CONTRACT DOCUMENTS

FOR

2020-21 Sanitary Sewer Misc. I&I Repair Project
12-month "On Call" Contract

(DISTRICT PROJECT #C2003-II)

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Lake Whatcom Water & Sewer District
1220 Lakeway Drive
Bellingham, WA 98229
(360) 734-9224, (360) 738-8250 Fax

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Bellingham, WA 98229
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ADVERTISEMENT FOR BIDS

Lake Whatcom Water and Sewer District ("District") will receive sealed Bid proposals for the following project:

TITLE:	2020-21 Sanitary Sewer Misc. I&I Repair Project 12-month "On Call" Contract (District Project #C2003-II)
ESTIMATED BASE BID COST RANGE:	Base Bid $50,000 to $100,000 (Not including sales tax)
SUBMITTAL TIME/DATE/LOCATION:	Prior to 2:05 P.M. PST, Wednesday, August 19, 2020 Lake Whatcom Water and Sewer District 1220 Lakeway Drive Bellingham, WA 98229 Public Bid Opening will commence at approximately 2:10 P.M. The District Office is currently closed to the public due to COVID-19. The project bid opening will be broadcast live to the public using an online meeting platform. The day before the bid opening an e-mail will be sent to the MRSC Small Works Roster contact list with an invitation and instructions to join the bid opening.
PRE-BID MEETING:	Non-mandatory Campground Main CIPP site meeting Wednesday, August 12, 2020, 1:00 P.M. at 2271 Lake Louise Rd. In accordance with CDC and State requirements, face masks are required and 6-foot social distancing from all persons will be enforced.

Plans and specifications can be downloaded at: www.lwwsd.org. Within 24 hours following the bid opening, Bidders may obtain Bid results at the same location.

Direct questions regarding this project to Kristin Hemenway, PE at Lake Whatcom Water & Sewer District, 1220 Lakeway Drive, Bellingham, WA 98229, (360) 734-9224.

Bidder Responsibility will be evaluated for this project. In determining Bidder responsibility, the Owner shall consider an overall accounting of the criteria set forth in "DIVISION 00300 SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA".

Lake Whatcom Water and Sewer District reserves the right to accept or reject any or all proposals and to waive informalities or irregularities.

INSTRUCTIONS TO BIDDERS

PART 0 – GENERAL CONDITIONS

0.1 EXPLANATION TO PROSPECTIVE BIDDERS

A. A. In accordance with RCW 39.04.380 pertaining to a **Reciprocal Preference for Resident Contractors**, any public works bid received from a nonresident contractor from a state that provides an in-state percentage bidding preference, a comparable percentage disadvantage must be applied to the bid of that nonresident contractor.

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

1. Is from a state that provides a percentage bid preference to its resident contractors bidding on public works contracts; and
2. At the time of bidding on a public works project, does not have a physical office located in Washington.

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

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

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

B. Any prospective Bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must submit a request in writing to the Architect/Engineer (A/E) not later than 7 calendar days before the Bid due date. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective Bidder concerning a solicitation will be furnished promptly to all other prospective Bidders by addendum to the solicitation, if that information is necessary in submitting Bids or if the lack of it would be prejudicial to other prospective Bidders.

0.2 PREPARATION OF BIDS – CONSTRUCTION

A. Bids must be: (1) submitted on the Bid proposal forms, or copies of forms, furnished by the Owner or the Owner's agent, and (2) signed in ink. The person signing a Bid must initial each change appearing on any Bid form. If the Bid is made by a corporation, it shall be signed by the corporation's authorized designee empowered to make a binding

commitment for the corporation with the Bid. The address of the Bidder shall be typed or printed on the Bid form in the space provided.

B. A complete set of Bidding Documents shall be used in preparing Bids; neither Owner nor A/E assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents. Bidder shall be solely responsible for obtaining a complete set of Bidding Documents and relying on same for Bid preparation.

C. The Bid form may require Bidders to submit Bid prices for one or more items on various bases, including: (1) lump sum base Bid; (2) lump sum Bid alternate prices; (3) unit prices; or (4) any combination of items (1) through (3) above.

D. If the solicitation includes alternate Bid items, failure to bid on the alternates may disqualify the Bid. If Bidding on all items is not required, Bidders should insert the words "no bid" in the space provided for any item on which no price is submitted.

E. Substitute Bid proposals will not be considered unless this solicitation authorizes their submission.

0.3 BID GUARANTEE

A. When the sum of the base Bid plus all additive Bid alternates is $35,000.00 or less, Bid security is not required.

When the sum of the base Bid plus all additive alternates is greater than $35,000.00, a Bid guarantee in the amount of 5% of the base Bid amount including Washington State Sales Tax (WSST) is required. Failure of the Bidder to provide Bid guarantee when required shall render the Bid non-responsive.

B. Acceptable forms of Bid guarantee are: A Bid bond on Lake Whatcom Water and Sewer District's Bid bond form (Section 00310 Bid Bond), or postal money order, or certified check or cashier's check made payable to Lake Whatcom Water and Sewer District (collectively "Bid Guarantee").

The Owner will return the Bid Guarantee (other than Bid bond) to unsuccessful Bidders as soon as practicable, but not sooner than the execution of a contract with the successful Bidder. The successful Bidder's Bid guarantee will be returned to the successful Bidder with its official notice to proceed with the work of the contract.

C. The Bidder will return to the Owner a signed contract, insurance certificate and bond or bond waiver within 15 days after receipt of the contract. If the apparent successful Bidder fails to sign all contractual documents or provide the bond and insurance as required or return the documents within 15 days after receipt of the contract, the Owner may terminate the award of the contract and retain the Bid Guarantee.

D. In the event a Bidder discovers an error in its Bid following the Bid opening, the Bidder may request to withdraw its Bid under the following conditions:

1. Written notification is received by the Owner within 24 hours following Bid opening.

2. The Bidder provides written documentation of the claimed error to the satisfaction of the Owner within three (3) business days following the Bid opening.

The Owner will approve or disapprove the request for withdrawal of the Bid in writing. If the Bidder's request for withdrawal of its Bid is approved, the Bidder will be released from further obligation to the Owner without penalty. If it is disapproved, the Owner may retain the Bidder's Bid Guarantee.

E. The Bidder shall provide a Bid bond using an industry standard form. To be considered adequate the Bid bond must be signed by Bidder or surety, include Power of Attorney, and be for this project and Bidder.

0.4 ADDITIVE OR DEDUCTIVE BID ITEMS

The low Bidder, for purposes of award, shall be the responsive Bidder offering the low aggregate amount for the base Bid item, plus additive or deductive Bid alternates selected by the Owner, and within funds available for the project.

0.5 ACKNOWLEDGEMENT OF ADDENDA

Bidders shall acknowledge receipt of all addenda to this solicitation by identifying the addenda numbers in the space provided for this purpose on the Bid proposal form. Failure to do so may result in the Bid being declared non-responsive.

0.6 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

The Bidder acknowledges that it has taken steps necessary to ascertain the nature and location of the Work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the Work or its cost, including but not limited to (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and road; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during the Work. The Bidder also acknowledges that it has satisfied itself as to character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including exploratory work done by the Owner, as well as from the drawings and specifications made a part of this Contract. Finally, the Bidder acknowledges that it has become familiar with federal, state and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress or performance of the Work. Any

failure of the Bidder to take the actions described and acknowledged in this paragraph will not relieve the Bidder from responsibility for estimating properly the difficulty and cost of successfully performing the Work.

0.7 BID AMOUNTS

A. The Bid prices shown for each item on the Bid proposal shall include all labor, material, equipment, overhead and compensation to complete all of the work for that item.

B. The actual cost of building permit, right-of-way revocable encroachment permit, and other local government permits required to complete the project, along with the public utility hookup fees, will be a direct reimbursement to the Contractor or paid directly to the permitting agency by the Owner. Fees for these permits should not be included by the Bidder in the Bid amount.

C. The Bidder agrees to hold the base Bid and alternate prices open for acceptance by the Owner for sixty (60) days from date of Bid opening.

D. Unit prices shall not be excessively unbalanced (either above or below the amount of a reasonable Bid) to the potential detriment of the Owner. An unbalanced bid item could render the proposal irregular and constitute grounds for rejection of the Bid.

0.8 TAXES

The Bid amounts shall not include Washington State Sales Tax (WSST). All other taxes imposed by law shall be included in the Bid amount. The Owner will include WSST in progress payments. The Contractor shall pay the WSST to the Department of Revenue and shall furnish proof of payment to the Owner if requested.

[NOTE: Contractor must provide a payment bond pursuant to RCW 39.08.101 in amount of the Contract Sum plus the WSST.]

0.9 SUBMISSION OF BIDS

A. Bid Proposals must be submitted on or before the time specified in the Advertisement for Bids. All Bids must be made on the Bid Proposal Form, and be accompanied by a Bid Bond or other acceptable Bid Guarantee, along with any supplementary Bid forms. All blank spaces for Bid prices must be filled in with ink or typewritten, and the Bid forms must be fully executed when submitted.

B. If the base Bid and the sum of the additive alternates is estimated by the Owner to be one million dollars or more, the Bid Proposal shall comply with the following requirements:

1. Pursuant to RCW 39.30.060, if the base Bid and the sum of the additive alternates is one million dollars or more, the Bidder shall provide names of the Subcontractors with whom the Bidder will subcontract for

performance of heating, ventilation and air conditioning (HVAC), plumbing, and electrical.

2. The Bidder can name itself for the performance of the work.

3. The Bidder shall not list more than one Subcontractor for each category of work identified UNLESS Subcontractors vary with Bid alternates, in which case the Bidder must indicate which Subcontractor will be used for which alternate.

4. Failure of the Bidder to submit as part of the Bid the NAMES of such Subcontractors or to name itself to perform such work shall render the Bidder's Bid nonresponsive and, therefore, void.

C. The Bid Proposal shall be submitted in a sealed envelope addressed to the office specified in the Advertisement for Bids. The envelope shall have printed on the outside:

1. The project title.
2. The name and address of the Bidder.
3. Identification as Bid Proposal.

D. Prior to the Bid opening, the Owner's representative will designate the official Bid clock. Any part of the Bid proposal or Bid modification not received prior to the times specified, per the designated Bid clock, will not be considered and the Bid will be returned to the Bidder unopened.

E. A Bid may be withdrawn in person by a Bidder's authorized representative before the opening of the Bids. Bidder(s) representative will be required to show ID and sign on Bid summary sheet before it will be released.

0.10 BID RESULTS

After the Bid Opening, Bidders may obtain Bid results from the District office by calling (360) 734-9224 or by downloading the Bid tabulation from www.lwwsd.org. Bid results may also be obtained from the A/E.

0.11 LOW RESPONSIBLE BIDDER

A. Mandatory Responsibility Criteria: Before award of the Contract, a Bidder must meet the following mandatory responsibility criteria under RCW 39.04.350(1) to be considered a responsible Bidder and qualified to be awarded the Contract for this public works project. The Bidder must:

1. At the time of Bid submittal, have a certificate of registration in compliance with chapter 18.27 RCW;

2. Have a current Washington Unified Business Identifier (UBI) number;

3. If applicable, have Industrial Insurance (workers' compensation) coverage for the Bidder's employees working in Washington as required in Title 51 RCW; a Washington Employment Security Department number as required in Title 50 RCW; and 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. If Bidding on a public works project subject to the apprenticeship utilization requirements in RCW 39.04.320, 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 date of the Bid solicitation;

6. Have received training on the requirements related to public works and prevailing wage in accordance with 39.12 RCW. The bidder must designate a person or persons to be trained on these requirements. The training must be provided by the department of labor and industries or by a training provider whose curriculum is approved by the department. The department, in consultation with the prevailing wage advisory committee, must determine the length of the training. Bidders that have completed three or more public works projects and have had a valid business license in Washington for three or more years are exempt from this subsection. The department of labor and industries must keep records of entities that have satisfied the training requirement or are exempt and make the records available on its web site. Responsible parties may rely on the records made available by the department regarding satisfaction of the training requirement or exemption; and

7. Within the three-year period immediately preceding the date of the bid solicitation, not have been 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 to have willfully violated, as defined in RCW49.48.082, any provision of chapter 49.46, 49.48, or 49.52 RCW.

B. Supplemental Responsibility Criteria: In addition to the mandatory Bidder responsibility, the Owner will consider an overall accounting of the attached "DIVISION 00300 SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA".

Following the Bid opening, upon Owner's request, the apparent low Bidder(s) must supply the information requested in DIVISION 003000 SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA, within two (2) business days of request

by Owner. Withholding information or failure to submit all the information requested within the time provided shall render the Bid non-responsive.

The Owner will make a determination whether or not the apparent low Bidder is responsible, taking into account all the information submitted by the apparent low Bidder(s) in response to this request. The Owner will notify the Bidder of its determination in writing, including the reasons for its determination.

Within three (3) days after receipt of the determination, if the Bidder is determined not responsible, the Bidder may withdraw its Bid or request an appeal hearing. The Bidder may also present additional information pursuant to RCW 39.04.350 (2)(d).

If the Bidder requests an appeal hearing, the Owner will schedule said hearing at a Board of Commissioner meeting, to be heard not later than two (2) weeks after receipt of Bidder's request. The appeal hearing members will be the Board of Commissioners. The Board will issue a Final Determination after reviewing information presented at the appeal hearing. If the Final Determination affirms that the Bidder is not responsible, the Owner will not execute a Contract for the Project with any other Bidder until two (2) business days after the Bidder determined to be not responsible has received the Final Determination. The Final Determination is specific to this Project, and will have no effect on other or future projects.

C. Bidders with concerns about the relevancy or restrictiveness of the Supplemental Bidder Responsibility Criteria required in these Bidding Documents may make or submit requests to the Owner to modify the criteria. Such requests should be in writing, describe the nature of the concerns, and proposed specific modifications to the criteria that will make the criteria more relevant or less restrictive of competition. Bidders shall submit any such request seven (7) days prior to the Bid submittal deadline and address the request to the Lake Whatcom Water & Sewer District General Manager.

0.12 "SUBCONTRACTOR RESPONSIBILITY CRITERIA"

A. In accordance with RCW 39.06.020 the Contractor shall include the language of this section in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. The requirements of this section apply to all subcontractors regardless of tier.

B. At the time of subcontract execution, the Contractor shall verify that each of its first tier subcontractors meets the following Bidder responsibility criteria:

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 subcontract Bid submittal;

2. Have a current Washington Unified Business Identifier (UBI) number; and if applicable, have:

    a. Industrial Insurance (workers' compensation) coverage for the subcontractor's employees working in Washington, as required in Title 51 RCW;
    b. A Washington Employment Security Department number, as required in Title 50 RCW;
    c. A Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;
    d. An electrical contractor license, if required by Chapter 19.28 RCW;
    e. An elevator contractor license, if required by Chapter 70.87 RCW.

3. Not be disqualified from Bidding on any public works contract under RCW 39.06.010 or 39.12.065(3).

4. Have received training on the requirements related to public works and prevailing wage in 39.12 RCW. The bidder must designate a person or persons to be trained on these requirements. The training must be provided by the department of labor and industries or by a training provider whose curriculum is approved by the department. The department, in consultation with the prevailing wage advisory committee, must determine the length of the training. Bidders that have completed three or more public works projects and have had a valid business license in Washington for three or more years are exempt from this subsection. The department of labor and industries must keep records of entities that have satisfied the training requirement or are exempt and make the records available on its web site. Responsible parties may rely on the records made available by the department regarding satisfaction of the training requirement or exemption; and

0.13 CONTRACT AWARD

A. The Owner will evaluate Bids responsiveness and responsibility.

1. A Bid will be considered responsive if it meets the following requirements:

    a. It is received at the proper time and place.
    b. It meets the stated requirements of the Bid proposal.
    c. It is submitted by a licensed/registered contractor within the State of Washington at the time of Bid opening and is not banned from Bidding by the Department of Labor and Industries.
    d. It is accompanied by a Bid Guarantee, if required.

2. A Bid will be considered responsible if it meets the following requirements:

    a. It meets the mandatory responsibility criteria established in RCW 39.04.350 and an overall accounting of the supplemental responsibility criteria established for the project.

B. The Owner reserves the right to accept or reject any or all Bid proposals and to waive informalities or irregularities at its discretion and to accept the Bid which Owner deems to be in its best interest. The lowest Bid will not necessarily be accepted. Without in any way limiting the generality of the foregoing, any Bid may be rejected by Owner in its sole discretion for any of the following reasons:

1. Incomplete Bid.
2. Obscured or irregular erasures or corrections.
3. Prices omitted or unbalanced.
4. Evidence of inadequate experience of Bidder
5. Evidence of inadequate capacity of Bidder
6. Failure to qualify under condition of Bidding Requirements
7. Evidence of previous failure to adequately perform work
8. Insertion by Bidder of conditions which vary from the Bidding Requirements or Bid Forms.

C. No action of the Owner other than a written "Notice of Acceptance," signed by an official properly authorized to execute same by the Owner, shall constitute an acceptance of a Bid.

D. The apparent low Bidder(s), for purpose of award, shall be the responsive Bidder(s) offering the low aggregate amount for the base Bid plus selected additive or deductive Bid alternates and meeting all other Bid submittal requirements.

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

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

EXAMPLE: Alaska Nonresident Contractor Bid Amount	$100,000
Multiplied by the Alaska CPD	x 0.05
Alaska CPD Total	$ 5,000

Alaska Nonresident Contractor Bid Amount	$100,000
Alaska CPD Total	$ 5,000
Nonresident Disadvantage Total	$105,000*

* Note: If the Nonresident Disadvantage Total is lower than all other Washington contractor bid amounts, the Alaska Nonresident Contractor is the successful bidder and will be awarded a contract for the bid amount of $100,000. If the Nonresident Disadvantage Total is higher than a Washington contractor bid amount, the successful Washington bidder will be awarded a contract for the bid amount.

F. The Contract will only become effective when signed by both the Contractor and the Owner. Prior to the Owner's signature, any and all costs incurred shall be the sole responsibility of the Bidder.

G. In the event of a tie low Bid between responsive and responsible Bidders, the Contract will be awarded by random method. The random method will be performed at a District public meeting, where a District commissioner will pull a winner from a hat containing the names of tie Bidders.

0.14 DOCUMENTS (ATTACHED)

A. Advertisement for Bids
B. Supplemental Bidder Responsibility Criteria
C. Bid Bond form
D. Bid Proposal
E. Payment Bond form
F. Performance Bond form
G. Retainage Bond form
H. Washington State Prevailing Wage Rates (by reference)
I. Water & Sewer Risk Management Pool (WSRMP): Builder's Risk – Hazard Evaluation Guide (FS-01-10)

SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA

Following the Bid opening, upon Owner's request, the apparent low Bidder(s) must supply the requested information as identified herein within two (2) business days of request by Owner. Withholding information or failure to submit all the information requested within the time provided shall render the Bid non-responsive.

The Owner will make a determination whether or not the apparent low Bidder is responsible, taking into account all the information submitted by the apparent low Bidder(s) in response to this request. The Owner will notify the Bidder of its determination in writing, including the reasons for its determination. Within three (3) days after receipt of the determination, if the Bidder is determined not responsible, the Bidder may withdraw its Bid or request an appeal hearing. The Bidder may also present additional information pursuant to RCW 39.04.350 (2)(d). If the Bidder requests an appeal hearing, the Owner will schedule said hearing at a Board of Commissioner meeting, to be heard not later than two (2) weeks after receipt of Bidder's request. The appeal hearing members will be the Board of Commissioners. The Board will issue a Final Determination after reviewing information presented at the appeal hearing. If the Final Determination affirms that the Bidder is not responsible, the Owner will not execute a Contract for the Project with any other Bidder until two (2) business days after the Bidder determined to be not responsible has received the Final Determination. The Final Determination is specific to this Project, and will have no effect on other or future projects.

The following supplemental Bidder responsibility criteria and requested supporting documentation are established for this Project. To be responsible, a Bidder must substantially meet the responsibility criteria established below.

1. Workload Capacity

Current Workload Capacity Criterion:

The Bidder's concurrent and projected workload during the life of this Contract should not exceed 150% of the actual contracted workload over the previous 12 month period unless the Bidder can demonstrate to the Owner's satisfaction that it has the capacity to assume the additional work of this Project, provide adequate staffing, and meet Project demands.

□	Current Workload Documentation:	Provide a list of all construction contracts $100,000 and above your firm has in progress and those projected to commence during the next 9 months, giving the name of project; name, address, and phone number of owner and architect/engineer; contract amount; percentage complete, and scheduled completion date. Failure to list all projects shall render the Bid non-responsive. List the current and projected workload for the next 12 months including this Contract, expressed in total contract value. $_____ List actual contracted workload for the previous 12 months expressed in total contract value. $_____

2. Previous Experience

Previous Experience Criterion:

The Bidder should have experience over the most recent past five (5) years with successfully completing public works projects similar in size and complexity to the current Project. The Contractor's Superintendent and Project Manager should also have experience within the past five (5) years successfully managing to completion public works projects of similar size and complexity to the current Project.

Previous Experience Documentation:

□	Experience of Contractor:	Provide a list of public works construction contracts similar in size and complexity your firm has completed in each of the past five (5) years, giving the name of the project, name, address, and phone number of owner, and architect/engineer, contract amount, date of completion, and percentage of the cost of the work performed with your own forces. This information will be used for references.
□	Experience of Superintendent:	Submit resume and references of the person proposed by the Bidder to superintend the work. Resume and references should demonstrate Superintendent has managed public works projects of similar complexity and similar size, and successfully completed the project(s) within the last five (5) years.
□	Experience of Project Manager	Submit resume and references of the person proposed by the Bidder to manage the project. Resume and references should demonstrate Project Manager has managed public works projects of similar complexity and similar size, and successfully completed the project(s) within the last five (5) years.

3. Ability to Perform Within Time Specified

Ability to Perform Criterion:

Bidder should have a demonstrable recent track record of completing public works projects on time.

Ability to Perform Documentation:

□	Contractor's Ability to Meet the Project Schedule	Provide a list of public works construction contracts similar in size and complexity by title, original contract time, and change order time extensions completed within the past five (5) years. Bidders shall document that it achieved substantial completion of these projects of similar size and scope within no more than 105% of the originally allowed contracted duration adjusted for change orders. References and current contact information for owners and architect/engineers on each project listed should be provided

BID BOND

KNOW ALL PEOPLE BY THESE PRESENTS, that _____ the

CONTRACTOR, hereinafter known as PRINCIPAL, and _____ hereinafter known as SURETY, are held and firmly bound to the Lake Whatcom Water and Sewer District hereinafter known as

OWNER, in the penal sum of _____

_____

dollars (not less than 5% of Base Bid plus Additive Alternates including Washington State Sales Tax) for the payment of which sum well and truly to be made, we do jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns firmly by these presents.

WHEREAS, the PRINCIPAL has submitted a Bid for

(*Project Title*): _____

NOW, THEREFORE, the condition of this obligation is such that if the OWNER accepts the Bid of the PRINCIPAL, and

a. the PRINCIPAL executes such Contract Documents required by the terms of the Bid and provides required bonds for the performance of the Contract and for the prompt payment of labor and material furnished for the project as may be specified in the Bid then this obligation is satisfied, or

b. in the event of the failure of the PRINCIPAL to execute such Contract Documents and provide such Bonds required by the terms of the Bid, the PRINCIPAL shall pay and forfeit to the OWNER the full penal sum hereof, then this obligation shall be null and void; otherwise this obligation remains in full force and effect and the SURETY shall forthwith pay and forfeit to the OWNER, as a penalty and liquidated damages, the amount of this bond.

SIGNED, SEALED AND DATED THIS _____ day of_____, 20____.

_____	_____
PRINCIPAL	SURETY
_____	_____
By	By
_____	_____
Title	Title
_____	_____
Address of PRINCIPAL	Address of SURETY

Note: If PRINCIPAL is Partnership, all Partners should execute bond. Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Washington. A power of attorney must be provided which appoints the SURETY's true and lawful attorney-in-fact to make, execute, seal and deliver this bond.

Project Name: 2020-21 Sanitary Sewer Misc. I&I Repair Project (District Project #C2003-II)

Name of Firm:_____

BASE BID:

Item	Description	Quantity	Unit	Unit Price	Amount
1	Mobilization and Demobilization	6	EA		
2	Campground CIPP Main Repair (MH to MH) - 8" Pipe Diameter	1	LS		
3	Traffic Control – 1 Person Crew	40	HR		
4	Traffic Control – 2 Person Crew	40	HR		
5	CIPP Sectional Liner, 6"-8" Pipe Diameter x 3 ft.	20	EA		
6	CIPP Sectional Liner, 6" - 8" Pipe Diameter x 4 ft.	20	EA		
7	Trim Protruding Lateral	20	EA		
8	Lateral Reconnection & Grouting	15	EA		
9	Top Hat Liner	15	EA		
10	Testing of 6"-8" Pipe Diameter Sewer Mainline Pipe Joint	50	EA		
11	Testing of 10"-12" Pipe Diameter Sewer Mainline Pipe Joint	50	EA		
12	Chemical Grouting 6"-8" Pipe Diameter Sewer Mainline Pipe Joint & Defect	30	EA		
13	Chemical Grouting 10"-12" Pipe Diameter Sewer Mainline Pipe Joint & Defect	30	EA		
14	Chemical Grouting Other Locations	15	EA		
15	Chemical Grout (Material)	500	GAL		
16	Sewage Bypass Pumping – 8" Pipe Diameter	8	EA		
17	Sewage Bypass Pumping – 10" Pipe Diameter	8	EA		
18	Smoke Testing (Mainline Sewer, Manhole to Manhole)	30	EA		
				Total Base Bid:	**$**

(do not include Washington State Sales Tax)

Name of Firm:_____

The Owner reserves the right to accept or reject any or all Bid prices within sixty (60) days of the Bid date.

Time for Completion

The undersigned hereby agrees to substantially complete all the Work (and accepted alternates**) within 365 calendar days** after the date of Notice to Proceed; and to achieve Final Completion within **0 calendar days** of Substantial Completion.

Work Window Limitation Seasonal clearing activity limitations established by Whatcom County Code 20.51.410 are in force. Clearing activity, which includes trench excavation/backfill and other land disturbance, that will result in exposed soils exceeding 500 square feet are not permitted from October 1 through May 31. Whatcom County measures the total project land disturbance area to determine the square footage threshold, not individual work sites or sequential trenching/backfill. **To meet this requirement the contractor must complete all excavation and land disturbance activities on the project between May 31 and October 1, except for the last 500 square feet.**

Liquidated Damages

The undersigned agrees to pay the Owner as liquidated damages the sum as specified in the General Conditions for each consecutive calendar Day that is in default after the Contract Time(s). Liquidated damages shall be deducted from the contract by Change Order or from the Contractor's application for payment as determined by Owner in its sole discretion.

Receipt of Addenda

Receipt of the following addenda is acknowledged:

Addendum No. ___	Addendum No. ____	Addendum No. ____
Addendum No. ___	Addendum No. ____	Addendum No. ____

Applicable Prevailing Wage Rages

State of Washington prevailing wage rates for this public works project located in Whatcom County may be found at the following website address of the Department of Labor and Industries: https://fortress.wa.gov/lni/wagelookup/prvWagelookup.aspx. Based on the Bid submittal deadline for this project, the applicable effective date for prevailing wages for this project is **(August 19, 2020)**. A copy of the applicable prevailing wage rates are also available for viewing at the office of the Owner, located at 1220 Lakeway Drive, Bellingham, Washington. Upon request, the Owner will mail a hard copy of the applicable prevailing wages for this project.

Bid Submittal Checklist

___ 00410 Bid Proposal (this form)

___ Bid Guarantee (00310 Bid Bond or other type of Bid Guarantee)

Name of Firm _____

Non-Collusion Declaration: By signing below, I hereby declare that I, firm, association or corporation has (have) not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action restraining free competitive bidding for this project.

In addition, by signing below I hereby declare that: Within the three-year period immediately preceding the date of the bid solicitation, I, firm, association or corporation has (have) not have been 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 to have willfully violated, as defined in RCW49.48.082, any provision of chapter 49.46, 49.48, or 49.52 RCW.

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

Check One: Sole Proprietorship ☐ 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:

_____

Signed by _____, Official Capacity _____

Print Name _____

Date of Execution _____

Place of Execution _____

** 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.*

Address _____

City _____ State _____ Zip Code _____

Telephone _____ FAX _____

State of Washington Contractor's License No. _____

Federal Tax ID # _____ e-mail address: _____

Employment Security Department No. _____

WATER & SEWER RISK MANAGEMENT POOL

[WSRMP]

INSURING WASHINGTON'S WATER AND SEWER UTILITIES SINCE 1987

Builder's Risk - Hazard Evaluation Guide for Projects > $100,000

(FS-01-10)

How to Use this Guide

Best risk management practice indicates that Districts and their project management representatives should require contractor's awarded a project to submit a written site specific loss control plan (SSLCP) for projects with a constructed value of $100,000 or greater. Builder's Risk hazard risk control procedures must be included in each contractor's loss prevention plan and submitted for review by the District. Districts are provided Builders Risk insurance through WSRMP which puts them in a much better negotiating position to contractually require that best practices be followed to control Builders Risk exposures. This guide can be used by member Districts to evaluate whether each element is covered in the general contractor's document submittals.

If a member District does not have such a Builder's Risk checklist they may want to provide the Prime Contractor a copy of the attached checklist after bid award to help the Prime Contractor know what the District expects should be in a good SSLCP.

If a SSLCP is included by reference as part of the construction contract then during the course of construction, when deviations occur from the loss control plan the owner is not directing the construction work but is only enforcing the contract.

If you have further questions about Builders Risk and Course of Construction Risk Management please call WSRMP at 425-452-9750 or email larryb@wsrmp.org

Builders' Risk (FS-01-10)

(Course of Construction Loss Control Guidance on Preparation of Site-Specific Loss Control Plans)

Introduction

This guide was prepared for building construction and other structures, during the course of construction, including the planning, site preparation, and erection/installation periods. Its focus includes loss prevention suggestions in the areas of management practices, fire and engineering planning, site security, off-site security, and construction practices. It is designed to consider property damage exposures rather than employee or public safety.

Structures in the course of construction are susceptible to substantial loss. Many of these losses, not including damage caused by environmental causes, could and should be prevented through management attention to the areas contained in this guide.

The topics covered in this document are intended to provide an overall awareness of the major exposures and hazards associated with District member construction risks. It is not possible to treat any of these subjects in an exhaustive manner. While the information and recommendations provided cannot guarantee a loss free environment, they should contribute to the control of losses. Adapt these guidelines to project requirements and sit-epecific con

SITE SECURITY

General Premises Protection and Control

a) Develop job site security plan and assign security responsibilities.
b) Contact police authorities and solicit aid of neighbors to watch site.
c) Require reports of theft and vandalism and maintain complete records thereof.
d) Encourage employees to suggest and assist in solving problems.
e) Consider utilizing a reputable security service with communication equipment to minimize incidence of fire, theft and vandalism.
f) Include security staff representatives as part of pre-construction and emergency planning meetings.

Theft and Vandalism

a) Enclose job site with an eight-foot chain link fence. If fencing is not practical, establish a fenced, well-lighted compound on the site for containment of essentials such as equipment and building materials, as well as the construction trailer.
b) Provide adequate but limited access with locking gates. Have a construction trailer at gate.
c) Locks should be of high quality and should remain locked at all times. Keys should be accessible only to appropriate personnel.
d) Check out site before leaving for the day.
e) Provide elevated nighttime lighting.
f) Utilize around the clock security guards.
g) Install alarm systems on trailers and storage sheds.

Equipment, Tools and Materials

a) Establish an inventory control program and check out system for tools and material.
b) Mark all tools and materials in distinctive manner.

c) Lock all equipment cabs during non-working hours, and monitor key control program.
d) Disable equipment by removing battery, distributor cap or rotor, chain equipment together, and position mobile equipment to block vulnerable items. Lock oil, gas and hydraulic caps.
e) Secure tools in locked storage shed or trailer.
f) Make one person responsible to sign for deliveries or materials and verify same.
g) Keep inventory of materials to a minimum and store away from perimeter fencing.
h) Control on site parking in designated areas to necessary vehicles and locate employee-parking remote from job site fence.

Security Service

a) Determine level of protection required by location, exposure to natural perils, and nature of on-site exposures.
b) Specify requirements to professional security service provider.
c) Consider these elements of security service:
   i. Site ingress and egress.
   ii. Local and remote control reporting.
   iii. Site Patrolling.
   iv. Requirements during all types of emergency plans, including use and activation of emergency equipment.
   v. Quality of on-site communications.
   vi. Quality of off-site communications for public fire and police assistance.
   vii. Knowledge and experience of service for type of construction.

d) Identify authority level of security service. All contractors on the site should understand such authority.

OFF-SITE SECURITY

Storage Yards and Lots

a) Provide adequate lighting, fencing, and watchmen service and/or camera supervision.
b) Do not store machinery and materials of high value or any property susceptible to damage by weather conditions at these off-site locations.
c) Avoid areas subject to flooding, earth slide and other natural perils.

Assembly Locations

a) Select reputable contractor when off-site assembly of machinery/equipment is required and obtain certificates of insurance from the contractor.
b) Pre-plan and coordinate off-site assembly of required items to maximize workflow procedures and minimize storage exposures.

Warehouses

a) Arrange purchasing/delivery to minimize need for prolonged storage periods.
b) Maintain effective inventory procedures for checking items received and removed from storage.
c) Provide adequate physical protection and controls against loss by fire, theft and vandalism.
d) Develop a fire prevention program that includes both private and public protection.
e) Ensure storage arrangements conform to applicable standards and maintain adequate access.
f) When a public warehouse facility is used, it should be reputable, financially responsible and in good physical condition with adequate protection.
g) Identify acceptable warehouse locations during preplanning process to facilitate selection if need arises.

Transit

a) Ensure proper equipment used for transporting property (e.g. low boys, flat beds, and vans).
b) Pre-plan route to avoid low overpasses, bridges with weight restrictions, etc.

c) Schedule delivery to job site to minimize storage exposures prior to installation.
d) Comply with special regulations and practices when transporting wide loads.
e) Secure items properly for transit and protect them from the weather.
f) Avoid overnight runs with unattended parking exposures whenever possible.
g) Avoid temporary dropping of trailer with load outside actual job site.
h) Arrange delivery at job site when designated personnel are available to accept load.
i) Assure proper handling equipment at job site for safe unloading upon arrival.
j) Assure adequate access to job site (e.g.: clearance of streets and overheads, stability of ground ramps).
k) Inspect load and sign bill of lading upon receipt from carrier noting any shortages or damages.
l) Determine who has title to property in transit to avoid disputes after a loss.

HOISTING AND RIGGING

a) When hoisting or rigging is necessary, use a licensed, capable rigger and obtain certificates of insurance from the rigger.
b) Follow the manufacturers' recommended procedures when loading/unloading equipment and materials.
c) Engineer all critical loads to be hoisted. Do not rely on invoice weights, when accurate weights are critical to the hoist.

FIRE PROTECTION / HAZARD PREVENTION

The potential for serious fire damage is often greater during the course of construction than after the building is completed. The lack of fire proofing on structural members, lack of cut offs, accumulations of combustibles, temporary heat and hot processes, coupled with incomplete fire protection systems such as alarms, standpipes and sprinklers create this vulnerability.

The following guidelines will help reduce the potential of a fire during construction and will help to provide a framework for fire control should a fire occur.

Management Responsibilities

a) Establish accountability AND responsibilities.
b) Implement prevention/protection programs.

Fire Prevention

a) Organize safe storage of materials.
b) Remove packing materials, combustible form work and other trash regularly. Do not allow trash to accumulate on the site.
c) Welding and cutting operations should be conducted safely, away from combustible materials. A fire watch should be posted in the area during operations and for 30 minutes after hot work is completed. Protect exposed, immovable combustibles.
d) Tar kettles should be located outside the building, safely away from combustibles.
e) Temporary heat should be provided by UL listed equipment, which is properly installed. Bonfires and drum fires should be prohibited.
f) Spare gas cylinders should be stored upright with valve cover in place. Cylinders should be stored in a cool area and should be secured to prevent tipping.
g) Fuel gases should be stored away from oxidizing gases.
h) Flammable liquids should be limited in quantity to that necessary for operations. Bulk storage should be in stable, diked tanks or properly marked safety cans located away from source of ignition and physical damage.
i) Only flame resistant tarpaulins should be used.
j) Temporary offices and tool sheds should be located outside the building. If such structures are erected inside the building, construction should be of non-combustible material and sprinkler protection should be provided.
k) Temporary electrical service and circuits should be installed in accordance with the National Electrical Code.
l) Temporary heating devices such as LPG fueled jet heaters should be UL listed and located a safe distance from any combustible materials.

Public Protection

a) Job site access for fire department usage, including access to all sides of the structure should be provided and maintained throughout the period of construction.
b) Water supply should be adequate, reliable and accessible for all areas of the job site. Notify proper authority as soon as fire hydrants, standpipes or similar devices become available so they can inspect and test as appropriate.
c) Fire protection systems should be expedited and should be with hose connection completed and placed in service on each floor as early as possible during construction.
d) Temporary sprinkler system should be provided in areas where hazards warrant.
e) For high-rise buildings, extend a serviceable standpipe up and provide at least one 2 1/2" hose outlet on each floor. Locate top hose outlet not more than one floor below the highest area containing combustibles. Provide a readily accessible fire department connection outside at street level.
f) Properly maintained fire extinguishers should be provided in all office sheds, tool sheds, etc., and on each floor of the building.
g) Security services should be provided during all idle hours. Security guards should patrol the construction site regularly and should record rounds on a watch clock.
h) Provide communication capabilities with the public fire department.
i) Fire walls protecting horizontal and vertical openings should be completed as early as possible during construction.
j) An emergency organizational plan should be established to call the fire department, implement fire fighting measures, and take action to limit the damage should a fire occur. Furnish site plan to fire department showing access points to the site and critical storage areas, such as flammable liquids and solids.
k) Arrange periodic on-site visits by fire department.

CONSTRUCTION PRACTICES

Consideration of the types, methods and features of construction are significant aids in evaluating the loss potential of builder's risks. The many practices must be compatible and complementary to minimize or avoid loss, always bearing in mind that changes in design should be approved by the design engineer and project manager. Offered here are some guidelines to help control this exposure.

COMPONENT CONSIDERATIONS

To properly evaluate the general exposure to any structure, one should evaluate the key components that make up the project, e.g. foundation, frame, roof. It may be desirable to employ specialists, e.g. special rigging, post tensioning or specialized concrete placement. Bear in mind that soil and foundation engineers are not always used. During all phases of construction and development, supervision by specialized, experienced engineers and contractors is critical to assure proper communication and continuity of design.

Foundations

Hazard: Improper design or workmanship can result in abnormal settlement, which can affect the integrity of the completed structure.
Suggestion: In more complex foundation situations, utilize test piles to verify capability. Maintain adequate de-watering capability (especially in deeper foundations or cast in place piles or caissons). Require contractor to report unusual soil conditions from the expected, especially compressible soils or voids.

Structural Support

Hazard: Improperly erected structural support can result in extensive repairs or even total collapse of the structure.
Suggestion: The design engineer should be represented at the site in order to assure the contractor's understanding of the

construction details such as expansion joints, erection sequence, and temporary support requirements. Utilize specialist contractors as necessary.

Facades

Hazard: Improperly constructed facades can result in personal hazard (falling objects) as well as threaten the water, weather and insulation integrity of the building.
Suggestion: It is essential that a qualified specialist contractor be utilized as well as any specialized erection guidance.

Roof Structures

Hazard: Failure of roof systems to maintain water integrity as well as load capability can result in water damage to interiors as well as collapse.
Suggestion: Inspections should include tests for adequate expansion as well as water removal capability (to avoid pounding).

TECHNIQUES AND TYPES OF CONSTRUCTION

Contractors use a variety of techniques to perform the various types of construction required by building designers. While the type of structure will determine the basic material (e.g. concrete, reinforced concrete, and structural steel), the contractor often has a number of options in choosing the respective technique. In order to avoid these hazards of specialized work, it is recommended that only experienced, specialized contractors be used. Some of these techniques and their considerations are:

Concrete Placement

Hazard: Improperly placed or poor quality concrete can often result in a member that is structurally weak or overstressed (excessive shrinkage). This can lead to extensive remedial repairs or catastrophic collapse of an entire structure.
Suggestion: Require independent inspection of incoming concrete as well as observation of contractor placement. Additional tests of samples should be made to verify ultimate strength. Pouring sequence should be arranged to minimize setting shrinkage of the overall member and assembly. Shoring equipment should have a safety factor based on accepted testing procedures. During and after the pour, there should be continuous inspection of the shoring system so that any movements can be adjusted immediately.

Flying Forms

Hazard: Aside from the damage, which may occur to the forms themselves during the moving operation, the major concern is the collapse hazard. This can result, either from the removal of the forms before proper curing of the concrete or the structural failure of the flying forms themselves.
Suggestion: The forms should be designed for the specific job and the manufacturer's specification should be followed in the assembly and pouring of the concrete within designated safe capacities. Recommended capacities are for new equipment, therefore, after each concrete placement, all parts of the forms should be inspected and any dents, cracks, broken welds, etc., should be repaired or the part replaced.

Tilt-Up and Precast Wall Construction

Hazard: Usual rigging exposures when panels are lifted into place. Until the roof is in place, there is a critical period when the walls are highly susceptible to wind or other accidental damage.
Suggestion: Properly approved and engineered rigging plans should be drawn and not altered without the engineer's approval. Once in place, panels must be properly braced against wind or lateral movement. Temporary bracing should be carefully designed, recognizing not only the normal wind factors for the area, but also allowing for unexpected high winds which could be encountered. Construction of the bracing should follow manufacturer's recommendations and be closely supervised.

Slurry Wall Excavation

Hazard: This technique can result in collapse or ground sliding when improperly performed.
Suggestion: Utilize only experienced specialist contractors for this work.

Other Techniques Which Require Specialized Contractor Experience

Slip Forming
Jump Forming
Post Tensioning

Fast Track Construction

Hazard: Changes to design during construction, which are not properly coordinated, can cause damage or even structural collapse.
Suggestion: Require continuous monitoring of construction as well as changes by the design engineers to assure proper communication as well as continuity of design.

CONTRACTOR DESIGN/BUILD EXPERIENCE

Since all design work is not done by the architect/engineer, some additional considerations are:

Reinforced Concrete

Hazard: Improper design of form work causing collapse of uncured concrete. Also there is the possibility of collapse due to improper detailing of reinforcing steel.
Suggestion: Require contractor qualification or require subcontract to qualified specialty contractor.

Cofferdam/Retaining Wall

Hazard: Collapse due to improper design.
Suggestion: Have specialized and detailed design reviewed by project design engineer.

Rigging Design

Hazard: Damage due to collapse of component or system during specialized rigging operations.
Suggestion: Require design engineers to review critical work (rigging plans) as well as utilize specialized, experienced and qualified contractor.

NATURAL PERILS

Earthquake

Refer to applicable building codes to determine seismic zone (0, 1, 2, 3, 4,) and anticipated earthquake intensity, if any, for the location.

Identify any fault, fault length, date and maximum magnitude of a seismic event. Also check seismic history for frequency of events.

Consider pre-construction site conditions determined that could be affected by seismic activity.

a. Terrain: Topography of land, bodies of water.
b. Geologic formation and soil conditions: bedrock type, thickness and type of overburden, water table, filled ground.
c. Ground site response: compaction, landslides, liquefaction, uplift or displacement along a fault.

Emergency plans in event of seismic activity should include: availability of cranes, site protection, utilities outages, vandalism and theft protection, and transportation of injured to nearest hospital clinic or aid station. Construction in known seismic zones should conform to that zone's requirements and should be verifiable through the architect's/engineer's plans and specifications.

Flood

Determine if location is in 100-year flood plain. On line resources are available to estimate flood zones.

Consider local site conditions that could induce flash flooding such as: up-slope exposures, gullies, washes, dams, reservoirs, water impoundment on site or adjacent site, existing drainage facilities for overloading by flash flooding or unusual rains.

Make chronological inventory of materials, building equipment installed and to be installed, construction equipment and electrical facilities.

Establish plan to monitor weather forecasts 24 hours per day to identify need to move equipment or materials to higher elevations or safer locations.

Windstorm

Determine meteorological history of the area including known losses.

Check for local prevailing winds and phenomena. Even low winds can cause damage to partially completed structures such as framing, unsupported masonry, and tilt up construction. Gusts can be twice the prevailing wind speeds.
Unprotected and unsecured materials are particularly vulnerable.

Establish plan to monitor weather forecasts 24 hours per day to identify need to install extra bracing or supports, and provide better protection for equipment or materials susceptible to windstorm damage.

PERFORMANCE BOND

KNOW ALL PEOPLE BY THESE PRESENTS, that _____ the

CONTRACTOR, hereinafter known as PRINCIPAL, and _____ hereinafter known as SURETY, are held and firmly bound to the Lake Whatcom Water and Sewer District hereinafter known as

OWNER, in the penal sum of _____

_____ dollars (including Washington State Sales Tax) for the payment of which sum well and truly to be made, we do jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the PRINCIPAL entered into a Contract

with the OWNER dated the _____ day of_____ _____,20____ to construct the

(*Project Title*): _____, and which Agreement is on file at the OWNER's office and by this reference is made a part hereof.

WHEREAS, said PRINCIPAL is required under the terms of said Agreement to furnish a bond for the faithful **performance** of said Agreement:

NOW, THEREFORE, if the Principal shall well, truly, and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received agrees that no change, extension of time, alteration or addition to the terms of the Contract, the SPECIFICATIONS accompanying the Contract, or to the WORK to be performed under the Contract shall in any way affect its obligation on this BOND, and waives notice of any change, extension of time, alteration or addition to the terms of the Contract or the WORK performed. The Surety agrees that modifications and changes to the terms and conditions of the Contract that increase the total amount to be paid the Principal shall automatically increase the obligation of the Surety on this BOND and notice to Surety is not required for such increased obligation.

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

IN WITNESS WHEREOF, the duly authorized officers of PRINCIPAL and of SURETY execute this instrument in three counterparts, each one of which shall be deemed an original, this the_____ day of_____, 20____.

_____	_____
PRINCIPAL	SURETY
_____	_____
By	By
_____	_____
Title	Title
_____	_____
Address of PRINCIPAL	Address of SURETY

Note: Date of Bond must not be prior to date of Contract. If PRINCIPAL is a Partnership, all Partners should execute bond. Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Washington. A power of attorney must be provided which appoints the SURETY's true and lawful attorney-in-fact to make, execute, seal and deliver this bond.

PAYMENT BOND

KNOW ALL PEOPLE BY THESE PRESENTS, that _____ ____ the

CONTRACTOR, hereinafter known as PRINCIPAL, and _____ hereinafter known as SURETY, are held and firmly bound to the Lake Whatcom Water and Sewer District hereinafter known as

OWNER, in the penal sum of _____

_____ dollars (including Washington State Sales Tax) for the payment of which sum well and truly to be made, we do jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the PRINCIPAL entered into a Contract

with the OWNER dated the _____ day of_____, 20____ to construct the

(*Project Title*): _____, and which Agreement is on file at the OWNER's office and by this reference is made a part hereof.

WHEREAS, said PRINCIPAL is required under the terms of said Agreement to furnish a bond for the faithful **payment** of all laborers, mechanics, subcontractors, materialmen and all persons who shall supply said Principal or said subcontractors with provisions and supplies for the carrying on of work under said Contract:

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said Contract and pay all laborers, mechanics, subcontractors, materialmen and all persons who shall supply said Principal or said subcontractors with provisions and supplies for the carrying on of such work during the original term of said Contract and any extension thereof that may be granted by the Lake Whatcom Water and Sewer District, and during the life of any guaranty required under the Contract and shall well and truly perform and fulfill the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract and pay all laborers, mechanics, subcontractors, materialmen and all persons who supply said Principal or said subcontractors with provisions and supplies for the carrying on of such modifications which may hereafter be made, then this obligation to be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received agrees that no change, extension of time, alteration or addition to the terms of the Contract, the SPECIFICATIONS accompanying the Contract, or to the WORK to be performed under the Contract shall in any way affect its obligation on this BOND, and waives notice of any change, extension of time, alteration or addition to the terms of the Contract or the WORK performed. The Surety agrees that modifications and changes to the terms and conditions of the Contract that increase the total amount to be paid the Principal shall automatically increase the obligation of the Surety on this BOND and notice to Surety is not required for such increased obligation.

PROVIDED, FURTHER, this Bond is executed pursuant to RCW Chapter 39.08.

IN WITNESS WHEREOF, the duly authorized officers of PRINCIPAL and of SURETY execute this instrument in three

counterparts, each one of which shall be deemed an original, this the_____ _____ day of_____,

20_____.

_____	_____
PRINCIPAL	SURETY
_____	_____
By	By
_____	_____
Title	Title
_____	_____
Address of PRINCIPAL	Address of SURETY

Note: Date of Bond must not be prior to date of Contract. If PRINCIPAL is a Partnership, all Partners should execute bond. Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Washington. A power of attorney must be provided which appoints the SURETY's true and lawful attorney-in-fact to make, execute, seal and deliver this bond.

RETAINAGE BOND

KNOW ALL PEOPLE BY THESE PRESENTS, that _____ the

CONTRACTOR, hereinafter known as PRINCIPAL, and _____ hereinafter known as SURETY, are held and firmly bound Lake Whatcom Water and Sewer District hereinafter known as OWNER and the State of Washington (STATE), and are similarly held and bound unto the beneficiaries of the trust fund created by Chapter 60.28 Revised Code of Washington (RCW), and their heirs, executors, administrators, successors and assigns in the penal sum of _____

_____

dollars, plus 5% of any increases in the Contract Sum that have occurred or may occur, due to change orders, increases in the quantities or the addition of any new item of work.

WHEREAS, the PRINCIPAL has executed Contract for

(*Project Title*):_____

WHEREAS, said Contract and Chapter 60.28 RCW require the OWNER to withhold from the PRINCIPAL the sum of five percent (5%) from monies earned by the PRINCIPAL on estimates during the progress of the Work, hereinafter referred to as earned retained funds; and

WHEREAS, the PRINCIPAL/SURETY has requested that the OWNER accept a bond in lieu of earned retained funds as allowed under Chapter 60.28 RCW.

NOW, THEREFORE, this obligation is such that the SURETY, its successors and assigns, are held and bound unto OWNER, STATE and unto all beneficiaries of the trust fund created by RCW 60.28.011(1) in the aforesaid sum. This bond, including any proceeds therefrom, is subject to all claims and liens and in the same manner and priority as set forth for retained percentages in Chapter 60.28 RCW. The condition of this obligation is such that if the PRINCIPAL shall satisfy all payment obligations to persons who may lawfully claim under the trust fund created pursuant to Chapter 60.28 RCW, to the STATE, and to the OWNER, and indemnify and hold the OWNER harmless from any and all loss, costs, and damages that the OWNER may sustain by release of said retainage to PRINCIPAL/SURETY, then this obligation shall be null and void provided the SURETY is notified by OWNER that the requirements of RCW 60.28.021 have been satisfied and the obligation is duly released by OWNER; otherwise it shall remain in full force and effect.

IT IS HEREBY FURTHER DECLARED AND AGREED that this obligation shall be binding upon and inure to the benefit of the PRINCIPAL, the SURETY, the OWNER, STATE and, the beneficiaries of the trust fund created by Chapter 60.28, Revised Code of Washington (RCW) and their respective heirs, executors, administrators, successors and assigns.

The laws of the State of Washington shall be applicable in the determination of the rights and obligations of the parties hereunder. Venue for any dispute or claim hereunder shall be the superior court of Whatcom County.

SIGNED, SEALED AND DATED THIS _____ day of_____, 20____.

_____	_____
PRINCIPAL	SURETY
_____	_____
By	By
_____	_____
Title	Title
_____	_____
Address of PRINCIPAL	Address of SURETY

Note: Date of Bond must not be prior to date of Contract. If PRINCIPAL is Partnership, all Partners should execute bond. Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Washington. A power of attorney must be provided which appoints the SURETY's true and lawful attorney-in-fact to make, execute, seal and deliver this bond.

LAKE WHATCOM WATER AND SEWER DISTRICT
UNIT PRICE PUBLIC WORKS CONTRACT

THIS AGREEMENT is made on **MONTH & DAY**, **2020**, between LAKE WHATCOM WATER AND SEWER DISTRICT ("District"), a Washington special purpose district, and **NAME OF CONTRACTOR** ("Contractor").

In consideration of the terms and conditions contained in this Contract and attached to it, the parties agree as follows:

1. PROJECT

The Contractor shall do all work and furnish all tools, materials, and equipment for the District's public works project known as **2020-21 Sanitary Sewer Misc. I&I Repair Project (District Project #C2003-II)** ("Project") in accordance with and as more fully described in the attached Contract Documents. This project is a Unit Price Contract, as provided under the provisions of Revised Code of Washington (RCW) 57.08.050(6). No Work is guaranteed under the terms of this Contract. The Contact term shall be for one (1) year from the date of contract execution, with the District's option to extend the Contract for one (1) additional year.

2. WORK / WORK ORDERS

The term Work, as used in this Contract, means the construction and services necessary or incidental to fulfill Contractor's obligations in conformance with this Contract. The District authorizes Work by issuance of individual Work Orders. Work Orders include a summary of the Work to be completed, Completion Deadline, Unit Price Items expected to be utilized, estimated Quantity for each unit price item, and a Not-to-Exceed Work Order Cost. All Work shall be completed in accordance with PROJECT PLANS & TECHNICAL SPECIFICATIONS and BID PROPOSAL. The Contractor shall return an executed Work Order to the District prior to beginning any work.

3. NOT-TO-EXCEED WORK ORDER COST

Subject to the terms herein, the District shall pay the Contractor for authorized Work at Unit Prices established by this Contract, but shall not exceed the authorized Not-to-Exceed Work Order Cost. Washington State sales tax (**8.5%**) will be added to the Unit Price Work and Not-to-Exceed Work Order Cost. The Unit Prices include the cost of all Work, materials, fees, and expenses required for completion of any future Work Order executed under this Contract, including without limitation labor, materials, overhead, administrative, and permit and regulatory costs, as stated in the Bid Proposal and attachments hereto, unless otherwise agreed to by the parties in writing.

4. PAYMENT TERMS

Work Orders shall be payable in the following manner: On or before the 26th day of any month following completion of Work authorized by an executed Work Order, the Contractor shall submit a detailed monthly pay application for all services provided describing in reasonable and understandable detail the Work completed during the previous month, the progress of the Work, and the requested payment in an amount equal to the value of unit quantities of Work completed. The District shall issue a warrant for payment of approved Work contained in the application within thirty (30) days after approval of the pay application, pursuant to the terms below:

a. In cases of single payment, the District shall make payment only after all appropriate releases are submitted.

b. In cases of multiple payments, the District shall retain monies as required by RCW 60.28 and pay the retainage as provided therein.

5. CHANGE IN THE WORK

Change in the Work, Not-to-Exceed Work Order Cost, or Completion Deadline shall be incorporated into the Contract through the execution of Change Orders signed by the Contractor and District.

a. **Change Order Processing**. The District may at any time order additions, deletions, revisions, or other changes in the Work. The Contractor will then prepare and submit a Change Order Proposal to the District for consideration that details changes to the Work, Not-to-Exceed Work Order Cost or Completion Deadline. If the District approves the Change Order Proposal it shall be attached to a Change Order form signed first by the Contractor, then by the District.

b. **Changed or Unforeseen Conditions**. During the course of Work the Contractor may discover changed or unforeseen conditions not anticipated by either party. If changed or unforeseen conditions are discovered that might affect the Work, Not-to-Exceed Work Order Cost, or Completion Deadline, the Contractor shall immediately inform the District on the day of discovery. If the District determines Work must continue, the District will authorize a Field Authorization allowing the Contractor to continue with Work on a time and materials basis not to exceed an estimated amount agreed to onsite by the Contractor and District. The Contractor shall submit detailed labor, equipment, and material cost documentation to the District for review within five (5) business days of the event. If approved by the District, the District will prepare a Change Order form attaching the Field Authorization with backup documentation for Change Order processing. The Contractor agrees to 15% overhead and 6% profit charged on Field Authorization labor, equipment, and material costs. Failure to provide Notice and cost documentation under the terms of this Contract constitutes a full and complete waiver of such claim. In no case, shall a claim for equitable adjustment be allowed if submitted after the Work Order has reached final acceptance by the District.

6. COMPLETION DEADLINE/LIQUIDATED DAMAGES

The Contractor shall commence work under this Contract upon receipt of notice to proceed from the District after a Work Order is fully executed by the District and Contractor. The Contractor shall complete the Work of the Work Order within the number of calendar days agreed to for each Work Order (the Completion Deadline). If the Work Order is not completed by such date, then, because of the difficulty in computing the actual damages to the District arising from any delay in completing the Work, it is agreed by the parties that the Contractor shall pay the District liquidated damages as computed below for each calendar day the Work remains incomplete after expiration of the specified completion date. The parties agree that such amount represents a reasonable forecast of the actual damages the District will suffer by failure of the Contractor to complete the Work within the agreed upon time. The execution of this Contract constitutes acknowledgement by the Contractor that the Contractor has ascertained and agrees that the District will actually suffer damages as computed by the following formula:

$$LD = (0.15*C)/T$$

Where: LD = liquidated damages per calendar day (rounded to nearest dollar)
C = original Not-to-Exceed Work Order Cost
T = original Work Order Completion Deadline in calendar days for achieving Substantial Completion

7. WARRANTY

The Contractor warrants that all materials and equipment shall be new unless otherwise specified, of good quality, and free from defective workmanship and materials. The Contractor further warrants that the Work shall be free from defects in workmanship and material, and shall transfer to the District all written warranties related to the Work performed and equipment installed. The foregoing Contractor's warranty shall remain in effect for one (1) year following final acceptance.

8. PREVAILING WAGES

The Contractor shall pay prevailing wages as required and shall comply with RCW 39.12 and RCW 49.28. Notice of intent to pay prevailing wages and prevailing wage rates for the Project must be posted for the benefit of workers. The Contractor shall submit a statement of intent to pay prevailing wages, approved by the industrial statistician of the Department of Labor and Industries, with its first (or only) pay request. Prevailing wage rates shall be updated annually, using the rates in effect at the beginning of each contract year. The Contractor and its subcontractors shall also submit Affidavits of Wages Paid to the Department of Labor and Industries for certification annually for all Work completed during the prior twelve (12) months. Before Payment on the Contract, Contractor shall demonstrate that the Department of Labor and Industries' prevailing wage requirements have been satisfied.

9. BONDS

Contractor shall provide performance bond and payment bond for the faithful performance and payment of all its obligations under this Contract and in accordance with RCW 39.08.010. The performance bond shall remain in effect to guarantee the repair and replacement of defective equipment, materials, and workmanship and payment of damages sustained by the District on account of such defects, discovered within one (1) year after final acceptance by the District. In lieu of performance and payment bonds for Contracts up to $35,000, Contractor may authorize the District to retain 50% of the Contract amount for a period of thirty days after the date of final acceptance as provided for under RCW 39.08.010.

10. INDEMNIFICATION

Contractor and its subcontractors shall defend, indemnify, and hold harmless the District, its commissioners, officers, managers, employees, engineers, agents, and volunteers from and against any and all demands, claims, losses, injuries, damages, liabilities, suits, judgment, reasonable attorneys' fees and costs, and other expenses of any kind on account of, relating to, or arising out of Contractor's Work under this Contract, except to the extent such injuries or damages are caused by the negligence of the District. For the purposes of this indemnification, Contractor specifically and expressly waives any immunity granted under the Washington Industrial Insurance Act, Title 51 RCW. This waiver has been mutually negotiated and agreed to by the parties. If a court of competent jurisdiction determines that this contract is subject to RCW 4.24.115, Contractor's obligation to defend, indemnify, and hold harmless the District, its officers, employees, agents and volunteers shall be limited to the extent of the District's negligence. The provisions of this paragraph shall survive the expiration or termination of this Contract.

11. INSURANCE

Contractor shall obtain, and keep in force during the term of this Contract, insurance policies as follows:

a. **Commercial General Liability**. Limits no less than $1,000,000.00 combined single limit per occurrence and $2,000,000.00 aggregate for personal injury, bodily injury and property damage. Coverage shall be as broad as Insurance Services Office form number (CG 00 01) covering Commercial General Liability.

b. **Automobile Liability Insurance**. Limits no less than $1,000,000.00 combined single limit per accident for bodily injury and property damage. Coverage shall be as broad as Insurance Services Office form number (CA 00 01) covering Business Auto Coverage, symbol 1 "any auto"; or the combination of symbols 2, 8, and 9.

c. **Workers' Compensation**. Coverage shall be at least as broad as Workers' Compensation coverage, as required by the Industrial Insurance Act of the State of Washington, as well as any similar coverage required for this work by applicable Federal Law.

d. **Employer's Liability or "Washington Stop Gap"**. Coverage shall be at least as broad as the protection provided by the Workers Compensation policy Part 2 (Employers Liability) or, in states with monopolistic state funds, the protection provided by the "Stop Gap" endorsement to the general liability policy.

e. The insurance policies shall specifically name the District, its elected or appointed officials, officers, employees, and volunteers as insureds with regard to damages and defense of claims arising from (1) activities performed by or on behalf of the Contractor; or (2) products and completed operations of the Contractor; or (3) premises owned, leased, or used by the Contractor.

f. The insurance policies (1) shall state that coverage shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability; (2) shall be primary insurance with regard to the District; and (3) shall state that the District will be given at least 45 days' prior written notice of any cancellation, suspension or material change in coverage.

g. Before commencing work and services, Contractor shall provide to the District a Certificate of Insurance evidencing the required insurance accompanied by endorsements as are necessary to comply with the requirements of this section. The District reserves the right to request and receive a certified copy of all required insurance policies.

h. Any payment of deductible or self-insured retention shall be the sole responsibility of Contractor.

12. JOB SAFETY/HOUSEKEEPING

All Work done shall be done in a manner that minimizes interruptions or inconvenience to the public and/or District staff. All Work shall be carried on with due regard for the safety of the public, and Contractor shall maintain strict compliance with the appropriate provisions relating to control of traffic and pedestrians through work areas as set forth in the Manual on Uniform Traffic and Control Devices (current edition) as adopted by the Washington State Department of Transportation. Property and streets adjacent to a Project site shall be kept free and clear at all times from accumulations of mud, dirt, gravel, rock, and other matter. Contractor will be responsible for daily and final clean up and disposal of refuse, waste and debris produced by its operation. Refuse shall not be permitted to accumulate to the extent that it

interferes with free access to the Project site. Should the District determine Contractor is not fulfilling its obligations in this regard, the District reserves the right to take such action as may be necessary, and to charge Contractor with any costs that may be incurred in any remedial action.

13. COMPLIANCE WITH CODES AND REGULATIONS

Contractor is expected to comply with all applicable statutes in performing Project Work, including, but not limited to all state and local laws, regulations, codes and standards that are applicable at the time Contractor performs work.

14. PERMITS, TAXES, TEMPORARY FUNCTIONS

Contractor shall secure and pay for all permits, fees and licenses necessary for the performance of this Contract. Contractor shall pay any and all federal, state and municipal taxes, including sales taxes, if any, for which Contractor may be liable in carrying out this Contract. Contractor shall be responsible for all temporary functions associated with its work, including but not limited to, lighting, wiring, protection, hoisting, scaffolding, rigging, flagman, drinking water, sanitation, storage, ventilation and heat.

15. TERMINATION

If Contractor: (1) fails to provide a sufficient number of properly skilled workers or a sufficient quantity of suitable materials or adequate equipment; (2) fails to diligently prosecute work according to the Project schedule; (3) causes, by act or omission, stoppage, delay, or interference of the Work; (4) fails to correct or repair any damaged or defective Work or materials; (5) fails to comply with any provisions of this Contract; (6) becomes insolvent or adjudged bankrupt; or (7) fails to make prompt payment to lower tier subcontractors or suppliers, then the District may terminate this Contract upon two (2) business days written notice to the Contractor. If Contractor fails to cure the default within the two (2) day notice period, then Owner may terminate this Contract for default.

16. GENERAL PROVISIONS

a. **Notices**. Any notice or demand desired or required to be given under this Contract shall be in writing and deemed given when personally delivered, sent by facsimile machine, or deposited in the United States Mail (or with an express courier), postage prepaid, sent certified or registered mail, and addressed to the parties as set forth below or to such other address as either party shall have previously designated by such a notice:

District:	Contractor:
Attn: General Manager	Attn: _____
Lake Whatcom Water and Sewer District	_____
1220 Lakeway Drive	_____
Bellingham, WA 98229	_____
Phone: (360) 734-9224	Phone: _____
Fax: (360) 738-8250	Fax: _____

b. **Relationship Between Parties**. The Contractor is an independent Contractor with regard to performance of the details of the Work. The Contractor is responsible for its acts or omissions and acts or omissions of its agents, employees, servants, subcontractors, or otherwise during the performance of this Contract. Work in progress is subject to District inspection and review at any time.

c. **Entire Agreement**. This Contract and its attachments contain the entire understanding between the District and Contractor relating to the Project which is the subject of this Contract. This Contract merges all prior discussions, negotiations, letters of understanding or other promises whether oral or in writing. Subsequent modification or amendment of this Contract shall be in writing and signed by the parties to this Contract.

d. **Modification**. No modification of this Contract and no waiver of rights under this Contract shall be valid or binding on the parties unless the same is in writing.

e. **Waiver**. Waiver of any breach or default hereunder shall not constitute a continuing waiver or a waiver of any subsequent breach either of the same or of another provision of this Contract.

f. **Assignment**. Neither party shall assign, transfer or otherwise dispose of this Contract in whole or in part to any individual, firm or corporation without the prior written consent of the other party. Subject to the provisions of the preceding sentence, this Contract shall be binding upon and inure to the benefit of the respective successors and assigns of the parties hereto: This Contract is made only for the benefit of the District and the Contractor and successors in interest and no third party or person shall have any rights hereunder whether by agency or as a third party beneficiary.

g. **Severability**. If any term, covenant or condition of this Contract is held by a court of competent jurisdiction to be invalid, the remainder of this Contract shall remain in effect.

h. **Dispute Resolution**. If any dispute, controversy, or claim arises out of this Contract, the parties agree to first try to settle the dispute, controversy, or claim in non-binding mediation with the assistance of a recognized professional mediation service. The parties shall each designate a representative with full settlement authority who will participate in the mediation. The parties shall bear all expenses associated with the mediation equally, except for attorneys' fees. Any Claim subject to, but not resolved by, mediation shall be subject to a private arbitration which, unless the parties mutually agree otherwise, shall be held in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement; however, irrespective of the size of the dispute, the arbitration proceedings will be conducted by a single arbitrator. A demand for arbitration shall be made in writing, and delivered to the other party to the Contract. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

i. **Jurisdiction/Law**. This Contract shall be governed by and construed in accordance with the laws of the State of Washington. Any suit to enforce or relating to this Contract, including the enforcement of any arbitration award, shall be brought in Whatcom County Superior Court, Whatcom County, Washington.

j. **Attorneys' Fees**. In the event that any party commences litigation against the other party relating to the performance, enforcement or breach of this Contract, the prevailing party in such action shall be entitled to all costs, including attorneys' fees, expert witness fees and costs and any such fees or costs incurred on appeal.

_____
("CONTRACTOR")

Contractor Registration Number: _____

Unified Business Identifier (UBI #): _____

Employment Security Department Number: _____

State Excise Tax Registration Number: _____

_____
(Signature)

_____
(Printed Name and Title)

Dated: _____

Lake Whatcom Water and Sewer District
("DISTRICT")

_____
Justin Clary, General Manager

Dated: _____

Project Information and Specifications

Vicinity Map – Various Locations
Geneva, Sudden Valley and North Shore Neighborhoods of Bellingham, WA

I. SUMMARY OF WORK

Lake Whatcom Water and Sewer District (District/Owner) has estimated the Work to be less than $350,000 and therefore must comply with formal bidding procedures set forth in RCW 57.08.050.

The District intends to contract with an experienced, qualified Contractor over a 12-month period to provide the "on-call" professional repair, rehabilitation and replacement services for portions of the District's sanitary sewer system and related infrastructure as part of the 2020-21 Sanitary Sewer Misc. I&I Repair Project (Project). The "on-call" work generally consists of the trenchless repair and rehabilitation of existing sewer manholes and 8-inch and 10-inch diameter sanitary sewer mains to reduce Inflow & Infiltration (I&I) and system defects using methods such as chemical grouting, CIPP lining, top hat liners, etc., in accordance with the project plans and specifications. The work areas are located within the boundaries of Lake Whatcom Water and Sewer District in various neighborhoods throughout Sudden Valley, Geneva and the North Shore areas in Bellingham, Washington.

Contract Term. The contract shall be in effect for 12-months from the date of contract execution with the District's option to extend the contract for an additional one-year period with a Change Order.

Initial, potential projects under this project could include those listed in Attachment A.

The District typically bids, as separate projects, projects that are identified as major capital improvement projects and also projects that must comply with formal bidding procedures set forth in RCW 57.08.050. The District does not guarantee any minimum or maximum work quantities under this bid/contract and reserves the right to bid any services or construction activities as a separate procurement at its sole discretion.

The project includes, but is not limited to, the following items of work:

- Multiple work sites. Approximate, known locations of spot repairs, manholes and pipe lining locations at the date of project advertisement are shown in the attachment. The District expects that additional repair needs will be identified during the term of the on-call contract.
- Contractor provided traffic control incidental to the bid item unit prices to maintain traffic flow at each repair location, in accordance with local jurisdiction requirements. A traffic control bid item is provided for specific instances, detailed in the Project Specifications, where work requires a full lane closure and either a 1-person or 2-person flagging crew as detailed in the Measurement and Payment Section.
- Contractor obtained Whatcom County Encroachment Permit for traffic control approval within Lake Whatcom Boulevard, Lake Louise Road, Geneva and North Shore neighborhoods.
- Contractor obtained Sudden Valley Encroachment Permit(s) if excavation is required at sites within Sudden Valley.
- Contractor obtained Whatcom County Encroachment Permit(s) if excavation is required at sites outside of the Sudden Valley Community Association including but not limited to work sites on Lake Whatcom Boulevard, Lake Louise Road Right-of-Way, Geneva and North Shore neighborhoods.
- Coordination with Sudden Valley Community Association.
- Sewer bypass pumping of sanitary sewage, as needed to complete the work and for the duration of each repair project, using pumps adequately sized to maintain wastewater flows at each repair location for the duration of the repair.
    - *Exception*. The campground sewer main does not have active sewer customer connections.
- Cleaning of sanitary sewer pipes and manholes before work is performed. Video files to be logged and provided to Owner.
- Confirming selection of appropriate repair type before performing work.
- CIPP of approximately 360 LF of 8-inch VCP pipe, “Campground Mains”, from manhole to manhole. This item of work has its own bid item (Bid Item No. 2 – Campground CIPP lining (MH to MH) - 8” Diameter Pipe) and bid item includes, but is not limited to complete CIPP lining, mobilization/demobilization and traffic control. See Attachment B.
- Installing various sanitary sewer pipe repair products including but not limited to CIPP sectional liner pipe repairs and chemical grout or other Owner-approved pipe repair product.
- Trimming of protruding sewer service laterals.

- Reinstating sewer service laterals.
- Concrete repair work within sanitary sewer manholes.
- Cleaning and video of sewer pipes and manholes after work is performed. Video files to be logged and provided to Owner.
- Preparation of multiple reports to meet project specifications including Excel Worksheets to provide to Owner.
- Maintaining sewer service usage during construction or providing public notice, as detailed herein, limiting residential service interruptions to maximum 4 (four) hours.
- Repair, replacement and restoration of all damage resulting from Contractor's work. Each site shall be restored to conditions equal to or better than preconstruction conditions.
- Normal hours of work shall be between 7:00 a.m. and 5:30 p.m. Monday through Thursday.
- No Owner inspection will be performed on any Friday, weekend or on an Owner observed Holiday.
- Warranty of work.

The District expects to identify and coordinate repair locations and methods with the contractor before the start of each Work Order. Generally, the District's proposed repair method will be to follow the Project Specifications for repair using chemical grout to seal all leaking joints in: 1) sewer pipes that are structurally sound, 2) to seal leaking lateral service lines at their connections to the mainline pipe, and 3) to seal leaking manholes and other buried utility structures. Short cracks in pipes that are less than 8-feet deep, shall be repaired with cured-in-place sectional liners in accordance with the Project Specifications. Other repair methods and approaches may be evaluated for specific repair needs with the goal to implement the best repair type for each location.

The contractor and all subcontractors shall be firm(s) experienced in the professional installation of the work they perform.

II. PROJECT SPECIFICATIONS

1.0 GENERAL REQUIREMENTS

The Project includes, but is not limited to, the following items of work:

1.1 Contractor's Responsibility

The work included in this contract is shown on the contract plans and described in these project specifications. All work incidental and necessary to the completion of the work described and shown shall be performed by the Contractor. In submitting a bid for the this project, the Bidder warrants that they are an expert in this and related work, that they understand the process and functions shown, and that the various work and processes not shown but necessary for the success of this project will be provided by the Contractor.

All details, materials, methods and equipment required to complete the Work are not detailed and fully described in the contract documents. If not defined in the contract documents, Contractor shall furnish, install and perform the Work using workmanship, materials, equipment, and methods that are industry standards used by professionals regularly performing this type of work.

Contractor shall provide all labor, equipment, materials, supervision, tools, supplies, insurance, permits and all costs associated with all other items necessary to perform the work described in the Project Specifications and shown on the project drawings.

1.2 Contract Term

The contract shall be in effect for 12-months (approximately 365 calendar days) from the date of execution. The District reserves the right to extend the contract for an additional one-year period with a Change Order.

1.3 Bid Prices

Estimated Quantities: Any quantities on the Bid Form are estimates and are stated for bid comparison purposes. The Owner does not warrant expressly or by implication that the actual quantities of work will correspond with the estimated quantities. The Owner reserves the right to increase the dollar amount of the Contract for the Contractor to perform additional work consistent with the scope of work for the project. The Owner will pay the Contractor based on actual quantities of each item of work completed in accordance with the Contract Documents. There will be no adjustment to bid item prices for increases or decreases in actual quantities.

The Owner may consider a bid irregular and reject it as non-responsive if any of the bid item prices are excessively unbalanced (either above or below the amount of a reasonable bid) to the potential detriment of the Owner.

1.4 Procedure for Issuing Work Orders

The work shall be assigned by the Owner through Work Orders. The Owner shall identify the need for specific work assignments under the Contract and shall issue a Work Order to the Contractor for performing the Work in accordance with the Project Specifications, Contract and Bid Form. The Contractor shall promptly complete the paperwork associated with each Work Order issued and shall promptly schedule the work in accordance with a mutually agreeable schedule for the work. If a mutually agreeable completion time cannot be met for individual projects, the District reserves the right to bid services or construction activities as a separate procurement.

The Work Order shall:

- Identify the location and estimated quantity for the work to be performed.
- Identify the expected start and completion date, as mutually agreed upon by the District and Contract, for the work included in the work order.
- Be completed electronically.
- Be completed within the time for completion.
- Be billed as a separate invoice, following completion of Work, for each Work Order issued.

The District has the right to prioritize and re-prioritize Work Order(s) issued depending on need or urgency.

1.5 Preconstruction Meeting

A teleconference or video conference preconstruction meeting is required with the Contractor and Lake Whatcom Water and Sewer District staff a minimum of 2-days before the start of construction on the first Work Order. Additional preconstruction meetings may be required if the Contractor changes project managers assigned to subsequent Work Orders.

1.6 Compliance with Regulations

All work must comply with Whatcom County Planning & Development Services and all other State or County regulations.

1.7 Temporary Erosion and Sedimentation Control (TESC)

Contractor shall, where required to perform the work, provide all Temporary Erosion and Sedimentation Control (TESC) in accordance with the 2019 Storm Water Management Manual for Western Washington (SWMMWW), Volume II, by the Washington State Department of Ecology, Publication Number 14-10-055. Contractor shall use Best Management Practices (BMPS) described therein.

1.8 Utility Services and Use of District Water

Contractor shall be responsible for furnishing, maintaining and providing all utility needs throughout the duration of the construction, including but not limited to: portable sanitation services and portable power generation.

Use of District water. When needed to perform the Contractor's work, and where available, the Contractor will be allowed to use Owner's water supplied from an Owner's fire hydrant near the site. The Contractor shall only connect to the fire hydrant when approved and only when connected to an approved double-check device and District-supplied water usage meter. The Contractor must provide all necessary clean fittings, hoses and equipment. Only the Owner is permitted to operate water valves. The Contractor will not be responsible for water consumption charges for use of Owner's water. If a fire hydrant is not conveniently located for the Contractor's use, the Contractor shall provide its own source of water at no additional cost to the Owner.

1.9 Site control

Protect in place all adjacent property and structures. Contractor shall be responsible for repair/replacement of all damage and shall restore to pre-construction conditions.

The Contractor shall maintain the area in a clean condition during construction. The site shall be cleared of all rubbish, debris and equipment and shall be left in a neat condition with surfaces restored to pre-construction conditions or to the restoration requirements detailed in the plans and specifications.

1.10 Traffic Control

Any traffic control activities required during construction shall be consistent with the Uniform Traffic Control Manual, latest edition, and applicable codes and permits.

Traffic control and approved traffic control plans, shall maintain traffic flow with a minimum of one travel lane open to traffic at all times, at each repair location. Except, where allowed by the governing authority, the contractor can delay traffic for up to 3 minutes.

If flaggers are used, orientation meeting per WAC 296-155-305 shall be held each time a new flagger is introduced to the site or if site conditions change significantly. The Contractor is responsible for scheduling such meetings.

Traffic control shall be considered incidental to each bid item unit price for all work except for work within the right-of-way of Lake Louise Road, Lake Whatcom Blvd. or in areas of Sudden Valley and Whatcom County right-of-way required by governing authorities to have a dedicated flagging crew and also a full one-lane road closure. See Measurement and Payment Section 6.0.

1.11 Shop Drawings / Submittals

Contractor shall provide the following project submittals:

1.11.1 Schedule. The contractor shall submit a detailed schedule of work to present at the preconstruction meeting.

1.11.2 Project Data Submittals. The contractor shall submit Product Manufacturer's technical data, material type and manufacturer, ASTM references, catalogue cuts or brochures and manufacturer's requirements including, but not limited to; installation methods and requirements, storage, handling, temperature control, curing, field testing processes and

procedures, equipment requirements, service reconnections and trimming and manufacturer's documentation and certification that materials and products are in conformance with appropriate standards and these specifications.

Submittal data shall include sufficient information to determine if it is in compliance with the project requirements. Submittal review does not relieve the Contractor from responsibility for errors or omissions, or responsibility for consequences due to deviations from the contract documents. Acceptable submittals will be reviewed as promptly as possible and transmitted to the Contractor no later than 14 calendar days after receipt.

By approving and submitting shop drawings, the Contractor warrants they have determined and verified all field measurements, field construction criteria, materials, catalog numbers, and similar data, and have checked and coordinated each shop drawing with required work and with the contract documents.

Lake Whatcom Water and Sewer District
1220 Lakeway Drive
Bellingham, WA 98229
Attn: Construction Engineer
E-mail: KH@lwwsd.org

1.12 Substitutions

Any product or construction method that does not meet these specifications will be considered a substitution. Substitutions must be approved prior to their installation or use on this project.

1.13 Construction Record Drawings

Prior to receiving final payment for the work, the Contractor shall deliver a complete set of acceptable "as-constructed" records to the Owner. Plans shall be made on a clean, unmarked print(s) for this project and shall clearly show deleted items and new or modified items (in red). The Contractor shall provide "as-built" information on all items and work shown on the plans showing details of the finished product including dimensions, locations, outlines, changes, manufacturers, etc. The information must be in sufficient detail to allow the Owner's personnel to locate, maintain, and operate the finished product and its various components.

All costs associated with construction record drawings shall be considered incidental to the project pay items.

2.0 SITE WORK

2.1 Excavation and Backfill

Contractor shall perform site excavation, only where required and as necessary to perform the work. Project work utilizes trenchless pipe and manhole repair and rehabilitation techniques. Therefore, excavation work performed would only be unanticipated excavation for Contractor's remediation of failed operations. In such cases, Contractor shall limit excavation depth and footprint to that necessary to perform the Work. All excavated materials shall be removed from

the project site. All permits for the disposal of excavated material shall be obtained by the Contractor.

Backfill materials shall consist of crushed surfacing top course material meeting the requirements of WSDOT 9-03.9(3) and installed in accordance with Lake Whatcom Water & Sewer District Construction Standard Details, General Notes #12.

Provide all necessary backfill, compaction, final grading of the site to the elevation necessary to blend surface with the existing elevations and final surface restoration, all per Lake Whatcom Water & Sewer District Construction Standards (Attachment C). Backfill shall be compacted to a minimum 95% modified Proctor within traffic areas (roadway section or shoulder) and to minimum 90% modified Proctor in landscape or open areas.

All costs associated with excavation and backfill shall be considered incidental to the project bid items.

3.0 PRE-REHABILITATION UTILITY WORK AND DOCUMENTATION

3.1 Sewage Bypassing

The Contractor shall maintain existing live sewers in service at all times. No flow that will negatively affect the installation of the rehabilitation products shall be allowed in pipes during product installation. Contractor shall utilize flow-through plugs, flow-through bladders and other flow-through devices to perform the repair work and should only use sewage bypass pumping when such flow-through devices cannot accomplish the required repairs.

When, and where required to perform the work, Contractor shall provide bypassing for sewage. Construction shall accommodate for flows by blocking the main upstream and pumping or directing the flow into a downstream manhole or adjacent system. The pumps and bypass lines shall be of adequate capacity and size to handle the flow. The upstream manhole shall be monitored at all times and an emergency deflate system shall be incorporated so that the plugs may be removed at any time without requiring confined space entry. Bypass pumps and hoses shall not interfere with traffic and if hoses are located within or across traffic lanes, hoses must utilize hose ramps capable of fully protecting hoses and withstanding H-20 traffic loading.

The Contractor shall be responsible for continuity of sanitary sewer service to each facility connected to the section of sewer during the execution of the work.

Contractor shall prepare an emergency plan detailing procedures to follow in event of pump failure, sewer overflows, service backups and spillage. Contractor shall keep a copy on site for the project duration. If sewage backup occurs, the Contractor shall be responsible for clean-up, repair, property damage, claims and all costs associated with the sewage backup.

Remove sewage bypass after work is complete and where applicable, after lateral connections are reinstated.

All costs associated with sewage bypassing shall be considered incidental to the project bid items when flow depth is less than ½ pipe diameter. When a repair location's sewage flow depth exceeds ½ pipe diameter and sewage bypass pumping is required to perform the work because flow through the pipe or structure will affect the proper system installation in accordance with

the manufacturer's installation instructions, then said flows shall be bypassed and compensation shall be made per the Bid Proposal and as described in the Section 6.0, Measurement and Payment.

3.2 Service Lateral Usage

The Contractor, when and where required to perform the work, shall maintain customer's service usage throughout the duration of the project.

With Owner approval, and customer notification, the Contractor may request service usage termination for a maximum of 4 hours during weekday working hours, for any residential property served by sewer and impacted by the work.

3.3 Customer Notification of Service Interruption

The Contractor shall coordinate customer notification in advance of any planned Work impacting a customer. Customer notification shall consist of a minimum of 48-hours delivered, written notice by means of a door hanger, delivered to each customer door. The notice shall clearly inform the customer of the date and beginning and ending time of the expected service interruption and advise the customer to minimize or avoid water usage during this period. The notification shall include telephone cell phone number(s) for the Contractor's on-site project representative. The Contractor shall ensure that every user is so notified.

Only District maintenance staff shall shut-off water valves to customer water services. Contractor shall coordinate water shut-off with the Engineer, a minimum of 48-hours in advance of shut-off need.

Provide a copy of each written notice to Owner.

All costs associated with the requirements of this section shall be considered incidental to the project bid items.

3.4 Video Inspection of Sewers

The Contractor shall perform multiple video inspections: after the sewer cleaning operation and after pipe/manhole rehabilitation has been completed and accepted, including reconnection and grouting of laterals.

Experienced personnel shall perform the video inspection and document the inspection in accordance with NASSCO Pipeline Assessment and Certification Program (PACP) standards. The video inspection shall be completed in the same direction each time and shall be done with a CCTV color camera. A pan/tilt pivot head camera shall be used for all pipelines that are greater than 6-inches in diameter to allow detailed lateral inspection. Each inspection video shall provide a clear view free of obstructions and lens obscuring damage or debris. Video recording shall start after the camera is placed in the starting manhole and all initial measurements and adjustments have been made. Video recording shall include the full length of the run and shall stop and provide details on each lateral, defect or anomaly. Video recording shall stop in the ending manhole, prior to removing the camera from the manhole.

Contractor shall submit video, along with a video log, to Engineer. Files shall be named in accordance with the requirements of these specifications. Video shall be submitted to the Owner on a USB flash drive.

Contractor shall protect the manholes to withstand all forces generated by cleaning, televising, grouting or lining equipment.

All costs associated with video requirements and documentation shall be considered incidental to the project bid items.

Video Camera Requirements

Contractor shall use a video camera for the inspection that is specifically designed and constructed for sewer inspection. The camera shall be 100% digital. Analog video deliverables will not be accepted. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, monitor and other components of the video system shall be capable of producing picture quality sufficient to determine condition of the pipes being inspected. The camera used for television inspection shall be self-propelled, crawler-type units having 360-degree pan and tilt capabilities. No hand winching units shall be allowed. The camera shall be moved through the pipe in either direction at a moderate rate, within the limits and recommendations specified by the PACP standards, stopping when necessary to thoroughly document the sewer condition at required locations.

Minimum Video Reporting Requirements

Each individual pipe run (manhole to manhole) shall be included in a single video file and shall provide record of distances to within +/- 2 feet.

Inspection video shall be in MPG video format with a minimum frame resolution of at least 640x480 pixels and a frame rate of at least 29 fps.

Screen text in the video shall be clearly displayed on a contrasting background (e.g. light text on dark background or dark text on light background).

Inspection videos shall begin and end with the following screen text for approximately 15 seconds.

a. Beginning and ending manhole numbers
b. Cartegraph Asset ID
c. Cartegraph Task ID
d. Pipe diameter
e. Pipe material
f. Name of Project “2020 Sewer Repair Project”
g. Location (street name)
h. Date and time of day

i. Contractor name

j. Operator's name

k. The running footage (distance travelled and inspected)

During video inspection, the screen text shall include the following and no other information, and shall do so without obscuring the central view of the pipe being inspected:

a. Beginning and ending manhole numbers

b. The running footage (distance traveled)

Video files shall be named in accordance with the following file naming convention:

Pipe Serial Number – Date time stamp in YYYMMDD format.

For example: a pre-lining video inspection of a pipe with District assigned serial number of 12345 where the inspection ended on December 1, 2020 would be named like this: PRE-12345-20201201.mpg

As an additional example: a post-lining video inspection on a pipe with a serial number of 67890, where the inspection ended on January 10, 2021, would be named like this: POST-67890-20210110.mpg.

3.5 Cleaning and Inspection of Sewers

Immediately prior to performing the rehabilitation and repair work, the Contractor shall be responsible for cleaning, inspecting, confirming the inside diameter, and determining the condition of each pipe and manhole to be repaired. When cleaning manholes, do not discharge material through sanitary sewer system. Remove materials at the manhole. When cleaning pipes, material shall be removed from pipes at the closest downstream manhole and not allowed to continue downstream. Filter solids-laden water through an approved desilting device.

Pipe shall be cleaned with a high-velocity jet (hydro cleaning) equipment. The equipment and methods shall be satisfactory to the Engineer. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size pipes and manholes to be cleaned. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tank, auxiliary engines, pumps and hydraulically driven hose reel. The NASSCO Jetter Code of Practice shall be consulted and followed for selection of recommended nozzle types and pressure applications for various cleaning requirements.

When cleaning is complete, manholes and pipes shall be free of all dirt, grease, rocks, roots, sand and other debris and materials. The sewer line cleaning shall allow for the proper seating of the packer when used for chemical grouting.

Pressure wash and clean interior surfaces of manholes of debris, dirt, oil, grease, remains of old coating materials, and any other extraneous materials.

During sewer cleaning operations satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools, which depend upon water pressure to provide their cleaning force, or tools which retard the flow in the sewer line are used, precautions shall be taken to insure that the water pressure created does not damage or cause flooding of any property being served by the sewer.

The cleaning process shall include the removal of all roots. Root removal may be accomplished by the use of mechanical equipment such as root cutters and porcupines and high-velocity jet cleaners. Chemical treatment may be used at the option of the Contractor.

Cleaning methods and products shall be compatible with product requirements for work being performed.

For top hat repairs cleaning and preparation shall reach at least 2-feet into the side sewer lateral from the sewer main pipe.

Contractor shall protect the manholes to withstand forces generated by cleaning equipment.

All costs associated with cleaning and root removal shall be considered incidental to the project bid items.

Inspection Documentation.

Contractor shall provide all test results, repair and inspection documentation to the Engineer for acceptance. Contractor shall furnish the Owner with as-built locations of all rehabilitated sewer segments and manholes. Contractor shall provide Owner with one copy of completed work scope table including the information detailed below, including: type of spot repair technology installed, length of repair, number of sleeves installed (if applicable), and distance from nearest downstream manhole.

Sewer Mains:

Example:

Asset / Pipe ID	Repair Date	Distance From DS MH to Repair	# Sleeves	Sleeve Length	Type of Repair / Quantity of Rehabilitation Material Used / Other Notes

Sewer Manholes:

Example:

Cartegraph Manhole ID	Repair Date	MH Depth	Type of Repair / Quantity of Rehabilitation Material Used / Notes

All costs associated with inspection documentation shall be considered incidental to the project bid items.

3.6 Removal of Protruding Lateral Service Connection

Contractor shall clear the pipe(s) of any protruding service connection(s) (lateral(s)) that will prevent proper liner insertion and inversion or prevent contractor's full and complete access to the location for the repair. A protruding lateral shall be removed internally with a hydro-jet cutter. Contractor shall obtain Engineer's approval prior to the removal of protruding pipe(s) and shall provide evidence clearly showing the need for the removal(s).

3.7 Chemical Treatment of Roots in Sewer Pipes and Manholes

Where chemical treatment of roots is required, the chemical root inhibitor shall be Dichlobenil (2-6-dichlorobenzonitrile): Norosac 50W or approved equal.

Contractor shall add root inhibitor to the chemical grout mixture at a safe level of concentration having the ability to remain active with the grout for a minimum of 12 months.

All costs associated with the application of chemical root inhibitors shall be considered incidental to the project bid items.

3.8 Smoke Testing

Where required, and as directed by the District, it is the intent of this specification to provide for the smoke testing materials and procedures to be used in the investigation of the sanitary sewer facilities. All materials and procedures shall be consistent with these specifications, current industry standards, or as approved by the District. All work shall be performed by a qualified crew properly trained, with demonstrated and documented field experience, in the smoke testing procedures and proper use of all smoke testing equipment.

The nature of the smoke testing inspections shall be to confirm system connectivity, identify gravity sewer system defects, cross-connections between storm and sanitary sewer, location of potential building traps visualized by sewer vents with no smoke and to provide a permanent record of the defects including type, location, and severity.

The Contractor shall test the gravity sanitary sewer system using high capacity blower(s). The smoke blower will be suitable for the anticipated testing and generate non-toxic smoke. The contractor personnel will visually identify and document each defect location. Contractor shall provide safety equipment suitable for the anticipated field and traffic conditions. Digital camera(s) will be used for documentation of observations. All inspections shall be recorded on standard smoke testing paper forms or entered into an electronic database.

The inspections will be performed by introducing non-toxic smoke into the sanitary sewer pipes using a high capacity blower (or approved equal depending on the project goals), observing smoke exiting vent stacks and at defect locations, and documenting the defects.

The smoke testing field crew, excluding personnel assigned for traffic control, shall be of sufficient size, and no less than 3 persons, in order to properly operate the smoke generation machine and provide full coverage of the area to visually locate smoke discharged from defects.

It is the intent of this specification that the smoke testing be accomplished without the need for sewage bypass pumping. The Contractor shall provide temporary plugs, sandbags, or flow barriers as required to contain an adequate volume of smoke within the section of sewer being tested. The Contractor shall monitor the resulting surcharged sewer at the manhole upstream of the tested section of sewer and prevent overflow conditions from occurring by removing the flow barriers or removing sewage by vacuum trucks. Where sewage bypassing is required to perform the work, with approval from the Engineer, the Contractor shall perform Sewage Bypassing in accordance with Project Specification Section 3.2.

Products

Smoke fluid, smoke candles, or approved equal, shall produce continuous smoke that can be controlled by the testing crew for the duration of the test. The smoke generated shall be white to gray in color, leave no residue, and shall be non-toxic and non-explosive. The Contractor shall supply the smoke MSDS sheet with Submittals.

Equipment

The Contractor shall provide all equipment, tools and incidentals required to perform smoke testing as required by the Project Specifications, including but not limited to: blowers, smoke, sewer line stoppers, sand bags, cameras, safety equipment, sewage bypassing and traffic control equipment.

Blowers. The Contractor shall provide a portable blower designed and built specifically for the use of smoke testing. The blower shall be self-contained and capable of producing a minimum of 4,500 cubic feet of air per minute. Blowers with less cfm may be approved by the District provided it is demonstrated that sufficient pressure is generated for the testing. If inadequate pressure is being generated, then additional blowers (dual blowers) or larger blowers may be required. Adequate pressure is being provided when smoke is exiting the vent stacks as a plume or, where no vent stacks are present, smoke is exiting the upstream/downstream manhole casting/vent, hole/pick hole, etc. In general, the larger the pipeline diameter being tested, the higher the smoke blower capacity (cfm) required.

The base of the blower shall have appropriate adapters and seals to make a good connection to the manhole without excessive loss of smoke.

Work Progress

The work shall generally progress as follows:

- Notify appropriate agencies of smoke testing schedule in advance of the work.

- The Contractor shall notify, by hand delivery of approved door hangers to each address, all residences and businesses in the smoke testing study area. All notification door hangers shall be approved by the Project Manager before printing and distribution. The Contractor shall place door hangers on all residences and business at minimum of 2 days (but not greater than 7 days) prior to smoke testing at those specific addresses. Notification shall be an ongoing process throughout the project and shall be limited to the area provided in the look-ahead schedule.
- The Contractor shall maintain a log of notifications. The logs shall include the facility name, notification date, time and individual notified. Notification of sensitive locations such as hospitals, nursing homes, day care, schools and the like must be done again immediately prior to testing.
- The Contractor shall notify emergency Services and dispatch centers each morning, prior to testing that day.
- The Contractor shall provide traffic control, as required, in accordance with Project Specification Section 1.10.
- The Contractor shall provide flow control.
- The Contractor shall perform the smoke testing per the Project Specifications.
- The Contractor shall prepare and provide the required smoke testing data documents.

Performance of Smoke Testing

All smoke testing information shall conform to the most recent version of the NASSCO smoke testing codes and database structure.

Contractor shall not perform smoke testing on days that will hinder the results of the test. For example, when heavy rains, or excessively saturated soil conditions would interfere with the effectiveness of the testing. Contractor may provide soil moisture or segment re-testing data as evidence that soil conditions are favorable for smoke testing.

Contractor shall confirm that adequate conditions (soil moisture, existence of catchment hoods, proper notifications, residents requiring assistance or notification, any preliminary procedures that may be necessary prior to conducting test, etc.) exist which will allow for desired results.

The sections of sewer subject to testing shall typically:

- Consist of a central manhole, where the blower will be positioned, and an upstream and downstream manhole and the sewer pipe between them. With three (3) manholes and two pipe sections, lengths should not exceed 1000 feet. The blower capacity and/or number of blowers necessary will be determined by the adequacy of pressure as observed at the vent stack or downstream/upstream manholes.

  Longer sections may be tested as approved by the Engineer, provided good pressure, as evidenced by smoke plume, is observed at the vent stacks.

  (OR)

- Consist of two (2) manholes and one (1) pipe section for a 400 to 800 feet pipe run.
- The walk through for locating defects will not begin until smoke is highly visible with a smoke plume emanating from the plumbing vents of houses at the end of the setup location (maximum 500 ft radius) from the smoke testing machine.
- The Contractor shall place a locate flag, and record locations in project testing documentation, at the location of each defect. Walkers shall traverse not only the roadway shoulder or sidewalk, but between all homes and in back yards looking for illegal connections including patio, pool drains, roof drain connections and buildings where vent stacks do not exhibit smoke.

  Defect location records shall:

  a) Accurately and neatly record all smoke testing data on field worksheets as approved by the Engineer.

  b) For each sewer main tested, the Contractor shall prepare a field log identifying each point of smoke exfiltration from:

     - Roof gutters
     - Sewer cleanouts
     - Leakage in house laterals
     - Patio or area drains
     - Storm drain cross connections
     - Manholes
     - Sewer vents (lack of smoke)
     - Any other source not stated above

  c) Use triangulation methods to locate and re-locate defects. Triangulation shall be done with respect to the distance from two fixed objects (house corners, power poles, fire hydrant, etc.) and record on a location sketch.

  d) Measure and show the distance from the upstream manhole to a point perpendicular to the defect and the measured distance left/right to the defect.

  e) Each smoke defect, as identified above, shall include an address, be referenced by sketch, and dimensioned to permanent landmarks.

  f) Photograph all leaks and include photographs in the field log. Photographs of smoke evidence shall have a location indicated in the photograph using a defect flag where possible. All photographs shall be clearly cross-referenced to the typed and/or computer generated log indicating the location of the leak. Once the defect has been flagged the Contractor shall take a digital picture (delivered in minimum 640x480 resolution) clearly showing the smoke exiting from the defect, flag and physical features at or near the defect. Photographs should include sufficient field of view so that drainage patterns can be discerned.

- Contractor shall furnish project data in the NASSCO format approved by the Project Manager using the NASSCO smoke testing codes. Deliverables shall include: maps of study area with corrections noted, summary of work quantities completed and a summary of defect findings.

4.0 PIPE AND MANHOLE REHABILITATION

4.1 Sanitary Sewer Chemical Grouting

The work in this Section of providing for the rehabilitation of sanitary sewer manholes, defective pipe joints, sealing lateral connection using the lateral packer method, circumferential and longitudinal pipe cracks and other pipe defects by the application of chemical grouting materials in accordance with the most current edition of:

- ASTM F2304 "Standard Practice for Sealing of Sewers Using Chemical Grouting",
- ASTM F2414 "Standard Practice for Sealing Sewer Manholes Using Chemical Grouting", and
- ASTM F2454 "Standard Practice for Sealing Lateral Connections and Lines from the Mainline Sewer System by the Lateral Packer Method, Using Chemical Grouting".

Contractor shall, in performance of the work in this section, complete all required activities listed in Section 3.0, Pre-Rehabilitation Utility Work and Documentation, including but not limited to sewage bypassing, cleaning and video inspection and documentation, to Owner's approval, before performing work as detailed herein.

Contractor shall provide a statement from each product manufacturer that Contractor and each crew member involved in each process is certified by manufacturer that they have successfully completed training in handling, applying, finishing and installing the materials or systems used.

Chemical Grout

Grout used shall be Avanti AV-100 acrylamide or equal. Contractor shall provide a chemical sealant solution containing principal chemical sealant constituent, initiator (trigger) and catalyst specifically recommended for the purpose of sealing leaks in sanitary sewer lines and manholes. Chemical sealant constituent, initiator (trigger) and catalyst shall be compatible when mixed. Solution shall have ability to tolerate dilution and react in moving water. After final reaction, it shall be a stiff, impermeable, yet flexible gel. The grout proportions shall be such that dilute aqueous solutions – when properly catalyzed – will form stiff gels. Grout shall make true solution at concentrations as high as three pounds per gallon of water. Solutions shall have ability to accept dilution by groundwater of at least 50% by volume, without significantly changing sealing ability of the gel when at rest or in motion. Solutions shall gel in a predetermined time when exposed to normal groundwater pH ranges, and be capable of formula adjustments to compensate for changing conditions. Final reaction shall produce a continuous, irreversible, impermeable stiff gel at chemical concentrations as low as 0.4 lbs per gallon of water that is able to break away from the joint sealing packer when the packer is

deflated. Gel shall not be rigid or brittle. Gel shall have negligible corrosion rate on mild steel plates.

Grout shall be tinted to allow detection of grout at locations where applied.

The cured material must withstand submergence in water without degradation.

Chemical Root Inhibitor

Chemical Root Inhibitor shall be in accordance with Section 3.5, Chemical Treatment of Roots in Sewer Lines.

Contractor shall add root inhibitor to the chemical grout mixture at a safe level of concentration having the ability to remain active within the grout for a minimum of 12 months. Contractor shall mix root inhibitor with the grout according to the instructions of the grout manufacturer and in the specified quantities as recommended by the grout manufacturer.

Insoluble (Particulate) Additives. Inactive solids such as diatomaceous earth may be mixed with grout by Contractor as filler only upon written approval of Owner.

Water shall be potable.

Equipment

The Contractor shall provide all equipment necessary for the installation. The packer shall be cylindrical and have a diameter less than the pipe size. The packer shall be constructed in a manner to allow restricted amounts of sewage to flow and shall be pneumatically operated. Hydraulically or mechanically expanded devices shall not be permitted.

Lateral sealing packers and its sealing bladders, end bulb, void area, sensing device and test connections shall meet the requirements of ASTM F2454

To test the accuracy, integrity, and performance capabilities of sealing equipment units, Contractor shall perform a demonstration test in a test cylinder constructed so that a minimum of two known leak sizes can be simulated. Contractor shall provide test cylinders and pressure gauges. Contractor shall perform the demonstration test for each chemical sealing unit prior to beginning work. This technique will establish test equipment performance capability in relationship to test criteria and insure that there is no leakage of the test medium from the system or other equipment defects that could affect joint testing results. Tests may be required at any other time during joint testing work if the Owner suspects testing equipment is not functioning properly. All testing costs shall be borne by the Contractor.

Pressure Testing of Joints

Joint testing pressure shall be equal to 0.5 psi per vertical foot of pipe depth plus 2 psi; however, test pressure shall not exceed 10 psi without the approval of the Engineer.

Individually test each sewer pipe joint at the above-specified pressure (and retest after sealing) in accordance with the following procedure:

<u>Air Test Procedure</u>

a. The packer shall be positioned within the pipe in such a manner as to straddle the joint to be tested.

b. The packer ends shall be expanded so as to isolate the joint from the remainder of the pipe and create a void area between the packer and the pipe joint. The ends of the testing device shall be expanded against the pipe as per manufacturer's recommendations. If all attempts to isolate the joint fail, pump grout in an attempt to seal the leak around the packer end elements.

c. After the void pressure is observed to be equal to or greater than the required test pressure, the air flow shall be stopped. If the void pressure decays by more than 1.0 psi within 15 seconds, the joint will have failed the test and shall be sealed.

d. Upon completing the testing of each individual joint, the packer shall be deflated with the void pressure meter continuing to display void pressure. Should the void pressure meter fail to drop to 0.0 +/- 0.5 psi, clean the test equipment of residual grout material or make the necessary equipment repairs to provide for an accurate void pressure-reading.

Preparation

Contractor shall thoroughly clean the sewer pipe and manhole designated to receive the chemical grouting. Cleaning shall consist of removal of all debris, solids, roots and other deposits in the pipe, particularly at the pipe joints.

Contractor shall apply root inhibitor when roots are present.

Chemical Grout Application

Repairs shall take place at joints, generally small circumferential cracks, small holes or similar points of infiltration as identified. The repair shall be such that the original cross sectional area and shape of the interior of sewer pipe shall not be permanently reduced or changed.

Sewer Pipes:

Do not allow solid material to enter sewage flow.

Contractor shall position the sealing packer over the area to be repaired by means of a metering device at the surface and video camera in the line. Accurate measurement of the location of the defect to be sealed shall be made, using the portion of sealing packer as "Datum" or measurement point or target. Such measurement to the target shall also be used to obtain necessary measurement for positioning the injection area of sealing packer over area to be sealed.

Contractor shall expand the sealing packer sleeves using controlled pressures. Expanded sleeve shall seal against the inside periphery of pipe to form a void area at the point of infiltration, completely isolated from the remainder of the line. Contractor shall pump sealant materials into this isolated area through hose systems at controlled pressures which are in excess of groundwater pressures. Contractor shall pump as much grout as is required to seal any leaks and fill the voids. No location shall be considered sealed unless, while under continual pressure, an attempt is made to pump grout to "refusal" (up to ½ gal per in. diameter pipe size). The term

"refusal" means the mixed chemical grout has flowed throughout the void, through any failure point, and into the surrounding soil. At "refusal" the chemical grout has gelled and formed a cohesive seal stopping further grout flow, thus the rise in void pressure shows a "refusal" to pumping more grout into the void area.

Determining the effective volume of grout. The volume of the void space of the packer must be subtracted from the total volume of grout pumped at the repair location. The effective volume of grout is the total volume pumped less the void volume of the packer chamber.

Grout shall break away from the packer and stay in place when the packer is deflated and moved from the point of infiltration.

Upon completion of injection, Contractor shall retest the point of repair. If retesting shows the seal was not completely effective, Contractor shall repeat the sealing process until the defect successfully passes the pressure test. After sealing the entire sewer section, Contractor shall remove surplus grouting material from section at the immediate downstream manhole. If surplus grouting materials left in the sewer section by Contractor results in sewer surcharging and subsequent damage to public or private property, Contractor shall be responsible for damage to property and expenses incurred by Owner.

If a mainline or lateral joints require more than 0.5 gallon of grout per inch-diameter per pipe joint, modify grouting procedure to perform stage grouting by pumping additional grout in up to 4 gallon increments, waiting 1 gel set cycle time or 1 full minute, whichever is greater between stages. Maximum number of stages shall not exceed two stages of 4 gallons each unless approved by the Engineer.

The Engineer may determine that the grout consumption is too high and may direct the Contractor to stop subsequent attempts to continue grout injection.

Gel Checks. Contractor shall make gel checks daily for each sealing vehicle to monitor both induction period and gel characteristics. Contractor shall also make checks for every mixed batch or at least twice per day if only one batch is used. Owner reserves the right to request adjustment of gel times or reject the entire batch if acceptable gel characteristics do not exist. Periodic gel checks shall also be made in the pipe (at request of Owner) by seating the sealing packer on the pipe barrel and filling the packer void with grout solutions. Pressure will then be monitored until a rise in pressure is observed, indicating that grout has gelled in the packer void. Contractor shall certify, for each of the sealing vehicles, results of required gel checks.

Records and measurement. Contractor shall measure and record the amount of chemical delivered to each injection site. Records for each repair location shall include the following

- Repair location.
- The test pressure before and after sealing and the duration of the test.
- The volume of grout material used to seal each joint.
- The volume of grout placed per section.
- The gel set time used.
- The barrel test results.

- The grouting material used including additive and their respective quantities.

Lateral Connection Sealing Verification

A lateral test and seal camera, meeting the requirements and operated in accordance with ASTM F2454 shall be conducted for all lateral connections to verify that a seal is obtained.

Air Test Procedure

Lateral connection joint testing pressure shall be equal to 0.5 psi per vertical foot of pipe depth plus 2 psi; however, test pressure shall not exceed 10 psi without approval of the Engineer.

a. Air testing lateral connections shall be accomplished by isolating the area to be tested with the lateral connection packer and by applying positive pressure into the isolated void area. A pan and tilt camera shall be used to position the lateral packer for laterals directly connected to the mainline sewer. The lateral bladder shall be inverted from the mainline assembly into the lateral pipe and inflated. The mainline elements shall then be inflated to isolate the lateral connection and the portion of the lateral to be tested. A sensing unit shall monitor the pressure of the packer void and will accurately transmit a continuous readout of the void pressure to the control panel at the grouting truck or to a pressure gauge on the packer recorded by the CCTV camera.

b. The test procedure will consist of applying a controlled air pressure into each isolated void area. Air shall then be slowly introduced into the void area until a pressure equal to or greater than the required test pressure, but in no cases greater than 2 psi above the required test pressure, is observed on the pressure monitoring equipment. Once the designated pressure in the isolated void is displayed on the meter of the control panel, the application of air pressure will be stopped and a 15 second waiting period will commence. The void pressure will be observed during this period. If the void pressure drop is greater than 2.0 psi within 15 seconds, the lateral shall be considered to have failed the air test and shall be grouted and retested.

c. After completing the air test for each individual lateral specified herein, deflate the lateral packer, with the void pressure meter continuing to display void pressure. If the void pressure does not drop to 0.0 +/- 0.5 psi, the equipment shall be adjusted to provide a zero void pressure reading at the monitor.

Warranty

The Contractor shall guarantee the sealing of the pipe joint by the grout for one full year from the date of acceptance of the Owner to the extent that the Contractor will repair and/or re-grout any defects including, but not limited to: root penetration, signs of infiltration, and cracks in the pipe or grouting material, which may appear in the structure because of faulty design, workmanship, or contractor's materials.

4.2 Cured-in-Place Pipe Lining

The work in this section shall cover the rehabilitation of existing sanitary sewers, normally without excavation, by the installation of cured-in-place pipe (CIPP) lining system in accordance with the most current edition of ASTM F1743 "Standard Practice for Rehabilitation of Existing

Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP).

A CIPP lining system is formed by the insertion of a resin impregnated flexible, non-woven felt tube inserted into the existing pipe using a pressure apparatus positioned in the pipe. Curing shall be accomplished by circulating hot water, steam, UV, or other approved method, to cure the resin to a hard, impermeable, corrosion resistant, structural pipe within a pipe. The CIPP technology shall not require bonding to the existing pipe for any part of its structural strength.

It is the intent of this specification to provide for the reconstruction of a particular section of sewer pipe without excavation.

The finished cured-in-place pipe must be fabricated from material which when cured will meet the structural design loads and chemical resistance guidelines of ASTM F1216 and withstand long-term internal exposure to domestic sewage.

If an insertion or service pit is required for trenchless replacement work, including but not limited to installation or repair of CIPP lining systems, any utilities removed, disturbed or destroyed during excavation shall be relocated, replaced or reinstalled by the Contractor. All excavation and all costs associated with the insertion or service pits including but not limited to protection and bracing of utilities, pavement repairs, traffic control, permits and backfill associated with the insertion pit or service pit shall be considered incidental to the project bid items.

Contractor shall, in performance of the work in this section, complete all required activities listed in Section 3.0, Pre-Rehabilitation Utility Work and Documentation, including but not limited to sewage bypassing, cleaning and video inspection and documentation, to Owner's approval, before performing work as detailed herein.

Contractor shall provide a statement from each product manufacturer that Contractor and each crew member involved in each process is certified by manufacturer that they have successfully completed training in handling, applying, finishing and installing the materials or systems used.

Design Calculations

Contractor shall provide CIPP design calculations prepared under the supervision of a licensed professional Engineer in accordance with the contract documents and the referenced standards.

Liner Tube

The tube material shall meet the requirements of ASTM F1216 and ASTM D5813, or better. Liner tube shall consist of one or more layers of flexible needled felt or an equivalent non-woven or woven material or combination of non-woven and woven materials, capable of carrying resin, and withstanding installation pressures and curing temperatures. The liner tube material must be compatible with the resin system used.

The material shall be able to stretch to fit irregular sections and negotiate bends. The outside layer of the tube shall be plastic coated with a material that is compatible with the resin system used. The liner shall be fabricated to a size that, when installed, will tightly fit the internal

circumference and length of the existing pipe without any annular space between the liner and existing wall. Contractor shall make allowance for circumferential stretching during installation.

Seams in the tube shall be stronger than the non-seamed material.

The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color so that a clear detailed examination with video inspection equipment may be made.

No overlapping sections shall be allowed in the circumference or the length of the liner. The cured-in-place pipe shall provide a smooth bore interior.

The liner shall be fabricated from materials which when cured, will be chemically resistant to withstand internal exposure to sewage gases.

The minimum tube length shall be that deemed necessary by the Contractor to effectively span the distance across the repair location, unless otherwise specified. The Contractor shall verify the necessary lengths in the field before impregnations of the tube with resin.

For installations with fully deteriorated pipe (such as a pipe hole), each installation shall have a design report documenting the design criteria for the fully deteriorated pipe section, relative to the hydrostatic pressure, depth of soil cover and type of soil.

Resin

The resin system shall meet the structural land chemical resistance requirements of ASTM F1216 and/or ASTM F1743 or better. A general purpose, un-saturated, styrene-based thermoset resin and catalyst system or an epoxy resin and hardener that is compatible with the inversion process shall be used. The resin and compatible with the insertion process, must be able to cure in presence or absence of water, and the initiation temperature for cure shall be recommended by the manufacturer.

Polyester Resin shall have minimum flexural strength of 4,500 psi per ASTM D790 and Flexural Modulus of Elasticity of 250,000 psi per ASTM D790.

Resin shall not be subjected to ultraviolet light and shall form no excessive bubbling or wrinkling during lining.

Physical Properties

The CIPP system shall conform to and comply with the minimum structural standards listed below:

Characteristic	Test Method	Vinylester & Epoxy Resins
Tensile Strength	ASTM D638	3,000 psi
Flexural Stress	ASTM D790	5,000 psi
Flexural Modulus of Elasticity	ASTM D790	300,000 psi
Flexural Strength (long term)		150,000 psi

The required structural CIPP wall thickness shall be based on the above minimum physical properties and calculated in accordance with the guidelines in the appendix of ASTM F1216.

Approved Processes

Cured-in-place pipe system shall be Insituform® CIPP, Ecoliner, Inliner Technologies or approved equal.

Point Repairs / Spot Repair Defects

Contractor shall clean and clear the line of obstruction such as solids, roots, debris, offset joints, protruding service connections or collapsed pipe that will prevent proper liner insertion and inversion. All irregularities in the pipe or service connections shall be repaired. A protruding lateral shall be removed internally with a hydro-jet cutter.

If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment or by remotely performed point repair methods acceptable to the Engineer, then the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction. Before any point repair excavation is pursued, the Contractor shall give the Engineer 3-days notice, and may only proceed with the Engineer's written authorization.

Trim Protruding Laterals

Contractor shall trim all protruding laterals as necessary to install CIPP liner in each run as described in the project plans and specifications.

Chemical Grouting of All Joints and Severe Defects

Before installation of liners, the Contractor shall pressure test all joints and, in accordance with Section 4.1, use chemical grout to grout all defective pipe joints, cracks and any other defect that may impede the specified performance of the liner.

Hydrophilic End Seal Sleeves

At each pipe to manhole connection install a full-circle compression gasket sealing product that swells with the presence of water. Product shall be Insignia Hydrophilic End Seal Sleeve by LMK Technologies, or approved equal. Install sleeves in accordance with manufacturer's installation instructions.

Resin Impregnation

A certified Wet Out Report shall be completed, signed and submitted for each liner delivered to the site. The Wet Out Report shall include, but is not limited to, wet-out date resin identification, resin weight, resin admixtures, fabric tube length, diameter and thickness. The Contractor shall designate a location where the liner tube will vacuum impregnated with resin (wet-out) under controlled conditions with distribution rollers to thoroughly saturate the tube. The volume of resin used shall be sufficient to fill all voids in the tube material at normal thickness and diameter. The volume shall be adjusted by adding 5% to 10% excess resin volume compared to the volume of the felt to compensate for the change in resin volume due to polymerization and to allow for any migration of resin into the cracks and joints in the original pipe.

The Contractor shall allow the Engineer to observe the "wet-out" procedure.

The impregnated liner bag shall be transported to and stored at the site in such a manner that it will not be damaged, exposed to direct sunlight, or result in any public safety hazard. The impregnated liner tube shall be kept cool during shipment and storage. All materials shall be subject to inspection and review prior to installation.

Liner (Tube) Installation

CIPP shall be installed in accordance with ASTM F1216 for Heat Cure CIPP systems and the manufacturer's recommendations.

The impregnated tube shall be inspected for tears and frayed sections. The wet out tube, in good condition, shall be positioned in the pipeline using either inversion (ASTM F 1216) or a pull-in method (ASTM F 1743). If pulled into place, a power winch shall be utilized and care shall be exercised not to damage the tube as a result of pull-in friction. The tube shall be fully extended to the next designated manhole or termination point. The application of hydrostatic head, compressed air, or other means shall fully extend the liner to the next designated manhole or termination point and inflate and firmly adhere the liner to the pipe wall producing dimples at service connections. The resin that provides a structural seal shall not contact the pipe until positioned at the point of repair.

A resin impregnated sample (wick) shall be retained by the installer to provide verification of the curing process taking place in the host pipe.

The installer shall be capable of viewing the beginning of the liner contacting the host pipe verifying the exact placement of the liner. Video documentation of the placement, prior to curing, shall be provided to the Owner. No measuring from a CCTV counter or estimating will be allowed. The liner must be installed at low pressure (not to exceed 10 psi) to prevent damage to the host pipe.

The tube shall be inverted out of the carrying device by controlled air or water pressure. The installer shall be capable of viewing the entire liner contacting the host pipe from the beginning to the end of the liner verifying the liner has covered the entire damaged section. Video documentation of the entire liner contacting the host pipe, prior to curing, shall be provided to the owner. The tube shall be held tightly against the wall of the host pipe by the pressure, until the cure is complete.

Curing

After placement is completed, curing shall be accomplished by utilizing circulating heated water or steam under hydrostatic pressure in accordance with ASTM F 1216 and the manufacturer's directions and recommended cure schedule. The manufacturer of the resin/catalyst system shall determine the target temperature used by the Contractor.

Contractor shall provide reliable and/or redundant equipment to maintain the heat source supply. The heat source piping shall be fitted with continuous monitoring thermocouples to gauge the temperature of the incoming and outgoing water, steam, and/or air supply. Water, steam or air temperature during the cure period shall meet the requirements of the resin/catalyst system manufacturer as measured at the heat source inflow and outflow return

lines. An additional continuous monitoring thermocouple shall be placed between the impregnated felt tube and the pipe invert at the remote manhole or access point.

Initial cure is completed when the exposed portions of cured pipe appear to be hard and the remote temperature sensor indicates that the temperature is sufficient to cure the resin/catalyst system being used.

Cool Down

The hardened liner shall be cooled to a temperature below 100 degrees F before relieving the hydrostatic head or air pressure in the liner pipe and returning normal flow back into the system. Cool-down may be accomplished by introducing cool water or air into the lined pipe. Care shall be taken in the release of the hydrostatic head or pressure so that a vacuum will not develop which could damage the newly installed liner.

Cut-Off-Sealing Pipe

After draining the hardened liner pipe (if heated water was used), the Contractor will cut the pipe free from the inversion standpipe at the upstream manhole and remove the standpipe. The Contractor will cut the pipe off at the downstream manhole and remove the un-inverted end "turn-back". Seals shall be made with an epoxy or resin mixture compatible with the liner/resin system and shall be performed as recommended by the manufacturer. Hydraulic cements and quick set cement products are not acceptable. The pipe shall be cut neatly and smoothly at each end to preclude snagging and shoaling of debris.

If the installed pipe fails to make a tight seal at the repair edges, the Contractor shall apply a watertight resin mixture sealant at that point. The resin mixture shall be compatible with the resin mixture of the CIPP. There shall be no infiltration/inflow from the annular space outside the hardened liner.

Finish

The finished pipe shall be continuous over the length of a repair location and be free as commercially practicable from visual defects such as foreign inclusions, dry spots, pinholes, and delamination. Any defects that will affect the integrity of the pipe will be repaired at the Contractor's expense.

When the curing process is complete, the pressure shall be released. The inflation bladder and launching device shall be removed from the host pipe with the winch.

Installer shall completely remove all materials, other than the cured tube/resin composite, from the host pipe.

Lateral Reconnection at Service Connections and Grouting

The Contractor shall be responsible for confirming the locations of all lateral connections prior to installing and curing CIPP. Unless otherwise directed by the Engineer, all lateral connections shall be reinstated.

Contractor shall certify he has a minimum of two (2) complete working cutters plus spare key components on the site before each inversion. The operator of the remote controlled cutting device shall have at least 2 years of experience successfully working with such equipment.

Contractor shall fully reinstate all active lateral connections in each run, as soon as is practical after lining the pipe. The lateral connections shall be reopened from inside the sewer by means of a closed-circuit television controlled cutting device appropriate for use on CIPP liners. All openings shall be clean and neatly cut and the bottom of the opening shall be flush with the lateral pipe. The opening shall be buffed with a wire brush to remove rough edges and provide a smooth finish. Service connections shall be reestablished to a minimum of 95% of the flow capacity.

No additional payment will be made for excavations for the purpose of reopening lateral connections. All costs and liabilities associated with such excavation and restoration work shall be the responsibility of the Contractor.

Any service connection opened to greater than 100% of its original diameter shall have a "Top Hat" system installed at Contractor's expense. The liner materials shall meet or exceed ASTM F2561 specifications and meet or exceed the lateral repair standards.

Testing

Contractor shall periodically conduct sampling and testing of the cured product in accordance with the manufacturer's recommendations for quality control purposes. Documentation of such sampling and testing shall be provided to the Engineer upon request. Also, upon request, Contractor shall provide Engineer with acceptable samples to be submitted to an independent testing lab for confirmation at the Owner's expense, unless tested samples do not meet the minimum requirements then Contractor shall pay for the testing costs and expenses.

Contractor shall test all pipe with a mandrel in accordance with WSDOT Standard Specification 7-17.3(2)G.

Quality Assurance

After completion of all liner insertion, service reconnections, and finish work at the manholes, the sewer shall be televised with video inspection equipment.

The finished liner shall be continuous over the entire length of the spot repair location and shall be free from damage, deflection, hole, leaks and other visual defects such as foreign inclusions, dry spots, pinholes, and delamination.

If the CIPP fails to make a tight seal at the repair edges, the Contractor shall apply a resin mixture seal at that point. The resin seal shall be compatible with the resin mixture of the CIPP. There shall be no infiltration/inflow from the annular space outside the hardened liner.

Wrinkles in the finished liner pipe that cause a backwater of 1 inch or more or reduce the hydraulic capacity of the pipe are unacceptable and shall be removed and repaired by the Contractor at the Contractor's expense. Method of repair shall be proposed by the Contractor and submitted to the Engineer for review.

The following repair methods for common defects, where approved by the Engineer, may be considered acceptable. Acceptance of the work will be made only after all work, replacements and repairs are made and all required documentation has been received, reviewed and determined acceptable by the Engineer.

DEFECT	REPAIR	REJECTION CRITERIA
Wrinkles/ridges exceeding 5% of pipe diameter outside of 120-degree invert arc or wrinkles/ridges exceeding 2% of pipe diameter inside of the 120-degree invert arc centered at the bottom of the pipe.	Grind to within required tolerance. Coat ground area with manufacturer's approved resin. Point repair may be required if minimum thickness is affected by repair.	The Engineer may reject the work if wrinkles or ridges exceed 10% of pipe diameter.
Holes, tears, soft spots, lifts, delamination, blisters/bubbles.	Point repairs shall comply with manufacturer's approved recommendations.	If defective areas cover greater than 5% of the surface area, the Engineer reserves the right to reject the work. In such case replacement is required.
CIPP thickness less than required minimum thickness.	If the Engineer determines that the CIPP is acceptable, payment may be reduced by the percentage below the design minimum thickness. In some cases a second CIPP within the first may be allowed.	If the actual thickness is less than 87.5% of the design minimum thickness, the Engineer reserves the right to reject the work. In such case, replacement is required.
Service reinstated to greater than 100% of original diameter.	System must be installed at the Contractor's expense. The liner shall be LMK Technologies, Shorty T-Liner, or approved equal. The liner must extend at least 6 inches beyond both sides of a lateral opening and extend at least 36 inches into the lateral. A manufacturer approved adhesive shall be used to ensure a tight bond against the CIPP liner.	The Engineer reserves the right to reject any improperly installed lateral repairs.

Infiltration of groundwater shall be ground for rejection of work.

The Contractor shall provide a warranty to be in force and effect for a period of one year from the final date of acceptance. The warranty shall cause the Contractor to repair or replace the

liner should failure result from faulty materials or installation, or if infiltration is observed through the liner or at the ends of the liner. In the case where a repair is made to the CIPP liner, such repairs, if approved by the Engineer, shall include an extended warranty for one (1) additional year from the expiration of the Contract warranty.

4.3 Cured-in-Place Sectional Point Repairs

This specification shall cover the point repair and rehabilitation of existing sanitary sewers, normally without excavation, by the installation of cured-in-place pipe (CIPP) sectional lining system in accordance with the most current edition of ASTM F2599 "Standard Practice for Sectional Repair of Damaged Pipe by Means of an Inverted Cured-in-Place Liner".

A CIPP lining system is formed by the insertion of a resin impregnated flexible, non-woven felt tube inserted into the existing pipe using a pressure apparatus positioned in the pipe. Curing shall be accomplished by circulating hot water, steam, UV, or other approved method, to cure the resin to a hard, impermeable, corrosion resistant, structural pipe within a pipe. The CIPP technology shall not require bonding to the existing pipe for any part of its structural strength.

It is the intent of this specification to provide for the reconstruction of a particular section of sewer pipe without excavation.

The finished cured-in-place pipe must be fabricated from material which when cured will meet the structural design loads and chemical resistance guidelines of ASTM F1216 and withstand long-term internal exposure to domestic sewage.

If an insertion or service pit is required for trenchless replacement work, including but not limited to installation or repair of CIPP lining systems, any utilities removed, disturbed or destroyed during excavation shall be relocated, replaced or reinstalled by the Contractor. All excavation and all costs associated with the insertion or service pits including but not limited to protection and bracing of utilities, pavement repairs, traffic control, permits and backfill associated with the insertion pit or service pit shall be considered incidental to the project bid items.

Contractor shall, in performance of the work in this section, complete all required activities listed in Section 3.0, Pre-Rehabilitation Utility Work and Documentation, including but not limited to sewage bypassing, cleaning and video inspection and documentation, to Owner's approval, before performing work as detailed herein.

Contractor shall provide a statement from each product manufacturer that Contractor and each crew member involved in each process is certified by manufacturer that they have successfully completed training in handling, applying, finishing and installing the materials or systems used.

Products

Sectional Liners

Sectional liners shall consist of a one-piece cured in place liner, which provides a verifiable non-leaking connection at the repair location. Contractor shall coordinate and confirm compatibility of the trenchless repair of sewer mains and and pipe host materials with product

manufacturers. Contractor shall ensure that resin systems are compatible with all products that they will contact.

The sectional liner shall consist of one or more layers of flexible needled felt or an equivalent non-woven material, or a combination of non-woven and woven materials, capable of carrying resin and withstanding installation pressures. The sectional liner shall have properties meeting the following minimum requirements:

- The sectional liner at service reconnections shall have a minimum of 18-inch length of contact area extending on each side of the damaged section of the host pipe, with the SMHG O-rings positioned between the liner tube and the host pipe.
- The sectional liners shall be capable of conforming to the repair location and shall be able to stretch to fit an irregular pipe cross-section.
- The resin shall be compatible with the host pipe material or other rehabilitation lining systems that it may contact.
- Seams with other rehabilitation lining systems shall be stronger than the non-seamed liner fabric.
- The sectional liners shall be manufactured with material from a consistent supplier. All materials of similar type shall be from a single source for the entire project.
- The sectional liner shall be fabricated to a size that, when installed, will tightly fit the internal circumferences of both the sewer main. Allowance shall be made for circumferential stretching during the installation process.
- The hydraulic capability of the sectional liner shall be greater than or equal to the hydraulic capacity of the original host pipe, based on hydraulic calculations with standard engineering roughness coefficients.
- The sectional liners shall be designed to be installed from inside the sewer main with no side sewer service or surface excavation access required.
- The sectional liners shall be supplied as a complete, continuous system with one single liner for use at each repair location.
- The sectional liner (textile tube) shall be surrounded by an impermeable flexible translucent bladder that will contain the resin and facilitate visual monitoring of the vacuum impregnation (wet out) procedure.
- The sectional liner (textile tube) shall be fabricated with a 2 in. ring of compressible textile material at the upstream and downstream ends, to create a smooth transition.

Contractor shall confirm sectional liner requirements, including the minimum repair length, at all repair locations. Contractor shall, at no additional cost to the Owner, fully evaluate each repair location and shall furnish, provide and install sectional liners sized to provide a full and complete repair at each repair location, meeting or exceeding the requirements provided above.

Sectional liners shall be as manufactured by Insituform® CIPP, Ecoliner, Inliner Technologies or approved equal.

Resin

Resin used in sectional liner work shall be a general purpose, unsaturated thermosetting or UV-setting, polyester, vinylester, or epoxy resin compatible with the sectional liner material, host pipe material, and other rehabilitation system that it may contact, and with proper catalysts and/or hardeners as designed for the specific application.

Resin shall meet or exceed the physical properties listed in this section.

Resin shall form no excessive bubbling or wrinkling during lining.

Resin shall be manufactured with materials from a consistent supplier. All materials of similar type shall be from a single source for the entire project.

The resin shall have no fillers added for the sole purpose of increasing the resin volume.

Physical Properties

The composite materials of the sectional liners fabric and resin shall, upon installation inside the host pipe, exceed the minimum test standards specified by the American Society for Testing and Materials.

Polyester Resin shall have minimum flexural strength of 4,500 psi per ASTM D790 and Flexural Modulus of Elasticity of 250,000 psi per ASTM D790.

The sectional liners shall be corrosion resistant to withstand exposure to sewage gases containing quantities of hydrogen sulfide, carbon monoxide, diluted sulfuric acid and other chemical reagents typical of sewage conveyance. Chemical resistance of the installed sectional liner shall meet the chemical resistance requirements of ASTM F1216.

The wall color of the interior pipe surface of the sectional liner, after installation, shall be a light reflective color.

The hydraulic profile of the installed sectional liner shall be maintained. The sectional liner shall have at a minimum the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using commonly accepted roughness coefficients for the existing pipe material taking into consideration its age and condition.

Pressure Grout

Pressure grout, when used in application of pipeline repair shall be a chemical grout designed for injection and shall be AV100 chemical grout as manufactured by Avanti International or approved equal and in accordance with Section 4.1, Sanitary Sewer Chemical Grouting.

Installation

For installation of sectional liners after sanitary sewer pipe rehabilitation, the Contractor shall re-establish the existing side sewer service connections. The work shall be done without excavation, from the interior of the rehabilitated sewer main pipe by means of a remotely controlled cutting device that re-establishes the service connection and completed with the

installation of a service connection sectional liner in accordance with the specifications and manufacturer's installation instructions.

Contractor shall make all necessary provisions to ensure service conditions and structural conditions of host pipe are suitable for installation and warranty of the service connection sectional liner. Provisions shall include, but are not limited to: temporary sewer bypassing, temporary sewer service interruption of side sewer, temporary shutdown of water service, utility coordination and handling customer notification for interruption of water service, correction of structural defects and adjustment of active infiltration. Contractor shall provide customer notification when required to shut-off water. Shut-off notifications shall follow procedures in Section 3.3.

Resin Impregnation

Vacuum impregnate the tube with resin under controlled conditions. Use a volume of resin sufficient to fill all voids in the tub material at nominal thickness and diameter. Volume shall be adjusted by adding excess resin for the change in resin volume due to polymerization and to allow for any migration of resin into the cracks and joints of the host pipe, per manufacturer's recommendations. The resin impregnated sectional liner assembly shall be stored in such a manner that it will not be damaged, exposed to direct sunlight, exposed to any curing environment, or result in a public safety hazard. All materials shall be subject to inspection and review prior to installation.

Sectional Liner Installation

The installation device shall be pulled into the pipe using a cable winch or robotically transported from an access point (manhole) to the service connection point. Use internal video cameras to correctly position the device as required by the sectional liner manufacturer's instructions. The installer shall document placement of the liner by internal camera video inspection. Video documentation of the placement, prior to and after curing, shall be provided to the Engineer. The sectional liner assembly shall be pressurized per the sectional liner manufacturer's recommendations to conform the liner to the connecting sewer main and side sewer service pipe.

Curing

For water, air or steam cure. After placement of the sectional liner is complete, provide a suitable heat source and distribution equipment. The equipment shall be capable of circulating hot water, air, and/or steam throughout the section in accordance with the sectional liner's manufacturer's recommendations to raise the temperature uniformly above the temperature required to affect a resin cure. The temperature shall be determined by the sectional liner manufacturer based on the resin/catalyst system employed.

The heat source shall be fitted with continuous monitoring thermocouples to gauge the temperature of the incoming and outgoing water, steam and/or air supply. Water, steam or air temperature during the cure period shall meet the requirements of the sectional liner manufacturer as measured at the heat source inflow and outflow return lines.

Provide standby equipment to maintain the heat source supply. The temperature during the cure shall not be less than 130 degrees Fahrenheit at the boundary between the pipe wall and

the liner unless otherwise directed by the sectional liner manufacturer to meet the sectional liner system requirements.

Temperature shall be maintained during the entire curing period as recommended by the sectional liner manufacturer and shall follow the heating schedule supplied by the sectional liner manufacturer.

For conductive element cure. After placement of the sectional liner is complete, provide a suitable power supply and heat source distribution equipment. The specified heat source shall be capable of heating the sectional liner section evenly to affect the proper cure of the resin in accordance with the sectional liner manufacturer recommendations. The power supply and termination point shall be fitted with continuous monitoring gauges to monitor the temperature during the curing process.

Provide standby equipment to maintain the heat source supply. The temperature during the cure shall not be less than 130 degrees Fahrenheit at the boundary between the pipe wall and the liner unless otherwise directed by the sectional liner manufacturer to meet the sectional liner system requirements.

Temperature shall be maintained during the entire curing period as recommended by the sectional liner manufacturer and shall follow the heating schedule supplied by the sectional liner manufacturer.

For UV light cure. After placement of the sectional liner is complete, including the required pressurization of the placement device, provide a suitable UV light source that will completely cure the liner. The cure time shall be as recommended by the sectional liner manufacturer.

Cool down. Cool the sectional liner down to temperature in the manner specified by the sectional liner manufacturer following the cure period, prior to relieving any static pressure head applied during installation. Care shall be taken to ensure that a vacuum is not induced which could damage the new sectional liner during the release of the pressure head on the new sectional liner.

A visual inspection during bladder removal will verify the completion of the cure.

4.4 Side Sewer Reconnections / Cured-in-Place Lateral Top Hat Liners

The work in this Section consists of using trenchless replacement methods to reconnect side sewer pipes to rehabilitated sewer mains or to repair side sewer pipe connections where directed in the plans and project information.

The materials and methods used to construct cured in place lateral top hat liners shall be compatible with the materials and methods used to construct Cured in Place Pipe Liners or pipe material in case of lateral top hat repairs. Documentation of this compatibility shall be submitted in writing and approved by the Engineer prior to construction.

The Contractor shall be responsible for locating and reconnecting all existing side sewers which are currently in service in a timely manner. The Contractor shall not rely on plans or Owner records to locate such side sewers. Condition scan videos for the existing sewer mains show many inactive services. Active services shall be permanently reconnected immediately after

trenchless replacement work. Inactive services shall be reconnected unless directed by the Engineer, in writing, to not connect an active service. Payment will only be made to reconnect services that are actually reconnected and approved for reconnection by the Engineer.

It is the intent of this specification to provide for the reconstruction of a particular section of sewer pipe without excavation.

The finished cured-in-place pipe must be fabricated from material which when cured will meet the structural design loads and chemical resistance guidelines of ASTM F1216 and withstand long-term internal exposure to domestic sewage.

If an insertion or service pit is required for trenchless replacement work, including but not limited to installation or repair of CIPP lining systems, any utilities removed, disturbed or destroyed during excavation shall be relocated, replaced or reinstalled by the Contractor. All excavation and all costs associated with the insertion or service pits including but not limited to protection and bracing of utilities, pavement repairs, traffic control, permits, backfill and compaction associated with the insertion pit or service pit shall be considered incidental to the project bid items.

Contractor shall, in performance of the work in this section, complete all required activities listed in Section 3.0, Pre-Rehabilitation Utility Work and Documentation, including but not limited to sewage bypassing, cleaning and video inspection and documentation, to Owner's approval, before performing work as detailed herein.

Contractor shall provide a statement from each product manufacturer that Contractor and each crew member involved in each process is certified by manufacturer that they have successfully completed training in handling, applying, finishing and installing the materials or systems used.

Products

Top Hat Liners

Top hat liners shall consist of a one-piece cured in place liner, which provides a verifiable non-leaking connection at the interface of the mainline sewer pipe and lateral pipeline. Contractor shall coordinate and confirm compatibility of the trenchless replacement of sewer mains and side sewer connections with product manufacturers. Contractor shall ensure that resin systems are compatible with all products that they will contact.

The top hat liner shall consist of one or more layers of flexible needled felt or an equivalent non-woven material, or a combination of non-woven and woven materials, capable of carrying resin and withstanding installation pressures. The top hat liner shall have properties meeting the following minimum requirements:

- The top hat liner at service reconnections shall have a minimum of 3-inch wide contact area on the wall of the sewer main pipe around the connection of the side sewer service (the brim) and the thickness shall be uniform.
- The top hat liners at service reconnections shall have a minimum of 6-inches of contact area extending from the "brim" into the side sewer service.

- The top hat liners shall be capable of conforming to the connection and into the side sewer service. It shall be able to stretch to fit an irregular pipe service connection.
- The resin shall be compatible with the liner fabric, pipe material for case of a top hat repair, or other rehabilitation lining systems that it may contact, and the host pipe materials.
- Seams shall be stronger than the non-seamed liner fabric.
- The top hat liners shall be manufactured with material from a consistent supplier. All materials of similar type shall be from a single source for the entire project.
- The top hat liner shall be fabricated to a size that, when installed, will tightly fit the internal circumferences of both the sewer main and the reconnected side sewer service pipe. Allowance shall be made for circumferential stretching during the installation process.
- The hydraulic capability of the top hat liner shall be greater than or equal to the hydraulic capacity of the original host pipe, based on hydraulic calculations with standard engineering roughness coefficients.
- The top hat liners shall be designed to be installed from inside the sewer main with no side sewer service or surface excavation access required.
- The top hat liners shall be supplied as a complete system, with all components as recommended and approved by a single top hat liner manufacturer. Substitutions of individual components shall be approved by the top hat liner manufacturer and documented in writing and submitted to the Engineer.

Contractor shall confirm top hat liner requirements at all repair locations. Top hat liner minimum dimensions provided above are minimum dimensions for the side sewer reconnection locations. Contractor shall, at no additional cost to the Owner, fully evaluate each repair location and shall furnish, provide and install top hat liners sized to provide a full and complete repair at each repair location, meeting or exceeding the requirements provided above.

Subject to these specifications, the following products and manufacturers or assemblers are acceptable:

- InnerSeal Innerwrap Lateral Connection Seal System, manufactured by Perma-Liner Industries, Inc.,
- Insituform Connection System, manufactured by Insituform Technologies, Inc.
- “Top-Hat” Lateral Sealing Systems, manufactured by Cosmic Sondermaschinenbau GmbH.
- Or approved equal.

Resin

Resin used in tophat liner work shall be a general purpose, unsaturated thermosetting or UV-setting, polyester, vinylester, or epoxy resin compatible with the top hat liner material, host

pipe material, and other rehabilitation system that it may contact, and with proper catalysts and/or hardeners as designed for the specific application.

Resin shall meet or exceed the physical properties listed in this section.

Resin shall form no excessive bubbling or wrinkling during lining.

Resin shall be manufactured with materials from a consistent supplier. All materials of similar type shall be from a single source for the entire project.

The resin shall have no fillers added for the sole purpose of increasing the resin volume.

Physical Properties

The composite materials of the top hat liners fabric and resin shall, upon installation inside the host pipe, exceed the minimum test standards specified by the American Society for Testing and Materials.

Polyester Resin shall have minimum flexural strength of 4,500 psi per ASTM D790 and Flexural Modulus of Elasticity of 250,000 psi per ASTM D790.

The top hat liners shall be corrosion resistant to withstand exposure to sewage gases containing quantities of hydrogen sulfide, carbon monoxide, diluted sulfuric acid and other chemical reagents typical of sewage conveyance. Chemical resistance of the installed top hat liner shall meet the chemical resistance requirements of ASTM F1216.

The wall color of the interior pipe surface of the top hat liner, after installation, shall be a light reflective color.

The hydraulic profile of the installed top hat liner shall be maintained. The top hat liner shall have at a minimum the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using commonly accepted roughness coefficients for the existing pipe material taking into consideration its age and condition.

Pressure Grout

Pressure grout, when used in application of pipeline repair shall be a chemical grout designed for injection and shall be AV100 chemical grout as manufactured by Avanti International or approved equal and in accordance with Section 4.1, Sanitary Sewer Chemical Grouting.

Installation

For installation of top hat liners after sanitary sewer pipe rehabilitation, the Contractor shall re-establish the existing side sewer service connections. The work shall be done without excavation, from the interior of the rehabilitated sewer main pipe by means of a remotely controlled cutting device that re-establishes the service connection and completed with the installation of a service connection top hat liner in accordance with the specifications and manufacturer's installation instructions.

Contractor shall make all necessary provisions to ensure service conditions and structural conditions of host pipe are suitable for installation and warranty of the service connection top hat liner. Provisions shall include, but are not limited to: temporary sewer bypassing, temporary sewer service interruption of side sewer, temporary shutdown of water service, utility

coordination and handling customer notification for interruption of water service, correction of structural defects and adjustment of active infiltration. Contractor shall provide customer notification when required to shut-off water. Shut-off notifications shall follow procedures in Section 3.3.

Resin Impregnation

Vacuum impregnate the tube with resin under controlled conditions. Use a volume of resin sufficient to fill all voids in the tub material at nominal thickness and diameter. Volume shall be adjusted by adding excess resin for the change in resin volume due to polymerization and to allow for any migration of resin into the cracks and joints of the host pipe, per manufacturer's recommendations. The resin impregnated top hat liner assembly shall be stored in such a manner that it will not be damaged, exposed to direct sunlight, exposed to any curing environment, or result in a public safety hazard. All materials shall be subject to inspection and review prior to installation.

Top hat Liner Installation

The installation device shall be pulled into the pipe using a cable winch or robotically transported from an access point (manhole) to the service connection point. Use internal video cameras to correctly position the device as required by the top hat liner manufacturer's instructions. The installer shall document placement of the liner by internal camera video inspection. Video documentation of the placement, prior to and after curing, shall be provided to the Engineer. The top hat liner assembly shall be pressurized per the top hat liner manufacturer's recommendations to conform the liner to the connecting sewer main and side sewer service pipe.

Curing

For water, air or steam cure. After placement of the top hat liner is complete, provide a suitable heat source and distribution equipment. The equipment shall be capable of circulating hot water, air, and/or steam throughout the section in accordance with the top hat liner's manufacturer's recommendations to raise the temperature uniformly above the temperature required to affect a resin cure. The temperature shall be determined by the top hat liner manufacturer based on the resin/catalyst system employed.

The heat source shall be fitted with continuous monitoring thermocouples to gauge the temperature of the incoming and outgoing water, steam and/or air supply. Water, steam or air temperature during the cure period shall meet the requirements of the top hat liner manufacturer as measured at the heat source inflow and outflow return lines.

Provide standby equipment to maintain the heat source supply. The temperature during the cure shall not be less than 130 degrees Fahrenheit at the boundary between the pipe wall and the liner unless otherwise directed by the top hat liner manufacturer to meet the top hat liner system requirements.

Temperature shall be maintained during the entire curing period as recommended by the top hat liner manufacturer and shall follow the heating schedule supplied by the top hat liner manufacturer.

For conductive element cure. After placement of the top hat liner is complete, provide a suitable power supply and heat source distribution equipment. The specified heat source shall be capable of heating the top hat liner section evenly to affect the proper cure of the resin in accordance with the top hat liner manufacturer recommendations. The power supply and termination point shall be fitted with continuous monitoring gauges to monitor the temperature during the curing process.

Provide standby equipment to maintain the heat source supply. The temperature during the cure shall not be less than 130 degrees Fahrenheit at the boundary between the pipe wall and the liner unless otherwise directed by the top hat liner manufacturer to meet the top hat liner system requirements.

Temperature shall be maintained during the entire curing period as recommended by the top hat liner manufacturer and shall follow the heating schedule supplied by the top hat liner manufacturer.

For UV light cure. After placement of the top hat liner is complete, including the required pressurization of the placement device, provide a suitable UV light source that will completely cure the liner. The cure time shall be as recommended by the top hat liner manufacturer.

Cool down. Cool the top hat liner down to temperature in the manner specified by the top hat liner manufacturer following the cure period, prior to relieving any static pressure head applied during installation. Care shall be taken to ensure that a vacuum is not induced which could damage the new top hat liner during the release of the pressure head on the new top hat liner.

4.5 Sewer Manhole Rehabilitation

The work in this Section consists of providing for the repair and rehabilitation of sanitary sewer manholes, by the application of cementitious acrylic or urethane grouting materials and chemical grout, to make repairs and to rehabilitate existing manholes for eliminate inflow and infiltration. Chemical Grouting shall be done in accordance with Section 4.1, Sanitary Sewer Chemical Grouting, and ASTM F-2304-03 “Standard Practice for Rehabilitation of Sewers Using Chemical Grouting”.

It is not the intent of this project to provide full manhole rehabilitation and interior coatings. **Rehabilitation, for this project, is intended to encompass localized repairs along manhole construction joints, section joints, and grade ring riser sections and cracks. Manholes are 48-inches diameter and where rehabilitation is required, the rehabilitation is required at multiple locations within each manhole.**

Contractor shall, in performance of the work in this section, complete all required activities listed in Section 3.0, Pre-Rehabilitation Utility Work and Documentation, including but not limited to sewage bypassing, cleaning and video inspection and documentation, to Owner’s approval, before performing work as detailed herein.

Contractor shall provide a statement from each product manufacturer that Contractor and each crew member involved in each process is certified by manufacturer that they have successfully completed training in handling, applying, finishing and installing the materials or systems used.

Products

Acrylic or Acrylate Base Grout

Grout shall be Avanti International, AV 118 Duriflex, De Neef, Inc., AC400 or approved equal.

- Two-part chemical grout mixed at point of injection.
- Minimum 25 percent acrylic or acrylate base material by volume.
- Use higher concentration of base material at Contract Manager's direction to increase strength or offset dilution during injection period.
- Controllable reaction time: 10 seconds to 1 hour
- Viscosity: 1.5 to no more than 2.5 centipoise water and remains constant throughout injection period.
- Tolerates dilution and reacts in moving water.
- Final reaction: Continuous irreversible, impermeable, non-porous still gel in pure form. Stabilized soil in ground that will not become brittle or rigid.
- Gel does not bleed water under stress.
- Dehydrated gel returns to 90 percent of its original volume and form after prolonged period of low ground water.
- Do not use catalyst containing dimethyl amino propionitrile (DMAPM).
- Use root inhibitor in accordance with Section 3.7, Chemical Treatment of Roots in Sewer Lines and Manholes, when roots are present in manholes.
- Use Latex additive for increased tensile strength.
- Tinted to allow detection of grout in drill holes or at leakage locations.

Latex Additive

Latex additive shall be Avanti, AV 257 Icoset or approved equal.

Urethane Base Grout

Urethane base grout shall be 3M Corporation, Scotch-Seal 5610, De Neef, Inc., Hydroactive Multigel NF, Avanti International AV 350 or approved equal.

- Ratio: One part urethane prepolymer to 1 to 10 parts water by volume (10 to 50 percent prepolymer).
- Liquid prepolymer:
    - Solids content: 77 to 83 percent.
    - Specific Gravity: 1.04
    - Flash Point: 20 degrees Celsius.
    - Viscosity: 200 to 1,200 centipoise at 70 degrees Fahrenheit.
- Water for reacting prepolymer: pH of 5 to 9.

- Use gel control agent to control cure time as required.
    - Final Reaction: chemically stable, non-biodegradable, flexible gel, impermeable to water at pressures up to 15 psi.
- Use root inhibitor in accordance with Section 3.7, Chemical Treatment of Roots in Sewer Lines and Manholes, when roots are present in manholes.
- Use latex additive for increased tensile strength.
- Tinted to allow detection of grout in drill holes or at leakage locations.

Latex Additive: Latex additive shall be Avanti, AV 257 Icoset or approved equal.

Pressure Grout

Pressure grout shall be a chemical grout designed for injection and shall be AV100 chemical grout as manufactured by Avanti International or approved equal and in accordance with Section 4.1, Sanitary Sewer Chemical Grouting and in accordance with ASTM F2414.

Manhole Preparation

Clean manhole in accordance with Section 3.5, Cleaning and Inspection of Sewers. Examine surfaces to be repaired for structural defects such as honeycombing, rock pockets, faulty construction joints, cracks and leaking joints. Repair irregularities in manhole following approved submittals for rehabilitation products used. Remove debris from manhole and sewer.

Trim and grout incoming laterals and pipes following approved submittals for rehabilitation products used.

Repair leakage in manhole following approved submittals for rehabilitation products used using the appropriate products, or combination of products, to properly rehabilitate the structure.

Grouting

Provide 48 hour notice to Engineer prior to start of work for equipment inspection.

- Allow measurements to be taken.
- Demonstrate acceptable grout volumetric measuring technique.

Adjust chemical mixing ratios required for specific application.

- Minimum gel time 30 seconds or at Engineer's direction.

Do not block pipes entering/exiting manhole with grout.

- Use mirror or camera to confirm pipes are not blocked.

Protect area of manhole below repair work.

- Do not allow solid material to enter sewage flow.
- Remove protective devices as soon as practicable.

Manhole Sealing

Following ASTM F2414 and specified herein.

- Do not use curtain grout sealing around brick manholes.
- Drill only the amount of holes necessary to stop leakage.
- Seal manhole base when specified: Drill holes and inject grout through manhole base.

Report

Document the repairs at each location in written and digital report to the Owner. Document the repair location within the manhole, the amount of product used to make repairs and the size of each repair.

4.6 Cementitious Lining of Existing Manholes

The work in this Section includes requirements for repair and rehabilitation of sanitary sewer manholes identified for cementitious lining using Cementitious Crystalline Waterproofing applied to sanitary sewer manhole interior floor, walls, risers and rings from floor to top of manhole where evidence of infiltrations or manhole damage is present. Cementitious lining shall be done per these specifications and in accordance with the most current edition of ASTM F2551 "Standard Practice for Installing a Protective Cementitious Liner System in Sanitary Sewer Manholes".

Contractor shall, in performance of the work in this section, complete all required activities listed in Section 3.0, Pre-Rehabilitation Utility Work and Documentation, including but not limited to sewage bypassing, cleaning and video inspection and documentation, to Owner's approval, before performing work as detailed herein.

Contractor shall provide a statement from each product manufacturer that Contractor and each crew member involved in each process is certified by manufacturer that they have successfully completed training in handling, applying, finishing and installing the materials or systems used.

Products

Xypex Megamix II, Xypex Patch 'n Plug and Xypex Gamma Cure, as manufactured by Xypex Chemical Corporation. No substitutions accepted.

Application

Before applying Xypex products, Contractor shall thoroughly clean, then sandblast or high-pressure waterblast surfaces to a rough finish suitable for product application meeting the manufacturer's surface roughness requirements and a minimum ICRI (International Concrete Restoration Institute) Surface Profile 4 or 5.

The Contractor shall schedule Steve Keyser, at CRW Company, 206-276-1548 and xypexnw@outlook.com, to verify and confirm surface requirements are met before starting application of Xypex products. Steve Keyser shall also detail construction methods for the various Xypex products.

Loose concrete and grout shall be removed and patched with Xypex Patch 'n Plug. All voids, including voids around all pipe openings shall be fully filled with Patch 'n Plug before application

of Xypex Megamix II. Notify the Engineer if any water is observed flowing into the wetwell through cracks in the walls. Cracks with active water flows must be filled with Xypex Patch 'n Plug before application of Xypex Megamix II. For cracks with water infiltration exceeding the water pressure that can be stopped with Patch 'n Plug, notify the Engineer. Such cracks, may require chemical grout in accordance with Section 4.1 and ASTM F2414. Where appropriate, apply Patch 'n Plug in accordance with the manufacturer's instructions and recommendations

Megamix II waterproofing thickness shall be no less than 3/8" as recommended by the manufacturer and application shall produce and even layer of uniform thickness that provides a monolithic surface along wetwell walls with full coverage of all specified surfaces and interfacing joints.
Cure Xypex Megamix II using Xypex Gamma Cure compound in the intervals, application rate and in accordance with recommendations specified by the manufacturer. Protect newly applied coating from weather, groundwater and sewage during the cure time.

The manhole can return to service only after 96 hours (4 days) of full cure time, or with written approval from the manufacturer to allow for a shorter cure duration.

Questions regarding application of Xypex products shall be directed to Steve Keyser, at CRW Company, 206-276-1548 and xypexnw@outlook.com.

5.0 SAFETY

In carrying out its responsibilities, Contractor shall protect the lives and health of employees performing the Work and other persons who may be affected by the Work; prevent damage to materials, supplies, and equipment whether on site or stored off-site; and prevent damage to other property at the site or adjacent thereto. Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss; shall erect and maintain all necessary safeguards for such safety and protection; and shall notify owners of adjacent property and utilities when prosecution of the Work may affect them. For these purposes, the Contractor shall:

Follow Washington Industrial Safety and Health Act (WISHA) regional directives and provide a site-specific safety program that will require an accident prevention and hazard analysis plan for the contractor and each subcontractor on the work site. The Contractor shall develop and submit a site-specific safety plan (SSSP) to the Owner's representative for review prior to the initial scheduled pre-construction meeting. Owner shall have up to 5 working days to review and comment on the SSSP.

Provide adequate safety devices and measures including, but not limited to, the appropriate safety literature, notice, training, permits, placement and use of barricades, signs, signal lights, ladders, scaffolding, ventilation, air monitoring, necessary personal protective equipment for all employees, staging, runways, hoist, temporary lighting, grounded outlets, wiring, construction processes, and equipment required by Chapter 19.27 RCW, State Building Code (Uniform Building, Electrical, Mechanical, Fire, and Plumbing Codes); Chapter 212-12 WAC, Fire Marshal Standards, Chapter 49.17 RCW, WISHA; Chapter 296-155 WAC, Safety Standards for

Construction Work; Chapter 296-65 WAC; WISHA Asbestos Standard; WAC 296-62-071, Respirator Standard; WAC 296-62, General Occupation Health Standards, WAC 296-24, General Safety and Health Standards, WAC 296-24, General Safety and Health Standards, Chapter 49.70 RCW, and Right to Know Act.

6.0 MEASUREMENT AND PAYMENT

The following is a list of bid items for the project. Payment for all work will be made at the contract unit price or lump sum price as indicated in the Bid Proposal. The contract price for each item constitutes full compensation for furnishing all equipment, labor, materials, transportation, appurtenances, and incidentals and performing all work necessary to complete the various bid items in accordance with the Contract Documents. Payment for each item shall be considered as full compensation, notwithstanding that minor features may not be mentioned herein.

BID ITEM NO. 1 - MOBILIZATION / DEMOBILIZATION

Measurement. Will be measured per each (EA). Together a mobilization and demobilization is one (1) total unit. One (1) mobilization / demobilization will be paid for each Work Order issued under this "on call" contract, regardless of the duration of the work performed. Example: a Work Order is issued for several CIPP section liners and various locations of chemical grouting to repair defective pipe. In this scenario, payment would be made for one (1) mobilization / demobilization.

Payment. The unit price for this bid item shall cover the complete costs of the work, including but not limited to all costs for the labor, equipment, materials, transportation, traffic control, permits and incidentals required for mobilization and demobilization on the project as described in Project Specifications.

Note: Mobilization / Demobilization for bid item no. 2, Campground CIPP Main Repair, is included in the unit price for bid Item no. 2 and a separate Mobilization / Demobilization will not be paid for work associated with bid item no. 2.

BID ITEM NO. 2 – CAMPGROUND CIPP LINING (MH TO MH) – 8" DIAMETER PIPE

Measurement. Will be measured by lump sum (LS).

Payment. The unit price for this bid item shall cover the full compensation for installation of a complete CIPP liner in accordance with the Project Specifications Section 4.2 and Attachment B, including but not limited to; mobilization and demobilization, traffic control, protection of adjacent property, pipe cleaning and root removal, chemical root inhibitor application, pre-inspection video, pipe defect rehabilitation before CIPP lining, video inspection following completion of work, chemical grouting of joints (except chemical grout material shall be paid under bid item No. 15), CIPP liner, curing, testing, filling of annular space, written and digital reports, site cleanup and restoration and all other items of work not listed or not covered in other bid items but required to complete the bid item as described in the Project Specifications.

BID ITEM NO. 3 & 4 – TRAFFIC CONTROL (CREW SIZE PER BID FORM)

Traffic control shall be considered incidental to each bid item unit price for all work *except* for work within the rights-of-way of Lake Louise Road, Lake Whatcom Blvd. or in areas of Sudden Valley and Whatcom County right-of-way required by governing authorities to have a dedicated flagging crew and requiring one or more full lane closure(s) that restrict public travel to intermittent, alternating, travel in one direction.

Measurement. Measurement shall be per crew hour (HR), for the number of hours required to perform and complete the work. Bid item no. 3 is for traffic control operations that are performed using one (1) flagger and bid item no. 4 is for traffic control operation that are performed using two (2) flaggers.

Payment. The unit price for this bid item shall be full compensation for required Traffic Control, per Project Specifications Section 1.10, including but not limited to preparing and implementing approved traffic control plans, permits, certified flagger(s) and all required barricades, signs and traffic control devices to implement and execute the approved traffic control plan(s).

BID ITEM NO. 5 & 6 – CIPP SECTIONAL LINERS (PIPE DIAMETER & LINER LENGTH PER BID FORM)

Measurement. Will be measured per each (EA).

Payment. The unit price for this bid item shall cover the full compensation for installation of complete CIPP sectional liner(s) in accordance with the Project Specifications Section 4.3, including but not limited to traffic control, sewage bypassing, temporary plugging, protection of adjacent property, pipe cleaning and root removal, chemical root inhibitor application, pre-inspection video, pipe defect rehabilitation before CIPP sectional liner installation, video inspection following completion of work, CIPP sectional liner, curing, testing, written and digital reports, site cleanup and restoration and all other items of work not listed or not covered in other bid items but required to complete the bid item as described in the Project Specifications.

BID ITEM NO. 7 – TRIM PROTRUDING LATERAL

Measurement. Will be measured per each (EA).

Payment. The unit price for this bid item shall cover the full compensation to trim protruding lateral(s) in accordance with the Project Specifications Section 3.6.

BID ITEM NO. 8 – LATERAL RECONNECTION AND GROUTING

Measurement. Will be measured per each (EA).

Payment. The unit price for this bid item shall be full compensation for grouting and restoring service connections between the main and each active lateral or branch connection in accordance with the Project Specifications Section 4.4.

BID ITEM NO. 9 – TOP HAT LINER

Measurement. Will be measured per each (EA).

Payment. The unit price for this bid item shall be full compensation for installation of complete top hat liner(s) detailed in the Project Specifications Section 4.4, including but not limited to traffic control, sewage bypassing, temporary plugging, protection of adjacent property, pipe cleaning and root removal, chemical root inhibitor application, pre-inspection video, video inspection following completion of work, CIPP top hat liner system, curing, testing, written and digital reports, site cleanup and restoration and all other items of work not listed or not covered in other bid items but required to complete the bid item as described in the Project Specifications.

BID ITEM NO. 10 & 11 – TESTING OF PIPE JOINTS (PIPE DIAMETER PER BID FORM)

Measurement. Will be measured per each (EA) joint tested.

Payment. The unit price for this bid item will be full compensation for testing pipe joints in accordance with in the Project Specifications Section 4.1. Payment for testing joints following chemical grouting is incidental to the bid items for chemical grouting.

BID ITEM NO. 12 & 13 – CHEMICAL GROUTING OF MAINLINE PIPE JOINTS & DEFECTS (PIPE DIAMETER PER BID FORM)

Measurement. Will be measured per each (EA) joint and repair location sealed.

Payment. The unit price for this bid item will be full compensation for chemical grouting (except chemical grout materials) of mainline sewer pipe joints and defects in accordance with the Project Specifications Section 4.1. Payment for testing joints and repairs following chemical grouting is incidental to this Bid item. Payment for chemical grout materials is paid under bid item no. 15 based on the effective volume of chemical grout material used for each repair.

BID ITEM NO. 14 – CHEMICAL GROUTING OF MANHOLES & OTHER UTILITY VAULTS

Measurement. Will be measured per each (EA) manhole and vault location sealed.

Payment. The unit price for this bid item will be full compensation for chemical grouting (except chemical grout materials) of standard 48-inch diameter sanitary sewer manholes and other buried utility vaults that require repair of defects using the injection of chemical grout in accordance with the Project Specifications Section 4.1. Payment for testing repairs following chemical grouting is incidental to this Bid item. Payment for chemical grout materials is paid under bid item no. 15 based on the effective volume of chemical grout material used for each repair.

BID ITEM NO. 15 – CHEMICAL GROUT (MATERIALS)

Measurement. Will be measured per effective gallon (GAL). The unit price for this bid item will be the effective volume of chemical grout used, measured in gallons, for the volume of chemical grout used for sealing mainline sewer pipe joints, lateral piping, lateral connections and manhole joints and defects.

Payment. The unit price for this bid item will be full compensation for the material cost of chemical grout used for the sealing of pipe joints, defects, manholes and other structures requiring sealing using chemical grout in accordance with the Project Specifications Section 4.1.

BID ITEM NO. 16 & 17 – SEWAGE BYPASS PUMPING (PIPE DIAMETER PER BID FORM)

Measurement. Will be measured per each (EA) location where a sewage bypass pumping system is required, implemented and operated to perform the work.

Payment. The unit price for this bid item will be full compensation for sewer bypass pumping in accordance with the Project Specifications Section 3.1.

Exception. All costs associated with sewer bypassing shall be considered incidental to the project bid items when flow depth is less than ½ pipe diameter. However, when a repair location's sewage flow depth exceeds ½ pipe diameter, and flow-through devices cannot be used for the proper installation *and* sewer bypass pumping is required to perform the work because flow through the pipe or structure will affect the proper system installation in accordance with the manufacturer's installation instructions, then said flows shall be bypassed and compensation shall be made per the Bid Proposal and as described in this section. Use of flow-through devices are not are not considered sewage bypass pumping and no additional payment will be made for their use.

BID ITEM NO. 18 – SMOKE TESTING (MAINLINE SEWER MH TO MH)

Measurement. Will be measured per each (EA) section of pipe, up to 10" diameter, that is smoke tested, regardless of the number of sewer services connected, where one section is defined as the pipe located between one upstream manhole and one downstream manhole. For payment purposes, the Contractor shall assume that each tested pipe section shall be 400 lineal feet and tested pipe sections exceeding 400 lineal feet shall be prorated based on the actual length.

> Example 1. The tested pipe section, as measured from upstream manhole to downstream manhole, is 480 feet. The subsequent pay item shall be for 1.2 EA (480/400).
>
> Example 2. The tested pipe section, as measured from upstream manhole to downstream manhole, is 325 feet. The subsequent pay item shall be for 1.0 EA.

Payment. The unit price for this bid item will be full compensation for smoke testing in accordance with the Project Specifications Section 3.8.

***** END OF PROJECT INFORMATION AND SPECIFICATIONS *****

2020-21 Sanitary Sewer Misc. I&I Repair Project

Attachment A – Defect List

July 23, 2020

2020-21 Sewer Misc. I&I Repair Project

7/27/2020

DEFECT LIST

COLD SPRING LN

Sewer Main 13-024
T20-1629
Repair Inflow/Infiltration
PRESSURE GROUT I&I AT JOINT
INSPECTION BEGAN AT UPSTREAM MANHOLE S13-23.

* 116 FT - REPAIR I&I AT JOINT. THIS JOINT IS JUST UPSTREAM FROM DOWNSTREAM MANHOLE S13-22.

PHOTOS IN ATTACHMENT. VIDEO FROM 4/28/2020

Sewer Manhole S13-22
T20-1360
Repair Inflow/Infiltration
(blank)
MH has 2 infiltration spots on ring joints inside MH. Also, joint in main just upstream shows infiltration. See video for inspection of sewer main 13-

CREEKSIDE LN

Sewer Main 13-013
T19-3995
Repair Inflow/Infiltration
CIPP REPAIR
CIPP REPAIR WITH TOP HAT. WATCH THE VIDEO FROM 3/14/19. AT 72.6 FT THERE IS INFILTRATION GUSHING. LOOKS TO BE FROM SEVERAL SPOTS, LIKELY 3, COULD BE MORE. THIS WILL NEED A LONG TOP HAT!

SEE UPLOADS

DONALD AVE

Sewer Manhole NE-30
T20-1955
Repair Inflow/Infiltration
Grout Manhole Ring
Per Northshore Smoke Testing Project 2015, manhole had smoke seeping from rings.

Follow-up Task T17-3887 identifies "grout, ring inflow under cone".

FAWN CT

Sewer Manhole S3-46
T20-1957
Repair Inflow/Infiltration
GROUT RING
Per Task T17-3609 12/18/18 Mike noted it needs grout around the seam between concrete and iron ring.

FREMONT ST

Water Valve PRV-AUS
T20-2416
Repair Minor
Repair Vault I&I
(blank)

HOLLY VIEW WAY

Sewer Main 15-002
T20-1649
Repair Major
CIPP PIPE REPAIR FOR HOLE
Roots penetrated pipe at approx. 41 to 44' from downstream manhole S15-1. Roots were removed. Hole in pipe with soil visible.

See also task T19-4057 and inspection video 5-11-2020.

HONEYCOMB LN

Sewer Main Z-006
T19-4052
Repair Inflow/Infiltration
REPAIR INFLOW - CIPP
CIPP REPAIR AT JOINT. JOINT IS 196.9' FEET FROM DOWNSTREAM MANHOLE. INFILTRATION BUBBLING UP FROM PIPE PIPE INVERT.

Sewer Manhole S11-13
T20-0664
Repair Inflow/Infiltration
(blank)
REPAIR MANHOLE - I&I
Sewer Manhole Z-3
T20-1956
Repair Inflow/Infiltration
RESET MANHOLE RING AND GROUT
Per smoke testing report 8/5/2013 manhole Z-3 is leaking. Per followup task T17-3840 5/31/2018 the manhole was found to need repair: "reset ring, grout".

Unclear if this was actually done.

LAKE LOUISE RD

Sewer Main CG-004
T20-1678
Reline
CIPP 8-INCH VCP PIPE
(blank)
Sewer Main CG-005
T20-1679
Repair Inflow/Infiltration
CIPP REPAIR 2 LOCATIONS
CIPP POINT REPAIRS, MEASURED FROM UPSTREAM MANHOLE CG-06:

* 56 FT - JOINT SEPARATION MEDIUM, GASKET SHOWING IN JOINT.
* 146 FT - FRACTURE CIRCUMFERENTIAL, INFILTRATION WEEPER

LAKE WHATCOM BLVD

Sewer Lateral 80000656
T20-0642
Repair Inflow/Infiltration
Infiltration in side sewer
Inside drop into manhole G7-0009 at 2707 Lake Whatcom Blvd. Leak appears to be within ROW so District responsibility. Per BW. Note added by KH 5-6-20

During mainline inspection, running infiltration was noticed in the side sewer portion. Inspection was done after plumber had removed blockage in side sewer. Picture attached. Jason 2/19/20
Sewer Manhole G7-9
T20-0324
Repair Inflow/Infiltration
(blank)
Lots of water coming in from channel that goes up Viewhaven. Coming from the top of the inlet pipe.
Sewer Manhole GT-27A
T20-2143
Repair Inflow/Infiltration
(blank)
MH has infiltration runner in wall above downstream outlet pipe. See video for main section gt-019

LASALLE AVE

Sewer Manhole LAS2
T20-0353
Repair Inflow/Infiltration
(blank)
REPAIR MANHOLE I&I
Sewer Manhole LAS3
T20-0352
Repair Inflow/Infiltration
(blank)
When checking for a dish Jonathan noticed significant I&I leaking in through the manhole chimmney/walls

MAPLE CT

Sewer Main 10-019
T19-4059
Repair Minor
CIPP REPAIR

JOINT OFFSET NEAR THE DOWNSTREAM MANHOLE. CLEAN OUT ROOTS THEN RELINE OR REPAIR.

Roots removed and main reinspected. Jason 4/28/20

MARIGOLD DR

Sewer Main 18-012
T19-4055
Repair Inflow/Infiltration
CIPP REPAIR

CIPP REPAIR AT JOINT OFFSET. HEAVY ROOTS GETTING THROUGH AND IS A POTENTIAL CLOGGER. ROOTS AT 230.8 FT FROM UPSTREAM MANHOLE

SEE VIDEO FROM 2019.
Main has been flushed clean and reinspected. Jason 4/28/20

KH 5-13-20. I confirmed with Jason that this repair should remain on the 2020 list to fix. The roots have been very problematic through the years.

MEADOW CT

Sewer Main 8-012
T20-0470
Repair Major
Hole in pipe
Hole in the pipe at 86 ft from upstream manhole. 3 inch hole in pipe with piece missing. Hole is at 6 o clock position, bottom of the pipe. Picture attached.

MORGAN ST

Sewer Main G1-057
T20-1963
Repair Inflow/Infiltration
Trim Protruding Lateral and Top Hat Repair
(blank)

POLO PARK DR

Sewer Main 9-006
T19-4016
Repair Inflow/Infiltration
CIPP REPAIR
CIPP REPAIR OR GROUT, INFILTRATION SEEPING AT LATERAL CONNECTION.

LOCATION AT 57.4'

TASK ALSO ADDED TO FLUSH. FLUSH FIRST.

RIVER RIDGE LOOP

Sewer Main 29-008
T19-4001
Repair Inflow/Infiltration
REMOVE ROOTS & POSSIBLE GROUT JOINT
ROOTS AT 37' AND 124' FROM DOWNSTREAM MANHOLE.

CLEAN AND REMOVE ROOTS, THEN RE-CAMERA. THESE JOINTS MAY REQUIRE PRESSURE GROUTING OR CIPP.

ALSO, THE LATERAL CONNECTION AT 83' IS POORLY INSTALLED. CAMERA AGAIN AND SEE IF THERE IS AN I&I ISSUE.

Main was flushed clean and reinspected. Jason 4/28/20

UPDATE BASED ON WATCHING 4/28/20 VIDEO: KH (5/13/20)

FROM VIDEO, 3 LOCATIONS FOR CHEMICAL GROUT REPAIR.
AS MEASURED FROM DOWNSTREAM MANHOLE S29-7
* JOINT 37'
* JOINT 79'
* JOINT 124' (THIS JOINT IS CLOSE TO UPSTREAM MANHOLE S29-8

Sewer Manhole S29-8
T20-1667
Repair Drop Sewer
(blank)

MH has inside drop sewer from lateral 2400290039 that has infiltration dripping. After inspecting the lateral with the push camera, we can't determine where the infiltration is coming from. We did discover that the lateral has a large sag just outside the manhole that is collecting deposits and causing the asphalt to fail. This section is in the right of way. Jason 5/12/20

SAGEWOOD CT

Sewer Manhole S1-52

T19-4049

Repair Inflow/Infiltration

GROUT MANHOLE

GROUT INSIDE MANHOLE, CHIMNEY & RINGS. WATER DRIPPING ON CAMERA INSPECTION VIDEO

SIGMA CIRCLE

Sewer Main 16-011

T19-2386

Repair Minor

CIPP REPAIR

Pipe joint offset observed in 10/31/19 video. Offset at 10 feet w/ infiltration observed coming up from the bottom of the pipe at 6:00. Another offset at 76 ft with infiltration coming up from the bottom of the pipe. Major roots at this location. Roots need to be cleaned then CIPP repair at the joint.

After repair, camera main and look at the lateral a 64.8'. Video inspection of the lateral was missed on the 10/31/19 video.

In total 3 CIPP repair points in this main.

Main was flushed clean and reinspected. Jason 4/28/20

SUNNYSIDE LN

Sewer Main 29-002

T20-2109

Reline

(blank)

This is THE Sunnyside line on which we did the major repair.

At 245 and 252 feet there are leaking joints coming from the top of the main and from the bottom/side of the main. Neither are terrible and neither are causing problems or appear to be a sign of a bigger issue.

WHITNEY ST

Sewer Manhole G4-7

T18-6507

Repair Wall

Grout Leaks Around Pipe Penetrating MH Wall

Miguel reported the leaks after opening a manhole to investigate a failed private grinder pump. Maybe we can group this repair with other known leaking manholes to get the best price from a contractor.

WISTERIA LN

Sewer Main 30-023

T19-4061

Repair Inflow/Infiltration

REPAIR JOINT OFFSET

LARGE JOINT OFFSET NEAR DOWNSTREAM MANHOLE. OFFSET APPEARS TO BE ONE JOINT OF PIPE THAT IS MUCH LOWER THAN ADJACENT PIPE. PRESSURE GROUT AT MANHOLE S30-22.

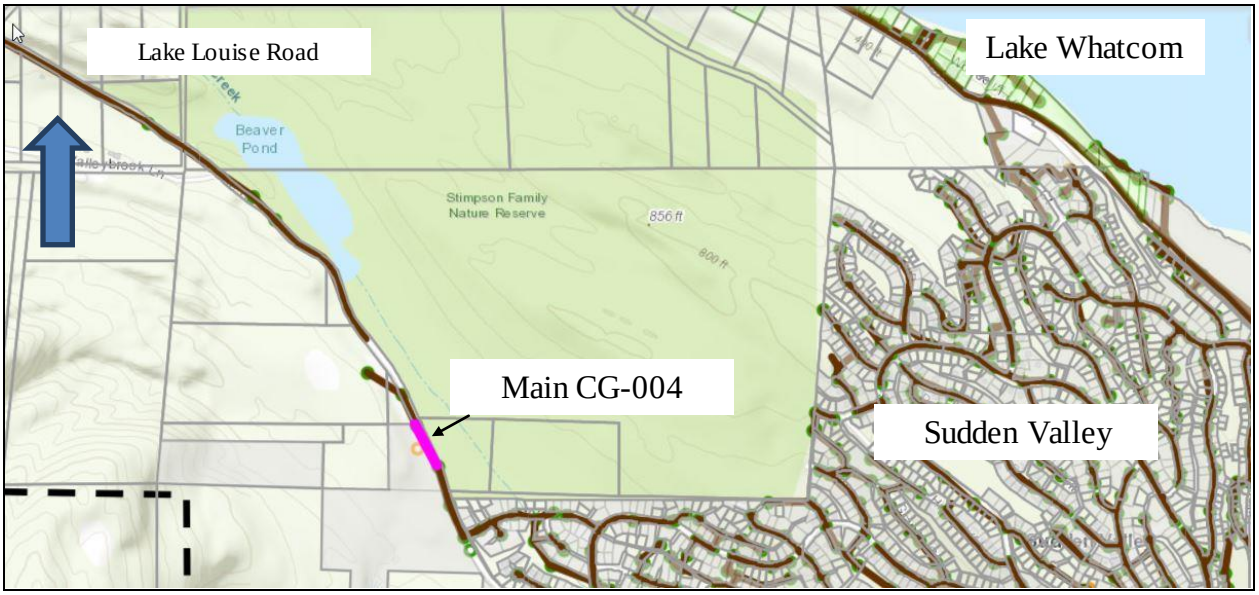
Grand Total

2020-21 Sanitary Sewer Misc. I&I Repair Project

Attachment B – Campground Main CIPP Information

July 23, 2020

Vicinity Map – Campground Sewer Main
Lake Louise Road – Bellingham, WA



BID ITEM NO. 2 – CAMPGROUND CIPP LINING (MH TO MH) – 8" DIAMETER PIPE

Main ID: CG-004
Upstream Manhole: CG-04
Downstream Manhole: CG-03
Length: Approximately 360 LF
Pipe Diameter: 8-inch
Pipe Material: VCP
Active Customer Connections: None
Bid Item Unit: Lump Sum (LS)
Measurement & Payment: See Project Specifications Bid Item No. 2.
Note: This project component is for the complete CIPP lining installation, manhole to manhole, with mobilization/demobilization and traffic control, included in the lump sum price, except chemical grout is to be paid under Bid Item No. 15.

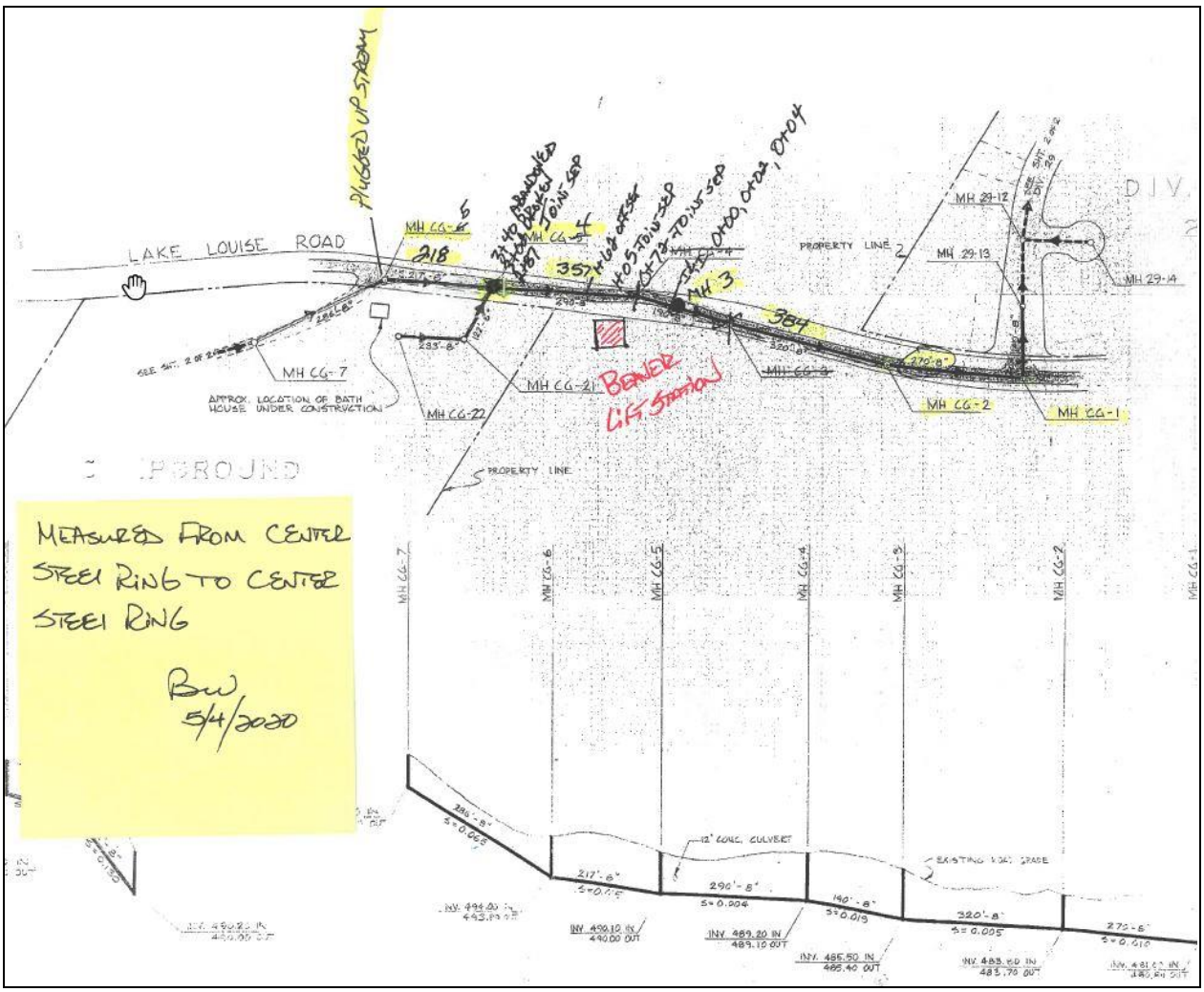
Condition Video Link:
From TV inspection by District Operation & Maintenance 5/4/2020
https://www.dropbox.com/sh/ry8e5yihyxnyota/AACZ83ZVus64w9DZaVRwIt2ua?dl=0

Task description:
Install CIPP liner per Project Specifications. Before liner installation inject chemical grout to refusal at each joint and follow with pressure test.

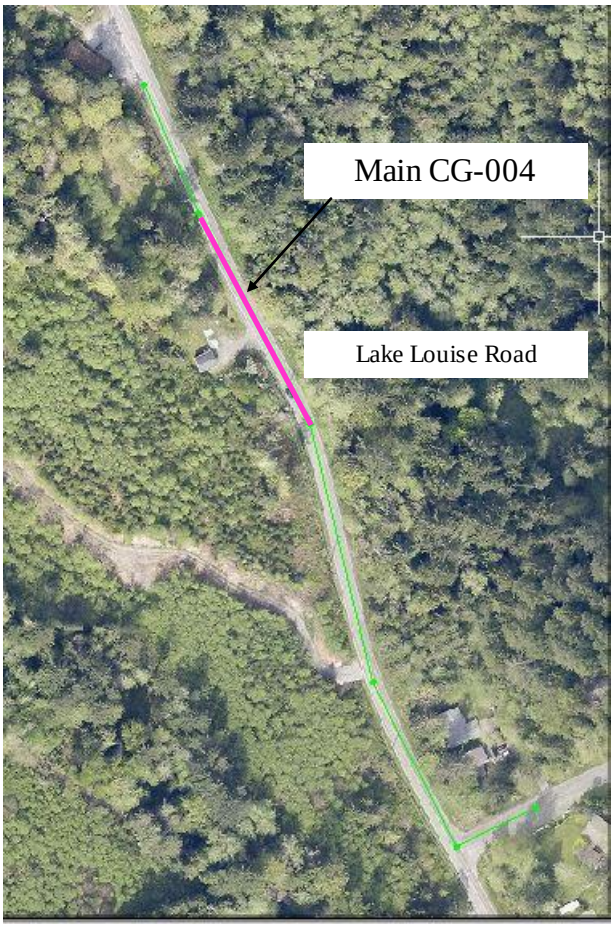
To schedule a pre-bid site meeting contact Kristin Hemenway: 360-389-1997 or kristin.hemenway@lwwsd.org

As-Built Plan & Profile

Refer to notes on the plan view for edits to manhole id and pipe lengths.



Plan View



2020-21 Sanitary Sewer Misc. I&I Repair Project

Attachment C – District Construction Standards

GENERAL NOTES

1. All work and materials shall meet the requirements of the most current editions of the Lake Whatcom Water and Sewer District (District) Design and Construction Standards, Lake Whatcom Water and Sewer District Construction Contract Documents and Project Specifications (for Public Works Projects), the instructions and recommendations of the Manufacturer of the material concerned and select specifications within the Standard Specifications for Road, Bridge and Municipal Construction as prepared by Washington State Department of Transportation (WSDOT) and with all other regulatory agency requirements and permits including but not limited to work within Whatcom County right–of–way shall meet Whatcom County (County) design and construction requirements. In case of a conflict between the above standards, the more stringent shall apply. All work and materials shall be subject to the approval of the District Engineer.

2. Contractor shall obtain encroachment permits or other permissions which may be required from the County, Sudden Valley Community Association, or other entity having jurisdiction over roads and streets, prior to commencing work.

3. Contractor shall provide and maintain all Temporary Erosion Control and Sedimentation (TESC) in accordance with the most current edition of the Storm Water Management Manual for Western Washington (SWMMWW), Volume II, by the Washington State Department of Ecology, Publication Number 14–10–055. Contractor shall use required and necessary Best Management Practices (BMPS) described therein and as may be further described or detailed on the project drawings.

4. Contractor shall call 1–800–424–5555 48 hours before construction for utility locations. Contractor shall not begin excavation until utility notification period is complete.

5. A preconstruction meeting is required with the District and Contractor performing the work a minimum of 2–days before the start of construction.

6. Authority of Engineer, its appointees, assistants and inspectors, shall be per WSDOT 1–05.1. All references to the Engineer or District Engineer shall also mean its appointees, assistants and inspectors as per WSDOT 1–05.2.

7. The Contractor shall be responsible for the safety of all workers and shall comply with all appropriate state safety and health standards, codes, rules, and regulations, including, but not limited to, those promulgated under the Washington Industry Safety and Health Act RCW 49.17 (WISHA) and as set forth in Title 296 WAC (Department of Labor and Industries). In particular the Contractor's attention is drawn to the requirements of WAC 296.800 which requires employers to provide a safe and healthful workplace.

8. Inspection of work and materials shall be in accordance with WSDOT 1–05.6. Removal of unauthorized or defective work shall be in accordance with WSDOT 1–05.7.

9. The Contractor shall take all steps necessary to ensure that the existing facilities remain fully operational during all stages of construction, including but not limited to providing bypass pumping, standby storage, emergency generators and pump trucks, as necessary during service interruptions or outages.

10. No inspections or tie–ins to District's facilities shall be performed on a Friday, Weekend or District Holiday.

11. All pipe shall be bedded in bedding material meeting the requirements of WSDOT 9–03.12(3). The bedding cross–section shall be blocked with Control Density Fill (CDF) per WSDOT 2–09.3(1)E a minimum of every 800 feet and the trench drained to daylight or to a storm drain in accordance with District Standard Detail G11.

12. Backfill above the pipe zone bedding within County ROW, within the roadway section or at driveway crossings shall consist of crushed surfacing top course material meeting the requirements of WSDOT 9–03.9(3). Backfill within private roadways shall consist of material meeting the requirements of WSDOT 9–03.19. Backfill in other areas shall consist of material meeting the requirements of WSDOT 9–03.15, except as shown on the plans or details. Backfilling of trenches shall be in accordance with WSDOT 7.08.3(3).

13. Pea gravel shall not be used for pipe bedding or trench/excavation backfill material. The District may approve limited use of pea gravel where hazardous site conditions exist that pose an immediate threat to workers or public. Pea gravel, if approved for use by the Engineer, shall be a clean mixture free from organic matter meeting the following gradation (passing by weight a US standard sieve); 100% passing 1/2", 95–100% passing 3/8", 0–10% passing #8, and 0–3% passing #200.

14. Backfill shall be compacted to minimum 95% modified Proctor within traffic areas and minimum 90% modified Proctor in landscape and open areas.

15. Tracer wire installation is required on all District owned pipe, electrical conduits and communication lines/conduits. Tracer wire is also required on private side sewers. Install tracer wire per District Standard Detail E6. In addition to tracer wire, install 2–inch wide detectable marking tape 8 to 12 inches below the finish surface. Detectable marking tape shall meet the requirements of WSDOT 9–15.18 and be color coded blue for water, green for sewer, red for electrical and orange for telecommunication.

16. Public water lines and any sanitary sewer line or other non–potable conveyance system shall maintain a minimum of 10–feet horizontal separation (parallel alignment) and a minimum 18–inch vertical separation (parallel alignment and crossings at angles including perpendicular with the sewer line below the water line), measured as the closest distance between outside of pipes, in accordance with the most current editions of the Washington State Department of Health (DOH) Water System Design Manual Section 8.4.4 and the Department of Ecology (DOE) "Criteria for Sewage Works Design" Section C1–9.

When local conditions prevent these separations, with the approval of the District Engineer, installations shall follow the requirements outlined for unusual conditions in the referenced DOH and DOE manuals which includes details for specific pipe materials, pipe segment lengths, joint separation requirements, concrete encasement and/or pipe casings. If a pressure sewer cannot be installed with a minimum 18–inch separation from a water line at a crossing, then the pressure sewer shall be constructed only under the water line with ductile iron pipe or standard sewer pipe in a casing (casing material per the DOE manual) extending at least 10–feet on each side of the crossing.

17. Control Density Fill (CDF), if required, shall meet the requirements of WSDOT 2–09.3(1)E.

18. From the main to the property line, sewer pipes and water pipes shall maintain a minimum horizontal separation of 10–feet. When local conditions prevent the 10–feet separation, separation shall be per District Standard Detail G10, Water Line and Sewer Line Trench Detail, Unusual Conditions. Separation of water service lines and sewer pipes within private property shall be per District Standard Detail G9.

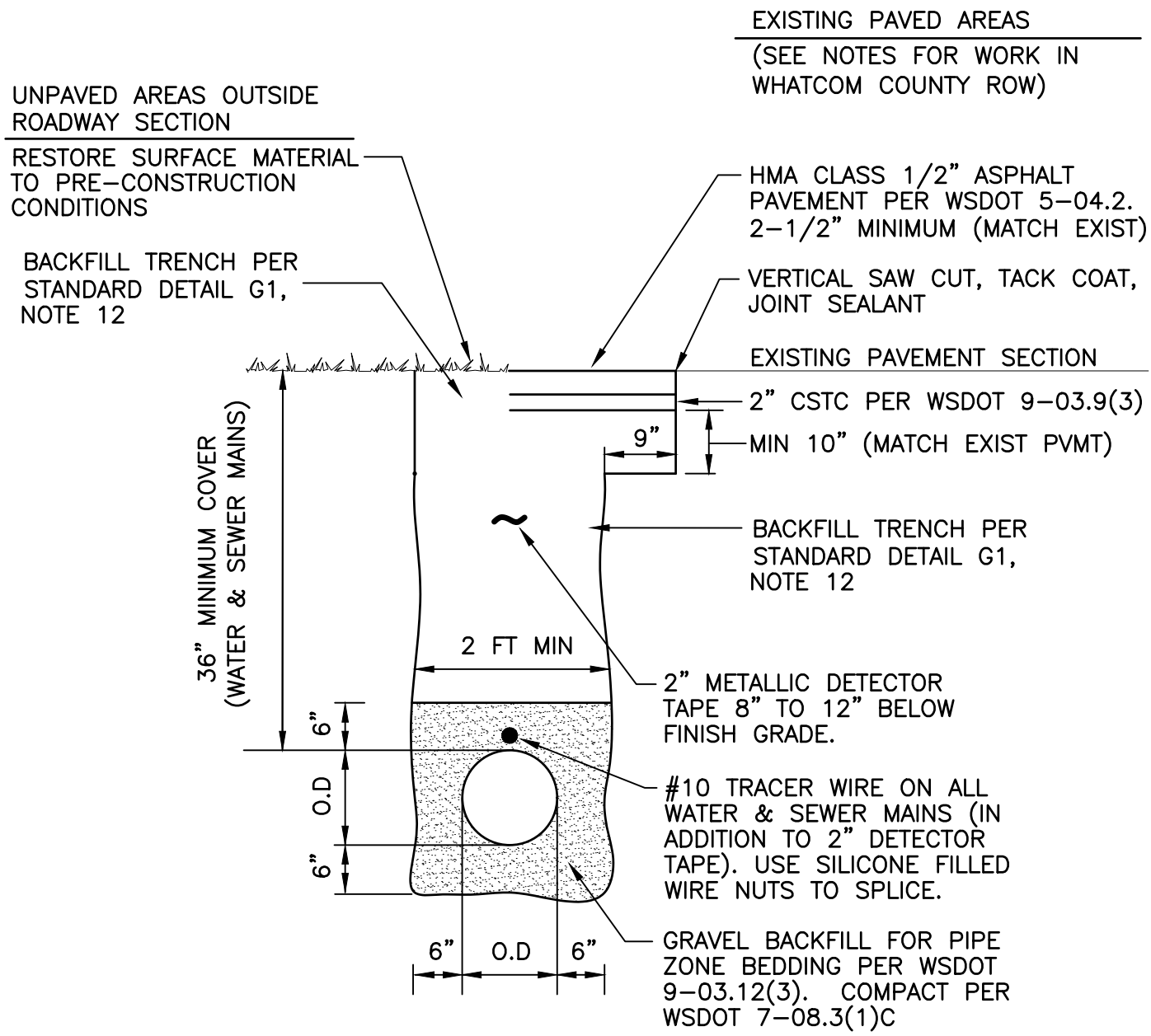
19. Contractor shall remove all debris and excess excavation; repair all damage, and restore the site, public or private, to pre–construction conditions.

20. Where mains or service lines are placed within a ditch area, the buried depth shall be at least 30–inches below the bottom of the ditch, measured from the crown of the pipe to the bottom of the ditch.

21. All work within Whatcom County Right Of Way (ROW) shall meet the requirements of the most current edition of the Whatcom County Development Standards, Section 512.

22. The Lake Whatcom Water and Sewer District is located within the Lake Whatcom Watershed where seasonal clearing activity limitations established by Whatcom County Code 20.51.410 are in force. Clearing activity, which includes trench excavation/backfill and other land disturbance, that will result in exposed soils exceeding 500 square feet are not permitted from October 1 through May 31.

23. References to the Uniform Plumbing Code (UPC) shall be to the edition, amendments standards and exemptions adopted by Whatcom County, as detailed in the most current edition of the Whatcom County Code, Chapter 15.04, Building Codes.



NOTES:

1. With respect to trench repairs and pavement overlays, in the event of conflict between this detail and Whatcom County Standard Drawing Numbers 512.F-1 and 512.F-2, the more stringent standard shall apply.

2. Standard utility locations within county-maintained public road prisms as shown in the 2012.09.25 version of Whatcom County Standard Drawing No. 512.D-1 shall apply.

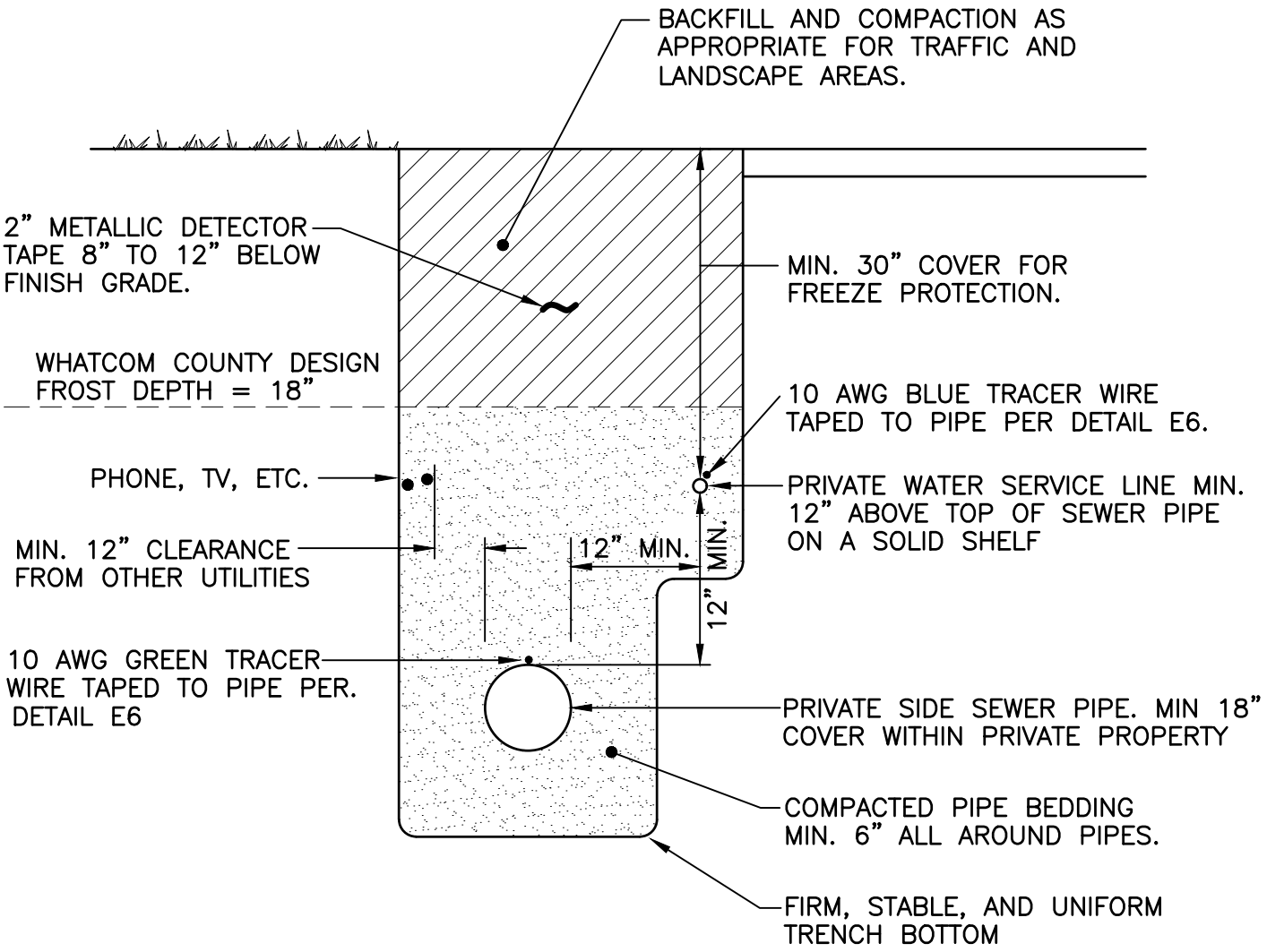
LAKE WHATCOM WATER & SEWER DISTRICT

TYPICAL TRENCH AND BACKFILL DETAIL

STANDARD DETAIL

G4

3/11/2020



NOTES:

1. Side sewer lines and water service lines shall not be installed in the same trench unless the above common trench detail is adhered to (UPC 720.1).

2. Water service lines crossing a sewer line shall be a minimum of 12–inches above the top of the sewer line (UPC 720.1(3)).

3. When a common trench is used for water service and side sewer lines, both pipes shall be bedded in material meeting WSDOT 9–03.12(3) Gravel Backfill for Pipe Zone Bedding as shown in following table:

Sieve Size	Percent Passing by Weight
1.5"	99–100
1"	75–100
5/8"	50–100
U.S. No. 4	20–80
U.S. No. 40	3–24
U.S. No 200	10.0 max
Sand Equivalent	35 min.

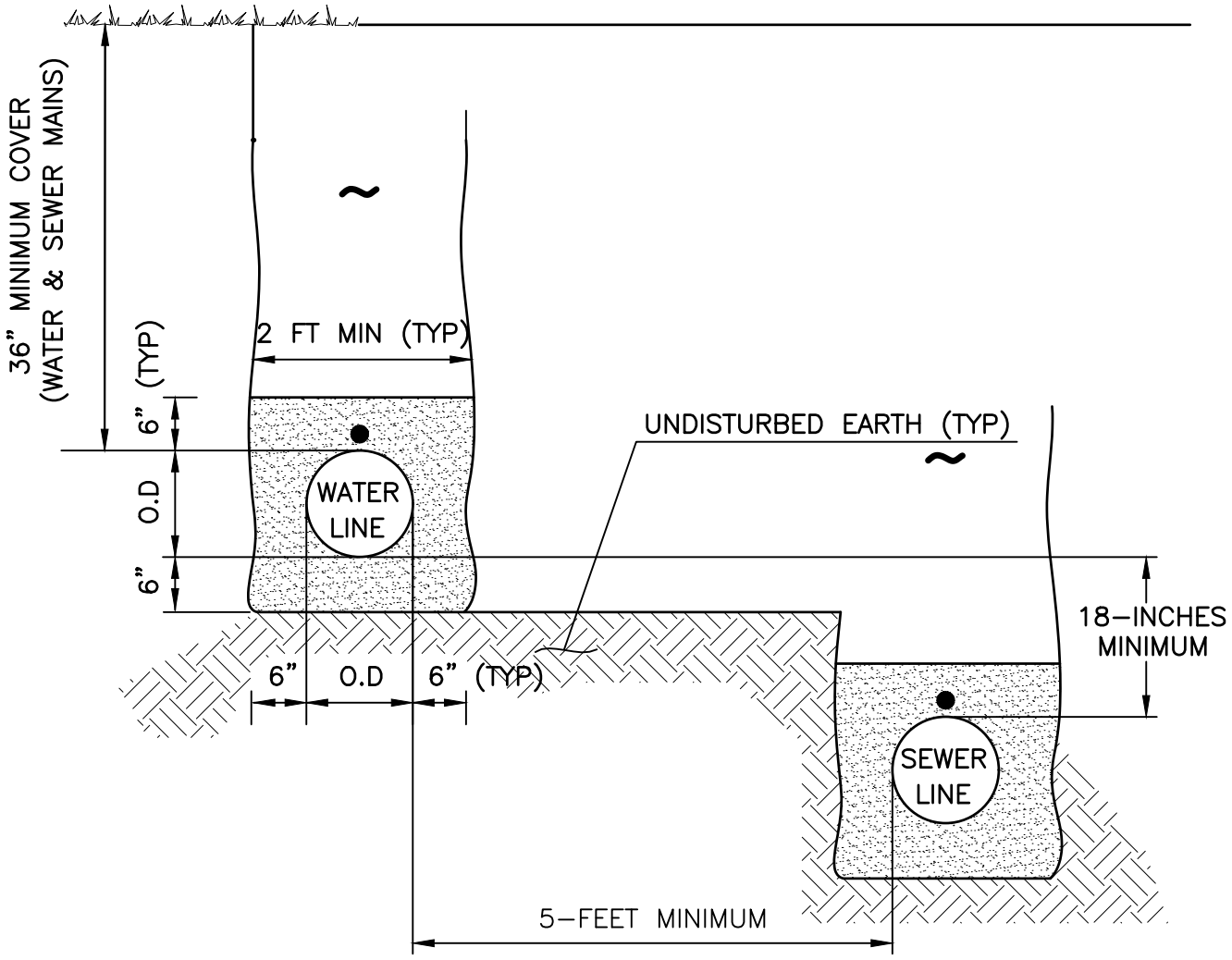
LAKE WHATCOM WATER & SEWER DISTRICT

COMMON TRENCH DETAIL: PRIVATE WATER SERVICE LINE AND SIDE SEWER LINE

STANDARD DETAIL

G8

3/11/2020



NOTES:

1. When local conditions prevent the required 10–feet horizontal separation (parallel alignment) and minimum 18–inch vertical separation between public water lines and any sanitary sewer line, with the approval of the District Engineer, details of DOE "Criteria for Sewage Works Design" Section C1–9.1.2 shall be followed.
2. The water line shall be laid on a bench of undisturbed earth with the bottom of the water line at least 18–inches above the crown of the sewer and shall have at least 5–feet of horizontal separation at all times. Additional mitigation efforts, such as impermeable barriers, may be required by the appropriate state and local agencies.
3. If the 18–inch vertical separation cannot be obtained, the sewer shall be constructed of materials and joints that are equivalent to water main standards of construction and shall be pressure tested to ensure water tightness prior to backfilling. Adequate restraint should be provided to allow testing to occur. See DOE "Criteria for Sewage Works Design Section C1–9.1.2.
4. Trench bedding, backfill, tracer wire, detector tape and restoration per Standard Detail G4.

LAKE WHATCOM WATER & SEWER DISTRICT

WATER LINE AND SEWER LINE TRENCH DETAIL
UNUSUAL CONDITIONS

STANDARD DETAIL

G9

3/11/2020

SEWER SYSTEM NOTES:

1. Sewer system materials, trenching, bedding, installation, backfilling, and testing shall meet the requirements of WSDOT 7–05 and WSDOT 7–17 and District standards detailed herein.

2. Gravity sewer pipe shall be ASTM D3034–SDR 35 PVC per WSDOT 9–05.12(1). In certain applications, the District may require class 52 ductile iron pipe, per WSDOT 9–30.1(1), encased in polyethylene encasement per WSDOT 9–30.1(2).

3. Pressure sewer pipe shall be class 52 ductile iron pipe per WSDOT 9–30.1(1) encased in polyethylene encasement per WSDOT 9–30.1(2) or PVC C900 class 150 per WSDOT 9–30.1(5). HDPE may be substituted with the approval of the District Engineer (pipe rating, resins, physical properties, dimensions and tolerances must be as specified in the American Water Works Associations (AWWA) Manual C901 for the specific design conditions).

4. Sewer service lines from the public sewer main to the cleanout adjacent to the building must be installed by a contractor on the District's current Bonded Side Sewer Contractor list.

5. All sewer system installations shall be inspected prior to backfill.

6. All gate valves for sewer force mains shall have a cast iron valve box with a commercial concrete collar (18" x 18" x 6") with each valve. Valves not in pavement shall have a 24" x 24" x 6" concrete collar cast around the valve box.

7. Side sewers, from main to private property line, shall meet the requirements of WSDOT 7–18. Side sewers shall have a minimum slope of 2%. Side sewers shall maintain a minimum cover of 36–inches and 30 inches under ditches. Side sewers and cleanout/test tee at property line shall be minimum 6–inches in diameter.

8. Side sewers within private property shall meet the requirements of the District Standards detailed herein. Gravity side sewers shall have a minimum slope of 2%. Minimum size for gravity sewer lines will be 4–inches for a single family residence and 6–inches for a multi–family residence up to a 4–plex. See Standard Detail S10 for requirements regarding layout (bends) and cleanouts. Sewer cleanouts shall be installed per WSDOT 7–19.

9. Grout for manholes shall be a non–shrinking cementitious grout, containing no gypsum or calcium sulfate Di–hydrate (CaSO42H2O), conforming to WSDOT 9–20.3(2), such as Rapid Set Cement All or approved equivalent. Grout shall be installed according to manufacturer's instructions. JET SET, BLUELINE, AND QUICKCRETE ARE NOT ALLOWED.

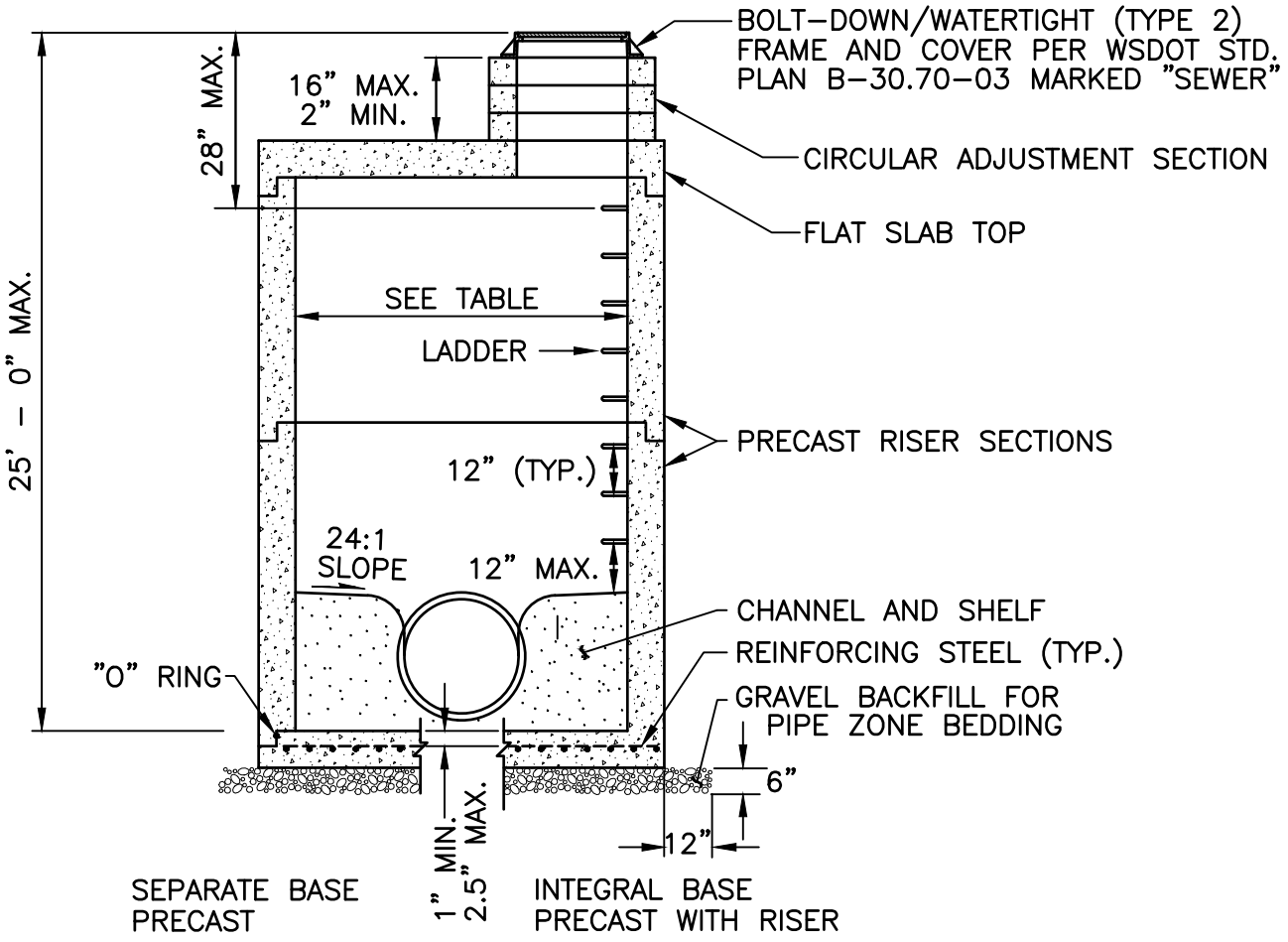
10. All sewer pipe and appurtenances shall be flushed and cleaned prior to being put into service. Debris shall not be allowed into the existing sewer system.

11. The District Engineer shall witness testing. Contractor shall provide the District Engineer 48–hours notice prior to conducting tests or sampling.

12. Pipe shall be tested after backfill by the low–pressure air test method per WSDOT 7–17.3(2)F. PVC pipe shall have a mandrel passed through it to check for any deflections in the pipe per WSDOT 7–17.3(2)G. All sewers shall be television inspected and video delivered to the District, with all costs borne by Contractor, before acceptance. Connection to the existing system is not permitted until final acceptance.

13. Side sewers on private property shall be water tested per WSDOT 7–17.3(2)A and 7–17.3(2)B.

14. Downspouts, foundation/crawl space sump pumps, yard drains, or any outside drains shall not be connected to sanitary sewer mains or services.



MANHOLE DIMENSION TABLE						
DIAM	MIN. WALL THICKNESS	MIN. BASE THICKNESS	MAXIMUM KNOCKOUT SIZE	MINIMUM DISTANCE BETWEEN KNOCKOUTS	PIPE ALLOWANCES PIPE MATERIAL WITH MAX. INSIDE DIAM.	
					ALL METAL	SOLID WALL PVC
48"	4"	6"	36"	8"	30"	30"
54"	4.5"	8"	42"	8"	36"	36"
60"	5"	8"	48"	8"	42"	42"
72"	6"	8"	60"	12"	54"	48"
84"	8"	12"	72"	12"	60"	48"
96"	8"	12"	84"	12"	72"	48"

NOTES:
1. Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum.

2. No steps are required when height is 4' or less.

BASED ON WSDOT STANDARD PLANS B–15.60–02 AND B–10.20–01.

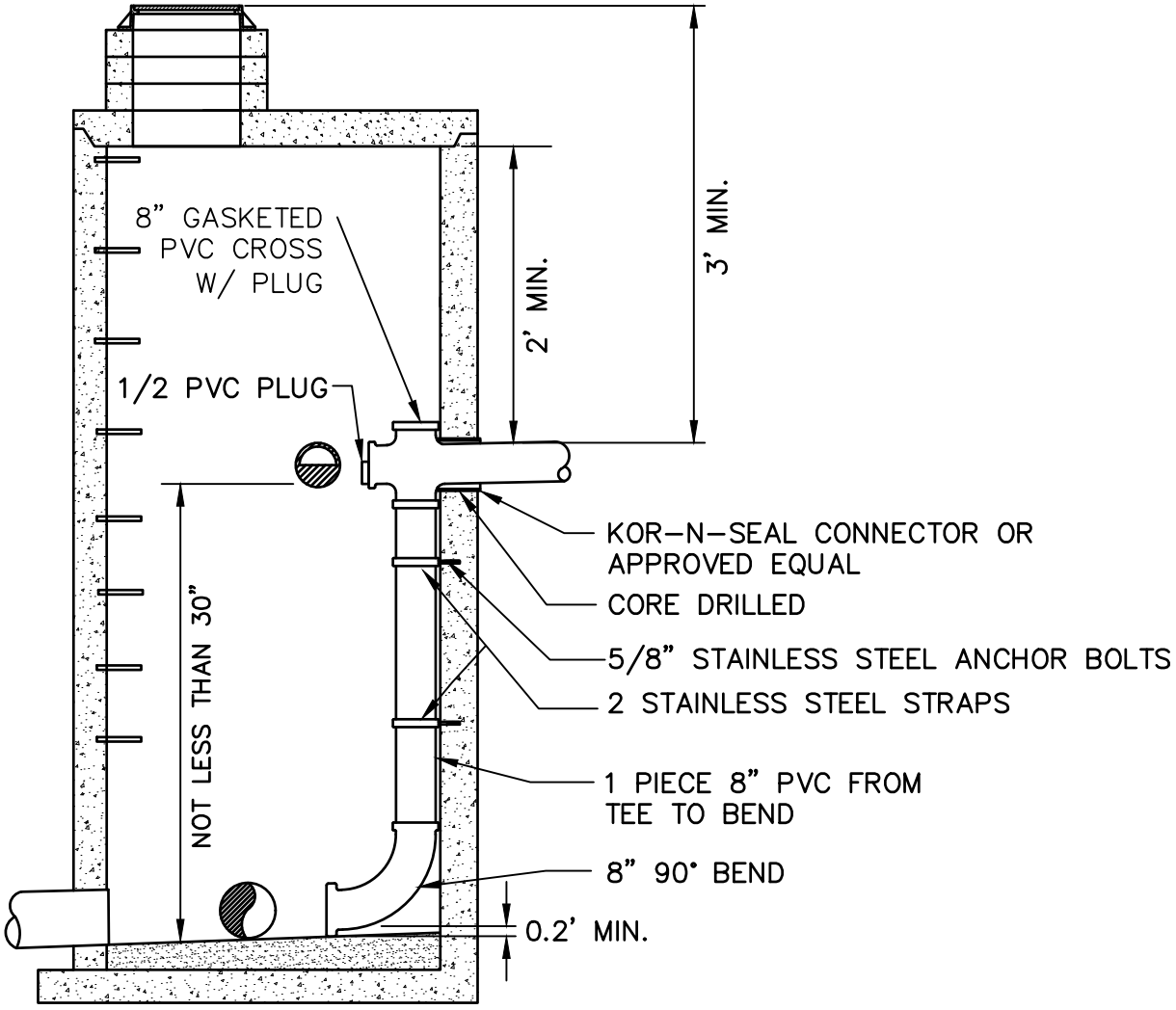
LAKE WHATCOM WATER & SEWER DISTRICT

SANITARY SEWER MANHOLE TYPE 3

STANDARD DETAIL

S3

9/20/2017



NOTES:

1. Inside drop manhole shall be installed only where approved the District and when manhole width is minimum 60-inches, unless approved by the District.

2. Drop tee to be installed minimum of 2' below ceiling.

3. Size of manhole will increase with larger diameter pipe and shall be approved by the District Engineer.

4. Channel to outlet.

BASED ON CITY OF BELLINGHAM
DRAWING SS-715 DATED 11/29/04.

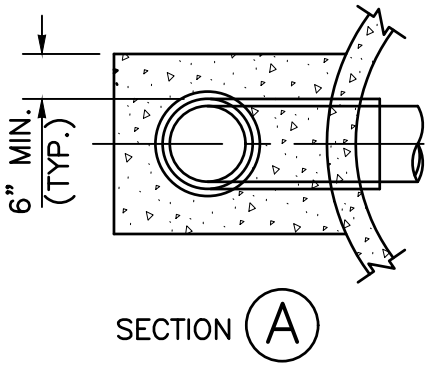
LAKE WHATCOM WATER & SEWER DISTRICT

INSIDE DROP SEWER MANHOLE CONNECTION

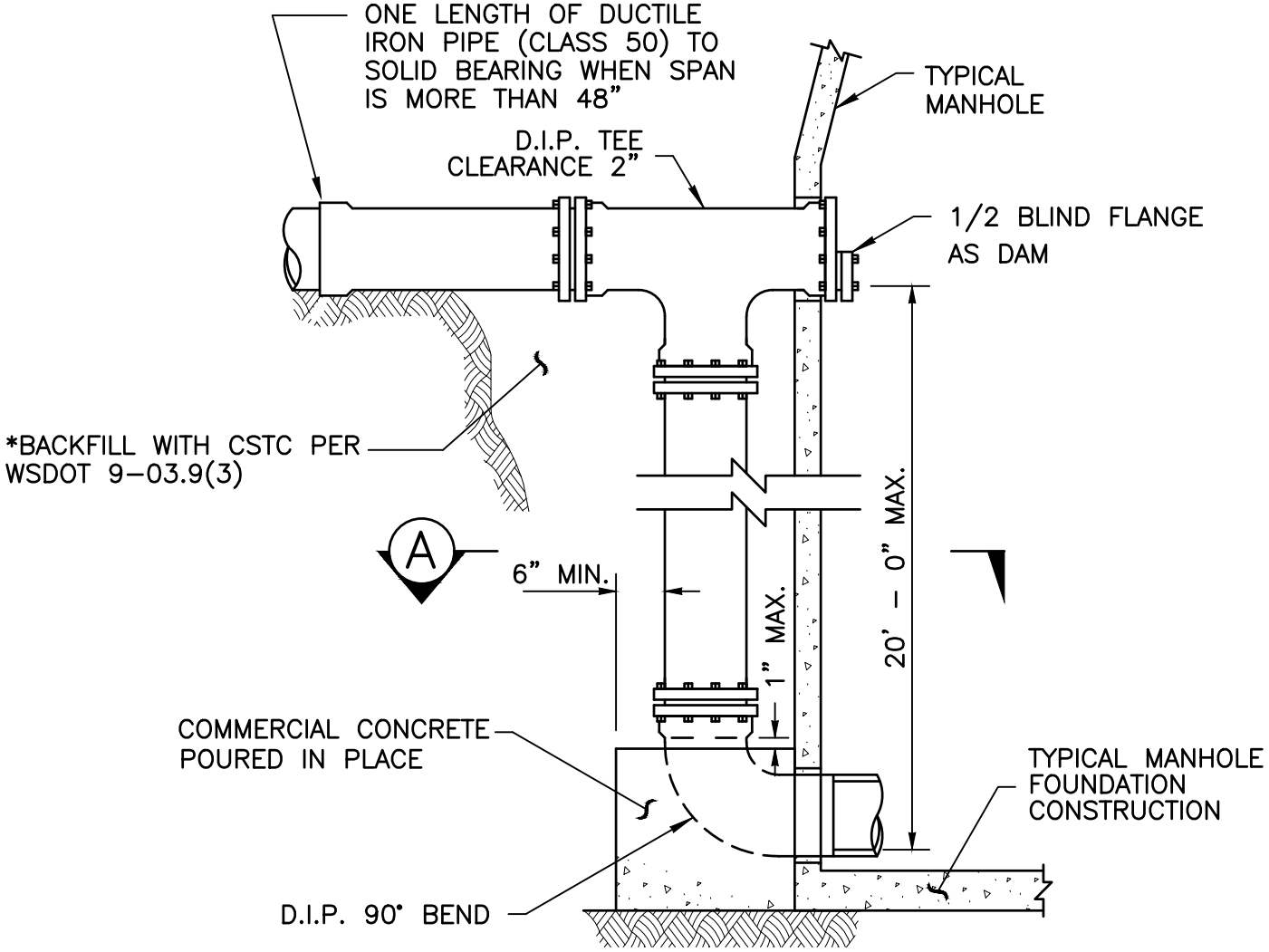
STANDARD DETAIL

S4

3/11/2020



SECTION A



NOTES:

1. Outside drop manholes shall be installed only where approved by the District.
2. All pipe shall be minimum Class 52 ductile iron pipe.
3. * Differs from WSDOT Std. Plan B-85.50-01

BASED ON WSDOT STANDARD PLAN B-85.50-01 DATED 6/10/08.

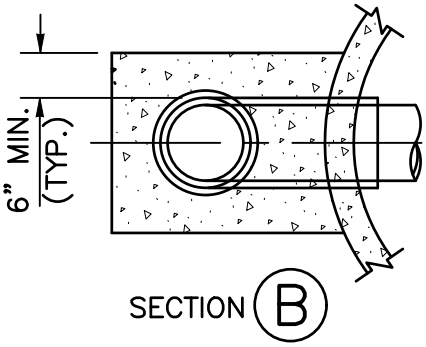
LAKE WHATCOM WATER & SEWER DISTRICT

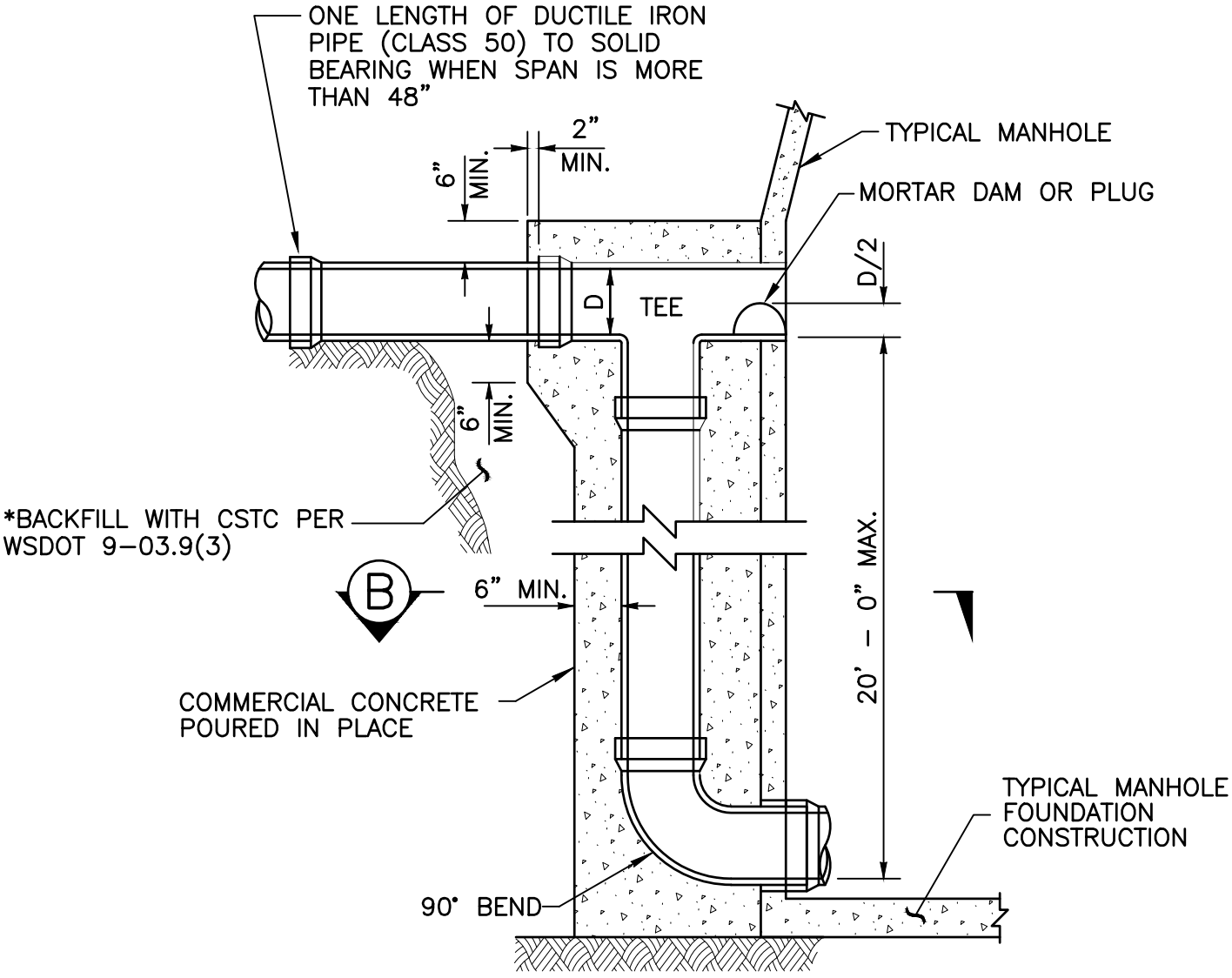
OUTSIDE DROP SEWER MANHOLE CONNECTION
Sheet 1 of 2

STANDARD DETAIL

S5

9/20/2017





NOTES:

1. All pipe, except ductile iron pipe, shall be concrete encased.

2. Outside drop manhole shall be installed only where approved by the district.

3. * Differs from WSDOT Std. Plan B-85.50-01.

BASED ON WSDOT STANDARD PLAN B-85.50-01 DATED 6/10/08.

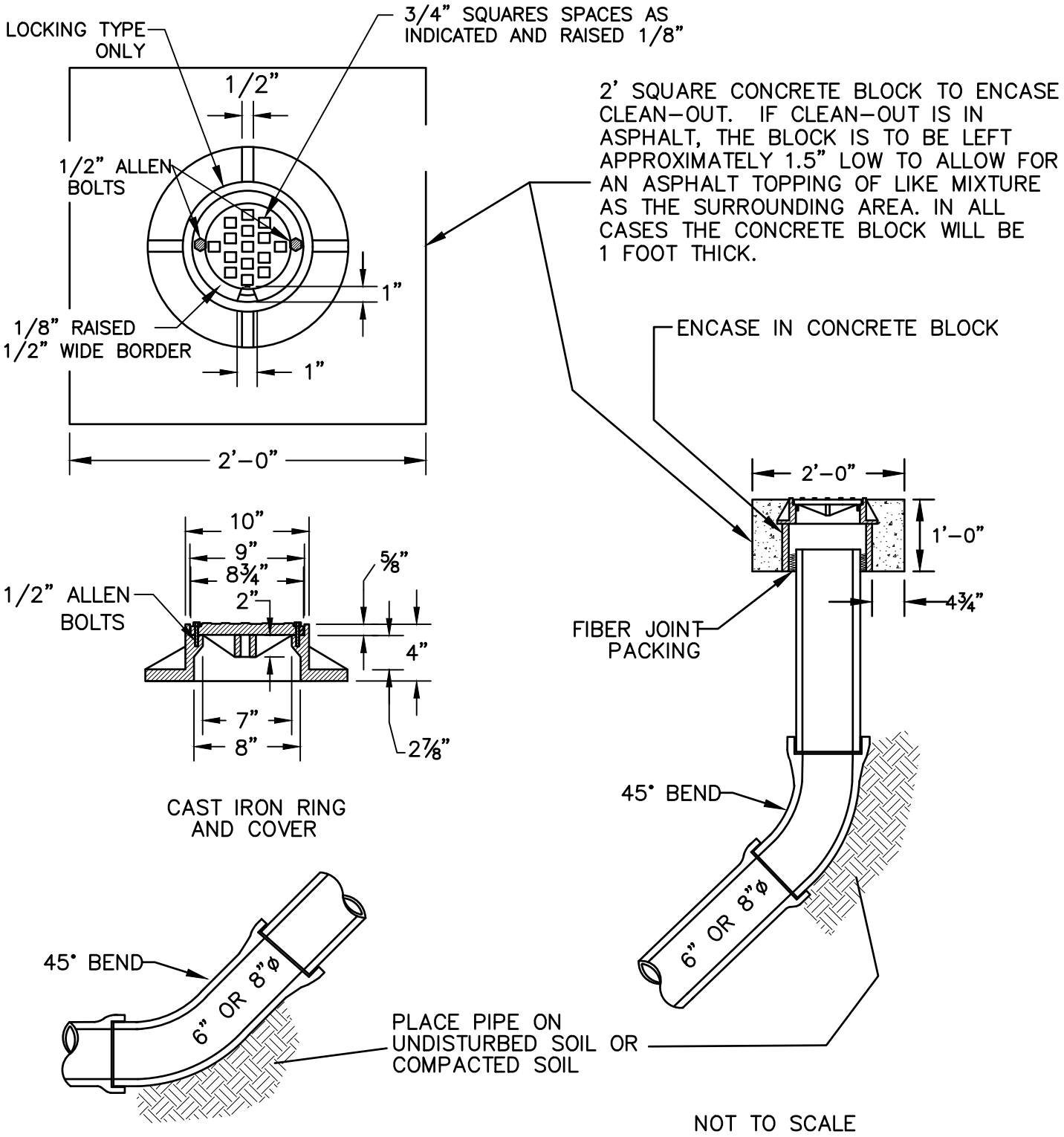
LAKE WHATCOM WATER & SEWER DISTRICT

OUTSIDE DROP SEWER MANHOLE CONNECTION
Sheet 2 of 2

STANDARD DETAIL

S6

9/20/2017



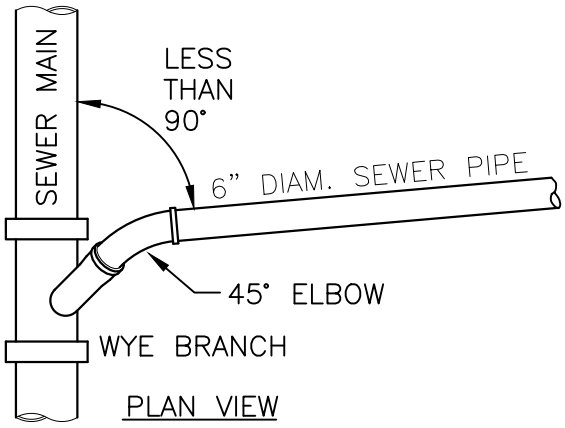
LAKE WHATCOM WATER & SEWER DISTRICT

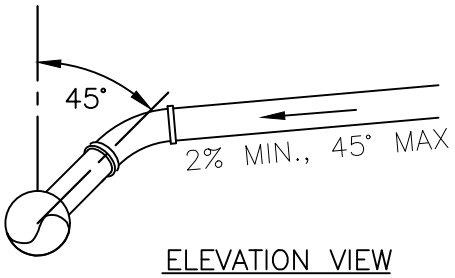
SEWER MAIN CLEANOUT

STANDARD DETAIL

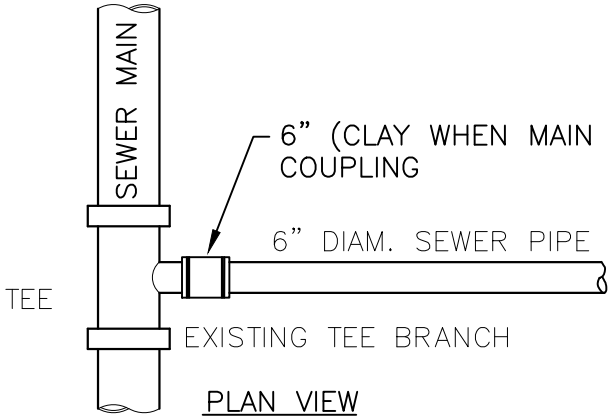
S7

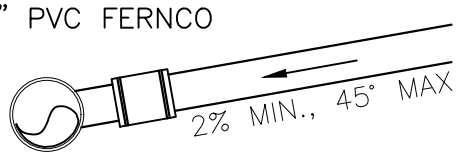
5/1/2014



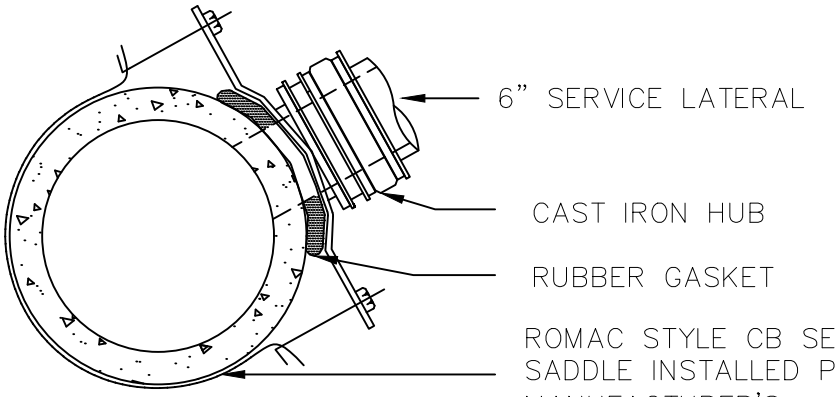


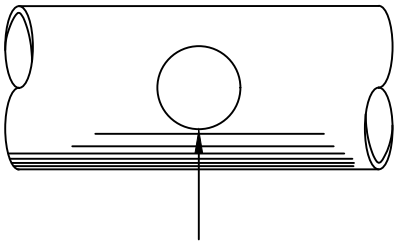
SERVICE LATERAL INSTALLED WITH NEW MAINS





CONNECTION TO EXISTING TEE





NOTES;
1. Install wye fitting with gaskets for new sewer installations
2. Pipe bedding shall be sand or pea gravel 6" all around. Pea gravel is limited to a 12–inch x 12–inch area around a new tap onto sewer main.
3. Minimum cover to finish grade is 30".
4. Core drill hole then remove coupon. Do not drop coupon into pipe.

CONNECTION TO EXISTING SEWER (TAP)

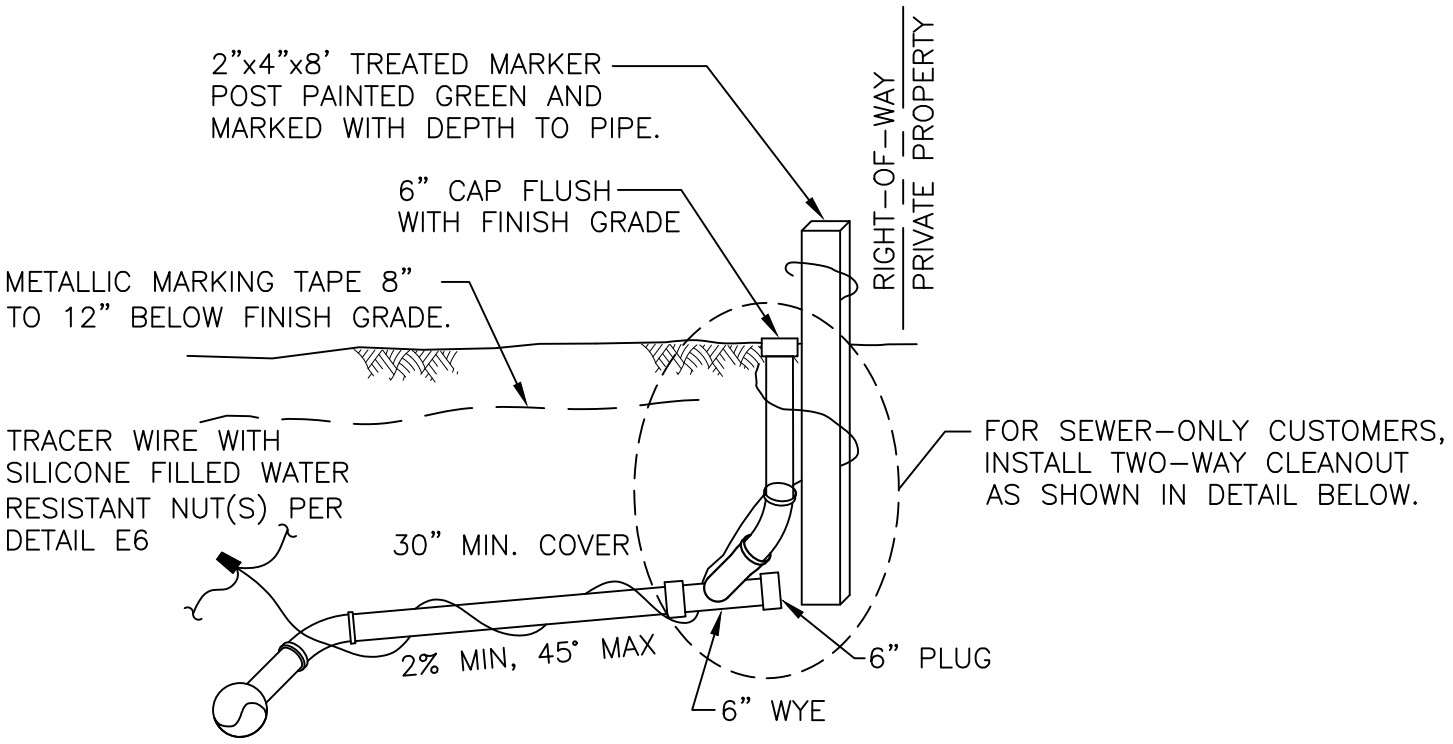
LAKE WHATCOM WATER & SEWER DISTRICT

SEWER LATERAL CONNECTION TO MAIN

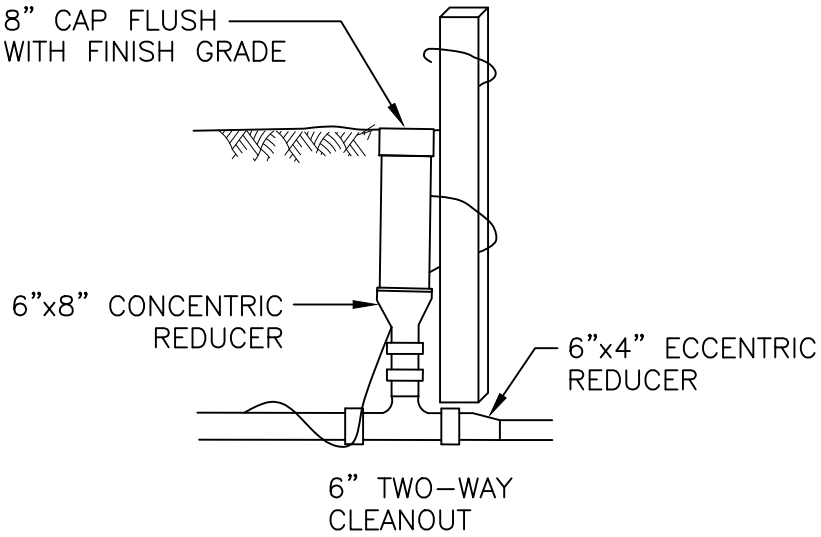
STANDARD DETAIL

S8

4/4/2019

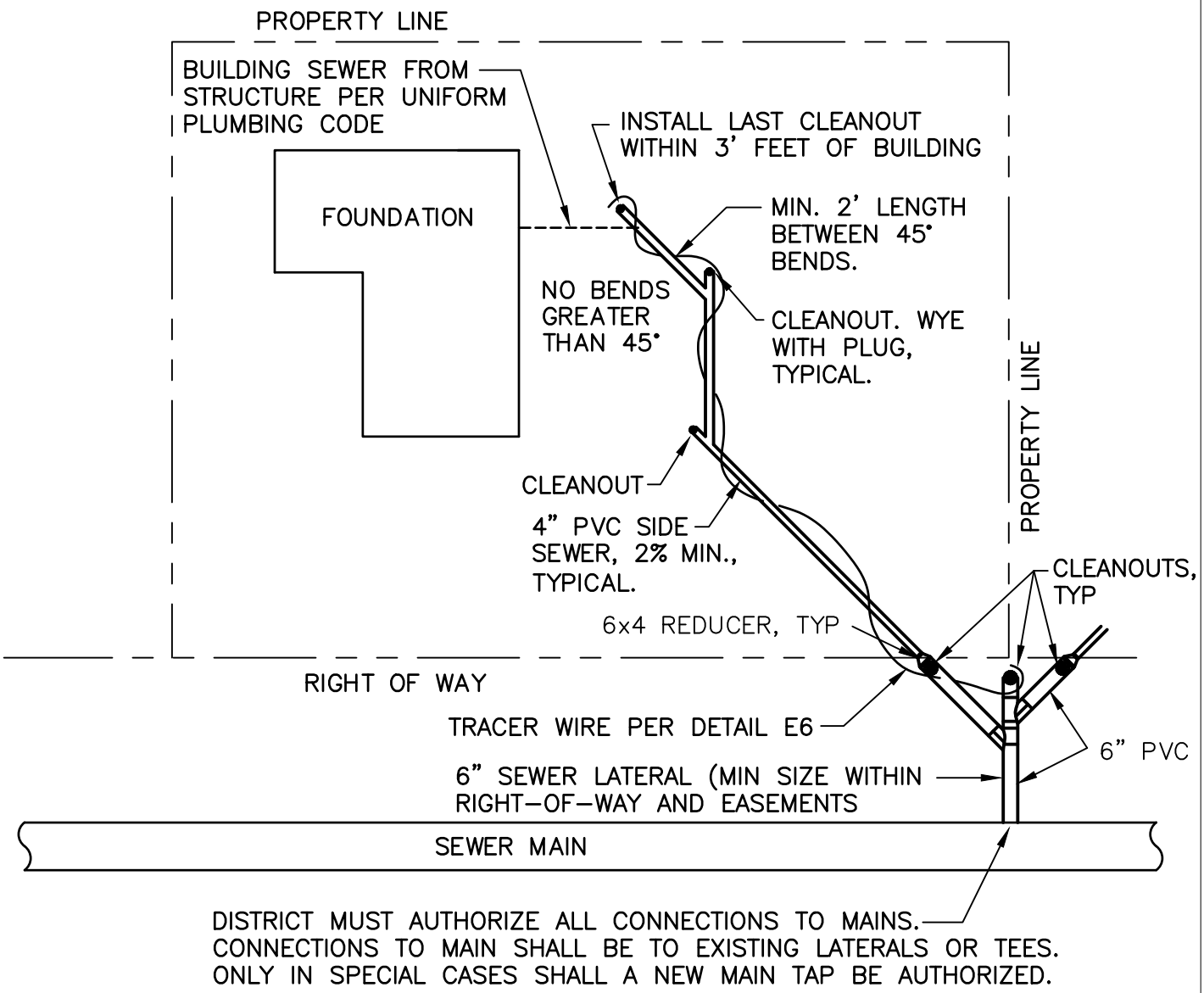


TYPICAL SEWER LATERAL & CLEANOUT



CLEANOUT FOR SEWER-ONLY CUSTOMERS.

LAKE WHATCOM WATER & SEWER DISTRICT	SEWER LATERAL AND CLEANOUT	STANDARD DETAIL S9 5/1/2014



Notes:

1. All pipe from main to cleanout at foundation shall be PVC ASTM D3034 SDR 35, joints shall conform to ASTM D3212 using elastomeric gaskets conforming to ASTM F477. Fittings shall be injection molded, factory welded, or factory solvent cemented.
2. Minimum 18" of cover from property line to building.
3. Down spouts, sump pumps, outside drains and storm drainage shall not be connected to the sewer line.
4. Bends greater than 45° will not be accepted.
5. Minimum size for sewer lines will be 4" for single family residence and 6" for multi-family residence up to a 4 plex.
6. Cleanouts on service lines shall be installed at every change in alignment or grade in excess of 22 1/2 degrees.
7. Cleanouts shall be spaced no greater than 100' apart.
8. A cleanout shall be installed within 3' of the building.
9. Transitions of different material type shall be with a Romac Style 501 coupling or equal.

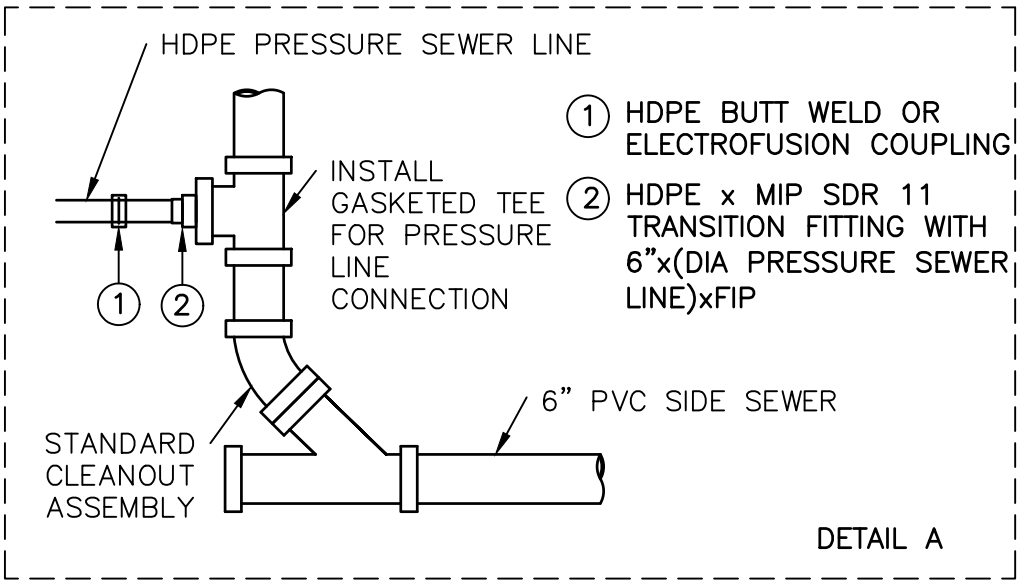
LAKE WHATCOM WATER & SEWER DISTRICT

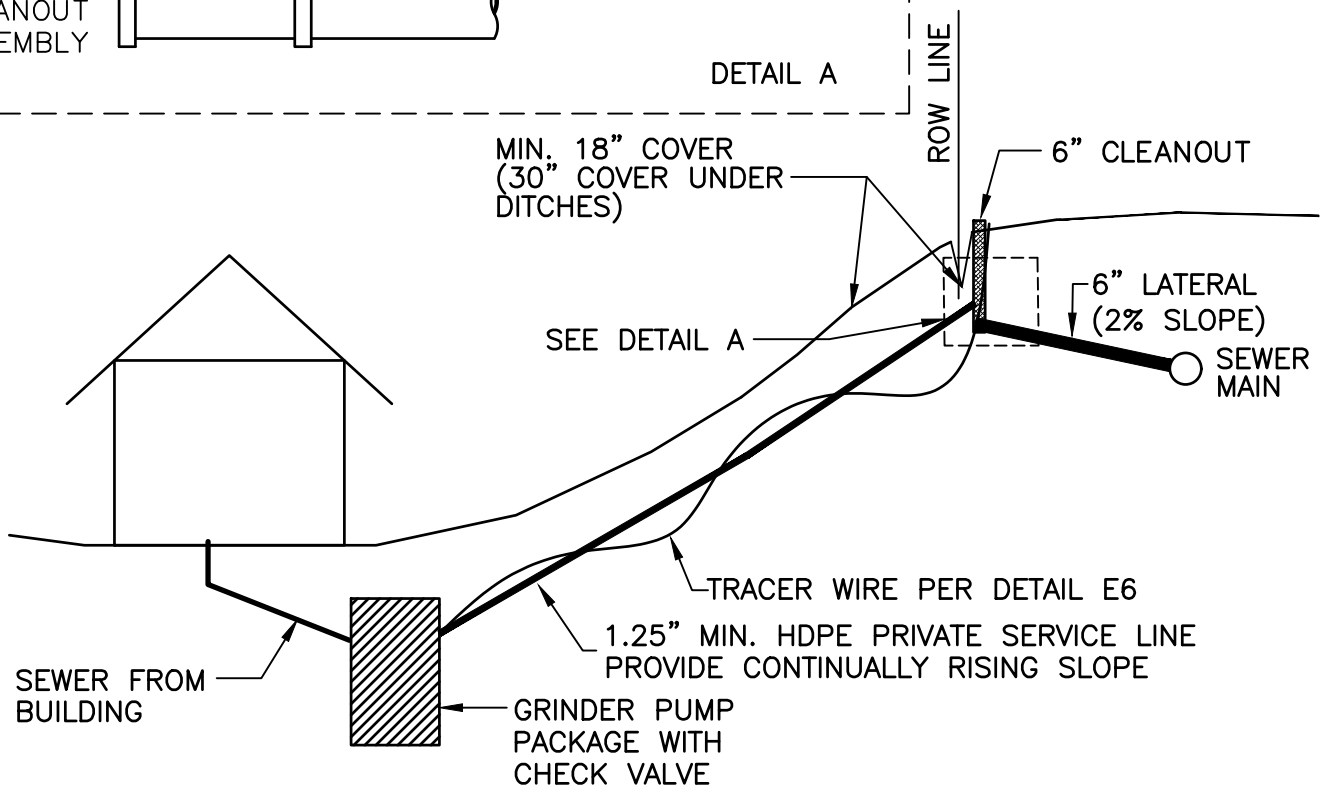
GRAVITY SIDE SEWER INSTALLATION

STANDARD DETAIL

S10

5/1/2014





SEE DEPT. OF ECOLOGY (DOE) CRITERIA FOR SEWAGE WORKS DESIGN, SECTIONS C1–10.1 & C1–10.2 FOR GRINDER PUMP DESIGN & COMPONENT INFORMATION

NOTES:

1. Pressure sewer service pipe shall be PE 3408 HDPE conforming to the requirements of ASTM D–3350. Piping shall be SDR11, IPS (OD), pressure rated at 160 PSI, conforming to the requirements of AWWA C901 and ASTM F714. Fittings shall be electro–fusion welded socket joints.

2. Grinder pump package shall consist of at least a grinder pump, basin, cover, check valve, controls, and interior and exterior visual and audible alarms (with battery backup for high level alarm), provided by Environment–One (E–One, D–Series Package Grinder Pump System) or approved equal.

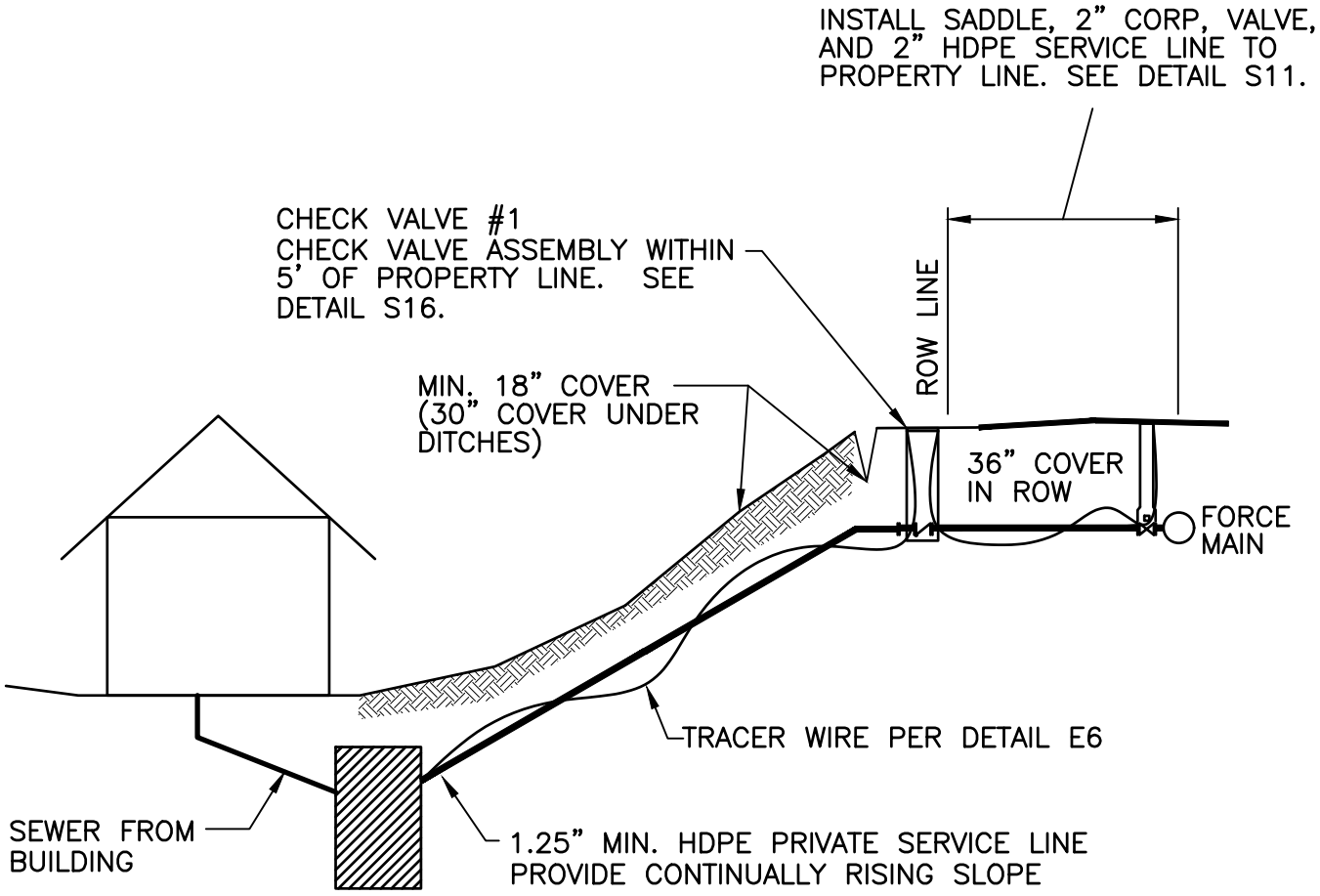
LAKE WHATCOM WATER & SEWER DISTRICT

GRINDER PUMP SERVICE TO GRAVITY MAIN INSTALLATION

STANDARD DETAIL

S11

3/11/2020



GRINDER PUMP (CHECK VALVE #2 AT GRINDER PUMP)

SEE DOE'S CRITERIA FOR SEWAGE WORKS DESIGN, SECTIONS C1–10.1 & C1–10.2 FOR GRINDER PUMP DESIGN & COMPONENT INFORMATION

NOTES:

1. Pressure sewer service pipe shall be PE 3408 HDPE conforming to the requirements of ASTM D–3350. Piping shall be SDR11, IPS (OD), pressure rated at 160 PSI, conforming to the requirements of AWWA C901 and ASTM F714. Fittings shall be electro–fusion welded socket joints.

2. Two check valves are required between the pump station and the force main. One check valve shall be installed within 5' of the right–of–way in the check valve vault. The second valve shall be installed at the grinder pump.

3. Grinder pump package shall consist of at least a grinder pump, basin, cover, check valve, controls, and interior and exterior visual and audible alarms (with battery backup for high level alarm), provided by Environment–One (E–One, D–Series Package Grinder Pump System) or approved equal.

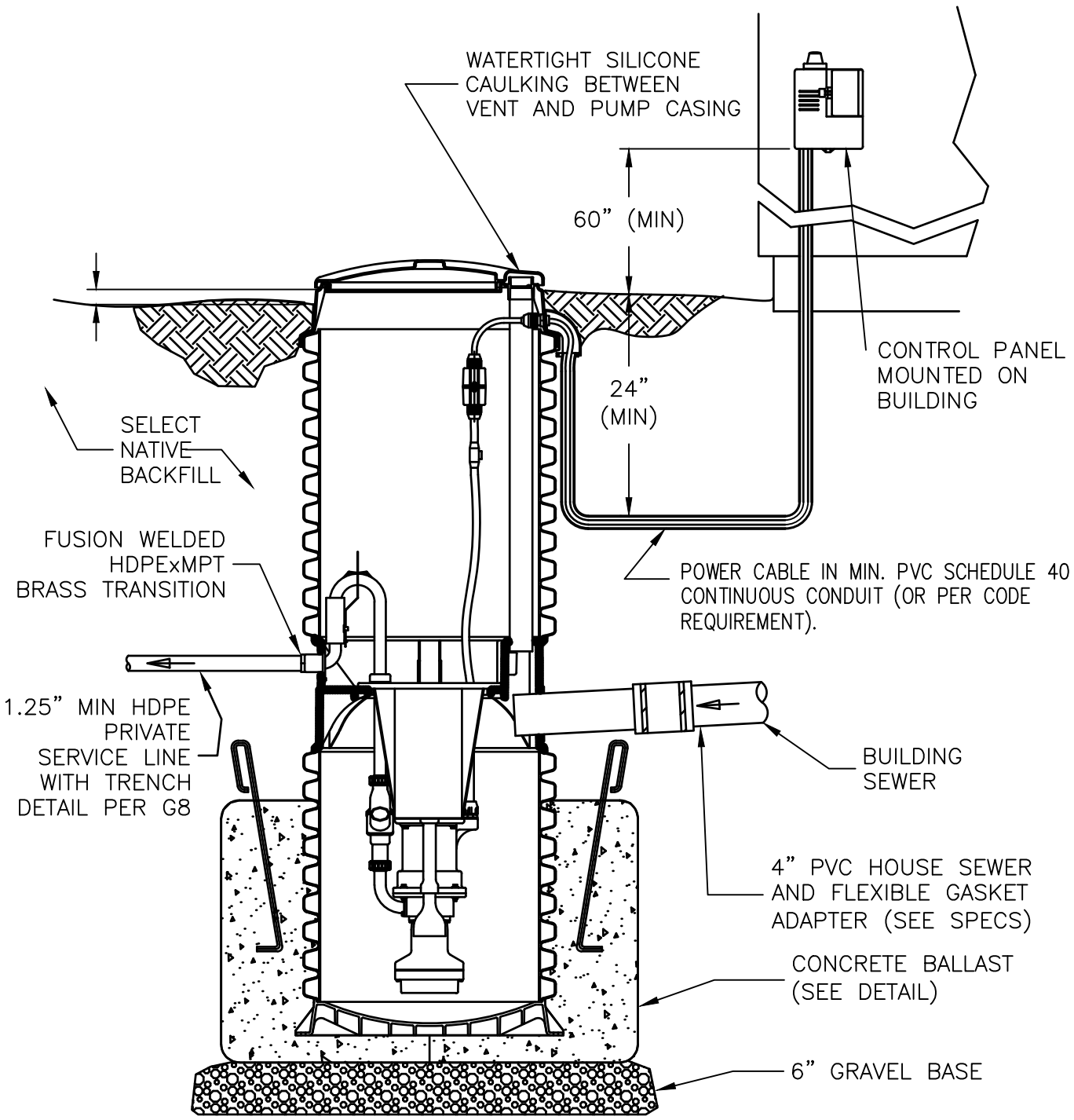
LAKE WHATCOM WATER & SEWER DISTRICT

GRINDER PUMP SERVICE TO FORCE MAIN INSTALLATION

STANDARD DETAIL

S12

3/11/2020



NOTES:

1. Install E/One tank assembly and panel per manufacturer's installation manual and follow requirements for manufacturer's warranty.
2. All fittings shall be Type 316 stainless steel compression fittings.
3. Alarm panel and electrical inspected by others.

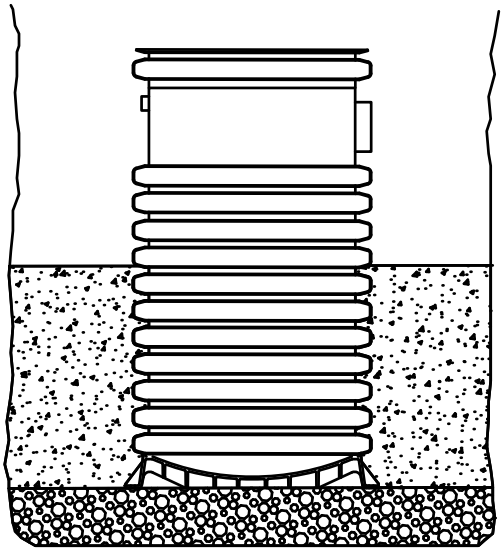
LAKE WHATCOM WATER & SEWER DISTRICT

TYPICAL E/ONE GRINDER PUMP INSTALLATION

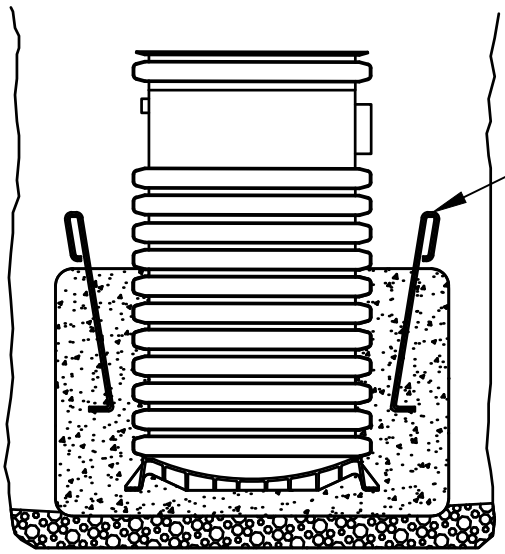
STANDARD DETAIL

S13

3/11/2020



POURED IN PLACE



PRECAST

NOTES

1. PER E/ONE, THE FOLLOWING QUANTITIES OF CONCRETE ARE NECESSARY TO ANCHOR THE TANKS (VERIFY ALL MODEL QUANTITIES WITH MANUFACTURER):
2. ENVIRONMENT ONE MODEL NO. 2010 REQUIRES 370 lbs. (2.5 CU.FT.) PER FOOT OF TOTAL STATION HEIGHT.
3. ENVIRONMENT ONE MODEL NO. 2012 REQUIRES 400 lbs. (2.7 CU.FT.) PLUS 370 lbs. FOR EACH FOOT OF TOTAL STATION HEIGHT.

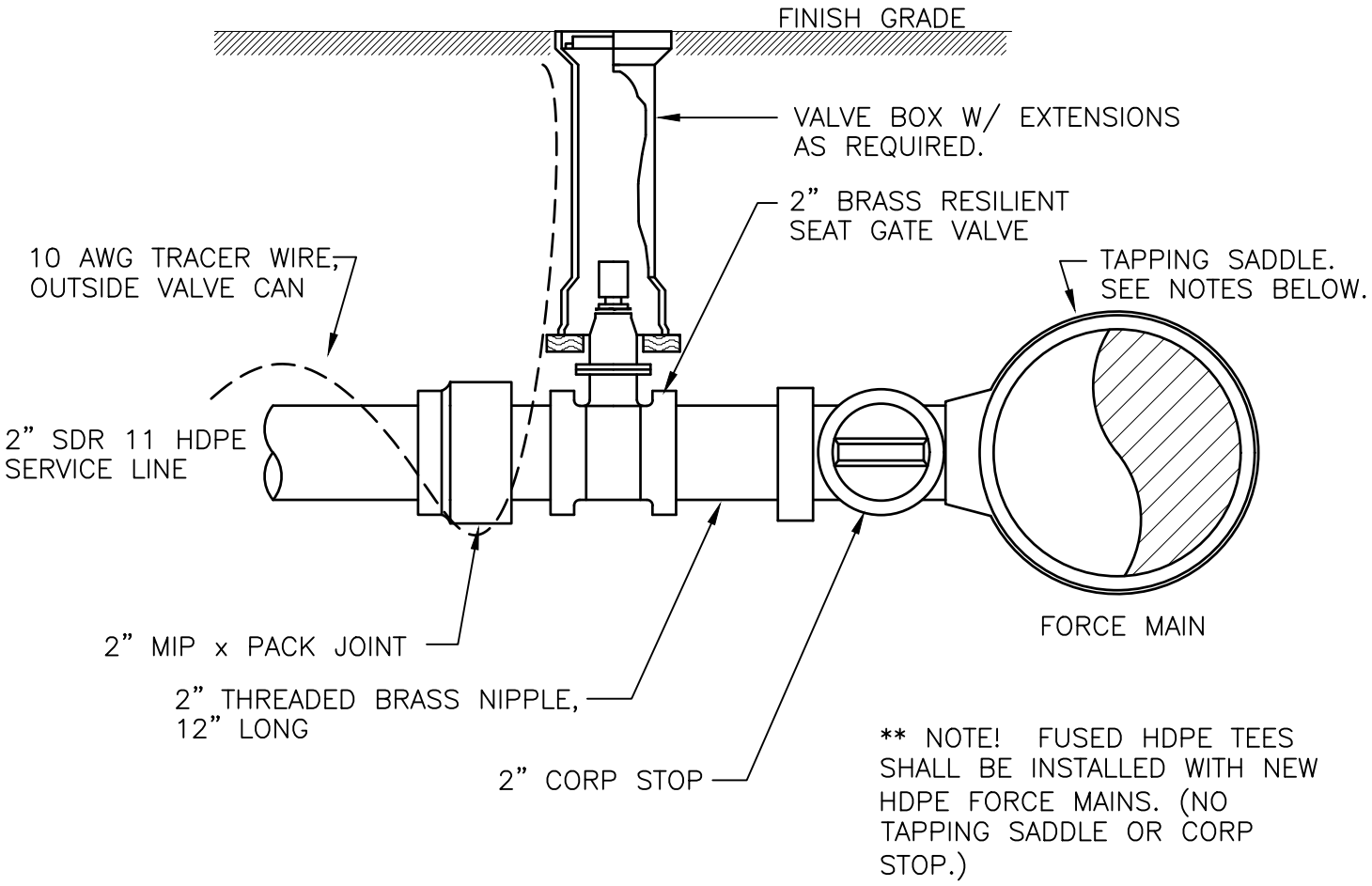
LAKE WHATCOM WATER & SEWER DISTRICT

GRINDER PUMP INSTALLATION
CONCRETE BALLAST

STANDARD DETAIL

S14

3/11/2020



NOTES:

1. HDPE Service Saddles. Saddles for use on SDR 17 HDPE mains shall be epoxy or nylon coated ductile iron tapping saddles with a double stainless steel strapping mechanism specifically recommended by the manufacturer for use on HDPE piping. Saddles shall be Romac style 202N–H or approved equal.

2. PVC Service Saddles. Saddles for use on AWWA C900 PVC mains shall have epoxy or nylon coated ductile iron tapping saddles with a double strap stainless steel strapping mechanism. Service saddles shall be Romac style 202N or approved equal.

3. Ductile Iron Service Saddles. Saddles for use on ductile iron mains shall have epoxy or nylon coated ductile iron tapping saddles with stainless steel tapping mechanism. Service saddles shall be Romac style 101NS or approved equal.

4. Customer Service Shutoff Valves. Shutoff valves shall be resilient wedge type gate valves in conformance with AWWA C515. Valves shall be suitable for sewage service and be equipped with transition gaskets where needed. Gate valves shall have a non–rising stem and be fusion–bonded epoxy coated inside and out meeting AWWA C550. Gate valves shall be Clow resilient wedge gate valves or approved equal.

5. Valve boxes shall have the word "SEWER" cast into the cover.

6. Fittings. All fittings shall be brass.

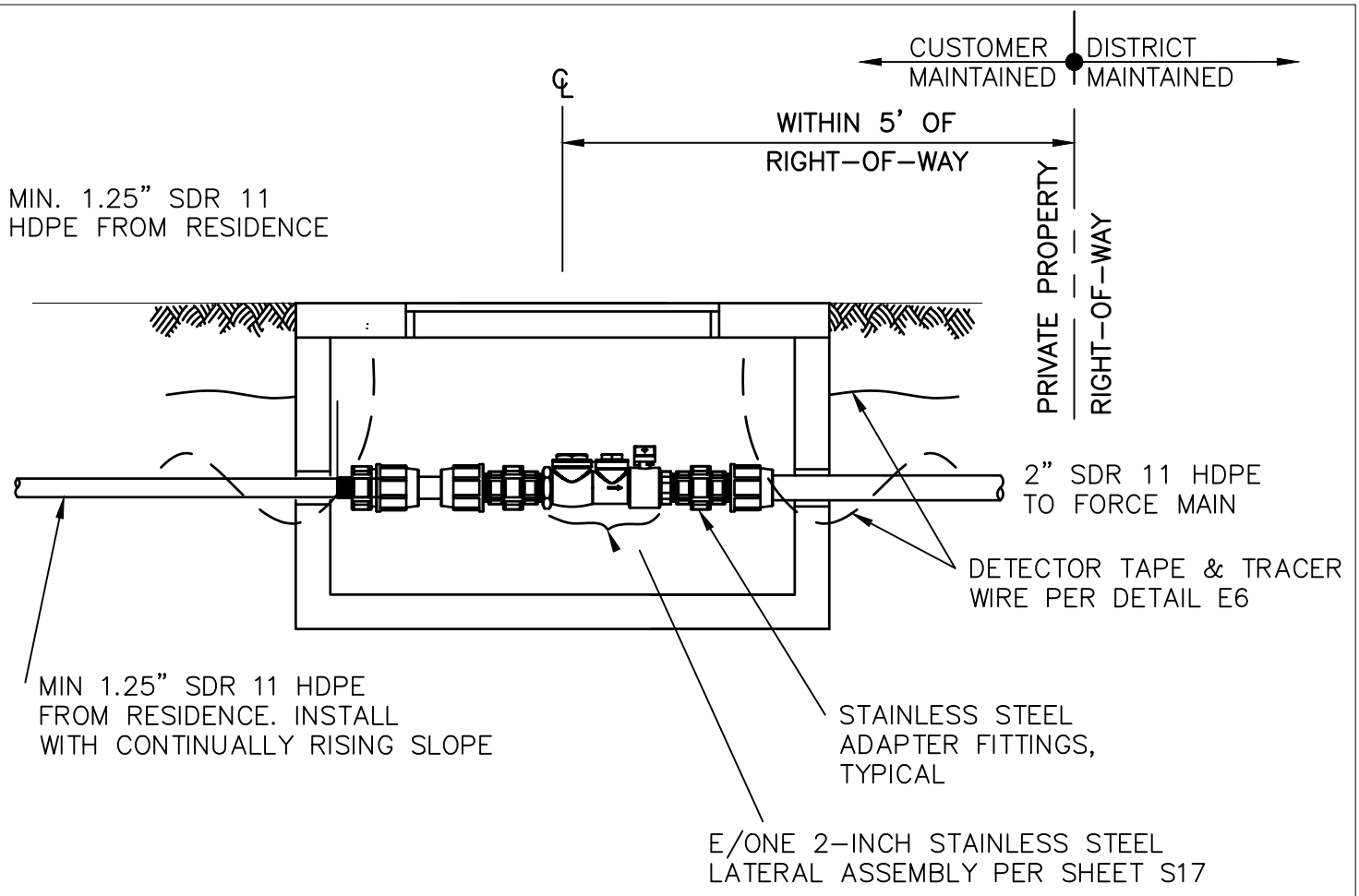
LAKE WHATCOM WATER & SEWER DISTRICT

CONNECTION TO FORCE MAIN

STANDARD DETAIL

S15

3/11/2020



Notes:

1. Vault. Vault shall be a pre-cast concrete hand hole with a minimum 2'-0" by 3'-0" inside diameter and a maximum 4'-0" inside depth. Hand hole and access hatch shall be traffic rated. Access hatch shall be galvanized steel checker plate with pick holes and bolt down holes in plate and shall be designed for H-20 loading when within or adjacent to roadway or driveways. Lid shall be marked "SEWER" with 2" raised letters. Check valve vaults shall be Utility Vault Model 2436 hand hole or approved equal.

2. Air/Vacuum Valve. Where required, in cases where continually rising slope cannot be obtained, an air relief and combination air relief/ vacuum relief valves shall be installed. Air/Vacuum valve shall be as manufactured by Orenco, Apco, Crispin, ARI, or equivalent for sewer service. All valves shall be on private property and be fully accessible to enable customer's operation, maintenance and repair.

3. Fittings and Adapters. Adapter fittings shall be Type 316 stainless steel. Install with appropriate adapters/union fittings for future maintenance and quick disassembly. All fittings, adapters and pipe shall be rated for minimum 235 psi.

4. Install all fittings and adapters per manufacturer's recommendations.

5. Assembly and pipe shall be pressure tested.

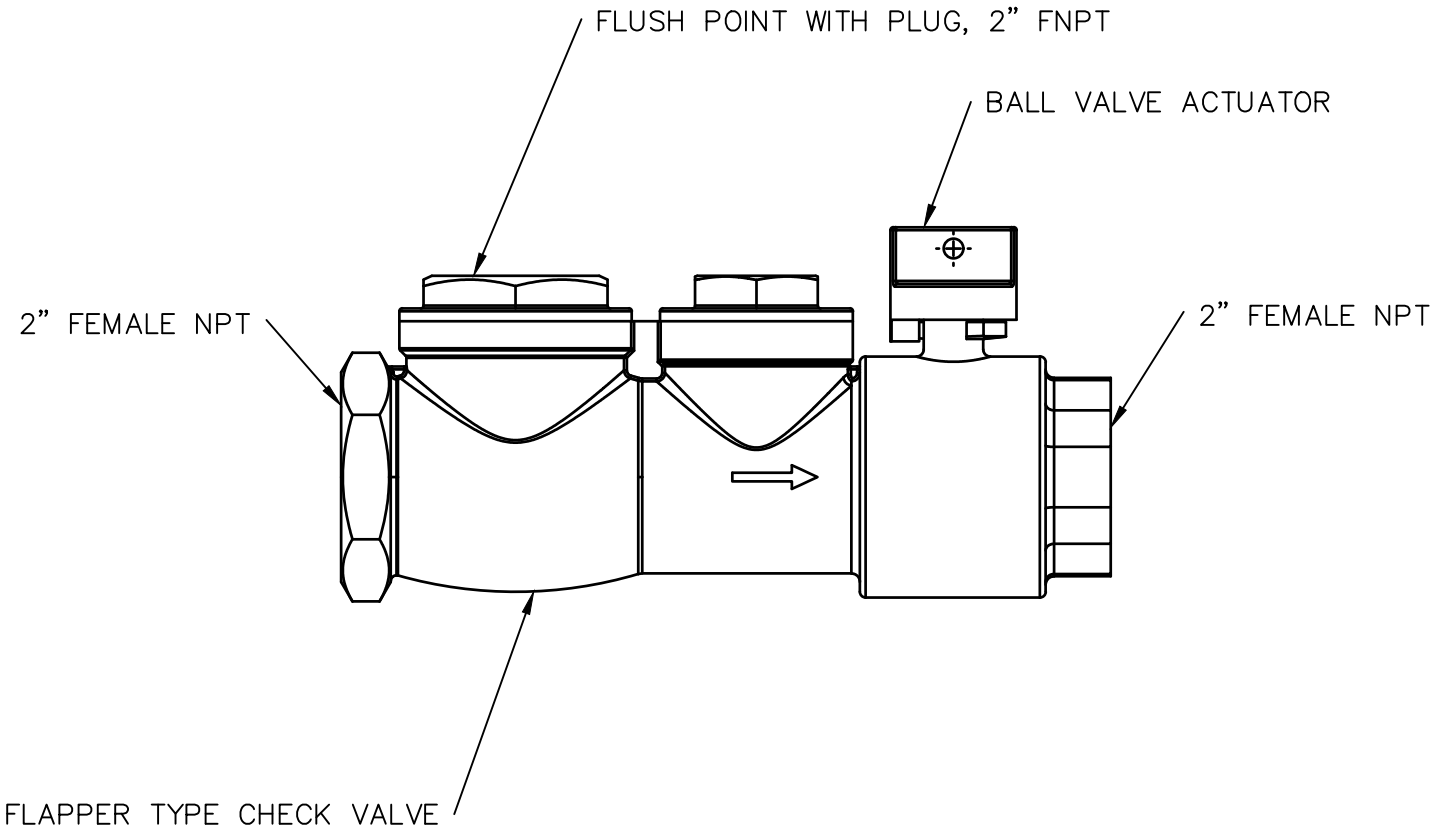
LAKE WHATCOM WATER & SEWER DISTRICT

FORCE MAIN SERVICE CHECK VALVE

STANDARD DETAIL

S16

3/11/2020



Notes:

1. Assembly shall be Type 316 stainless steel with min 235 psi pressure rating.
2. Assembly is a ball valve curb stop with female pipe threads, valve position stops (open/closed), with flush point and integral check valve. Assembly shall be E/One 2" Lateral Assembly NC0443P01 or approved equal.

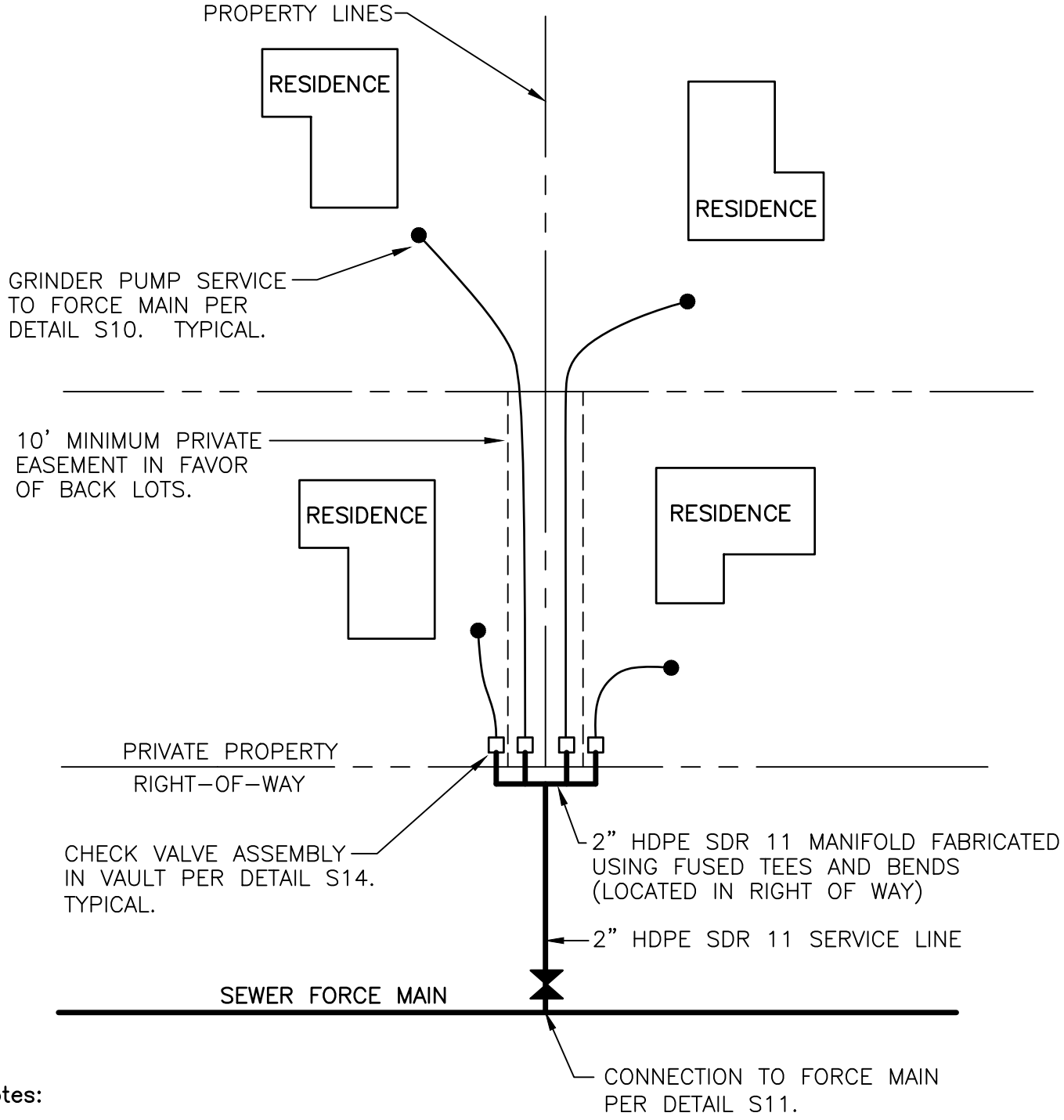
LAKE WHATCOM WATER & SEWER DISTRICT

E/ONE 2" LATERAL ASSEMBLY

STANDARD DETAIL

S17

3/11/2020



Notes:

1. If approved by the District Engineer, a single 2" service tap may be shared with multiple residences. District will review requests for shared taps on a case by case basis. Property owners desiring to install a shared tap, shall individually but at the same time, submit a sewer permit application with the grinder pump check list for review by the District.

2. Manifold must be fabricated using fused HDPE tees and bends by a contractor certified by a HDPE pipe or fusion machine manufacturer.

LAKE WHATCOM WATER & SEWER DISTRICT

SHARED FORCE MAIN SERVICE TAP

STANDARD DETAIL

S18

3/11/2020