious weeds and their seeds.

UTILITY CROSSINGS

18. Align the conduit as perpendicular as possible to the watercourse.

19. Avoid crossing at meander bends, braided streams, alluvial fans, active flood plains, or any other area that is inherently unstable and may lead to eroding and scouring of the stream bed.

20. Install the conduit well below scour depth of the watercourse to prevent natural scouring of the stream bed from exposing the pipeline or cable.

21. Directional drilling:

a. Design the drill path to an appropriate depth below the watercourse to minimize the risk of frac-out and to a depth to prevent exposure of the line from natural scouring of the stream bed; and

b. Locate the drill entry and exit points away from the banks of the watercourse to minimize impact on these areas.

c. Do not disturb the streambed. If the streambed collapses and flow enters the drilling area, work activities must cease and the Habitat Biologist listed below must be contacted immediately.

22. Route construction water (wastewater) from the project to an upland area above the limits of anticipated floodwater. Remove fine sediment and other contaminants before discharging the construction water to waters of the state.

IN-WATER WORK AREA ISOLATION USING BLOCK NETS

23. If the existing pipeline that is to be cut is still submerged or in the water when it will be cut, isolate fish from the work



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area by using block nets.

24. Install block nets at sites with reduced flow volume or velocity, uniform depth, and good accessibility.
 25. Do not install block nets at sites with heavy vegetation, large cobble or boulders, undercut banks, or deep pools unless you can secure and maintain them.
 26. Install block nets at an angle to the direction of flow (not perpendicular to the flow) to avoid entrapping fish in the nets.
 27. After the first block net is secured at the upstream end, use a second block net to herd fish downstream and out of the project area.
 28. Install a downstream block net if fish may reenter the work area from downstream.
 29. To anchor block nets, place bags filled with clean round gravel along the bottom of the nets.
 30. Secure block nets along both banks and the channel bottom to prevent failure from debris accumulation, high flows, and/or flanking.
 31. To keep fish out of the job site, leave block nets in place until the work is complete and conditions are suitable for fish.
 32. Check block nets at least three times a day for entangled fish and accumulated debris.
- FISH LIFE REMOVAL only if the work area needs to be isolated from the flow.
33. All persons participating in capture and removal must have training, knowledge, and skills in the safe handling of fish life.
 34. If electrofishing is conducted, a person with electrofishing training must be on-site to conduct or direct all electrofishing activities.
 35. Place block nets upstream and downstream of the in-water work area before capturing and removing fish life.
 36. Capture and safely move fish life from the work area to the nearest suitable free-flowing water.

IN-WATER WORK AREA ISOLATION USING A TEMPORARY BYPASS

37. Isolate fish from the work area (only if the existing pipe to be cut is submerged or in the water) by using either a total or partial bypass to reroute the stream through a temporary channel or pipe.
38. Sequence the work to minimize the duration of dewatering.
39. Use the least-impacting feasible method to temporarily bypass water from the work area. Consider the physical characteristics of the site and the anticipated volume of water flowing through the work area.
40. Design the temporary bypass to minimize the length of the dewatered stream channel.
41. During all phases of bypass installation and decommissioning, maintain flows downstream of the project site to ensure survival of all downstream fish.
42. Install a cofferdam or similar device at the upstream and downstream end of the bypass to prevent backwater from entering the work area.
43. Return diverted water to the channel immediately downstream of the work area. Dissipate flow energy from the diversion to prevent scour or erosion of the channel and bank.
44. If the diversion inlet is a gravity diversion that provides fish passage, place the diversion outlet where it facilitates gradual and safe reentry of fish into the stream channel.
45. If the bypass is a pumped diversion, once started it must run continuously until it is no longer necessary to bypass flows. This requires back-up pumps on-site and twenty-four-hour monitoring for overnight operation.
46. If the diversion inlet is a pump diversion in a fish-bearing stream, the pump intake structure must have a fish screen



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installed, operated, and maintained in accordance with RCW 77.57.010 and 77.57.070. Screen the pump intake with one of the following:

- a) Perforated plate: 0.094 inch (maximum opening diameter);
- b) Profile bar: 0.069 inch (maximum width opening); or
- c) Woven wire: 0.087 inch (maximum opening in the narrow direction).

The minimum open area for all types of fish screens is twenty-seven percent. The screened intake facility must have enough surface area to ensure that the velocity through the screen is less than 0.4 feet per second. Maintain fish screens to prevent injury or entrapment of fish.

- 47. The fish screen must remain in place whenever water is withdrawn from the stream through the pump intake.
- 48. Remove fish screens on dewatering pumps in the isolated work area only after all fish are safe and excluded from the work area.
- 49. Isolate pump hose intakes with block nets so that fish cannot get near the intake.
- 50. Return water flow slowly to the in-water work area to prevent the downstream release of sediment laden water. If necessary, install silt fencing above the bypass outlet to capture sediment during re-watering of the channel.

DEMOBILIZATION AND CLEANUP

- 51. Before the end of the in-water work period specified in the "timing limitations" provision, abandon temporary roads in wet or flood-prone areas.
- 52. Upon completion of the project, restore the disturbed bed, banks, and riparian zone to preproject condition to the extent possible.
- 53. Seed areas disturbed by construction activities with a native seed mix suitable for the site that has at least one quick-establishing plant species.
- 54. Complete replanting of riparian vegetation in disturbed areas during the first dormant season (late fall through late winter) after project completion, and by April 30, 2020. Plant trees 10 feet on center, and shrubs five feet on center. Plant conifers in with the quicker establishing trees as much as possible, as space allows. Maintain plantings for at least three years to ensure at least eighty percent of the plantings survive. Failure to achieve the eighty percent survival in year three will require you to submit a plan with follow-up measures to achieve requirements or reasons to modify requirements.
- 55. Upon completion of the project, remove all materials or equipment from the site and dispose of all excess spoils and waste materials in an upland area above the limits of anticipated floodwater.
- 56. Remove temporary erosion and sediment control methods after job site is stabilized or within three months of project completion, whichever is sooner. All erosion control materials that will remain onsite must be composed of 100% biodegradable materials.
- 57. Deposit waste material from the project, such as construction debris, silt, excess dirt, or overburden, in an upland area above the limits of anticipated floodwater.
- 58. Deposit all trash from the project at an appropriate upland disposal location.

LOCATION #1:	Site Name: Daisy Lane , , WA		
WORK START:	January 1, 2019	WORK END:	October 31, 2019
<u>WRIA</u>	<u>Waterbody:</u>	<u>Tributary to:</u>	
03 - Skagit Lower - Samish	Bulson Creek (lb)	Carpenter Creek	



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<u>1/4 SEC:</u>	<u>Section:</u>	<u>Township:</u>	<u>Range:</u>	<u>Latitude:</u>	<u>Longitude:</u>	<u>County:</u>
	16	33 N	04 E	48.203603	-122.18197	Skagit
<u>Location #1 Driving Directions</u>						

APPLY TO ALL HYDRAULIC PROJECT APPROVALS

This Hydraulic Project Approval pertains only to those requirements of the Washington State Hydraulic Code, specifically Chapter 77.55 RCW. Additional authorization from other public agencies may be necessary for this project. The person(s) to whom this Hydraulic Project Approval is issued is responsible for applying for and obtaining any additional authorization from other public agencies (local, state and/or federal) that may be necessary for this project.

This Hydraulic Project Approval shall be available on the job site at all times and all its provisions followed by the person (s) to whom this Hydraulic Project Approval is issued and operator(s) performing the work.

This Hydraulic Project Approval does not authorize trespass.

The person(s) to whom this Hydraulic Project Approval is issued and operator(s) performing the work may be held liable for any loss or damage to fish life or fish habitat that results from failure to comply with the provisions of this Hydraulic Project Approval.

Failure to comply with the provisions of this Hydraulic Project Approval could result in a civil penalty of up to one hundred dollars per day and/or a gross misdemeanor charge, possibly punishable by fine and/or imprisonment.

All Hydraulic Project Approvals issued under RCW 77.55.021 are subject to additional restrictions, conditions, or revocation if the Department of Fish and Wildlife determines that changed conditions require such action. The person(s) to whom this Hydraulic Project Approval is issued has the right to appeal those decisions. Procedures for filing appeals are listed below.



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MINOR MODIFICATIONS TO THIS HPA: You may request approval of minor modifications to the required work timing or to the plans and specifications approved in this HPA unless this is a General HPA. If this is a General HPA you must use the Major Modification process described below. Any approved minor modification will require issuance of a letter documenting the approval. A minor modification to the required work timing means any change to the work start or end dates of the current work season to enable project or work phase completion. Minor modifications will be approved only if spawning or incubating fish are not present within the vicinity of the project. You may request subsequent minor modifications to the required work timing. A minor modification of the plans and specifications means any changes in the materials, characteristics or construction of your project that does not alter the project's impact to fish life or habitat and does not require a change in the provisions of the HPA to mitigate the impacts of the modification. If you originally applied for your HPA through the online Aquatic Protection Permitting System (APPS), you may request a minor modification through APPS. A link to APPS is at <http://wdfw.wa.gov/licensing/hpa/>. If you did not use APPS you must submit a written request that clearly indicates you are seeking a minor modification to an existing HPA. Written requests must include the name of the applicant, the name of the authorized agent if one is acting for the applicant, the APP ID number of the HPA, the date issued, the permitting biologist, the requested changes to the HPA, the reason for the requested change, the date of the request, and the requestor's signature. Send by mail to: Washington Department of Fish and Wildlife, PO Box 43234, Olympia, Washington 98504-3234, or by email to HPAapplications@dfw.wa.gov. You should allow up to 45 days for the department to process your request.

MAJOR MODIFICATIONS TO THIS HPA: You may request approval of major modifications to any aspect of your HPA. Any approved change other than a minor modification to your HPA will require issuance of a new HPA. If you originally applied for your HPA through the online Aquatic Protection Permitting System (APPS), you may request a major modification through APPS. A link to APPS is at <http://wdfw.wa.gov/licensing/hpa/>. If you did not use APPS you must submit a written request that clearly indicates you are requesting a major modification to an existing HPA. Written requests must include the name of the applicant, the name of the authorized agent if one is acting for the applicant, the APP ID number of the HPA, the date issued, the permitting biologist, the requested changes to the HPA, the reason for the requested change, the date of the request, and the requestor's signature. Send your written request by mail to: Washington Department of Fish and Wildlife, PO Box 43234, Olympia, Washington 98504-3234. You may email your request for a major modification to HPAapplications@dfw.wa.gov. You should allow up to 45 days for the department to process your request.

APPEALS INFORMATION

If you wish to appeal the issuance, denial, conditioning, or modification of a Hydraulic Project Approval (HPA), Washington Department of Fish and Wildlife (WDFW) recommends that you first contact the department employee who issued or denied the HPA to discuss your concerns. Such a discussion may resolve your concerns without the need for further appeal action. If you proceed with an appeal, you may request an informal or formal appeal. WDFW encourages you to take advantage of the informal appeal process before initiating a formal appeal. The informal appeal process includes a review by department management of the HPA or denial and often resolves issues faster and with less legal complexity than the formal appeal process. If the informal appeal process does not resolve your concerns, you may advance your appeal to the formal process. You may contact the HPA Appeals Coordinator at (360) 902-2534 for more information.

A. INFORMAL APPEALS: WAC 220-660-460 is the rule describing how to request an informal appeal of WDFW actions taken under Chapter 77.55 RCW. Please refer to that rule for complete informal appeal procedures. The following information summarizes that rule.



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A person who is aggrieved by the issuance, denial, conditioning, or modification of an HPA may request an informal appeal of that action. You must send your request to WDFW by mail to the HPA Appeals Coordinator, Department of Fish and Wildlife, Habitat Program, PO Box 43234, Olympia, Washington 98504-3234; e-mail to HPAapplications@dfw.wa.gov; fax to (360) 902-2946; or hand-delivery to the Natural Resources Building, 1111 Washington St SE, Habitat Program, Fifth floor. WDFW must receive your request within 30 days from the date you receive notice of the decision. If you agree, and you applied for the HPA, resolution of the appeal may be facilitated through an informal conference with the WDFW employee responsible for the decision and a supervisor. If a resolution is not reached through the informal conference, or you are not the person who applied for the HPA, the HPA Appeals Coordinator or designee may conduct an informal hearing or review and recommend a decision to the Director or designee. If you are not satisfied with the results of the informal appeal, you may file a request for a formal appeal.

B. FORMAL APPEALS: WAC 220-660-470 is the rule describing how to request a formal appeal of WDFW actions taken under Chapter 77.55 RCW. Please refer to that rule for complete formal appeal procedures. The following information summarizes that rule.

A person who is aggrieved by the issuance, denial, conditioning, or modification of an HPA may request a formal appeal of that action. You must send your request for a formal appeal to the clerk of the Pollution Control Hearings Boards and serve a copy on WDFW within 30 days from the date you receive notice of the decision. You may serve WDFW by mail to the HPA Appeals Coordinator, Department of Fish and Wildlife, Habitat Program, PO Box 43234, Olympia, Washington 98504-3234; e-mail to HPAapplications@dfw.wa.gov; fax to (360) 902-2946; or hand-delivery to the Natural Resources Building, 1111 Washington St SE, Habitat Program, Fifth floor. The time period for requesting a formal appeal is suspended during consideration of a timely informal appeal. If there has been an informal appeal, you may request a formal appeal within 30 days from the date you receive the Director's or designee's written decision in response to the informal appeal.

C. FAILURE TO APPEAL WITHIN THE REQUIRED TIME PERIODS: If there is no timely request for an appeal, the WDFW action shall be final and unappealable.

Habitat Biologist Wendy.Cole@dfw.wa.gov
Wendy Cole 360-466-4345, Ext:272

for Director
WDFW



HYDRAULIC PROJECT APPROVAL

Washington Department of
Fish & Wildlife
PO Box 43234
Olympia, WA 98504-3234
(360) 902-2200

Issued Date: November 13, 2018
Project End Date: March 31, 2019

Permit Number: 2018-4-816+01
FPA/Public Notice Number: N/A
Application ID: 16461

PERMITTEE	AUTHORIZED AGENT OR CONTRACTOR
Public Utility District No. 1 of Skagit County ATTENTION: Mark Handzlik PO Box 1436 Mount Vernon, WA 98273	Public Utility District No. 1 of Skagit County ATTENTION: Wendy LaRocque 1415 Freeway Dr, PO Box 1436 Mount Vernon, WA 98273-2429

Project Name: McLean Road

Project Description: Public Utility District No. 1 of Skagit County (District) is proposing to install approximately 347 linear feet (LF) of 14-inch PVC water pipeline via a trenchless boring technique (horizontal direction drilling). This waterline will replace the 8-inch waterline located in the culvert bedding. A 4-inch PVC fiber optic conduit will also be installed. The bore path includes a non-named fish bearing stream / slough.

PROVISIONS

- 1. TIMING LIMITATION:** You may begin the project on February 1, 2019, and you must complete the project by March 31, 2019.
- 2. APPROVED PLANS:** You must accomplish the work per plans and specifications submitted with the application and approved by the Washington Department of Fish and Wildlife, entitled Standard Application, dated October 30, 2018, except as modified by this Hydraulic Project Approval. You must have a copy of these plans available on site during all phases of the project construction.
- 3. INVASIVE SPECIES CONTROL:** Follow Level 1 Decontamination protocol for low risk locations. Thoroughly remove visible dirt and organic debris from all equipment and gear (including drive mechanisms, wheels, tires, tracks, buckets and undercarriage) before arriving and leaving the job site to prevent the transport and introduction of invasive species. Properly dispose of any water and chemicals used to clean gear and equipment. For contaminated or high risk sites please refer to the Level 2 Decontamination protocol. You can find this and additional information in the Washington Department of Fish and Wildlife's "Invasive Species Management Protocols", available online at <http://wdfw.wa.gov/publications/search.php?Cat=Aquatic Invasive Species>.
- 4. FISH KILL/ WATER QUALITY PROBLEM NOTIFICATION:** If a fish kill occurs or fish are observed in distress at the job site, immediately stop all activities causing harm. Immediately notify the Washington Department of Fish and Wildlife of the problem. If the likely cause of the fish kill or fish distress is related to water quality, also notify the Washington Military Department Emergency Management Division at 1-800-258-5990. Activities related to the fish kill or fish distress must not resume until the Washington Department of Fish and Wildlife gives approval. The Washington Department of Fish and Wildlife may require additional measures to mitigate impacts.

STAGING, JOB SITE ACCESS, AND EQUIPMENT

- 5.** Establish staging areas (used for equipment storage, vehicle storage, fueling, servicing, and hazardous material storage) in a location and manner that will prevent contaminants such as petroleum products, hydraulic fluid, fresh concrete, sediments, sediment-laden water, chemicals, or any other toxic or harmful materials from entering waters of the state.
- 6.** Design and locate new temporary access roads to prevent erosion and sediment delivery to waters of the state.



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7. Clearly mark boundaries to establish the limit of work associated with site access and construction.
8. This Hydraulic Project Approval does not authorize the removal of riparian zone vegetation.
9. If wet or muddy conditions exist, in or near a riparian zone or wetland area, use equipment that reduces ground pressure.
10. Check equipment daily for leaks and complete any required repairs in an upland location before using the equipment in or near the water.
11. Use environmentally acceptable lubricants composed of biodegradable base oils such as vegetable oils, synthetic esters, and polyalkylene glycols in equipment operated in or near the water.
12. This Hydraulic Project Approval does not authorize equipment crossings of the stream.

CONSTRUCTION-RELATED SEDIMENT, EROSION AND POLLUTION CONTAINMENT

13. Protect all disturbed areas from erosion. Maintain erosion and sediment control until all work and cleanup of the job site is complete.
14. All erosion control materials that will remain onsite must be composed of 100% biodegradable materials.
15. Straw used for erosion and sediment control, must be certified free of noxious weeds and their seeds.
16. Stop all hydraulic project activities except those needed to control erosion and siltation, if flow conditions arise that will result in erosion or siltation of waters of the state.
17. Prevent project contaminants, such as petroleum products, hydraulic fluid, fresh concrete, sediments, sediment-laden water, chemicals, or any other toxic or harmful materials, from entering or leaching into waters of the state.
18. Route construction water (wastewater) from the project to an upland area above the limits of anticipated floodwater. Remove fine sediment and other contaminants before discharging the construction water to waters of the state.
19. Deposit waste material from the project, such as construction debris, silt, excess dirt, or overburden, in an upland area above the limits of anticipated floodwater unless the material is approved by the Washington Department of Fish and Wildlife for reuse in the project.
20. Deposit all trash from the project at an appropriate upland disposal location.

UTILITY CROSSING

21. Align the conduit as perpendicular as possible to the watercourse.
22. Install the conduit well below scour depth of the watercourse to prevent natural scouring of the stream bed from exposing the pipeline or cable.
23.
 - a. Design the drill path to an appropriate depth (20 feet is in the permit application) below the watercourse to minimize the risk of frac-out and to a depth to prevent exposure of the line from natural scouring of the stream bed;
 - b. Locate the drill entry and exit points away from the banks of the watercourse to minimize impact on these areas.
 - c. Do not disturb the streambed. If the streambed collapses and flow enters the drilling area, work activities must cease and the Habitat Biologist listed below must be contacted immediately.

DEMOBILIZATION AND CLEANUP

24. Before the end of the in-water work period specified in the "timing limitations" provision, abandon temporary roads in wet or flood-prone areas.
25. Seed areas disturbed by construction activities with a native seed mix suitable for the site that has at least one quick-establishing plant species.
26. Remove temporary erosion and sediment control methods after job site is stabilized or within three months of project completion, whichever is sooner.



HYDRAULIC PROJECT APPROVAL

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Permit Number: 2018-4-816+01
FPA/Public Notice Number: N/A
Application ID: 16461

LOCATION #1:	Site Name: McLean Road , Mount Vernon, WA 98273					
WORK START:	March 4, 2019			WORK END:	August 31, 2019	
<u>WRIA</u>	<u>Waterbody:</u>			<u>Tributary to:</u>		
03 - Skagit Lower - Samish	Unknown Stream Number			Unknown		
<u>1/4 SEC:</u>	<u>Section:</u>	<u>Township:</u>	<u>Range:</u>	<u>Latitude:</u>	<u>Longitude:</u>	<u>County:</u>
NW 1/4	21	34 N	03 E	48.420889	-122.441095	Skagit
<u>Location #1 Driving Directions</u>						

APPLY TO ALL HYDRAULIC PROJECT APPROVALS

This Hydraulic Project Approval pertains only to those requirements of the Washington State Hydraulic Code, specifically Chapter 77.55 RCW. Additional authorization from other public agencies may be necessary for this project. The person(s) to whom this Hydraulic Project Approval is issued is responsible for applying for and obtaining any additional authorization from other public agencies (local, state and/or federal) that may be necessary for this project.

This Hydraulic Project Approval shall be available on the job site at all times and all its provisions followed by the person (s) to whom this Hydraulic Project Approval is issued and operator(s) performing the work.

This Hydraulic Project Approval does not authorize trespass.

The person(s) to whom this Hydraulic Project Approval is issued and operator(s) performing the work may be held liable for any loss or damage to fish life or fish habitat that results from failure to comply with the provisions of this Hydraulic Project Approval.

Failure to comply with the provisions of this Hydraulic Project Approval could result in a civil penalty of up to one hundred dollars per day and/or a gross misdemeanor charge, possibly punishable by fine and/or imprisonment.

All Hydraulic Project Approvals issued under RCW 77.55.021 are subject to additional restrictions, conditions, or revocation if the Department of Fish and Wildlife determines that changed conditions require such action. The person(s) to whom this Hydraulic Project Approval is issued has the right to appeal those decisions. Procedures for filing appeals are listed below.



HYDRAULIC PROJECT APPROVAL

Washington Department of
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Olympia, WA 98504-3234
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Application ID: 16461

MINOR MODIFICATIONS TO THIS HPA: You may request approval of minor modifications to the required work timing or to the plans and specifications approved in this HPA unless this is a General HPA. If this is a General HPA you must use the Major Modification process described below. Any approved minor modification will require issuance of a letter documenting the approval. A minor modification to the required work timing means any change to the work start or end dates of the current work season to enable project or work phase completion. Minor modifications will be approved only if spawning or incubating fish are not present within the vicinity of the project. You may request subsequent minor modifications to the required work timing. A minor modification of the plans and specifications means any changes in the materials, characteristics or construction of your project that does not alter the project's impact to fish life or habitat and does not require a change in the provisions of the HPA to mitigate the impacts of the modification. If you originally applied for your HPA through the online Aquatic Protection Permitting System (APPS), you may request a minor modification through APPS. A link to APPS is at <http://wdfw.wa.gov/licensing/hpa/>. If you did not use APPS you must submit a written request that clearly indicates you are seeking a minor modification to an existing HPA. Written requests must include the name of the applicant, the name of the authorized agent if one is acting for the applicant, the APP ID number of the HPA, the date issued, the permitting biologist, the requested changes to the HPA, the reason for the requested change, the date of the request, and the requestor's signature. Send by mail to: Washington Department of Fish and Wildlife, PO Box 43234, Olympia, Washington 98504-3234, or by email to HPAapplications@dfw.wa.gov. You should allow up to 45 days for the department to process your request.

MAJOR MODIFICATIONS TO THIS HPA: You may request approval of major modifications to any aspect of your HPA. Any approved change other than a minor modification to your HPA will require issuance of a new HPA. If you originally applied for your HPA through the online Aquatic Protection Permitting System (APPS), you may request a major modification through APPS. A link to APPS is at <http://wdfw.wa.gov/licensing/hpa/>. If you did not use APPS you must submit a written request that clearly indicates you are requesting a major modification to an existing HPA. Written requests must include the name of the applicant, the name of the authorized agent if one is acting for the applicant, the APP ID number of the HPA, the date issued, the permitting biologist, the requested changes to the HPA, the reason for the requested change, the date of the request, and the requestor's signature. Send your written request by mail to: Washington Department of Fish and Wildlife, PO Box 43234, Olympia, Washington 98504-3234. You may email your request for a major modification to HPAapplications@dfw.wa.gov. You should allow up to 45 days for the department to process your request.

APPEALS INFORMATION

If you wish to appeal the issuance, denial, conditioning, or modification of a Hydraulic Project Approval (HPA), Washington Department of Fish and Wildlife (WDFW) recommends that you first contact the department employee who issued or denied the HPA to discuss your concerns. Such a discussion may resolve your concerns without the need for further appeal action. If you proceed with an appeal, you may request an informal or formal appeal. WDFW encourages you to take advantage of the informal appeal process before initiating a formal appeal. The informal appeal process includes a review by department management of the HPA or denial and often resolves issues faster and with less legal complexity than the formal appeal process. If the informal appeal process does not resolve your concerns, you may advance your appeal to the formal process. You may contact the HPA Appeals Coordinator at (360) 902-2534 for more information.

A. INFORMAL APPEALS: WAC 220-660-460 is the rule describing how to request an informal appeal of WDFW actions taken under Chapter 77.55 RCW. Please refer to that rule for complete informal appeal procedures. The following information summarizes that rule.



HYDRAULIC PROJECT APPROVAL

Washington Department of
Fish & Wildlife
PO Box 43234
Olympia, WA 98504-3234
(360) 902-2200

Issued Date: November 13, 2018
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Permit Number: 2018-4-816+01
FPA/Public Notice Number: N/A
Application ID: 16461

A person who is aggrieved by the issuance, denial, conditioning, or modification of an HPA may request an informal appeal of that action. You must send your request to WDFW by mail to the HPA Appeals Coordinator, Department of Fish and Wildlife, Habitat Program, PO Box 43234, Olympia, Washington 98504-3234; e-mail to HPAapplications@dfw.wa.gov; fax to (360) 902-2946; or hand-delivery to the Natural Resources Building, 1111 Washington St SE, Habitat Program, Fifth floor. WDFW must receive your request within 30 days from the date you receive notice of the decision. If you agree, and you applied for the HPA, resolution of the appeal may be facilitated through an informal conference with the WDFW employee responsible for the decision and a supervisor. If a resolution is not reached through the informal conference, or you are not the person who applied for the HPA, the HPA Appeals Coordinator or designee may conduct an informal hearing or review and recommend a decision to the Director or designee. If you are not satisfied with the results of the informal appeal, you may file a request for a formal appeal.

B. FORMAL APPEALS: WAC 220-660-470 is the rule describing how to request a formal appeal of WDFW actions taken under Chapter 77.55 RCW. Please refer to that rule for complete formal appeal procedures. The following information summarizes that rule.

A person who is aggrieved by the issuance, denial, conditioning, or modification of an HPA may request a formal appeal of that action. You must send your request for a formal appeal to the clerk of the Pollution Control Hearings Boards and serve a copy on WDFW within 30 days from the date you receive notice of the decision. You may serve WDFW by mail to the HPA Appeals Coordinator, Department of Fish and Wildlife, Habitat Program, PO Box 43234, Olympia, Washington 98504-3234; e-mail to HPAapplications@dfw.wa.gov; fax to (360) 902-2946; or hand-delivery to the Natural Resources Building, 1111 Washington St SE, Habitat Program, Fifth floor. The time period for requesting a formal appeal is suspended during consideration of a timely informal appeal. If there has been an informal appeal, you may request a formal appeal within 30 days from the date you receive the Director's or designee's written decision in response to the informal appeal.

C. FAILURE TO APPEAL WITHIN THE REQUIRED TIME PERIODS: If there is no timely request for an appeal, the WDFW action shall be final and unappealable.

Habitat Biologist Wendy.Cole@dfw.wa.gov
Wendy Cole 360-466-4345, Ext:272

for Director
WDFW

APPENDIX B
EASEMENTS



201903200052

03/20/2019 12:52 PM Pages: 1 of 4 Fees: \$102.00
Skagit County Auditor

RETURN TO:

Public Utility District No. 1 of Skagit County
1415 Freeway Drive
P.O. Box 1436
Mount Vernon, WA 98273-1436

SKAGIT COUNTY WASHINGTON
REAL ESTATE EXCISE TAX

2019986

MAR 20 2019

Amount Paid \$ 13 .90

Skagit Co. Treasurer
By *nam* Deputy

PUD UTILITY EASEMENT

THIS AGREEMENT is made this 18TH day of MARCH, 2019, between **FIR ISLAND FARMS**, a PARTNERSHIP CONSISTING OF Kathryn J. Hufferline as successor in interest to Sybil Boswyk, deceased, and Grace A. Ahrens and Girard F. Ahrens, Co-Trustees of the Grace A. Ahrens and Girard F. Ahrens, Trust Agreement dated January 9, 1976, of County of Skagit, in the State of Washington, hereinafter referred to as "Grantor(s)", and **PUBLIC UTILITY DISTRICT NO. 1 OF SKAGIT COUNTY, WASHINGTON**, a Municipal Corporation hereinafter referred to as "District". Witnesseth:

WHEREAS, Grantor(s) are the owners of certain lands and premises situated in the County of Skagit, and

WHEREAS, the District wishes to acquire certain rights and privileges along, within, across, under, and upon the said lands and premises.

NOW, THEREFORE, Grantor(s), for and in consideration of \$500.00, receipt of which is hereby acknowledged, conveys and grants to the District, its successors or assigns, the perpetual right, privilege, and authority to do all things necessary or proper in the construction and maintenance of water, sewer, electrical, and communication lines and/or other similar public service related facilities. This includes the right to construct, operate, maintain, inspect, improve, remove, restore, alter, replace, change the size of, relocate, connect to and locate at any time pipe(s), line(s) or related facilities, along with necessary appurtenances for the transportation and control of water, sewer, electrical, and electronic information on facilities over, across, along, in and under the following described lands and premises in the County of Skagit, State of Washington, to wit:

Tax Parcel Number: P22241

Lot 1 of Short Plat #PL01-0397 recorded under AF#200201240242 lying in the NW¼ of the SW¼ of Section 21, Township 34 North, Range 03 East, W.M., less County road.

on the easement described as follows (See Exhibit A – Easement Map):

That portion of the NW¼ of the SW¼ of Section 21, Township 34 North, Range 03 East, W.M., in Skagit County, Washington, described as follows:

COMMENCING at the West ¼ Corner of said Section 21 being the centerline intersection of Best Road and McLean Road; thence N88°50'08"E a distance of 727.00 feet; thence S01°09'52"E a distance of 30 feet to the south margin of said McLean Road and the **POINT OF BEGINNING**.

Thence continuing S01°09'52"E a distance of 10.00 feet; thence N88°50'08"E a distance of 170.00 feet; thence N01°09'52"W a distance of 10.00 feet to the south margin of said McLean Road; thence S88°50'08"W along the south margin of said McLean Road a distance of 170.00 feet to the **POINT OF BEGINNING**. Containing 0.04 acres, more or less.

Grantor(s) authorizes the District the right of ingress and egress from said lands of the Grantor(s). The Grantor(s) also gives the District permission to cut, trim and/or remove all timber, trees, brush, or

other growth standing or growing upon the lands of the Grantor(s) in the described easement for the purposes of the activities listed above, as well as the right to cut, trim and/or remove vegetation which, in the opinion of the District, constitutes a menace or danger to said pipe(s), line(s) or related facilities, and/or to persons or property by reason of proximity to the line. The Grantor(s) agrees that title to all brush, other vegetation or debris trimmed, cut, and removed from the easement pursuant to this Agreement is vested in the District.

Grantor(s), their heirs, successors, or assigns hereby conveys and agrees not to construct or permit to be constructed structures of any kind on the easement area without written approval of the General Manager of the District. Grantor(s) shall conduct their activities and all other activities on Grantor's property so as not to interfere with, obstruct or endanger the usefulness of any improvements or other facilities, now or hereafter maintained upon the easement or in any way interfere with, obstruct or endanger the District's use of the easement.

The Grantor(s) also agree to and with the District and warrant that the Grantor(s) lawfully own the land aforesaid, has a good and lawful right and power to sell and convey same, that same is free and clear of encumbrances except as indicated in the above legal description, and that Grantor(s) will forever warrant and defend the title to said easement and the quiet possession thereof against the lawful claims and demands of all persons whomsoever.

Any mortgage on said land held by a mortgagee is hereby subordinated to the rights herein granted to the District; but in all other respects the mortgage shall remain unimpaired.

In Witness Whereof, the Grantor(s) hereunto sets his hand and seal this 18TH day of MARCH, 2019.

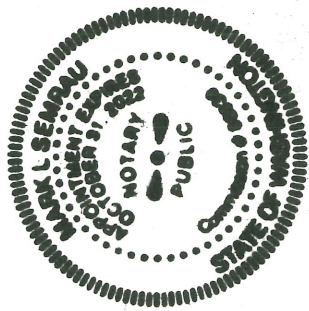
Girard F. Ahrens
Girard F. Ahrens

3/18/19
Date

STATE OF WASHINGTON)
) ss
COUNTY OF SKAGIT)

I certify that I know or have satisfactory evidence that Girard F. Ahrens is the person who appeared before me, and said person acknowledged that she signed this instrument, on oath stated that she was authorized to execute the instrument and acknowledged it as the trustee of Fir Island Farms to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Date: MARCH 18, 2019
(Signature) Mark L. Semrau
Notary Public in and for the State of Washington



(Printed Name) MARK L. SEMRAU
My appointment expires: 10.31.2022

Grace A. Ahrens

Grace A. Ahrens

3/18/19

Date

STATE OF WASHINGTON)
) ss
COUNTY OF SKAGIT)

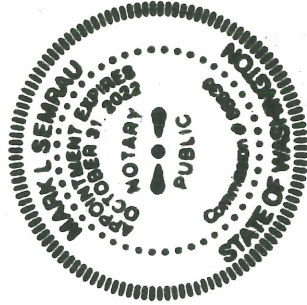
I certify that I know or have satisfactory evidence that Grace A. Ahrens is the person who appeared before me, and said person acknowledged that she signed this instrument, on oath stated that she was authorized to execute the instrument and acknowledged it as the trustee of Fir Island Farms to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Date: MARCH 18, 2019

(Signature) Mark A. Semrau
Notary Public in and for the State of Washington

(Printed Name) MARK L. SEMRAU

My appointment expires: 10.31.2022



Kathryn J. Hefferline

Kathryn J. Hefferline

3/18/19

Date

STATE OF WASHINGTON)
) ss
COUNTY OF SKAGIT)

I certify that I know or have satisfactory evidence that Kathryn J. Hefferline is the person who appeared before me, and said person acknowledged that she signed this instrument, on oath stated that she was authorized to execute the instrument and acknowledged it as the trustee of Fir Island Farms to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Date: MARCH 18, 2019

(Signature) Mark A. Semrau
Notary Public in and for the State of Washington

(Printed Name) MARK L. SEMRAU

My appointment expires: 10.31.2022

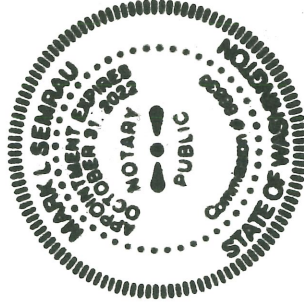
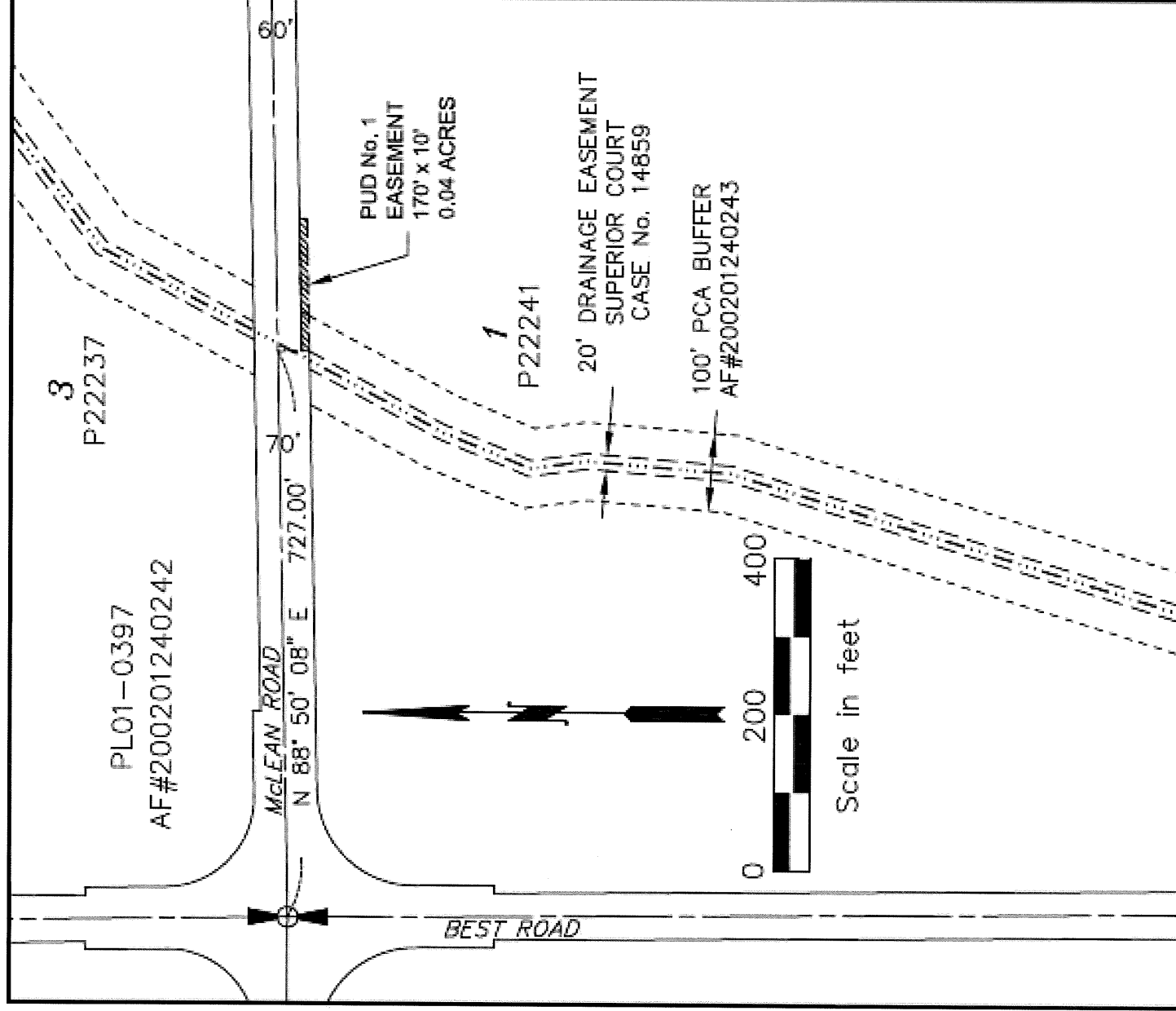


EXHIBIT "A"



**EXHIBIT A
EASEMENT MAP**

SITUATED IN THE A PORTION OF THE NW ¼ OF THE SW ¼ OF SECTION 21, TOWNSHIP 34 NORTH, RANGE 03 EAST, W.M., SKAGIT COUNTY, WASHINGTON

APPENDIX C
PREVAILING WAGE

Current Washington State Department of Labor and Industries prevailing wage rates are available at:

<http://www.lni.wa.gov/tradeslicensing/prevwage/wagerates/>

Wage rates applicable for this project are those for Skagit County with an effective date of October 13, 2016.

APPENDIX D
INADVERTENT DISCOVERY PLAN



1415 Freeway Drive
P.O. BOX 1436
Mount Vernon, WA 98273-1436
tel: (360) 424-7104
www.SkagitPUD.org

Owned by the people we serve.

Contractor Inadvertent Discovery Plan

I. Protocol

In the event that human remains and/or cultural or archaeological resources (see section II below) are encountered during the course of project construction, the following actions shall be taken:

- A. The contractor shall immediately stop work at and adjacent to the site of discovery, call back all haul trucks in transit containing loads of site soils, move any land-altering equipment to a reasonable distance from the discovery, completely secure the site, and contact the District.
- B. If the discovery consists of cultural or archaeological items that do not include human remains, the District shall notify the following parties:
 - 1) A professional archaeologist
 - 2) The Department of Archaeology and Historic Preservation (DAHP) (Gretchen Kaehler, office: 360-586-3088; cell: 360-628-2755)
 - 3) Swinomish Indian Tribal Community (Josephine Peters, 360-466-7352)
 - 4) Upper Skagit Tribe (Scott Schuyler, 360-982-8218)
 - 5) Samish Indian Nation (Jackie Ferry, 360-293-6404)
 - 6) Stillaguamish Tribe (Kerry Lyste, 360-657-3687 ext. 14)

If the discovery consists of human remains, the District shall immediately contact the following parties:

- 1) The Skagit County Sheriff's Department (non-emergency line: 360-428-3211) and the Skagit County Coroner, (Daniel Dempsey 360-336-9431) to determine if the remains are forensic in nature.
 - 2) If the remains are not forensic in nature, the District shall contact DAHP (Gretchen Kaehler 360-586-3088 and Guy Tasa 360-586-3534); who will take the lead on determining the appropriate method of treatment for the remains and will consult with the affected tribes.
- C. The District shall issue a written order to the contractor to cease all construction operations at the location of the potential cultural resources find. The order shall contain the following:

- 1) A clear description of the work to be suspended.
- 2) Any instructions regarding issuance of further orders by the contractor for material services.
- 3) Guidance as to action to be taken on the subcontracts.
- 4) Any suggestions to the contractor as to minimization of its costs.
- 5) Estimated duration of the temporary suspension.

The work suspension order shall be effective until such time as a qualified archaeologist can be called by the District to assess the significance of the potential cultural resources and make recommendations to the State Historical Preservation Officer. If the archaeologist, in consultation with the State Historic Preservation Officer, determines that the potential find is a significant cultural resource, the District shall extend the duration of the work suspension order, in writing, and the contractor shall suspend work at the location of the find.

II. Protected Cultural or Archaeological Resources

Cultural material that may be protected by law could include but is not limited to:

- Buried layers of black soil with layers of shell, charcoal, and fish and/or mammal bones.
- Buried cobbles that may indicate a hearth feature;
- Non-natural sediment or stone deposits that may be related to activity areas of people;
- Stone, bone, shell, horn, or antler tools that may include projectile points, scrapers, cutting tools, wood working wedges or axes, and grinding stones;
- Stone tools or stone flakes;
- Perennially damp areas may have preservation conditions that allow for remnants of wood and other plant fibers; in these locations there may be remains including fragments of basketry, weaving, wood tools, or carved pieces; and
- Human remains.

APPENDIX E
GEOTECHNICAL DATA

Aspect Consulting, LLC

GEOTECHNICAL EVALUATION

Daisy Lane Stream Crossing

Daisy Lane
Skagit County, Washington
Skagit PUD Project No. 3733

Prepared for: PUD No. 1 of Skagit County

Project No. 180487-01 • May 16, 2019 Final





GEOTECHNICAL EVALUATION

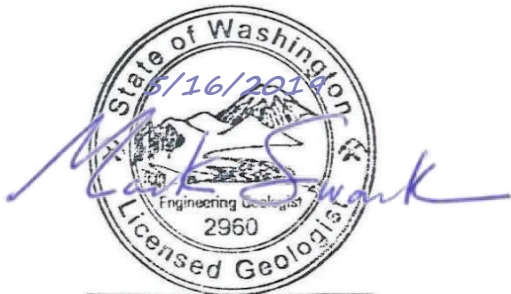
Daisy Lane Stream Crossing

Daisy Lane, Skagit County, Washington
Skagit PUD Project No. 3733

Prepared for: PUD No. 1 of Skagit County

Project No. 180487-01 • April 26, 2019 Final

Aspect Consulting, LLC



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1 Introduction

This Geotechnical Evaluation summarizes Aspect Consulting, LLC's (Aspect) observations, conclusions, and recommendations for the proposed water main replacement along Daisy Lane in Skagit County, Washington (Project, Site). The Site location is shown on Figure 1.

We performed our services for the Public Utility District No. 1 of Skagit County (Skagit PUD) in accordance with our agreed-upon scope of work and signed contract.

1.1 Scope of Services

Our scope of services included a literature review, Site reconnaissance, subsurface explorations, and geotechnical engineering analyses. This report includes:

- Site and Project descriptions
- Distribution and characteristics of subsurface soil, bedrock, and groundwater along the proposed stream undercrossing alignment
- Pipe installation recommendations for pipe installation using horizontal direction drilling (HDD) methods
- Construction dewatering considerations
- Site preparation recommendations and general construction recommendations

1.2 Project Understanding

We understand erosion within the Bulson Creek stream channel has exposed the Skagit PUD existing 6-inch-diameter ductile iron water main pipe and it needs to be replaced. The replacement water main will be 8-inch-diameter fusible polyvinyl chloride (PVC) installed using HDD techniques.

The Skagit PUD's 30% Design Plans (Skagit PUD, 2018) shows the Project stationing between 0+00 and 4+00. The HDD path for the replacement 8-inch PVC pipe will be along the north side of Daisy Lane. The entry point is near Station 3+06 on the Project's east side and the exit point is near Station 0+16 on the west side, for an approximately 290-foot-long bore path with the bore path 20 feet below the existing slough channel.

2 Site Conditions

2.1 General

The Site is in the low foothills of the Cascades Mountain Range, adjacent to the broad Skagit River floodplain located to the west. The Project alignment extends along Daisy Lane (a private, gated gravel road) between Lake Sixteen to the east and a residential neighborhood to the southwest.

The immediate Site gently slopes down to the west and is surrounded by shrubs and trees. Based on the provided plan set (Skagit PUD, 2018), the ground surface elevation (EL, NAVD88¹) is between approximately EL 286 feet at Station 0+00 on the west end of the Project and EL 298 feet at Station 4+00 on the east end (refer to Figure 2 for stationing).

2.2 Geologic Setting

The Site is mapped as glaciomarine drift (Qgdm_{ec}) near the contact with glacial till (Qgt_v) (Dragovich et al., 2002). Other glacially derived deposits mapped in the vicinity of the site include deltaic outwash sand and gravel (Qgod_e) and terrestrial to marine recessional outwash sand and gravel (Qgo_e). To the east of the Site, the surface geology is mapped as sedimentary bedrock of Bulson Creek (ΦEC_{bcg} and ΦEC_{bs}). Although not shown on the geologic map, alluvium is typically deposited in close proximity to stream channels and may be part of the local stratigraphy. These geologic units are described below.

Alluvium (Holocene): These deposits lie in and along stream channels that are partly subject to seasonal flooding. The sediments consist mostly of stream-laid stratified sand and gravel in present and former channels. The floodplain deposits are mostly fine-grained sediments such as fine to very fine sand, silt, and clay with some organic matter.

Everson Glaciomarine Sediments (Pleistocene): The glaciomarine drift subunit of Qgdm_{ec} is described as a silt- and clay-rich unit with few to no dropstones. The unit composition ranges from sandy silt, sandy clay, clayey silt, or clay with only rare gravel, cobbles, or boulders. When dry, the unit is light yellow-brown and blocky and stiff; when moist or wet, the unit becomes dark brown to grayish blue and soft.

Vashon Till (Pleistocene): Glacial till (Qgt_v) is described as a diamicton of clay, silt, sand, and gravel. Till deposits are typically dark yellowish brown to brownish gray and dense to very dense. Till is generally found near the bottom of the glacial stratigraphic sequence, typically above advance outwash or bedrock.

Everson Deltaic Outwash Complex (Pleistocene): Deltic outwash (Qgod_e) and terrestrial to marine recessional outwash (Qgo_e) deposits both generally consist of mixtures of sand and gravel. These units are typically loose in condition.

Rocks of Bulson Creek (Eocene): Sedimentary bedrock in the vicinity of the Site is described as Eocene-age conglomerate (ΦEC_{bcg}) and sandstone (ΦEC_{bs}). The conglomerate and sandstone represent a lower and upper facies of the rocks of Bulson

¹ North American Vertical Datum of 1988.

Creek. The lower facies ($\Phi E_{c_{bcg}}$) includes material deposited in alluvial fan and fluvial environments and consists of pebble to cobble conglomerate. The upper facies ($\Phi E_{c_{bs}}$) is composed of sandstone deposited in nearshore or shallow marine water. The upper facies is typically well-sorted coarse- to medium-grained sandstone with lesser interbeds of conglomerate, pebbly sandstone, siltstone, coal, and shale.

2.3 Subsurface Conditions

2.3.1 Subsurface Explorations

Subsurface conditions were explored by advancing four borings (AB-1 through AB-4) on October 25, 2018, in the locations shown on Figure 2. Two shallow borings, designated AB-1 and AB-4, were advanced to approximately 12 feet below ground surface (bgs) and two deeper borings, designated AB-2 and AB-3, were advanced to approximately 30 feet bgs and 22 feet bgs, respectively.

An Aspect geologist logged the explorations and collected representative samples. Exploration logs summarizing the subsurface conditions are presented in Appendix A. Observations and tests were performed in general accordance with ASTM International (ASTM) D2488, *Standard Practice for Description and Identification of Soils* (Visual-Manual Procedure; ASTM, 2018). The terminology used in the soil classifications and other modifiers are defined and presented on the attached Figure A-1 included in Appendix A. Selected soil samples underwent laboratory testing for further classification; the results of these tests are included in Appendix B.

2.3.2 Soils

The summary of the subsurface units below the existing ground surface encountered in the borings are as follows:

<i>Road Surfacing</i>	The borings were drilled through the 6-inch-thick gravel road surface. The GRAVEL (GP) was typically about 0.75-inch in diameter with little to no sand or fines content.
<i>Everson Glaciomarine Sediments ($Q_{gdm_{ec}}$)</i>	Underlying the road bed, the soils consisted of brown SAND WITH SILT (SP-SM) to SILTY SAND (SM). Soil relative density was generally medium dense to dense with standard penetration test (SPT) blow counts were between 23 and 30 blows per foot (bpf), with the exception of the upper few feet in boring AB-4, which was very loose with SPT of 3 bpf. The unit extended to about 5.0 to 10.5 feet bgs.
<i>Rocks of Bulson Creek – Sandstone Unit ($\Phi E_{c_{bs}}$)</i>	Sandstone bedrock was encountered between 5 and 10.5 feet bgs. The SANDSTONE generally consisted of fine- to medium-grained sand, consistent with the description of the upper facies rocks of Bulson Creek ($\Phi E_{c_{bs}}$). Sandstone pieces in the samples were very friable, easily crumbling to its granular constituents. It was possible to penetrate the sandstone with a tri-cone bit and rotary wash drilling methods. Rock quality designation (RQD) was not determined with this drilling method. The SPT blow counts were

generally 50 blows for less than 6 inches. The rock strength is based on the SPT blow counts and ranges from very weak (R1) to weak (R2).

2.3.3 Groundwater

No static or perched groundwater was observed during our Site explorations; the shallow alluvial soils were generally dry to moist. The relatively shallow sandstone bedrock represents a relatively impervious layer. As such, we anticipate that shallow, perched groundwater conditions are hydraulically connected to Bulson Creek and may be present during the wet season. Shallow perched groundwater levels at the Site will fluctuate seasonally with precipitation and local subsurface conditions.

3 Conclusions and Recommendations

Based on our geotechnical evaluation of the Site that included data review, subsurface explorations, soil laboratory testing, and engineering analyses, the proposed HDD undercrossing is feasible. Our interpretation of the geology at the Site is illustrated in a subsurface profile from near the proposed alignment (Figure 2).

The currently planned replacement water main will be 8-inch-diameter fusible PVC installed using trenchless HDD techniques. Considerations for design and construction of the pipeline are presented below. Work should be performed as specified and directed by Skagit PUD and based on the current *District Standard General Notes* (Skagit PUD, 2015).

The key findings and conclusions include:

- Our explorations indicate relatively uniform conditions consisting of 5 to 10 feet of medium dense to dense unconsolidated silty sand overlying very weak to weak (R1 to R2) sandstone. The majority of the bore path will be within very weak to very weak sandstone, but the launch and reception pits will be within the unconsolidated silty sand.
- We consider the very weak to weak sandstone to be *geotechnically favorable* for HDD installation. The sandstone has sufficient shear strength to resist hydraulic fracture, yet it is weak enough that it can easily be drilled with tri-cone bits and rotary wash drilling methods.
- As discussed in Section 3.1, we conclude the risk of hydraulic fracture will be acceptably low, provided a 7-foot minimum cover depth is maintained.
- Groundwater was not observed in the borings at the time of drilling. We anticipate groundwater to be hydraulically connected to Bulson Creek and perched above the relatively impermeable sandstone bedrock. Dewatering will likely not be required during construction; where water is present, it can be managed with sump pumps within the launch and receiving pits.
- Logs and wood debris, as well as live trees, are located along the alignment and could impede the proposed directional drilling within the unconsolidated soil unit in the upper depths, near the launch and receiving pits.
- The bore path should be kept outside of the footprint of the existing bridge's shallow foundations.
- Pipe and handhole installation should be performed in accordance with Skagit PUD Standards.

3.1 Hydraulic Fracture

Inadvertent fluid return, often referred to as “hydrofracture” or “frac-out”, during HDD are the migration of the drilling fluids to the ground surface. Hydraulic fracturing can occur when the pressure of the drilling fluid exceeds the strength and confining stress of

the surrounding soil. In these conditions the excess pressure can fracture the soil around the bore, allowing the drilling fluid to escape to the surface.

We evaluated the hydraulic fracture potential for the proposed bore path within the interpreted geologic conditions shown in Figure 2 utilizing the cavity expansion theory (Bennett and Wallin, 2008). Parametric studies were performed on the equation variables, which include the drill fluid unit weight, viscosity, and flow rate; the pilot-bore diameter; and the surrounding soils moduli. A factor of safety of 2.0 is incorporated hydraulic fracture in our analyses. Based on our results, we conclude the 20-foot cover depth shown in the 30 percent plans are adequate to protect against potential hydraulic fracture.

Skagit PUD also requested we calculate the minimum cover depth above the HDD bore that would be sufficient to prevent hydrofracture. Utilizing the same equations described above, we performed a sensitivity analyses by varying the cover thicknesses along the alignment. Based on our analyses and geotechnical engineering judgment, we consider a minimum cover depth (i.e. vertical distance between the crown of the HDD bore path and the stream invert) of 7 feet (EL 275 feet) is sufficient to prevent hydrofracture in the conditions encountered during our explorations. The revised HDD plan and profile could consider the minimum depths as acceptable for determining the bending radius for the pipe material and diameter.

The hydrofracture potential and risk is a combination of the Site's subsurface conditions and the contractor's approach to installing the pipeline. In addition, not all inadvertent fluid returns are due to hydraulic fracture, and other causes include existing fissures in the soil, preferential seepage paths along piers, piles, or other structures, and open-graded, loose gravel or rocks above the bore. The contractor is solely responsible for the HDD pipe installation and the contract documents should require the contractor employ means and methods that will minimize the risk of uncontrolled releases of drilling fluid into the creek or surrounding area.

4 References

- ASTM International (ASTM), 2018, 2018 Annual Book of ASTM Standards, West Conshohocken, Pennsylvania.
- Bennet, D., and K. Wallin, 2008, Step-by-Step Evaluation of Hydrofracture Risks for HDD Projects, Proceedings, North American Society for Trenchless Technology, 2008 No-Dig Conference and Exhibition.
- Dragovich, J.D., L.A. Gilbertson, D.K. Norman, G. Anderson, and G. Petro, 2002, Geologic Map of the Utsalady and Conway 7.5-minute Quadrangles, Skagit, Snohomish, and Island Counties, Washington, 1:24,000 Scale, Washington State Department of Natural Resources, Washington Division of Geology and Earth Resources, Open File Report 2002-S, Revised 2004.
- Skagit Public Utility District (Skagit PUD), 2015, District Standard General Notes, revised October 30, 2015.
- Skagit Public Utility District (Skagit PUD), 2018, Daisy Lane Stream Crossing Plan Set, Mount Vernon, Skagit County, Washington, P.N. 3733, CO 5014, dated August 24, 2018.

5 Limitations

Work for this project was performed for the Public Utility District No. 1 of Skagit County (Client) and this report was prepared consistent with recognized standards of professionals in the same locality and involving similar conditions, at the time the work was performed. No other warranty, expressed or implied, is made by Aspect Consulting, LLC (Aspect).

Recommendations presented herein are based on our interpretation of site conditions, geotechnical engineering calculations, and judgment in accordance with our mutually agreed-upon scope of work. Our recommendations are unique and specific to the project, site, and Client. Application of this report for any purpose other than the project should be done only after consultation with Aspect.

Variations may exist between the soil and groundwater conditions reported and those actually underlying the site. The nature and extent of such soil variations may change over time and may not be evident before construction begins. If any soil conditions are encountered at the site that are different from those described in this report, Aspect should be notified immediately to review the applicability of our recommendations.

It is the Client's responsibility to see that all parties to this project, including the designer, contractor, subcontractors, and agents, are made aware of this report in its entirety. At the time of this report, design plans and construction methods have not been finalized, and the recommendations presented herein are based on 90 percent design plans and project information. If project developments result in design changes, Aspect should be contacted to determine if our recommendations contained in this report should be revised and/or expanded upon.

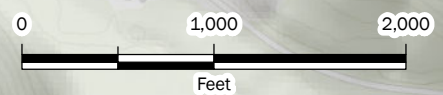
The scope of work does not include services related to construction safety precautions. Site safety is typically the responsibility of the contractor, and our recommendations are not intended to direct the contractor's site safety methods, techniques, sequences, or procedures. The scope of our work also does not include the assessment of environmental characteristics, particularly those involving potentially hazardous substances in soil or groundwater.

All reports prepared by Aspect for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect. Aspect's original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

Please refer to Appendix C titled "Report Limitations and Guidelines for Use" for additional information governing the use of this report.

We appreciate the opportunity to perform these services. If you have any questions please call Erik Andersen, PE, Principal Geotechnical Engineer, at 360-746-8964.

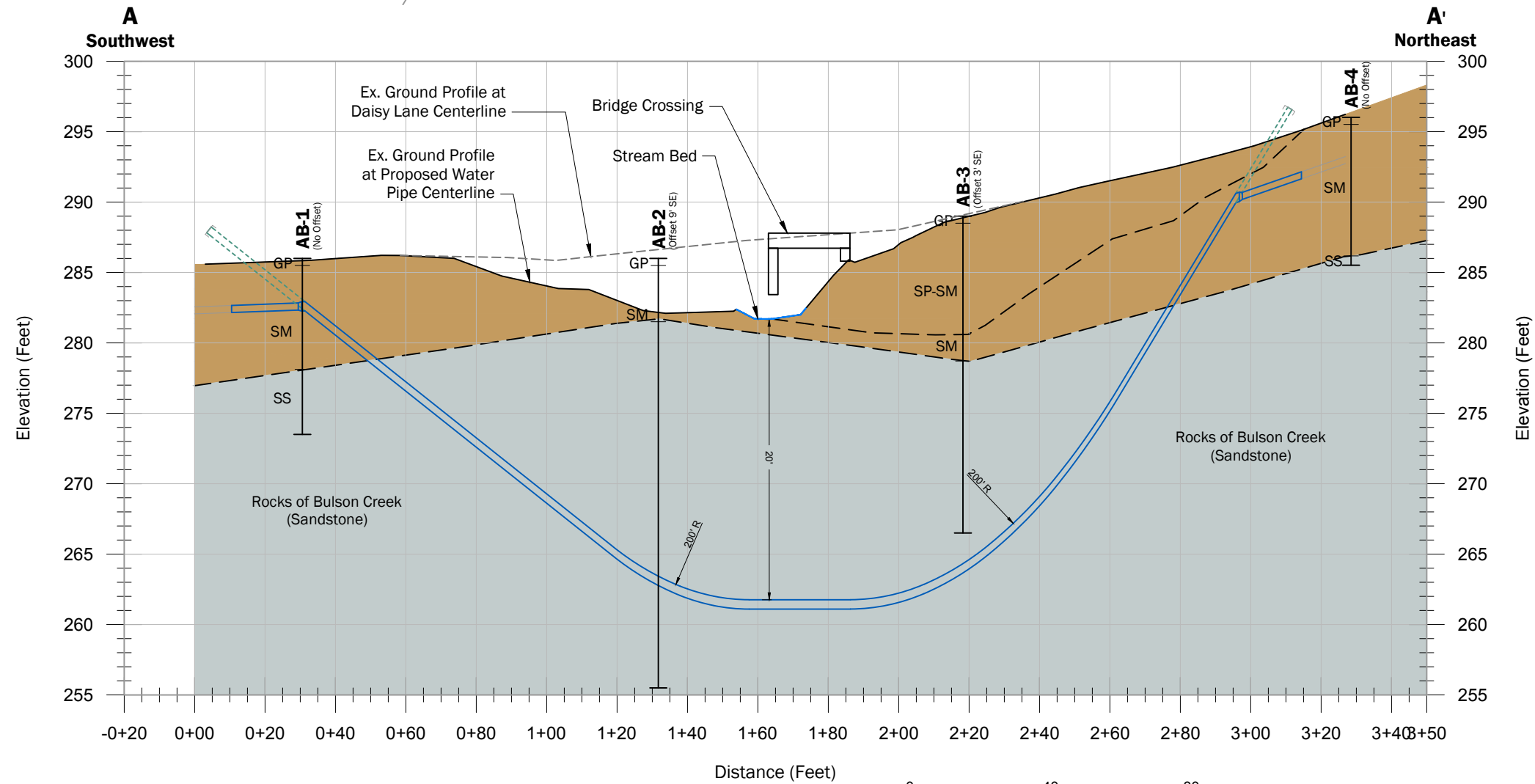
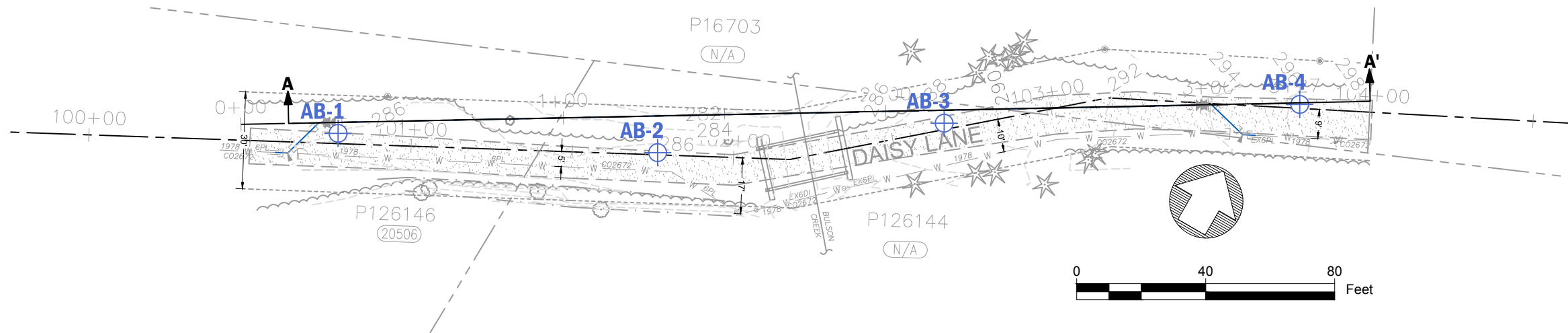
FIGURES



Site Location Map
 Geotechnical Evaluation
 Daisy Lane
 Mount Vernon, Washington

	JAN-2019	BY: AAF / TDR	FIGURE NO. 1
	PROJECT NO. 180487-01	REVISED BY: RAP	

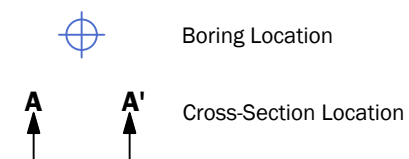
GIS Path: I:\Projects_8\Share\180487\Geotechnical\Bulson_180487\Deliverables\Bulson_180487\Site Location Map.mxd | Coordinate System: NAD_1983 StatePlane Washington North FIPS 4601 Feet | Date Saved: 1/4/2019 | User: rpehin | Print Date: 1/4/2019



Horizontal Scale: 1" = 40'
 Vertical Scale: 1" = 10'
 Vertical Exaggeration 4x

Source: Base map CAD file provided by Skagit PUD, dated 08/24/2018.

- Legend**
- Everson Glaciomarine Sediments (Silty Sand and Sand with Silt)
 - Rocks of Bulson (Sandstone)



- AB-1** (Offset 11' N) — Offset and direction
- Borehole ID
- SM** — Material Type
- Inferred Geologic Contact

Cross-Section A-A'
 Geotechnical Evaluation
 Daisy Lane
 Mount Vernon, Washington



Jan-2019
 PROJECT NO. 180487-01
 BY: AAF/CMV
 REVISED BY: -

FIGURE NO. **2**

APPENDIX A

Subsurface Explorations

A. Subsurface Exploration Program

Four borings, designated AB-1 through AB-4, were advanced at the Site on October 25, 2018. The borings were drilled using 8.5-inch-diameter (OD) hollow-stem auger methods by Gregory Drilling (under subcontract to Aspect), using a CME-85 truck-mounted drilling rig equipped with a 140-pound automatic-safety hammer. Samples were obtained at 2.5 to 5-foot intervals below ground surface (bgs) to the depths explored using the Standard Penetration Test (SPT) in general accordance with ASTM International Method D1586.

The SPT method involves driving a 2-inch-outside-diameter split-barrel sampler with a 140-pound hammer free-falling from a distance of 30 inches. The number of blows for each 6-inch interval is recorded, and the number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance (“N”) or blow count. The resistance, or N-value, provides a measure of the relative density of granular soils or the relative consistency of cohesive soils. If a total of 50 blows are recorded for a single 6-inch interval, the test is terminated and the blow count is recorded as 50 blows for the total inches of penetration. Samples were placed in labeled plastic jars and taken to a laboratory for further classification.

The locations of explorations are shown on Figure 2 and were collected in the field using a global positioning system (GPS). Borings were backfilled with the bentonite chips and capped to match the surrounding conditions.

Coarse-Grained Soils - More than 50% ¹ Retained on No. 200 Sieve	Gravels - More than 50% ¹ of Coarse Fraction Retained on No. 4 Sieve	≤ 5% Fines	GW	Well-graded GRAVEL Well-graded GRAVEL WITH SAND
			GP	Poorly-graded GRAVEL Poorly-graded GRAVEL WITH SAND
	Gravels - More than 50% ¹ of Coarse Fraction Retained on No. 4 Sieve	≥ 15% Fines	GM	SILTY GRAVEL SILTY GRAVEL WITH SAND
			GC	CLAYEY GRAVEL CLAYEY GRAVEL WITH SAND
	Sands - 50% ¹ or More of Coarse Fraction Passes No. 4 Sieve	≤ 5% Fines	SW	Well-graded SAND Well-graded SAND WITH GRAVEL
			SP	Poorly-graded SAND Poorly-graded SAND WITH GRAVEL
Sands - 50% ¹ or More of Coarse Fraction Passes No. 4 Sieve	≥ 15% Fines	SM	SILTY SAND SILTY SAND WITH GRAVEL	
		SC	CLAYEY SAND CLAYEY SAND WITH GRAVEL	
Fine-Grained Soils - 50% ¹ or More Passes No. 200 Sieve	Silt and Clays Liquid Limit Less than 50%	ML	SILT SANDY or GRAVELLY SILT SILT WITH SAND SILT WITH GRAVEL	
			CL	LEAN CLAY SANDY or GRAVELLY LEAN CLAY LEAN CLAY WITH SAND LEAN CLAY WITH GRAVEL
			OL	ORGANIC SILT SANDY or GRAVELLY ORGANIC SILT ORGANIC SILT WITH SAND ORGANIC SILT WITH GRAVEL
	Silt and Clays Liquid Limit 50% or More	MH	ELASTIC SILT SANDY or GRAVELLY ELASTIC SILT ELASTIC SILT WITH SAND ELASTIC SILT WITH GRAVEL	
			CH	FAT CLAY SANDY or GRAVELLY FAT CLAY FAT CLAY WITH SAND FAT CLAY WITH GRAVEL
			OH	ORGANIC CLAY SANDY or GRAVELLY ORGANIC CLAY ORGANIC CLAY WITH SAND ORGANIC CLAY WITH GRAVEL
Highly Organic Soils			PT	PEAT and other mostly organic soils

"WITH SILT" or "WITH CLAY" means 5 to 15% silt and clay, denoted by a "-" in the group name; e.g., SP-SM • "SILTY" or "CLAYEY" means >15% silt and clay • "WITH SAND" or "WITH GRAVEL" means 15 to 30% sand and gravel. • "SANDY" or "GRAVELLY" means >30% sand and gravel. • "Well-graded" means approximately equal amounts of fine to coarse grain sizes • "Poorly graded" means unequal amounts of grain sizes • Group names separated by "/" means soil contains layers of the two soil types; e.g., SM/ML.

Soils were described and identified in the field in general accordance with the methods described in ASTM D2488. Where indicated in the log, soils were classified using ASTM D2487 or other laboratory tests as appropriate. Refer to the report accompanying these exploration logs for details.

1. Estimated or measured percentage by dry weight
2. (SPT) Standard Penetration Test (ASTM D1586)
3. Determined by SPT, DCPT (ASTM STP399) or other field methods. See report text for details.

MC	=	Natural Moisture Content	GEOTECHNICAL LAB TESTS
GS	=	Grain Size Distribution	
FC	=	Fines Content (% < 0.075 mm)	
GH	=	Hydrometer Test	
AL	=	Atterberg Limits	
C	=	Consolidation Test	
Str	=	Strength Test	
OC	=	Organic Content (% Loss by Ignition)	
Comp	=	Proctor Test	
K	=	Hydraulic Conductivity Test	
SG	=	Specific Gravity Test	

Organic Chemicals			CHEMICAL LAB TESTS
BTEX	=	Benzene, Toluene, Ethylbenzene, Xylenes	
TPH-Dx	=	Diesel and Oil-Range Petroleum Hydrocarbons	
TPH-G	=	Gasoline-Range Petroleum Hydrocarbons	
VOCs	=	Volatile Organic Compounds	
SVOCs	=	Semi-Volatile Organic Compounds	
PAHs	=	Polycyclic Aromatic Hydrocarbon Compounds	
PCBs	=	Polychlorinated Biphenyls	
Metals			
RCRA8	=	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, (d = dissolved, t = total)	
MTCA5	=	As, Cd, Cr, Hg, Pb (d = dissolved, t = total)	
PP-13	=	Ag, As, Be, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se, Tl, Zn (d=dissolved, t=total)	

PID	=	Photoionization Detector	FIELD TESTS
Sheen	=	Oil Sheen Test	
SPT ²	=	Standard Penetration Test	
NSPT	=	Non-Standard Penetration Test	
DCPT	=	Dynamic Cone Penetration Test	

Descriptive Term	Size Range and Sieve Number	COMPONENT DEFINITIONS
Boulders	= Larger than 12 inches	
Cobbles	= 3 inches to 12 inches	
Coarse Gravel	= 3 inches to 3/4 inches	
Fine Gravel	= 3/4 inches to No. 4 (4.75 mm)	
Coarse Sand	= No. 4 (4.75 mm) to No. 10 (2.00 mm)	
Medium Sand	= No. 10 (2.00 mm) to No. 40 (0.425 mm)	
Fine Sand	= No. 40 (0.425 mm) to No. 200 (0.075 mm)	
Silt and Clay	= Smaller than No. 200 (0.075 mm)	

% by Weight	Modifier	% by Weight	Modifier	ESTIMATED¹ PERCENTAGE	
<1	=	Subtrace	15 to 25 =		Little
1 to <5	=	Trace	30 to 45 =		Some
5 to 10	=	Few	>50 =		Mostly

Dry	=	Absence of moisture, dusty, dry to the touch	MOISTURE CONTENT
Slightly Moist	=	Perceptible moisture	
Moist	=	Damp but no visible water	
Very Moist	=	Water visible but not free draining	
Wet	=	Visible free water, usually from below water table	

Non-Cohesive or Coarse-Grained Soils			RELATIVE DENSITY
Density³	SPT² Blows/Foot	Penetration with 1/2" Diameter Rod	
Very Loose	= 0 to 4	≥ 2'	
Loose	= 5 to 10	1' to 2'	
Medium Dense	= 11 to 30	3" to 1'	
Dense	= 31 to 50	1" to 3"	
Very Dense	= > 50	< 1"	

Cohesive or Fine-Grained Soils			CONSISTENCY
Consistency³	SPT² Blows/Foot	Manual Test	
Very Soft	= 0 to 1	Penetrated >1" easily by thumb. Extrudes between thumb & fingers.	
Soft	= 2 to 4	Penetrated 1/4" to 1" easily by thumb. Easily molded.	
Medium Stiff	= 5 to 8	Penetrated >1/4" with effort by thumb. Molded with strong pressure.	
Stiff	= 9 to 15	Indented ~1/4" with effort by thumb.	
Very Stiff	= 16 to 30	Indented easily by thumbnail.	
Hard	= > 30	Indented with difficulty by thumbnail.	

GEOLOGIC CONTACTS		
Observed and Distinct	Observed and Gradual	Inferred

	Exploration Log Key
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Skagit PUD Geo - 180487

Geotechnical Exploration Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

Daisy Lane, Daisy Lane - 134' west of bridge

48.34337, -122.30044 (est)

AB-1

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev. (NAVD88)

Gregory

Rotary drill rig

Autohammer; 140 lb hammer; 30" drop

286' (est)

Operator

Exploration Method(s)
8.5" OD X 4.25" ID
Hollow-Stem Auger

Work Start/Completion Dates

Top of Casing Elev. (NAVD88)

Depth to Water (Below GS)

Josh

10/25/2018

NA (est)

No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot					Blows/6'	Tests	Material Type	Description	Depth (ft)
				0	10	20	30	40					
1	285	Boring backfilled with bentonite chips.									Road Surface GRAVEL (GP); dense, dry, gray; 3/4" angular gravel.	1	
2	284										Everson Glaciomarine Sediments (QdgmeC) SILTY SAND (SM); medium dense to dense, slightly moist, brown to gray; low plasticity; fine to medium sand; trace fine, subrounded to rounded gravel.	2	
3	283		S1						7			3	
4	282								14				4
5	281								16				5
6	280		S2						5			Becomes moist, brown; with few fine, subrounded to rounded gravel.	6
7	279								12				7
8	278		S3						17		GS	Rocks of Bulson Creek SANDSTONE; very weak to weak (R1 to R2), fresh, gray; fine to medium sand; crumbles to granular constituents.	8
9	277												9
10	276		S4									With fine subangular to angular gravel.	10
11	275												11
12	274		S5										12
13	273											Bottom of exploration at 12.6 ft. bgs.	13
14	272											14	
15	271											15	
16	270											16	
17	269											17	
18	268											18	
19	267											19	
20	266											20	
21	265											21	
22	264											22	
23	263											23	
24	262											24	

Legend

- No Soil Sample Recovery
- Split Barrel 2" X 1.375" (SPT)

Plastic Limit ——— Liquid Limit

No Water Encountered

Water Level

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: MWS

Exploration Log AB-1

Sheet 1 of 1



Skagit PUD Geo - 180487

Geotechnical Exploration Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

Daisy Lane, Daisy Lane - 33' west of bridge

48.34349, -122.30008 (est)

AB-2

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev. (NAVD88)

Gregory

Rotary drill rig

Autohammer; 140 lb hammer; 30" drop

286' (est)

Operator

Exploration Method(s)
8.5" OD X 4.25" ID
Hollow-Stem Auger

Work Start/Completion Dates

Top of Casing Elev. (NAVD88)

Depth to Water (Below GS)

Josh

10/25/2018

NA (est)

No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot					Blows/6'	Tests	Material Type	Description	Depth (ft)
				0	10	20	30	40					
1	285	Boring backfilled with bentonite chips.										1	
2	284											2	
3	283											3	
4	282											4	
5	281											5	
6	280		S1							5 38 50/3"		6	
7	279											7	
8	278											8	
9	277											9	
10	276		S2							50/2"	Becomes fresh, gray.	10	
11	275											11	
12	274											12	
13	273											13	
14	272											14	
15	271		S3							50/4"		15	
16	270											16	
17	269											17	
18	268											18	
19	267											19	
20	266		S4							50/5"		20	
21	265											21	
22	264											22	
23	263											23	
24	262											24	

Legend

- No Soil Sample Recovery
- Split Barrel 2" X 1.375" (SPT)

Plastic Limit ——— Liquid Limit

No Water Encountered

Water Level

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: MWS

Exploration Log
AB-2

Sheet 1 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\PROJECTS\SKAGIT_PUD_GEO.GPJ January 18, 2019



Skagit PUD Geo - 180487

Geotechnical Exploration Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

Daisy Lane, Daisy Lane - 33' west of bridge

48.34349, -122.30008 (est)

AB-2

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev. (NAVD88)

Gregory

Rotary drill rig

Autohammer; 140 lb hammer; 30" drop

286' (est)

Operator

Exploration Method(s)
8.5" OD X 4.25" ID
Hollow-Stem Auger

Work Start/Completion Dates

Top of Casing Elev. (NAVD88)

Depth to Water (Below GS)

Josh

10/25/2018

NA (est)

No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot					Blows/6'	Tests	Material Type	Description	Depth (ft)
				0	10	20	30	40					
26	260	[Patterned Box]	S							50/2"		Rocks of Bulson Creek SANDSTONE; very weak to weak (R1 to R2), slightly weathered, brown; fine to medium sand; crumbles to granular constituents. (continued)	26
27	259												27
28	258												28
29	257												29
30	256				S						50/4"		
31	255	Bottom of exploration at 30.4 ft. bgs.											31
32	254											32	
33	253											33	
34	252											34	
35	251											35	
36	250											36	
37	249											37	
38	248											38	
39	247											39	
40	246											40	
41	245											41	
42	244											42	
43	243											43	
44	242											44	
45	241											45	
46	240											46	
47	239											47	
48	238											48	
49	237											49	

Legend

- No Soil Sample Recovery
- Split Barrel 2" X 1.375" (SPT)

Plastic Limit |-----| Liquid Limit

No Water Encountered

Water Level

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: MWS

Exploration Log AB-2

Sheet 2 of 2



Skagit PUD Geo - 180487

Geotechnical Exploration Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

Daisy Lane, Daisy Lane - 30' east of bridge

48.34365, -122.29980 (est)

AB-3

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev. (NAVD88)

Gregory

Rotary drill rig

Autohammer; 140 lb hammer; 30" drop

289' (est)

Operator

Exploration Method(s)
8.5" OD X 4.25" ID
Hollow-Stem Auger

Work Start/Completion Dates

Top of Casing Elev. (NAVD88)

Depth to Water (Below GS)

Josh

10/25/2018

NA (est)

No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot						Blows/6'	Tests	Material Type	Description	Depth (ft)
				0	10	20	30	40	50					
1	288	Boring backfilled with bentonite chips.											Road Surface GRAVEL (GP); dense, dry, gray; 3/4" angular gravel.	1
2	287												Everson Glaciomarine Sediments (Qdgmec) SAND WITH SILT (SP-SM); medium dense, dry, brown; non-plastic; medium sand.	2
3	286													3
4	285													4
5	284									12				5
6	283			S1						18				6
7	282									9				7
8	281													8
9	280													9
10	279			S2						21/50/5.5"	GS		SILTY SAND (SM); loose to medium dense, moist, gray; low plasticity; fine and coarse sand; trace fine, subrounded gravel.	10
11	278											Rocks of Bulson Creek SANDSTONE; very weak to weak (R1-R2), slightly weathered, light gray; fine to medium sand; crumbles to granular constituents.	11	
12	277												12	
13	276												13	
14	275												14	
15	274		S3						50/4"				15	
16	273												16	
17	272												17	
18	271												18	
19	270												19	
20	269		S4						50/3"				20	
21	268												21	
22	267		S5						50/5"				22	
23	266											Bottom of exploration at 22.4 ft. bgs.	23	
24	265												24	

Legend

- No Soil Sample Recovery
- Split Barrel 2" X 1.375" (SPT)

Plastic Limit ——— Liquid Limit

No Water Encountered

Water Level

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: MWS

Exploration Log AB-3

Sheet 1 of 1



Skagit PUD Geo - 180487

Geotechnical Exploration Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

Daisy Lane, Daisy Lane - 140' east of bridge

48.34383, -122.29943 (est)

AB-4

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev. (NAVD88)

Gregory

Rotary drill rig

Autohammer; 140 lb hammer; 30" drop

296' (est)

Operator

Exploration Method(s)
8.5" OD X 4.25" ID
Hollow-Stem Auger

Work Start/Completion Dates

Top of Casing Elev. (NAVD88)

Depth to Water (Below GS)

Josh

10/25/2018

NA (est)

No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot					Blows/6'	Tests	Material Type	Description	Depth (ft)		
				0	10	20	30	40						50	
1	295	Boring backfilled with drill cuttings.	S1								GS	Road Surface GRAVEL (GP); dense, dry, gray; 3/4" angular gravel.	1		
2	294											Everson Glaciomarine Sediments (Qdgmec) SILTY SAND (SM); very loose, moist, brown; low plasticity; fine sand; fine, trace fine, subrounded to rounded gravel; trace organics (roots).	2		
3	293									1				3	
4	292									2				4	
5	291									4			Becomes medium dense; non-plastic; fine to coarse sand; trace fine, subrounded to subangular gravel.	5	
6	290				S2							8			6
7	289											15			7
8	288				S3							14			8
9	287											38			9
10	286				S4							50/5"		Rocks of Bulson Creek SANDSTONE; very weak to weak (R1-R2), slightly weathered, brown and tan; fine sand; crumbles to granular constituents.	10
11	285								40		Bottom of exploration at 10.7 ft. bgs.	11			
12	284								50/1"			12			
13	283											13			
14	282											14			
15	281											15			
16	280											16			
17	279											17			
18	278											18			
19	277											19			
20	276											20			
21	275											21			
22	274											22			
23	273											23			
24	272											24			

Legend

- No Soil Sample Recovery
- Split Barrel 2" X 1.375" (SPT)

Plastic Limit ——— Liquid Limit

No Water Encountered

Water Level

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: MWS

Exploration Log AB-4

Sheet 1 of 1

APPENDIX B

Laboratory Test Results

B. Geotechnical Laboratory Tests

A geotechnical laboratory testing program was developed to determine index and engineering properties of materials at the Site. Soil samples used in the testing program were collected from the soil borings. The tests that were performed and the procedures followed are outlined below.

Soil Classification

Soil samples from the explorations were visually classified in the field and then taken to our laboratory, where the classifications were verified in a controlled environment. Field and laboratory observations included density/consistency, moisture condition, and grain-size and plasticity estimates. The classifications of selected samples were checked by grain-size analysis and plasticity index testing. Classifications were made in general accordance with the Unified Soil Classification System (USCS), ASTM D2488.

Moisture-Content Determination

Moisture contents were determined for samples recovered in the explorations in general accordance with ASTM D2216, as soon as possible following their arrival to the laboratory. Moisture contents are shown on the exploration logs in Appendix A.

Particle Size Analyses

Particle size analyses were performed on select soil samples to determine their grain-size distributions. The Sieve Analysis of Fine and Coarse Aggregates was performed by wet sieve analyses, determining percentages (by weight) of the sample passing a series of sieves from the 1-inch sieve, down to the No. 200 (0.75 mm) sieve.

Test Method for Materials Finer than 75 μm (No. 200) in Mineral Aggregates was performed by wet sieve analyses, determining a percentage (by weight) of the sample passing the No. 200 (0.75 mm) sieve.

The results of the particle size analyses are presented on Figure B1 through B3. Grain size analysis results for full sieve and percent passing No. 200 sieve are presented in numerical order based on boring/test pit and sample number.

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Sieve Report

Project: Skagit PUD - Daisy Site Project #: 18B011-07 Client: Aspect Consulting Source: AB-D1 S3 @ 7.5' Sample#: B18-0947	Date Received: 26-Oct-18 Sampled By: Client Date Tested: 30-Oct-18 Tested By: A. Eifrig	Unified Soil Classification System, ASTM-2487 SM, Silty Sand with Gravel Sample Color: brown																																																																																																																																																																																																	
ACCREDITED <small>Certificate #: 1366.01, 1366.02 & 1366.04</small>																																																																																																																																																																																																			
AASHTO T-176, AASHTO T-255, AASHTO T-335, AASHTO T-89, AASHTO T-90																																																																																																																																																																																																			
Specifications No Specs Sample Meets Specs ? N/A	D ₍₅₎ = 0.013 mm % Gravel = 19.6% D ₍₁₀₎ = 0.026 mm % Sand = 51.8% D ₍₁₅₎ = 0.039 mm % Silt & Clay = 28.6% D ₍₃₀₎ = 0.088 mm Liquid Limit = n/a D ₍₅₀₎ = 0.309 mm Plasticity Index = n/a D ₍₆₀₎ = 0.501 mm Sand Equivalent = n/a D ₍₉₀₎ = 9.482 mm Fracture %, 1 Face = n/a Dust Ratio = 25/52 Fracture %, 2+ Faces = n/a	Coeff. of Curvature, C _C = 0.58 Coeff. of Uniformity, C _U = 19.08 Fineness Modulus = 2.50 Plastic Limit = n/a Moisture %, as sampled = 7.7% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =																																																																																																																																																																																																	
AASHTO T11/T27																																																																																																																																																																																																			
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Sieve Size</th> <th rowspan="2">Actual Cumulative Percent Passing</th> <th rowspan="2">Interpolated Cumulative Percent Passing</th> <th rowspan="2">Specs Max</th> <th rowspan="2">Specs Min</th> </tr> <tr> <th>US</th> <th>Metric</th> </tr> </thead> <tbody> <tr><td>12.00"</td><td>300.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>10.00"</td><td>250.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>8.00"</td><td>200.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>6.00"</td><td>150.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>4.00"</td><td>100.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>3.00"</td><td>75.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>2.50"</td><td>63.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>2.00"</td><td>50.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1.75"</td><td>45.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1.50"</td><td>37.50</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1.25"</td><td>31.50</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1.00"</td><td>25.00</td><td>100%</td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>3/4"</td><td>19.00</td><td>94%</td><td>94%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>5/8"</td><td>16.00</td><td>93%</td><td>93%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1/2"</td><td>12.50</td><td>92%</td><td>92%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>3/8"</td><td>9.50</td><td>90%</td><td>90%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1/4"</td><td>6.30</td><td>84%</td><td>84%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#4</td><td>4.75</td><td>80%</td><td>80%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#8</td><td>2.36</td><td>73%</td><td>73%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#10</td><td>2.00</td><td>72%</td><td>72%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#16</td><td>1.18</td><td>66%</td><td>66%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#20</td><td>0.850</td><td>63%</td><td>63%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#30</td><td>0.600</td><td>61%</td><td>61%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#40</td><td>0.425</td><td>59%</td><td>59%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#50</td><td>0.300</td><td>49%</td><td>49%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#60</td><td>0.250</td><td>45%</td><td>45%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#80</td><td>0.180</td><td>40%</td><td>40%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#100</td><td>0.150</td><td>37%</td><td>37%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#140</td><td>0.106</td><td>32%</td><td>32%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#170</td><td>0.090</td><td>30%</td><td>30%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#200</td><td>0.075</td><td>28.6%</td><td>28.6%</td><td>100.0%</td><td>0.0%</td></tr> </tbody> </table>	Sieve Size		Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	US	Metric	12.00"	300.00		100%	100.0%	0.0%	10.00"	250.00		100%	100.0%	0.0%	8.00"	200.00		100%	100.0%	0.0%	6.00"	150.00		100%	100.0%	0.0%	4.00"	100.00		100%	100.0%	0.0%	3.00"	75.00		100%	100.0%	0.0%	2.50"	63.00		100%	100.0%	0.0%	2.00"	50.00		100%	100.0%	0.0%	1.75"	45.00		100%	100.0%	0.0%	1.50"	37.50		100%	100.0%	0.0%	1.25"	31.50		100%	100.0%	0.0%	1.00"	25.00	100%	100%	100.0%	0.0%	3/4"	19.00	94%	94%	100.0%	0.0%	5/8"	16.00	93%	93%	100.0%	0.0%	1/2"	12.50	92%	92%	100.0%	0.0%	3/8"	9.50	90%	90%	100.0%	0.0%	1/4"	6.30	84%	84%	100.0%	0.0%	#4	4.75	80%	80%	100.0%	0.0%	#8	2.36	73%	73%	100.0%	0.0%	#10	2.00	72%	72%	100.0%	0.0%	#16	1.18	66%	66%	100.0%	0.0%	#20	0.850	63%	63%	100.0%	0.0%	#30	0.600	61%	61%	100.0%	0.0%	#40	0.425	59%	59%	100.0%	0.0%	#50	0.300	49%	49%	100.0%	0.0%	#60	0.250	45%	45%	100.0%	0.0%	#80	0.180	40%	40%	100.0%	0.0%	#100	0.150	37%	37%	100.0%	0.0%	#140	0.106	32%	32%	100.0%	0.0%	#170	0.090	30%	30%	100.0%	0.0%	#200	0.075	28.6%	28.6%	100.0%	0.0%	<p style="text-align: center;">Grain Size Distribution</p> <p style="text-align: center;">+ Sieve Sizes —▲— Max Specs —●— Min Specs —◆— Sieve Results</p>
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#170	0.090	30%	30%	100.0%	0.0%																																																																																																																																																																																														
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 All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments: _____

Reviewed by: _____

Meghan Blodgett-Carrillo

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Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Sieve Report

Project: Skagit PUD - Daisy Site Project #: 18B011-07 Client: Aspect Consulting Source: AB-D3 S2 @ 10.0' Sample#: B18-0948	Date Received: 26-Oct-18 Sampled By: Client Date Tested: 30-Oct-18 Tested By: A. Eifrig	Unified Soil Classification System, ASTM-2487 SM, Silty Sand Sample Color: gray																																																																																																																																																																																																	
Certificate #: 1366.01, 1366.02 & 1366.04																																																																																																																																																																																																			
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Specifications No Specs Sample Meets Specs ? N/A	D ₍₅₎ = 0.009 mm % Gravel = 2.5% D ₍₁₀₎ = 0.017 mm % Sand = 53.9% D ₍₁₅₎ = 0.026 mm % Silt & Clay = 43.6% D ₍₃₀₎ = 0.052 mm Liquid Limit = n/a D ₍₅₀₎ = 0.111 mm Plasticity Index = n/a D ₍₆₀₎ = 0.189 mm Sand Equivalent = n/a D ₍₉₀₎ = 1.619 mm Fracture %, 1 Face = n/a Dust Ratio = 5/9 Fracture %, 2+ Faces = n/a	Coeff. of Curvature, C _C = 0.82 Coeff. of Uniformity, C _U = 10.97 Fineness Modulus = 1.17 Plastic Limit = n/a Moisture %, as sampled = n/a Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =																																																																																																																																																																																																	
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<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Sieve Size</th> <th rowspan="2">Actual Cumulative Percent Passing</th> <th rowspan="2">Interpolated Cumulative Percent Passing</th> <th rowspan="2">Specs Max</th> <th rowspan="2">Specs Min</th> </tr> <tr> <th>US</th> <th>Metric</th> </tr> </thead> <tbody> <tr><td>12.00"</td><td>300.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>10.00"</td><td>250.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>8.00"</td><td>200.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>6.00"</td><td>150.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>4.00"</td><td>100.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>3.00"</td><td>75.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>2.50"</td><td>63.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>2.00"</td><td>50.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1.75"</td><td>45.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1.50"</td><td>37.50</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1.25"</td><td>31.50</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1.00"</td><td>25.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>3/4"</td><td>19.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>5/8"</td><td>16.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1/2"</td><td>12.50</td><td>100%</td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>3/8"</td><td>9.50</td><td>100%</td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1/4"</td><td>6.30</td><td></td><td>98%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#4</td><td>4.75</td><td>98%</td><td>98%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#8</td><td>2.36</td><td></td><td>94%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#10</td><td>2.00</td><td>94%</td><td>94%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#16</td><td>1.18</td><td></td><td>86%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#20</td><td>0.850</td><td></td><td>83%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#30</td><td>0.600</td><td></td><td>80%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#40</td><td>0.425</td><td>79%</td><td>79%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#50</td><td>0.300</td><td></td><td>69%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#60</td><td>0.250</td><td></td><td>65%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#80</td><td>0.180</td><td></td><td>59%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#100</td><td>0.150</td><td>57%</td><td>57%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#140</td><td>0.106</td><td></td><td>49%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#170</td><td>0.090</td><td></td><td>46%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#200</td><td>0.075</td><td>43.6%</td><td>43.6%</td><td>100.0%</td><td>0.0%</td></tr> </tbody> </table>	Sieve Size		Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	US	Metric	12.00"	300.00		100%	100.0%	0.0%	10.00"	250.00		100%	100.0%	0.0%	8.00"	200.00		100%	100.0%	0.0%	6.00"	150.00		100%	100.0%	0.0%	4.00"	100.00		100%	100.0%	0.0%	3.00"	75.00		100%	100.0%	0.0%	2.50"	63.00		100%	100.0%	0.0%	2.00"	50.00		100%	100.0%	0.0%	1.75"	45.00		100%	100.0%	0.0%	1.50"	37.50		100%	100.0%	0.0%	1.25"	31.50		100%	100.0%	0.0%	1.00"	25.00		100%	100.0%	0.0%	3/4"	19.00		100%	100.0%	0.0%	5/8"	16.00		100%	100.0%	0.0%	1/2"	12.50	100%	100%	100.0%	0.0%	3/8"	9.50	100%	100%	100.0%	0.0%	1/4"	6.30		98%	100.0%	0.0%	#4	4.75	98%	98%	100.0%	0.0%	#8	2.36		94%	100.0%	0.0%	#10	2.00	94%	94%	100.0%	0.0%	#16	1.18		86%	100.0%	0.0%	#20	0.850		83%	100.0%	0.0%	#30	0.600		80%	100.0%	0.0%	#40	0.425	79%	79%	100.0%	0.0%	#50	0.300		69%	100.0%	0.0%	#60	0.250		65%	100.0%	0.0%	#80	0.180		59%	100.0%	0.0%	#100	0.150	57%	57%	100.0%	0.0%	#140	0.106		49%	100.0%	0.0%	#170	0.090		46%	100.0%	0.0%	#200	0.075	43.6%	43.6%	100.0%	0.0%	<p style="text-align: center;">Grain Size Distribution</p> <p style="text-align: center;">+ Sieve Sizes —▲— Max Specs —●— Min Specs —◆— Sieve Results</p>
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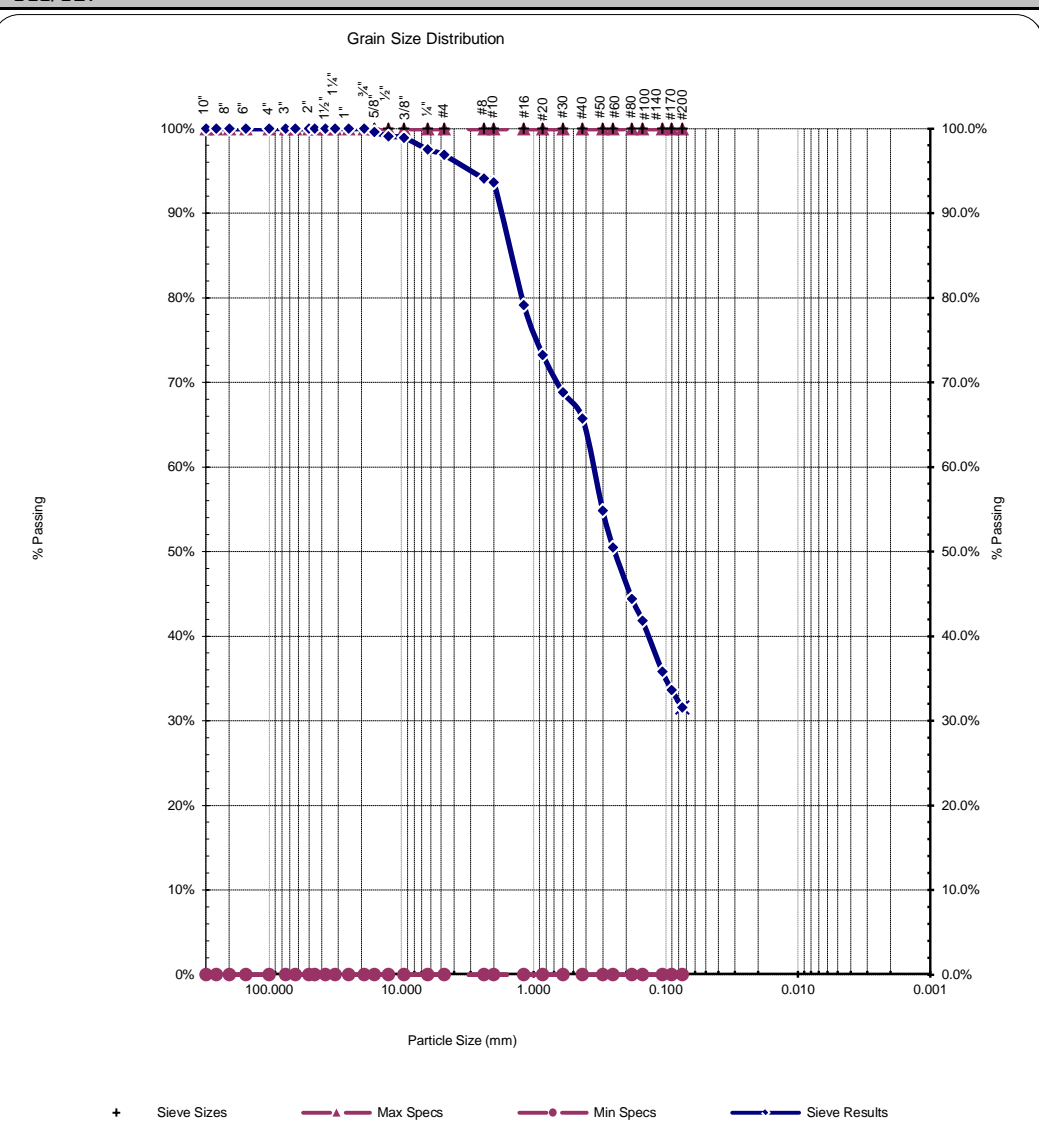
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Sieve Report

Project: Skagit PUD - Daisy Site Project #: 18B011-07 Client: Aspect Consulting Source: AB-D4 S2 @ 5.0' Sample#: B18-0949		Date Received: 26-Oct-18 Sampled By: Client Date Tested: 30-Oct-18 Tested By: A. Eifrig		Unified Soil Classification System, ASTM-2487 SM, Silty Sand Sample Color: brown		 Certificate #: 1366.01, 1366.02 & 1366.04																																																																																																																																																																																																			
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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments:

Reviewed by: 

Meghan Blodgett-Carrillo

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APPENDIX C

Report Limitations and Guidelines for Use

C. Report Limitations and Guidelines for Use

Geoscience is Not Exact

The geoscience practices (geotechnical engineering, geology, and environmental science) are far less exact than other engineering and natural science disciplines. It is important to recognize this limitation in evaluating the content of the report. If you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or property, you should contact Aspect Consulting, LLC (Aspect).

This Report and Project-Specific Factors

Aspect's services are designed to meet the specific needs of our clients. Aspect has performed the services in general accordance with our agreement (the Agreement) with the Client (defined under the Limitations section of this project's work product). This report has been prepared for the exclusive use of the Client. This report should not be applied for any purpose or project except the purpose described in the Agreement.

Aspect considered many unique, project-specific factors when establishing the Scope of Work for this project and report. You should not rely on this report if it was:

- Not prepared for you;
- Not prepared for the specific purpose identified in the Agreement;
- Not prepared for the specific subject property assessed; or
- Completed before important changes occurred concerning the subject property, project, or governmental regulatory actions.

If changes are made to the project or subject property after the date of this report, Aspect should be retained to assess the impact of the changes with respect to the conclusions contained in the report.

Reliance Conditions for Third Parties

This report was prepared for the exclusive use of the Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against liability claims by third parties with whom there would otherwise be no contractual limitations. Within the limitations of scope, schedule, and budget, our services have been executed in accordance with our Agreement with the Client and recognized geoscience practices in the same locality and involving similar conditions at the time this report was prepared

Property Conditions Change Over Time

This report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by events such as a change in property use or occupancy, or by natural events, such as floods,

earthquakes, slope instability, or groundwater fluctuations. If any of the described events may have occurred following the issuance of the report, you should contact Aspect so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical, Geologic, and Environmental Reports Are Not Interchangeable

The equipment, techniques, and personnel used to perform a geotechnical or geologic study differ significantly from those used to perform an environmental study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually address any environmental findings, conclusions, or recommendations (e.g., about the likelihood of encountering underground storage tanks or regulated contaminants). Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding the subject property.

We appreciate the opportunity to perform these services. If you have any questions please contact the Aspect Project Manager for this project.

GEOTECHNICAL EVALUATION

McLean Road - Phase II
Best Road to Wall Street
Directional Drill Project

Mount Vernon, Washington
Skagit PUD Project No. 3761

Prepared for: PUD No. 1 of Skagit County

Project No. 180487-02 • May 16, 2019 Final





GEOTECHNICAL EVALUATION

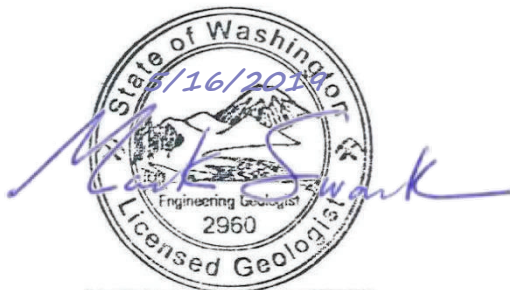
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1 Introduction

This Geotechnical Engineering Report summarizes Aspect Consulting, LLC's (Aspect) observations, conclusions, and recommendations for the proposed water main replacement along McLean Road in rural Skagit County, Washington (Project, Site). The Site location is shown on Figure 1.

We performed our services for the Public Utility District No. 1 of Skagit County (Skagit PUD) in accordance with our agreed-upon scope of work and signed contract.

1.1 Scope of Services

Our scope of services included a literature review, Site reconnaissance, subsurface explorations, and geotechnical engineering analyses. This report includes:

- Site and Project descriptions
- Distribution and characteristics of subsurface soil, bedrock, and groundwater along the proposed drainage channel undercrossing alignment
- Pipe installation recommendations for pipe installation using horizontal direction drilling (HDD) methods
- Construction dewatering considerations
- Site preparation recommendations and general construction recommendations

1.2 Project Understanding

We understand Skagit PUD plans to replace the existing water main along McLean Road between Beaver Marsh Road and Best Road. The new 12-inch-diameter water main, along with an ancillary 4-inch fiber optic conduit, will be installed beneath Little Sullivan Slough using trenchless methods by horizontal directional drilling (HDD) techniques.

The Skagit PUD's 30% Design Plans (Skagit PUD, 2018) shows the Project stationing between 6+00 and 11+00. The HDD path for the replacement 12-inch PVC pipe will be parallel along the south side of McLean Road with entry point near Station 6+68 on the Project's west side and the exit point near Stations 9+95 on the east side. The 30% plans show the length of HDD as approximately 327 linear feet with the bore path 20 feet below the existing slough channel.

2 Site Conditions

2.1 General

The Site is approximately 0.1-mile east of the McLean Road and Best Road intersection and within the broad floodplain near the mouth of the Skagit River Basin. The HDD bore alignment will be parallel to McLean Road, approximately 33 feet south of its centerline, between the road embankment and agricultural fields.

The immediate Site vicinity is relatively flat and gently slopes down to the south. Based on the provided plan set (Skagit PUD, 2018), the road surface elevation (EL, NAVD88¹) is between approximately EL 9 feet at Station 6+00 on the west end of the Project and EL 14 feet at Station 11+00 on the east end (refer to Figure 2 for stationing). The existing roadway surface is typically about 4 feet higher than the agricultural field along the HDD bore alignment.

2.2 Geologic Setting

The Site is mapped as Quaternary nearshore deposits (Q_n) (Dragovich et al., 2000) that are described as mostly estuarine or tidal flat deposits composed of fine sand, silt, and clay. Common soils associated with this unit are massive silt, silt with organic, or peaty mats, with occasional thinly bedded fine sand, silt, and clay.

The geology map shows the Site lies within an *abandoned fluvial or tidal channel visible on 1:12,000-scale NW-1996 aerial photographs*. This geomorphology is likely denoted by the sandy deposits underlying the fine-grained soils more reminiscent of Q_n deposits.

2.3 Subsurface Conditions

2.3.1 Subsurface Explorations

Subsurface conditions were explored by advancing four borings (AB-1 through AB-4) on October 26, 2018, in the locations shown on Figure 2. Two shallow borings, designated AB-1 and AB-4, were advanced to approximately 12 and 17 feet below ground surface (bgs), respectively and two deeper borings, designated AB-2 and AB-3, were each advanced to approximately 32 feet bgs.

An Aspect geologist logged the explorations and collected representative samples. Exploration logs summarizing the subsurface conditions are presented in Appendix A. Observations and tests were performed in general accordance with ASTM International (ASTM) D2488, *Standard Practice for Description and Identification of Soils* (Visual-Manual Procedure; ASTM, 2018). The terminology used in the soil classifications and other modifiers are defined and presented on the attached key in Appendix A. Selected soil samples underwent laboratory testing for further classification; the results of these tests are included in Appendix B.

¹ North American Vertical Datum of 1988.

2.3.2 Soils

The summary of the subsurface units below the existing ground surface encountered in the borings are as follows:

Ground Surface and Fill

The surface conditions adjacent the road embankment where the borings were drilled consisted of thin layer of grass and organic topsoil atop a layer of fill. The fill is 2 to 3 feet of brown, medium dense SILTY GRAVEL WITH SAND (GM) with medium sand and fine to coarse, rounded gravel.

Nearshore Deposits

Between approximately 4 and 10 feet bgs, soft to very soft CLAY (CL) and SILT (ML) were encountered underlying the fill in borings AB-3 and AB-4 on the west side of the slough.

These fine-grained deposits thin (or “pinch out”) moving east along the alignment. We encountered an interbed of this layer between approximately 2 and 5 feet bgs in boring in AB-2, and this unit was not encountered in boring AB-1.

Alluvial Deposits

Alluvial deposits underly the fill and nearshore deposits, consisting of CLAYEY SAND (SC), SAND WITH SILT (SP-SM), and SAND (SP or SW), and SAND WITH GRAVEL (SW). Gravels were typically subround to subangular. The soil relative densities were very loose to medium dense, with SPT blow counts between 2 and 18 blows per foot (bpf).

Organics and woody debris were encountered at depths where the HDD projects through the subsurface profile.

2.3.3 Groundwater

Groundwater was encountered in the borings at the time of drilling at between EL 0 feet and EL 3 feet. We anticipate the groundwater conditions will be hydraulically connected to Little Sullivan Slough and will fluctuate seasonally with precipitation, irrigation, and local subsurface conditions.

3 Conclusions and Recommendations

Based on our geotechnical evaluation of the Site that included data review, subsurface explorations, soil laboratory testing, and engineering analyses, the proposed HDD undercrossing is feasible. Our interpretation of the geology at the site is illustrated in a subsurface profile from near the proposed alignment (Figure 2).

The currently planned replacement water main will be 12-inch diameter PVC. However, we understand a 4-inch PVC fiber optic conduit will also be installed concurrently with the 12-inch water main. Thus, the HDD bore diameter will be approximately 24 inches (several inches greater than the two pipes bundled together). Considerations for design and construction of the pipeline are presented below. Work should be performed as specified and directed by Skagit PUD and based on the current *District Standard General Notes* (Skagit PUD, 2015).

The key findings and conclusions include:

- On the western portion of the Project, our explorations indicate about 4 feet of gravel fill and 10 feet of very soft to very soft clay and silt overlying very loose to medium dense sands.
- On the eastern portion of the Project, 4 feet of gravel and between 0 and 5 feet of very soft to soft clay overlies the very loose to medium dense sands.
- The pipeline will primarily be installed within the sandy deposits, with the launch zone within fine-grained nearshore deposits and the reception zone within the coarse-grained alluvial deposits.
- Large woody debris may be encountered during installation and could potentially impede advancing the HDD bore. The contractor contract documents should include provisions for refusal on woody debris.
- As discussed in Section 3.1, we conclude the risk of hydraulic fracture will be acceptably low, provided a 10-foot minimum cover depth is maintained.
- Groundwater was encountered at approximately 5 feet bgs and is likely hydraulically connected to Little Sullivan Slough and will fluctuate with irrigation. We anticipate dewatering will not be required during construction, and if water is present, can be managed with sump pumps within the launch and receiving pits.
- Pipe and handhole installation should be performed in accordance with Skagit PUD Standards.

3.1 Hydraulic Fracture

Inadvertent fluid return, often referred to as “hydrofracture” or “frac-out,” during HDD are the migration of the drilling fluids to the ground surface. Hydraulic fracturing can occur when the pressure of the drilling fluid exceeds the strength and confining stress of the surrounding soil. In these conditions the excess pressure can fracture the soil around the bore, allowing the drilling fluid to escape to the surface.

We evaluated the hydraulic fracture potential for the proposed bore path within the interpreted geologic conditions shown in Figure 2 utilizing the cavity expansion theory (Bennett and Wallin, 2008). Parametric studies were performed on the equation variables, which include the drill fluid unit weight, viscosity, and flow rate; the pilot-bore diameter; and the surrounding soils moduli. A factor of safety of 2.0 is incorporated hydraulic fracture in our analyses. Based on our results, we conclude the 20-foot cover depth shown in the 30 percent plans are adequate to protect against potential hydraulic fracture.

Skagit PUD also requested we calculate the minimum cover depth above the HDD bore that would be sufficient to prevent hydrofracture. Utilizing the same equations described above, we performed a sensitivity analyses by varying the cover thicknesses along the alignment. Based on our analyses and geotechnical engineering judgment, we consider a minimum cover depth (i.e. vertical distance between the crown of the HDD bore path and the invert of Little Sullivan Slough) of 10 feet (EL -7 feet) is sufficient to prevent hydrofracture in the conditions encountered during our explorations. The revised HDD plan and profile could consider the minimum depths as acceptable for determining the bending radius for the pipe material and diameter.

The hydrofracture potential and risk is a combination of the Site's subsurface conditions and the contractor's approach to installing the pipeline. In addition, not all inadvertent fluid returns are due to hydraulic fracture, and other causes include existing fissures in the soil, preferential seepage paths along piers, piles, or other structures, and open-graded, loose gravel or rocks above the bore. The contractor is solely responsible for the HDD pipe installation and the contract documents should require the contractor employ means and methods that will minimize the risk of uncontrolled releases of drilling fluid into the creek or surrounding area.

4 References

- ASTM International (ASTM), 2018, 2018 Annual Book of ASTM Standards, West Conshohocken, Pennsylvania.
- Bennet, D., and K. Wallin, 2008, Step-by-Step Evaluation of Hydrofracture Risks for HDD Projects, Proceedings, North American Society for Trenchless Technology, 2008 No-Dig Conference and Exhibition.
- Dragovich, J.D., L.A. Gilbertson, D.K. Norman, G. Anderson, and G. Petro, 2002, Geologic Map of the Utsalady and Conway 7.5-minute Quadrangles, Skagit, Snohomish, and Island Counties, Washington, 1:24,000 Scale, Washington State Department of Natural Resources, Washington Division of Geology and Earth Resources, Open File Report 2002-S, Revised 2004.
- Skagit Public Utility District (Skagit PUD), 2015, District Standard General Notes, revised October 30, 2015.
- Skagit Public Utility District (Skagit PUD), 2018, McLean Road, Best Road to Wall Street Directional Drill Plan Set, Mount Vernon, Skagit County, Washington, P.N. 0.523, CO 4829, dated August 28, 2018.

5 Limitations

Work for this project was performed for the Public Utility District No. 1 of Skagit County (Client) and this report was prepared consistent with recognized standards of professionals in the same locality and involving similar conditions, at the time the work was performed. No other warranty, expressed or implied, is made by Aspect Consulting, LLC (Aspect).

Recommendations presented herein are based on our interpretation of site conditions, geotechnical engineering calculations, and judgment in accordance with our mutually agreed-upon scope of work. Our recommendations are unique and specific to the project, site, and Client. Application of this report for any purpose other than the project should be done only after consultation with Aspect.

Variations may exist between the soil and groundwater conditions reported and those actually underlying the site. The nature and extent of such soil variations may change over time and may not be evident before construction begins. If any soil conditions are encountered at the site that are different from those described in this report, Aspect should be notified immediately to review the applicability of our recommendations.

It is the Client's responsibility to see that all parties to this project, including the designer, contractor, subcontractors, and agents, are made aware of this report in its entirety. At the time of this report, design plans and construction methods have not been finalized, and the recommendations presented herein are based on 90 percent design plans and project information. If project developments result in design changes, Aspect should be contacted to determine if our recommendations contained in this report should be revised and/or expanded upon.

The scope of work does not include services related to construction safety precautions. Site safety is typically the responsibility of the contractor, and our recommendations are not intended to direct the contractor's site safety methods, techniques, sequences, or procedures. The scope of our work also does not include the assessment of environmental characteristics, particularly those involving potentially hazardous substances in soil or groundwater.

All reports prepared by Aspect for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect. Aspect's original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

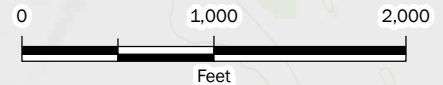
Please refer to Appendix C titled "Report Limitations and Guidelines for Use" for additional information governing the use of this report.

We appreciate the opportunity to perform these services. If you have any questions please call Erik Andersen, PE, Principal Geotechnical Engineer, at 360-746-8964.

FIGURES



SITE LOCATION

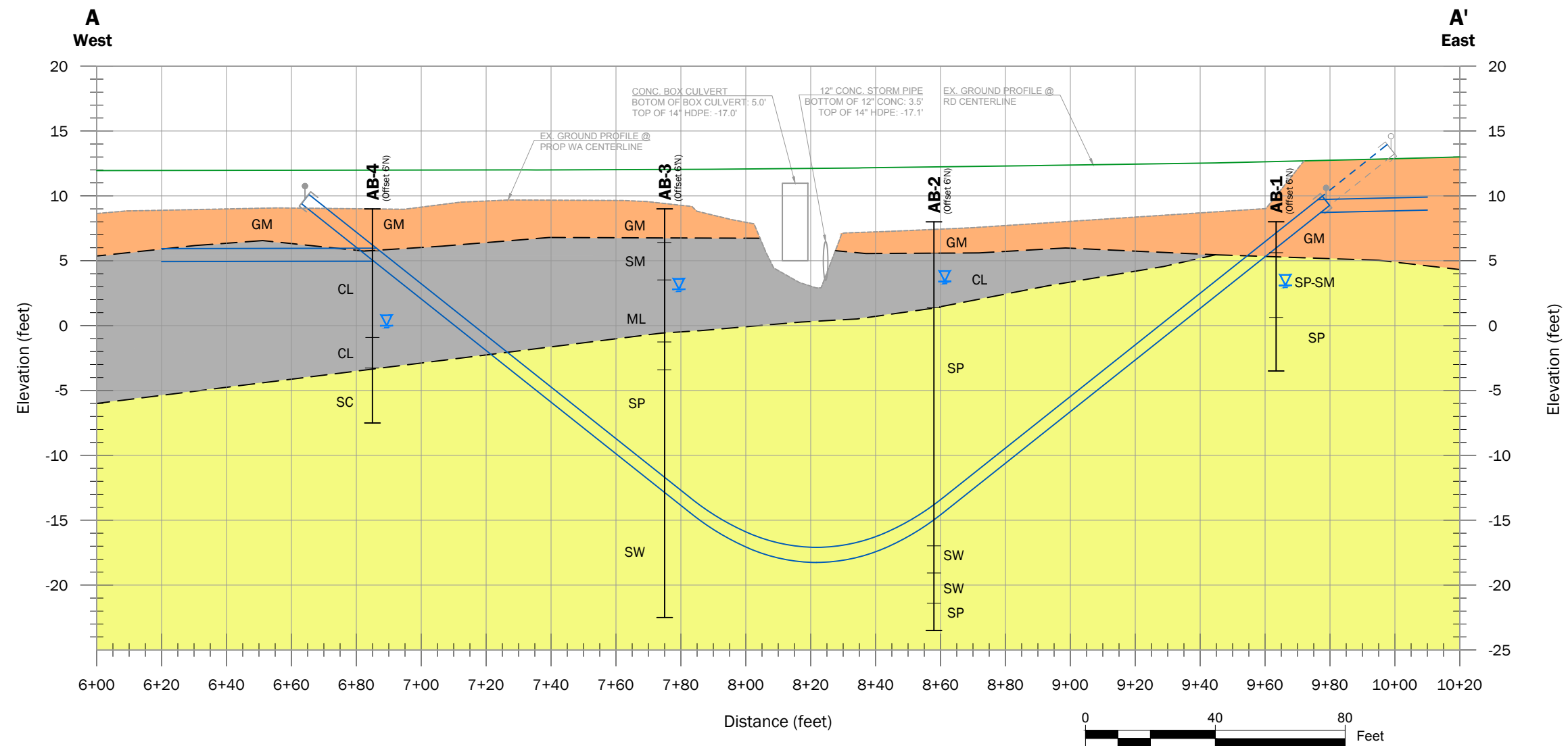
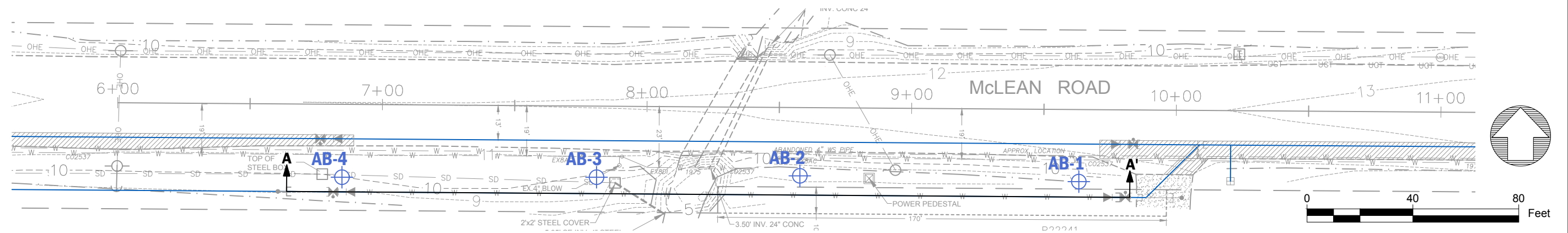


Site Location Map

Geotechnical Evaluation
Skagit PUD Geotech - McLean Road
Skagit County, Washington

	DEC-2018	BY: AAF / TDR	FIGURE NO. 1
	PROJECT NO. 180487-02	REVISED BY: ---	

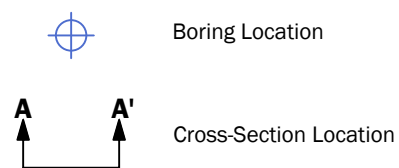
GIS Path: I:\Projects_8\SkagitPUD\Geotech\Dash\Learn_180487\Deliverables\McLeanRoad_V01_Site_Location_Map.mxd | Coordinate System: NAD_1983_StatePlane_Washington_North_FIPS_4601_Feet | Date Saved: 12/14/2018 | User: tuihan | Print Date: 12/14/2018



Horizontal Scale: 1" = 40'
 Vertical Scale: 1" = 10'
 Vertical Exaggeration 4x

Source: Base map CAD file provided by Skagit PUD, dated 08/24/2018.

- Legend**
- Fill
 - Fine-Grained Alluvium
 - Course-Grained Alluvium



- AB-1** (Offset 6'S) — Offset and direction
- Borehole ID
- GM — Material Type
- ▽ — Groundwater Elevation
- — Inferred Geologic Contact

Cross-Section A-A'
 Geotechnical Evaluation
 McLean Road
 Mount Vernon, Washington



Dec-2018
 PROJECT NO.
 180487-02

BY:
 AAF/CMV
 REVISED BY:
 -

FIGURE NO.
2

CAD Path: \\SEASTORE2\Drafting\Geotech\180487_Skagit PUD\2018-11\CrossSections\180487-02.dwg Fig 2 - McLean || Date Saved: Dec 17, 2018 10:32am || User: cvanlyke

APPENDIX A

Subsurface Explorations

A. Subsurface Exploration Program

Four borings, designated AB-1 through AB-4, were advanced at the Site on October 26, 2018. The borings were drilled using 8.5-inch-diameter (OD) hollow-stem auger methods by Gregory Drilling (under subcontract to Aspect), using a CME-85 truck-mounted drilling rig equipped with a 140-pound automatic-safety hammer. Samples were obtained at 2.5 to 5 foot intervals below ground surface (bgs) to the depths explored using the Standard Penetration Test (SPT) in general accordance with ASTM International Method D1586.

The SPT method involves driving a 2-inch-outside-diameter split-barrel sampler with a 140-pound hammer free-falling from a distance of 30 inches. The number of blows for each 6-inch interval is recorded, and the number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance (“N”) or blow count. The resistance, or N-value, provides a measure of the relative density of granular soils or the relative consistency of cohesive soils. If a total of 50 blows are recorded for a single 6-inch interval, the test is terminated and the blow count is recorded as 50 blows for the total inches of penetration. Samples were placed in labeled plastic jars and taken to a laboratory for further classification.

The locations of explorations are shown on Figure 2 and were collected in the field using a global positioning system (GPS). Borings were backfilled with the bentonite chips and capped to match the surrounding conditions.

Coarse-Grained Soils - More than 50% ¹ Retained on No. 200 Sieve	Gravels - More than 50% ¹ of Coarse Fraction Retained on No. 4 Sieve	≤5% Fines	GW	Well-graded GRAVEL Well-graded GRAVEL WITH SAND
		≥15% Fines	GP	Poorly-graded GRAVEL Poorly-graded GRAVEL WITH SAND
	Sands - 50% ¹ or More of Coarse Fraction Passes No. 4 Sieve	≤5% Fines	GM	SILTY GRAVEL SILTY GRAVEL WITH SAND
		≥15% Fines	GC	CLAYEY GRAVEL CLAYEY GRAVEL WITH SAND
Fine-Grained Soils - 50% ¹ or More Passes No. 200 Sieve	Sands - 50% ¹ or More of Coarse Fraction Passes No. 4 Sieve	≤5% Fines	SW	Well-graded SAND Well-graded SAND WITH GRAVEL
		≥15% Fines	SP	Poorly-graded SAND Poorly-graded SAND WITH GRAVEL
	Silt and Clays Liquid Limit Less than 50%	≤5% Fines	SM	SILTY SAND SILTY SAND WITH GRAVEL
		≥15% Fines	SC	CLAYEY SAND CLAYEY SAND WITH GRAVEL
Highly Organic Soils	Silt and Clays Liquid Limit 50% or More	≤5% Fines	ML	SILT SANDY or GRAVELLY SILT SILT WITH SAND SILT WITH GRAVEL
		≥15% Fines	CL	LEAN CLAY SANDY or GRAVELLY LEAN CLAY LEAN CLAY WITH SAND LEAN CLAY WITH GRAVEL
	Silt and Clays Liquid Limit 50% or More	≤5% Fines	OL	ORGANIC SILT SANDY or GRAVELLY ORGANIC SILT ORGANIC SILT WITH SAND ORGANIC SILT WITH GRAVEL
		≥15% Fines	MH	ELASTIC SILT SANDY or GRAVELLY ELASTIC SILT ELASTIC SILT WITH SAND ELASTIC SILT WITH GRAVEL
Highly Organic Soils	Silt and Clays Liquid Limit 50% or More	≤5% Fines	CH	FAT CLAY SANDY or GRAVELLY FAT CLAY FAT CLAY WITH SAND FAT CLAY WITH GRAVEL
		≥15% Fines	OH	ORGANIC CLAY SANDY or GRAVELLY ORGANIC CLAY ORGANIC CLAY WITH SAND ORGANIC CLAY WITH GRAVEL
Highly Organic Soils			PT	PEAT and other mostly organic soils

"WITH SILT" or "WITH CLAY" means 5 to 15% silt and clay, denoted by a "-" in the group name; e.g., SP-SM • "SILTY" or "CLAYEY" means >15% silt and clay • "WITH SAND" or "WITH GRAVEL" means 15 to 30% sand and gravel. • "SANDY" or "GRAVELLY" means >30% sand and gravel. • "Well-graded" means approximately equal amounts of fine to coarse grain sizes • "Poorly graded" means unequal amounts of grain sizes • Group names separated by "/" means soil contains layers of the two soil types; e.g., SM/ML.

Soils were described and identified in the field in general accordance with the methods described in ASTM D2488. Where indicated in the log, soils were classified using ASTM D2487 or other laboratory tests as appropriate. Refer to the report accompanying these exploration logs for details.

1. Estimated or measured percentage by dry weight
2. (SPT) Standard Penetration Test (ASTM D1586)
3. Determined by SPT, DCPT (ASTM STP399) or other field methods. See report text for details.

MC = Natural Moisture Content	GEOTECHNICAL LAB TESTS	
GS = Grain Size Distribution		
FC = Fines Content (% < 0.075 mm)		
GH = Hydrometer Test		
AL = Atterberg Limits		
C = Consolidation Test		
Str = Strength Test		
OC = Organic Content (% Loss by Ignition)		
Comp = Proctor Test		
K = Hydraulic Conductivity Test		
SG = Specific Gravity Test		
Organic Chemicals		
CHEMICAL LAB TESTS		
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes		
TPH-Dx = Diesel and Oil-Range Petroleum Hydrocarbons		
TPH-G = Gasoline-Range Petroleum Hydrocarbons		
VOCs = Volatile Organic Compounds		
SVOCs = Semi-Volatile Organic Compounds		
PAHs = Polycyclic Aromatic Hydrocarbon Compounds		
PCBs = Polychlorinated Biphenyls		
Metals		
RCRA8 = As, Ba, Cd, Cr, Pb, Hg, Se, Ag, (d = dissolved, t = total)		
MTCA5 = As, Cd, Cr, Hg, Pb (d = dissolved, t = total)		
PP-13 = Ag, As, Be, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se, Tl, Zn (d=dissolved, t=total)		
FIELD TESTS		
PID = Photoionization Detector		
Sheen = Oil Sheen Test		
SPT ² = Standard Penetration Test		
NSPT = Non-Standard Penetration Test		
DCPT = Dynamic Cone Penetration Test		
COMPONENT DEFINITIONS		
Descriptive Term	Size Range and Sieve Number	
Boulders =	Larger than 12 inches	
Cobbles =	3 inches to 12 inches	
Coarse Gravel =	3 inches to 3/4 inches	
Fine Gravel =	3/4 inches to No. 4 (4.75 mm)	
Coarse Sand =	No. 4 (4.75 mm) to No. 10 (2.00 mm)	
Medium Sand =	No. 10 (2.00 mm) to No. 40 (0.425 mm)	
Fine Sand =	No. 40 (0.425 mm) to No. 200 (0.075 mm)	
Silt and Clay =	Smaller than No. 200 (0.075 mm)	
% by Weight	Modifier	ESTIMATED¹ PERCENTAGE
<1 =	Subtrace	15 to 25 = Little
1 to <5 =	Trace	30 to 45 = Some
5 to 10 =	Few	>50 = Mostly
MOISTURE CONTENT		
Dry =	Absence of moisture, dusty, dry to the touch	
Slightly Moist =	Perceptible moisture	
Moist =	Damp but no visible water	
Very Moist =	Water visible but not free draining	
Wet =	Visible free water, usually from below water table	
RELATIVE DENSITY		
Non-Cohesive or Coarse-Grained Soils		
Density³	SPT² Blows/Foot	Penetration with 1/2" Diameter Rod
Very Loose =	0 to 4	≥ 2'
Loose =	5 to 10	1' to 2'
Medium Dense =	11 to 30	3" to 1'
Dense =	31 to 50	1" to 3"
Very Dense =	> 50	< 1"
CONSISTENCY		
Cohesive or Fine-Grained Soils		
Consistency³	SPT² Blows/Foot	Manual Test
Very Soft =	0 to 1	Penetrated >1" easily by thumb. Extrudes between thumb & fingers.
Soft =	2 to 4	Penetrated 1/4" to 1" easily by thumb. Easily molded.
Medium Stiff =	5 to 8	Penetrated >1/4" with effort by thumb. Molded with strong pressure.
Stiff =	9 to 15	Indented ~1/4" with effort by thumb.
Very Stiff =	16 to 30	Indented easily by thumbnail.
Hard =	> 30	Indented with difficulty by thumbnail.
GEOLOGIC CONTACTS		
Observed and Distinct	Observed and Gradual	Inferred
		Exploration Log Key



Skagit PUD McLean Road - 180487-02

Geotechnical Exploration Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

McLean Road, McLean Road - east

Ground Surface (GS) Elev. (NAVD88)

AB-1

Contractor

Equipment

Sampling Method

Gregory

Rotary drill rig

Autohammer; 140 lb hammer; 30" drop

8' (est)

Operator

Exploration Method(s)
8.5" OD X 4.25" ID
Hollow-Stem Auger

Work Start/Completion Dates

Top of Casing Elev. (NAVD88)

Depth to Water (Below GS)

Josh

10/26/2018

NA (est)

4.9' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot					Blows/6'	Tests	Material Type	Description	Depth (ft)		
				0	10	20	30	40						50	
1	7	Boring backfilled with bentonite chips. ▽ 10/26/2018	S1 S2 S3 S4							1	MC GS MC	<p>Topsoil</p> <p>TOPSOIL; soft, moist, brown</p> <p>Fill</p> <p>SILTY GRAVEL WITH SAND (GM); medium dense, moist, brown; non-plastic; medium sand; fine to coarse, rounded gravel.</p> <p>Qal</p> <p>SAND WITH SILT (SP-SM); very loose to loose, moist, brown and gray; medium to coarse sand; some fine, subangular to angular gravel.</p> <p>Becomes wet, gray brown; trace organics.</p> <p>SAND (SP); very loose, wet, gray; medium sand; few fine, subrounded to subangular gravel.</p>	1		
2	6									2		2	2	2	
3	5											4	2		3
4	4														4
5	3											1			5
6	2											2			6
7	1														7
8	0											1			8
9	-1											1			9
10	-2											1			10
11	-3											1			11
12	-4										Bottom of exploration at 11.5 ft. bgs.	12			
13	-5											13			
14	-6											14			
15	-7											15			
16	-8											16			
17	-9											17			
18	-10											18			
19	-11											19			
20	-12											20			
21	-13											21			
22	-14											22			
23	-15											23			
24	-16											24			

Legend

- ☐ No Soil Sample Recovery
- ▣ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ——— Liquid Limit

▽ Water Level ATD

Water Level

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: MWS

Exploration Log AB-1

Sheet 1 of 1



Skagit PUD McLean Road - 180487-02

Geotechnical Exploration Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

McLean Road, McLean Road - east central

48.42061, -122.44073 (est)

AB-2

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev. (NAVD88)

Gregory

Rotary drill rig

Autohammer; 140 lb hammer; 30" drop

8' (est)

Operator

Exploration Method(s)
8.5" OD X 4.25" ID
Hollow-Stem Auger

Work Start/Completion Dates

Top of Casing Elev. (NAVD88)

Depth to Water (Below GS)

Josh

10/26/2018

NA (est)

4.6' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot					Blows/6'	Tests	Material Type	Description	Depth (ft)
				0	10	20	30	40					
1	7	Boring backfilled with bentonite chips.									TOPSOIL; soft, moist, brown	1	
2	6										FILL SILTY GRAVEL WITH SAND (GM); medium dense, moist, brown; non-plastic; medium sand; fine to coarse, subangular to rounded gravel.	2	
3	5										Qn SANDY CLAY (CL); soft, wet, gray; medium plasticity; medium sand.	3	
4	4											4	
5	3	▽ 10/26/2018							1			5	
6	2		S1						2		Qal SAND (SP); loose, wet, gray; medium sand; trace fine, subangular gravel; trace organics.	6	
7	1								3			7	
8	0											8	
9	-1											9	
10	-2								2		Becomes medium to coarse sand; trace fine, subrounded to rounded gravel; trace organics.	10	
11	-3		S2						3			11	
12	-4											12	
13	-5											13	
14	-6											14	
15	-7								3		Becomes without gravel; without organics.	15	
16	-8		S3						4			16	
17	-9											17	
18	-10											18	
19	-11											19	
20	-12								3			20	
21	-13		S4						4			21	
22	-14								6			22	
23	-15											23	
24	-16											24	

Legend

- ☐ No Soil Sample Recovery
- ▣ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ——— Liquid Limit

▽ Water Level ATD

Water Level

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: MWS

Exploration Log
AB-2

Sheet 1 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\PROJECTS\SKAGIT_PUD\MCLEAN.GPJ January 18, 2019



Skagit PUD McLean Road - 180487-02

Geotechnical Exploration Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

McLean Road, McLean Road - east central

48.42061, -122.44073 (est)

AB-2

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev. (NAVD88)

Gregory

Rotary drill rig

Autohammer; 140 lb hammer; 30" drop

8' (est)

Operator

Exploration Method(s)
8.5" OD X 4.25" ID
Hollow-Stem Auger

Work Start/Completion Dates

Top of Casing Elev. (NAVD88)

Depth to Water (Below GS)

Josh

10/26/2018

NA (est)

4.6' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot					Blows/6'	Tests	Material Type	Description	Depth (ft)
				0	10	20	30	40					
26	-18		S5						4	GS MC	SAND (SW); medium dense, wet, gray; fine to coarse sand; few fine, subrounded gravel.	26	
27	-19								5				27
28	-20		S6						5			SAND WITH GRAVEL (SW); medium dense, wet, gray; fine to coarse sand; fine, subangular to subrounded gravel.	28
29	-21								6			29	
30	-22								8			30	
31	-23		S7						5		SAND (SP); medium dense, wet, gray; medium to coarse sand.	31	
32	-24								6			32	
33	-25								12			33	
34	-26											34	
35	-27											35	
36	-28											36	
37	-29											37	
38	-30											38	
39	-31											39	
40	-32											40	
41	-33											41	
42	-34											42	
43	-35											43	
44	-36											44	
45	-37											45	
46	-38											46	
47	-39											47	
48	-40											48	
49	-41											49	

GS MC

Bottom of exploration at 31.5 ft. bgs.

Legend

- No Soil Sample Recovery
- Split Barrel 2" X 1.375" (SPT)

Plastic Limit |-----| Liquid Limit

Water Level ATD

Water Level

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: MWS

Exploration Log AB-2

Sheet 2 of 2

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\PROJECTS\SKAGIT PUD\MCLEAN.GPJ January 18, 2019



Skagit PUD McLean Road - 180487-02

Geotechnical Exploration Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

McLean Road, McLean Road - west central

Ground Surface (GS) Elev. (NAVD88)

AB-3

Contractor

Equipment

Sampling Method

Gregory

Rotary drill rig

Autohammer; 140 lb hammer; 30" drop

9' (est)

Operator

Exploration Method(s)
8.5" OD X 4.25" ID
Hollow-Stem Auger

Work Start/Completion Dates

Top of Casing Elev. (NAVD88)

Depth to Water (Below GS)

Josh

10/26/2018

NA (est)

6.2' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot					Blows/6'	Tests	Material Type	Description	Depth (ft)	
				0	10	20	30	40						50
1	8	Boring backfilled with bentonite chips. ▽ 10/26/2018	S1							1		TOPSOIL; soft, moist, brown	1	
2	7										1		FILL SILTY GRAVEL WITH SAND (GM); medium dense, moist, brown; non-plastic; medium sand; fine to coarse, rounded gravel.	2
3	6												Qn SILTY SAND WITH GRAVEL (SM); loose, moist, brown; non-plastic; medium sand; fine to coarse, rounded gravel.	3
4	5													4
5	4										1		SANDY SILT (ML); soft, moist to wet, gray with brown and orange mottling; low to medium plasticity; fine sand; some organics.	5
6	3										1			6
7	2													7
8	1													8
9	0													9
10	-1										1		Qal SAND (SP); very loose, wet, gray; medium sand; 4-inches heave.	10
11	-2								2			11		
12	-3											12		
13	-4											13		
14	-5											14		
15	-6								1		Becomes loose.	15		
16	-7								2			16		
17	-8								4			17		
18	-9								6			18		
19	-10								5			19		
20	-11								4		SAND (SW); medium dense, wet, gray; fine to coarse sand; few fine, subangular gravel.	20		
21	-12								6			21		
22	-13								5			22		
23	-14								1		Becomes very loose.	23		
24	-15								2			24		

Legend

- ☐ No Soil Sample Recovery
- ▣ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ——— Liquid Limit

▽ Water Level ATD

Water Level

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: MWS

Exploration Log AB-3

Sheet 1 of 2



Skagit PUD McLean Road - 180487-02

Geotechnical Exploration Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

McLean Road, McLean Road - west central

48.42060, -122.44103 (est)

AB-3

Contractor

Equipment

Sampling Method

Gregory

Rotary drill rig

Autohammer; 140 lb hammer; 30" drop

Operator

Exploration Method(s)
8.5" OD X 4.25" ID
Hollow-Stem Auger

Work Start/Completion Dates

Ground Surface (GS) Elev. (NAVD88)

9' (est)

Josh

10/26/2018

Top of Casing Elev. (NAVD88)

NA (est)
6.2' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot					Blows/6'	Tests	Material Type	Description	Depth (ft)
				0	10	20	30	40					
26	-17		S6						3	GS MC	SAND (SW); medium dense, wet, gray; fine to coarse sand; few fine, subangular gravel. (continued) Becomes loose.	26	
27	-18							3	27				
28	-19		S7					4	3			Becomes medium dense; abundant organics; partially decomposed woody debris.	28
29	-20							12	4	Abundant organics; partially decomposed woody debris.	29		
30	-21							3	3		30		
31	-22		S8					7	7		31		
32	-23										Bottom of exploration at 31.5 ft. bgs.	32	
33	-24											33	
34	-25											34	
35	-26											35	
36	-27											36	
37	-28											37	
38	-29											38	
39	-30											39	
40	-31											40	
41	-32											41	
42	-33											42	
43	-34											43	
44	-35											44	
45	-36											45	
46	-37											46	
47	-38											47	
48	-39											48	
49	-40											49	

Legend

- No Soil Sample Recovery
- Split Barrel 2" X 1.375" (SPT)

Plastic Limit ——— Liquid Limit

Water Level

Water Level

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: MWS

Exploration Log AB-3

Sheet 2 of 2



Skagit PUD McLean Road - 180487-02

Geotechnical Exploration Log

Project Address & Site Specific Location

Coordinates (Lat, Lon WGS84)

Exploration Number

McLean Road, McLean Road - west

48.42060, -122.44145 (est)

AB-4

Contractor

Equipment

Sampling Method

Ground Surface (GS) Elev. (NAVD88)

Gregory

Rotary drill rig

Autohammer; 140 lb hammer; 30" drop

9' (est)

Operator

Exploration Method(s)
8.5" OD X 4.25" ID
Hollow-Stem Auger

Work Start/Completion Dates

Top of Casing Elev. (NAVD88)

Depth to Water (Below GS)

Josh

10/26/2018

NA (est)

9' (ATD)

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Blows/foot					Blows/6'	Tests	Material Type	Description	Depth (ft)
				0	10	20	30	40					
1	8	Boring backfilled with bentonite chips.	S1							5	FC MC FC=77.8%	TOPSOIL; soft, moist, brown	1
2	7									5			FILL SILTY GRAVEL WITH SAND (GM); medium dense, moist, brown; non-plastic; medium sand; fine to coarse, rounded gravel.
3	6		S2							2	Qn CLAY WITH SAND (CL); stiff, moist, gray with brown mottling; medium plasticity; fine sand; trace organics.	3	
4	5		S3a/b							1		Becomes soft; trace fine, rounded to subrounded; trace organics.	4
5	4		S4							2	Becomes very soft.		5
6	3		S5							1		FC MC FC=51.5%	SANDY CLAY (CL); very soft, wet, dark gray; medium plasticity; fine sand; laminae of fine sand.
7	2		S6							2	Qal CLAYEY SAND (SC); very soft, wet, dark gray; low plasticity; fine sand.		
8	1									PUSH		Becomes wet, dark gray.	8
9	0	▽ 10/26/2018									Bottom of exploration at 16.5 ft. bgs.		9
10	-1									0		Becomes very soft.	10
11	-2									0	FC MC FC=51.5%		SANDY CLAY (CL); very soft, wet, dark gray; medium plasticity; fine sand; laminae of fine sand.
12	-3									1		Qal CLAYEY SAND (SC); very soft, wet, dark gray; low plasticity; fine sand.	
13	-4									PUSH	Becomes wet, dark gray.		13
14	-5											Bottom of exploration at 16.5 ft. bgs.	14
15	-6									PUSH	Bottom of exploration at 16.5 ft. bgs.		15
16	-7											Bottom of exploration at 16.5 ft. bgs.	16
17	-8										Bottom of exploration at 16.5 ft. bgs.		17
18	-9											Bottom of exploration at 16.5 ft. bgs.	18
19	-10										Bottom of exploration at 16.5 ft. bgs.		19
20	-11											Bottom of exploration at 16.5 ft. bgs.	20
21	-12										Bottom of exploration at 16.5 ft. bgs.		21
22	-13											Bottom of exploration at 16.5 ft. bgs.	22
23	-14										Bottom of exploration at 16.5 ft. bgs.		23
24	-15											Bottom of exploration at 16.5 ft. bgs.	24

Legend

- ☐ No Soil Sample Recovery
- ▣ Split Barrel 2" X 1.375" (SPT)

Plastic Limit ——— Liquid Limit

▽ Water Level ATD

Water Level

See Exploration Log Key for explanation of symbols

Logged by: AAF
Approved by: MWS

Exploration Log AB-4

NEW STANDARD EXPLORATION LOG TEMPLATE P:\GINT\PROJECTS\SKAGIT PUD\MCLEAN.GPJ January 18, 2019

APPENDIX B

Laboratory Test Results

B. Geotechnical Laboratory Tests

A geotechnical laboratory testing program was developed to determine index and engineering properties of materials at the Site. Soil samples used in the testing program were collected from the soil borings. The tests that were performed and the procedures followed are outlined below.

Soil Classification

Soil samples from the explorations were visually classified in the field and then taken to our laboratory, where the classifications were verified in a controlled environment. Field and laboratory observations included density/consistency, moisture condition, and grain-size and plasticity estimates. The classifications of selected samples were checked by grain-size analysis and plasticity index testing. Classifications were made in general accordance with the Unified Soil Classification System (USCS), ASTM D2488.

Moisture-Content Determination

Moisture contents were determined for samples recovered in the explorations in general accordance with ASTM D2216, as soon as possible following their arrival to the laboratory. Moisture contents are shown on the exploration logs in Appendix A.

Particle Size Analyses

Particle size analyses were performed on select soil samples to determine their grain-size distributions. The Sieve Analysis of Fine and Coarse Aggregates was performed by wet sieve analyses, determining percentages (by weight) of the sample passing a series of sieves from the 1-inch sieve, down to the No. 200 (0.75 mm) sieve.

Test Method for Materials Finer than 75 μm (No. 200) in Mineral Aggregates was performed by wet sieve analyses, determining a percentage (by weight) of the sample passing the No. 200 (0.75 mm) sieve.


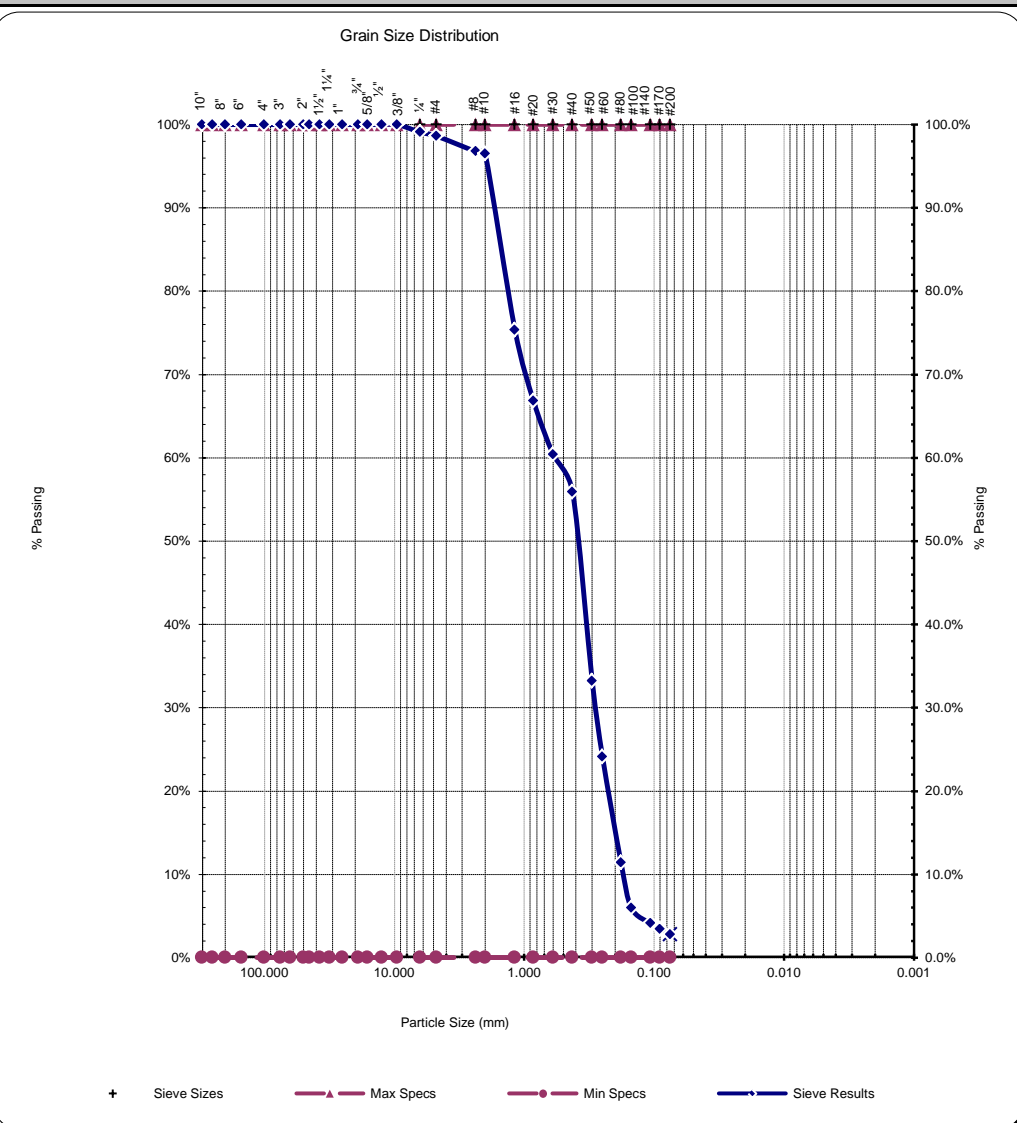
The results of the particle size analyses are presented on Figure B1 through B3. Grain size analysis results for full sieve and percent passing No. 200 sieve are presented in numerical order based on boring/test pit and sample number.

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting




Sieve Report

Project: Skagit PUD - McLean Site Project #: 18B011-06 Client: Aspect Consulting Source: AB-M1 S3 @ 7.5' Sample#: B18-0942		Date Received: 26-Oct-18 Sampled By: Client Date Tested: 30-Oct-18 Tested By: A. Eifrig		Unified Soil Classification System, ASTM-2487 SP, Poorly graded Sand Sample Color: gray		 ACCREDITED Certificate #: 1366.01, 1366.02 & 1366.04																																																																																																																																																																																															
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Specifications No Specs Sample Meets Specs ? N/A		D ₍₅₎ = 0.127 mm % Gravel = 1.4% D ₍₁₀₎ = 0.172 mm % Sand = 95.8% D ₍₁₅₎ = 0.200 mm % Silt & Clay = 2.8% D ₍₃₀₎ = 0.282 mm Liquid Limit = n/a D ₍₅₀₎ = 0.393 mm Plasticity Index = n/a D ₍₆₀₎ = 0.584 mm Sand Equivalent = n/a D ₍₉₀₎ = 1.748 mm Fracture %, 1 Face = n/a Dust Ratio = 1/20 Fracture %, 2+ Faces = n/a		Coeff. of Curvature, C _C = 0.79 Coeff. of Uniformity, C _U = 3.39 Fineness Modulus = 2.30 Plastic Limit = n/a Moisture %, as sampled = 30.4% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =																																																																																																																																																																																																	
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<table border="1"> <thead> <tr> <th colspan="2">Sieve Size</th> <th rowspan="2">Actual Cumulative Percent Passing</th> <th rowspan="2">Interpolated Cumulative Percent Passing</th> <th rowspan="2">Specs Max</th> <th rowspan="2">Specs Min</th> </tr> <tr> <th>US</th> <th>Metric</th> </tr> </thead> <tbody> <tr><td>12.00"</td><td>300.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>10.00"</td><td>250.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>8.00"</td><td>200.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>6.00"</td><td>150.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>4.00"</td><td>100.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>3.00"</td><td>75.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>2.50"</td><td>63.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>2.00"</td><td>50.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1.75"</td><td>45.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1.50"</td><td>37.50</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1.25"</td><td>31.50</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1.00"</td><td>25.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>3/4"</td><td>19.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>5/8"</td><td>16.00</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1/2"</td><td>12.50</td><td></td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>3/8"</td><td>9.50</td><td>100%</td><td>100%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>1/4"</td><td>6.30</td><td></td><td>99%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#4</td><td>4.75</td><td>99%</td><td>99%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#8</td><td>2.36</td><td></td><td>97%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#10</td><td>2.00</td><td>96%</td><td>96%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#16</td><td>1.18</td><td></td><td>75%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#20</td><td>0.850</td><td></td><td>67%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#30</td><td>0.600</td><td></td><td>60%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#40</td><td>0.425</td><td>56%</td><td>56%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#50</td><td>0.300</td><td></td><td>33%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#60</td><td>0.250</td><td></td><td>24%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#80</td><td>0.180</td><td></td><td>11%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#100</td><td>0.150</td><td>6%</td><td>6%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#140</td><td>0.106</td><td></td><td>4%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#170</td><td>0.090</td><td></td><td>3%</td><td>100.0%</td><td>0.0%</td></tr> <tr><td>#200</td><td>0.075</td><td>2.8%</td><td>2.8%</td><td>100.0%</td><td>0.0%</td></tr> </tbody> </table>		Sieve Size		Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min	US	Metric	12.00"	300.00		100%	100.0%	0.0%	10.00"	250.00		100%	100.0%	0.0%	8.00"	200.00		100%	100.0%	0.0%	6.00"	150.00		100%	100.0%	0.0%	4.00"	100.00		100%	100.0%	0.0%	3.00"	75.00		100%	100.0%	0.0%	2.50"	63.00		100%	100.0%	0.0%	2.00"	50.00		100%	100.0%	0.0%	1.75"	45.00		100%	100.0%	0.0%	1.50"	37.50		100%	100.0%	0.0%	1.25"	31.50		100%	100.0%	0.0%	1.00"	25.00		100%	100.0%	0.0%	3/4"	19.00		100%	100.0%	0.0%	5/8"	16.00		100%	100.0%	0.0%	1/2"	12.50		100%	100.0%	0.0%	3/8"	9.50	100%	100%	100.0%	0.0%	1/4"	6.30		99%	100.0%	0.0%	#4	4.75	99%	99%	100.0%	0.0%	#8	2.36		97%	100.0%	0.0%	#10	2.00	96%	96%	100.0%	0.0%	#16	1.18		75%	100.0%	0.0%	#20	0.850		67%	100.0%	0.0%	#30	0.600		60%	100.0%	0.0%	#40	0.425	56%	56%	100.0%	0.0%	#50	0.300		33%	100.0%	0.0%	#60	0.250		24%	100.0%	0.0%	#80	0.180		11%	100.0%	0.0%	#100	0.150	6%	6%	100.0%	0.0%	#140	0.106		4%	100.0%	0.0%	#170	0.090		3%	100.0%	0.0%	#200	0.075	2.8%	2.8%	100.0%	0.0%		
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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments:

Reviewed by: 
 Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Sieve Report

Project: Skagit PUD - McLean Site Project #: 18B011-06 Client: Aspect Consulting Source: AB-M2 S6 @ 27.5' Sample#: B18-0943	Date Received: 26-Oct-18 Sampled By: Client Date Tested: 30-Oct-18 Tested By: A. Eifrig	Unified Soil Classification System, ASTM-2487 SW, Well-graded Sand with Gravel Sample Color: gray																																																																																																																																																																																																	
ACCREDITED <small>Certificate #: 1366.01, 1366.02 & 1366.04</small>																																																																																																																																																																																																			
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Specifications No Specs Sample Meets Specs ? N/A	D ₍₅₎ = 0.101 mm % Gravel = 18.1% D ₍₁₀₎ = 0.196 mm % Sand = 78.3% D ₍₁₅₎ = 0.295 mm % Silt & Clay = 3.6% D ₍₃₀₎ = 0.742 mm Liquid Limit = n/a D ₍₅₀₎ = 1.496 mm Plasticity Index = n/a D ₍₆₀₎ = 1.872 mm Sand Equivalent = n/a D ₍₉₀₎ = 7.536 mm Fracture %, 1 Face = n/a Dust Ratio = 1/6 Fracture %, 2+ Faces = n/a	Coeff. of Curvature, C _C = 1.50 Coeff. of Uniformity, C _U = 9.57 Fineness Modulus = 3.66 Plastic Limit = n/a Moisture %, as sampled = 16.5% Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =																																																																																																																																																																																																	
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 All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments:

Reviewed by:

Meghan Blodgett-Carrillo

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111 Silverdale ~ 360.698.6787 Tukwila ~ 206.241.1974

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Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Sieve Report

Project: Skagit PUD - McLean Site Project #: 18B011-06 Client: Aspect Consulting Source: AB-M3 S6 @ 25.0' Sample#: B18-0944	Date Received: 26-Oct-18 Sampled By: Client Date Tested: 30-Oct-18 Tested By: A. Eifrig	Unified Soil Classification System, ASTM-2487 SW, Well-graded Sand Sample Color: gray																																																																																																																																																																																																	
ACCREDITED <small>Certificate #: 1366.01, 1366.02 & 1366.04</small>																																																																																																																																																																																																			
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3/4"	19.00		100%	100.0%	0.0%																																																																																																																																																																																														
5/8"	16.00		100%	100.0%	0.0%																																																																																																																																																																																														
1/2"	12.50	100%	100%	100.0%	0.0%																																																																																																																																																																																														
3/8"	9.50	100%	100%	100.0%	0.0%																																																																																																																																																																																														
1/4"	6.30		99%	100.0%	0.0%																																																																																																																																																																																														
#4	4.75	98%	98%	100.0%	0.0%																																																																																																																																																																																														
#8	2.36		88%	100.0%	0.0%																																																																																																																																																																																														
#10	2.00	86%	86%	100.0%	0.0%																																																																																																																																																																																														
#16	1.18		55%	100.0%	0.0%																																																																																																																																																																																														
#20	0.850		42%	100.0%	0.0%																																																																																																																																																																																														
#30	0.600		33%	100.0%	0.0%																																																																																																																																																																																														
#40	0.425	26%	26%	100.0%	0.0%																																																																																																																																																																																														
#50	0.300		17%	100.0%	0.0%																																																																																																																																																																																														
#60	0.250		14%	100.0%	0.0%																																																																																																																																																																																														
#80	0.180		9%	100.0%	0.0%																																																																																																																																																																																														
#100	0.150	7%	7%	100.0%	0.0%																																																																																																																																																																																														
#140	0.106		5%	100.0%	0.0%																																																																																																																																																																																														
#170	0.090		4%	100.0%	0.0%																																																																																																																																																																																														
#200	0.075	3.8%	3.8%	100.0%	0.0%																																																																																																																																																																																														
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Comments: _____

Reviewed by: _____

Meghan Blodgett-Carrillo

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APPENDIX C

Report Limitations and Guidelines for Use

C. Report Limitations and Guidelines for Use

Geoscience is Not Exact

The geoscience practices (geotechnical engineering, geology, and environmental science) are far less exact than other engineering and natural science disciplines. It is important to recognize this limitation in evaluating the content of the report. If you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or property, you should contact Aspect Consulting, LLC (Aspect).

This Report and Project-Specific Factors

Aspect's services are designed to meet the specific needs of our clients. Aspect has performed the services in general accordance with our agreement (the Agreement) with the Client (defined under the Limitations section of this project's work product). This report has been prepared for the exclusive use of the Client. This report should not be applied for any purpose or project except the purpose described in the Agreement.

Aspect considered many unique, project-specific factors when establishing the Scope of Work for this project and report. You should not rely on this report if it was:

- Not prepared for you;
- Not prepared for the specific purpose identified in the Agreement;
- Not prepared for the specific subject property assessed; or
- Completed before important changes occurred concerning the subject property, project, or governmental regulatory actions.

If changes are made to the project or subject property after the date of this report, Aspect should be retained to assess the impact of the changes with respect to the conclusions contained in the report.

Reliance Conditions for Third Parties

This report was prepared for the exclusive use of the Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against liability claims by third parties with whom there would otherwise be no contractual limitations. Within the limitations of scope, schedule, and budget, our services have been executed in accordance with our Agreement with the Client and recognized geoscience practices in the same locality and involving similar conditions at the time this report was prepared

Property Conditions Change Over Time

This report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by events such as a change in property use or occupancy, or by natural events, such as floods,

earthquakes, slope instability, or groundwater fluctuations. If any of the described events may have occurred following the issuance of the report, you should contact Aspect so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Geotechnical, Geologic, and Environmental Reports Are Not Interchangeable

The equipment, techniques, and personnel used to perform a geotechnical or geologic study differ significantly from those used to perform an environmental study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually address any environmental findings, conclusions, or recommendations (e.g., about the likelihood of encountering underground storage tanks or regulated contaminants). Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding the subject property.

We appreciate the opportunity to perform these services. If you have any questions please contact the Aspect Project Manager for this project.