MUKILTEO WATER & WASTEWATER

DEVELOPER STANDARDS FOR WATER AND WASTEWATER

2018

Gray & Osborne, Inc.
CONSULTING ENGINEERS

Revised 1/3/2018

ADOPTION

The Developer Standards for the construction and acceptance of water and sewerage facilities in the Mukilteo Water & Wastewater District were adopted by the District's Board of Commissioners on January 3, 2018, under Resolution No. 433-18.

NOTICE

The standards herein are presented to inform the Developer/Contractor of the general minimum requirements for construction and acceptance of Water and Wastewater facilities within the Mukilteo Water &Wastewater District ("District").

Mukilteo Water & Wastewater District does not assume responsibility for keeping this material current. The District should be consulted in case of doubt regarding the applicability of any standards or item(s) presented herein. Some of the information presented herein is based on governmental codes, ordinances, industry standards, and is subject to change in the event that the governing codes, ordinances or standards are changed. The District is not responsible for notifying developers, contractors, or other individuals of such changes as they may be adopted.

TABLE OF CONTENTS

PART 1 - PROVISIONS APPLICABLE TO WATER AND SEWER EXTENSIONS

A. GENERAL AND PRE-CONSTRUCTION

PART 2 - WATER MAINS

PART 3 - SEWER MAINS

1" Water Service Installation	W-D10
1-1/2" Water Service Installation	W-D11
2" Water Service Installation	W-D12
3" and Larger Water Service Installation	W-D13
Vertical Anchor Block	W-D14
Thrust Blocking	W-D15
Thrust Restraint for Ductile Iron Pipe	W-D16
Double Check Valve Assembly for 2" & Smaller Service	W-D17
Double Check Detector Hot Box Enclosure	W-D18
Double Check Detector Backflow Prevention Assembly	W-D19
Fire Line Connection	W-D20
Fire Line Riser Detail	W-D21
Typical Utility Crossing	W-D22
Asphalt Pavement Repair	W-D23
Valve Stem Extension	W-D24
Water Sampling Station	W-D25
Reduced Pressure Backflow 3/4" – 2"	W-D26
Irrigation Deduct	W-D27

Details - Sewer Mains

Sanitary Sewer Typical Trench Section	S-D1
Sanitary Sewer Manhole Section	S-D2
Sanitary Sewer Manhole Saddle	S-D3
Sanitary Sewer Manhole Plan	S-D4
Standard Manhole Frame and Cover	S-D5
Alternative Manhole Frame and Cover	S-D6
Manhole Grade Adjustment	S-D7
Standard Side Sewer	S-D8
Side Sewer Lateral Connection to Existing Main	S-D9
Sanitary Sewer Cleanout	S-D10

MWWD DEVELOPER EXTENSION CHECKLIST

NAME OF DEVELOPMENT: _____ EXT. # _____
DATE: _____ OWNER'S NAME: _____
PHONE: _____ EMAIL: _____
ADDRESS: _____
ENGINEER: _____ PHONE: _____
CONTRACTOR: _____ PHONE: _____

Date	Pre-Construction
_____	Sign Pre-application Declaration
_____	Provide Fire Flow Requirement for Commercial, Industrial & MF Projects
_____	Fill out and return Industrial Pretreatment Program Survey
_____	If Reimbursement Requested, Comply with the Resolution A945
_____	Deposit Received by District $_____
_____	Sign Developer Extension Agreement by Commissioners
_____	Pre-Design Meeting
_____	Preliminary Plan Review by District
_____	Commissioners Authorized Water/Sewer Plan Approval
_____	Department of Ecology Approval (Sewer Plans Only)
_____	Snohomish County/City/State Right-of-Way Use Permit
_____	Other Permits, Specify _____
_____	Pre-Construction Meeting
_____	Certificate of Insurance (Provided by Contractor Prior to Pre-Con)
_____	Received all Required Recorded Off-Site Easements
_____	Copy of Contractor's State License Prior to Pre-Con
_____	Copy of Preliminary Plat as prepared for submittal
	Water
_____	Approval of Materials to be used
_____	System Pressure Tested

_____ Purification Tested

_____ Water Turned On

_____ Punch List Sent to Owner

Sewer

_____ Approval of Materials to be used

_____ System Pressure Tested

_____ Flushed

_____ T.V.'d Mandrell Pulled, Line Plugs Pulled

_____ Punch List Sent to Owner

Post Construction

_____ As-Built's Reviewed and Red-Lines Sent to Developer's Engineer

_____ Red Lines Returned to District – As-Builts OK

_____ Mylar, Electronic Copy and 2 Copy Sets of Plans to District Office

_____ Itemized List of Cost Water/Sewer

_____ Bill of Sale Water/Sewer

_____ Copy of Recorded Plat Received

_____ All Fees Paid

_____ Final Punch List

_____ 2-Year Maintenance Bond Received

_____ Project Accepted as Complete by District

_____ Declaration of Construction Sent to Department of Ecology (Sewer Only)

_____ Recorded On-site – Easements, including Easement Map

_____ Recorded Off-site – Easements, including Easement Map

_____ Resolution # _____ Accepting Project for O & M

_____ Water Service and Sewer Service Available to Project

DESIGN CRITERIA & PLAN SUBMITTAL SUMMARY

(Adjustments may be made by the District on site specific projects)

The following must be provided:

1. GENERAL

1. Cover sheet showing entire property and location of improvements.

2. Location of streets, rights-of-ways, easements (easements to be labeled, on the plans, “to Mukilteo Water & Wastewater District”), property lines, existing and proposed utilities and improvements (Design plans for water and sewer system must be on separate sheets).

3. Stationing or pipe lengths for the site area and on all improvements to be constructed. Stationing, from the nearest downstream manhole, for all proposed sewer facilities.

4. Existing and proposed grades of streets, easements and areas of improvements.

5. Match lines and title blocks for each sheet.

6. North arrow and engineering scale on each sheet.

7. Maximum Horizontal Scale of 1"=30' Vertical Scale of 1"=5' (or as otherwise approved by District). Vertical Datum shall be NGVD 29.

8. Sewers to be located below potable water lines, with 18-inch vertical separation and with a minimum 10-foot horizontal separation from parallel water lines. Crossing angles shall be 45 deg. or greater. Unusual or special conditions are addressed in accordance with the Department of Ecology and the Department of Health criteria.

9. Permanent access for District service vehicles shall be provided at all manholes. Adequate separation shall be provided between sewers and parallel utilities to allow for future access for repair. Vertical separation of 12 inches shall be provided between all crossing utilities.

10. Water system plans are to be separate from other utility plans, but all other utilities are to be shown with the water system portions highlighted.

11. Sanitary sewer plans are to be separate from other utility plans, but all other utilities are to be shown with the sewer system portions highlighted.

12. Construction plans shall be signed & dated by a Washington State licensed engineer.

13. Standard notes for water and sewer system construction shall be included with construction plans.

14. Approval block for District signature shall be included on all sheets of the construction plans.

15. Standard details for water and sewer system construction shall be included in with construction plans.

16. A Fire Flow Analysis shall be performed on all commercial, multi-family, industrial or any project identified by the District to determine available water flow and pressure. The Developer shall deposit funds prior to the analysis being performed. The District's consulting engineer shall perform all Fire Flow Analysis.

2. WATER

1. Water mains to be located 10 feet northerly or easterly of street centerline (or as otherwise approved by District).

2. Operational system pressure range to be between 35 and 135 psi.

3. Minimum system pressures to be 30 psi under maximum hour demand conditions and 20 psi under maximum day demands plus fire flow demands.

4. Water main to be 8-inch minimum pipe diameter (or as otherwise approved by the District). Pipe diameters may be larger as required to deliver water needed to comply with Item 3 above.

5. Maximum design velocities in mainline to be 8 feet per second (8 fps) under maximum day demand plus fire flow demand.

6. Water mains to be designed with the following minimum cover:
   - 8 inch diameter - 3'-6"
   - 12 inch and larger - 4'-0"
   - Water mains in Easements - 5'-0" (Unless otherwise approved by the District.)
   - HDPE Pipe – to be determined with approval of the District

7. Loop water mains to minimize occurrence of dead end lines. Provide fire hydrant or blow-off assembly at dead end mains for flushing purposes.

8. Pipes connecting fire hydrants to be at least 6 inches in diameter. The maximum length of 6-inch pipe between the main and fire hydrant to be 50 feet and shall be installed with restraint joints.

9. Only one fire hydrant to be installed on any dead end 8-inch main.

10. Fire hydrant spacing in single-family residential areas are not to exceed 500 feet. Hydrant spacing in commercial, industrial, and multi-family residential areas are not to exceed 300 feet.
11. Maintain a maximum distance between hydrants and the building portion of any lot for residential buildings of 300 feet measured along an access roadway or driveway.

12. For all other occupancy type buildings, maintain a maximum distance between hydrants and the buildable portion of any lot of 150 feet measured along an access roadway or driveway.

13. For commercial buildings, the minimum number of hydrants required is determined by dividing the required fire flow in gpm by 1,200. The hydrant must be located no closer than 50 feet to any served building and at no greater distance than 300 feet from any portion thereof. In addition, a hydrant must be located within 150 feet of a sprinkler standpipe or fire department connection. District shall determine if hydrants located across streets from construction site can be included for fire protection.

14. Fire line services shall have a State approved Double Check Detector Backflow Prevention Assembly, at a minimum, installed in a utility vault at the ROW/Property line with 6-inch PVC gravity drain to storm.

15. Valves are to be installed on each leg of all tees and crosses and at intervals of 500 feet or less in commercial or multi-family areas and 800 feet or less in single-family areas (or as otherwise approved by the District).

16. Valves to be installed on each side of the hydrant tee at fire hydrants designated by the District.

17. Valves to be installed on the water main at each end of mains located in easements.

18. Combination air and vacuum valve assemblies to be located at all high points in the system (or as otherwise approved by the District).

19. All dead end mains to be terminated with line size tees by 6-inch flanged tee, thrust blocks, and blow-off assembly.

20. All pipeline deflections to be designed in accordance with pipe manufacturer's recommendations.

21. Thrust blocks and/or anchor blocks to be provided for all fittings and bends.

22. Provide polyethylene encased restrained joint pipe and fittings within all easements and in site sensitive areas identified by Developer or District.

23. All residential lots to be served with a minimum of a single 1-inch copper service line between the main and meter. No connections to the main or meter boxes are to be located on easements.

24. Individual structures connected to the water system, including multiple structures on the same lot, shall have a minimum of one water service each.

25. Provide a pressure reducing valve station at each crossing of District's pressure zone lines, consisting of two PRV valves and a pressure relief valve.

26. All commercial, multi-family, industrial, fire and irrigation services shall include a DOH approved backflow preventer located immediately behind and on the property side of the water service box.

3. SEWER

1. Sewer mains to be located 5 feet southerly or westerly of street centerline (or as otherwise approved by the District). Pipe material, length, diameter and slope are designated on each run in plan and profile views. (Pipe information may be omitted on the plan view when the plan and profile are located on the same sheet).

2. Sewer mains to be designed with no less than the following minimum grade:
   - 8-inch gravity main - 0.75%
   - 6-inch side sewer - 2.0%
   - 8-inch gravity dead end - 1.0%

   Slopes of less than 0.75% but greater than 0.5% may be considered, at the discretion of the District, in certain situations/areas. Steeper slopes may be required depending on topography and tributary flows (at the discretion of the District).

3. All sewer mains to have a minimum cover of 3 feet. (Side sewer laterals in public rights-of-way to have a minimum 5 feet of cover at right-of-way line).

4. Sewer mains to be of material noted below: Gravity Sewer and Laterals:
   - PVC Pipe: 5'-18' cover
   - Polyethylene or Epoxy Lined DI Pipe or Equal: 3 feet to 5 feet cover
   - Polyethylene or Epoxy Lined DI Pipe or Equal: 18-feet deep and over, and/or slopes of 18% or greater
   - Polyethylene or Epoxy Lined DI Pipe: for force mains
   - HDPE Pipe: With approval of the District

5. Sewer mains on 18% slope or greater to be anchored securely with concrete anchors or equal.
   - 18 to 35% - 36 feet center to center
   - 35 to 50% - 24 feet center to center
   - 50 and over - 16 feet center to center

6. Side sewer laterals to be located 5 feet to 10 feet from the lot corner on the lower side of the lot (or as otherwise approved by District). Manhole required 10 feet into property on all side sewers not serving single family lots. Stationing shall be provided from the nearest downstream manhole.

7. Side sewer lateral invert elevations and minimum house floor elevations to be shown on the construction plans for all critical lots.

8. Manhole spacing not to exceed 400 feet (or as approved by the District).

9. Manholes (6-foot minimum depth) are to be located at all changes in grade, pipe alignment, pipe intersections, termination points and 10 feet into property on all side sewers other than single family. Clean-outs are not acceptable as a substitute.

10. Manholes in excess of 20 feet in depth to be 54-inch diameter.

11. Manholes are not to be located in low points of vertical curves or curb flow lines (gutter sections).

12. Manholes shall have minimum of 0.10-foot drop across channel.

13. Match crowns of differing sizes of pipes in manholes.

14. Drop connections are not allowed except as approved by the District. If allowed, drop connections are to be outside drops and are not to exceed 10 feet.

15. All manholes to have water tight locking covers with District service vehicle access provided.

16. Invert and rim elevations to be shown on plan and profile for all manholes.

17. Correct invert elevation of the manholes to be shown at point of connection (field verified).

18. When specified by the District, grease interceptors shall be provided for all Commercial, Industrial, and School food establishments, or when specified by the District (Interceptor shall be installed as close as possible to source of grease/fat). When specified, by the District, Sample Chamber to be installed immediately downstream of the Grease Interceptor.

19. Sewer Grinder Pumps are not allowed. Where standard conforming gravity service cannot be achieved and denial of service is the only remaining option, private ownership of grinder pumps may be considered by the District. The Developers Engineer shall provide the District with information utilized in determining gravity service unavailability showing that all means of achieving gravity service, regardless of cost, have been reviewed and eliminated. If it is proven that gravity service is unavailable, only then will the District accept the Developers Engineer's proposal identifying pump design and the areas to be served for District review and approval.

20. The need of sewage lift stations shall be presented by the Developer and evaluated by the District. If the District determines the need for a lift station, the Developer and Developer's Engineer shall present areas of service, total developed flow projection, pump capacities and operating head conditions. Design must comply with the District requirements for the site-specific project.

21. Sewer force mains shall be restrained joint ductile iron and a minimum of 6-inches diameter and shall be designed for a minimum of 2-1/2 feet per second (fps) velocity. HDPE Pipe may be utilized at the Direction or approval of the District.

22. Construction work shall not commence until approval is received from the State Department of Ecology.

23. Where applicable, sewer construction work shall not commence until District personnel have witnessed the installation of a plug to protect the downstream system.

The checklist, design criteria and plan submittal summary are partial lists prepared to assist in plan review. See full text of Standards and Details. Additional District requirements may be mandated, on a case by case basis, due to site specific conditions.

WATER SYSTEM INSTALLATION NOTES (To be included on all Construction Plan Sets)

1. Prior to any construction activity, the Developer shall arrange a pre-construction conference with the Mukilteo Water and Wastewater District. The Developer, Contractor and proposed on-site supervisors shall attend.

2. All work and materials shall be in accordance with the latest revision, including addenda and updates, of the Mukilteo Water and Wastewater District Developer Standards. Contractor to have Mukilteo Water and Wastewater District Standards on job site.

3. No District inspections will take place and the Job will be shut down unless an approved and District signed copy of these Plans are on the job site at all times construction is in progress.

4. All water system improvements shall be constructed in accordance with these approved Plans. Any deviation from the Plans will require approval from the owner, engineer, District and appropriate public agencies.

5. Notify the District 72 hours (3 working days) prior to beginning construction and for any restarts of work.

6. The District shall be notified three working days prior to the time the Developer would like to connect to existing mains or for installation of tapping tees. The connection shall be done in accordance with District requirements. Connections to take place Tuesdays through Thursdays only. Developer shall not operate any District valves; these will be operated by Water District personnel only.

7. For aid in utility location, call 1-800-424-5555, a minimum of 48 hours (2 working days) prior to beginning of construction. Existing utilities, whether shown or not, shall be located prior to construction, so as to avoid damage or disturbance, and the Developer shall assume all responsibility and costs connected therewith to protect, maintain and repair, where necessary.

8. Water line construction within the proposed development shall not commence until the street has been brought to sub-grade, meeting District approval.

9. Water main shall be field staked prior to construction, with 25-foot stakes on curves. Lot corner stakes shall also be in place prior to construction.

10. Pipe shall be ductile iron, AWWA Class 52 thickness, with rubber gaskets, push on type, or mechanical joint, meeting AWWA Specifications. Fittings shall be AWWA, cement lined, ductile iron, and either mechanical joint or flanged, as indicated herein. All pipe to be purchased and installed as a part of the developers water system shall be delivered to the job site with water tight wrapping or pipe plugs. Plugs and/or wrapping shall remain in place until the pipe is installed in the trench.

11. Unless otherwise specified valves 12 inch and smaller shall be ductile iron resilient seated gate valves: Acceptable valves are Mueller, Clow, M&H, U.S. Pipe and American Flow Control, Series 2500. Valves larger than 12 inches shall be ductile iron butterfly valves; Acceptable valves are Pratt Groundhog and Dresser 450.

12. All bolts on water works fittings shall be coated with Armite Anti-Seize Compound No. 609, or equal, prior to installation. All water works fittings and bolted assemblies shall be completely covered with visqueen plastic, 4 mil. The end of the plastic shall be taped to secure them to the pipe.

13. Hydrants shall be Mueller Centurion A-423, Clow Medallion, or Dresser Reliant 129 meeting AWWA Specifications. Hydrants shall be furnished with threaded outlets, meeting fire district/department standards. Both thrust blocking and mega lugs restraints are required on each hydrant installation.

    - Hydrants within the City of Mukilteo fire service area and Fire District #1 shall be equipped with 4-inch Storz adapters; all other hydrants shall utilize a 5-inch Storz adapter. All hydrants shall have a 4-½-inch NST threads on pumper port.

14. Provide thrust blocking and/or restrained joints at all fittings and bends and up-thrust fittings, in accordance with District standards, conditions and specifications.

15. All new connections to the existing water system shall be in strict conformance with the appropriate subsections of the specifications of the District. No connection shall be made between the new main and the existing mains until the new piping has been flushed, disinfected, tested and received satisfactory bacteriological test results.

16. Individual water services to the property line shall be 1” diameter minimum size and be installed with 36-inch minimum cover.

17. Residential fire sprinkler systems shall have a minimum 1-inch meter/service. Backflow prevention assemblies shall be installed on all residential fire sprinkler systems and located immediately behind the water meter/service on the property side.

18. Fire line services shall have a Double Check Detector Backflow Prevention Assembly installed in a utility vault at the ROW/Property line with a 6-inch PVC gravity drain to storm. Fire line service shall terminate, in the structure to be served, with the District’s Riser Detail.

19. All commercial, multi-family, industrial and irrigation services shall include a DOH approved backflow prevention assembly located immediately behind and on the property side of the water meter. Alternate locations may be acceptable upon approval by the District. Structures requiring fire sprinkler system shall have at least one backflow prevention assembly per each structure, protecting the potable water system from the fire system. The backflow prevention assembly shall be located in a flood proof vault or service box, depending on size, outside the structure in a location approved by the District.

20. Where road grades are established, provide a minimum of 48-inch cover over 12 inch or larger water mains, and provide a minimum of 42-inch cover over 8-inch mains; or additional depth as required to miss other utilities.

21. Water mains constructed within easements or private roads shall be installed with polyethylene encasement, restrained joints and with a 5'-0" minimum cover. During backfill operations, furnish and install 3-inch-wide metallic marker tape with 3 feet of cover over water main.

22. Minimum radius for 12 inch and smaller pipelines constructed on curves (4 degree deflection per joint) is 258 feet.

23. Compaction: All trench backfill and roadway embankment shall be compacted to 95% of modified proctor dry maximum density in accordance with ASTM D1557, except the top 6 inches in paved areas, which shall be 100%.

24. Construction inspection will be done by Mukilteo Water and Wastewater District and/or their designated engineer. No utility facilities will be accepted by the District if proper inspections have not been completed.

25. The water main construction phase will not be considered complete until the installation is acceptable to the District including a satisfactory hydrostatic pressure test, a satisfactory disinfection test, satisfactory flow of service lines, and completion of all items on the inspector's punch list.

26. Water service is available only after transfer of ownership to the District and after payment of all current applicable fees.

WASTEWATER SYSTEM INSTALLATION NOTES (To be included on all Construction Plan Sets)

1. Prior to any construction activity, the Developer shall arrange a pre-construction conference with the Mukilteo Water and Wastewater District. The Developer, Contractor and proposed on-site supervisor shall attend.

2. All work and materials shall be in accordance with the latest revision, including addenda and updates, of the Mukilteo Water and Wastewater District Developer Standards. Contractor to have Mukilteo Water and Wastewater District Standards on job site at all times while construction is in progress.

3. A District approved signed copy of the Plans must be on the job site whenever construction is in progress.

4. All work and material shall be in accordance with the applicable standards and specifications of the District, the Project Specifications, and the most recent edition of the APWA Standards and specifications.

5. Work shall not commence until approval is received from the State Department of Ecology, unless the review and approval is waived by Ecology.

6. Front property corners shall be set by a land surveyor licensed in the State of Washington prior to the start of construction.

7. Notify the District 72 hours (3 working days) prior to beginning construction and for any restarts of work.

8. For aid in utility location, call 1-800-424-555, a minimum of 48 hours (2 working days) prior to beginning of construction. Existing utilities, whether shown or not, shall be located prior to construction, so as to avoid damage or disturbance, and the Developer shall assume all responsibility and costs connected therewith to protect, maintain and repair, where necessary.

9. Pipe lengths, manhole depths, etc., as shown are approximate. Developer is responsible for supplying proper quantities of materials.

10. Provide the District's inspector with a copy of all cut sheets prior to construction.

11. Permanent access for District service vehicles shall be provided at all manholes. Manholes shall be constructed as per District standard details, including construction of channels. Where indicated, provide knock-outs and channelization for side sewer or future mainline extensions; and for PVC pipe, provide a watertight flexible rubber boot or Heavy Duty sand collar. Provide water tight locking lids for manhole covers.

12. Connection to existing main shall be done so as to prevent any foreign materials from entering existing sewers. Existing pipe in saddle manhole installations shall not be cut or removed until instructed to do so by the District.

13. Connection to existing manholes shall be made by utilization of a concrete core-drilling machine of adequate diameter to grout in place an adapter if PVC sewer lines are installed. Align core-drilling machine to provide minimum of 0.10-foot drop across the manhole.

14. PVC pipe shall be SDR-35 ASTM D3034 furnished in 13-foot maximum lengths and shall be fully encased in pea gravel (or crushed rock, base course, if installed within the City limits of Everett) extending from 4 inches below to 12 inches above pipe barrel.

15. DI sanitary sewer pipe shall conform to AWWA C151 and shall be polyethylene or epoxy lined, restrained joint. The DI pipe shall be Class 52, unless otherwise approved.

16. Sewers to be located below potable water lines, with 18-inches vertical separation and with a minimum of 10-foot horizontal separation from parallel water lines. Crossing angles shall be 45 deg. or greater. Unusual or special conditions are addressed in accordance with the Department Ecology and Department of Health criteria.

17. Side sewer shall be a minimum of 6 inches in diameter and shall have a minimum slope of 2%. Side sewer shall include two 6-inch tees at the property line; one within the public right-of-way and one within the private property. See detail.

18. All sewer lines shall be cleaned and tested in accordance with District standards and specifications.

19. The Contractor shall be responsible for maintaining and/or repairing asphalt and gravel surface disturbed as a result of this construction until they are accepted by the public works department of the City and/or County.

20. Compaction: All trench backfill and roadway embankment shall be compacted to 95% of Modified Proctor dry maximum density in accordance with ASTM D1557, except the top 6 inches in paved areas which shall be 100%.

21. Manhole covers located in asphalt areas shall be adjusted to finish grade prior to paving.

22. No utility facilities will be accepted by the District if proper inspections have not been completed.

23. Sewer service is available only after transfer of ownership to the District and after payment of all current applicable fees.

APPROVAL BLOCK

Approved by: _____ _____
Mukilteo Water and Wastewater District Date

Mukilteo Water and Wastewater District Extension No. _____

Gray & Osborne No. _____

Project must be completed and ownership transferred to the Mukilteo Water and Wastewater District within 1 year from the date of approval. In the event that the project developer fails to do so, the project will be subject to reapplication, additional plan review and revision, due to any changes in District standards or requirements occurring prior to completion and transfer of ownership. Water/sewer service is available only after payment of all current fees, recording of easements and transfer of ownership to the District.

APPLICATION AND AGREEMENT
TO CONSTRUCT EXTENSION
TO DISTRICT SYSTEM

APPLICATION AND AGREEMENT TO CONSTRUCT EXTENSION TO DISTRICT SYSTEM

_____WATER _____SEWER

Project Name: _____ NO._____

Address: _____

The undersigned (the "Developer") applies to the Commissioners of Mukilteo Water and Wastewater District (the "District"), for permission to construct and connect a private extension(s), as indicated above, to the District's existing system as herein provided and agrees to the terms and conditions of this Developer Extension Agreement as follows:

1. Location of Extension.

A. Water

The proposed water system extension (the "extension") will be installed in streets and other approved rights-of-way and/or easements and shall be for the use and benefit of the property hereinafter described, which property is owned by the Developer and/or other owners for whom the Developer is acting as agent. Any such owners have joined in this application and are designated on the signature page hereof as "additional Owners." Legal description of the property is noted in Exhibit "A" (provided by Developer):

B. Sewer

The proposed sewer system extension (the "extension") will be installed in streets and other approved rights-of-way and/or easements and shall be for the use and benefit of the property hereafter described, which property is owned by the Developer and/or other owners for whom the Developer is acting as agent. Any such owners have joined this application and are designated on the signature page hereof as "additional owners." Legal description of the property is noted in Exhibit "A" (provided by Developer):

2. Warranty of Authority.

The Developer and any additional owners warrant that they are the owners of all the property described in this Agreement. Developer shall provide a title report to the District establishing that the parties executing this Agreement are the owners of all the real property described herein.

3. Description of Extension.

A. Water

The proposed extension will consist of approximately _____ lineal feet of water main and appurtenances and shall be installed in accordance with this Agreement and in accordance with Plans prepared in conformity with District Standard Details and Specifications and approved by the District.

B. Sewer

The proposed extension will consist of approximately _____ lineal feet of sewer main and appurtenance and shall be installed in accordance with this Agreement and in accordance with Plans prepared in conformity with District Standard Details and Specifications and approved by the District.

4. Fees to be paid by the Developer.

A. A fee in the amount of _____ is payable prior to acceptance of this Agreement by the Commissioners of the Mukilteo Water and Wastewater District (the "Board") as an initial deposit for payment of District expenses including, but not limited to, engineering, inspection, legal, permit and administration costs. Should said expenses exceed the deposit paid by the Developer, the difference shall be paid by the developer to the District upon demand. If after the project is completed and accepted, it is determined that expenses were less than the deposit paid by the Developer, the balance, in excess of $100.00, will be refunded to the Developer.

B. The foregoing fee is not intended to include allowance for any unusual costs incurred by the District on account of property surveys, changes in design, necessary construction engineer comment preparation, project coordination, errors or omissions by the Developer, its contractor or agents, unusual negotiations, legal expenses incurred beyond the expense of normal review of documents, and/or any other project related costs. The District will bill the Developer for any such unusual costs and the same shall be paid promptly by the Developer. The District may stop work until payment is received.

5. Preparation of Plans

The Developer shall retain its own engineer to prepare the Plans for the extension according to the District's Standard Details and Specifications and the following requirements apply:

a. Developer must obtain District approval of the Developer's Engineer in accordance with Paragraph WS-11 of this agreement;

b. After the Board accepts the Pre-application and Developer Extension Agreement and the required deposit is received, the Developer's Engineer shall arrange for a pre-design meeting and bring to that meeting:

1) A complete set of base maps.
2) A grading and clearing plan.
3) A storm sewer plan.
4) Sanitary sewer plans, if applicable.
5) City/County fire flow requirements in the form of a letter from the appropriate Fire Official for multi-family and commercial projects (all projects other than single family).
6) A contour map of the project with contour intervals of five (5) feet or less and using a scale of one (1) inch equals fifty (50) feet. All data shall be based on National Geodetic Vertical Datum (NGVD) 29.
7) At the predesign meeting, a set of District drawing standards will be given to the Developer's Engineer at their request.

c. The Developer shall arrange for the conference and the attendance of concerned parties.

d. At the pre-design meeting, the Developer's Engineer shall submit to the District a conceptual plan for the utility development of the project.

e. Upon preliminary review of the conceptual plan, the Developer's Engineer shall prepare and submit to the District a preliminary design and Plan for review and approval by the District. The District shall have the right to require changes in the preliminary design and Plan as may be deemed necessary. All Designs and Plans prepared by the Developer's Engineer shall be prepared in accordance with the District's Standard Details and Specification

f. Upon approval of the preliminary design and Plan by the District, the Developer's Engineer shall prepare a proposed final Plan and submit three copies of the proposed final Plan to the District for review by the District. Upon receipt of the proposed final Plan, the District may require changes to the proposed final Plan.

g. Upon completion of all required changes to the final Plan, if any are required, the Board shall consider the final Plan for approval at a regularly scheduled Board meeting. The Board may approve, reject, or require changes to the final Plan.

h. Prior to approval of the final Plan, the Developer shall submit a copy of the preliminary plat as prepared for submittal to the applicable jurisdiction.

i. Upon approval of the final Plan, the District shall indicate its one (1) year approval of the Plan on the Developer's original drawings.

j. Upon approval of the Developer's original Plan drawings, the Developer's Engineer shall submit copies of the approved Plan so that the Developer (or District, when required) can apply for permits and approvals for the Plan. The Developer's Engineer shall notify the District of any permits required. Should changes to the Plan be required in order to receive said permits and approvals, the Developer's Engineer shall make all changes as required, subject to approval of the District.

6. **Warranties of Developer -- Water and Sewer.**

The bill of sale provided by the Developer to the District shall be on a District approved form and shall contain the following warranties with the District as beneficiary:

a. That Developer is the owner of the extension, the same is free and clear of all encumbrances and the Developer has good right and authority to transfer title thereto to the District and will defend the title of the District against the claims of all third parties claiming to own the same or claiming any interest therein or encumbrance thereon; and

b. That all bills and taxes relating to the construction and installation of the water/sewer main and appurtenances have been paid in full and that there are no lawsuits or claims pending involving this project. The undersigned further warrants that in the event any lawsuit is filed as a result of, or involving, this project the undersigned shall undertake to defend the lawsuit and shall accept responsibility for all costs of litigation, including costs on appeal, and shall hold the District harmless on any judgment rendered against the District; and

c. That all laws, ordinances and regulations respecting construction of this project have been complied with; the system extension is in proper working condition, order and repair, is adequate and fit for the intended purpose of use as a public (water) (sewer) system and as an integral part

of the (water) (sewer) system of the District, and that it has been constructed in accordance with the conditions and standards of the District; and

d. That for a period of 2 years from the date of final acceptance of the extension by the District, the extension and all parts thereof shall remain in proper working condition, order and repair; and that Developer shall repair or replace, at its expense, any work or material which may prove to be defective during the period of the warranty.

In addition, the Developer shall obtain warranties and guaranties from its subcontractor and/or suppliers where such warranties or guaranties are specifically required in this Agreement. When corrections of defects occurring within the warranty period are made, the Developer shall further warrant corrected work for 2 years after acceptance of the corrected work by the District.

7. **Final Acceptance - Conditions Precedent.**

Compliance with all terms and conditions of this Agreement, the Plans and Specifications prepared hereunder and other District requirements shall be a condition precedent to the District's obligation to allow connection to the District's system, to accept the bill of sale to the extension(s), and to the District's agreement to maintain and operate the extension(s) and to provide service to the real property that is described in this Agreement.

The District shall not be required to allow any connection to the District's system of the portion of the real property described in this Agreement, if there are any unpaid fees or costs which are payable to the District under this Agreement or other unpaid fees arising under other District requirements, or if the easements have not been prepared to conform to the constructed alignment of the water and/or sewer system by the District and executed by the Developer and District for recording.

The District shall not be obligated to provide service to the property described in this Agreement, if construction by third parties of facilities to be deeded to the District has not been completed and title accepted by the District if such third-party facilities are necessary to provide service to the property described in this Agreement.

The District will accept title to the extension(s) when all work which may, in any way, affect the lines constituting the extension(s) has been completed, any damage to said extension(s) which may exist has been repaired, the District has made final inspection and given its approval to the extension(s) as having been completed in accordance with this Agreement, the Plans and Specifications and other requirements of the District, and all General Facilities Charges, Connection Charges and fees

applicable to the Project in effect on the date of application have been paid.

The District shall not be obligated to allow service connections to its system until all fees, General Facility Charges and connection charges in effect on the date of application for service have been paid.

8. Limitation of Period of Acceptance.

The extension(s) shall be completed and accepted within 12 months of the date of acceptance of the Plans by the Board. If the extension is not completed and accepted within the 12 month period, then this Agreement and all of the Developer's rights herein shall terminate and cease. Under special circumstances, with a formal written request, an extension of the time for completion of the Agreement may be allowed at the sole discretion of the District. In the event the Agreement terminates, the Developer shall be required to make a new pre-application and new application for extension agreement to the District. Any such new agreement, including any extension, entered into between the District and the Developer pursuant to a new application shall be subject to any new or amended resolutions, policies, or standards and specifications which have taken effect since the execution of the terminated agreement.

9. Maintenance Bond.

Acceptance by the District shall not relieve the Developer of the obligation to correct defects in labor and/or materials as herein provided and/or the obligations set forth in applicable paragraphs hereof. Prior to acceptance of the extension(s) by the District and the transfer of title to such extension(s) as set forth herein, the Developer shall, if required by the District, furnish to the District a maintenance bond (cash or bond) which shall continue in force from the date of acceptance of said extension(s) for a period of 2 years. The bond shall be in a form provided by the District and shall require the Developer and/or the bonding company to correct the defects in labor and materials, which arise in, said system(s) and transfer of title. The maintenance bond shall be in an amount equal to 10 percent of the cost of said extension(s), but not less than two thousand dollars ($2,000.00).

10. Procedure for Acceptance.

Acceptance of title to the extension(s) shall be made by motion of the Board. Prior to such acceptance, an executed bill of sale in a form approved by the District and containing the warranties required by this Agreement shall be executed by the Developer and any additional owners and delivered to the District.

11. Effect of Acceptance.

Acceptance by District shall cause the extension(s) to be a public system subject to the control, use and operation of the District and all regulations, conditions of service, and service charges as the District determines to be reasonable and proper, and subject to the law of the State of Washington.

12. Performance Guarantee.

Developer shall, if requested, furnish to the District prior to the preconstruction conference a performance guarantee of a type and in a form as determined by the District, in its sole discretion, in an amount equal to 150 percent of the District approved Developer's Engineer estimated cost of the extension(s) or contractor bid price(s). The performance guarantee shall require completion of all work in accordance with the Agreement, the Plans and Specifications and other requirements of the District within a period of 12 months from the date of acceptance of the Plans by the Board. The District in its sole discretion may also require a payment bond of a type and in a form as determined by the District requiring the payment by the Developer of all persons furnishing labor and materials in connection with the work performed under the Agreement, and shall hold the District harmless from any claims there from. Any payment bond required by the District shall be provided to the District prior to the preconstruction conference as a condition of the District granting final acceptance of the work referenced herein. No third person or party shall have any rights under any performance guarantee the District may require from the Developer and such is provided entirely for the benefit of the District and the Developer and their successors in interest.

13. Correction of Defects Occurring Within Warranty Period.

When defects in the extension(s) are discovered within the warranty period, Developer shall start work to remedy any such defects within 7 calendar days of notice by the District and shall complete such work within a reasonable time. In emergencies, where damages may result from delay and where loss of service may result, corrections may be made by the District upon discovery, in which case the cost thereof shall be borne by the Developer. In the event the Developer does not commence and/or accomplish corrections within the time specified, the work may be accomplished by the District at its option, and the cost thereof shall be paid by the Developer.

Developer shall be responsible for any expenses incurred by the District resulting from defects in the Developer's work, including actual damages, costs of materials and labor expended by the District in making repairs and the cost of engineering, inspection and supervision by the District.

14. Rates and Charges.

The property described in this Agreement shall be subject to all rates and charges established by the District.

15. Subcontracting.

Developer is fully responsible for the acts and omissions of subcontractors and persons employed, directly or indirectly, by subcontractors, as well as the acts and omissions of persons directly employed by the Developer.

16. No Assignment without District Approval.

The Developer's rights and responsibilities arising out of this Agreement are not assignable unless District consent is obtained prior to any proposed assignment. Written documents as required by the District of any District approved assignment shall be filed with the District by the Developer herein at the time of any assignment.

17. General Provisions, Technical Details, Specifications.

Refer to the "Parts One, Two, and Three" for General Provisions, Water, Sewer Standard Specifications and Standard Details, which are attached hereto and made a part of this Agreement.

18. Remedies Available to District.

In the event the Developer fails to pay any of the extension fees and charges and fines referenced herein when due as determined by the District, the charge or fine shall then be delinquent and shall accrue interest at the highest legal rate per annum until paid. In addition to any other remedies available to the District, the District shall be entitled to file a lien against the Real Property referenced herein in the event of nonpayment and to foreclose such lien pursuant to RCW 57.08.081, or as such statutes may be revised, amended or superseded.

19. Notice.

Any notice required by this Agreement to be given by the District to the Developer shall be given at the following address:

Name: _____ Phone: _____

Address: _____

_____

Email: _____

20. Complete Agreement.

This Agreement, including Parts One, Two, and/or Three as appropriate and the plans approved by the District constitutes the entire Agreement between the Developer and District with respect to the rights and responsibilities of both parties in regard to Developer project referred to herein. For purposes of identification, this Agreement shall be assigned a number by the District, which number shall be endorsed on the first page of the Agreement. This Agreement may be changed in writing only upon mutual agreement of the Commissioners of the District and the Developer.

ACCEPTANCE OF THIS APPLICATION BY THE DISTRICT CONSTITUTES A CONTRACT WITH THE APPLICANT, THE TERMS OF WHICH ARE EACH PARAGRAPH OF THIS MANUAL, THE DISTRICT'S MATERIALS, CONSTRUCTION AND STANDARD DETAILS, SPECIFICATIONS, AND THE EXTENSION DESIGN DRAWINGS APPROVED BY THE DISTRICT BOARD OF COMMISSIONERS.

DEVELOPER, _____,
a ___corporation, ____partnership, ____joint venture, ____sole proprietorship, ____individual.

NOTE:

1. If the Developer is a corporation, this Agreement must be executed by its duly authorized representative and the Developer hereby warrants same.

2. If the Developer is a partnership, at least one of the general partners must sign this Agreement and indicate his/her capacity as such.

3. If the Development is a joint venture, each joint venture shall sign. One may sign on behalf of the others pursuant to a power of attorney.

DATED this _____ day of _____, 20_____.

By _____
(Owner)

_____
(print/type name)

Its _____
(print/type name)

Individual

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ signed this instrument and acknowledged it to be _____ free and voluntary act for the uses and purposes mentioned in the instrument.

Dated _____

Signature of Notary Public _____

Title _____

My appointment expires _____

Corporate/Partnership

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ signed this instrument, on oath stated that he/she was authorized to execute the instrument and acknowledge it as the _____ of _____ to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated _____

Signature of Notary Public _____

Title _____

My appointment expires _____

ACCEPTANCE OF THIS APPLICATION BY THE DISTRICT CONSTITUTES A CONTRACT WITH THE APPLICANT, THE TERMS OF WHICH ARE EACH PARAGRAPH OF THIS MANUAL, THE DISTRICT'S MATERIALS, CONSTRUCTION AND STANDARD DETAILS, SPECIFICATIONS, AND THE EXTENSION DESIGN DRAWINGS APPROVED BY THE DISTRICT BOARD OF COMMISSIONERS.

OWNER, **SNOHOMISH COUNTY**, a political subdivision of the State of Washington,

NOTE:

1. If the Developer is a corporation, this Agreement must be executed by its duly authorized representative and the Developer hereby warrants same.

2. If the Developer is a partnership, at least one of the general partners must sign this Agreement and indicate his/her capacity as such.

3. If the Development is a joint venture, each joint venture shall sign. One may sign on behalf of the others pursuant to a power of attorney.

DATED this _____ day of _____, 20_____.

By _____
(Owner)

_____
(print/type name)

Its _____
(print/type name)

Government

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ signed this instrument, on oath stated that he/she was authorized to execute the instrument and acknowledge it as the _____ of _____ to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated _____

Signature of Notary Public _____

Title _____

My appointment expires _____

THE FOREGOING APPLICATION of _____ accepted this _____ day of _____, 20____.

MUKILTEO WATER AND WASTEWATER DISTRICT

By_____
Its President

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledge that he/she signed this instrument, on oath stated that he/she was authorized to execute the instrument and acknowledged it as the President, or their designee, of the Board of Commissioners of the MUKILTEO WATER AND WASTEWATER DISTRICT, a municipal corporation, to be the free and voluntary act of such corporation for the uses and purposes mentioned in the instrument.

Dated_____

_____
Notary Public in and for the State of Washington, residing at _____

My Appointment Expires _____

PART 1

PROVISIONS APPLICABLE TO WATER AND SEWER EXTENSIONS

A. GENERAL AND PRECONSTRUCTION

WS-1 DEFINITIONS

(a) "Board" means Board of Commissioners of the Mukilteo Water and Wastewater District.

(b) "Concerned Parties" means those persons, companies, or agencies designated by the District to attend the preconstruction conference.

(c) "Contractor" means the person, firms, Contractors or Sub Contractors employed by the Developer to do any part of the work, all of whom shall be considered agents of the Developer.

(d) "Design" means design and the preparation of the Plans for the extension to the District's water distribution and/or sewer collection system.

(e) "Developer" means the owner(s) of the property to be benefited by the proposed extension, or that person or organization in charge of developing the project, either on behalf of the owner(s) or pursuant to an agreement to purchase the property, and includes the Developer's agents.

(f) "Developer Engineer" means the engineering firm, and that firm's representatives, retained by the Developer to design and prepare the Plans for the work to be performed under this agreement in accordance with District specifications, and which shall be considered an agent of the Developer.

(g) "District" means MUKILTEO WATER AND WASTEWATER DISTRICT and its employees.

(h) "District Engineer" means the engineering firm, and that firm's representatives, retained and assigned by the Board to act as the Engineer for the work to be performed under this Agreement.

(i) "Otherwise Specified, or As Specified" means the directions contained in the Plans, Special Specifications, if any and otherwise as given by the District, incident to the performance of the work other than in these General Provisions.

(j) "Plans" means drawings, including reproductions thereof, of the work to be performed as an extension to the District's water distribution and/or wastewater collection system, prepared or approved by the District, and approved by the Board.

(k) "Specifications" means the directions, provisions, standards, and requirements as approved by the Board for the performance of the work and for the quantity and quality of materials.

(l) "Work" means the labor, materials, superintendence, equipment, transportation, supplies, and other facilities necessary or convenient to the completion of the proposed extension described in the application contained herein.

WS-2 PURPOSE

MUKILTEO WATER AND WASTEWATER DISTRICT, as a municipal corporation, has a responsibility to the public to ensure that water and wastewater mains installed in public streets or easements are constructed in accordance with currently accepted standards for public work. The requirements imposed upon developers by these regulations are intended by the District as a contract with the Developer, incorporating minimum standards, which are prerequisite to acceptance of the work by the District as a part of its water and sewer systems. Privately constructed extensions shall not be permitted to connect thereto unless the work is performed and paid for in accordance with these regulations.

WS-3 AUTHORITY OF THE DISTRICT

The District may approve, reject, or require changes in Plans prepared by the Developer's Engineer, including such changes in the Plans as the District may deem necessary during the course of work. The District shall inspect the work and may stop work whenever necessary to ensure compliance with the approved Plans and Specifications. The District shall have authority to reject nonconforming work and materials and to decide questions arising during performance of the work. The failure of the District to reject or disapprove any part of the work or materials shall not be deemed an acceptance of any such part of the work or materials. The District shall have the authority to approve or disapprove the contractor selected by the Developer to perform the work.

WS-4 GOVERNING LAW/FORUM

This Agreement shall be construed and enforced in accordance with, and the validity and performance hereof shall be governed by the laws of the State of Washington. Any suit to enforce the provisions of the Agreement shall be brought in Snohomish County, Washington.

WS-5 NO THIRD PERSON SHALL HAVE ANY RIGHTS HEREUNDER

This Agreement is made entirely for the benefit of the District and the Developer and successors in interest and no third person or party shall have any rights hereunder whether by agency or as a third-party beneficiary or otherwise.

WS-6 REIMBURSEMENT CHARGES

The Developer shall also pay all reimbursement charges, if any, levied against the property pursuant to the District's reimbursement policy.

WS-7 COSTS OF LITIGATION

If the District or the Developer commences any legal action relating to the provisions of this Agreement, the prevailing party shall be entitled, in addition to all other amounts to which it is otherwise entitled by this Agreement, to all costs of litigation, including but not limited to costs, witness, expert and reasonable attorney's fees, including all such costs and fees incurred in appeal.

If litigation arises out of this Agreement or related to this project to which the District is not a party, the Developer will reimburse the District for all costs and expenses, including attorney's or engineer's fees, incurred as a result of such litigation, including but not limited to time and materials at the regular rates established by District resolution.

WS-8 LIABILITY INSURANCE

The Developer/Contractor shall purchase, from insurance companies which have an A.M. Best rating of "AVII" or better, commercial general liability and automobile liability insurance against liability to the Developer, the District, the Developer's engineer and the District employees for negligent injury to person or property resulting from performance, supervision, or inspection of the work. The District shall be named as an additional insured under such policy. Proof of the existence of such insurance shall be provided to the District in a form acceptable to the District prior to the Pre-Construction Meeting.

The minimum limits of coverage shall be as follows:

General Aggregate	$2,000,000.00
Products - Comp/OPS Aggregate	$2,000,000.00
Personal Injury	$2,000,000.00
Each Occurrence	$2,000,000.00
Automobile Liability	$2,000,000.00

Policies shall be kept in force until the project is accepted by the District. The District shall be given at least 30 days written notice of cancellation, non-renewal, material reduction, or modification of coverage.

The coverage provided by the insurance policies are to be primary to any insurance maintained by the District, except with respect to losses attributable to the sole negligence of the District. Any insurance that might cover this Agreement which is maintained by the District shall be in excess of the Developer's/Contractor's insurance and shall not contribute with it.

The insurance policy shall protect each insured in the same manner as though a separate policy had been issued to each. The inclusion of more than one insured shall not affect the rights of any insured with respect to any claim, suit or judgment made or brought by or for any other insured or by or for any employee of any other insured.

The general aggregate provisions of the insurance policy shall be amended to show that the general aggregate limit of the policies apply separately to this project.

The insurance policy shall not contain a deductible or self-insured retention in excess of $10,000 unless approved by the District.

Providing coverage in the stated amounts shall not be construed to relieve the Developer from liability in excess of such limits.

WS-9 INDEMNITY

The Developer shall indemnify, defend and hold the District and all its representatives harmless from and against all losses and claims, demands, payments, suits, actions, recoveries and judgments of every nature and description brought or recovered against the District by reason of the act or omission of the Developer, its agents or employees, in the performance of the work, and for any cost or expense incurred by the District in connection therewith, including overhead expense, legal expense, attorney's fees and costs attributable

thereto; and if suit in respect to the foregoing is filed, the Developer shall appear and defend the same at its own cost and expense, and if judgment is rendered or settlement made requiring payment of damages by the District, the Developer shall pay the same. The Developer's obligation to indemnify the District shall not extend to the sole negligence of the District or to the extent of any concurrent negligence of the District.

Developer agrees to hold the District harmless from any liability or expense, including reasonable attorney's fees incurred by District by reason of the Developer's (or the Developer's employees or contractors) breach of any covenant contained on any franchise or permit granted by state, city, county, public or private utility to the District for the purpose of enabling the Developer to undertake construction within any right-of-way.

The Developer further agrees that if any official complains to the District that the Developer is violating such franchise or permit in any respect, or if the Developer damages any District facilities, the District Manager shall give the Developer such notice as is reasonable under the circumstances to comply with such franchise or permit or to make repairs or restoration. In such event that the District deems it necessary to make any repairs or restoration (emergency or otherwise), the District shall be reimbursed for the cost thereof by the Developer.

In any and all claims against the District or any of its agents or employees by any employees of the Developer, its Contractor, or any subcontractor, or anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation under this article shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Workmen's Compensation Acts, Disability Benefit Acts, or other employee benefit acts. THE WAIVER OF ANY LIMITATION OF THE INDEMNIFICATION OBLIGATION CONTAINED IN THIS PARAGRAPH HAS BEEN SPECIFICALLY NEGOTIATED BY THE PARTIES.

WS-10 SELECTION OF DEVELOPER'S ENGINEER

When the Developer submits this Agreement to the District for execution, the Developer shall notify the District in writing of the person or firm proposed to do the design. The Developer shall not employ any person or firm for any part of the design work that the District may object to as incompetent, unfit, or irresponsible. Nothing contained in this Agreement shall create any contractual rights between the District and any person or firm employed by the Developer to design and prepare the Plans.

WS-11 AUTHORITY OF DEVELOPER'S ENGINEER

The Developer's Engineer shall only have authority to design and prepare the Plans for the extension to the District's water distribution and/or sewer collection system. The Plans shall conform in all respects to the District's Standard Details and Specifications and they must be approved by the District prior to commencement of work. The District shall have the sole right to approve or reject the Plans or require changes to be made to them. Failure of the District to require changes in the Plans prior to Plan approval shall not be deemed a waiver of the District's right to require such changes in the Plans as the District may deem necessary during the course of work. Failure by the District to discover errors, omissions, or discrepancies in the Plans shall not relieve the Developer of this responsibility.

WS-12 OMISSIONS AND DISCREPANCIES

Minor items of work or materials omitted from Plans and Specifications prepared by the District, the District's Engineer, or the Developer's Engineer, but clearly inferable from the same and which are called for by accepted good practice, shall be provided and/or performed by the Developer as part of the construction. In case of doubt, the District shall be consulted and its decision shall be final.

WS-13 DEVELOPER TO BE INFORMED

The Developer shall be fully informed regarding the nature, quality and extent of the work to be performed, and if in doubt, shall secure specific instructions from the District.

The Developer shall employ on the project site during progress of the construction of the project, a competent supervisor who shall represent the Developer during their absence, and to whom instruction may be given as though to the Developer. The Supervisor shall become familiar with the Plans and Specifications and shall promptly report to the District any error, inconsistency or omission which may be discovered.

WS-14 PLANS AND SPECIFICATIONS ACCESSIBLE

The Developer shall have one copy of the Signed Plans and Specifications constantly accessible on the job.

WS-15 OWNERSHIP OF PLANS

The original mylars, three plan copies and an electronic file of all “as built” plans prepared by Developer’s Engineer shall be delivered to the District as a condition of and prior to acceptance of the project, and shall become the property of the District. Neither Developer nor Developer’s Engineer shall have any rights of ownership, copyright, trademark, or patent in the Plans.

WS-16 QUALITY OF MATERIALS AND WORKMANSHIP

Unless otherwise specified, all materials shall be new, and workmanship and materials shall be of the highest quality commonly used. The Developer shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

WS-17 EXISTING UTILITIES OR OBSTRUCTIONS

A. Preparation of Plans.

The District shall make available to the Developer information it may have regarding existing utilities and obstructions. Such information will be provided to the Developer for whatever value it may have, without any guaranty of its accuracy or that it is complete. Incompleteness or errors in this information shall not be basis for a claim against the District nor shall it relieve the Developer or responsibility for repairing any damage its activities may cause to such utilities.

B. Notification of Utilities.

In every case, the Developer shall contact all utilities and determine what existing utilities and obstructions may exist. The Developer shall reimburse the District for damage to the property of the District or damage to property of others caused by the Developer for which the District is liable and for other expenses, including attorney’s fees and court costs incurred by the District because of such damage. Whenever the Developer fails to repair or restore existing improvements damaged by its operation within 48 hours of notice, the District may perform the work or contract with others to perform the work and all costs incurred shall be paid by the Developer; provided that whenever the District determines an emergency exists, it may notify the Developer who shall commence repair or restoration work immediately, or the District may undertake the work itself or through another contractor at the Developer’s expense.

C. Asbestos Cement Pipe.

The Developer shall be aware that portions of the existing water mains within the District are asbestos cement pipe. The Developer shall conduct all work related to existing asbestos cement pipe in strict accordance with current WISHA safety regulations and provisions contained within the latest edition of "Recommended Standard Asbestos-Cement Pipe Work Practice Procedures and Training Requirements" adopted and published by the Pacific Northwest Section of the American Water Works Association. All costs related to work in compliance with established rules and regulations shall be the responsibility of the Developer.

WS-18 MATERIALS AND EQUIPMENT LIST

The Developer shall file a material and equipment list with the District no later than 14 calendar days prior to the start of construction, including the quantity, manufacturer, and model number, if applicable, of material and equipment to be installed as part of the work. This list shall be prepared even though the Developer utilizes materials and equipment named in the Specifications. The District shall have the right to reject materials and equipment, which in the District's opinion do not conform to District specifications and the approved Plans. Failure of the District to reject materials and equipment at the time the list is filed shall not be deemed a waiver of the District's right to reject such materials or equipment at a later time.

WS-19 DETERMINATION OF "AS EQUAL"

The District shall be sole judge whether supplies or material qualify "as equal" substitutions under the Plans and Specifications.

WS-20 SPECIFICATIONS INCORPORATED BY REFERENCE

Where federal, AWWA, ASTM, APWA, Snohomish County, WSDOT, City of Mukilteo, City of Everett, or any other standard specifications are referenced or included by reference herein the latest issue and/or amendment thereto published at the date of approval of the Agreement by the District shall be incorporated in the contract. Should a conflict exist between the approved design drawings and any standard specifications or details referenced herein, the District shall determine which shall prevail.

WS-21 COMPLIANCE WITH PUBLIC AUTHORITY

The work shall be performed in accordance with regulations of each public authority, including federal, state, county, public health departments, and municipalities, which may have jurisdiction over the manner and quality of performance of the work. The Developer shall be responsible for investigating and ascertaining the requirements of each public authority. The Developer shall reimburse the District for all costs incurred by the District for permits, inspection fees and other charges imposed by public authority because of the work.

The public shall not be inconvenienced unnecessarily in its use of the public streets.

The Developer shall enforce discipline and good order among its employees and shall not employ on the work any unfit person or anyone not skilled in the work assigned to them. Employees or agents of the Developer who may impair the quality of the construction shall be removed from the work upon the written request of the District, without cost to the District.

All construction in public streets or rights-of-way shall be performed in accordance with the standards and requirements of the governmental agency having jurisdiction, and in accordance with requirements of the franchise or permit therefore. The Developer shall be responsible to ascertain these requirements and for assuring that its Contractor adheres thereto.

The Developer shall be responsible for assuring compliance with the requirements of all permits, franchises, and licenses.

WS-22 ROYALTIES AND PATENTS

The Developer shall pay all royalties and license fees and defend all suits or claims for infringement of any patent rights and shall save the District harmless on account thereof, except the District shall be responsible for all such loss if a particular process or the product of a particular manufacturer is specified by the District, unless the Developer or its Contractor has information that the process or article is an infringement of a patent and fails to promptly notify the District thereof in writing.

WS-23 LAWS TO BE OBSERVED

The Developer shall comply with all federal, state, and local laws, ordinances and regulations that affect the work, which is the subject of this Agreement.

WS-24 DISTRICT RESOLUTIONS AND FINES

The Developer's attention is specifically directed to Resolution No. A-870 (unlawful connection) and/or any resolutions repealing and/or replacing said resolution. The foregoing Resolution imposes a fine for violating its terms and conditions. Specification of this Resolution is not intended to be inclusive or limiting, and the Developer hereby agrees to comply with all District Resolutions and to ensure compliance with District Resolutions by the Developer's agents. The Developer agrees to pay any fine imposed pursuant to District Resolutions as a condition of and prior to connection to the District's system.

WS-25 OTHER WORK

The District has the right to let other contracts for other work which may affect the work hereunder. Other persons performing such other work shall be afforded reasonable opportunity by the Developer herein for introduction and storage of their materials and execution of their work.
The work hereunder and such other work shall be properly coordinated and connected.

WS-26 CONTRACTORS

Only Contractors licensed and bonded with the State of Washington and approved by the District shall be hired to install water and/or sewer extensions. Contractors must have prior experience in the installation of water and sewer extensions. A copy of the license shall be provided to the District. Nothing contained in this Agreement shall create any contractual rights between the District and any person or firm employed to do the work.

WS-27 EASEMENTS

All easements required shall be obtained by the Developer in a form satisfactory to the District without cost to the District and shall provide for a permanent easement and temporary construction easement as shown on the Plans. All easements shall be of the following types, unless specifically modified by the District:

1) Offsite Easement
   This easement is required for water and/or sewer facilities installed on private property offsite of the proposed development.

2) Onsite Easement (Private Road)
This easement is required for water and/or sewer facilities installed in a private road within the proposed development and shall include the full easement length and width provided for the private road together with an additional 10 feet parallel and adjoining each side of the private road.

3) Onsite Easement
This easement is required for water and/or sewer facilities installed on private property located within the proposed development and outside of private or public roads.

4) Parallel and Adjoining Easement
This easement is required parallel and adjoining to all public roads within or bordering the proposed development.

Parallel and Adjoining Easements shall be a minimum of ten feet in width and all other easements shall be a minimum of fifteen feet in width.

The width of the onsite and/or offsite easements may be required to be increased by the District, at their discretion for reasons such as, but not limited to, water and/or sewer facilities installed at depths greater than 10 feet or in areas where access is difficult due to topographic constraints.

All easements shall be clearly identified on the plans and labeled as easements granted to the Mukilteo Water and Wastewater District.

All easements shall be clearly written in a manner that the easement can be plotted from the description. The Developer shall provide the District with supporting data to verify the location of all easements including 8-1/2" x 11" drawings of the property and easement with bearings and distances utilized in the easement description. When requested, the Developer shall provide the District satisfactory title insurance, insuring without exception the District's interest in all easements conveyed to the District.

Permanent easements shall be conveyed to the District free of any permanent structures or other structures which interfere with District maintenance and operations. The Developer further covenants and agrees not to construct or install such structures on or near the easement.

Executed copies of offsite easements shall be delivered to the District prior to construction. All other easements shall be delivered to the District prior to the acceptance of the work addressed in this Agreement.

Where easements are required on property owned by Snohomish County Airport, the same easement documents are utilized with the word “Easement” replaced with “License”.

WS-28 PRE-CONSTRUCTION CONFERENCE

No work shall begin on the extension(s) until the Developer has held a preconstruction conference with all concerned parties at the District office. The Developer shall arrange for the conference and the attendance of concerned parties only when all necessary permits have been issued by public authority and are in District possession.

B. CONSTRUCTION

WS-29 PROTECTION OF WORK AND PROPERTY

The Developer shall exercise due care to protect property and the work addressed by this Agreement.

The Developer shall be solely responsible for any loss or damage to property or the work herein occurring prior to the completion of and acceptance of the work by the District.

WS-30 PUBLIC HAZARD OR INCONVENIENCE

If the performance of the work should result in hazard or substantial inconvenience to the public, the District may correct the same, if in the opinion of the District the same should be necessary, and the Developer shall, on request, reimburse the District for expense incurred. The Developer shall also reimburse the District for the expense incurred in complying with any order of public authority lawfully made with respect to the work during the performance of the work or within the two-year guarantee period after acceptance of the same.

WS-31 SAFETY

The Developer shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during the performance of the work, and for compliance with all federal, state, and local safety laws and regulations.

This requirement will apply continuously and not be limited to normal working hours.

The right of the District or the District's Engineer to conduct construction review of the Developer's performance or inspection of the work or the site is not intended to include review of the adequacy of the Developer's safety measures in, on, or near the construction site.

WS-32 SANITATION

Necessary sanitation convenience for the use of workmen on the job, properly secluded from public observation, shall be provided and maintained during the performance of the work as required by the appropriate agency.

WS-33 CROSS-CONNECTION CONTROL

The Developer shall comply with all state, local and District rules and regulations prohibiting cross-connections. The Developer shall install and maintain state approved backflow prevention devices as required by the District in its absolute discretion as a condition of receiving final acceptance of the extension improvements and utility service from the District. Prior to acceptance of the Project, the Developer shall provide the District with a certified field test of all permanent backflow prevention devices.

WS-34 INSPECTION AND TESTS

All work shall be subject to inspection by the District. The District shall at all times have access to the work whenever it is in preparation or progress, and the Developer shall provide proper facilities for such access and inspection. The Developer shall make reasonable tests of the work at the Developer's expense upon the District's request. Whenever work must be specially tested or inspected for compliance with public regulations, or with the Plans and Specifications, the Developer shall give the District reasonable notice of the readiness of the work for such test or inspection. The District shall make inspections within 24 hours of notification by the Developer. Work shall not be covered up without consent of the District, and if it should be covered without such consent, it shall be uncovered for inspection at the Developer's expense. Such inspections and tests shall not relieve the Developer of any of its responsibilities under this Agreement.

The presence or absence of a District inspector on any job will be at the sole discretion of the District, and such presence or absence of a District inspection shall not relieve the Developer of its responsibility to obtain the construction results specified in the Agreement.

The District and the District's Engineer do not purport to be a safety experts, and are not so engaged in that capacity whenever performing inspections and tests pursuant to this provision. The authority of the District to perform inspection and tests shall not relieve the Developer of its responsibility for safety.

WS-35 OVERTIME AND HOLIDAY WORK

There will be no overtime work for District personnel. If it is necessary for District personnel to work overtime caused by the Developer, the time will be charged to the Developer at the District's established rate. If it is necessary for work to be done on a weekend or holiday, the Developer will be charged a 4 hour minimum call-out. If approved by the District, 72 hours' notice shall be required.

WS-36 TRAFFIC MAINTENANCE AND PROTECTION

All work shall be performed with due regard for the safety and convenience of the public and so that interference with automotive and pedestrian traffic is minimized. Flagging personnel, barricades, signs, and traffic control shall be furnished as required by the appropriate agency.

WS-37 ACCESS

Bridging shall be provided across private driveways and roadways during the period when trenches are open to avoid interference with normal traffic flow.

WS-38 REFERENCE POINTS AND INSTRUCTIONS

The Developer shall provide all property corners and street centerline stakes, and shall provide reasonable and necessary opportunities and facilities for setting points and making measurements including construction staking. The Developer shall not proceed until provisions have been made to establish such points as may be necessary for the work. The work shall be performed in strict conformity with such points and instructions. The Developer shall carefully preserve all bench marks, reference points and stakes, and, in case of destruction, shall be responsible for any resulting expense such as the cost of re-staking and shall be responsible for any errors that may be caused by their absence or disturbance.

WS-39 ALIGNMENT OF PIPES AND APPURTENANCES

The Developer shall furnish sufficient horizontal control, including lot stakes and construction stakes, for locating and staking the lines and appurtenances.

Correctness of such horizontal control is the sole responsibility of the Developer and any modification of horizontal location of any facility shall be at the Developers expense.

WS-40 CONFINEMENT OF DEVELOPER'S OPERATIONS

The Developer shall confine construction activities within the property of the Developer and the limits of easements and construction permits outside of the Developer's property. All work on easements and permit areas outside the Developer's property shall be performed in strict compliance with the provisions of the easement or permit with which provisions the Developer shall familiarize itself. Any damage to property or persons from any encroachment beyond these limits shall be the responsibility of the Developer.

WS-41 RESTORATION OF IMPROVEMENTS

Culverts, driveways, roadways, pipelines, or other existing improvements located within easements and public rights-of-way which are removed or disturbed in the course of the work shall be restored to their original condition at the expense of the Developer. In cutting through established lawns, the sod shall be removed before trenching and replaced after backfilling to the satisfaction of the property owner.

Private improvements and landscaped areas shall be restored to their former condition at the expense of the Developer.

A signed release from the affected property owner will be required. As a minimum requirement, all restoration shall be conformed to the condition of the area prior to construction.

In areas where restoration of existing improvements is necessary and to provide records of existing improvements, the Developer shall provide photographs before and after construction as required in a format acceptable to the District.

WS-42 EROSION CONTROL

Erosion and sediment control throughout the project including abutting and downstream properties shall be the responsibility of the Developer.

The Developer shall determine the appropriate temporary erosion and sediment control necessary for the construction time of the year and shall furnish and install the necessary controls as the first order of work.

Such erosion control shall be fully maintained during the course of construction, modifying the control when necessary.

Temporary erosion and sediment control shall consist of and be installed in accordance with the Department of Ecology's Storm Management for the Puget Sound Basin Technical Manual for water quality. Upon failure of the Developer to provide immediately such erosion control, the District shall be at liberty, without further notice to the Developer to install and remove the necessary erosion control. The Developer shall reimburse the District for any costs incurred on account thereof.

WS-43 TRENCH SAFETY SYSTEMS

The Developer shall provide safety systems for trench excavation that meet the requirements of the Washington Industrial Safety and Health Act, Chapter 49.17 RCW, and any regulations published thereunder, for all trench excavation that will exceed a depth of 4 feet.

WS-44 EXCAVATION AND BACKFILL

These Specifications refer particularly to trench excavation. However, the applicable provisions shall also apply to all excavation and backfill for manholes, structures and other appurtenances.

All excavation performed shall be considered unclassified. Excavation shall consist of the removal of any and all material encountered, including, but not limited to cutting and removal of existing surfacing, tree stumps, trees, logs, abandoned rail ties, piling, riprap, rock, etc.
The root systems of all trees which are outside of the easements or the right-of-way shall not be cut or disturbed, but shall be tunneled or otherwise protected by the Developer to ensure that no damage is done.

Where trenching is performed through paved and concrete areas, the hard surface shall be precut with saws or mechanical cutters in neat, straight lines before removal. The pavement and concrete so removed shall be loaded and hauled to waste.

During excavation, installing of pipelines and structures, and the placing of backfill, excavations shall be kept free of water. The Developer shall furnish all equipment necessary to dewater the excavation and shall dispose of the water as required by the regulatory agencies and in such a manner as not to cause a nuisance or menace to the public. The dewatering system shall be installed and operated by the Developer so that the ground water level outside the excavation is not reduced to the extent that the adjacent structures or property are endangered or damaged.

The release of ground water to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soil, prevent disturbance of backfill, and prevent movement of structures and pipelines. Where the undisturbed condition of natural soils is inadequate for support of the planned construction, excavation shall be extended below the structure or pipeline grades to permit the placing of foundation gravel.

The water main shall be bedded to a point 6 inches over the crown of the pipe by hand shoveling the material into place and working it under and around the pipe and compacting it with foot tamping or other suitable means to provide proper support to the pipe in its backfilled condition. Excavated material which is unsuitable for bedding the pipe shall be hauled to waste and the pipe bedded with gravel backfill for pipe bedding as indicated in the Specifications for Gravel Materials.

The gravity sewer shall be bedded to a point 12 inches over the crown of the pipe by hand shoveling the material into place and working it under and around the pipe and compacting it with foot tamping or other suitable means to provide proper support to the pipe in its backfilled condition. The pipe shall be bedded with gravel backfill for pipe bedding (or pea gravel) except that all sewer pipes installed within the city limits of Everett shall be bedded with crushed surfacing, base course as indicated in the Specifications for Gravel Materials.

From the points described above to finished grade, all backfill materials shall be compacted to a minimum of 95 percent of the Modified Proctor dry maximum density per ASTM D1557.
The Developer shall provide the District with laboratory test results indicating compaction of the trenches meet this requirement.

Compaction Test Table

		Minimum Sampling
Material Trenches	Gradation/Classification See Note 1	Soils evaluation before and during construction by Developer's soils geologist. Testing as recommended.
	In-Place Density See Note 2 & 3	Minimum of one every 200 feet of trench, a minimum of one per day or as approved by the Engineer in areas of existing or proposed streets and one every 200 feet of trench in easements.

	Moisture-Density Relationships	Required for varying soil conditions as determined by soils geologist.

Note 1: All acceptance tests shall be conducted from in-place samples.

Note 2: Additional tests may be required when variations occur due to the Contractors operations, weather conditions, site conditions, etc.

Note 3: For trenches 12 feet and under, complete a minimum of one test at approximately 50 percent of trench depth and an additional test at or near the surface.

For **trenches 12-feet to 16-feet deep**, complete one test at approximately 4 feet above the pipe, one test at or near the surface and one test approximately halfway in between.

For **trenches greater that 16-feet deep**, complete tests at approximately 4-foot intervals above the pipe to the surface (four tests required) or as directed by the Engineer.

If compaction within any area of the project is questionable as determined by the District and prior to paving, additional excavation and testing in accordance with the above table as directed by the District shall be completed.

The Developer shall prepare and restore all test sites with his own equipment, labor, and materials. All costs incidental to the preparation and restoration of all test sites shall be at the Developer's cost.

The Developer shall remedy, at his expense, any defects that appear in the backfill prior to final acceptance of the work.

Within existing streets and rights-of-way, all trench backfill material shall be gravel base as indicated in the Specifications for Gravel Base or controlled density fill (CDF) as required by District or permits.

Partial backfill to protect the pipe will be permitted immediately after the pipe has been properly installed. Complete backfilling of trenches will not be permitted until the section of work in question has been inspected by the District.

Cleanup operations shall progress directly behind backfilling to accommodate the return to normal use of the trench area. Cleanup shall include cleaning streets over which waste haul has been carried and spilled.

The District reserves the right to restrict the Contractor in the amount of trench open during the working day. Should the Contractor, in the District's opinion, fail to diligently pursue the backfill and cleanup, this limit shall be 200 LF and shall be strictly enforced.

The Developer shall remedy, at no cost to the District, any defects that appear in the backfill prior to final acceptance of the work and also prior to termination of the performance bond. Such repair work required because of defective backfill shall also include replacement of any damaged surface improvements.

When trench dams are required, they shall be installed across the entire trench section keyed a minimum of 12-inches into undisturbed soil and to the full depth of all granular backfill materials. Trench dams shall be utilized in all areas of steep slopes, stream, and wetlands crossings and as determined by the District and other local governmental authorities. A drain may be required at the discretion of the District.

WS-45 GRAVEL MATERIALS

The types of gravel material which are to be used in trenches or other excavations are divided into the following classifications.

A. Foundation Gravel

This material shall be 1/2- to 2-inch gravel or broken stone. No more than 20 percent by weight shall pass the 1/2-inch sieve and not more than 2 percent shall pass the U.S. No. 200 sieve. The material shall be free of clay and organic material, but the material need not be washed. The material shall not have a wear percentage exceeding 35 percent after 500 revolutions by the use of the Los Angeles Machine.

Foundation gravel shall be used only where foundations are unstable and suitable excavated material immediately adjacent to the excavation is not available to stabilize such foundations.

B. Gravel Backfill for Pipe Bedding

Gravel backfill for pipe bedding shall consist of crushed, processed, or naturally occurring granular material. The material shall be free of clay and organic material. Not less than 95 percent shall pass the 1/2-inch sieve and not less than 95 percent shall be retained on the No. 4 sieve. Grading shall be to the limiting dimensions, but the material need not be washed. Saturated material will not be acceptable.

Gravel backfill for pipe bedding shall be placed under and around pipes as shown on the Standard Details when existing excavated material does not meet the above specification.

C. Crushed Surfacing, Base Course

This material shall conform to the Specifications for Crushed Surfacing, base course, Section 9-03.9(3) of the Standard Specification for Roads, Bridge, and Municipal Construction of the State of Washington.

Crushed surfacing, base course shall be placed under and around all sewer pipes installed within the city limits of Everett as shown on the Standard Details.

D. Gravel Base

This material shall conform to the Specification for Gravel Base, Section 9-03.19 of the Standard Specifications for Roads, Bridge and Municipal Construction of the State of Washington, except that 25 percent of the material shall be retained on the 1/4-inch sieve. The material is to be used for backfill of trenches, around manholes and structures, within all existing streets and rights-of-way and elsewhere where excavated material is unsuitable for backfill.

E. Quarry Spalls - Drainage Ditches

This material shall conform to the Specifications for Quarry Spalls, Section 9-13.6 of the Standard Specification for Roads, Bridge, and Municipal Construction of the State of Washington, modified for 100 percent to pass the 6-inch screen.

Quarry spalls shall be placed in ditches and on slopes to be protected. After placement, the quarry spalls shall be compacted by tracked equipment making a minimum of three passes.

WS-46 CONTROLLED DENSITY FILL

Controlled Density Fill (CDF) shall be a mixture of Portland cement, fly ash, aggregates, water and admixtures proportioned to provide a non-segregating, self-consolidating, free-flowing and excavation-able material which will result in a hardened, dense, non-settling fill.

CDF shall be batched and mixed in accordance with Section 6-02.3 Standard Specifications for Road, Bridge, & Municipal Construction of the State of Washington.

Materials are as follows:

1. Portland Cement AASHTO M85 or WSDOT/9-01
2. Fly Ash Class F
3. Aggregates WSDOT/9-03.1(2)B
4. Water WSDOT/9-25
5. Admixtures WSDOT/9-23.6

CDF shall be used in the following proportions for 1 cubic yard. Batch weights may vary depending on specific weights of aggregates.

Max. Gallons Of Mixing Water per Cubic Yard	50
Lbs. of Cement per Cubic Yard	50
Lbs. of Fly Ash per Cubic Yard	300
Lbs. of Dry Aggregate per Cubic Yard (Class 1 or 2 Sand per WSDOT 9-03.1(2)B	3,200
Compressive Strength	100 psi maximum at 28 days

CDF shall be batched to provide a flowable, non-segregating mix, with a slump between 6 and 8 inches.

CDF shall be discharged from the mixer by any reasonable means into the area to be filled. The CDF shall be brought up uniformly to the elevation shown on the Plans.

CDF shall not be placed on frozen ground.

CDF patching, mixing, and placing may be started if weather conditions are favorable, when the temperature is at 34 degrees F and rising. At the time of placement, CDF must have a temperature of at least 40 degrees F.

Mixing and placing shall stop when the temperature is 38 degrees F or less and falling. Each filling stage shall be as continuous an operation as is practicable.

For flowable CDF, compaction is not necessary for placement. The Developer may, as an option, adjust the water content only to obtain a 0 to 1 inch maximum slump mixture which if used shall be compacted in lifts not to exceed 12 inches. Compaction shall be accomplished by use of a hand vibratory plate or hoe-pack.

The Developer shall have a steel plate cover placed and anchored over the trench until the District determines the mixture is sufficiently cured, so that a permanent patch can be placed.

WS-47 STATE HIGHWAY AND STREAM CROSSINGS

All state highway, rail road, stream or other crossings as determined by the District where boring is required to complete the crossing shall be encased with steel casing.
Steel casing shall be of sufficient diameter (minimum of 24 inches), size, and strength to enclose the pipe and to withstand maximum loading. Sizing and wall thickness of casing is subject to approval by the District. The carrier pipe shall be ductile iron, Class 52, restrained joint pipe unless otherwise approved by the District. Casing spacers shall be installed at each 10 feet of the pipeline.

The spacers shall be Uni-Flange Series UFRCS 1300 or approved equal, sized to prevent uplift in the pipe. Sand backfill between the casing and the pipe shall be required. In order to prevent the sand from being washed from the casing, the ends of the casing shall be bricked and cemented or otherwise sealed after installation, backfill and testing of the pipe are complete.

WS-48 RESTORATION OF SURFACE IMPROVEMENTS

The restoration of various types of surface improvements shall be as described below. The Developer shall be responsible to maintain all roadway and walkway areas until the permanent repair is accomplished. The Developer shall repair or replace all areas damaged or disturbed during construction.

A. Temporary Surface Repair

The Developer shall place a temporary surface repair immediately after backfill in all streets and driveways. The material shall be MC-2 asphaltic concrete commonly referred to as “cold mix.” The backfill shall be thoroughly compacted and brought to a smooth grade prior to placing the material.

B. Asphalt Concrete Pavement Repair

The width of all pavement cuts shall be approved by the District before removal of pavement. All pavement cuts shall be continuous and shall be made with a machine specially equipped for this purpose. No skip cutting will be allowed.

Materials shall conform to Section 9.03 of the Standard Specifications for Road, Bridge & Municipal Construction of the State of Washington. Asphalt treated base shall be used as shown on the Standard Detail. All asphalt treated base shall conform and be placed in accordance with the requirements of Section 4-06, Standard Specifications for Road, Bridge and Municipal Construction of the State of Washington. The penetration of the asphalt used shall be between 85 and 100, viscosity grade AR4000.

Asphalt used for pavement repair shall be asphalt concrete pavement Class “B” and shall conform and be placed in accordance with the requirements of Section 5-04, Standard Specifications for Road, Bridge and Municipal Construction of the State of Washington.
The penetration of the asphalt used shall be between 85 and 100, viscosity grade, AR4000. All edges and joints of asphalt concrete pavement repair shall be sealed with asphalt cement.

The asphaltic paint binder, or tack coat, shall conform in all respects to Section 5-04, Standard Specifications for Road, Bridge, and Municipal Construction of the State of Washington. After pavement is in place, all joints shall be sealed.

Existing monument cases, valve boxes, catch basins, manholes, cleanouts, or any other items shall be adjusted to grade at the top of the finished surface of the roadway or easement.

C. Crushed Rock Surfacing

Shoulders, gravel driveways, roadways and alleys shall be resurfaced with crushed surfacing, top course. Crushed surfacing shall be manufactured in accordance with the provisions of Section 9-03.9(3) of the Standard Specifications for Road, Bridge, and
Municipal Construction of the State of Washington, and installed to a minimum thickness of 2 inches.

Special care shall be taken to ensure that the surface has been brought to a uniform grade prior to placement of the material.

Immediately prior to placement of the gravel, the drainage ditch, shoulders and/or driveways shall be graded to the original smooth contours existing prior to the construction in the area. Spreading shall be done as soon as each load is placed. The Developer shall be required, as far as practical, to haul material over the surfacing as it is placed.

D. Cement Concrete Curb

Cement concrete curbs shall be installed in accordance with Section 8-04.3(1) of the Standard specifications for Road, Bridge, and Municipal Construction of the State of Washington.

Existing curbs and gutters that are damaged or removed in performing the Project within the trench sections or as designated by the District shall be replaced in kind with the same shape and dimensions.

E. Extruded Cement Concrete Curb

Extruded cement concrete curbs shall be installed as shown on the Plans and in accordance with Section 8-04.3(1)A of the Standard specifications for Road, Bridge and Municipal Construction of the State of Washington.

F. Cement Concrete Sidewalks

Cement concrete sidewalks shall be installed as shown on the Plans and Section 8-14 of the Standard Specifications for Road, Bridge, and Municipal Construction of the State of Washington.

G. Landscaped, Improved, and Unimproved Areas

Certain improvements and landscaping exist in and along the public rights-of-way including the adjacent private properties. Wherever such property is damaged, destroyed, or the use thereof is interfered with due to the operation of the Developer, it shall be immediately restored to its former condition by the Developer. Notice should be given to the property owner along the route of construction by the Developer advising them of the methods to be used to preserve and restore the improvements. The construction areas not improved with surfacing or landscaping shall be restored to original grade and shape, smooth with no debris remaining in or adjacent to the site. The area shall be hydro-seeded in accordance with Section 8-01 of the Standard Specifications for Road, Bridge, and Municipal Construction of the State of Washington.

WS-49 CLEANUP

The construction site shall be kept clear during the progress of the work. Before the work shall be considered complete, the Developer shall clean out ditches that may have been filled during the work, replace damaged surfacing, remove surplus materials and trash and dispose of brush, repair all damages, and otherwise leave the job in a neat, orderly, and workmanlike condition. Dust control shall be provided during the progress of the work and during cleanup. The Developer shall keep existing roads and streets adjacent to or within the limits of the project open to and maintained in a good and safe condition for traffic at all times. The Developer shall remove, on a daily basis, any deposits or debris which may have accumulated on the roadway surface as a result of construction operations. Removal shall be performed on a more frequent basis should the District determine that such removal is necessary. Any damage resulting from the Developer's operation shall be repaired at no expense to the District.

WS-50 USE OF COMPLETED PORTIONS

The District shall have the right to take possession of and use any completed or partially completed portions of the work although the time may not have expired for completing the entire work, and this shall not be deemed acceptance of any of the work.

WS-51 FINAL INSPECTION

All material and completed work are subject to final inspection by the District, which shall have the right to subject any portion thereof to such tests as in the opinion of the District shall be necessary to determine whether the work complies with the Plans and Specifications.

WS-52 "AS-BUILT" RECORD DRAWINGS

The District will maintain "as-built" information about the project as it is constructed. This information will be made available to and utilized by the Developer's Engineer for preparation of "as-built" drawings. The "as-built" drawings shall be prepared at the Developer's expense.

C. POST CONSTRUCTION

WS-53 OWNERSHIP OF PLANS

The original mylars, three copies and an electronic file of all "as-built" Record Drawings prepared by the Developer's Engineer shall be delivered to the District as a condition of and prior to acceptance of the Project, and shall become the property of the District. Neither the Developer nor the Developer's Engineer shall have any rights of ownership, copyright, trademark or patent in respect to the Plans.

WS-54 LIENS

Prior to acceptance of the work, the Developer shall deliver to the District either a complete release of all liens that arise out of the performance of the work or evidence acceptable to the District that there are no liens filed against the work. If any lien arises or remains unsatisfied after acceptance of the work, the Developer shall reimburse the District for any costs incurred on account thereof.

WS-55 RECORDING

The District will not approve the Plat for recording until the entire underground portion of the water and/or sewer facilities have been installed, tested and in the case of sewers, televised; and a copy of the final plat to be recorded is delivered to the District for review of adequacy of easements. A copy of the final recorded plat and all necessary recorded easements shall be delivered to the District before service connections to the extension will be allowed.

WS-56 COMPLETION BOND

If the Developer completes the underground portion of the water and/or sewer system and desires water and/or sewer service prior to the final paving of streets within the development, or prior to final acceptance of such extension(s), and if approved by the District, then an additional cash completion bond shall be deposited with the District in an amount to be determined by the District to cover the cost of work yet to be completed in conjunction with the final paving, grading and transfer of ownership. An assignment of funds will be unacceptable.

WS-57 BILL OF SALE

Upon completion of the work and approval of the District, the Developer shall, as a condition of acceptance by the District, convey the work to the District by Bill of Sale, in accordance with the form attached as an appendix hereto.

END PART 1

PART 2

WATER MAINS

GENERAL

Any extension of the District's water system shall be completed in accordance with the terms of this agreement. All extensions shall conform to State of Washington Department of Health. District and other local authority requirements.

The Contractor shall comply with all of the requirements for back flow protection and cross connection control to protect the District's water system.

All materials, installation and workmanship shall be in accordance with the latest District Standards, American Water Works Association guidelines, and any other applicable governing jurisdictional authorities.

Any chemicals used in the water treatment shall comply with the requirements of ANSI/NSF 60 Water Treatment Chemicals.

Any products used to coat, line, seal or patch water contact surfaces (paint, pipe liners, interior coating) or that have substantial contact within the supply, pumping, treatment or distribution system shall comply with ANSI/NSF 61 Drinking Water System Components and Materials, and the Safe Drinking Water Act.

W-1 WATER MAIN PIPE

Water mains to be installed shall be ductile iron pipe for all sizes. In special circumstances, High Density Polyethylene Pipe may be used with the approval of the District

A. Ductile Iron Pipe (DI)

The ductile iron pipe shall conform to AWWA C151 Standards, except the minimum nominal thickness shall be as follows:

4" - 0.29" (Class 52 for bell and spigot, Class 53 for threaded spools)
6" - 0.31" (Class 52)
8" - 0.33" (Class 52)
12" - 0.37" (Class 52)
16" - 0.40" (Class 52)

Grade of iron shall be 60-42-10. The pipe shall be cement-lined to a minimum thickness of 1/16 inch meeting NSF standards for potable water and the exterior shall be coated with an asphaltic coating.

Each length shall be plainly marked with the manufacturer's identification, year cast, thickness, class of pipe and weight. The pipe shall be furnished with mechanical joint or push-on joint, conforming to AWWA C111 Standards, except where otherwise noted as calling for flanged joints.

Polyethylene encased or "bagged" pipe, where shown on the Plans shall be minimum of 8 mil thick, tube bagged, in accordance with AWWA C105.

Restrained joint pipe, where shown on the Plans, shall be push-on joint pipe with "Field Lok" gaskets or TR FLEX as furnished by US Pipe, or approved equal.

The pipe manufacturer shall certify in writing that the inspection and all tests of the specified standards for both pipe and gaskets being supplied for this project have been made and that the results thereof comply with the requirements of the Standard.

Joints shall be "made-up" in accordance with the manufacturer's recommendations. Standard joint material, including rubber ring gaskets shall be furnished with the pipe. Materials shall be suitable for the specified pipe sizes and pressures. The pipe joint utilized shall be the patented "Tyton" joint.

Except where necessary, in making connections with other lines and unless authorized by the District, pipes shall be laid with bells facing in the direction of laying and for lines on an appreciable slope, the bells shall face upwards.

All pipe shall be delivered to the job site with water tight wrapping or pipe plugs. All pipe shall be carefully checked on delivery as well as before placing in the trench. Pipe shall be carefully bedded, joined and protected. It shall be laid to the line and grade established and at all times the interior kept free from dirt, gravel, and all other foreign matter. The open ends shall be wrapped or plugged and secured at any time pipe laying is not in progress.

Water mains shall be laid on a uniform grade and the Developer shall anticipate those places where additional depth is required to avoid certain utilities, and adjust the pipeline profile accordingly to maintain uniform grade.

Prior to making permanent connections to the existing system, the new water main including service lines shall have passed a pressure test, been adequately flushed, and finally passed the required bacteriological test.

All types of pipe shall be handled in a manner that will prevent damage to the pipe, pipe lining or coating. Pipe and fittings shall be loaded and unloaded using hoists and slings in a manner to avoid shock or damage, and under no circumstances shall they be

dropped, skidded, or rolled against other pipe. Damaged pipe will be rejected, and the contractor shall immediately place all damaged pipe apart from the undamaged and shall remove the damaged pipe from the site within 24 hours.

Methods of handling shall be corrected by the Developer if the District determines that these methods are damaging to the pipe.

All pipe to be purchased and installed as a part of the Developers water system shall be delivered to the job site with water tight wrapping or pipe plugs. Furthermore, to comply with AWWA Standards, these pipe plugs or wrappings shall remain in place until the pipe is installed in the trench at which time one end plug would be removed for joining pipe ends.

If there is any pipe not meeting this requirement, the District shall reject it, or under special circumstances may allow that it be swabbed out with chlorine solution and capped before accepted by the District.
Dirt or other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations, and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned, and relayed. A clean whiskbroom shall be used for this purpose and for brushing to remove foreign matter prior to joining of pipe ends. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or by other means approved by the District to ensure cleanliness inside the pipe.

Pipe shall be stacked in such a manner as to prevent damage to the pipe, to prevent dirt and debris from entering the pipe, and to prevent any movement of the pipe. The bottom tiers of the stack shall be kept off the ground on timbers, rails or other similar supports. Pipe on succeeding tiers shall be alternated by bell and plain end. Timbers 4-inches by 4-inches in size shall be placed between tiers and chocks shall be placed at each end to prevent movement. For safety each size of pipe shall be stacked separately.

B. High Density Polyethylene Pipe (HDPE)

HDPE pipe may be used, under special circumstances only, with approval of the District. Approval shall be subject to a case-by-case review of the proposed application and of the proposed pipe and installation specifications. Design calculations shall be submitted to support the proposed SDR-rating, with respect to surge pressure and buckling, for District review and approval.

HDPE pipe shall conform to AWWA C-906. The HDPE pipe shall be butt-fused welded pipe (Driscopipe Prisma 4200 or equivalent) and shall be high-density, PE 3408 pipe. The material shall have a long term hydrostatic strength of 1,600 psi per ASTM D2837.

The pipe shall be made from polyethylene resin compound. Type III, Category 5, Class C, Grade P34 per ASTM D-1248. The minimum cell classification shall be PE334434C for PE 3408 materials per ASTM D-3350. The manufacturer shall provide the proper certification to ensure the materials comply with the specifications requirements.

The material shall contain a sufficient UV stabilization for 24 month of outdoor storage.

The manufacturer shall furnish an affidavit that all materials delivered comply with the requirements of the specifications together with copies of the test results (nominal values).

The manufacturer shall furnish a certification that Compressed Ring Test (ASTM F-1248) has been utilized to test for environmental stress crack resistance and results equal or exceed F°>5,000 hours.

The pipe shall be homogenous throughout and uniform in density, color and other properties.

Pipe markings shall include name or trademark of pipe fabricator, pipe outside diameter, standard dimension ratio (SDR), polyethylene cell classification per ASTM D-3350, production code from manufacturing location, name of manufacturer, and date of production.

Pipe and polyethylene fittings shall be produced by the same manufacturer from identical material meeting the requirements of this specification. Polyethylene fittings may be molded, or fabricated by heat fusion joining polyethylene components prepared from pipe, molded fittings, or polyethylene sheet or block, except fittings 8-inches nominal diameter and smaller shall be molded meeting the requirements of ASTM D-3261. Fittings fabricated from pipe shall be manufactured from pipe stock with a wall thickness not less than 25 percent greater than that of the pipe to which the fitting is to be jointed. The wall thickness of an outlet may be the same as the wall thickness of the pipe to which the outlet is to be joined. Flange fittings to ductile iron pipe shall comply with ANSI 150 and shall be designed and manufactured at not less than the design pressure of the system.

With the District's prior approval, electrofusion couplings may be used to facilitate pipe installation in the vicinity of existing utilities. Electrofusion couplings shall meet the standard of AWWA C906.

Thermal stability of resin:	ASTM D-3350 (220 degrees C)(4)
Ring-tensile strength test:	ASTM D-2290 92,900 psi)(1)
Elongation-at-break test:	ASTM D-638 (750%)(4)
Carbon black content:	ASTM D-4218 (2% min.; 3% max.(2)
Melt index:	ASTM D-1238 (0.1 gm/10 min.)(2)
Density:	ASTM D-1505 (0.955 gm/cm^3)(2)
Toe-in:	ASTM D-2122 (<1.5% smaller than average O.D., 12" from end)(3)
Environmental stress crack resistance:	ASTM D-1693 (F◦>192 hours min.)(4)
Frequency of Tests:	

(1) At least one per production run.
(2) At least one per day (24 hours).
(3) At least one per day (or one per each 8-hour shift).
(4) At least one per resin lot.

Flanged joining of pipe shall be performed with a convoluted ductile iron backup flange conforming to the vital dimensions of ANSI 16.5. The flange shall be epoxy coated ductile iron conforming to ASTM 536, Grade 65/45/12.

Gaskets provided at all flanged joints shall be Buna “N,” grade 60, or equal suitable for wastewater. Bolts and nuts for flanged joints shall be low-carbon steel conforming to ASTM A-307, 60,000 psi tensile strength, grade B. The bolts shall be evenly tightened using a crossing pattern and each flanged joint shall be checked and retightened after 1 hour or more has passed.

Flexible couplings used for connections of high density polyethylene to ductile iron pipe shall include an adaptor ring. Adaptor ring shall be pre-fabricated lap joint (follower ring) per ASTM 207 Class “D” with two sets of bolt circles. One bolt circle to match the lap joint bolt pattern and the other bolt circle to match the bolt pattern of a Standard Class 125 flange. Gasket shall be made of rudder 1/8-inch full face type. Bolts shall be provided as required for the connection. Flanges shall have a fusion bonded epoxy coating.

The polyethylene (HDPE) pipe shall be handled, stored, and installed so as to avoid physical damage to the pipe including cuts or gouges to depths in excess of 10 percent of wall thickness. The damaged portions of the pipe shall be removed and the undamaged portions rejoined using the thermal butt fusion joining method unless the pipe is acceptable to the District and manufacturer.

Sections of polyethylene pipeline shall be joined into continuous lengths by the butt fusion method above ground along the trench or by flanged connections in the trench as required to avoid existing utilities. The joining method shall be performed by personnel trained to assemble the pipe and in strict accordance with the pipe manufacturer's recommendation. The pipe shall be assembled as a continuous piping system to avoid the need for thrust blocks for thrust restraint at bends or fittings for thrust restraint.

In some cases along the pipeline, the manufacturers recommend bending radius may be exceeded and may require a fabricated fitting. All fabricated fittings shall be fully pressure rated and configured to conform to the total deflection angle noted on the Plans. As an alternative, fully pressure rated mitered fittings are acceptable.

Thermal butt fusion joining of the polyethylene pipe shall be performed with field proven equipment that has a centerline guidance system to hold the pipe and fittings in close alignment while the opposing butt ends are faced, cleaned, melted and fused together and then cooled, all in strict accordance with the pipe manufacturer's recommendations. Butt fusion joining shall be 100 percent efficient offering a joint weld strength equal to or greater than the tensile strength of the pipe.

Butt fusion joining of polyethylene pipe of unlike SDRs shall not be permitted unless assembled by butt fusion procedures as recommended by the manufacturer and approved by the District. Alternatively, joining of pipe with unlike SDRs shall be performed with flanged connections.

Care shall be taken to install the HDPE pipe in accordance with the pipe manufacturer's recommendations. Standard installation practice shall include techniques recommended by the manufacturer to compensate for high thermal expansion and contraction characteristics of HDPE pipe, including adequate backfill compaction, snaking the pipe in the trench, and making tie-in connections at anticipated operating temperatures.

Where an HDPE main connects to or passes through a buried structure, such as a manhole, valve vault or wet well, the connection to the structure shall be made using a ductile iron wall spool or sleeve cast or grouted into the structure wall. The force main shall transition from HDPE to ductile iron pipe outside the manhole using a flange adapter with a ductile iron backing ring, or other approved method. The transition shall occur within the greatest of 1 foot or 1-1/2 pipe diameters of the structure wall. The connection shall be anchored against pull-out at the structure in accordance with the pipe manufacturer's recommendations.

W-2 WATER MAIN FITTINGS

All fittings shall be short-bodied, ductile iron complying with applicable AWWA C110 or C153 Standards for 350 psi working pressure rating for mechanical joint fittings and 250 psi for flanged fittings. All fittings shall be cement-lined and either mechanical joint or flanged, as indicated on the Plans.

Fittings in sections shown on the Plans requiring restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc. MEGALUG, Romac Industries, Inc., Grip Ring Pipe Restrainer or approved equal. Stargrip Series 3000 mechanical joint restraint devices are not accepted or approved as equal.

Fittings shall be adequately “blocked” with poured-in-place concrete, within wooden forms shaped to establish a firm minimum bearing area, against an undisturbed earth wall as shown on the Standard Details. 4" x 4" minimum size Timber blocking may be permitted as temporary blocking, when utilized as forms outside the poured-in-place concrete when fittings are to be pressurized prior to the 24 hour minimum “set” time. The concrete thrust blocks must be in place at least 24 hours before beginning the pressure test, to allow the concrete to “set”. The strength of the concrete shall be 2,000 psi minimum.

All valves and all fittings requiring a concrete block shall first be covered with 4-mil Visqueen plastic sheets, before concrete is poured. The concrete shall not cover joints, bolt heads or nuts.

All bolts shall be coated with Armite Anti-Seize Compound No. 609, or equal, prior to installation.

Before cutting existing pipes, the Developer shall measure the pipe outside diameter to determine if pipe was manufactured to a diameter which is different than presently specified in /AWWA Standards, and if required, the Developer shall furnish alternate or additional fittings more compatible with the pipe outside diameter.

All connections to ductile or cast iron pipe shall be with ductile iron mechanical joint sleeves, or approved equal, except as shown on the Plans for mechanical joint tees, valves, etc.

All connections to pipe other than cast or ductile iron shall be with Romac, Smith Blair, Dresser or Ford flexible couplings. The couplings shall have long middle rings and shall have a fusion-bonded epoxy coating. Coupling gaskets shall be Grade 60. The bolts and nuts shall be high strength, low alloy steel or electrogalvanized mild steel.

All joints in the pipe, fittings, valves, flexible couplings, and sleeves, shall be fully seated with small clearances allowed for pipe expansion. Where flexible couplings and sleeves are called for, the space between ends of pipe shall not exceed one-quarter (1/4) inch.

When the space between pipe ends is excessive, a short section of pipe may be inserted as a spacer ring to limit such pipe movement within the coupling or sleeve, to obtain the one-quarter (1/4) inch limitation stipulated herein.

W-3 VALVES

All valves 12 inch and smaller shall be resilient seated ductile iron gate valves except where shown on the Plans. All valves 16 inch and larger shall be ductile iron butterfly valves.

The valve manufacturer shall certify in writing that the inspection and all tests of the specified standards for the valves being supplied for this project have been made and that the results thereof comply with the requirements of the Standard.

A. Resilient-Seated Gate Valves

The gate valves shall be resilient seated ductile iron body valves with non-rising stems (NRS) opening counterclockwise and equipped with a 2-inch square operating nut. Valves shall meet the full requirements of the AWWA C509 or C515 Standards. The valves shall have double “O” ring stem seals which shall withstand the test pressure without leakage. Valves shall be rated at
250 pounds per square inch (psi), minimum working pressure and furnished with either flanged and/or mechanical joints as shown on the Plans. All surfaces, interior and exterior, shall be epoxy-coated, acceptable for potable water.

Valves shall be Mueller, M&H, Clow, American Flow Control Series 2500, U.S. Pipe or approved equal.

B. Butterfly Valves

The butterfly valves shall be either mechanical joint or flanged ductile iron body valves equipped with a 2-inch square operating nut and shall be of the tight closing, rubber seat type. Valves shall meet the full requirements of AWWA C504-87 Standards, Class 150-B except the valve shall be able to withstand 200 psi differential pressure without leakage.

Butterfly valves shall be Henry Pratt Company “Groundhog,” “Dresser „450,” or approved equal.

All valves shall be set with the operating stems vertical. The axis of the valve box shall be common with the projected axis of the valve operating stem. The tops of the adjustable valve boxes shall be set to the existing or established grade, whichever is applicable.

All valves with operating nuts located more than 3 feet-6 inches below finished grade shall be equipped with extension stems to bring the operating nut from 2 feet-0 inches to 1 foot-0 inches from finished grade.

The extension stem of the length required to meet field conditions shall be a manufactured unit with a 1-inch-diameter mild steel rod. At the top of the extension stem there shall be a 2-inch standard operating nut complete with a centering flange.

Valve boxes shall be equal to the “Rich 940-B” Model. The flared end of the valve box shall be set at the bottom elevation of the 2-inch operating nut to allow space for rocks to be moved laterally from the operation nut. The “ears” on the valve box top shall be aligned parallel in the direction of the branch the valve opens and closes.

The valve box shall be placed over the valve or valve operator in such a manner that the valve box does not transmit shock or stress loads to the valve. The casting shall not rest directly upon the body of the valve or upon the water main.

Any extension of the valve box shall utilize additional flared end valve box bottom sections or cast iron hub soil pipe. Other materials are not acceptable.

In areas where the valve box is not in concrete or asphalt a 24-inch by 24-inch by 4-inch cement concrete block shall be installed around the valve box at finished grade. The valve box shall be flush with the top and centered.

A fiberglass valve marker post shall be furnished and installed where directed. Valve marker posts shall be blue in color, 3.75 inches wide (flat), 60-inches long and furnished with a 3-inch by 3-inch high density white reflector (250 candle power) and a flexible anchor barb. Valve markers shall be Carsonite Utility Marker CUM 375.

Markers shall be placed at the edge of the right-of-way opposite the valve and set so as to leave 36 inches of the post exposed above grade. The size of the valve and the distance in feet and inches to the valve shall be noted with decals, typically designed for use on fiberglass boats, placed on the face of the post, using letters approximately 2-inches high. Each post shall include the following decal: “Caution Water Valve, Before Digging, Call 1-800-424-5555, Utility Underground Location Center.”

W-4 TAPPING TEES AND TAPPING VALVES

The tapping sleeves shall be rated for a working pressure of 250 psi minimum and furnished complete with joint accessories. Tapping sleeves shall be constructed in two sections for ease of installation and shall be assembled around the main without interrupting service.

Fabricated steel style sleeves shall be fusion bonded coated, acceptable for potable water, and shall be manufactured by JCM, Romac or approved equal.

Size on size connections shall utilize stainless steel full circle tapping tee or DI MJ cut-in tee.

Tapping valves shall be resilient-seated ductile iron body gate valves provided with a standard mechanical joint outlet for use with ductile iron pipe and shall have oversized seat rings to permit entry of the tapping machine cutters. In all other respects, the tapping valves shall conform to the resilient seat gate valves herein specified with regards to operation and materials.

The tapping sleeve and valve shall be pressure tested to 200 psi (water) prior to tapping the main.

The installation of the tapping sleeves and valves and the tapping of the main shall be performed by Speer Taps, Ferguson Waterworks, Puget Sound Tapping Services, LLC, or Approved by District.

W-5 AIR RELIEF VALVES

Air and vacuum release assemblies shall be installed at high points on the water system as shown on the Plans or designated in the field by the District.

The air relief assemblies shall be a combination air and vacuum valve, Crispin #UL-10, Valmatic 201-C or APCO 143C complete as shown on the Standard Detail.

W-6 BLOWOFF ASSEMBLIES

The blow-off assemblies shall be furnished and installed as shown on the Standard Detail.

Temporary blow-offs utilized by the Contractor for flushing the water main shall be sufficient size to obtain 2.5 feet per second velocity in the main.

W-7 FIRE HYDRANTS

The fire hydrants shall be the break-away compression type, meeting AWWA C502-85 Standards, in which the valve will remain closed if the barrel is broken. The hydrants shall have a barrel diameter of not less than 8-1/2 inches, and the main valve opening shall be not less than 5-1/4 inches in diameter. The fire hydrants shall be equipped with two, 2-1/2-inch National Standard Thread (NST) hose nozzles and one, 4-1/2-inch NST pumper port. A permanent anodized Storz hydrant adapter and anodized Storz blind flange shall be installed on the 4-1/2-inch pumper port. Hydrants within the City of Mukilteo fire service area and Fire District #1 shall be equipped with 4-inch Storz adapters; all other hydrants shall utilize a 5-inch Storz adapter. Branch connection shall be for 6-inch pipe, as noted on the Standard Details, and shall be mechanical joint.

Fire hydrants shall be Mueller Centurian (A-423), Clow Medallion or M&H Dresser “Reliant” (129).

The Contractor shall furnish fire hydrants with the correct bury depth (trench depth), in accordance with the specified pipe depth and special conditions of the Project. The fire hydrants shall be installed to provide the mounting height above finished grade as shown on the Standard Detail. The hydrant shall be installed plumb on the vertical axis.

A 36-inch by 36-inch by 8-inch cement concrete block shall be installed with a broomed surface and finished edge at the finished grade line and shall be located 2 inches below the bury line of the hydrant. One quarter inch expansion strips shall be placed between hydrant barrel and concrete. Forms shall be removed from the block prior to acceptance by the District.

The hydrants shall be wire brushed, primed with one coat of Rust-Oleum High Performance Metal Primer and painted with two coats of Rust-Oleum Professional Oil-Based Safety Yellow.

Between the time that the hydrant is installed and the completed facility is placed in operation, the hydrant shall at all times, be wrapped in burlap, bagged, or covered in some other suitable manner as approved by the District, to clearly indicate that the hydrant is not in service.

The resilient, seated ductile iron body gate valve shall have a flange by mechanical joint body, and be bolted to the main line tee.

The connecting pipe between the fire hydrant and gate valve shall be 6-inch ductile iron restraint joint pipe and shall not exceed 50 feet in length. The fire hydrant and gate valve shall be restrained with a mechanical joint restraint device as indicated in Water Main Fittings. In addition to this, the hydrant and tee shall be fully blocked with concrete.

Hydrant guard posts, where shown on the Plans or required by the District, shall be 9-inch-diameter by 6-foot-long reinforced precast concrete units and the portion above ground painted similar to requirements for the fire hydrant.

The Developer shall install a raised blue reflector on the final lift of asphalt in line with the fire hydrant in accordance with the Fire District's requirements.

W-8 SERVICE CONNECTIONS

Individual services to each structure and/or property shall be installed and connected to the new water mains. Backflow assemblies shall conform to the latest Washington State Department of Health requirements and the District's Cross Connection Control Program.

Upon completion of the installation of the water main (before testing and disinfection) services shall be installed by connecting to the water main and extending the service line to the property line as shown on the Standard Details or approved equal. Service lines for residential property shall be Type "K" 1-inch (minimum size) copper service lines meeting the ASTM Specifications B-88-47. Larger service lines shall be of the type and style as designated in the Standard Details and shown on the Plans.

All Brass Fittings, installed both above and below grade, shall be "Lead Free" per the January 4, 2014 Washington State Department of Health Reduction of Lead in Drinking Water Act. Fittings shall comply with NSF/ANFI 61, NSF/ANFI 372 and shall have a weighted average lead content of 0.25 percent lead or less.

Commercial and multi-family projects that require larger than 1-inch meters shall provide 1-1/2-inch or 2-inch meter service installations per the District standards as shown on the Standard Details. Two inch and smaller meters are supplied by the District. Three inch and larger meters fall into a different design criteria and will be specifically designated as needed and supplied by other.

Corporation stops and the single meter shut-off valves shall be "Mueller" of the type and style noted on the Standard Details or approved equal. Included as a part of the service connection shall be the furnishing and installation of the meter box complete with a cast iron traffic lid, set flush with the proposed finished grade of the lot in the designated location near the property line, all as shown on the Standard Details. The angle type of shut-off valve shall be set inside the meter box in a proper position for installation of a future meter by the District. Upon completion of each service line as indicated herein, the Developer shall flush the service line to remove the debris that may interfere with the future meter installation, and further verify that the service line has full pressure and flow to the meter box. Meter boxes shall be marked with a painted 2 x 4 stake as shown on the Standard Details.

Service lines between the main and the property line shall be placed at a trench depth sufficient to maintain a 3-foot cover over the top of the service line for its full length, taking into consideration the final finished grade of the proposed street and the final finished grade of any storm ditches.

W-9 LARGE METER AND TESTS

If extensions require water meters 3 inches or larger, then such entire meter installations, including but not limited to, valves, piping, vaults, drain lines and meters shall be installed by the Developer conforming to District standards. The Developer shall pay the meter test fee established by the District and shall sign a District meter application form and pay all fees and charges due at that time.

W-10 FIRE LINE SERVICES

If extensions require a fire line service, then such entire installation, including but not limited to, valves, piping, vaults, drain lines and meters shall be installed by the Developer conforming to District standards. The service shall have a Double Check Detector Backflow Prevention Assembly installed in a utility vault at the ROW/Property line with a 6" PVC gravity drain to storm. Fire line service shall terminate in the structure to be served as shown on the Districts Fire Line Riser Detail.

W-11 DISINFECTION OF WATER MAINS

Water mains and appurtenances shall be disinfected in accordance with AWWA C651 before being placed in service. Water for filling and disinfection must be obtained by the Developer by arrangement with the District. Only District employees may operate valves for filling, testing and flushing operations.

After the main is filled, the system may be pressure tested prior to flushing only if the new chlorinated system is not directly connected to the District's existing system. If connected, the chlorinated water must be flushed from the main.

The method of placing calcium hypochlorite granules in the water main as it is being installed is acceptable if the pipe and appurtenances are kept clean and dry during construction.

The calcium hypochlorite granules contain approximately 65 percent available chlorine by weight. The minimum amount of calcium hypochlorite granules placed at the beginning and in each 500 feet of pipe is as follows:

Pipe Size	Calcium Hypochlorite Granules
6"	1.0 oz.
8"	2.0 oz.
12"	4.0 oz.
16" and larger	8.0 oz.

When the line is completed and ready to disinfect, water shall be allowed to flow in slowly, until it appears at the far end of the line so as not to displace the disinfecting agent. The system shall then be allowed to stand for at least 24 hours. The line shall then be flushed through the fire hydrants until a test shows the CL2 residual no longer exceeds distribution system residual.

In all instances, the Developer shall utilize a state approved double check valve type backflow prevention device to protect the potable water supply while filling, flushing and disinfecting the particular water main.

In the process of chlorinating newly laid water pipe, all valves, fire hydrants and other appurtenances shall be operated while the pipeline is filled with the chlorinating agent.

The Developer is herein advised that prior to making any restoration or permanent connections to the existing water mains the Developer shall first demonstrate to the District that the new water main has adequately passed a pressure test, been adequately flushed, and finally passed the required bacteriological test.

In all disinfection processes, the Developer shall take particular care in flushing and wasting the chlorinated water from the mains to assure that the flushed and chlorinated water does no physical or environmental damage to property, streams, storm sewers or any waterways. Flushing water must be disposed of in accordance with Washington State Department of Ecology Standards. Flushing water shall require de-chlorination or disposal to sewer system to prevent damage to the affected environment, particularly aquatic and fish life of receiving streams.

Before placing the lines in service, a satisfactory bacteriological report or approval shall be received from a State approved laboratory on samples collected from representative points in the new system. The District shall collect all samples for the bacteriological tests. However, the Developer shall notify the District requesting collection of samples 2 working days in advance, and schedule on days wherein samples can be conveniently processed by a State Department of health approved laboratory. If any of the pipeline materials are replaced thereafter, then that section shall again be disinfected, pressure tested and tested for bacteriological count.

If disinfection of mains by the above methods prove unsatisfactory and the lab report indicates any type of bacteria count, then the Developer shall re-chlorinate using other methods in accordance with AWWA C691, approved by the District.

W-12 HYDROSTATIC PRESSURE TEST

The water mains shall be hydrostatically tested before being placed in service. Water for testing must be obtained by the Developer by arrangement with the District. A positive displacement type pump shall be furnished by the Developer for the testing. Feed for the pump shall be from a disinfected clean container, wherein the actual amount of "makeup" water can be measured.

Upon completion of sections of the pipe installation, the water main shall be pressure tested in segments of 1,000 lineal feet or less. The test pressure shall be either 200 pounds per square inch, or twice the system pressure, using the greater value, and shall maintain the test for a period of not less than 2 hours.

Pressure testing against existing valves shall not be permitted unless authorized by the District.

The Developer shall provide temporary plugs, caps and blocking as required to pressure test and disinfect the new water main prior to making connections to the existing system.

Concrete thrust blocking for fittings shall be in place and the concrete "set" sufficiently to withstand the test pressure before starting the test.

All pressure tests shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. After this basic pipe line test has been completed, each valve shall be tested including the hydrant auxiliary valve by closing each in turn and relieving the pressure beyond. This test of the valves will be acceptable if there is no immediate loss of pressure on the gauge when the pressure comes against the valve being checked. The Developer shall verify and assure that the pressure differential across the valve does not exceed the rated working pressure of the valve.

Prior to calling for the District to witness the pressure test, the Developer shall first perform a satisfactory pressure test. The allowable leakage rate per thousand feet of each size pipeline is as follows:

Pipe Size	Allowable Leakage Gallon per hour per 1,000 Ft. @ 200 psi
6"	0.64
8"	0.85
10"	1.06
12"	1.28
16"	1.70

Any leakage caused by defective workmanship or materials shall be repaired, and the line shall again be tested to full compliance. All visible leaks in pipelines or fittings shall be repaired even if the test results fall within the allowable leakage.

W-13 CONNECTIONS TO EXISTING SYSTEMS

All cut-in connections to the existing system shall be made after a successful pressure test of the new main has been witnessed by the District and after a purity test has been satisfactorily evidenced.

Size on size connections shall utilize stainless steel full circle tapping tee or DI cut-in tee.

Where it is necessary to shut-off the existing (or new) mains to make a connection, the Developer shall notify the District 72 hours or 3 working days in advance of such shut-off, and the District will notify customers of the shut-off, provide temporary services to critical customers and shut-off the mains. Connections shall be performed between the hours of 9:00 a.m. and 4:30 p.m. only. No cut-in connections or connections of new piping to the existing piping shall be scheduled for Fridays or Mondays. Once the water has been shut-off, the Developer shall diligently pursue the connection to completion, so that the time required for the shut-off may be held to a minimum. The District will notify customers in the area of the scheduled shut-off.

The required connections shall not be started until all of the materials, equipment and labor necessary to properly complete the work are assembled on the site. All connections shall be completed the same day they are started. The Developer shall time its operations so that water will not be shutoff overnight or over weekends or holidays.

The location, type and size of existing facilities have been determined from available records and are approximate. It is anticipated that connections to these existing facilities may be made, in general, as shown on the Plans, except where adjustments are required for vertical and horizontal alignment.

It shall be the responsibility of the Developer to determine the exact horizontal and vertical location of connections, ascertain the type and size of existing facilities and determine potential conflicts prior to starting work on any connection. Alternatives shall be provided as required to complete the connection detail.

Connections to existing facilities shall be made with the use of fittings, valves, flexible couplings, solid sleeves, shackling and other miscellaneous fittings, including thrust blocks as shown on the Plans and with additional pipe or fittings as approved by the District.

Where connections are made to existing facilities and it is impractical to use the methods described herein to disinfect the section between the existing water main and the point of installation of the new water main (valve or temporarily plugged line) the Developer shall clean and swab the pipe, fittings and valves with a minimum 5 percent chlorinated solution immediately before making said connection and thereby disinfect the necessary connection.

All pipe and fittings used for the connection shall be clean and disinfected. The Developer shall take extra precautions to ensure the tightness of the connections, nuts and bolts. The existing water main shall be placed back into service by the District and the connection observed for leakage by the District prior to backfilling the pipe.

W-14 Anchor Rods, Shackle Rods and Restraints

Anchor rods, shackle rods and clamps shall be a minimum dimension as specified on the approved Construction Drawings or on the District's Standard Details and meet ASTM A36. If in conflict, the larger dimension shall prevail.

All thread rods shall be stainless steel. All rods, clamps, nuts and washers shall be hot dip galvanized after manufacture or stainless steel. Coating shall conform to ASTM A123 for zinc (hot galvanizing) coatings. Alternate coatings shall be submitted to the District for approval.

END PART 2

PART 3

SEWER MAINS

S-1 SEWER MAINS, LATERALS AND FORCE MAINS

Sewer pipe shall be polyvinyl chloride (PVC) or polyethylene or epoxy lined ductile iron (DI) with restrained joints for all sizes unless specifically noted otherwise.

Sewer mains to be installed shall be of material noted below:

Gravity Sewer and Laterals:

PVC Pipe:	5' - 18' Cover
DI Pipe:	3' - 5' Cover
	18' and Over
	Slopes of 18% or greater
Force Main:	DI or HDPE Pipe, with approval of the District

All types of pipe shall be handled in a manner that will prevent damage to the pipe, pipe lining or coating. Pipe and fittings shall be loaded and unloaded using hoists and slings in a manner to avoid shock or damage, and under no circumstances shall they be dropped, skidded, or rolled against other pipe. Damaged pipe will be rejected, and the Developer shall immediately place all damaged pipe apart from the undamaged and shall remove the damaged pipe from the site within 24 hours.

Methods of handling shall be corrected by the contractor if the District determines that these methods are damaging to the pipe.

Dirt or other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations, and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned, and relayed. A clean whiskbroom shall be used for this purpose and for brushing to remove foreign matter prior to joining of pipe ends. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or by other means approved by the District to ensure cleanliness inside the pipe.

Pipe shall be stacked in such a manner as to prevent damage to the pipe, to prevent dirt and debris from entering the pipe, and to prevent any movement of the pipe. The bottom tiers of the stack shall be kept off the ground on timbers, rails or other similar supports. Pipe on succeeding tiers shall be alternated by bell and plain end. Timbers 4 inch by 4 inch in size shall be placed between tiers and chocks shall be placed at each end to prevent movement. For safety each size of pipe shall be stacked separately.

Immediately upon beginning pipe installation, the Contractor shall place and secure a watertight plug in the sewer manhole. The plug shall remain in place throughout the project until such time as the project is accepted by the District.

Failure to place the plug or removal of a plug prior to approval shall be ground for District issued penalties.

A. Ductile Iron Pipe and Fittings

The ductile iron pipe shall conform to AWWA C151 Standards, except the minimum nominal thickness shall be as follows:

6" - 0.25" (Class 52)
8" - 0.27" (Class 52)
10" - 0.29" (Class 52)
12" - 0.31" (Class 52)

Grade of iron shall be 60-42-10. The pipe shall be polyethylene or epoxy lined to a nominal thickness of 40 mils. Minimum lining thickness shall be 30 mils. The exterior shall be coated with an asphaltic coating. Products meeting the standard are US pipe “Polylined,” “Protecto 401” and American Pipe “Polyband” or approved equal.

Each length shall be plainly marked with the manufacturer’s identification, year cast, thickness, class of pipe and weight. The pipe shall be furnished with mechanical joint or push-on joint, conforming to AWWA C111 Standards, except where otherwise noted calling for flanged joints.

Restrained joint pipe, where shown on the Plans, shall be push-on joint pipe with “Field Lok” gaskets or TR FLEX as furnished by US Pipe, or approved equal.

The pipe manufacturer shall certify in writing that the inspection and all tests of the specified standards for both pipe and gaskets being supplied for this project have been made and that the results thereof comply with the requirements of the Standard.

Joints shall be “made-up” in accordance with the manufacturer’s recommendations. Standard joint material, including rubber ring gaskets shall be furnished with the pipe. Materials shall be suitable for the specified pipe sizes and pressures. The pipe joint utilized shall be the patented “Tyton” joint.

All fittings shall be short-bodied, ductile iron complying with applicable AWWA C110 or C153 Standards. All fittings shall be polyethylene or epoxy lined and either mechanical joint or flanged, as indicated on the Plans.

Fittings in sections shown on the Plans requiring restrained joints shall be mechanical joint fittings with a mechanical joint restraint device. The mechanical

joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc., MEGALUG, Romac Industries, Inc., Grip Ring Pipe Restrainer or approved equal. Stargrip Series 3000 mechanical joint restraint devices are not accepted or approved as equal.

Fittings shall be adequately "blocked" with poured-in-place concrete, within wooden forms shaped to establish a firm minimum bearing area, against an undisturbed earth wall as shown on the Standard Details. Timber blocking will not be permitted. The concrete thrust blocks must be in place at least 24 hours before beginning the pressure test, to allow the concrete to "set." The strength of the concrete shall be 2,000 psi minimum.

All fittings requiring a concrete block shall first be covered with 4-mil Visqueen plastic sheets, before concrete is poured. The concrete shall not cover joints, bolt heads or nuts.

All bolts shall be coated with Armite Anti-Seize Compound No. 609, or equal, prior to installation.

All connections to ductile or cast iron pipe shall be with ductile iron mechanical joint sleeves except as shown on the Plans for mechanical joint tees, valves, etc.

B. PVC Pipe and Fittings

The PVC pipe shall be a minimum Class S.D.R. 35 and be manufactured in accordance with ASTM D3034. The pipe and fittings shall be furnished with bells and spigots, which are integral with the pipe wall. Pipe joints shall use flexible elastomeric gaskets conforming to ASTM D3212. Nominal laying lengths shall be 13 feet.

Tees for side sewer laterals shall be 6-inch-diameter fabricated tees. No field cutin tees will be allowed without approval of the District.

If approved by the District, the connection shall be made by machine-made tap and Romac Style Sewer "CB" Saddle, Insert-a-Tee or equal.

The gravity sewer pipe, unless otherwise approved by the District shall be laid upgrade from point of connection on the existing sewer or from a designated starting point. The sewer pipe shall be installed with the bell end forward or upgrade. When pipe laying is not in progress, the forward end of the pipe shall be kept tightly closed with an approved temporary plug. Wherever movable shoring (steel box) is used in the ditch, pipe shall be restrained by use of a winch mounted in the downstream manhole and a line of sufficient strength threaded through the pipe and set tight before each move.

Any indication that joints are not being held shall be sufficient reason for the District to require restraints, whether or not movable shoring is being used.

All gravity sewer pipe shall be laid in straight lines and at uniform rate of grade between manholes. Variance from established line and grade shall not be greater than 1/2 inch, provided that such variation does not result in a level or reverse sloping invert; provided, also, that variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed 1/64 inch per inch of pipe diameter, or a total of 1/2 inch maximum. Any corrections required in line and grade shall be reviewed with the District and the repairs shall be made at the expense of the Developer.

Pipe handling after the gasket has been affixed shall be carefully controlled to avoid disturbing the gasket and knocking it out of position, or fouling the gasket with dirt or other foreign material. Any gaskets so disturbed shall be removed, cleaned, re-lubricated if required, and replaced before the rejoining is attempted.

Care shall be taken to properly align the pipe before joints are forced entirely home. During insertion of the tongue or spigot, the pipe shall be partially supported by hand, sling or crane to minimize unequal lateral pressure on the gasket and thereby maintain concentricity until the gasket is properly positioned. Since most flexible gasket joints tend to creep apart when the end pipe is deflected and straightened, such movement shall be held to a minimum once the joint is home.

Sufficient pressure shall be applied in making the joint to assure that it is home, as described in the installation instructions provided by the pipe manufacturer. Sufficient restraint shall be applied to the line to assure that joints once home are held so, until fill material under and alongside the pipe has been sufficiently compacted. At the end of the workday, the last pipe laid shall be blocked in an effective way to prevent creep during “down time.”

All gravity sewer pipe shall be bedded with pea gravel (or crushed surfacing, base course, if installed within the city limits of Everett). The pipe shall be bedded from a depth of 4 inches below the pipe to 12 inches above the pipe. The bedding material shall extend across the full width of the trench and shall be compacted under the haunches of the pipe.

Special concrete bedding when required to provide additional support for the pipe shall consist of a pipe cradle constructed of Portland cement concrete containing not less than four sacks of cement per cubic yard. Sand, gravel and water proportions are subject to approval by the District. Maximum aggregate size shall be one and 1-1/2 inches. Maximum slump shall be 4 inches.

The bottom of the trench shall be fully compacted before the placement of pipe cradle. The Developer shall protect pipe against flotation and disturbing the horizontal alignment of the pipe during the pouring of the concrete.

Clay or bentonite dams shall be installed across the trench, keyed into native undisturbed soil and to the full depth of the granular material in all areas of steep slopes, stream crossings and within wetlands to prevent migration of water along the pipeline. The District shall determine where trench dams are required. See WS 44 P III-20.

C. High Density Polyethylene Pipe (HDPE)

HDPE pipe may be used, under special circumstances only, with approval of the District. Approval shall be subject to a case-by-case review of the proposed application and of the proposed pipe and installation specifications. Design calculations shall be submitted to support the proposed SDR-rating, with respect to surge pressure and buckling, for District review and approval.

HDPE pipe shall conform to AWWA C-906. The HDPE pipe shall be butt-fused welded pipe (Driscopipe Prisma 4200 or equivalent) and shall be high-density, PE 3408 pipe. The material shall have a long term hydrostatic strength of 1,600 psi per ASTM D2837.

The pipe shall be made from polyethylene resin compound. Type III, Category 5, Class C, Grade P34 per ASTM D-1248. The minimum cell classification shall be PE334434C for PE 3408 materials per ASTM D-3350. The manufacturer shall provide the proper certification to ensure the materials comply with the specifications requirements.

The material shall contain a sufficient UV stabilization for 24 month of outdoor storage.

The manufacturer shall furnish an affidavit that all materials delivered comply with the requirements of the specifications together with copies of the test results (nominal values).

The manufacturer shall furnish a certification that Compressed Ring Test (ASTM F-1248) has been utilized to test for environmental stress crack resistance and results equal or exceed F◦>5,000 hours.

The pipe shall be homogenous throughout and uniform in density, color and other properties.

Pipe markings shall include name or trademark of pipe fabricator, pipe outside diameter, standard dimension ratio (SDR), polyethylene cell classification per ASTM D-3350, production code from manufacturing location, name of manufacturer, and date of production.

Pipe and polyethylene fittings shall be produced by the same manufacturer from identical material meeting the requirements of this specification. Polyethylene fittings may be molded, or fabricated by heat fusion joining polyethylene components prepared from pipe, molded fittings, or polyethylene sheet or block, except fittings 8-inches nominal diameter and smaller shall be molded meeting the requirements of ASTM D-3261. Fittings fabricated from pipe shall be manufactured from pipe stock with a wall thickness not less than 25 percent greater than that of the pipe to which the fitting is to be jointed. The wall thickness of an outlet may be the same as the wall thickness of the pipe to which the outlet is to be joined. Flange fittings to ductile iron pipe shall comply with ANSI 150 and shall be designed and manufactured at not less than the design pressure of the system.

With the District's prior approval, electrofusion couplings may be used to facilitate pipe installation in the vicinity of existing utilities. Electrofusion couplings shall meet the standard of AWWA C906.

Thermal stability of resin:	ASTM D-3350 (220 degrees C)(4)
Ring-tensile strength test:	ASTM D-2290 92,900 psi)(1)
Elongation-at-break test:	ASTM D-638 (750%)(4)
Carbon black content:	ASTM D-4218 (2% min.; 3% max.(2)
Melt index:	ASTM D-1238 (0.1 gm/10 min.)(2)
Density:	ASTM D-1505 (0.955 gm/cm^3)(2)
Toe-in:	ASTM D-2122 (<1.5% smaller than average O.D., 12" from end)(3)
Environmental stress crack resistance:	ASTM D-1693 (F◦>192 hours min.)(4)
Frequency of Tests:	At least one per production run. At least one per day (24 hours). At least one per day (or one per each 8-hour shift). At least one per resin lot.

Flanged joining of pipe shall be performed with a convoluted ductile iron backup flange conforming to the vital dimensions of ANSI 16.5. The flange shall be epoxy coated ductile iron conforming to ASTM 536, Grade 65/45/12.

Gaskets provided at all flanged joints shall be Buna “N,” grade 60, or equal suitable for wastewater. Bolts and nuts for flanged joints shall be low-carbon steel conforming to ASTM A-307, 60,000 psi tensile strength, grade B. The bolts shall be evenly tightened using a crossing pattern and each flanged joint shall be checked and retightened after 1 hour or more has passed.

Flexible couplings used for connections of high density polyethylene to ductile iron pipe shall include an adaptor ring. Adaptor ring shall be pre-fabricated lap joint (follower ring) per ASTM 207 Class “D” with two sets of bolt circles. One bolt circle to match the lap joint bolt pattern and the other bolt circle to match the bolt pattern of a Standard Class 125 flange. Gasket shall be made of rudder 1/8-inch full face type. Bolts shall be provided as required for the connection. Flanges shall have a fusion bonded epoxy coating.

The polyethylene (HDPE) pipe shall be handled, stored, and installed so as to avoid physical damage to the pipe including cuts or gouges to depths in excess of 10 percent of wall thickness. The damaged portions of the pipe shall be removed and the undamaged portions rejoined using the thermal butt fusion joining method unless the pipe is acceptable to the District and manufacturer.

Sections of polyethylene pipeline shall be joined into continuous lengths by the butt fusion method above ground along the trench or by flanged connections in the trench as required to avoid existing utilities. The joining method shall be performed by personnel trained to assemble the pipe and in strict accordance with the pipe manufacturer’s recommendation. The pipe shall be assembled as a continuous piping system to avoid the need for thrust blocks for thrust restraint at bends or fittings for thrust restraint.

In some cases along the pipeline, the manufacturers recommend bending radius may be exceeded and may require a fabricated fitting. All fabricated fittings shall be fully pressure rated and configured to conform to the total deflection angle noted on the Plans. As an alternative, fully pressure rated mitered fittings are acceptable.

Thermal butt fusion joining of the polyethylene pipe shall be performed with field proven equipment that has a centerline guidance system to hold the pipe and fittings in close alignment while the opposing butt ends are faced, cleaned, melted and fused together and then cooled, all in strict accordance with the pipe manufacturer’s recommendations. Butt fusion joining shall be 100 percent efficient offering a joint weld strength equal to or greater than the tensile strength of the pipe.

Butt fusion joining of polyethylene pipe of unlike SDRs shall not be permitted unless assembled by butt fusion procedures as recommended by the manufacturer and approved by the District. Alternatively, joining of pipe with unlike SDRs shall be performed with flanged connections.

Care shall be taken to install the HDPE pipe in accordance with the pipe manufacturer's recommendations. Standard installation practice shall include techniques recommended by the manufacturer to compensate for high thermal expansion and contraction characteristics of HDPE pipe, including adequate backfill compaction, snaking the pipe in the trench, and making tie-in connections at anticipated operating temperatures.

Where an HDPE main connects to or passes through a buried structure, such as a manhole, valve vault or wet well, the connection to the structure shall be made using a ductile iron wall spool or sleeve cast or grouted into the structure wall. The force main shall transition from HDPE to ductile iron pipe outside the manhole using a flange adapter with a ductile iron backing ring, or other approved method. The transition shall occur within the greatest of 1 foot or 1-1/2 pipe diameters of the structure wall. The connection shall be anchored against pull-out at the structure in accordance with the pipe manufacturer's recommendations.

D. Side Sewer Laterals

A side sewer lateral is considered to be that portion of a sewer line that will be constructed between a main sewer line and a property line or easement limit line.

All applicable specifications given herein for sewer construction shall be held to apply to side sewer laterals. The side sewer lateral shall be of the same material as the mainline, except as noted in the Standing Side Sewer Detail.

Side sewers shall be for a single service connection only and be a minimum 6-inch-diameter pipe. Side sewers shall be connected to the tee, provided in the sewer main where such is available, utilizing approved fittings or adapters. The side sewer shall rise at a maximum of 45 degrees and a minimum of 2 percent, extending from the sewer main.

The maximum bend permissible at any one fitting shall not exceed 45 degrees. Any bend, or combination of bends equaling 45 degrees shall consist of or be followed by a wye clean out.

Where there are no basements, the minimum side sewer depth shall be 6 feet below existing curb line and 5 feet below ground at the property line, except where existing improvements, proposed improvements or topography may dictate additional depth. The elevations of the side sewer connections shall be of sufficient depth to serve all existing and potential future basements.

The Developer shall provide for each 6-inch side sewer service a 12-foot-long 2 x 4 wooden post, which extends from the invert of the end of the 6-inch pipe to above the existing ground. The exposed area of the post shall be painted white and shall have stenciled thereon in 3-inch letters (black paint) “S/S” and shall also indicate the total length of the 2 x 4.

Where there are no basements, the maximum side sewer depth at the 2 x 4 shall be no greater than 8 feet unless approved by the District.

All side sewers, other than single-family, shall have a standard sewer manhole installed, 10 feet into the property for sampling purposes.

Sewer Grinder Pumps are not allowed. Where standard conforming gravity service cannot be achieved and denial of service is the only remaining option, private ownership of grinder pumps may be considered by the District. The Developer’s Engineer shall provide the District with information utilized in determining gravity service unavailability showing that all means of achieving gravity service, regardless of cost, have been reviewed and eliminated. If it is proven that gravity service is unavailable, only then will the District accept the Developers Engineer’s proposal identifying pump design and the areas to be served for District review and approval.

E. Grease Interceptors

When specified by the District, grease interceptors shall be provided for all Commercial, Industrial or School food establishments and when specified by the District (Interceptor shall be installed as close as possible to source of grease/fat). When specified by the District, a Sample Chamber shall be installed immediately downstream of the Grease Interceptor.

S-2 MANHOLES

Permanent access for District service vehicles shall be provided at all manholes. Manholes shall be of the offset type and shall be precast concrete sections with either a cast in place base, or a precast base made from minimum 3,000 psi structural concrete. Joints between precast wall sections shall be confined O-ring or as otherwise specified. All manholes over 20 feet in depth shall be a minimum of 54 inches in diameter.

For connections to existing manholes, a concrete coring machine, suitable for this type of work, shall be utilized in making the connection. The existing manhole shall be rechanneled as required. The new pipe connection shall be plugged (water tight) until the new pipe system has been installed and approved. The Developer shall be responsible for any existing defects in the existing manhole unless these defects are witnessed by the District prior to any work being performed to make the connection.

The Developer shall be required to remove any and all deleterious material in the existing manhole and downstream reaches as a result of their connection.

The Developer shall excavate completely around the manhole to prevent unbalanced loading. The manhole shall be kept in operation at all times and the necessary precautions shall be taken to prevent debris or other material from entering the sewer.

A. Manhole Sections

Manhole sections shall be placed and aligned so as to provide vertical sides and vertical alignment of the ladder steps. The completed manhole shall be rigid, true to dimension, and be watertight. Rough, uneven surfaces will not be permitted.

B. Manhole Steps and Ladders

Manhole steps shall be polypropylene, Lane International Corp. No. P13938 or equal. Ladders shall be polypropylene Lane International Corp. or equal, and shall be compatible with the steps.

C. Grade Adjustment

Each manhole shall be provided with not less than 16 inches or more than 24 inches of grade adjustment between the top of the cone and the top of the manhole frame.

Masonry units or precast concrete adjustment rings shall be installed to adjust to final grade. The outside and inside of manhole adjusting bricks or rings and the joints of precast concrete sections shall be plastered and troweled smooth with 1/2 inch (minimum) of mortar in order to attain a watertight surface.

In unpaved areas, a 4-foot-diameter by 8-inches-thick concrete collar shall be poured around the manhole with a manhole marker post unless prior authorization has been granted by the District.

D. Channels

Channels shall be made to conform accurately to the sewer grade and shall be brought together smoothly with well-rounded junctions, satisfactory to the District. The channels shall be field poured after the inlet and outlet pipes have been laid and firmly grouted into place at the proper elevation. Allowances shall be made for a 0.1-foot drop in elevation across the manhole in the direction of flow. Channel sides shall be carried up vertically from the invert to three-quarters of the diameter of the various pipes. The concrete shelf shall be warped evenly and sloped 3/8 inch per foot to drain. Rough, uneven surfaces will not be permitted. Channels shall be constructed to allow the installation and use of a mechanical plug or flow meter of the appropriate size.

E. Pipe Connections

All pipe connections to the manhole shall be with a water tight flexible rubber boot, Kor-N-Seal, or by casting or grouting a Heavy Duty sand collar, or equal into the manhole wall.

F. Drop Manholes

Drop manholes shall, in all respects, be constructed as a standard manhole with the exception of the drop connection as shown on the Standard Detail.

G. Lift Holes and Steel Loops

All lift holes shall be completely filled with expanding mortar, smoothed both inside and outside, to insure water tightness. All steel loops shall be removed, flush with the manhole wall. The stubs shall be covered with mortar and smoothed. Rough, uneven surfaces will not be permitted.

H. Frames and Covers

Frames shall be gray iron and covers shall be ductile iron. Castings shall be free of porosity, shrink cavities, cold shuts or cracks, or any surface defects, which would impair serviceability. Repair of defects by welding, or by the use of “smooth-on” or similar material, will not be permitted. Frames and covers shall be machine finished or ground on seating surfaces so as to assure non-rocking fit in any position and interchangeability of covers.

All frames and covers shall be provided with three bolt locking lids. Rings and covers shall be positioned so one of the three locking bolts is located over the manhole steps.

Frames and covers shall be adjusted to conform to the final finished surface grade of the street or easement to the satisfaction of the District.

In easements and/or under special circumstances and at the sole discretion and approval of the District, manhole frames and covers shall be by Pamrex 24, available from Titus Industrial Group, 62292 Bryan Road, Bend, Oregon 97701, (541) 389-1975, or equal as approved by the District.

I. Manhole Marker Posts

A fiberglass manhole marker post shall be located adjacent to all manholes located in easement areas. The marker post shall be green in color, 3.75 inches wide (flat), 60-inches long and furnished with a 3-inch by 3-inch-high intensity white reflector (250 Candle Power) and a flexible anchor barb. Each post shall include the following decal: “Caution Sewer Manhole. Before digging, call 1-800-4245555, Utility Underground Location Center”. Manhole markers shall be Carsonite Utility Marker CUM 375.

The marker posts shall be set so as to leave thirty-six (36) inches of the post exposed above grade

J. Manhole Fall Protection

All manholes that are 20 feet or over in depth, measured from finished grade to invert of the pipe, shall be a minimum of 54 inches in diameter (or a size specified by the District) to facilitate the use of fall protection equipment.

S-3 TESTING GRAVITY SEWERS

The Developer shall furnish all facilities and personnel for conducting tests under the observation of the District. Methods other than low-pressure air test shall be subject to the approval of the District.

A. Preparation for Testing for Leakage

Before any leakage test is performed, the Developer shall clean and flush all gravity sewer lines with an approved rodding method or with a cleaning ball and clean water prior to testing. The inflatable diagonally ribbed rubber ball shall be of a size that will inflate to fit snugly into the pipe to be tested. After completion of backfill and cleaning, the completed gravity sewer, including side sewer stubs, shall be televised inspected. This will be permitted prior to paving. If the television inspection reveals excess debris, the Developer shall clean and televise again at its own expense. The sewer shall then be tested by the low-pressure air test method but only after all utilities are installed and the project paved. Except, however, that in certain conditions an exfiltration test may be required by the District.

The first section of pipe, not less than 300 feet in length, installed by each crew shall be tested in order to qualify the crew and/or the material. A successful installation of this first section shall be a prerequisite for further pipe installation by the crew. At the Developer's option, crew and/or material qualification testing may be performed at any time during the construction process after at least 2 feet of backfill has been placed over the pipe.

All debris flushed out of the line shall be removed at the first manhole where its presence is noted. In the event cemented or wedged debris or a damaged pipe shall stop the cleaning operation, the Developer shall remove the obstruction, and/or repair any damaged pipe. All visible leaks showing flowing water in pipelines or manholes shall be stopped even if the test results fall within the allowable leakage. The cleaning shall be carried out in such a manner as to not infiltrate water into existing facilities. Precautions shall be taken to prevent any damage caused by cleaning and testing. Any damage resulting shall be repaired by the Developer at its own expense. The manner and time of testing shall be subject to approval of the District.

B. Low Pressure Air Test

The sewer pipe shall be tested for leaks through the use of air in the following manner:

Immediately following the pipe cleaning and television inspection, the pipe installation shall be tested with low-pressure air. Air shall be slowly supplied to the plugged pipe installation until the internal air pressure reaches 4.0 pound per square inch greater than the average back pressure of any ground water that may submerge the pipe. At least two minutes shall be allowed for temperature stabilization before proceeding further.

The rate of air loss shall then be determined by measuring the time interval required for the internal pressure to decrease from 3.5 to 2.5 pounds per square inch while maintaining the stipulated pressure greater than the pipe section's average adjacent groundwater back pressure.

The pipeline shall be considered acceptable if the total rate of air loss from any section tested in its entirety between manholes, cleanouts or pipe ends does not exceed the following table:

TABLE OF TEST TIME IN MINUTES AND SECONDS
Length of 6" Pipe (ft.)

Length of 8" Pipe (ft.)	0	50	100	150	200	250	300	350	400
0	0	0:40	1:20	1:58	2:38	3:18	3:58	4:38	5:16
50	1:10	1:50	2:30	3:10	3:48	4:28	5:08	5:48	5:56
100	2:20	3:00	3:40	4:20	5:00	5:38	6:14	6:12	6:08
150	3:32	4:10	4:50	5:30	6:10	6:30	6:26	6:22	6:18
200	4:42	5:22	6:00	6:40	6:44	6:38	6:34	6:30	6:26
250	5:52	6:32	6:48	6:58	6:50	6:44	6:40	6:36	6:32
300	7:02	7:20	7:10	7:02	6:06	6:50	6:44	6:40	6:36
350	7:34	7:22	7:14	7:06	7:00	6:54	6:50	6:44	6:42
400	7:34	7:24	7:16	7:08	7:02	6:58	6:52	6:48	6:44

Test times will be provided by the District for combinations other than 8-inch mains and 6-inch laterals.

If the pipe installation fails to meet these requirements, the Developer shall determine at its own expense the source or sources of leakage, and shall repair (if the extent and type of repairs proposed by the Developer appear reasonable to the District) or replace all defective materials or workmanship. The completed pipe installation shall meet the requirements of this low-pressure air test or the alternative water exfiltration test before being considered for acceptance.

Plugs used to close the sewer pipe for the air test shall be securely braced with non-buoyant material to prevent the unintentional release of a plug, which can become a high velocity projectile. Gauges, air piping manifolds and valves shall be located at the top of the ground. No one shall be permitted to enter a manhole where a plugged pipe is under pressure. Air testing apparatus shall be equipped with a pressure release device such as a rupture disk or a pressure relief valve designed to relieve pressure on the pipe under test at 6 psi.

S-4 TESTING FORCE MAINS

The force mains shall be hydrostatically tested before being placed in service. Water for testing must be obtained by the Developer by arrangement with the District. A positive displacement type pump shall be furnished by the Developer for the testing. Feed for the pump shall be from a container, wherein the actual amount of “makeup” water can be measured.

The test pressure shall be either 200 pounds per square inch, or twice the system pressure, using the greater value and shall maintain the test for a period of not less than 1 hour. The test pressure shall be applied at the low end of the section tested.

The Developer shall provide temporary plugs, caps and blocking as required to pressure test the new force main.

Concrete thrust blocking for fittings shall be in place and the concrete “set” sufficiently to withstand the test pressure before starting the test.

Prior to calling for the District to witness the pressure test, the Developer shall first perform a satisfactory pressure test. The allowable leakage rate per thousand feet of each size pipeline is as follows:

Pipe Size	Allowable Leakage Gal. per Hour per 1,000 Ft. @ 200 psi
6"	0.64
8"	0.85
10"	1.06
12"	1.28

Any leakage caused by defective workmanship or materials shall be repaired, and the line shall again be tested to full compliance.

S-5 TELEVISED INSPECTION

After manhole adjustment, installation of ATB, channeling and the gravity sewer lines have been cleaned and flushed, the Developer shall provide a complete televised inspection.

The Developer shall perform a complete televised inspection of the sewer pipe and appurtenances and shall provide to the District, an electronic copy, in a format as specified by the District of the inspections together with a written log of the television inspection. The camera shall be a pan and tilt type equipped with adequate light and focusing to allow inspection of sewer main, side sewers and full circumference inspection of main line joints and fittings. The District shall determine if the quality of the electronic copy is acceptable.

Immediately prior to the televised inspection, the Developer shall run water through each sewer line for 5 to 10 minutes to provide water for detection of any adverse grade sections visible by the presence of ponded water. The camera shall be stopped periodically at the ponded areas and the depth of water shall be measured with a ball of known diameter on the pull line. Ponding shall not be greater than 1/16-inch per inch of pipe diameter and not exceed 1/2 inch in depth. During the inspection, all tees and other fittings shall be logged as to exact location within 1 percent maximum error in measurement, wherein accuracy is checked with various fittings and the terminating manhole.

The District shall be notified 48 hours prior to any television inspection and this work shall be performed on a schedule to allow the District to witness the inspection.

If the television inspection shows indications of deflections in the pipe, the District may require that the Developer pull a proper sized mandrel for the main through the pipe to confirm that the pipe deflection does not exceed the manufacturer's recommendations.

Any defects in material or installation identified by the television inspection shall be repaired as required by the District at the Developer's expense.

END PART 3

PART 4

TRENCHLESS INSTALLATION

TRENCHLESS

The District, at its sole discretions, may allow the use of trenchless methods to complete portions of water and/or sewer projects and extensions.

The use of trenchless methods will require special approval of the District. Trenchless methods shall only be considered when other standard methods of construction cannot be completed in a reasonable or economical fashion. Any use of trenchless methods shall be at the Contractor's complete risk as to the ability to satisfactorily complete the utility installation in compliance with District standards.

Methods the District is willing to consider and evaluate include:

- Horizontal Directional Drilling (HDD)
- Micro tunneling
- Pipe Jacking
- Pipe Bursting
- Auger Boring
- Pipe Ramming
- Cured in Place Pipe (CIPP) for rehabilitation

Each of these methods may be suitable for different site conditions, soil types, water table levels and utility size and type. Consideration shall be given to those issues when the Contractor is proposing a method to the District.

T-1 QUALIFICATIONS

The Contractor shall demonstrate to the satisfaction of the District that the Contractor is qualified to perform the work. The District reserves the right to contact references and investigate past performance and qualifications of the Contractor. The District may contact references for other projects, including District projects, even though the Contractor did not identify those projects and /or references. Poor references may be justification to determine that the Contractor is not acceptable for the proposed method. The Contractor shall provide references and, at a minimum, the information required by each item set forth below.

A. Trenchless Contractor:
   - Specializes in trenchless installations for a minimum of the last five years.
   - Has completed at least three trenchless installations in the last two years using the type of trenchless system proposed in the approved plans.
   - The three installations noted in the above must have been constructed in conditions of a similar nature and geology to those indicated in the approved plans, including work in granular soils, dealing with frac-out situations, and cleanup and disposing of bentonite.

B. Trenchless Superintendent:
   - Has experience on at least three trenchless Installations in the past two years using the type of trenchless system proposed in the approved plans.
   - Experience must include projects that have been constructed in conditions of a similar nature and geology to those indicated in the approved plans.
   - The superintendent’s responsibilities on each project must be documented.

C. Trenchless Operator:
- Experience as a trenchless machine operator on at least three trenchless installations in the past two years using the type of trenchless system proposed in the approved plans. Experience must include projects that have been constructed in lengths and conditions of a similar nature and geology to those indicated in the approved plans.
- The trenchless operator's responsibilities on each project must be documented.

D. Trenchless Designer:
- Registered professional engineer licensed in the State of Washington with a minimum of three years' experience in trenchless design and construction of installations for the proposed trenchless method. Previous installations shall be similar in diameters, lengths and conditions of a similar nature and geology to those for the proposed installation location.

E. Additional Qualifications:
- The District may request additional information depending on trenchless method approved for installation, to demonstrate that the Contractor is qualified to perform the Work. The information may include:

a) Drilling Fluids Engineer:
- Minimum of two years' experience with slurry design used in trenchless installations in granular and abrasive soils. Minimum of two years' experience with slurry separation systems and additives to be used for effective soil separation for all soil types and quantities indicated in the Drawings.

b) Biological Monitor:
- Fisheries biologist with a minimum of 10 years' experience in local sensitive species identification and surveys, experience with fish life status, salmon habitat requirements, and water quality issues.

c) Surveyor:
- Surveyor shall be a professional land surveyor who is licensed in the State of Washington.

T-2 TRENCHLESS SUBMITTALS

Contractor shall provide the District with a trenchless submittal **applicable to the trenchless method approved** that may include the following as appropriate:

A. Trenchless system plan for each drive. Resubmit for all modifications to that previously accepted. Certifications that pits are constructed as required and certified for trenchless operations.

B. Reports and records:
1. Alignment surveys and checks: prior, during, and at completion of pipe installation.

2. Daily trenchless operation records and measurements, and welding records including an electronic copy of the trenchless system electronic digital drive record.
3. Well decommissioning reports and permits.
4. Startup test results. (Micro tunneling)
5. Status of dewatering prior to pit wall penetration.
6. Field testing results.
7. Material catalog cut sheets.

C. Pipe repair procedures.

D. Pipe repair certifications.

E. CCTV documentation of casings and pipes. F. Tunnel Safety Plan. (Micro tunneling)

G. Frac-Out Mitigation and Contingency Plan.

H. Pre-tunneling meeting minutes. (Micro tunneling)

I. Obstruction removal records and testing results.

J. Annular filling plan

K. Bypass pumping plan if existing sewage flow is affected. See Division 3 for basics.

T-3 CONSTRUCTION STANDARDS

All materials, installation and workmanship shall be in accordance with the latest District standards and the latest edition of the State of Washington Standard Specifications for Road, Bridge and Municipal Construction.

All applicable standards for water and/or sewer installations, Divisions 2, 3 and 7, shall also apply.

T-4 MATERIALS

The Contractor shall furnish all material as noted herein and as indicated on the approved plans and as required to complete all work. All materials shall be manufactured with premium material and comply with all referenced standards.

T-5 CASING PIPE

Casing pipe is typically used in micro tunneling, pipe jacking, auger boring and pipe ramming applications. Calculations shall be provided for the proposed casing pipe material demonstrating sufficient capacity to accommodate highway loading during the life of the project and loading during installation. Casing pipe shall conform to all industry standards. Casing pipe that may be considered for District review includes steel or approved equal by the District. Minimum casing inside diameter (ID) shall be 24-inch.

T-6 CASING SPACERS

Casing spacers shall be used to support the carrier pipe inside the casing pipe. Casing spacers shall be equally spaced within the casing and shall be sized to center the carrier pipe within the casing pipe or as necessary to achieve desired slope. Casing spacers shall be as manufactured by Advanced Products and Systems Stainless Steel Band Casing Spacers, Model SSI, or Cascade Waterworks Manufacturing Company Stainless Steel Casing Spacer or approved equal. See Standard Detail TI-1.

T-7 ANNULAR FILLER

The annular space between the carrier pipe and casing pipe shall be filled with sand that conforms to Section 9-03.1 (2)B of the WSDOT Std. Specs for Class 2 Fine Aggregated gradations. Other materials shall be approved by the District prior to installation.

Method of installation of the annular filler shall take into consideration the impacts to the adjacent surroundings. An annular fill plan shall be included with the product information for District review.

T-8 CARRIER PIPE

For Horizontal Directional Drilling (HDD) applications the carrier pipe is typically installed without a casing pipe. For HDD installations the carrier pipe shall be high density polyethylene pipe (HDPE). For CIPP, the CIPP shall extend from end-to-end of the section being lined in a continuous jointures, seamless, tight fitting pipe-within-a-pipe with a Thermosetting Resin Impregnated Pipe or Tube.

A. Water & Sewer Force mains: HDPE pipe shall conform to all requirements set forth in Part 2 Water Mains and Part 3 Sewer Mains.

B. Gravity Sewer: HDPE pipe shall conform to all requirements set forth in Part 3 Sewer Mains.

For micro tunneling, pipe jacking, auger boring and pipe ramming applications, the carrier pipe is installed inside the casing pipe. Carrier pipes that will be considered by the District include:

A. Ductile Iron - Ductile iron (DI) pipe shall meet all requirements of Part 2, Water Mains or Part 3, Sewer Mains as applicable. In addition all DI pipe shall be restrained joint.

B. HDPE as specified above.

C. Cured in Place Pipe (CIPP) shall adhere to these referenced standards

- ASTM F1216: Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin- Impregnated Tube.
- ASTM D5813: Cured-in-Place Thermosetting Resin Sewer Pipe. Inversion Lining.

- ASTM D790: Test Methods for Flexural Properties of Non-Reinforced Plastics.
- ASTM F1743: Cured in Place Thermosetting Resin Sewer Pipe. Pull In and Inflate.

T-9 FITTINGS

Fittings and adapters shall match the pipe material being used.

A. For HDPE pipe all fittings and adapters shall be molded and fabricated HDPE compatible with the specified pipe, referenced standards and manufacturer requirements. All joints shall be butt-fused joints in accordance with referenced standards, and manufacturer requirements and using equipment specifically developed for joint fusions. Refer to Part 2 Water Mains and Part 3 Sewer Mains.

B. For DI pipe, all fittings and adapters shall meet all requirements of Part 2 Water Mains or Part 3 Sewer Mains as applicable. In addition, all DI pipe joints and adapters shall be restrained joint.

T-10 DRILLING FLUID

Drilling fluid, if used, shall be a slurry mix specifically used for horizontal directional drilling or micro tunneling and shall be biodegradable and non-toxic.

T-11 INSTALLATION

When approved by the District trenchless methods may be considered an option for the Contractor.

When approved by the District, use of HDD shall generally comply with the Horizontal Directional Drilling Manual as published by the North American Society for Trenchless Technology (NASTT) and standard industry requirements.

When approved by the District, the use of micro tunneling shall generally comply with the Standard Construction Guidelines for micro tunneling as published by the American Society of Civil Engineers (ASCE) and standard industry requirements.

When the approved trenchless method includes a casing and carrier pipe, the external void space between the casing and native material shall be filled with grout as specified on the approved plans. The annular void between the carrier pipe and casing shall be filled and the ends sealed off.

T-12 TRENCHLESS INSTALLATION

Pipe shall be installed to the lines and grades as shown on the plans and profiles. Because of the minimum pipe slopes and easement width, installation of the pipe shall be closely monitored to maintain the proper alignment.

Easements allowed for construction shall be as shown on the plans. All debris caused by construction shall be removed from the premises and legally disposed of. Contractor is liable for damages caused to construction areas from heavy equipment and trucks. Contractor is responsible for restoring area when construction is complete.

The equipment used during the drilling operation shall be determined by the Contractor for the approved trenchless method and meeting the requirements of the plans or specifications of this project.

The Contractor's drilling equipment shall be equipped with an electrical strike by sensing both current and voltage. The strike system shall be equipped with warning strobes on both the drill frame and the power unit. Contractor shall supply grounding mats for the operator.

Water required for the drilling operation may be obtained from the District if available. If available and the Contractor elects to use, Contractor shall apply to the District for a water use permit and shall furnish backflow prevention equipment according to District Standards. Water use shall follow the latest guidelines in accordance with District policy. The Contractor shall provide a tanker truck for use as a water reservoir for the drilling operation.

Contractor shall provide portable fluid (mud) tanks at both entry and exit points to contain all drilling fluids resulting from the drilling operation and is responsible for proper disposal of all drilling fluids and waste tailings offsite unless a suitable location is approved by the District.

For HDD installations, the pullback method shall be used to install the water/sewer lines. Once the pullback has begun, it shall be continuous until full completion.

Contractor shall make preparations for extended hours of operation during pullback of piping.

Contractor shall maintain a minimum horizontal separation of ten (10) feet between all sewer and water lines except when placed in the same casing. When water main pipe and sewer main pipe need to be installed in the same casing, the installation shall meet the Washington State Department of Health (DOH) separation requirements and may require separation by an additional casing around either the water or sewer within the joint casing. DOH approval is required whenever water and wastewater pipes are proposed to be placed in the same casing.

Acceptable horizontal and vertical tolerances vary depending on the trenchless method being used. In general and unless identified in the approved plans: horizontal variances are plus or minus one (1) foot from the plan alignment and vertical variances are plus or minus one-half foot from the elevation centerline or tighter. For gravity sewer carrier lines, pipe shall meet the minimum allowable slope or greater, per Part 3 Sewer Mains, continuously in the direction of flow. Contractor shall continuously record all measuring and gauging equipment used at all times during operation and pullback of the piping and the District shall have access to these records. Drilling fluids shall be recycled during the drilling operation whenever possible.

Contractor shall use every available means to install the pipeline in accordance with the approved plans. This includes sealing and re-drilling all or any part of the pilot hole if the completed or partially completed pilot is not in compliance with the plans. In the event the pipeline becomes lodged and cannot be pulled out of the drilled hole during installation, the Contractor shall seal the pipeline and existing hole and re-drill a pilot hole and pullback the pipeline again.

Drilling operations shall minimize impact on the environment. Contractor shall restore jobsite to original condition upon completion of all work activities.

The entire length of the trenchless installation shall have a recorded profile upon completion. Information shall be continually recorded throughout the drilling operation by a surface computing system placed behind the bit. Contractor shall furnish this information to the District upon completion of the trenchless method operation.

T-13 CIPP LINER INSTALLATION

The CIPP liner shall be installed and cured in the host pipe per the manufacturer's instructions, following the methods indicated in the materials submitted. CIPP installation shall be in accordance with ASTM F1216, Section 7, or ASTM F1743, Section 6, except as modified herein.

Resin Impregnation - The quantity of resin used for tube impregnation shall be sufficient to fill the volume of all voids in the tube material with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. The amount of resin used shall exceed the calculated value by ten percent (10%) to fill the voids in the annular between the CIPP and the existing pipe due to the structural deterioration of the existing pipe. The person in charge of the Contractor's wetout process shall submit a signed wetout sheet that shows the quantity of resin that was placed into the fabric tube, and certifies that the information is accurate and the resin was distributed uniformly throughout the fabric tube. A vacuum impregnation process shall be used. To ensure thorough resin saturation throughout the length of the felt tube the level of the vacuum and the speed of the resin advance shall be coordinated so that white spots (dry areas) at the inside surface of the flexible membrane shall be small, shallow, less than 10% of the fabric tube wall thickness or 3-mm, whichever is less, and be less than 1% of the volume of the resin per unit length.

A roller system shall be used to uniformly distribute the resin throughout the tube. The roller gap dimension shall be calculated by a method that determines the correct volume of resin/felt per unit length (foot, yard or meter), contained within the confining perimeter of the flexible membrane A gap dimension calculation based on the parameters as diameter, cut size, nominal felt void percentage, nominal resin polymerization shrinkage, the design thickness, and whether the flexible membrane will end up as the ID of the CIPP as with inversion, or the OD as with a pull-in method shall be submitted to the District for approval. If the Contractor uses an alternate method of resin impregnation and resin distribution, the method must produce the same results. The District must approve any alternate resin impregnation method.

The wet out tube shall be positioned in the pipeline using either inversion or a pull-in method. If pulled into place, a power winch shall be utilized and care should be exercised not to damage the tube as a result of friction during pull. The tube should be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.

Prior to installation, remote temperature gauges (typically thermocouple probes) shall be placed inside the host pipe at the invert level of each end to monitor the temperatures during the cure cycle. Liner and host pipe interface temperature shall be monitored and logged during cure and cool-down.

Curing shall be accomplished by utilizing hot water under hydrostatic pressure in accordance with the manufacturer's recommended cure schedule. The heat source in and output temperatures shall be monitored and logged during the cure and cool-down cycles. The manufacturer's recommended cure schedule shall be submitted for each line segment installed, and the liner wall thickness and the existing ground conditions with regard to temperature, moisture level, and thermal conductivity of soil, per ASTM F1216, 7.6.1.2 or ASTM F1743,
6.6.1.2 as applicable, shall be taken into account and shown how those factors influence the cure schedule.

If a pulling method is used, a cable shall be strung through the existing pipe to be rehabilitated and attached to the liner through an existing manhole or access point. The liner shall be pulled through the existing manhole and through the existing pipe by this cable. Care shall be taken not to damage the existing sewer lines or manholes during the installation. Appropriate sleeves and rollers shall be used to protect the liner.

T-14 COOL DOWN

The Contractor shall cool the CIPP in accordance with the approved manufacturer recommendations. Cooling shall be done without pressure interruption and with either water or air. When the exterior "skin" (interface) temperature on both ends reaches 100° F and held for the appropriate period of time, the processing shall be finished. The equipment may then be disconnected.

Temperatures shall be monitored and recorded throughout the installation process to ensure that each phase of the process is achieved at the approved manufacturer's recommended temperature.

T-15 FINISH

The finished lining shall be continuous over the entire length of an installation run and be free from visual defects such as foreign inclusions, dry spots, pinholes, and de-lamination. The lining shall be impervious and free of any leakage from the pipe to the surrounding ground or from the ground to inside the lined pipe.

Any defect, which will or could affect the structural integrity or strength of the linings, shall be repaired at the Contractor's expense, in a manner approved by the District.

The beginning and end of the CIPP shall be sealed to the rehabilitated pipeline. The sealing material shall be compatible with the pipe end and shall provide a watertight seal.

T-16 TESTING AND ACCEPTANCE

Trenchless methods shall be subject to all conditions and requirements of the applicable portions of Part 2 Water Mains and Part 3 Sewer Mains.

END PART 4

APPENDIX

MAINTENANCE BOND
MUKILTEO WATER AND WASTEWATER DISTRICT

KNOW ALL MEN BY THESE PRESENTS: That, _____, as Principal, and _____ as surety, and jointly and severally held firmly bound unto the Mukilteo Water and Wastewater District of Snohomish County, State of Washington, ("the District") in the sum of _____ ($_____) dollars for the payment of which, well and truly to be made, we jointly and severally bind ourselves and our heirs, executors, administrators, and assigns, firmly by these presents.

Whereas, the above-named Principal has pursuant to Developers Extension Agreement proposed Plans and Specifications, and constructed a _____ sewer _____ water system(s) in the (short) Plat of _____ Section _____, Township _____ North, Range _____ East, W.M., Snohomish County, State of Washington; and

Whereas, the District accepted the work by Resolution dated _____.

Now, therefore, the conditions of this obligation are such that, if the Principal shall maintain and remedy said work free from defects in material and workmanship, as more fully set forth in Paragraphs 5, 6 and WS 24 of the Developer Extension Agreement referenced above and as contained in the Bill of Sale delivered to the District, for a period of not less than two years from the date of final acceptance, then upon written notification to the Principal by the District of inspection and approval of the work, this obligation shall be void; otherwise, it shall remain in full force and effect.

The Developer agrees to notify the District at least 30 days in advance of the end of the two year period to allow for inspection and to prepare letters of notifications.

DATED this _____ day of _____, 20_____.

Received and approved by
Mukilteo Water and Wastewater District on:

Date: _____

By _____

_____
Principal

_____
Authorized signature

_____
Print Name

_____
Address

_____
City State Zip

_____
Telephone Number

The above address to be used for notifying the principal of repairs, etc., including post-notice of any emergency repairs made by County.

_____
Surety

_____

_____
Mailing Address

_____
Attorney in fact
(attach Power of Attorney)

PERFORMANCE, PAYMENT, AND GUARANTY BOND
MUKILTEO WATER AND WASTEWATER DISTRICT

_____, as principal, and _____, as Surety, a corporation duly licensed and authorized to do business in the state of Washington, are held and firmly bound unto the Mukilteo Water and Wastewater District hereinafter called "Owner," in the full sum of $_____ dollars ($_____), for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

NOW THEREFORE, if said Principal shall perform all the requirements of said Contract Documents required to be performed on its part, at the times and in the manner specified therein; and

If Principal shall pay for all materials, equipment, or other supplies, or for rental of same, used in connection with the performance of work contracted to be done, and for all amounts due under applicable State law for any work or labor thereon; and

If Principal shall pay the sales, use and any other applicable taxes of the State of Washington or any political subdivision of said State relating to this Agreement or to the work performed under this Agreement, and amounts due said State pursuant to Titles 50 and 51 of the Revised Code of Washington; and

If Principal shall indemnify and hold Mukilteo Water and Wastewater District harmless from any defects in the workmanship or materials incorporated into the work for a period of one year after the final acceptance of the work;

THEN the obligation of Principal and Surety under this bond shall be void, but otherwise it shall remain in full force and effect.

This bond shall inure to the benefit of any persons, companies, or corporations entitled to file claims under applicable State law.

In the event suit is brought upon this bond, a reasonable attorney's fee shall be awarded to the prevailing party.

Any alterations in the work to be done or the materials to be furnished, or changes in the time of completion, which may be made pursuant to the terms of the Contract Documents, shall not in any way release Principal or Surety thereunder, nor shall any extensions of time granted under the provisions of the Contract Documents release either Principal or Surety, and notice of such alterations or extensions of the Contract is hereby waived by Surety.

It is further agreed that nothing of any kind or nature that will not discharge the Principal shall operate as a discharge or release of the Surety, regardless of law, rule of equity or usage relating to the liability of sureties to the contrary notwithstanding.

SIGNED AND SEALED, this _____ day of _____. 20_____.

(Seal)	(Seal)
_____	_____
(Principal)	(Surety)
By: _____	By: _____
(Print Name)	(Print Name)
_____	_____
(Signature)	(Signature)
_____	_____
(Title)	(Title)
	Address: _____
	_____
	Telephone No.: _____

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	NAIC #
INSURED	INSURER A :	
	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE	$2,000,000
	CLAIMS-MADE X OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$500,000
							MED EXP (Any one person)	$5,000
							PERSONAL & ADV INJURY	$2,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$2,000,000
	POLICY X PRO-JECT LOC						PRODUCTS - COMP/OP AGG	$2,000,000
	OTHER:							$
C	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$2,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	X HIRED AUTOS / X NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
B	X UMBRELLA LIAB X OCCUR						EACH OCCURRENCE	$2,000,000
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$2,000,000
	DED X RETENTION $10,000							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						PER STATUTE / OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED?	N / A					E.L. EACH ACCIDENT	$
	(Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$
A	Washington Stop Gap						$1,000,000 Ea Accident $1,000,000 By Disease $1,000,000 Ea Employee	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

RE: Project Name: XXX

The General Liability and Auto Liability Policies includes an automatic Additional Insured endorsement that provides Additional Insured status to XXX and Mukilteo Water and Wastewater District as required by written contract or agreement that requires such status, and only with regard to work performed on behalf of the named insured.

CERTIFICATE HOLDER

Mukilteo Water and Wastewater District
7824 Mukilteo Speedway
Mukilteo, WA 98275

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

PARALLEL AND ADJOINING EASEMENT

THIS INSTRUMENT made this _____ day of _____, 20__,

by _____ _____, herein called the "Grantor", and the Mukilteo Water and Wastewater District, Mukilteo, Washington herein called the "Grantee".

WITNESSETH:

That said Grantor for valuable consideration does hereby convey and confirm unto the said grantee, right-of-way or easement across, under and upon the exterior ten –feet (10) parallel with and adjoining the street frontages, of all lots in which to install, lay, construct, renew, operate and maintain water and sewer mains, and related appurtenances for the purpose of serving this subdivision and other property with water and sewer service, together with the right to enter upon the lots at all times for the purposes stated upon the following described property in Snohomish County, Washington, more particularly described as follows:

ASSESSOR'S PROPERTY TAX NUMBER:

LEGAL DESCRIPTION:

And also granting to the Grantee and to those acting under said Grantee the use of such additional area immediately adjacent to said easement as shall be required for the construction and maintenance of the water and sewer mains and appurtenances in the above-described easement such additional area to be held to a minimum and returned to its original state by the Grantee or its agents.

That said Grantee shall have the right without prior institution of any suit or proceeding at law, at times as may be necessary, to enter upon said property for the purpose of construction, repairing, altering or reconstruction of said mains shall be accomplished in such a manner that the private improvements existing in this right-of-way shall not be disturbed or destroyed, or in the event they are disturbed or destroyed, they will be replaced in as good a condition as they were immediately before the property was entered upon by the Grantee.

The Grantor shall retain the right to use the surface of said easement, so long as said use does not interfere with the installation and maintenance of the mains and related appurtenances and so long as no permanent buildings or structures are erected on said easement.

This easement shall be a covenant running with the land and shall be binding on the successors, heirs, and assigns of both parties hereon.

By: _____

_____
(Print or type name(s)

Its: _____

INDIVIDUAL

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he signed this instrument and acknowledged it to be his free and voluntary act for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the state of
Washington, residing at _____
My Appointment Expires _____

****

CORPORATE/PARTNERSHIP

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that _____ signed this instrument, on oath stated that _____ was authorized to execute the instrument and acknowledged it as the _____ of _____ to be the free and voluntary act of such corporation for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the State of
Washington, residing at _____
My Appointment Expires _____

WATER AND SEWER SYSTEM ON-SITE EASEMENT

THE UNDERSIGNED, _____, Grantor(s), heirs, successors and assigns (hereinafter together referred to as "Grantor"), for the purpose of providing utility service to Grantor's property, hereby conveys and grants to MUKILTEO WATER AND WASTEWATER DISTRICT, its successors and assigns (hereinafter referred to as the "District"), from the following described property:

ASSESSOR'S PROPERTY TAX NUMBER(S):

LEGAL DESCRIPTION:

a permanent easement over, across, along, in, upon and under the following described portion of the above-described property:

The District shall have the right, without prior institution of any suit or proceeding at law, at times as may be necessary, to enter upon the property or easement and adjoining property owned by Grantor and his assigns and successors for the purpose of installing, constructing, patrolling, operating, maintaining, removing, repairing, replacing and using a water system, together with all connections and appurtenances thereto (the "Facility"), together with the right of ingress to and egress from that property for the foregoing purposes.

The Grantor, by executing this Easement, and the District, by accepting and recording this Easement, do hereby mutually covenant and agree as follows:

1. The District shall, if the property or easement is disturbed by the maintenance, removal, repair or replacement of the Facility, restore the surface of the property or easement as nearly as possible to the condition in which it existed at the commencement of said maintenance, removal, repair or replacement.
2. The District shall protect and save harmless Grantor from and against any and all claims, demands, loss, damage, expense and liability of every kind and description and for any damage to or loss or destruction of property suffered by Grantor, or any persons, firms, or corporations, because of the maintenance of the Facility; provided, however, that this hold harmless shall not apply to Grantor's negligence, or to any damage or injury resulting from a violation of Paragraph 5 herein.

3. The Grantor warrants that the Grantor has good title to the above property and warrants the Grantee title to, and quiet enjoyment of, the easement conveyed hereby.

4. All right, title and interest which may be used and enjoyed without interfering with the easement rights conveyed are reserved to the Grantor. The construction, installation or maintenance, after the date of this easement document, of structures of a permanent nature

    A. within the above-described permanent easement, or
    B. outside the aforementioned easements, but intruding into

    the easements so as to interfere with maintenance and repair of the Facility shall be deemed an encroachment upon the easement rights and as to such structures the provisions of Paragraphs 1 and 2 shall not apply; and, further, Grantor shall be obligated to remove said encroachments at Grantor's expense.

5. Grantor covenants that no digging, tunneling, or other form of construction activity shall be done on the easement or on Grantor's property which would disturb or damage the Facility unearth or undermine District's Facility or endanger the lateral support to the Facility.

6. The Grantor herein grants to the District and to those acting under the District the use of such additional area immediately adjacent to the easement necessary for the installation, operation, maintenance and repair of the Facility; provided that such additional area shall be held to a minimum and returned to its original state by the District.

7. Should either party hereto, or their heirs or assigns, institute suit to enforce any covenant or right granted herein, the prevailing party shall recover its costs of litigation, including a reasonable attorney's fee.

8. The covenants contained herein are intended to and shall run with the land and shall benefit and bind the parties and their respective successors and assigns.

DATED this _____ day of _____, 20__.

By: _____

_____
(Print Name)

Its: _____

INDIVIDUAL

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he signed this instrument and acknowledged it to be his free and voluntary act for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the state of Washington, residing at _____
My appointment expires _____

****

CORPORATE/PARTNERSHIP

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that _____ signed this instrument, on oath stated that _____ was authorized to execute the instrument and acknowledged it as the _____ of _____ to be the free and voluntary act of such corporation for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the state of Washington, residing at _____
My appointment expires _____

ON-SITE EASEMENT (PRIVATE ROAD)

THE UNDERSIGNED, _____, Grantor(s), heirs, successors and assigns (hereinafter together referred to as "Grantor"), for the purpose of providing utility service to Grantor's property, hereby conveys and grants to MUKILTEO WATER AND WASTEWATER DISTRICT, its successors and assigns (hereinafter referred to as the "District"), from the following described property:

ASSESSOR'S PROPERTY TAX NUMBER:

LEGAL DESCRIPTION:

a permanent easement over, across, along, in, upon and under the following described portion of the above-described property full easement length and width provided for the private road together with an additional 10 feet parallel and adjoining each side of the private road.

The District shall have the right, without prior institution of any suit or proceeding at law, at times as may be necessary, to enter upon the property or easement and adjoining property owned by Grantor and his assigns and successors for the purpose of installing, constructing, operating, maintaining, removing, repairing, replacing and using a water and/or sewer system, together with all connections and appurtenances thereto (the "Facility"), together with the right of ingress to and egress from that property for the foregoing purposes.

The Grantor, by executing this Easement, and the District, by accepting and recording this Easement, do hereby mutually covenant and agree as follows:

1. The District shall, if the property or easement are disturbed by the maintenance, removal, repair or replacement of the Facility, restore the surface of the property or easement as nearly as possible to the condition in which it existed at the commencement of said maintenance, removal, repair or replacement.
2. The District shall protect and save harmless Grantor from and against any and all claims, demands, loss, damage, expense and liability of every kind and description and for any damage to or loss or destruction of property suffered by Grantor, or any persons, firms, or corporations, because of the maintenance of the Facility; provided, however, that this hold harmless shall not apply to Grantor's negligence, or to any damage or injury resulting from a violation of Paragraph 5 herein.

3. The Grantor warrants that the Grantor has good title to the above property and warrants the Grantee title to, and quiet enjoyment of, the easement conveyed hereby.

4. All right, title and interest which may be used and enjoyed without interfering with the easement rights conveyed are reserved to the Grantor. The construction, installation or maintenance, after the date of this easement document, of structures of a permanent nature

   A. within the above-described permanent easement, or

   B. outside the aforementioned easements, but intruding into the easements so as to interfere with maintenance and repair of the Facility shall be deemed an encroachment upon the easement rights and as to such structures the provisions of Paragraphs 1 and 2 shall not apply; and, further, Grantor, shall be obligated to remove said encroachments at Grantor's expense.

5. Grantor covenants that no digging, tunneling, or other form of construction activity shall be done on the easement or on Grantor's property which would disturb or damage the Facility unearth or undermine District's Facility or endanger the lateral support to the Facility.

6. The Grantor herein grants to the District and to those acting under the District the use of such additional area immediately adjacent to the easement necessary for the installation, operation, maintenance and repair of the Facility; provided that such additional area shall be held to a minimum and returned to its original state by the District.

7. Should either party hereto, or their heirs or assigns, institute suit to enforce any covenant or right granted herein, the prevailing party shall recover its costs of litigation, including a reasonable attorney's fee.

8. The covenants contained herein are intended to and shall run with the land and shall benefit and bind the parties and their respective successors and assigns.

DATED this _____ day of _____, 20__.

By: _____

_____
(Print Name)

Its: _____

INDIVIDUAL

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he signed this instrument and acknowledged it to be his free and voluntary act for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the state of
Washington, residing at _____
My Appointment Expires _____

****

CORPORATE/PARTNERSHIP

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that _____ signed this instrument, on oath stated that _____ was authorized to execute the instrument and acknowledged it as the _____ of _____ to be the free and voluntary act of such corporation for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the state of
Washington, residing at _____
My Appointment Expires _____

OFF-SITE EASEMENT

THE UNDERSIGNED, _____, Grantor(s), heirs, successors and assigns (hereinafter together referred to as "Grantor"), for the purpose of providing utility service to Grantor's property, hereby conveys and grants to MUKILTEO WATER AND WASTEWATER DISTRICT, its successors and assigns (hereinafter referred to as the "Grantee"), from the following described property:

a permanent easement over, across, along, in, upon and under the following described portion of the above-described property:

The Grantee shall have the right, without prior institution of any suit or proceeding at law, at times as may be necessary, to enter upon said property or easement and adjoining property owned by Grantor and his assigns and successors for the purpose of installing, constructing, operating, maintaining, removing, repairing, replacing and using a _____, together with all connections and appurtenances thereto (the "Facility"), together with the right of ingress to and egress from the property for the foregoing purposes.

Grantor does hereby convey and grant to the Grantee a temporary construction easement for all purposes during the construction of the Facility over, across, along, in, upon and under the following described property, together with the right of ingress to and egress from that property for the foregoing purposes, to commence on the date of this instrument and to terminate on the date actual use thereof shall terminate. The temporary construction easement is legally described as:

The Grantor, by executing this Easement, and the Grantee, by accepting and recording this Easement, do hereby mutually covenant and agree as follows:

1. The Grantee shall, upon completion of construction of the Facility and before the termination of the temporary construction easement, remove all debris and restore the surface of the above-described property or easement as nearly as possible to the condition in which it existed at the date of this easement document.

2. The Grantee shall, if the property or easements are disturbed by the maintenance, removal, repair or replacement of the Facility, restore the surface of the property or easements as nearly as possible to the condition in which it existed at the commencement of maintenance, removal, repair or replacement.

3. The Grantee shall protect and save harmless Grantor from and against any and all claims, demands, loss, damage, expense and liability of every kind and description and for any damage to or loss or destruction of property suffered by Grantor, because of the construction and/or maintenance of the Facility; provided, however, that this hold harmless shall not apply to Grantor's negligence, or to any damage or injury resulting from a violation of Paragraph 6 herein.

4. The Grantor warrants that the Grantor has good title to the property and warrants that Grantee title to, and quiet enjoyment of, the easement conveyed hereby.

5. All right, title and interest which may be used and enjoyed without interfering with the easement rights conveyed are reserved to the Grantor. The construction, installation or maintenance, after the date of this easement document, of structures of a permanent nature

    a) within the permanent easement or within the temporary construction easement until such temporary construction easement shall have been terminated, or

    b) outside the aforementioned easements, but intruding into the easements so as to interfere with maintenance and repair of the Facility

    shall be deemed an encroachment upon the easement rights and as to such structures the provisions of Paragraphs 1, 2 and 3 shall not apply; and, further, Grantor, shall be obligated to remove the encroachments at Grantor's expense.

6. Grantor covenants that no digging, tunneling, or other form of construction activity shall be done on the easement or on Grantor's property which would disturb or damage the Facility unearth or undermine Grantee's Facility or endanger the lateral support to the Facility.

7. The Grantor grants to the Grantee and to those acting under the Grantee the use of such additional area immediately adjacent to the easement as shall be required for the installation, operation, maintenance and repair of the Facility; provided that such additional area shall be held to a minimum and returned to its original state by the Grantee.

8. Access to Grantor's property shall be maintained at all times during Grantee's installation.

9. The Grantee plans to assign the easement to the Mukilteo Water District on completion of the Facility and thereafter the Facility will be operated by the District. The Grantor consents to that assignment.

10. The Grantor may not connect Grantor's properties to the Facility without the consent of the District and then only upon payment of all charges imposed by the District for connection to and service by its facilities.

11. The Grantee agrees not to assign the easement to the District until Grantor's property is restored on the surface as nearly as possible to the condition in which it existed at the date of this easement document; at which time the Grantor shall sign a release to the Grantee.

12. Should either party hereto, or their heirs or assigns, institute suit to enforce any covenant or right granted herein, the prevailing party shall recover its costs of litigation, including a reasonable attorney's fee.

13. The covenants contained herein are intended to and shall run with the land and shall benefit and bind the parties hereto and their respective successors and assigns.

DATED this _____ day of _____, 20_____.

_____

_____

INDIVIDUAL

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he signed this instrument and acknowledged it to be his free and voluntary act for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the state of Washington,
residing at _____
My Appointment Expires _____

****

CORPORATE/PARTNERSHIP

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that is the person who appeared before me, and said person acknowledged that _____ signed this instrument, on oath stated that _____ was authorized to execute the instrument and acknowledged it as the _____ of _____ to be the free and voluntary act of such corporation for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the state of Washington,
residing at _____.
My appointment Expires _____

UTILITY LICENSE AGREEMENT
Developer On-Site

THE UNDERSIGNED, SNOHOMISH COUNTY, a political subdivision of the State of Washington, Grantor(s), heirs, successors and assigns (hereinafter together referred to as "Grantor"), for the purpose of providing utility service to Grantor's property, hereby conveys and grants to MUKILTEO WATER AND WASTEWATER DISTRICT, its successors and assigns (hereinafter referred to as the "District"), from the following described property:

ASSESSOR'S PROPERTY TAX NUMBER: _____

LEGAL DESCRIPTION:

See Attached

a license over, across, along, in, upon and under the following described portion of the above-described property:

Attached Exhibit A

The District shall have the right, without prior institution of any suit or proceeding at law, at times as may be necessary, to enter upon the property or license and adjoining property owned by Grantor and his assigns and successors for the purpose of installing, constructing, patrolling, operating, maintaining, removing, repairing, replacing and using a water and/or sewer system, together with all connections and appurtenances thereto (the "Facility"), together with the right of ingress to and egress from that property for the foregoing purposes.

The Grantor, by executing this license, and the District, by accepting and recording this License, do hereby mutually covenant and agree as follows:

1. The District shall, if the property or license is disturbed by the maintenance, removal, repair or replacement of the Facility, restore the surface of the property or license as nearly as possible to the condition in which it existed at the commencement of said maintenance, removal, repair or replacement.
2. The District shall protect and save harmless Grantor from and against any and all claims, demands, loss, damage, expense and liability of every kind and description and for any damage to or loss or destruction of property suffered by Grantor, or any persons, firms, or corporations, because of the maintenance of the Facility; provided, however, that this hold harmless shall not apply to Grantor's negligence, or to any damage or injury resulting from a violation of Paragraph 5 herein.The Grantor warrants that the Grantor has good title to the above property and warrants the District title to, and quiet enjoyment of, the license conveyed hereby.
3. All right, title and interest which may be used and enjoyed without interfering with the license rights conveyed are reserved to the Grantor. The construction, installation or maintenance, after the date of this license agreement document, of structures of a permanent nature

A. within the above-described license, or

B. outside the aforementioned license, but intruding into the license so as to interfere with maintenance and repair of the Facility shall be deemed an encroachment upon the license rights and as to such structures the provisions of Paragraphs 1 and 2 shall not apply; and, further, Grantor, shall be obligated to remove said encroachments at Grantor's expense.

4. Grantor covenants that no digging, tunneling, or other form of construction activity shall be done on the license or on Grantor's property which would disturb or damage the Facility unearth or undermine District's Facility or endanger the lateral support to the Facility.

5. The Grantor herein grants to the District and to those acting under the District the use of such additional area immediately adjacent to the license necessary for the installation, operation, maintenance and repairs of the Facility; provided that such additional area shall be held to a minimum and returned to its original state by the District.

6. Should either party hereto, or their heirs or assigns, institute suit to enforce any covenant or right granted herein, the prevailing party shall recover its costs of litigation, including a reasonable attorney's fee.

7. The rights, title, privileges and authority hereby granted shall continue to be in force until such time as the District, Its successors or assigns, shall permanently remove said water main from the property, or shall otherwise permanently abandon said line at which time all such rights, title, privileges and authority hereby granted shall terminate. Except that in the event Grantor, in its sole discretion, determines that said property is necessary for Airport purposes, the Grantor may revoke or reduce this license upon 18 months written notice to District. In the event this license is revoked or reduced Grantor shall pay all costs or relocation of the affected facilities.

DATED this _____ day of _____, 20__

By: _____

_____
(Print Name)

Its: _____

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that _____ signed this instrument, on oath stated that _____ was authorized to execute the instrument and acknowledged it as the _____ of Snohomish County to be the free and voluntary act of such corporation for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the state of Washington, residing at _____
My Appointment Expires _____

BILL OF SALE -- WATER

THE UNDERSIGNED hereby conveys and transfers to the MUKILTEO WATER AND WASTEWATER DISTRICT (the "District") the following described personal property:

Water main and appurtenances as installed under Mukilteo Water and Wastewater District's Developer Extension #___ and as listed on the Itemized Cost of Water System Form for _____, DE #___.

This conveyance is made in consideration of the District's agreement to provide routine maintenance of said property and to provide water services pursuant to the District's resolutions and regulations, which may be amended from time to time.

The undersigned, and its successors and assigns, covenants and agrees with the District, it successors and assigns, that the undersigned is the owner of said property and has the right and authority to sell the same, that the property is free of all liens or encumbrances, and that the undersigned will, and does, hereby warrant and agree to defend the title of the District, its successors and assigns, against the claims of all third parties claiming to own the same or claiming any interest therein or encumbrance thereon.

The undersigned warrants that all bills and taxes relating to the construction and installation of the water main and appurtenances have been paid in full and that there are no lawsuits pending involving this project. The undersigned further warrants that in the event any lawsuit is filed as a result of, or involving, this project the undersigned will undertake to defend the lawsuit and will accept responsibility for all costs of litigation, including costs on appeal, and will hold the District harmless on any judgment rendered against the District

The undersigned further warrants that all laws, ordinances and regulations respecting construction of this project have been complied with, and that the property is in proper working condition, order and repair and fit for purposes intended; i.e., for use as a water distribution system including distribution and supply lines adequate for the service intended and has been constructed in accordance with the conditions and standards of the District.

The undersigned covenants and agrees with the District to replace, repair and correct any defect in work or materials in respect to the personal property subject to this Bill of Sale arising during a period of two (2) years from date hereof, without cost to the District. The undersigned shall further warrant the corrected work for two (2) years after acceptance of the corrected work by the District.

DEVELOPER:

By _____

Its _____

INDIVIDUAL

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he signed this instrument and acknowledged it to be his free and voluntary act for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the State of
Washington, residing at _____.
My Appointment Expires _____.

CORPORATE/PARTNERSHIP

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that _____ signed this instrument, on oath stated that _____ was authorized to execute the instrument and acknowledged it as the _____ of _____ to be the free and voluntary act of such corporation for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the State of
Washington, residing at _____.
My Appointment Expires _____.

BILL OF SALE -- SEWER

THE UNDERSIGNED hereby conveys and transfers to the MUKILTEO WATER AND WASTEWATER DISTRICT (the "District") the following described personal property:

Sewer main and appurtenances as installed under Mukilteo Water and Wastewater District's Developer Extension #___ and as listed on the Itemized Cost of Sewer System Form for _____, DE #___.

This conveyance is made in consideration of the District's agreement to provide routine maintenance of said property and to provide sewer services pursuant to the District's resolutions and regulations, which may be amended from time to time.

The undersigned, and its successors and assigns, covenants and agrees with the District, it successors and assigns, that the undersigned is the owner of said property and has the right and authority to sell the same, that the property is free of all liens or encumbrances, and that the undersigned will, and does, hereby warrant and agree to defend the title of the District, its successors and assigns, against the claims of all third parties claiming to own the same or claiming any interest therein or encumbrance thereon.

The undersigned warrants that all bills and taxes relating to the construction and installation of the sewer main and appurtenances have been paid in full and that there are no lawsuits pending involving this project. The undersigned further warrants that in the event any lawsuit is filed as a result of, or involving, this project the undersigned will undertake to defend the lawsuit and will accept responsibility for all costs of litigation, including costs on appeal, and will hold the District harmless on any judgment rendered against the District

The undersigned further warrants that all laws, ordinances and regulations respecting construction of this project have been complied with, and that the property is in proper working condition, order and repair and fit for purposes intended; i.e., for use as a sewer distribution system including distribution and supply lines adequate for the service intended and has been constructed in accordance with the conditions and standards of the District.

The undersigned covenants and agrees with the District to replace, repair and correct any defect in work or materials in respect to the personal property subject to this Bill of Sale arising during a period of two (2) years from date hereof, without cost to the District. The undersigned shall further warrant the corrected work for two (2) years after acceptance of the corrected work by the District.

DEVELOPER:

By _____

Its _____

INDIVIDUAL

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that he signed this instrument and acknowledged it to be his free and voluntary act for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the State of Washington, residing at _____.
My Appointment Expires _____.

CORPORATE/PARTNERSHIP

STATE OF WASHINGTON)
) ss.
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that _____ signed this instrument, on oath stated that _____ was authorized to execute the instrument and acknowledged it as the _____ of _____ to be the free and voluntary act of such corporation for the uses and purposes mentioned in the instrument.

Dated _____

_____
Notary Public in and for the State of Washington, residing at _____.
My Appointment Expires _____.

MUKILTEO WATER AND WASTEWATER DISTRICT

ITEMIZED COST OF

PUBLIC WATER SYSTEM INSTALLATION

FOR:

DE #

DATE ACCEPTED: **RESOLUTION #**

DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
6" DUCTILE IRON PIPE			
8" DUCTILE IRON PIPE			
12" DUCTILE IRON PIPE			
DUCTILE IRON PIPE			
FIRE HYDRANT ASSEMBLIES			
1" WATER SERVICE(S)			
2" WATER SERVICE(S)			
WATER SERVICE(S)			
PRV STATION			
SAMPLE STATION			

TOTAL _____

NOTE:

1. **QUANTITY HAS BEEN COMPLETED BY DISTRICT FIELD INSPECTOR, FROM RECORD DRAWINGS. OWNER/DEVELOPER SHALL INSTALL THE UNIT COST AND SIGN THE DOCUMENT IF IN AGREEMENT WITH THE QUANTITY LISTED.**

2. **INCLUDE IN EACH PIPE PRICE (TOTAL COST & UNIT COST) THE COST OF GATE VALVES, FITTINGS, BLOW OFF ASSEMBLIES, AIR RELIEF ASSEMBLIES, PAVEMENT REPAIRS, AND ANY OTHER ITEMS NOT OTHERWISE LISTED ABOVE.**

3. **INCLUDE IN EACH FIRE HYDRANT PRICE THE MAIN LINE TEE, HYDRANT VALVE, VALVE BOXES, SHACKLE RODS, THRUST BLOCKS, HYDRANT POSTS AND OTHER RELATED ITEMS FOR A COMPLETE HYDRANT ASSEMBLY INSTALLATION.**

4. **BLANK SPACES RESERVED FOR MAJOR COST ITEMS SUCH AS PRESSURE REDUCING VAULTS, PRESSURE RELIEF VAULTS, PUMP STATION, ETC.**

I _____**, OWNER/DEVELOPER OF THE ABOVE DESCRIBED PROPERTY HAVE**
(PRINT)
SUBMITTED THE UNIT COSTS FOR THAT PROPERTY AGREE TO THE MUKILTEO WATER AND WASTEWATER DISTRICT'S LISTED QUANTITIES.

DATE _____ **SIGNED** _____

MUKILTEO WATER AND WASTEWATER DISTRICT

ITEMIZED COST OF

PUBLIC SEWER SYSTEM INSTALLATION

FOR:

DE #

DATE ACCEPTED: **RESOLUTION #**

DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
8" SEWER MAIN			
10" SEWER MAIN			
12" SEWER MAIN			
SIDE SEWER(S)			
MANHOLE(S)			

TOTAL _____

NOTE:

1. **QUANTITY HAS BEEN COMPLETED BY DISTRICT FIELD INSPECTOR, FROM RECORD DRAWINGS. OWNER/DEVELOPER SHALL INSTALL THE UNIT COST AND SIGN THE DOCUMENT IF IN AGREEMENT WITH THE QUANTITY LISTED.**

2. **INCLUDE IN EACH PIPE PRICE (TOTAL COST & UNIT COST) THE COST OF FITTINGS, SELECT BACKFILL COMPACTION, PAVEMENT REPAIRS, AND ANY OTHER ITEMS NOT OTHERWISE LISTED ABOVE.**

3. **BLANK SPACES RESERVED FOR MAJOR COST ITEMS SUCH AS FORCE MAINS, VAULTS, PUMP STATIONS, ETC.**

I _____**, OWNER/DEVELOPER OF THE ABOVE DESCRIBED PROPERTY HAVE**
(PRINT)
SUBMITTED THE UNIT COSTS FOR THAT PROPERTY AGREE TO THE MUKILTEO WATER AND WASTEWATER DISTRICT'S LISTED QUANTITIES.

DATE _____ **SIGNED** _____

Industrial Pretreatment Program Preliminary Survey
Mukilteo Water and Wastewater District

(Please fill in all blanks to the best of your ability.)

SECTION I: GENERAL INFORMATION

A. *INDUSTRIAL USER, GENERAL*

1. Company name _____
2. Division name (if applicable) _____
3. Mailing address:
   a. Street or P.O. Box _____
   b. City, state and zip _____
4. Facility address:
   a. Street _____
   b. City, state and zip _____
5. Business type (check all that apply)
   Manufacturing _____
   Distributing _____
   Retail _____
   Service _____
   Other _____
6. Number of employees at this facility:_____
7. Please provide all 4-digit Standard Industrial Classification (SIC) Codes applicable to this facility.
   _____
8. Has this facility been issued a local, state or federal wastewater discharge permit? Yes _____ No ____
   If yes, permit number _____ Agency _____
9. Does this facility have floor drains that discharge to the sewer system? Yes _____ No ____
10. Does this facility have on-site electrical generation facilities and/or electrical transformers? Yes _____ No ____
11. Brief description of business activities on premises:
    _____
    _____
    _____
    _____

SECTION II: WATER/WASTEWATER DATA

A. WATER USE

1. Please indicate the source and approximate usage rate of water.

Source name	Quantity, GPD

2. Please give a brief description of how water is used at this facility.

_____
_____
_____
_____

B. WASTEWATER DATA

1. Number of sewer connections _____

2. Check type of discharge: Batch _____Continuous _____

3. Approximate discharge in gallons per day for:

   a. Sanitary wastes _____
   b. Industrial process wastewater _____
   c. Cooling water _____
   d. Other _____

   Describe "other"_____
   _____
   _____

   Please note if any of the above wastewaters are not discharged to the Mukilteo Water and Wastewater District sewerage system.

4. Provide the following information to the best of your ability:

	YES	NO	UNKNOWN
a. Does wastewater pH ever fall below 5.5 or exceed 10?			
b. Does wastewater temperature ever exceed 140°F (60°C)?			
c. Do wastewater biological oxygen demand (BOD) or suspended solids ever exceed 300 mg/l			
d. Do wastewater oils and grease ever exceed 100 mg/l?			

5. Wastewater treatment:

   Does this facility practice any sort of wastewater treatment prior to discharge? Yes _____ No ____

   If yes, describe:_____
   _____
   _____

6. Waste disposal:

   Are any liquid wastes from this facility:

   a. Disposed of other than to the sanitary sewer system:

      Yes _____ No ____

      If yes, describe:_____
      _____
      _____

   b. Recycled or recovered: Yes _____ No ____

      If yes, describe:_____
      _____
      _____

7. Please provide a general list of chemicals and raw materials used at this facility._____
   _____
   _____
   _____
   _____

The information contained in this questionnaire is familiar to me, and to the best of my knowledge and belief, is true, complete and accurate.

_____ _____
Contact official Telephone

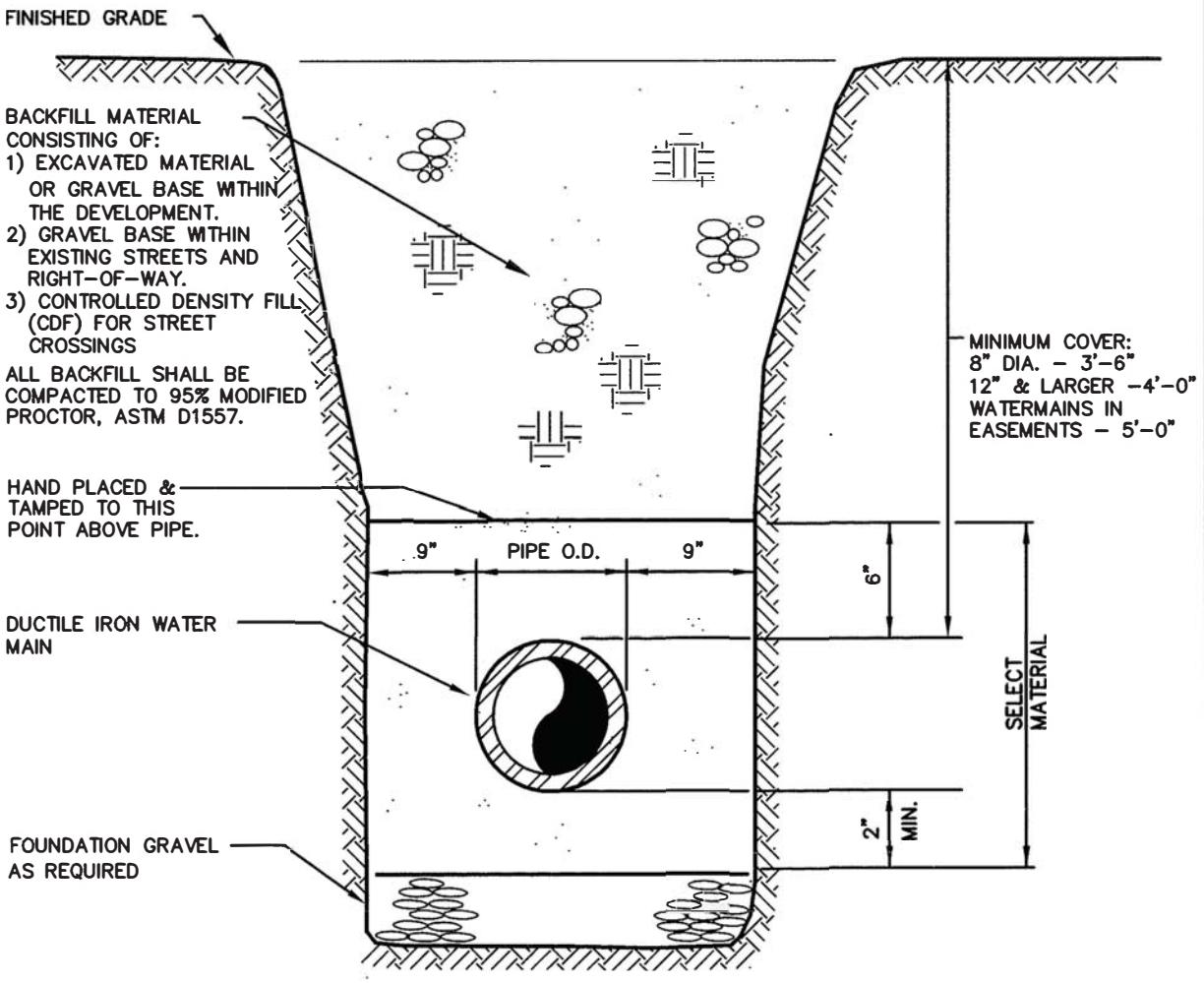
_____ _____
Name of signing official Title

_____ _____
Signature Date

DETAILS

WATER MAINS

Revised 1/3/2018



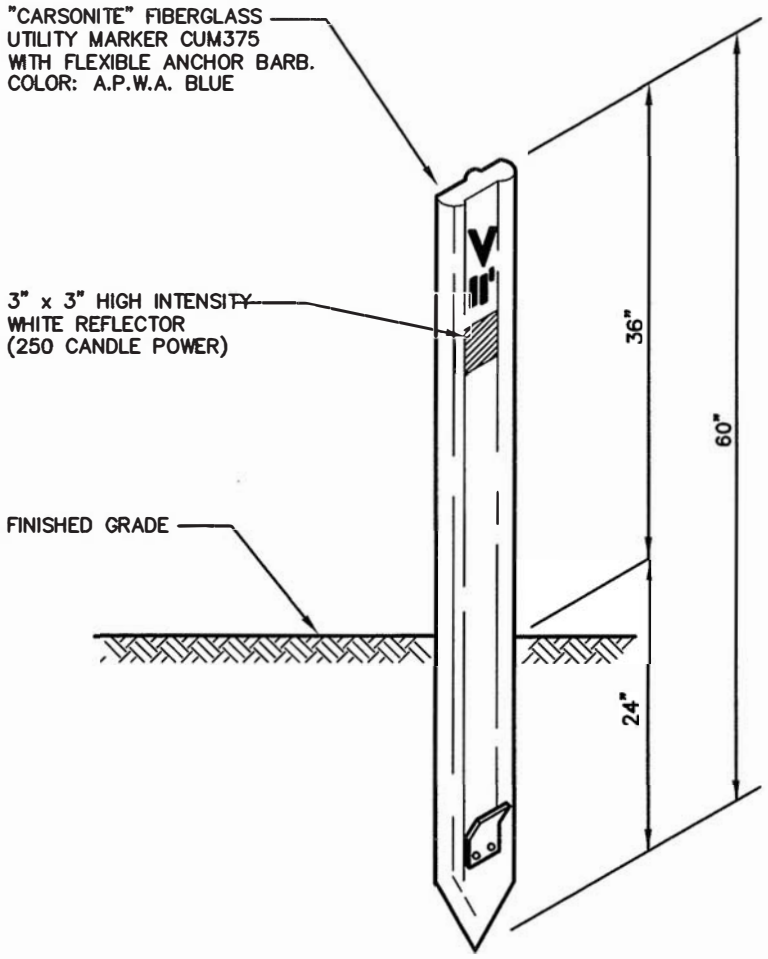
NOTES:

1. THE DEVELOPER SHALL PROVIDE THE DISTRICT WITH LABORATORY TEST RESULTS INDICATING COMPACTION OF THE TRENCH MEET THE REQUIREMENT OF 95% MODIFIED PROCTOR, ASTM D1557.
2. IN EASEMENTS, DURING BACKFILL OPERATIONS, FURNISH AND INSTALL 3" WIDE METALLIC MARKER TAPE WITH 3 FT. OF COVER OVER WATER MAIN.

WATER MAIN TYPICAL TRENCH SECTION

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D1



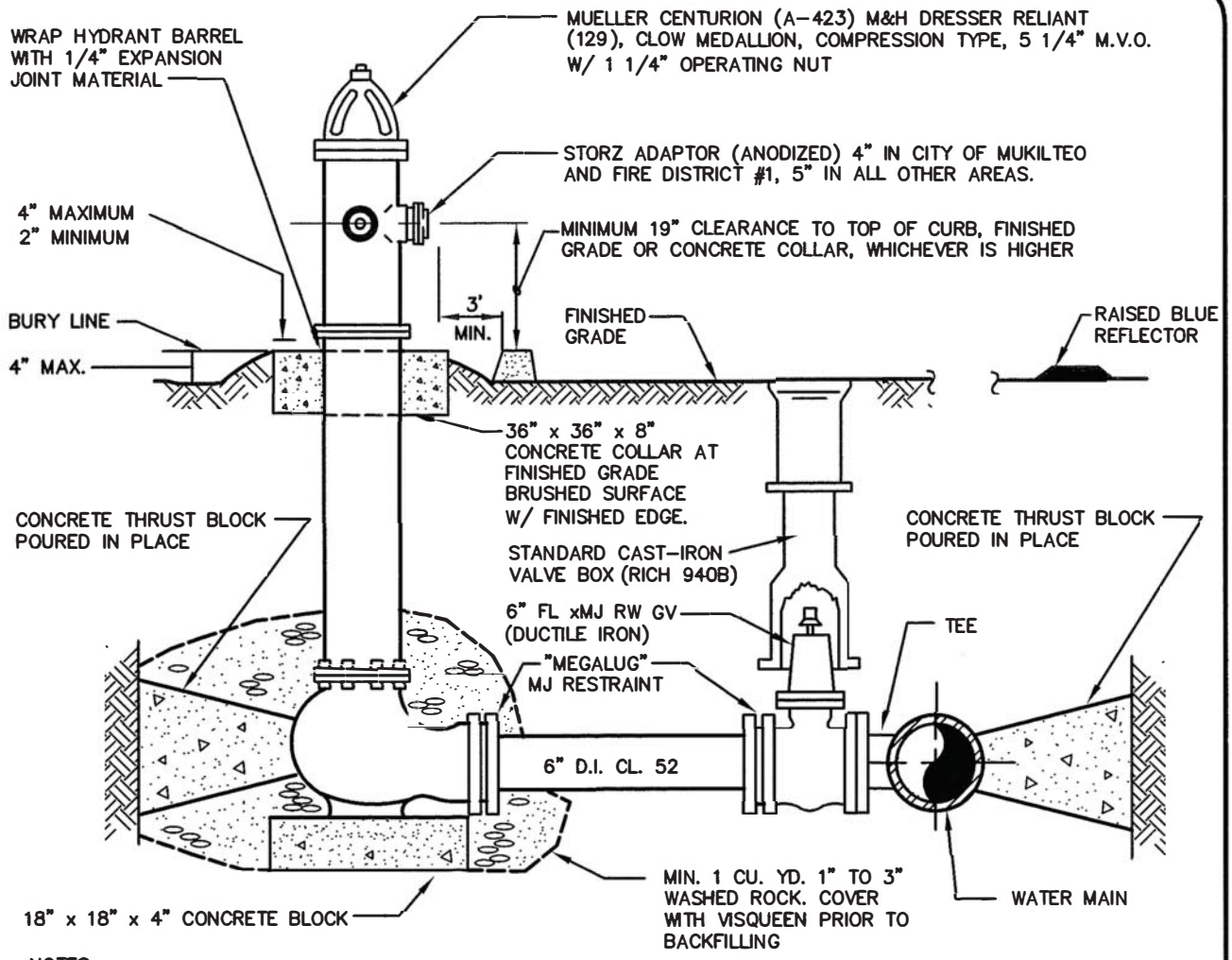
NOTES:

1. THE LETTER "V" AND THE DISTANCE IN FEET TO THE VALVE SHALL BE ON THE POST WITH 2" HIGH DECALS DESIGNED FOR USE ON FIBERGLASS BOATS.
2. EACH POST SHALL INCLUDE THE FOLLOWING DECAL: "CAUTION WATER VALVE, BEFORE DIGGING, CALL 811 UTILITY UNDERGROUND LOCATION CENTER."

VALVE MARKER

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D2



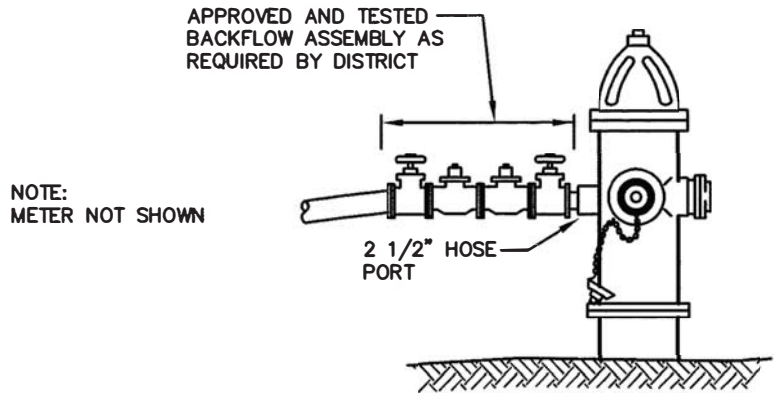
NOTES:

1. AFTER INSTALLATION, HYDRANT SHALL BE WIRE BRUSHED, PRIMED WITH RUST-OLEUM HIGH PERFORMANCE METAL PRIMER & FIELD PAINTED WITH TWO COATS OF RUST-OLEUM PROFESSIONAL OIL-BASED SAFETY YELLOW
2. WHEN HYDRANT SPOOL EXCEEDS 18', USE FULL CIRCLE MJ REPAIR SLEEVE WITH 'MEGALUGS' OR FIELD LOK GASKETS. MAXIMUM LENGTH IS 50'.
3. HYDRANTS SHALL BE BREAK-AWAY TYPE IN WHICH VALVE WILL REMAIN CLOSED IF BARREL IS BROKEN.
4. PROVIDE MINIMUM 3'-0" CLEARANCE AND LEVEL AREA AROUND HYDRANT.
5. GUARD POSTS MAY BE REQUIRED BY THE DISTRICT. SEE GUARD POST DETAIL FOR ADDITIONAL REQUIREMENTS.
6. DISTANCE IN FEET TO THE VALVE BOX SHALL BE PLACED AT THE BARREL, BELOW THE PUMPER PORT, WITH 2" HIGH DECALS DESIGNED FOR USE ON FIBERGLASS BOATS.
7. RAISED BLUE REFLECTOR IN ACCORDANCE WITH THE FIRE DISTRICTS REQUIREMENTS.
8. 3' MINIMUM CLEARANCE FROM BACK OF CURB OR BACK OF SIDEWALK TO ANY PART OF HYDRANT.

FIRE HYDRANT ASSEMBLY

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D3



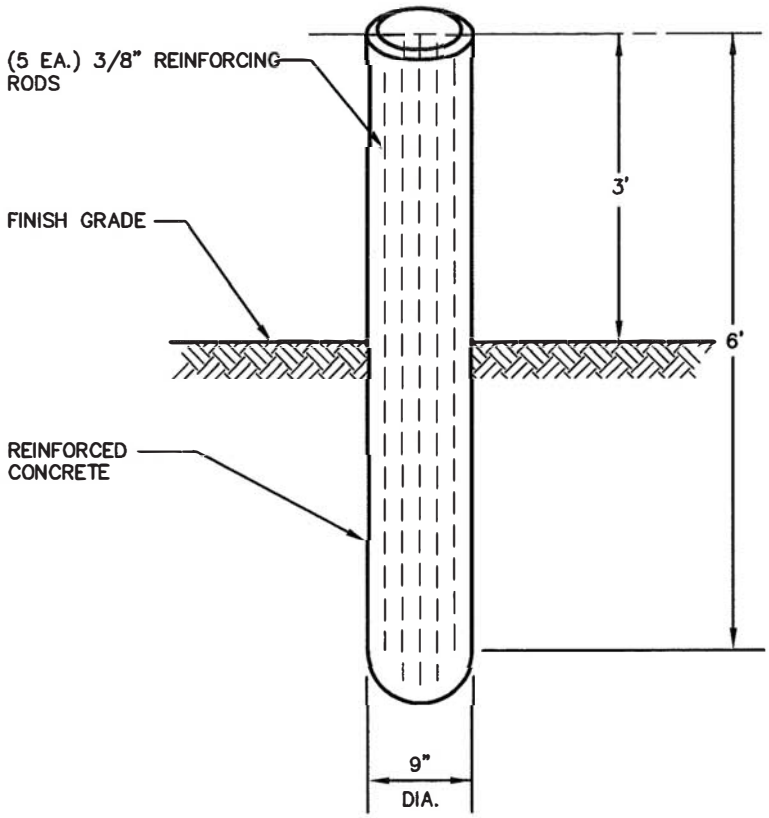
HYDRANT USE PROCEDURES

1. ACQUIRE HYDRANT METER FROM MWWD.
2. THERE SHALL BE AN ACCEPTABLE WASHINGTON STATE APPROVED BACKFLOW ASSEMBLY FURNISHED AND INSTALLED BY CONTRACTOR. A HYDRANT METER SHALL BE OBTAINED FROM DISTRICT. (NOT SHOWN ABOVE)
3. OPENING & CLOSING OF HYDRANT VALVE SHALL BE WITH AN ACCEPTABLE HYDRANT WRENCH.
4. THERE SHALL BE AN AUXILIARY VALVE ATTACHED TO THE 2 1/2" HOSE PORT OF THE HYDRANT.
5. THE HYDRANT VALVE SHALL BE FULLY OPENED AND THE WATER USE CONTROLLED EXCLUSIVELY BY THE AUXILIARY VALVE.
6. THE AUXILARY VALVE SHALL BE OPERATED IN A SLOW MANNER TO PREVENT UNDUE EXCESSIVE PRESSURE ON THE WATER SYSTEM.
7. ANY VIOLATION OF ANY OF THE ABOVE SHALL BE SUBJECT TO A FINE.

HYDRANT USE

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D4



NOTES

1. GUARD POSTS SHALL CONSIST OF REINFORCED 9" DIA. PRECAST UNIT.

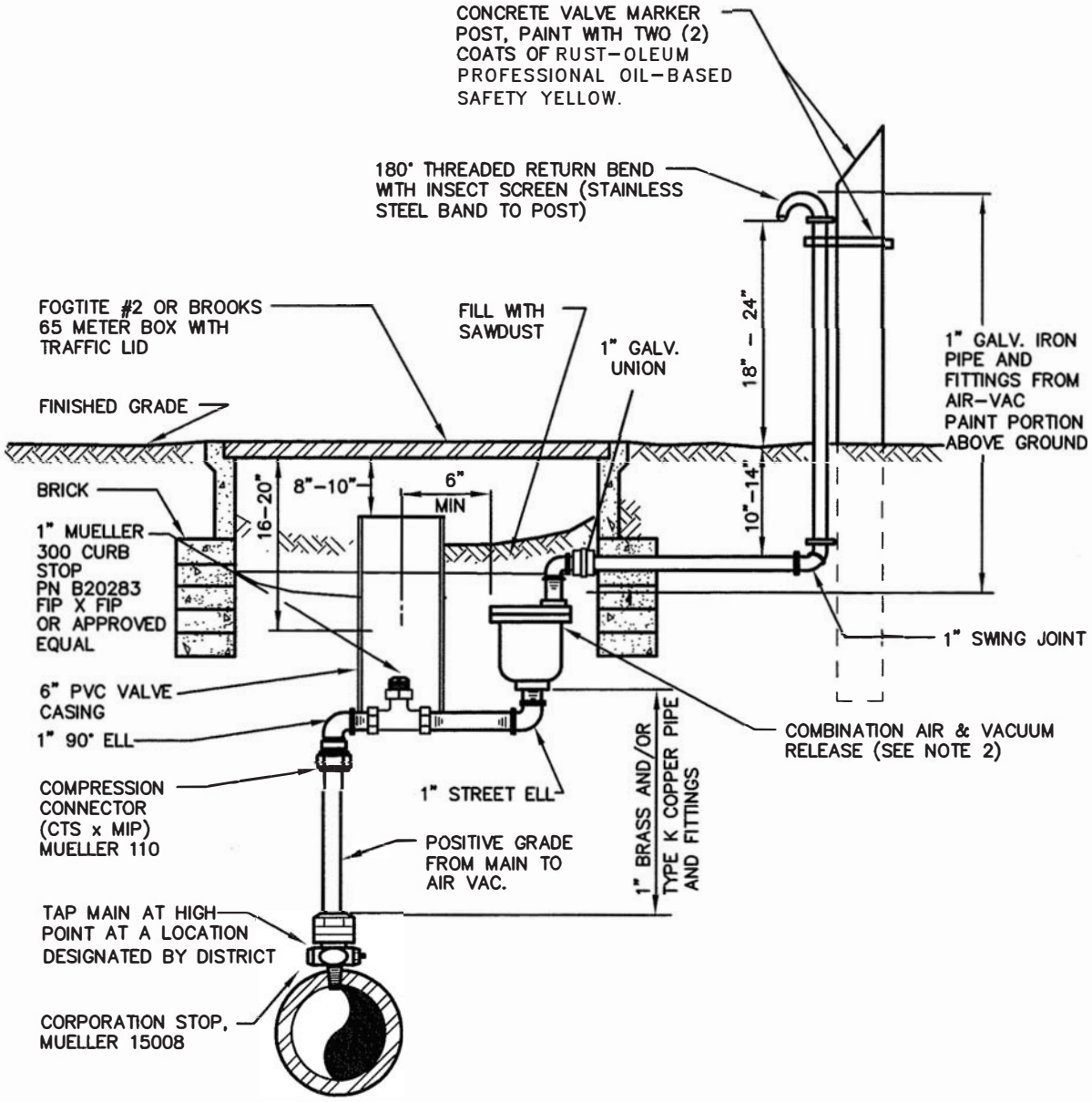
2. THE NUMBER AND CONFIGURATION OF THE GUARD POSTS MAY BE 2, 3, OR 4, AND SHALL BE DETERMINED BY THE DISTRICT BASED ON FIELD CONDITIONS.

3. GUARD POSTS SHALL BE PAINTED WITH TWO (2) COATS OF RUST-OLEUM PROFESSIOANL OIL-BASED SAFETY YELLOW PAINT.

GUARD POST

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D5



NOTES:

1. AIR-RELIEF ASSEMBLY LOCATION SHALL BE AT ALL HIGH POINTS OF THE SYSTEM.

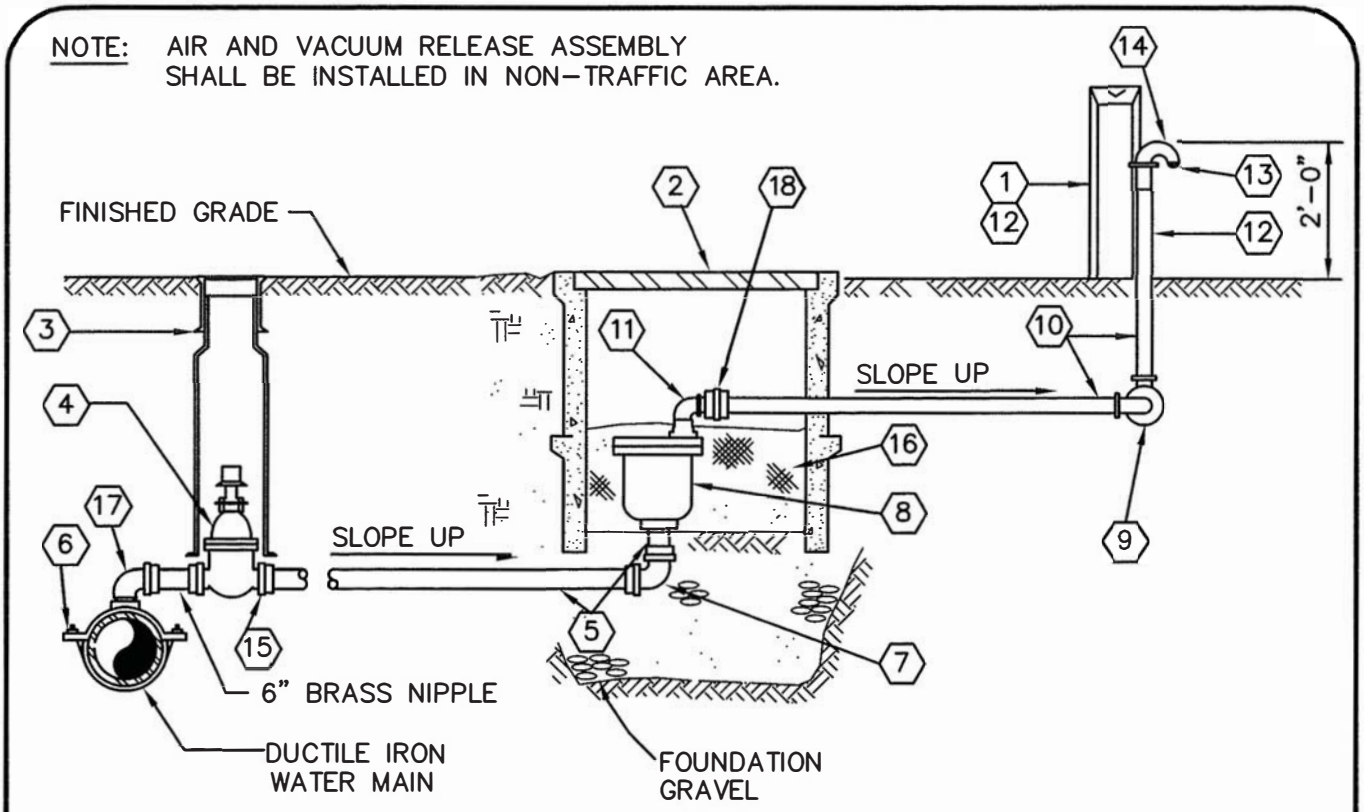
2. APPROVED COMBINATION AIR & VACCUM RELEASE ASSY'S:
   a. CRISPEN UL-10
   b. VALMATIC 201-C
   c. APCO-143C

1" AIR RELEASE ASSEMBLY

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D6

NOTE: AIR AND VACUUM RELEASE ASSEMBLY SHALL BE INSTALLED IN NON-TRAFFIC AREA.



1. CONCRETE VALVE MARKER POST
2. CONC. METER BOX, FOGTITE # 2 OR BROOKS 65
3. CAST IRON VALVE BOX
4. 2" AWWA RESILIENT SEAT GATE VALVE THD X THD, WITH OPERATING NUT
5. 2" TYPE "K" COPPER TUBING
6. DOUBLE STRAP STAINLESS STEEL SERVICE CLAMP OR LINE SIZE MJX2" FIP TEE
7. 90° BEND MUELLER No. H-15526 COMPRESSION X COMPRESSION
8. 2" COMBINATION AIR & VACUUM RELEASE ASSEMBLY; A. APCO MODEL 144. B. CRISPIN MODEL CRAL 2. C. VALMATIC
9. 2, 2"X90° ELL, GALV.
10. 2" GALV. IRON PIPE (FIELD LOCATE NEXT TO EXISTING PROPERTY LINE).
11. 2"X90° ELL (GALV.)
12. PAINT PORTION ABOVE GROUND WITH TWO COATS OF RUST-OLEUM SAFETY YELLOW.
13. 2" BEEHIVE STRAINER
14. 2" OPEN PATTERN RETURN BEND
15. STRAIGHT COUPLING, MUELLER No. H-15428 COMPRESSION TO M.I.P.
16. SAWDUST OR VERMICULITE
17. BRASS STREET ELL
18. 2" GALV. UNION

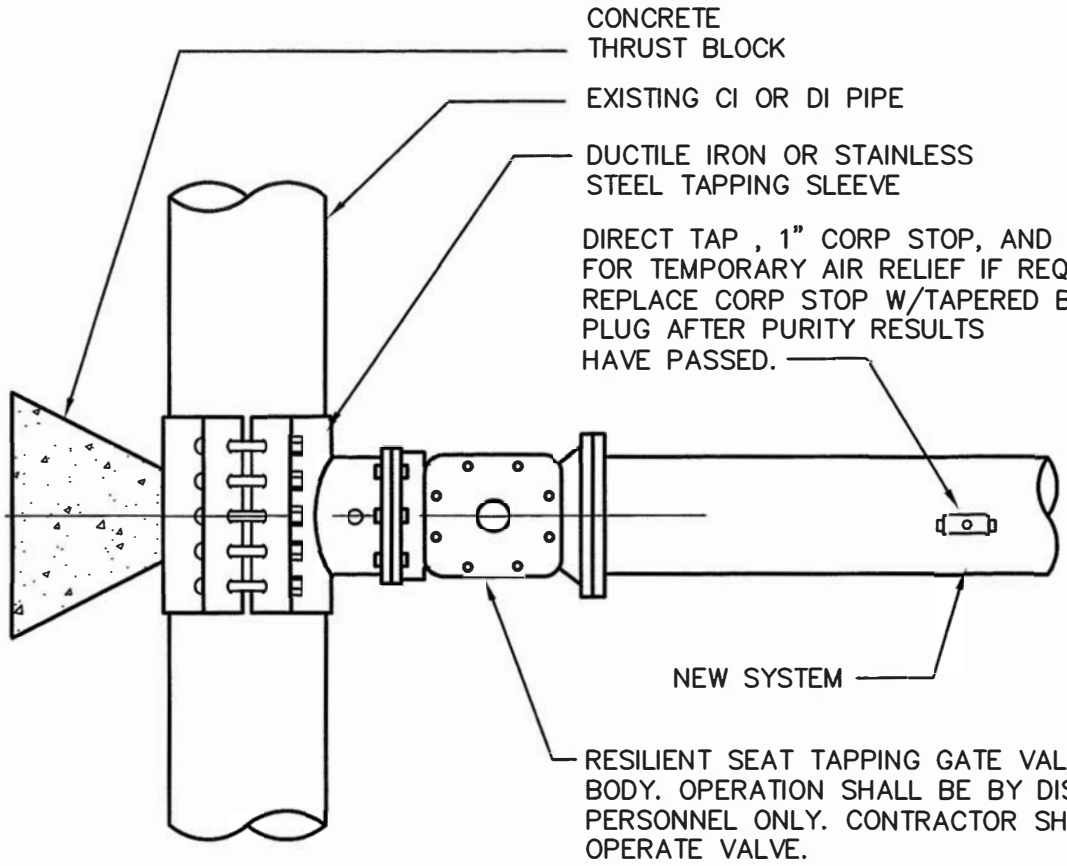
NOTES:

1. ALL PIPING BETWEEN DOUBLE STRAP SADDLE AND INLET SIDE OF COMBINATION AIR AND VACUUM ASSEMBLY SHALL BE COPPER OR BRASS
2. TAP WATER MAIN AT HIGH POINT, LOCATION TO BE DETERMINED BY THE DISTRICT

2" AIR RELEASE ASSEMBLY

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D7



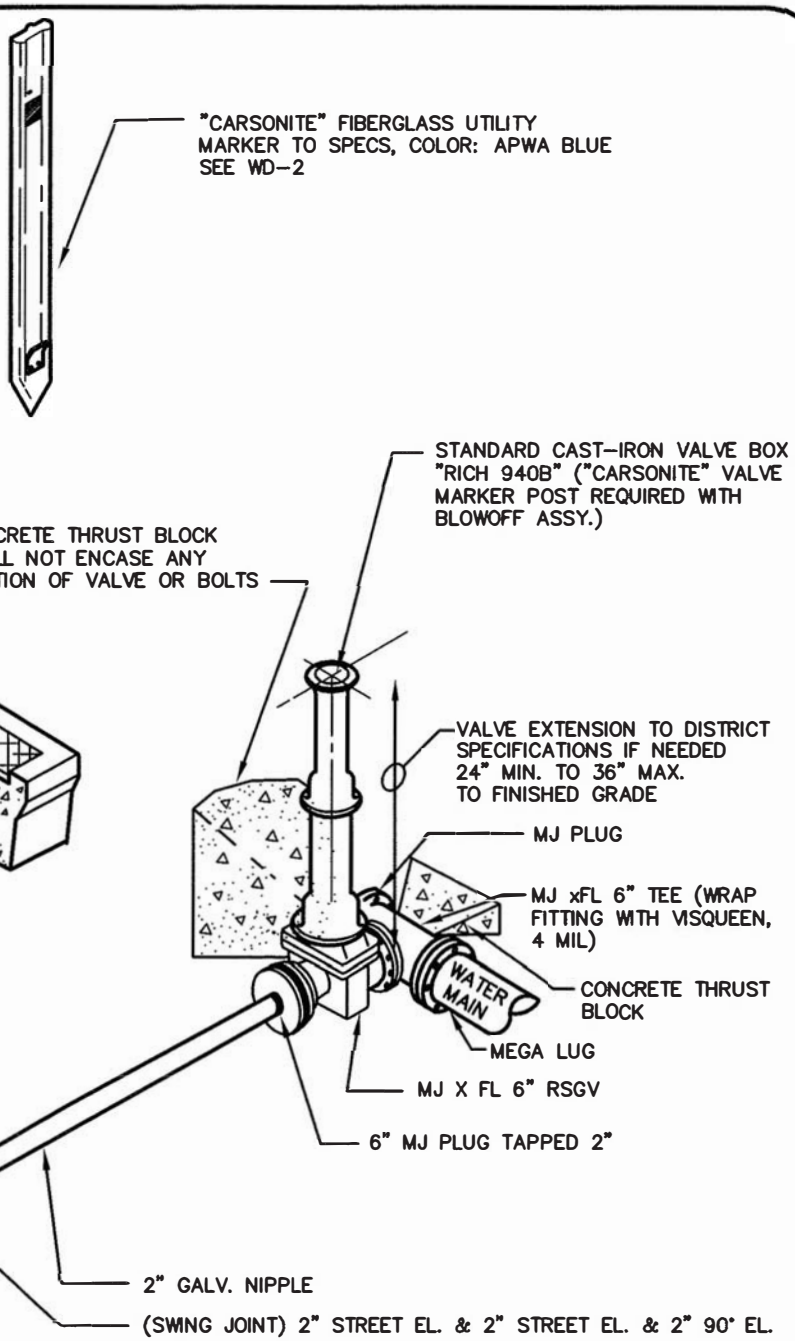
NOTES:

1. SIZE-ON-SIZE TAPPING TEES SHALL BE STAINLESS STEEL FULL CIRCLE MECHANICAL SLEEVE.
2. DUCTILE IRON TAPPING TEES SHALL BE ALLOWED IF TAP IS AT LEAST 2" SMALLER IN DIAMETER THAN THE EXISTING WATER MAIN.
3. TAPPING TEES SHALL BE PRESSURE TESTED TO 200 PSI
4. CONNECTIONS NOT ALLOWED ON FRIDAYS, HOLIDAYS, OR WEEKENDS

WET TAP CONNECTION

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D8



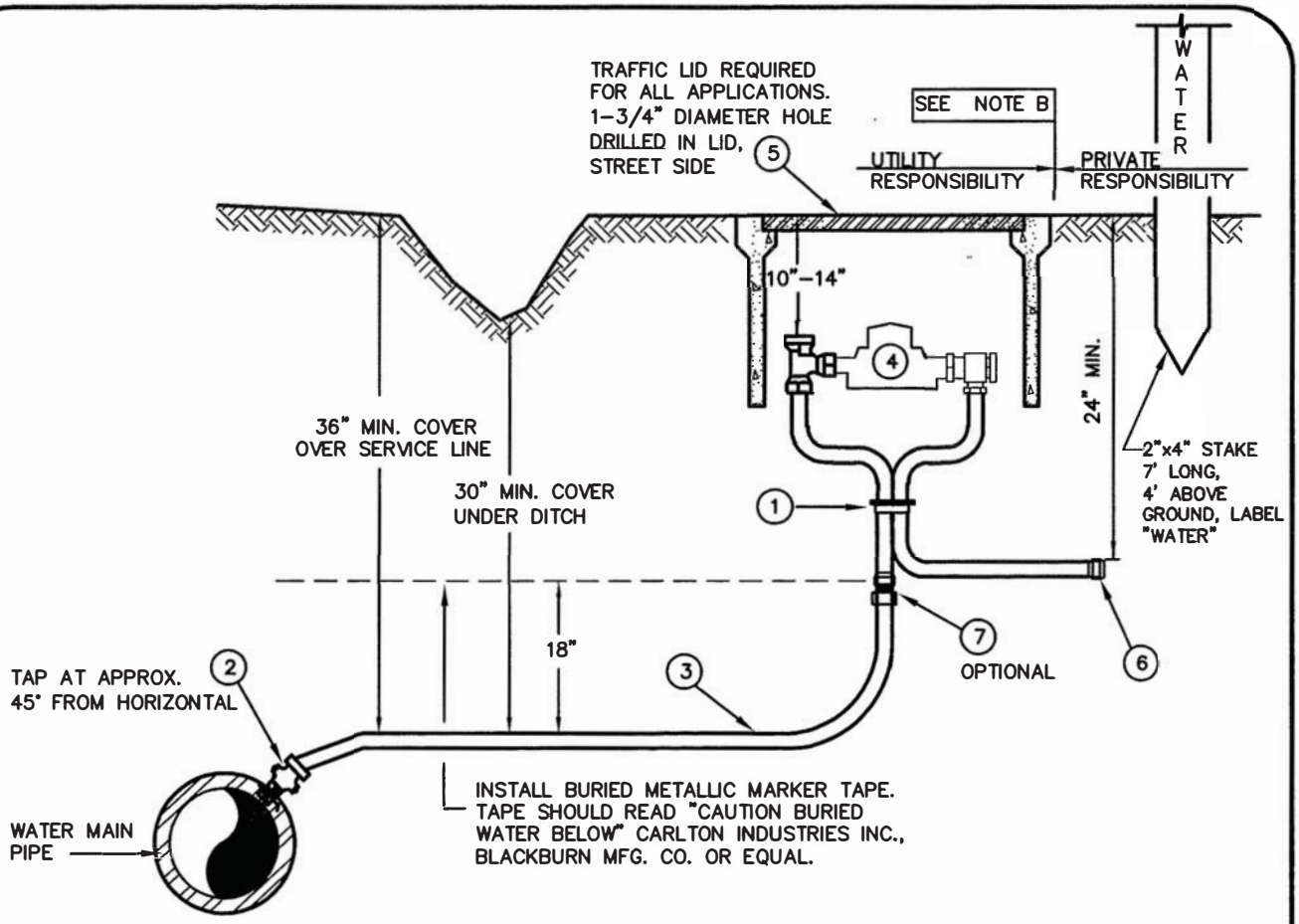
NOTE:

WHERE LAST STICK OF PIPE IS LESS THAN 18' INSTALL FIELD LOC GASKET AT LAST JOINT.

2" BLOWOFF ASSEMBLY

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D9



NO.	ITEM	MATERIAL	SIZE	APPROVED MODELS	
1	METER SETTER	COPPER	1"	FORD: VBH 94-15 W-11-44AVH WITH VERTICAL INLET MUELLER: B-24104-2	
2	CORPORATION STOP	FOR COPPER SERVICE	1"	FORD: FB-1000-4-Q	MUELLER: B-25008
3	DIAMETER OF PIPE SHALL MATCH METER SIZE	COPPER	1"	FEDERAL SPEC. WW-T-799. TYPE K ASTM SPEC. B88, TYPE K AWWA SPEC. 7S-CR, TYPE K	
4	METER (FURNISHED BY MWWD)				
5	METER BOX			FOGTITE: B 9 1/2 T; WITH 1-3/4" HOLE IN LID JR BROOKS: 37 W/CAST TRAFFIC LID; WITH 1-3/4" HOLE IN LID	
6	PVC PLUG AT END OF TAIL PIECE		1"		
7	COPPER X IP ADAPTOR		1"	FORD: C-8433-Q	MUELLER: H-14227

NOTES:

A. SPLICES – NOT ALLOWED UNLESS APPROVED BY THE DISTRICT. USE MUELLER 110 OR FORD QUICK JOINT.

B. OWNERS ARE RESPONSIBLE FOR INSTALLING PRESSURE REDUCER ON THEIR SYSTEM TO PROTECT THEIR FACILITIES FROM HIGH PRESSURE.

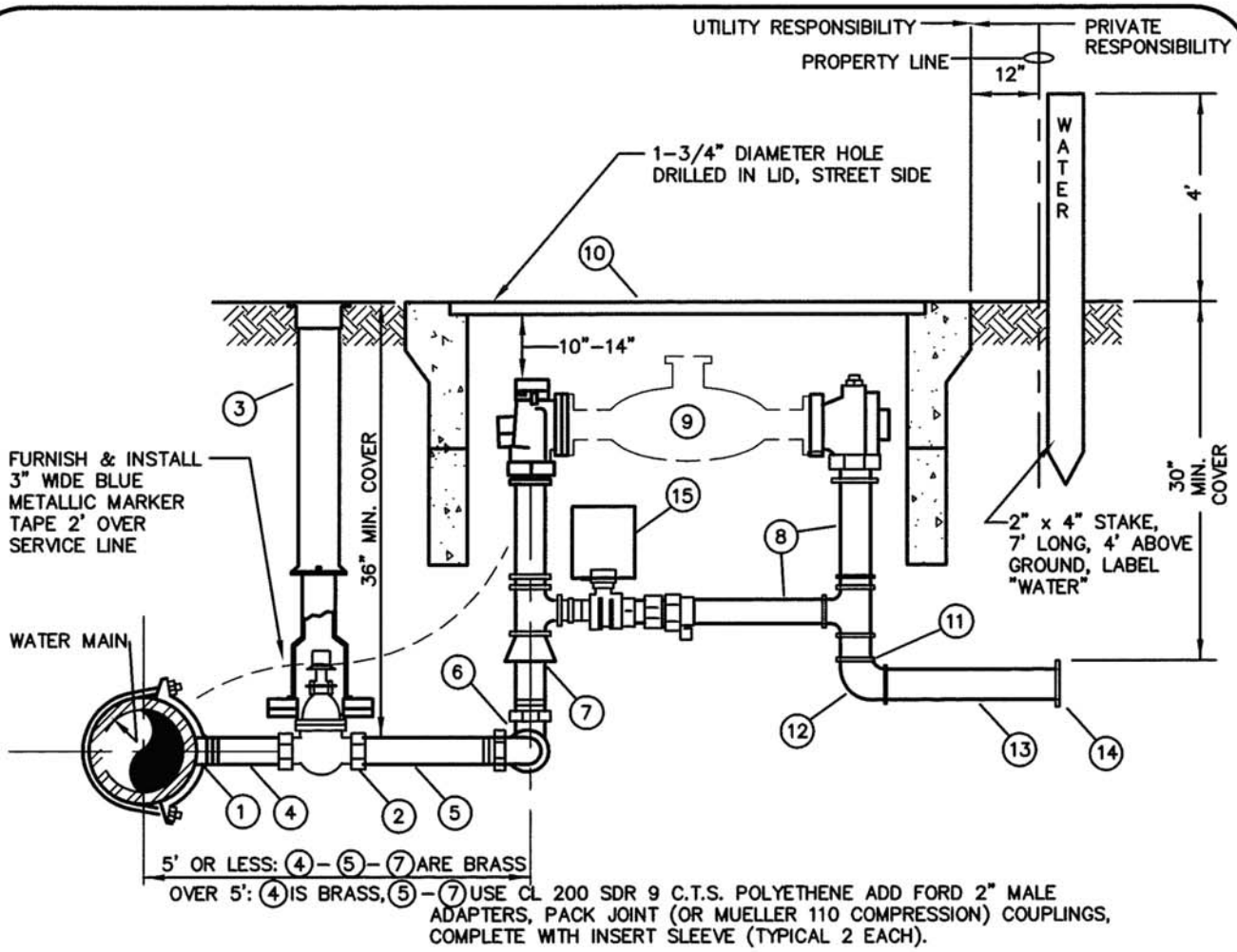
C. SURFACE RESTORATION IN ACCORDANCE WITH JURISDICTIONAL AUTHORITY.

D. 4" OF BEDDING REQUIRED ON ALL COPPER. SAND ONLY.

W-D10

1" WATER SERVICE INSTALLATION

Mukilteo Water and Wastewater District
STANDARD DETAILS

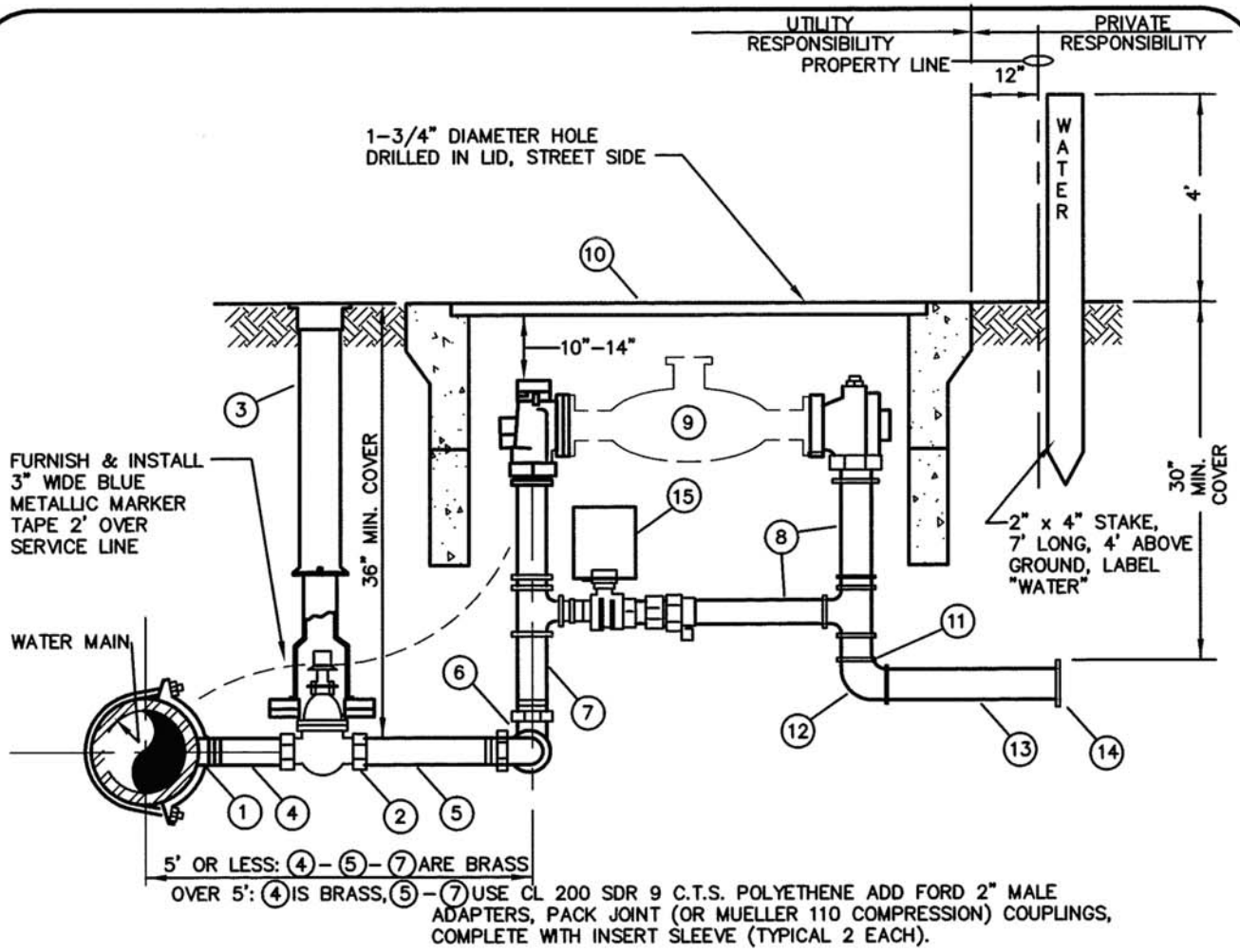


NO.	ITEM
1	ROMAC STYLE 202S STAINLESS STEEL DOUBLE STRAP TYPE SADDLE
2	2" RESILIENT WEDGE GATE VALVE WITH 2" OPERATING NUT
3	STANDARD CAST-IRON VALVE BOX (RICH NO. 940)
4	BRASS NIPPLE (3" MIN., 6" MAX.)
5	NIPPLE (SEE NOTE ABOVE)
6	BRASS SWING JOINT
7	NIPPLE (SEE NOTE ABOVE) WITH 2" x 1 1/2" REDUCER (FORD C-84-67)
8	METER SETTER, 1 1/2" FORD VBH66-12B WITH METER SPACER (LENGTH DETERMINED BY DISTRICT PRIOR TO INSTALLATION)
9	METER (FURNISHED BY DISTRICT) 13 1/4" LONG
10	METER BOX, NO.2 FOG TITE OR BROOKS NO. 65, WITH STEEL TRAFFIC COVER (FURNISH 2 BOXES). 1-3/4" DIAMETER HOLE IN LID.
11	1 1/2" BRASS NIPPLE
12	1 1/2" BRASS 90° EL
13	1 1/2" x 12" BRASS NIPPLE
14	1 1/2" CAP
15	6" PVC PIPE OVER BY-PASS VALVE.

1 1/2" WATER SERVICE INSTALLATION

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D11

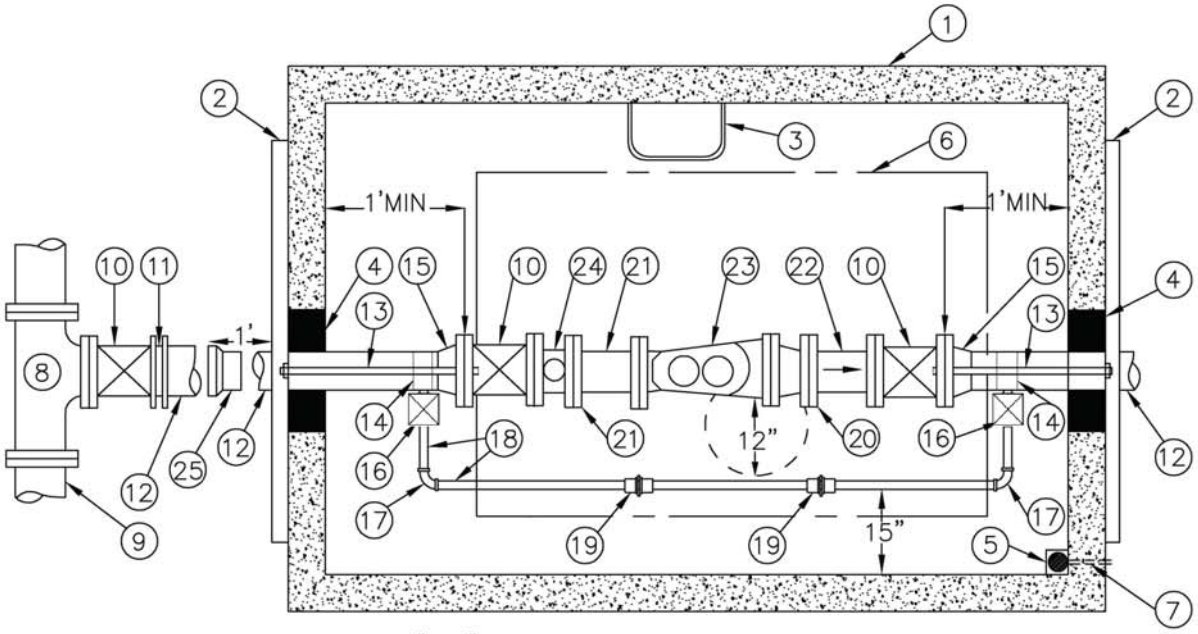


NO.	ITEM
1	ROMAC STYLE 202S STAINLESS STEEL DOUBLE STRAP TYPE SADDLE
2	2" RESILIENT WEDGE GATE VALVE WITH 2" OPERATING NUT
3	STANDARD CAST-IRON VALVE BOX (RICH NO. 940)
4	BRASS NIPPLE (3" MIN., 6" MAX.)
5	NIPPLE (SEE NOTE ABOVE)
6	BRASS SWING JOINT
7	NIPPLE (SEE NOTE ABOVE)
8	METER SETTER, 2" FORD VBH66-12B WITH METER SPACER (LENGTH DETERMINED BY DISTRICT PRIOR TO INSTALLATION)
9	METER (FURNISHED BY DISTRICT) 17 1/4" LONG
10	METER BOX, NO.2 FOG TITE OR BROOKS NO. 65, WITH STEEL TRAFFIC COVER (FURNISH 2 BOXES). 1-3/4" DIAMETER HOLE IN LID.
11	2" BRASS NIPPLE
12	2" BRASS 90° EL
13	2" x 12" BRASS NIPPLE
14	2" CAP
15	6" PVC PIPE OVER BY-PASS VALVE.

2" WATER SERVICE INSTALLATION

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D12



3"& 4" METER SERVICE INSTALLATION

① UTILITY VAULT No. 4484–LA OR APPROVED EQUAL

② 4~3"x3"x3/8" GALV. ANGLES, 48" LONG (HOT DIPPED)

③ INSTALL LANE POLYPROPYLENE (STEEL REINFORCED) LADDER ON OPPOSITE SIDE OF SECONDARY METER. LOCATION TO BE APPROVED BY THE DISTRICT. (MUST BE ACCESSIBLE FROM VAULT LIDS & MUST NOT INTERFERE WITH THE METER MOUNT OR TESTING)

④ NON–SHRINK WATER TIGHT GROUT (BOTH ENDS)

⑤ DRAIN VAULT TO DAYLIGHT OR PROVIDE WATERTIGHT VAULT. EASEMENT REQUIRED ON DRAIN

⑥ 36"X72" LW PRODUCTS HD ACCESS HATCH (H–20 RATED). HATCH TO BE COATED WITH THERMION TH604 ANTI–SLIP & ANTI CORROSION SYSTEM, GRADE #2 MODERATE TEXTURE. LID AND HATCH TO BE H–30 RATED IF IN TRAFFIC AREA.

⑦ INSTALL PVC SHORT NIPPLE & 90° POINTED DOWN IN THE CORNER DRAIN W/1" WASHED DRAIN ROCK POCKET. NOTE: DEPENDING ON MANUFACTURER AND SIZE OF VAULT DRAIN KNOCKOUTS COULD BE ON SIDES OR END OF LID.

⑧ 3" OR 4" TEE (FL)

⑨ WATER MAIN

⑩ 3" OR 4" R.W. GATE VALVE (FL x MJ)

⑪ MEGALUG GLAND OR APPROVED EQUAL.

⑫ 3" OR 4" DUCTILE IRON PIPE.

⑬ (4) 5/8 DIA. SST. ALLTHREAD– BOLT FLANGE THROUGH WALL TO ANGLE (STAINLESS)

⑭ ROMAC 2"X3" (202NS–4.05) OR 2"X4" (202NS–4.80) DOUBLE STRAP STAINLESS STEEL SADDLE OR APPROVED EQUAL

⑮ MEGALUG GLAND OR APPROVED EQUAL.

⑯ 2" R.W. GATE VALVE (2 PLACES)

⑰ 2" BRASS 90° BEND

⑱ 2" BRASS PIPE (TYP)

⑲ 2" BRASS UNION AS APPROVED BY THE DISTRICT

⑳ MEGAFLANGE ADAPTER

㉑ DUCTILE IRON SPOOL (FL X PE) (15" LONG FOR 3" METER, 20" LONG FOR 4" METER)

㉒ 3" OR 4" DUCTILE IRON SPOOL (FL X PE) (10" LONG MIN.)

㉓ 3" OR 4" BADGER RECORDALL COMPOUND SERIES METER (FL X FL), LEAD–FREE BRONZE ALLOY WITH HIGH RESOLUTION ENCODER (HR–E) AND ORION CE TRANSMITTER. MOUNT RADIO TRANSMITTER THROUGH VAULT LID AS DIRECTED BY THE DISTRICT. FACTORY PROGRAMMED FOR GALLONS.

㉔ 3" OR 4" BADGER PLATE STRAINER (FL X FL)

㉕ 4"x3" DUCTILE IRON REDUCER AS DIRECTED BY THE DISTRICT (MJxMJ) WITH MEGALUG FOLLOWER GLANDS.

NOTE:
PIPING & VALVES MUST BE SUPPORTED BY ADJUSTABLE PIPE SUPPORT STANDONS, MODEL S–92 OR APPROVED EQUAL, A MINIMUM OF TWO REQUIRED OR AS DIRECTED BY THE DISTRICT.

3" & 4"
SERVICE INSTALLATION

W-D13

Mukilteo Water and Wastewater District
STANDARD DETAILS

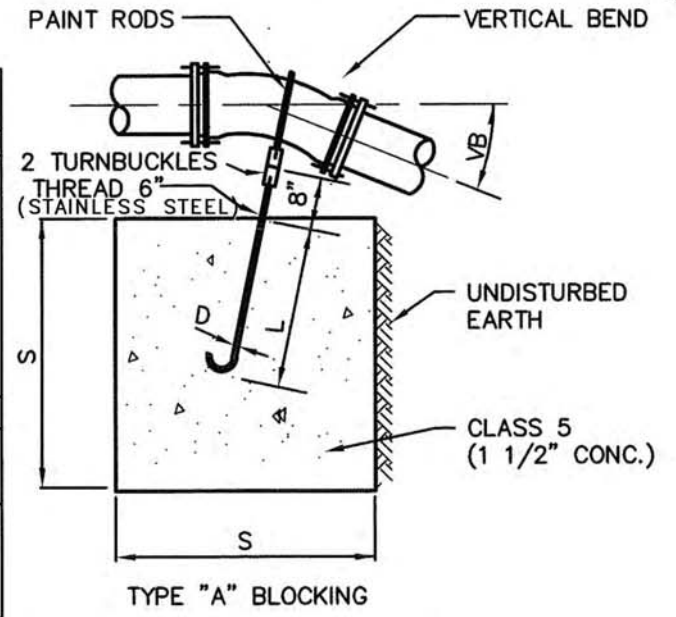
TYPE "A" BLOCKING
FOR 11 1/4°–22 1/2°–30° VERTICAL BENDS

PIPE SIZE NOMINAL DIAMETER– INCHES	TEST PRESSURE PSI	VB VERTICAL BEND DEGREES	No. OF CU. FT. OF CONC. BLOCKING	S SIDE OF CUBE LIN. FT.	D DIAM. OF RODS (2) INCHES	L DEPTH OF RODS IN CONCRETE LIN. FT.
4"	300	11 1/4	8	2	5/8"	1.5
		22 1/2	11	2.2		2.0
		30	17	2.6		
6"	300	11 1/4	11	2.2	5/8"	2.0
		22 1/2	25	2.9		
		30	41	3.5		
8"	300	11 1/4	16	2.5	5/8"	2.0
		22 1/2	47	3.6		
		30	70	4.1	3/4"	2.5
12"	250	11 1/4	32	3.2	5/8"	2.0
		22 1/2	88	4.5	7/8"	3.0
		30	132	5.1		
16"	225	11 1/4	70	4.1	7/8"	3.0
		22 1/2	184	5.7	1 1/8"	4.0
		30	275	6.5	1 1/4"	
20"	200	11 1/4	91	4.5	7/8"	3.0
		22 1/2	225	6.1	1 1/4"	4.0
		30	330	6.9	1 3/8"	4.5
24"	200	11 1/4	128	5.0	1"	3.5
		22 1/2	320	6.8	1 3/8"	4.5
		30	480	7.9	1 7/8"	5.5

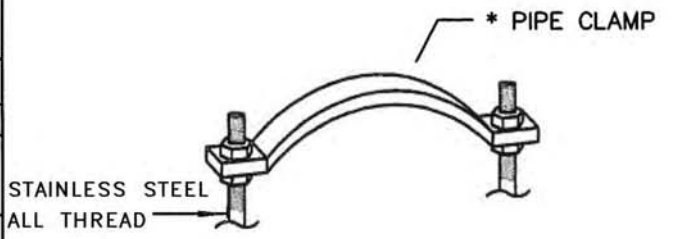
TYPE "B" BLOCKING
FOR – 45° VERTICAL BENDS

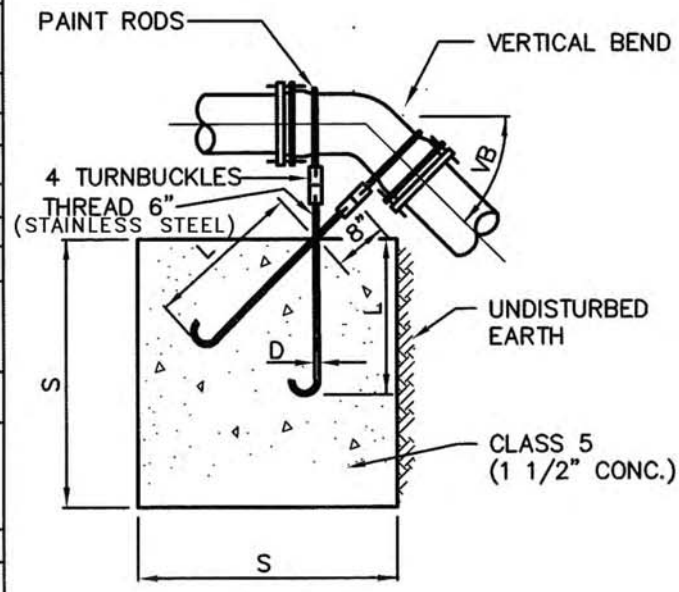
		VB		S	D	L
4"	300	45	30	3.1	5/8"	2.0
6"			68	4.1		
8"			123	5.0		
12"	250		232	6.1	3/4"	2.5
16"	225		478	7.8	1 1/8"	4.0
20"	200		560	8.2	1 1/4"	
24"			820	9.4	1 3/8"	4.5

* PIPE CLAMP, WASHERS AND NUTS MAY BE SUBSTITUTED FOR TURN BUCKLES. ALL OTHER SPECIFICATIONS THE SAME.



TYPE "A" BLOCKING



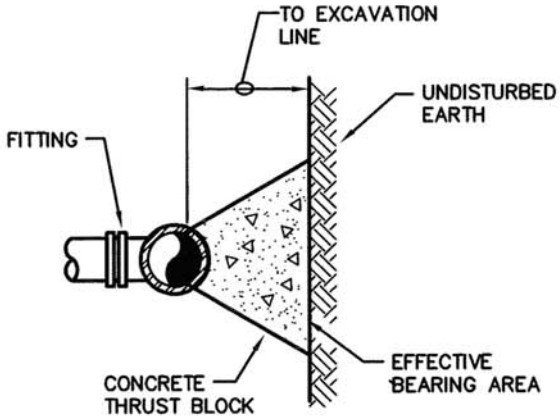


TYPE "B" BLOCKING

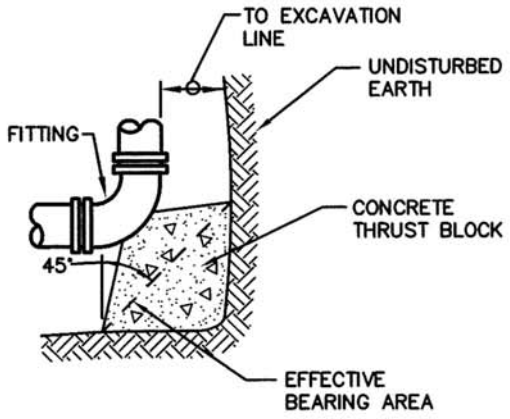
VERTICAL ANCHOR BLOCK

Mukilteo Water and Wastewater District
STANDARD DETAILS

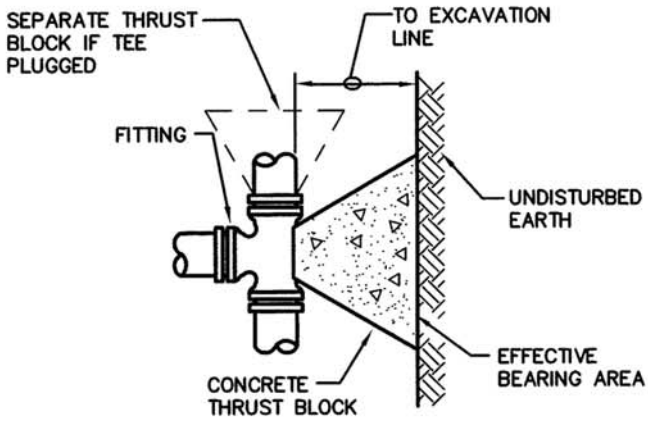
W-D14



TYPICAL SECTION



90°EL PLAN



TEE PLAN

EFFECTIVE BEARING AREA REQUIRED

PIPE SIZE	90° EL	45° EL	22 1/2° EL	11 1/4° EL	TEE
8"	7 SQ. FT.	4 SQ. FT.	2 SQ. FT.	2 SQ. FT.	5 SQ. FT.
12"	16 SQ. FT.	9 SQ. FT.	4 SQ. FT.	3 SQ. FT.	11 SQ. FT.
16"	28 SQ. FT.	15 SQ. FT.	8 SQ. FT.	5 SQ. FT.	20 SQ. FT.

TYPICAL FOR SANDY SOIL WITH 2,000 P.S.F. BEARING STRENGTH & 200 P.S.I. PRESSURE. IF PRESSURE IS GREATER OR SOIL BEARING IS LESS, THE THRUST BLOCK SIZE SHALL BE INCREASED.

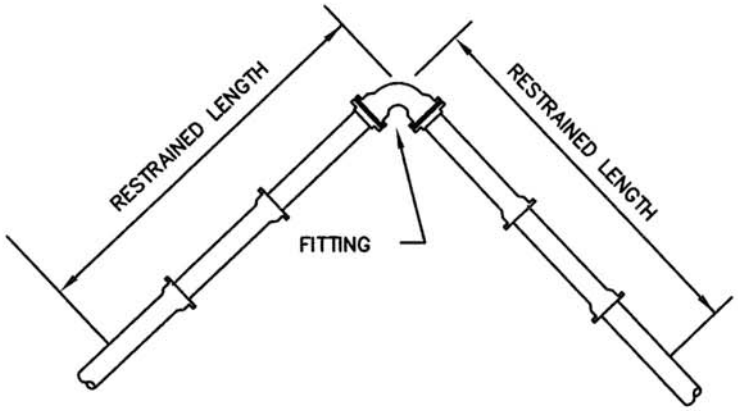
NOTES:

1. BLOCKING SHALL BE TO SOLID BEARING SURFACE.
2. ALL FITTINGS SHALL BE COVERED WITH 4 MIL VISQUEEN BEFORE CONCRETE IS POURED.
3. CONCRETE BLOCKING SHALL BE 2000 PSI MINIMUM CONCRETE POURED IN PLACE. ALL BLOCKS ON TEES SHALL BE SEPARATED FOR DIRECTION OF THRUST.
4. THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARDS. THE DEVELOPER'S ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE SIZE OF ALL THRUST BLOCKS BASED ON EXISTING AND LOCAL CONDITIONS.

THRUST BLOCKING

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D15



PIPE SIZE	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	TEE OR DEAD END CAP
	RESTRAINED LENGTH IN FEET				
4"	32	14	7	3	26
6"	44	19	9	5	32
8"	58	24	12	6	43
10"	70	29	14	7	54
12"	82	34	16	8	66
16"	106	44	21	11	88
18"	116	48	23	12	100

NOTES:

① RESTRAINED LENGTHS SHOWN ARE MINIMUM AND FOR LINEAL FEET REQUIRED ON EACH SIDE OF FITTING INDICATED.

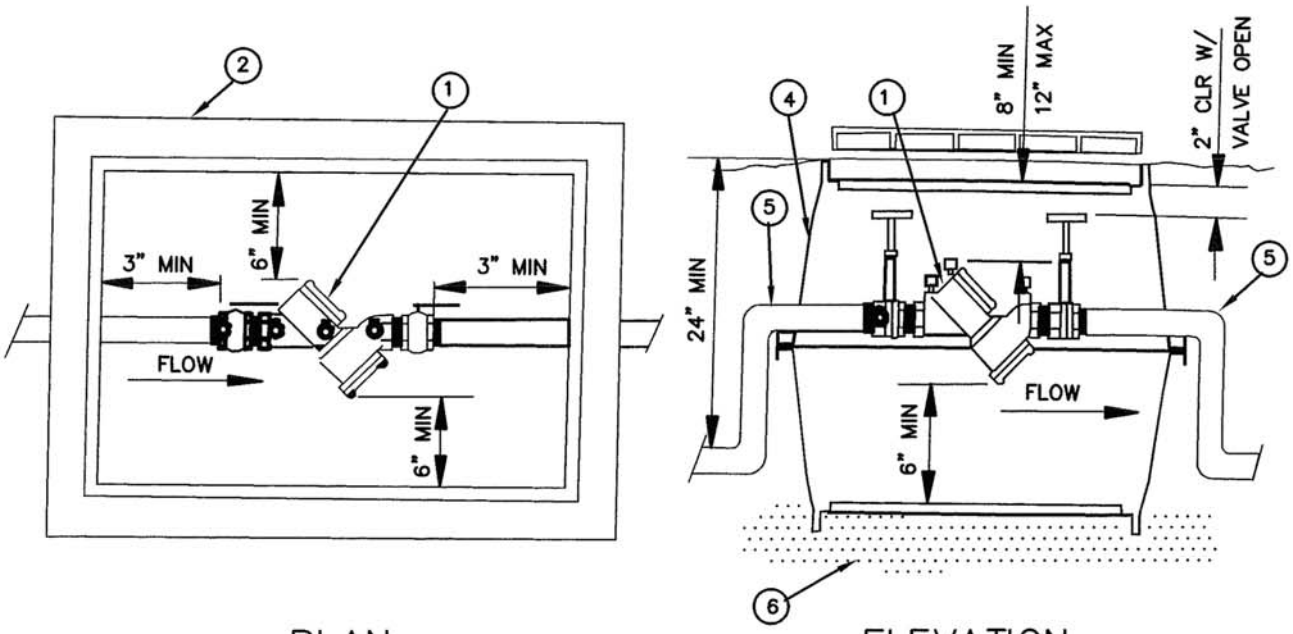
② FOOTAGES ARE BASED ON 200 PSI PRESSURE AND 42 INCHES COVER. IF PRESSURE IS GREATER OR COVER IS LESS, THE RESTRAINED LENGTH SHALL BE INCREASED.

③ THIS TABLE REPRESENTS THE "MINIMUM" CONSTRUCTION STANDARDS. THE DEVELOPER'S ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE LENGTH OF ALL RESTRAINED JOINT BASED ON EXISTING AND LOCAL CONDITIONS.

THRUST RESTRAINT FOR DUCTILE IRON PIPE

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D16



PLAN ELEVATION

LEGEND

(1) STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY

(2) IN NON-TRAFFIC AREAS USE:
PRECAST CONCRETE VAULT (UTILITY VAULT CO 233-LA, OR APPROVED EQUAL) OR
PLASTIC VALVE BOX (UTILITY VAULT CO 1324-12L OR APPROVED EQUAL)
IN TRAFFIC AREAS:
A TRAFFIC LOADED BOX MUST BE USED AND LOCATION APPROVED BY THE DISTRICT PRIOR TO INSTALLATION.

(3) ALL ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH WASHINGTON STATE DEPARTMENT OF HEALTH REQUIREMENTS.

(4) A DAYLIGHT DRAIN SHALL BE PROVIDED THERE MUST BE A 4" MIN LAYER OF FREE DRAINING GRAVEL AT THE BOTTOM OF BOX.

(5) ANGLES MAY BE IN OR OUT OF BOX SO LONG AS SUFFICIENT ROOM IS ALLOWED AT EACH END FOR VALVE OPERATOR AND DCVA REPAIR OR MAINTENANCE.

(6) PROVIDE FREE DRAINING SOIL.

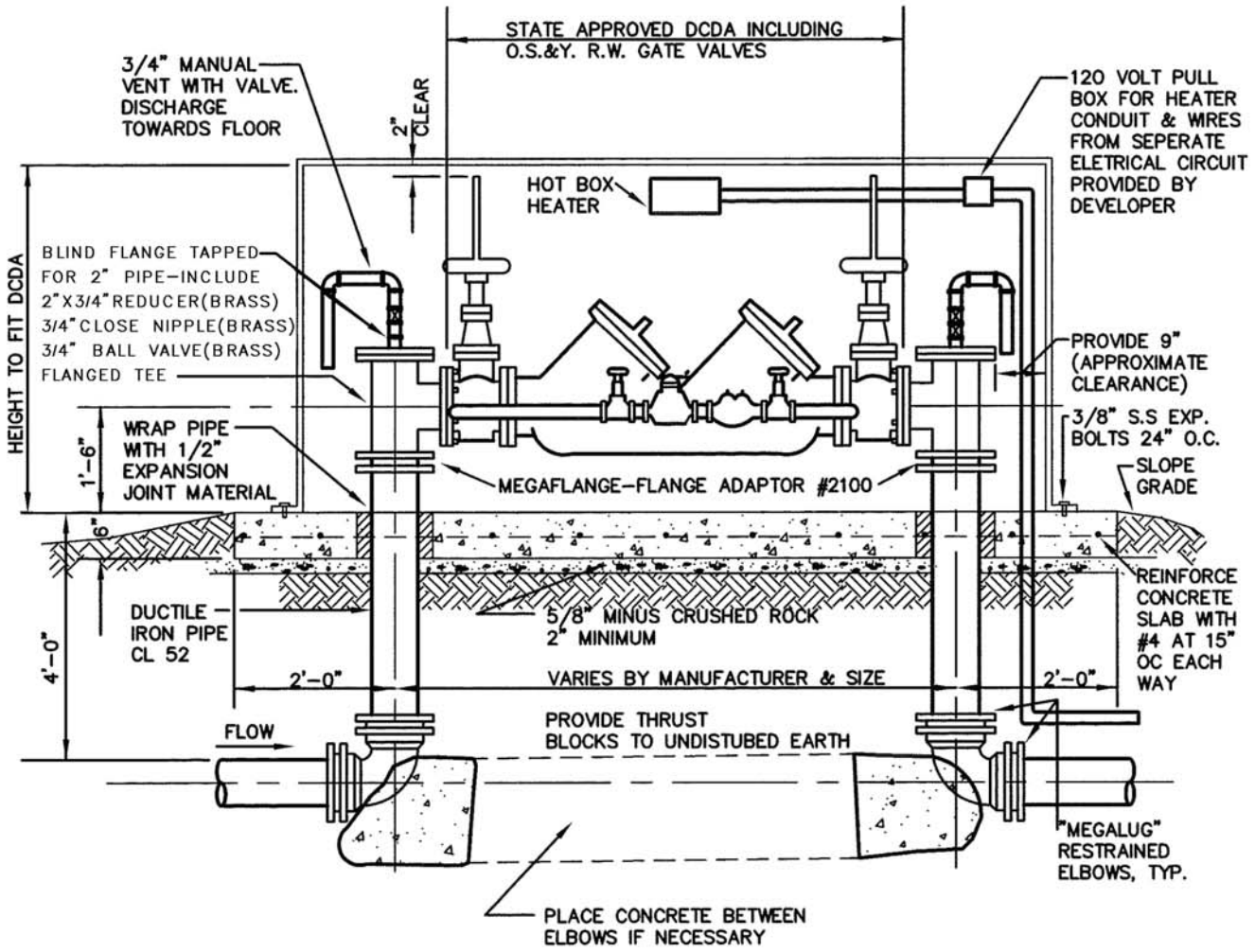
NOTES

1. ALL TEST COCKS MUST HAVE BRASS PLUGS.
2. TEST COCKS MUST FACE UP OR SIDEWAYS WHICH EVER IS MORE ACCESSIBLE

DOUBLE CHECK VALVE ASSEMBLY FOR 2" & SMALLER SERVICE

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D17



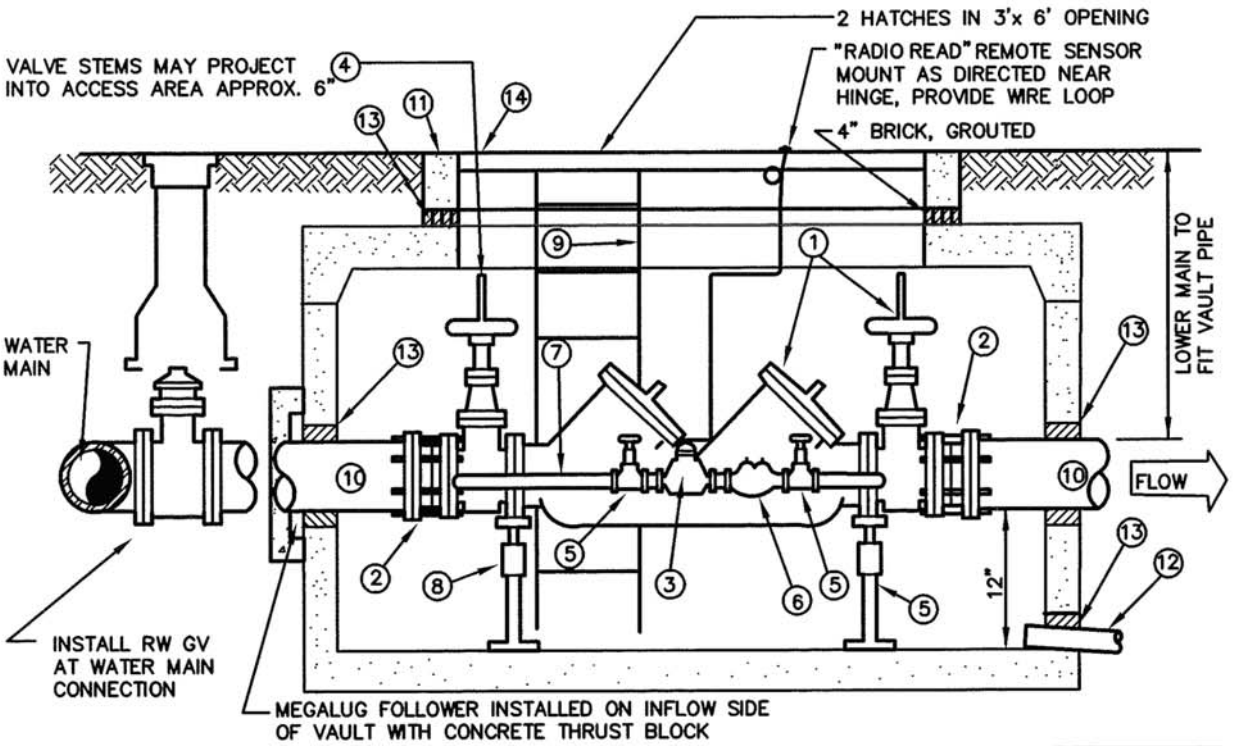
NOTES:

1. INSTALLATION OF HOT BOX SUBJECT TO APPROVAL OF DISTRICT AS AN ALTERNATE TO VAULTS.
2. ALUMINUM "HOT BOX" MODELS 4 THROUGH 10 FOR RESPECTIVE SIZE DCDA SHALL BE MODIFIED TO FIT ABOVE HEIGHT REQUIREMENTS. VALVE STEM SHALL NOT BE ALLOWED TO EXTEND OUTSIDE OF BOX.
3. HEATERS SHALL BE 2,000 WATT FOR 6" AND 8" SIZE: 3,000 WATT FOR 10" OR LARGER.
4. PROVIDE SPECIAL LOCK FOR 2 PADLOCKS.
5. CONCRETE TO BE 2500 PSI MIX WITH AIR ENTRAINMENT.
6. 5/8" X 3/4"BADGER RECORDALL DISC METER M25, 7-1/2" LAY LENGTH, LEAD-FREE BRONZE ALLOY HOUSING AND BOTTOM, HR-E ENCODER WITH ORION CE TRANSMITTER. FACTORY PROGRAMMED FOR GALLONS. MOUNT IN DISTRICT APPROVED LOCATION.

DOUBLE CHECK DETECTOR HOT BOX ENCLOSURE

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D18



NO.	DESCRIPTION
1	STATE APPROVED DOUBLE CHECK DETECTOR ASSEMBLY (DCDA) BACKFLOW PREVENTION ASSEMBLY WITH O.S.&Y. R.W. GATE VALVE
2	ROMAC STYLE 'FCA 501' FLANGED COUPLING ADAPTER
3	5/8" X 3/4"BADGER RECORDALL DISC METER M25, 7-1/2" LAY LENGTH, LEAD-FREE BRONZE ALLOY HOUSING AND BOTTOM, HR-E ENCODER WITH ORION CE TRANSMITTER. MOUNT RADIO TRANSMITTER THROUGH VAULT LID AS DIRECTED BY THE DISTRICT. FACTORY PROGRAMMED FOR GALLONS.
4	LOCATE CENTER OF VALVE 15" FROM CENTER OF VAULT TO ALLOW STEMS TO EXTEND INTO ACCESS OPENING WHEN APPLICABLE
5	3/4" SHUTOFF VALVE; BRASS GATE VALVE
6	STATE APPROVED 3/4" DOUBLE CHECK VALVE ASSEMBLY (DCVA)
7	BRASS OR TYPE K COPPER, DETECTOR CHECK PIPING (BY PASS LINE)
8	2 EA. GALVANIZED ADJUSTABLE STANCHIONS (LOCATE AT ENDS OF DOUBLE CHECK ASSEMBLY)
9	GALVANIZED STEEL LADDER, LOCATE AS DIRECTED BY DISTRICT, SECURE TO VAULT.
10	PIPE SPOOL, CL. 52 D.I., PLAIN END
11	"UTILITY VAULT" OR APPROVED EQUAL WITH 4" BRICK AND ADJUSTABLE COVER; 2 ACCESS HATCHES: EXCEPT 3 HATCHES FOR 10" DCDA. LW PRODUCTS OR EQUAL, H-20 LOADING 4" DCDA, USE 575 LA + 57 AT (4'-2" x 6'-6" x 4'-0" INSIDE) 6" DCDA, 4484 LA + 57 AT (4'-4" x 8'-4" x 6'-2" INSIDE) 6" DCDA, 5106 LA + 57 AT (5'-0" x 10'-6" x 4'-4" INSIDE) 8" DCDA, 5106 LA + 57 AT (5'-0" x 10'-6" x 6'-2" OR 4'-4" INSIDE) 10" DCDA, 5106 LA + 5106 AT (3 HATCH) (5'-0" x 10'-6" x 6'-2" OR 4'-4")
12	6" PVC DRAIN, DISCHARGE TO DAYLIGHT OR TO CATCH BASIN. MINIMUM SLOPE 1% UNLESS OTHERWISE APPROVED. ADD SCREENS AT BOTH ENDS.
13	WATERTIGHT GROUT, INLET AND OUTLET PIPE, DRAIN PIPE AND BRICK ACCESS OPENING
14	SIGN READING "DANGER-PERMIT REQUIRED-CONFINED SPACE, DO NOT ENTER"

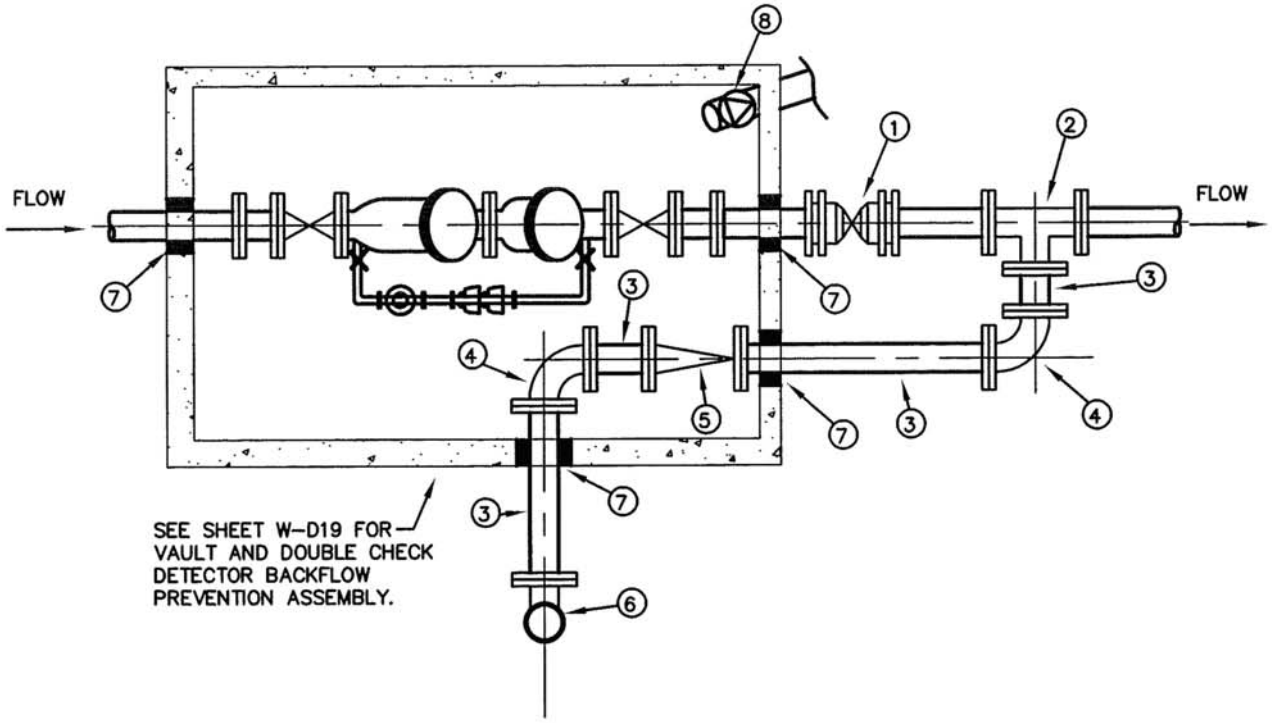
NOTE:

AFTER PRESSURE TEST AND PURITY SAMPLES ARE RECIEVED, A CERTIFIED BACKFLOW ASSEMBLY TESTER SHALL SUPPLY DISTRICT WITH A WRITTEN TEST REPORT ON EACH BACKFLOW ASSEMBLY.

DOUBLE CHECK DETECTOR BACKFLOW PREVENTION ASSY.

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D19



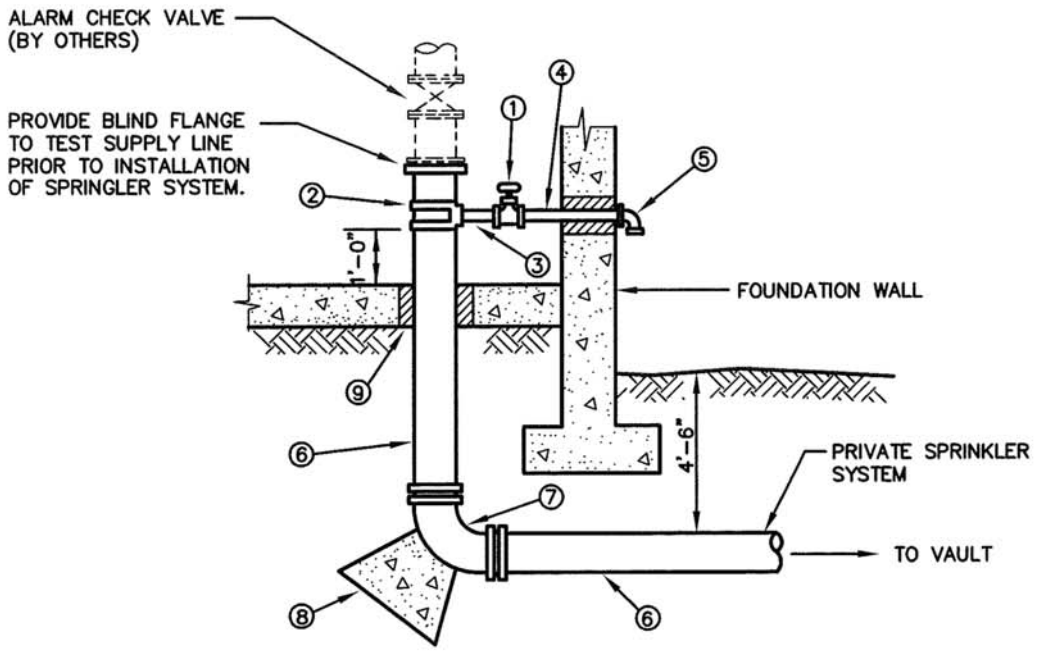
NO.	DESCRIPTION
1	POST INDICATOR VALVE, MJ WITH MEGALUGS
2	MAIN LINE SIZE X 4" TEE, MJ WITH MEGALUGS
3	4" DUCTILE IRON PIPE, CLASS 52*
4	4" x 90° BENDS, MJ WITH MEGALUGS
5	4" FLAPPER CHECK VALVE WITH BALL CHECK DRAIN VALVE. (IF ALTERNATE LOCATION IS REQUIRED, THE LOCATION WILL BE DETERMINED BY THE DISTRICT).MJ WITH MEGALUGS
6	FIRE DEPARTMENT CONNECTION, STORZ ADAPTER. CONNECTION TO COMPLY WITH FIRE DEPARTMENT REQUIREMENTS. 4" MUKILTEO & DIST. #1, 5" ELSEWHERE. ALL ABOVE GROUND PIPING TO BE PAINTED SAME COLOR RED AS P.I.V.
7	WATERTIGHT GROUT
8	6" PVC DRAIN TO DAYLIGHT OR CB, MINIMUM SLOPE 1%. SCREEN AT BOTH ENDS W/BACKWATER VALVE IN VAULT

* 4" DIAMETER AND SMALLER DUCTILE IRON PIPE SHALL BE CLASS 53 IF USED IN A THREADED APPLICATION.

FIRE LINE CONNECTION

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D20



No.	DESCRIPTION
1	2" RWGV OR BRONZE BALL VALVE
2	ROMAC STYLE 202S STAINLESS STEEL DOUBLE STRAP SADDLE (OR APPROVED EQUAL)
3	2" BRASS NIPPLE
4	2" GALVANIZED NIPPLE
5	2" GALVANIZED 90° EL
6	D.I. CL. 52 SUPPLY MAIN (SIZE AS DETERMINED BY FIRE FLOW REQUIREMENTS).
7	90° BEND (MJ x MJ) WITH MEGALUG
8	CONCRETE THRUST BLOCK (SIZE TO BE APPROVED BY DISTRICT)
9	1/2" EXPANSION JOINT

NOTE

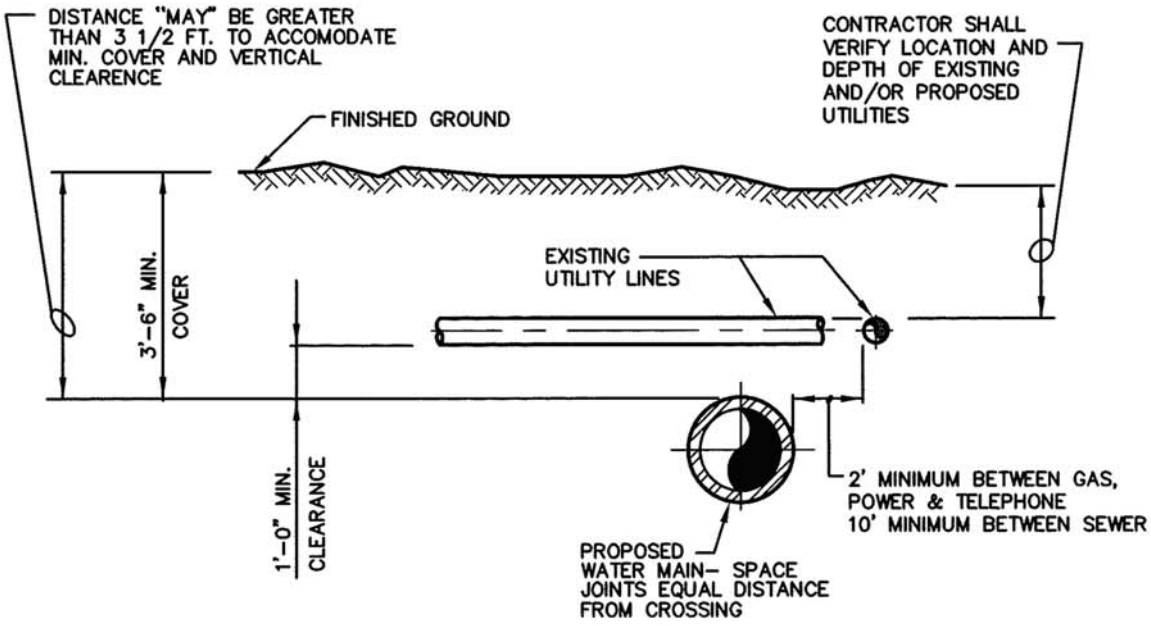
AFTER SYSTEM IS PRESSURE TESTED, PURITY SAMPLES SHALL BE TAKEN AT ALL RISERS IN SYSTEM.

4" DIAMETER AND SMALL DUCTILE IRON PIPE SHALL BE CLASS 53 IF USED IN A THREADED APPLICATION.

FIRE LINE RISER DETAIL

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D21

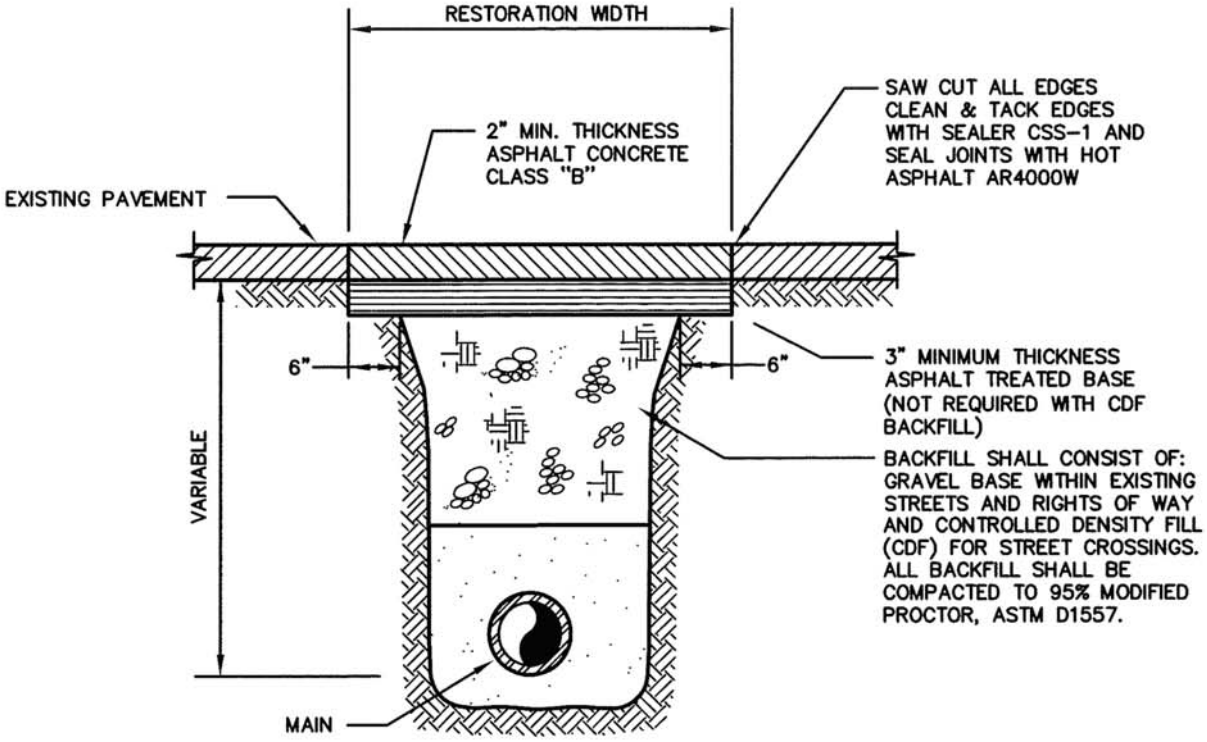


NOTES:
MINIMUM COVER SHOWN IS FOR 8" DIMATER PIPE.
SEE W-D1 FOR MINIMUM COVER FOR ALL PIPES.

TYPICAL UTILITY CROSSING

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D22



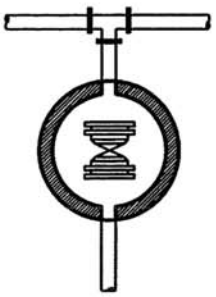
NOTES:

1. ALL ASPHALT STREETS AND DRIVEWAYS SHALL BE TEMPORARILY REPAIRED WITH COLD MIX, EXCEPT CROSSINGS WITH CDF SHALL BE COVERED WITH STEEL PLATES UNTIL THE CDF HAS CURRED TO ALLOW FOR PLACEMENT OF THE ASPHALT.
2. PATCH SHALL BE MACHINE ROLLED FLUSH WITH EXISTING PAVEMENT AND SHALL BE PLACED PER SEC. 5-04 OF THE WA. STATE D.O.T. SPECIFICATIONS.

ASPHALT PAVEMENT REPAIR

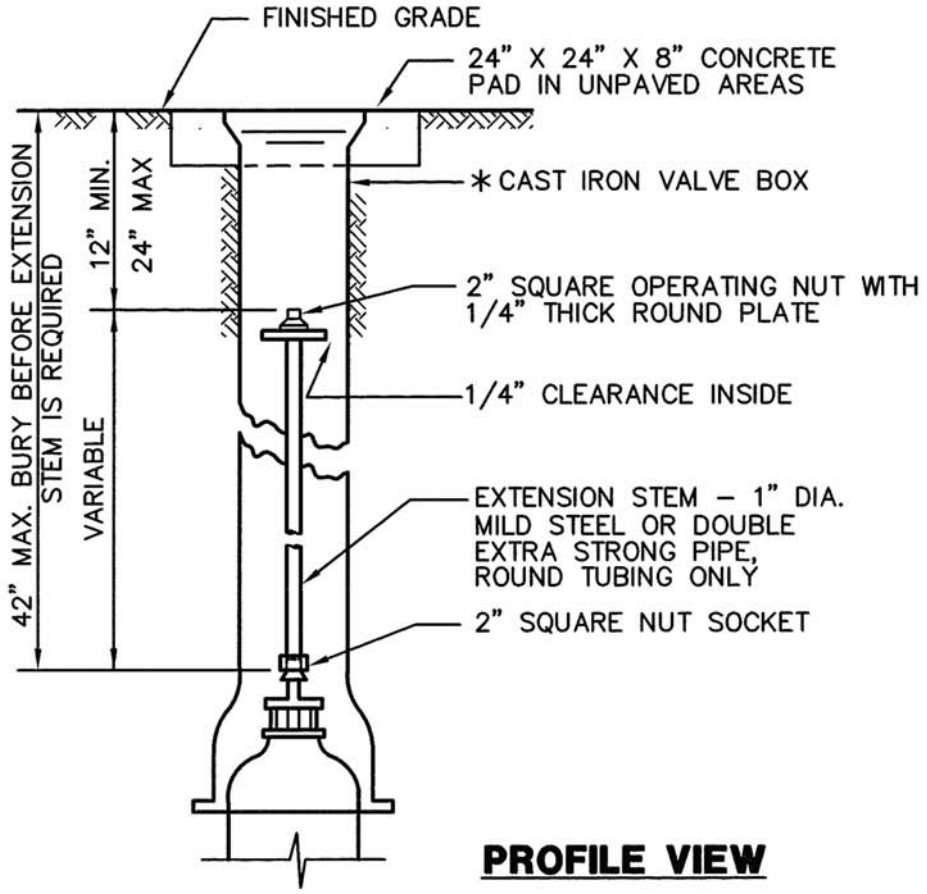
Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D23



ALIGN "EARS" ON VALVE BOX TOP WITH DIRECTION OF PIPE BRANCH THE VALVE OPENS AND CLOSES.

PLAN VIEW



PROFILE VIEW

*CAST IRON VALVE BOX EXTENSION SHALL UTILIZE 5" CAST IRON "SOIL PIPE". BELL END TO BE PLACED OVER TOP OF VALVE BOX BOTTOM.

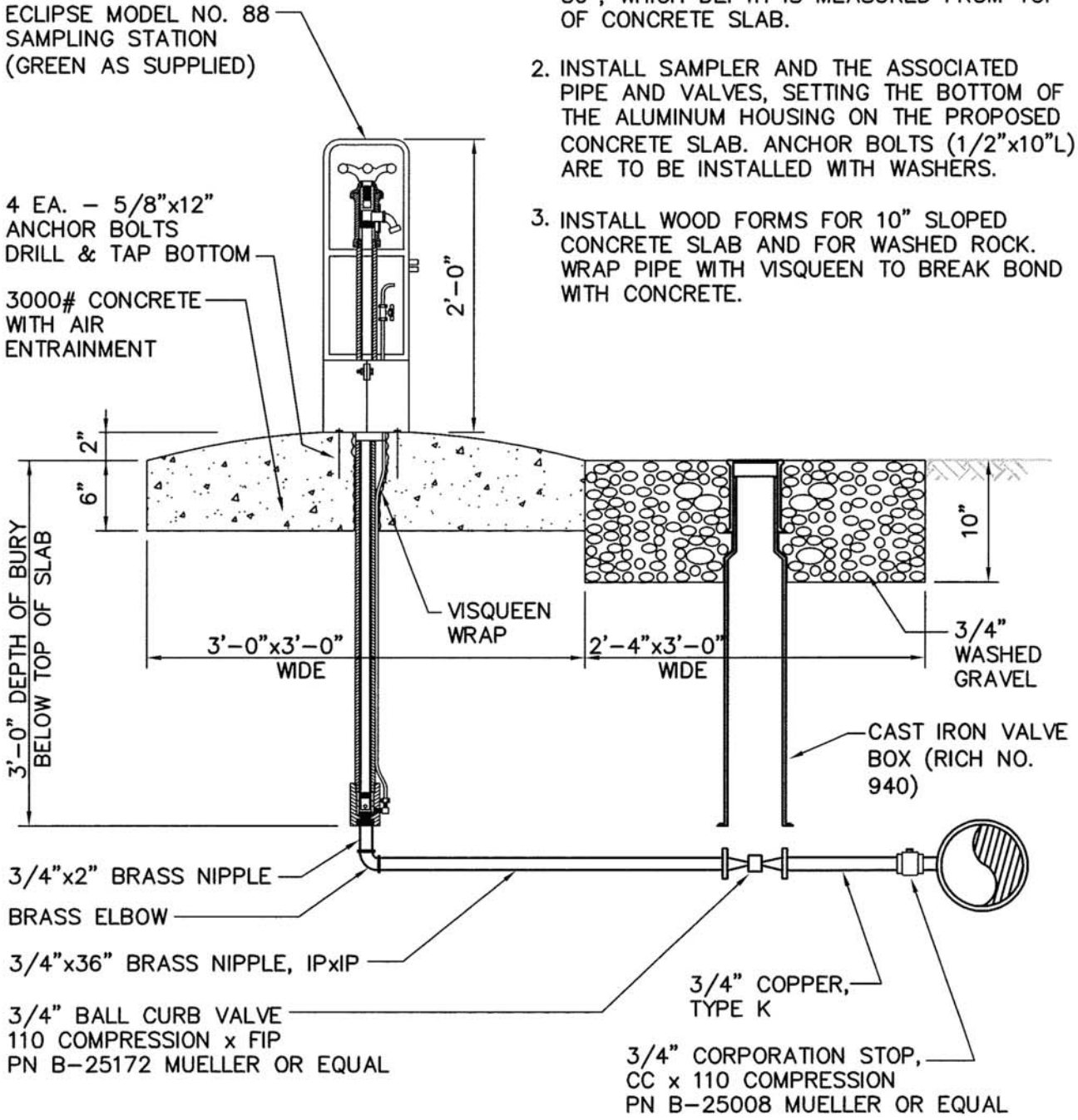
VALVE STEM EXTENSION

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D24

NOTES:

1. DEPTH OF BURY FOR ORDERING SAMPLER IS 36", WHICH DEPTH IS MEASURED FROM TOP OF CONCRETE SLAB.
2. INSTALL SAMPLER AND THE ASSOCIATED PIPE AND VALVES, SETTING THE BOTTOM OF THE ALUMINUM HOUSING ON THE PROPOSED CONCRETE SLAB. ANCHOR BOLTS (1/2"x10"L) ARE TO BE INSTALLED WITH WASHERS.
3. INSTALL WOOD FORMS FOR 10" SLOPED CONCRETE SLAB AND FOR WASHED ROCK. WRAP PIPE WITH VISQUEEN TO BREAK BOND WITH CONCRETE.

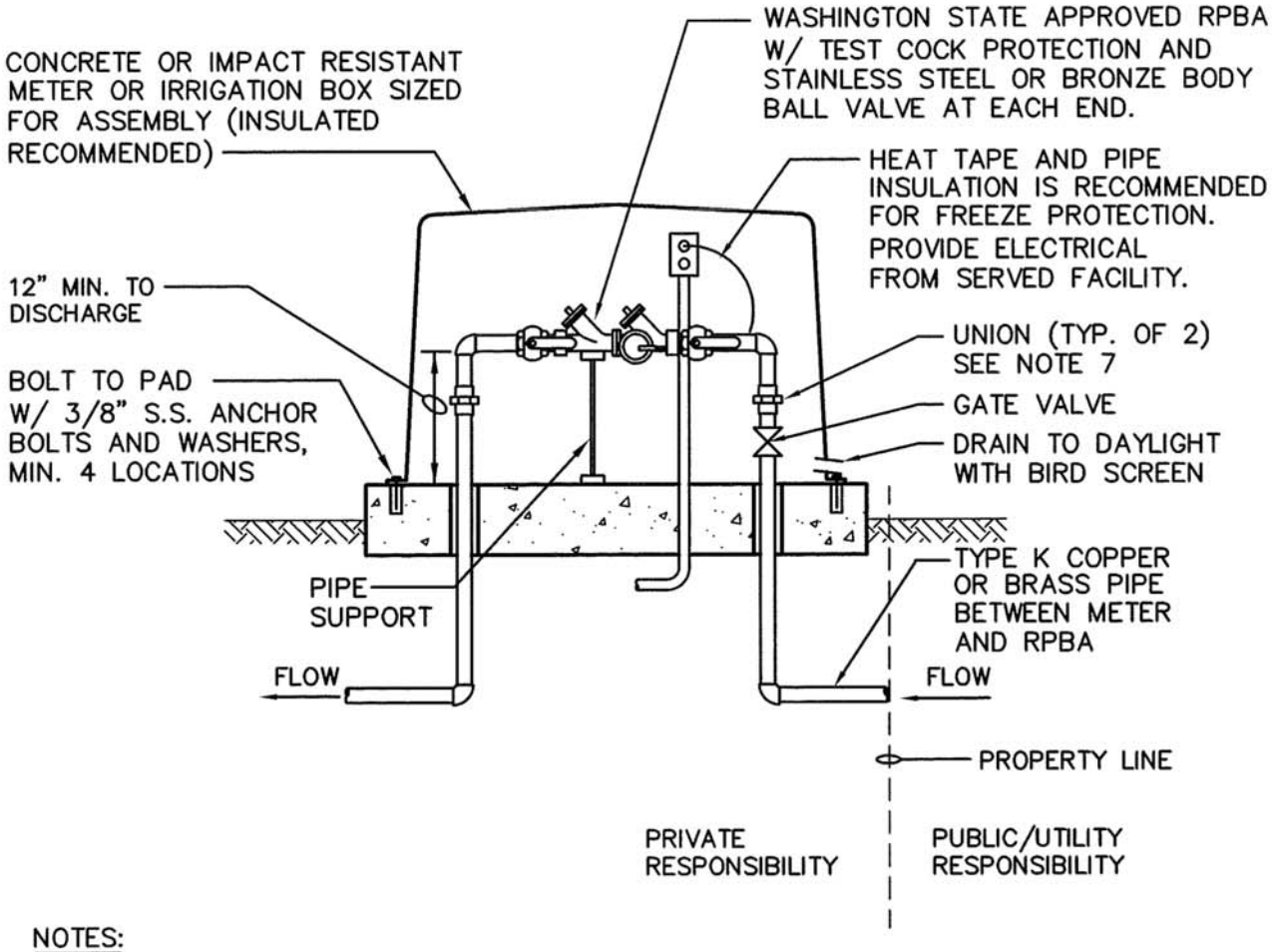


* WHERE APPLICABLE CAST IRON VALVE BOX MAY BE ENCLOSED BY CONCRETE PAD. REQUIRES 3/4"x12" BRASS NIPPLE, IPxIP.

WATER SAMPLING STATION
WATER DISTRIBUTION SYSTEM

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D25



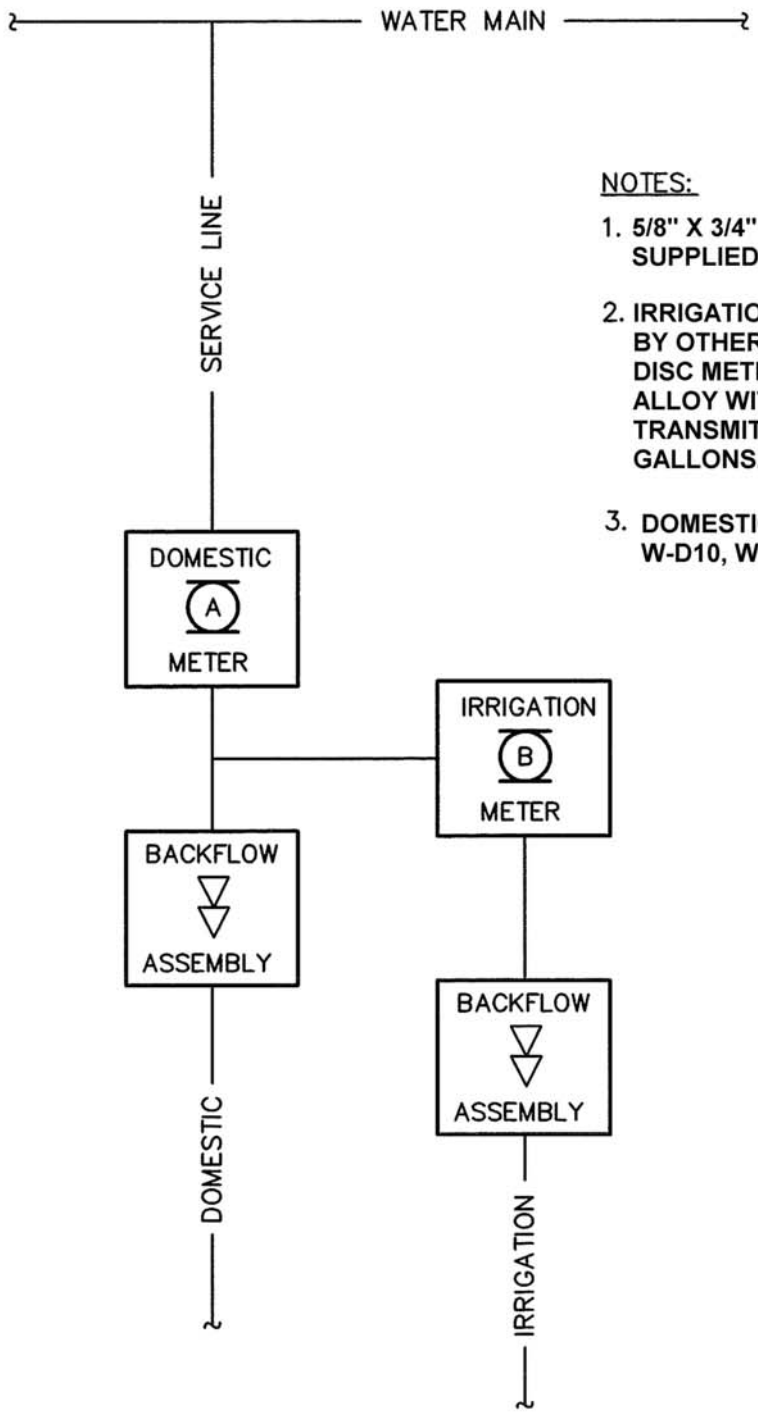
NOTES:

1. BACKFLOW ASSEMBLY SHALL BE SELECTED FROM WASHINGTON STATE DEPARTMENT OF HEALTH CURRENT APPROVED LIST.
2. CONCRETE TO BE 2500 PSI MIX WITH AIR ENTRAINMENT.
3. COMPLETE ALL WORK IN ACCORDANCE WITH STATE, DISTRICT AND MANUFACTURER STANDARDS.
4. SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL RPBA IS APPROVED BY THE DISTRICT AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.
5. RPBA IS CONSIDERED PART OF THE PRIVATE SYSTEM AND SHALL BE MAINTAINED BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATION REQUIRED.
6. PRESSURE TEST AND DISINFECT PER A.W.W.A. STANDARDS.
7. DIELECTRIC UNIONS SHALL BE USED TO SEPARATE DISSIMILAR MATERIALS.
8. RPBA BOX SHALL BE LOCATED IMMEDIATELY DOWNSTREAM OF WATER SERVICE BOX PRIOR TO ANY BRANCH CONNECTIONS WITH NO MORE THAN 1'–2' BETWEEN BOXES.

REDUCED PRESSURE BACKFLOW ASSEMBLY - 3/4" TO 2"

Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D26



NOTES:

1. 5/8" X 3/4" TO 2" DOMESTIC METER TO BE SUPPLIED BY THE DISTRICT.
2. IRRIGATION DEDUCT METER TO BE SUPPLIED BY OTHERS. SHALL BE BADGER RECORDALL DISC METER IN CAST BRONZE AND LOW LEAD ALLOY WITH HR-E ENCODER AND ORION CE TRANSMITTER. FACTORY PROGRAMMED FOR GALLONS.
3. DOMESTIC SERVICE TO BE INSTALLED PER W-D10, W-D11, W-D12, OR W-D13.

TYPICAL IRRIGATION DEDUCT SERVICE

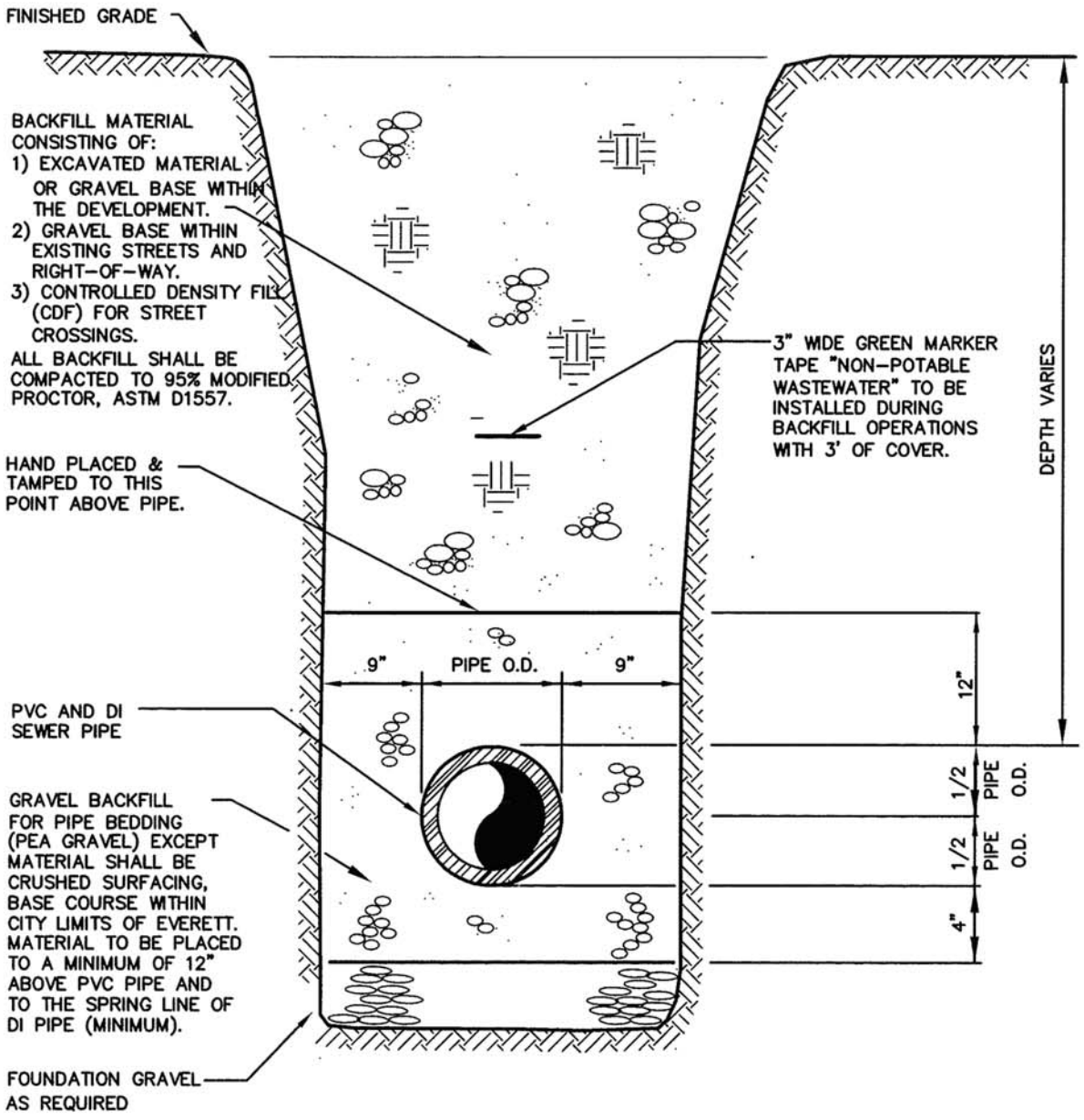
Mukilteo Water and Wastewater District
STANDARD DETAILS

W-D27

DETAILS

SEWER MAINS

Revised 1/3/2018



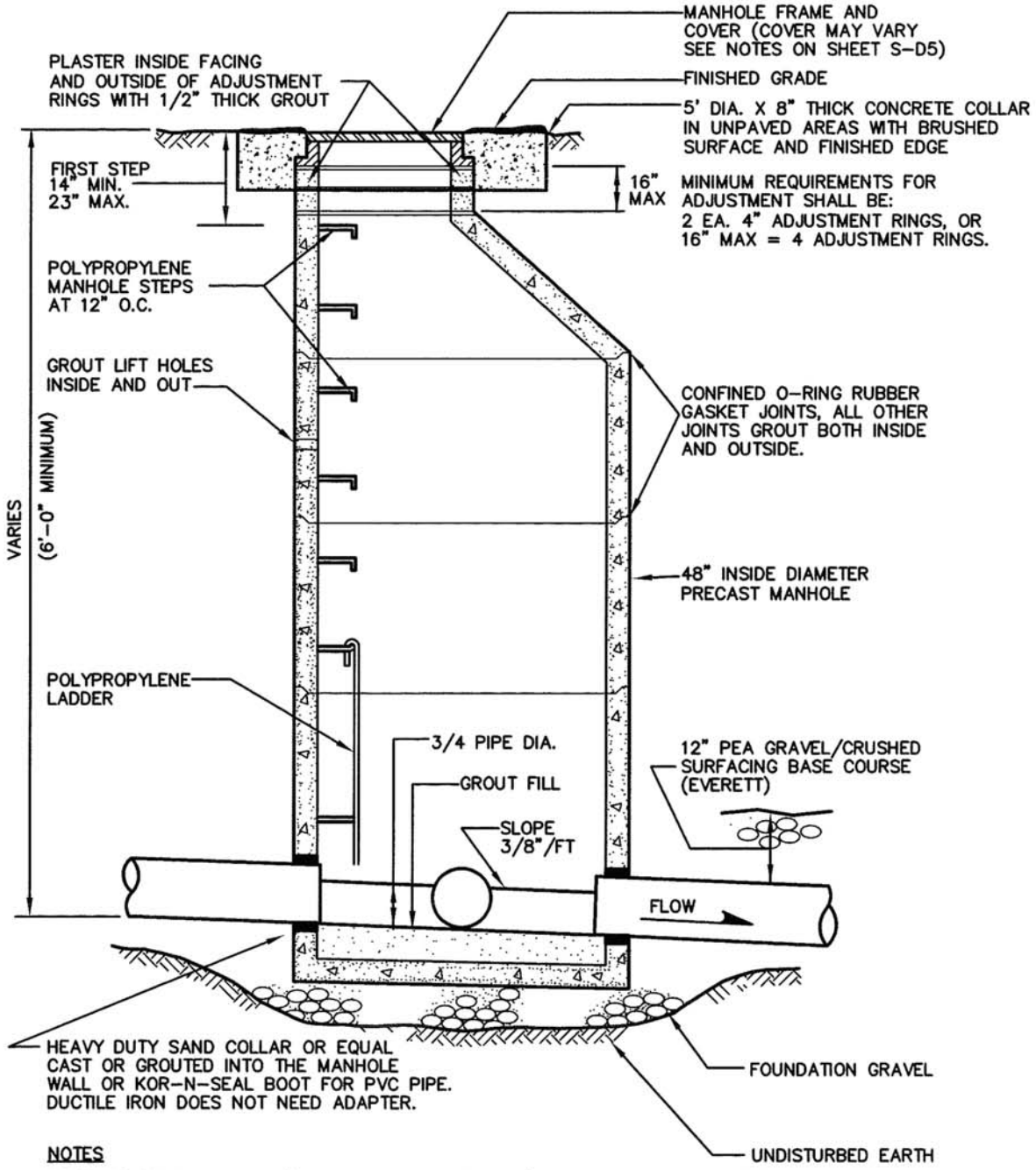
NOTES:

THE DEVELOPER SHALL PROVIDE THE DISTRICT WITH LABORATORY TEST RESULTS INDICATING COMPACTION OF THE TRENCHES MEET THE REQUIREMENT OF 95% MODIFIED PROCTOR, ASTM D1557

SANITARY SEWER TYPICAL TRENCH SECTION

Mukilteo Water and Wastewater District
STANDARD DETAILS

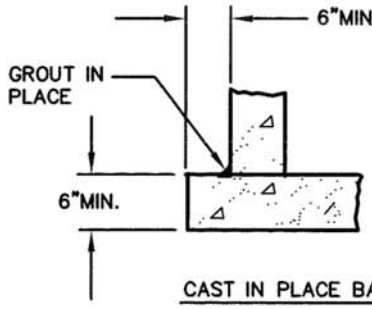
S-D1



NOTES

DROP OF GRADE THRU 48" MANHOLE SHALL BE 0.10', UNLESS OTHERWISE NOTED.

MANHOLE SIZES:
48" FOR DEPTH < 20 FT.
54" FOR DEPTH ≥ 20 FT.
60" FOR PIPE DIA. ≥ 15"
72" FOR PIPE DIA. ≥ 24"

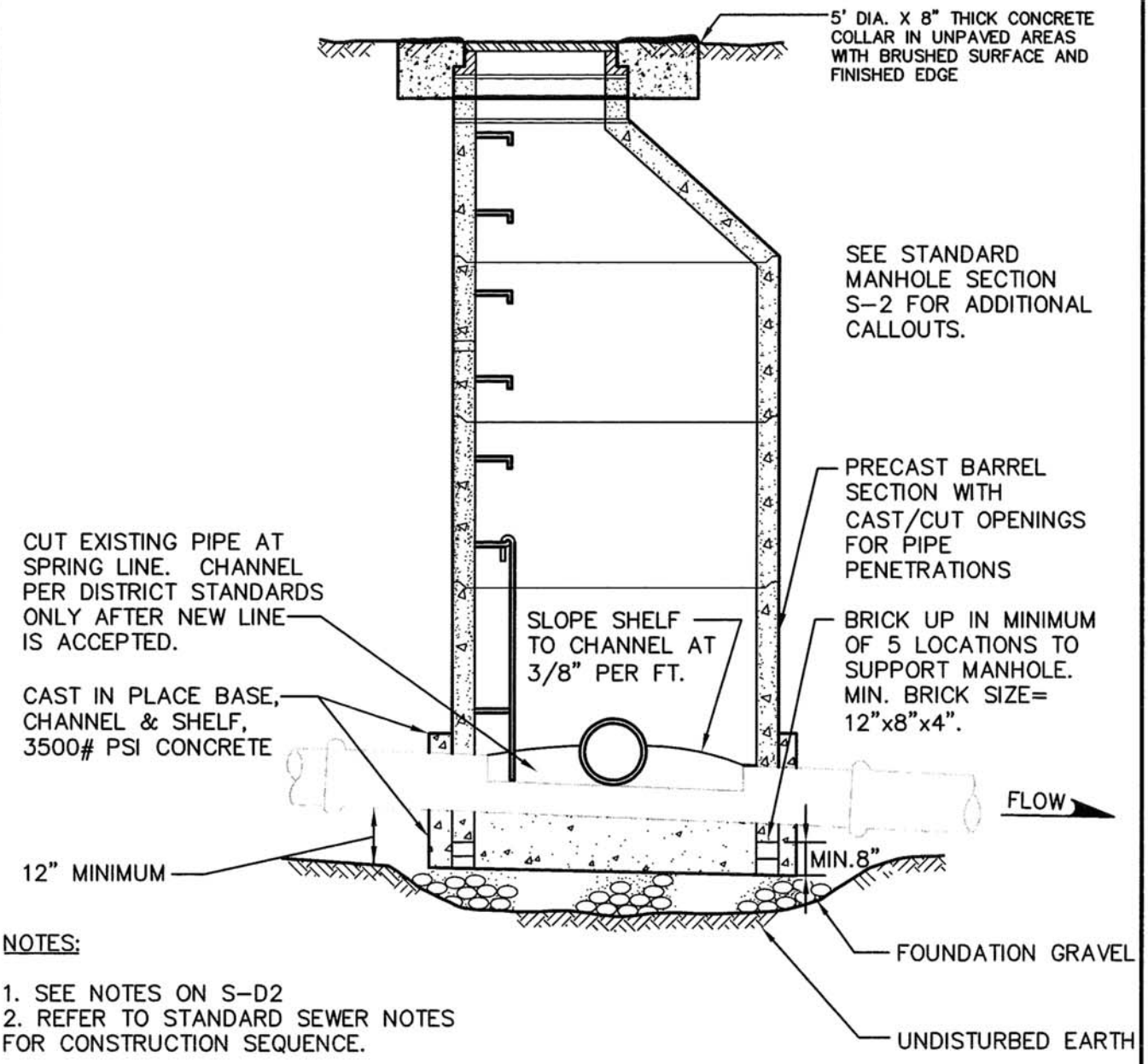


CAST IN PLACE BASE

SANITARY SEWER MANHOLE SECTION

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D2



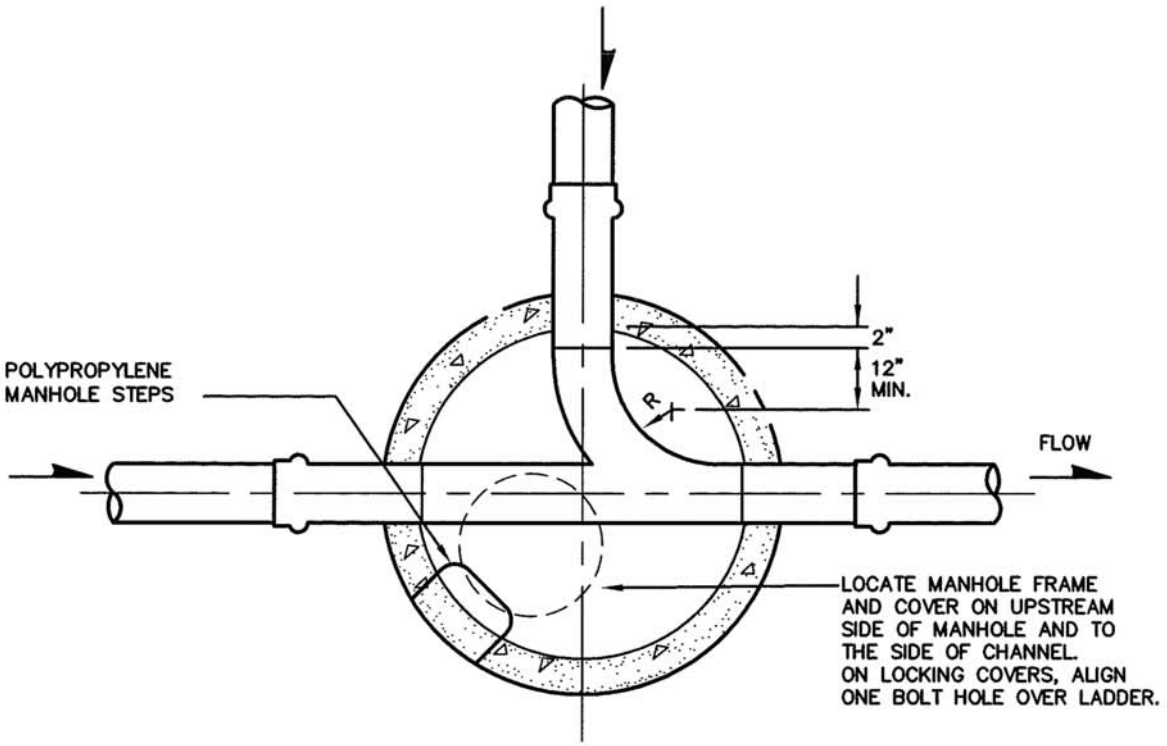
NOTES:

1. SEE NOTES ON S-D2
2. REFER TO STANDARD SEWER NOTES FOR CONSTRUCTION SEQUENCE.

SANITARY SEWER SADDLE MANHOLE

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D3



NOTES

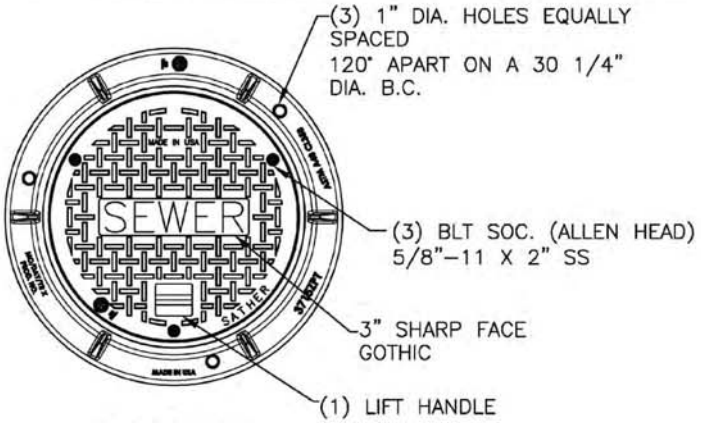
MANHOLE FRAME & LOCKING COVER

a. COVER SHALL HAVE THE WORD "SEWER" CAST WITH 2" HIGH LETTERS AND RAISED 3/8".
b. TOTAL WEIGHT OF FRAME & COVER SHALL BE 360 LBS. MIN.
c. DUCTILE IRON FRAME & COVER SHALL BE A.P.W.A. PLAN NO. 42.
d. NON-SKID PATTERN TO BE CAST INTEGRAL ON TOP OF COVER.
e. COVER SHALL BE PROVIDED WITH 3 EACH HOLES FOR LOCK DOWN PURPOSES.
f. PROVIDE 3 EACH 5/8", 11 N.C. SOCKET HEAD STAINLESS STEEL SCREWS, 3 5/8" LONG.
g. ALL HOLES FOR LOCKING COVER SHALL BE IN ALIGNMENT AND INTERCHANGEABLE.
h. FRAME AND COVER POSITIONED SO ONE OF THE LOCKING BOLTS IS CENTERED OVER THE STEPS.
i. DISTRICT APPROVED WATERTIGHT MANHOLE COVER REQUIRED.

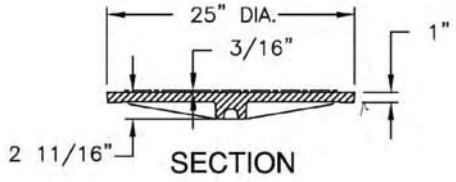
SANITARY SEWER MANHOLE PLAN

Mukilteo Water and Wastewater District
STANDARD DETAILS

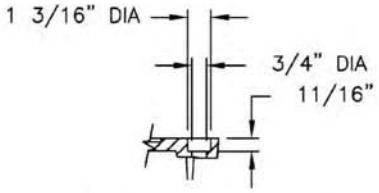
S-D4



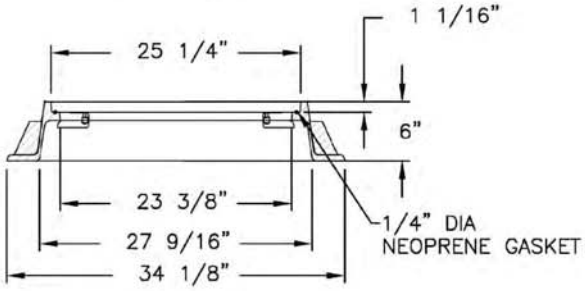
PLAN VIEW



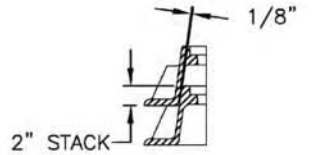
SECTION



BOLTHOLE DETAIL



SECTION



STACKING DETAIL

NOTES

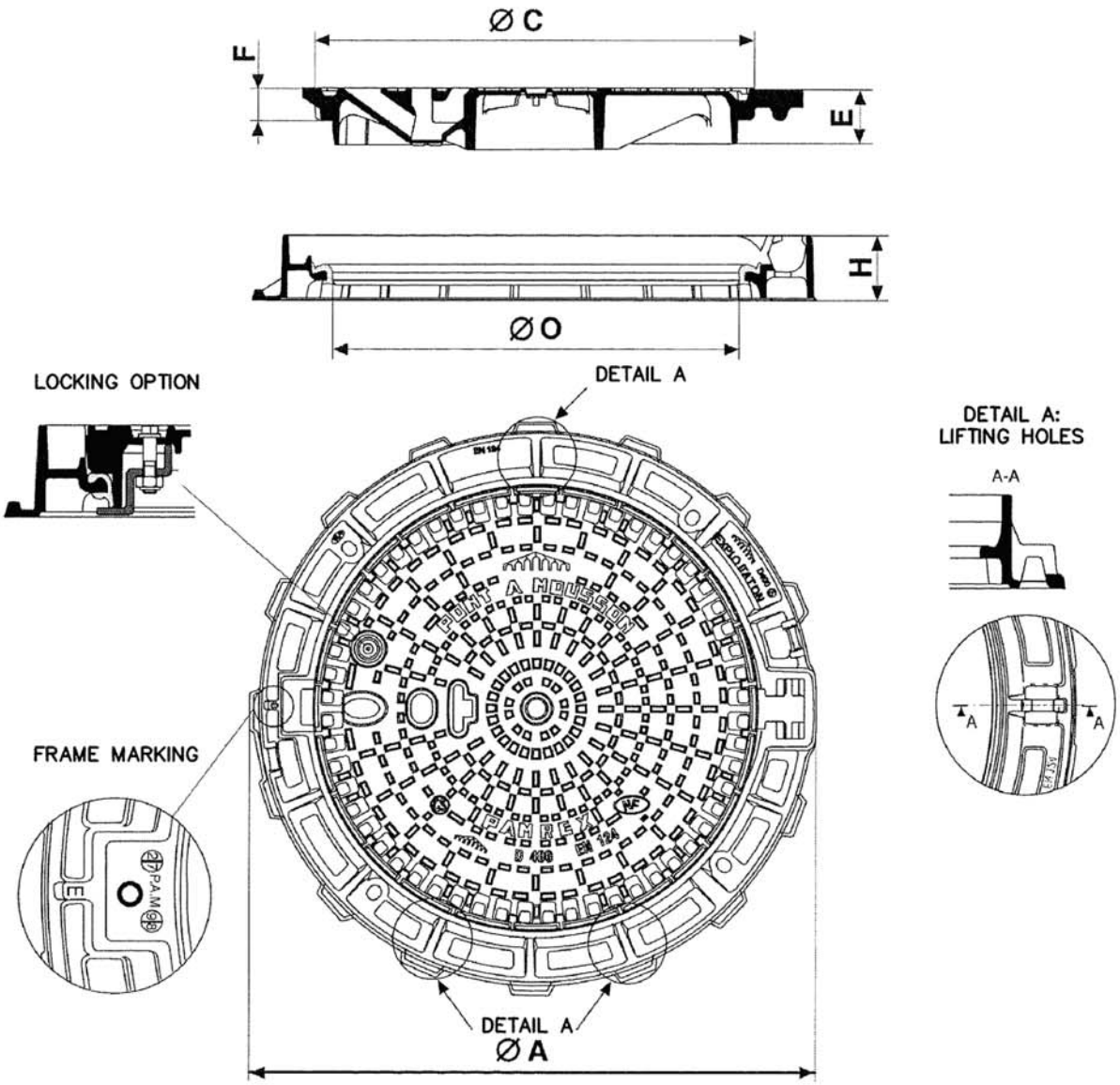
1. MATERIALS ARE DUCTILE IRON COVER ASTM A536, AND GRAY IRON IRON FRAME ASTM A48 CL35B PRODUCT# 3715ZPT.
2. MANUFACTURED IN THE USA BY EAST JORDAN IRON WORKS MANUFACTURING CO. HEAVY DUTY MANHOLE ASSEMBLY (H20 AND HS20 LOADINGS) OR APPROVED EQUAL.
3. MANHOLES LOCATED WITHIN NON–PAVED AREAS SHALL REQUIRE THE INSTALLATION OF GREEN FIBERGLASS MARKER POSTS 5' IN LENGTH WITH DECAL STATING "CAUTION SEWER PIPELINE". THE BURIED END SHALL BE "BARBED" OR AN ANCHOR KIT SHALL BE USED. INSTALL A CONCRETE COLLAR, 5' DIAMETER, 8" THICK UNLESS OTHERWISE DIRECTED BY THE DISTRICT.
4. 3/4" STRIP OF CONSEAL CD–101 MANHOLE RING AND COVER SEALANT REQUIRED BETWEEN COVER AND FRAME WHERE MANHOLE IS SUSCEPTIBLE TO INUNDATION OR THERE IS THE POTENTIAL FOR EXCESSIVE ODORS OR AS DIRECTED BY THE DISTRICT.
5. IN SIDEWALKS, RAMPS OR CROSSWALKS USE LID COMPLIANT TO AMERICANS WITH DISABILITIES ACT REQUIREMENTS.
6. SEE DETAIL S–D7 FOR ADJUSTMENT DETAILS.

MANHOLE FRAME AND COVER

S-D5

Mukilteo Water and Wastewater District
STANDARD DETAILS

Model	A inches	C inches	E inches	F inches	H inches	O inches	Reference	Weight lbs	Cover Weight lbs
Non ventilated	33	28	3.5	2	4	24	RE 60 R8 FD	195	122



NOTES:

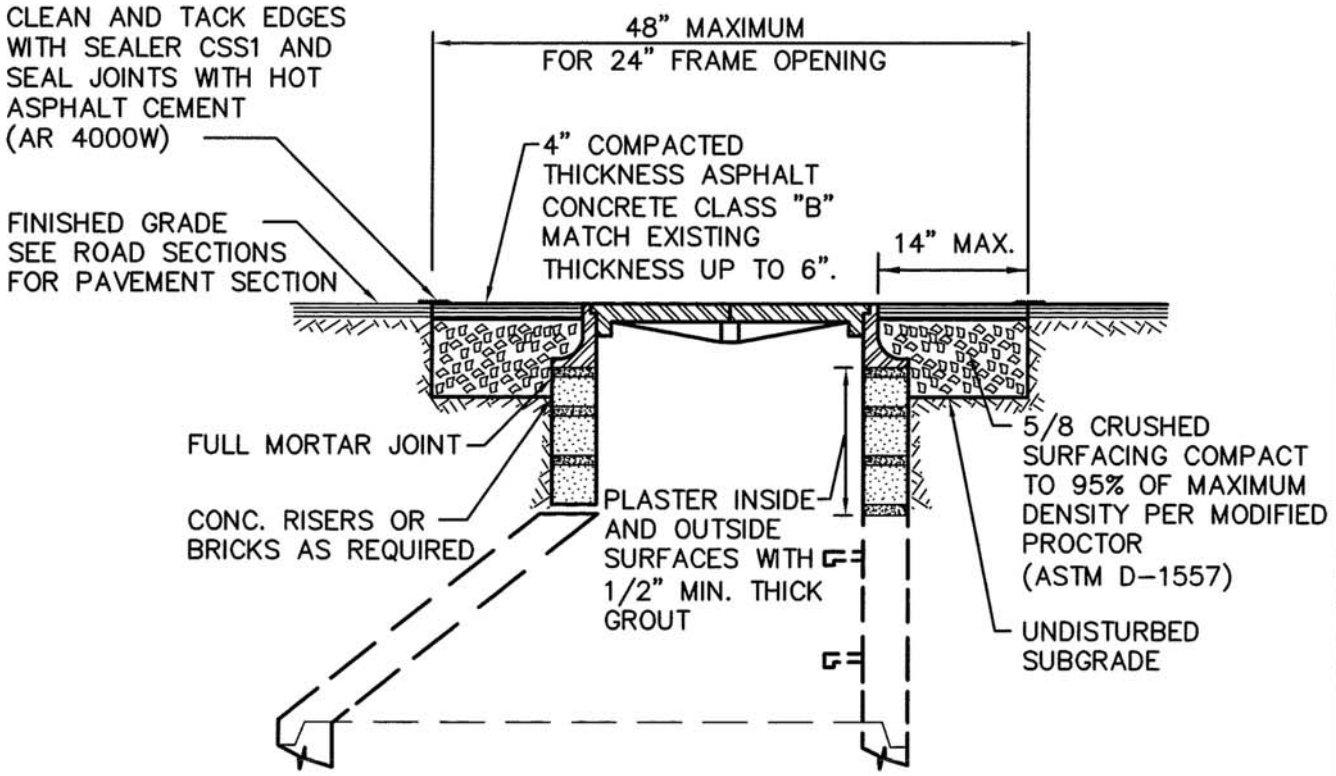
MANHOLE COVER AND FRAME SHALL BE PAMREX. COVERS AND FRAMES SHALL BE MANUFACTURED FROM DUCTILE IRON IN ACCORDANCE WITH ISO 1083. COVERS SHALL BE HINGED AND INCORPORATE A 90 DEGREE BLOCKING SYSTEM TO PREVENT ACCIDENTAL CLOSURE. COVERS SHALL BE ONE MAN OPERABLE USING STANDARD TOOLS AND SHALL BE CAPABLE OF WITHSTANDING A TEST LOAD OF 120,000 LBS. FRAMES SHALL BE CIRCULAR WITH A 24" CLEAR OPENING AND SHALL INCORPORATE A 360° MECHANICALLY ATTACHED ELASTOMER SEATING GASKET FOR INFILTRATION CONTROL AND TRAFFIC SHOCK. THE HINGE BOX SHALL INCLUDE A SELF-CLEANING, DUAL WIPER INFILTRATION PLUG. THE FRAME DEPTH SHALL NOT EXCEED 4 INCHES, AND THE FLANGE SHALL INCORPORATE BEDDING SLOTS, BOLT HOLES AND LIFTING EYES. ALL COMPONENTS SHALL BE BLACK COATED. FRAME WEIGHT: 73 LBS. COVER WEIGHT: 122 LBS. TOTAL WEIGHT 195 LBS.PAMREX IS AVAILABLE FROM TITUS INDUSTRIAL GROUP 877-582-9899

ALTERNATE MANHOLE FRAME AND COVER

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D6

CONSTRUCTION, INSTALLATION OR ADJUSTING TO GRADE OF MANHOLE RIMS SHALL CONFORM TO THE MOST RECENT WSDOT STANDARD SPECIFICATIONS



NOT TO SCALE

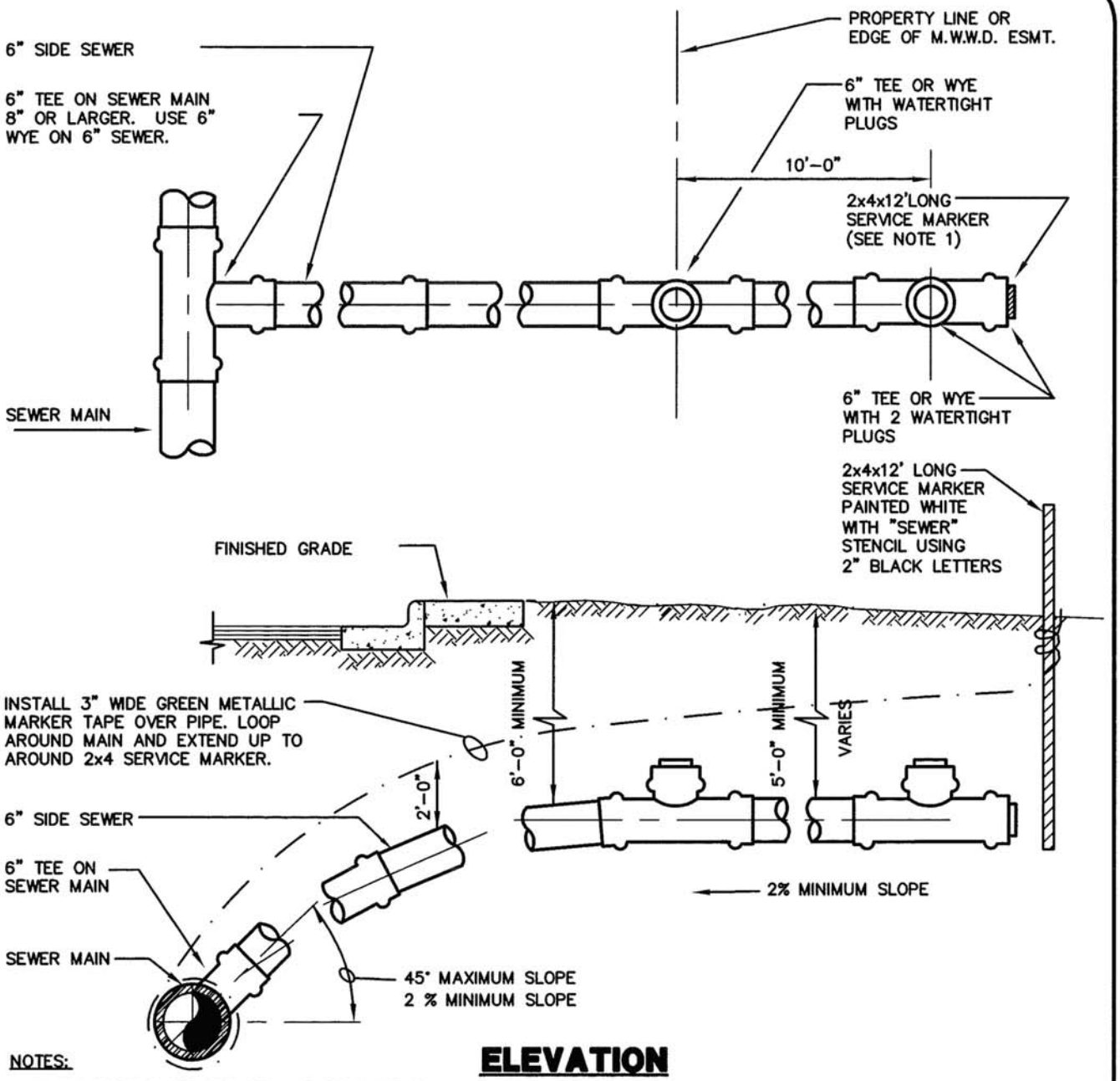
NOTE:

MAX. 4 EA, MIN. 2 EA 4" RISERS FOR NEW CONSTRUCTION

MANHOLE GRADE ADJUSTMENT DETAIL

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D7



ELEVATION

NOTES:

1. PAINT PORTION OF SERVICE MARKER THAT IS ABOVE FINISHED GRADE WITH WHITE PAINT. STENCIL WITH BLACK LETTERS "S/S" USING 3" HIGH LETTERS. LOCATE MARKER AT END OF EACH SERVICE.
2. SIDE SEWER TO BE LOCATED AT NEAR CORNER OF LOT ON LOWER SIDE OF PROPERTY UNLESS OTHERWISE APPROVED BY THE DISTRICT.
3. MAXIMUM DEFLECTION NOT TO EXCEED PIPE MANUFACTURER RECOMMENDATIONS.
4. SIDE SEWER LATERAL SHALL BE THE SAME MATERIAL AS THE MAIN LINE SEWER AND BEDDED THE SAME. MANHOLE PER S-D2 REQUIRED 10' INTO PROPERTY ON ALL SIDE SEWERS OTHER THAN SINGLE FAMILY.

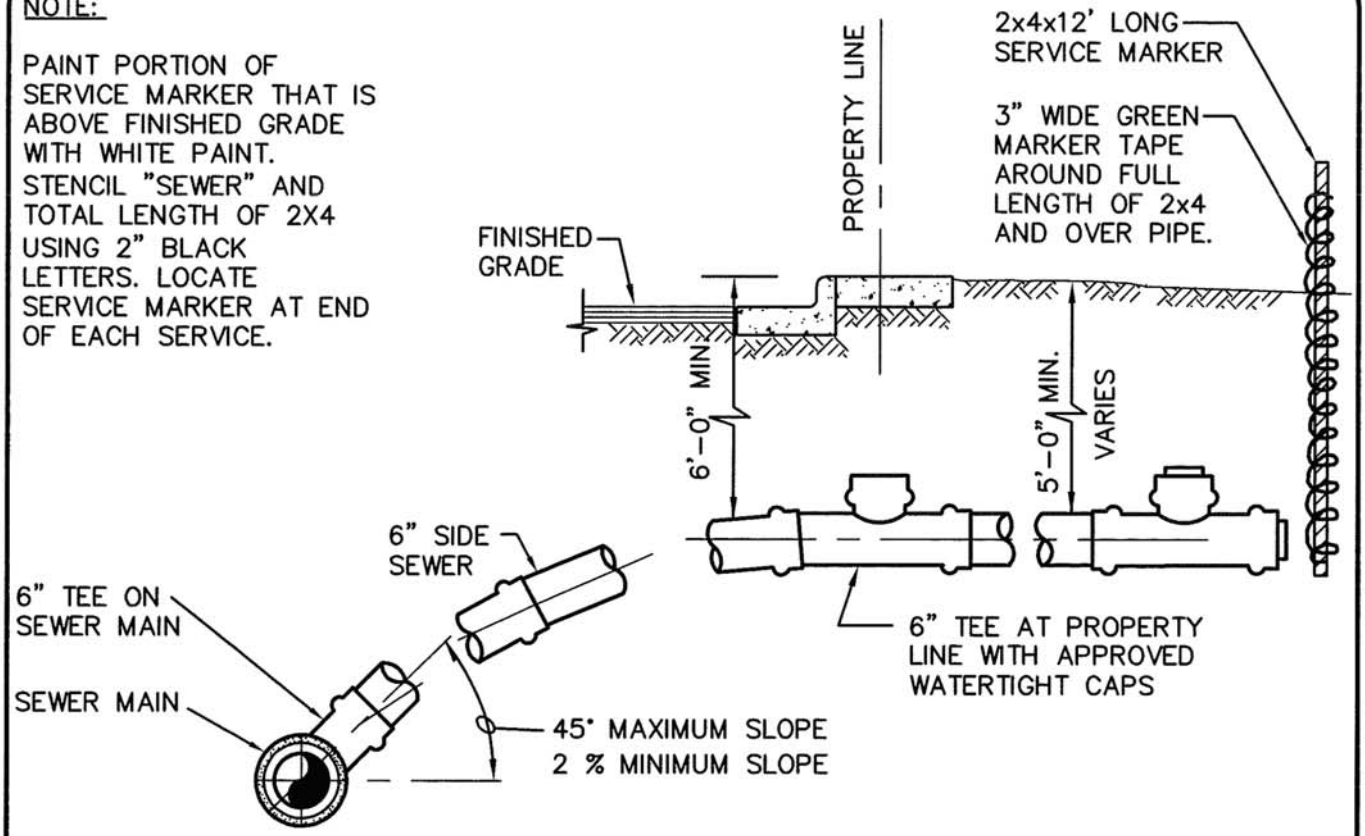
STANDARD SIDE SEWER

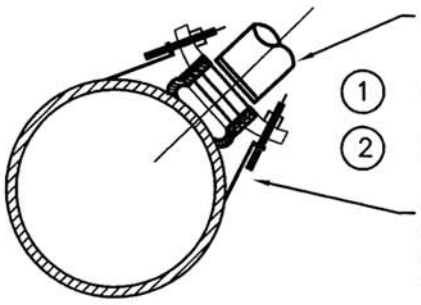
Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D8

NOTE:

PAINT PORTION OF SERVICE MARKER THAT IS ABOVE FINISHED GRADE WITH WHITE PAINT. STENCIL "SEWER" AND TOTAL LENGTH OF 2X4 USING 2" BLACK LETTERS. LOCATE SERVICE MARKER AT END OF EACH SERVICE.





(1) INSERT-A-TEE SADDLE FOR CONCRETE AND PVC PIPE

(2) ROMAC STYLE "CB" SADDLE FOR PVC AND D.I. PIPE

NOTES:

1. SEE STANDARD SIDE SEWER DETAIL FOR NEW CONSTRUCTION.

2. DEVELOPER TO PROVIDE ALL MATERIALS, TRAFFIC CONTROL, PERMITS, SHORING AND MISC. WORK AS REQUIRED TO TAP THE MAIN AND INSTALL THE SIDE SEWER.

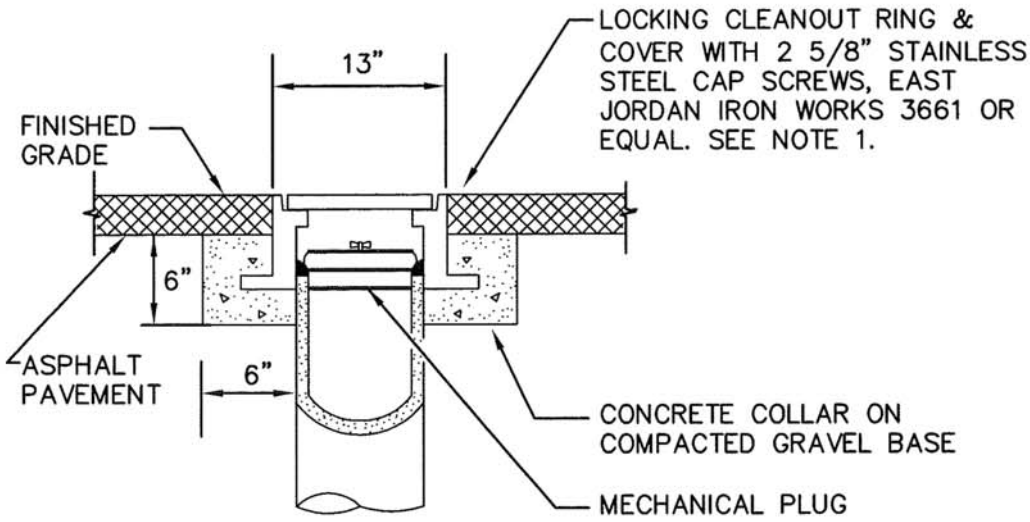
3. CUT-IN TEES ARE PERMITTED ONLY WITH DISTRICT APPROVAL.

SIDE SEWER LATERAL

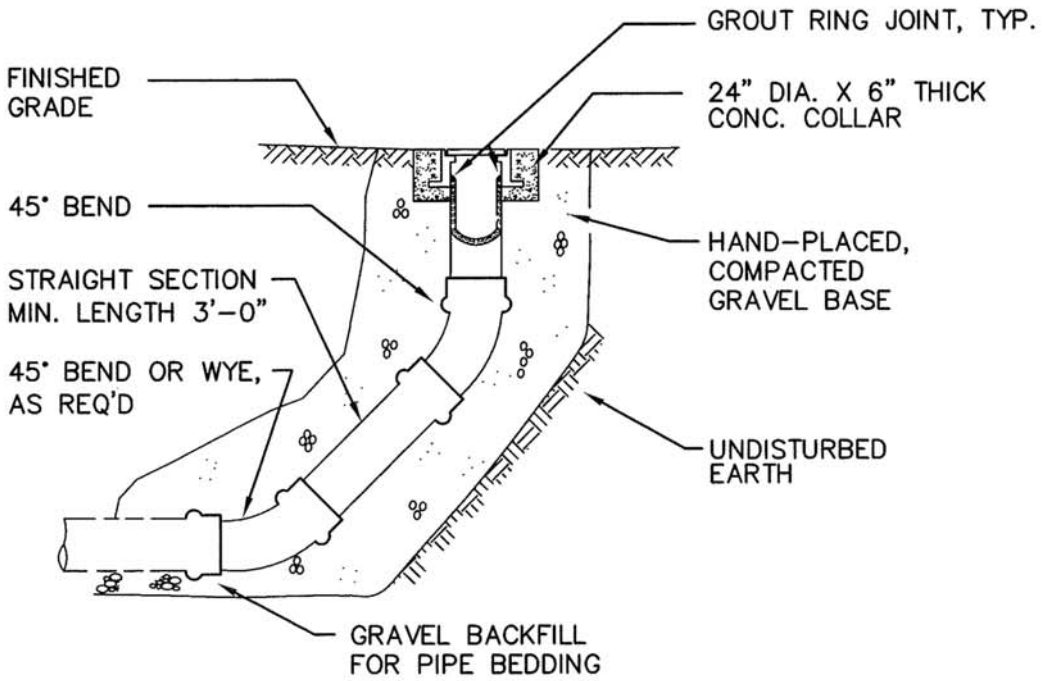
CONNECTION TO EXISTING MAIN

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D9



STREET USE



EASEMENT USE

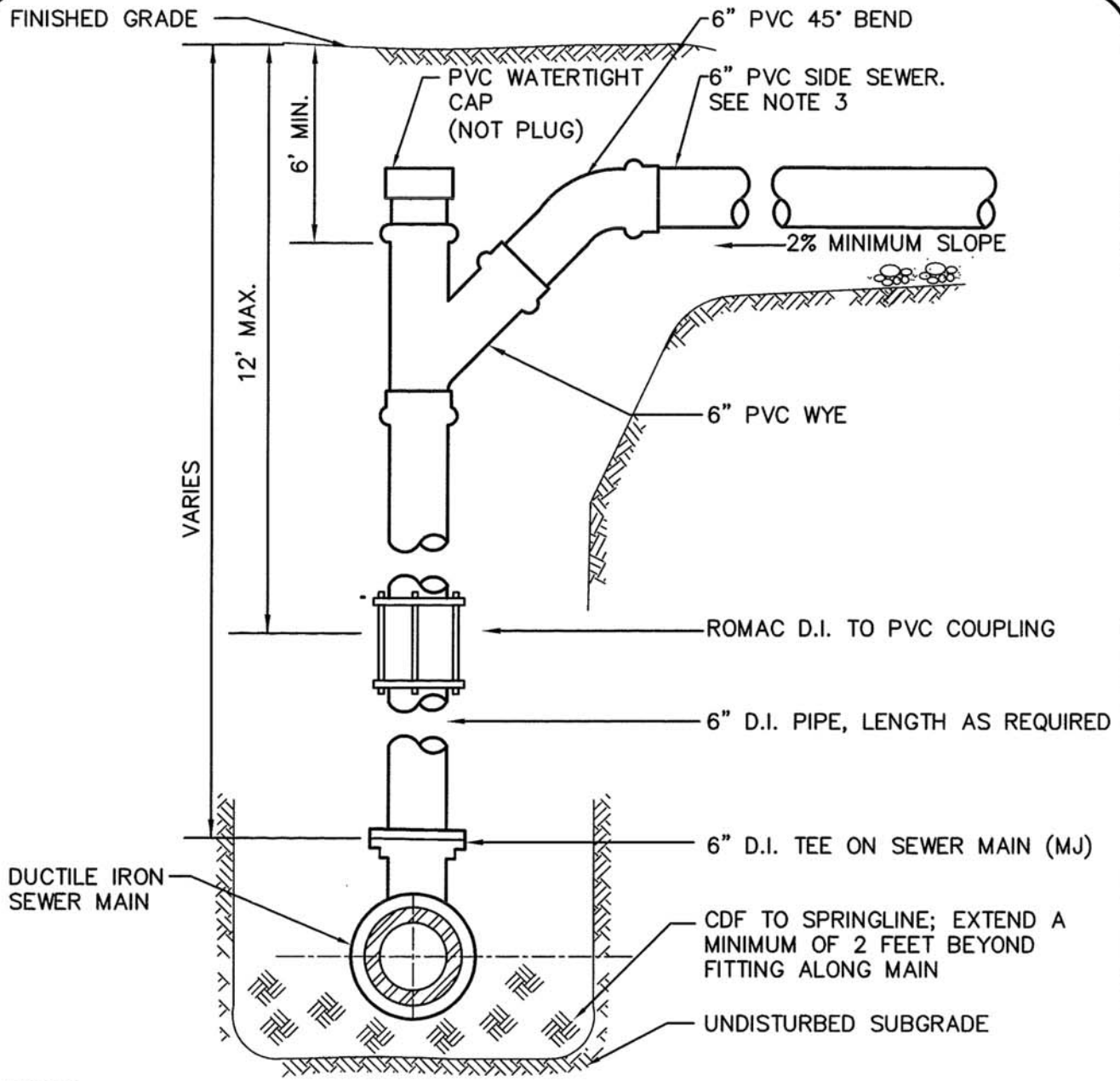
NOTES:

1. INSTALL CARRIAGE BOLT/OVERSIZE WASHER/LOCK NUT ASSEMBLY IN VENT HOLE TO PROTECT AGAINST GROSS INFLOW, PER STANDARD NOTES.

SANITARY SEWER CLEANOUT

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D10



NOTES:

1. USE OF STANDING SIDE SEWER REQUIRES DISTRICT APPROVAL.

2. USE WILL ONLY BE CONSIDERED WHEN DEPTH OF MAIN EXCEEDS 18' AND REQUIRED DEPTH OF SIDE SEWER IS LESS THAN 10' AT PROPERTY LINE, AND WHERE STANDARD SIDE SEWER CONNECTION IS NOT FEASIBLE.

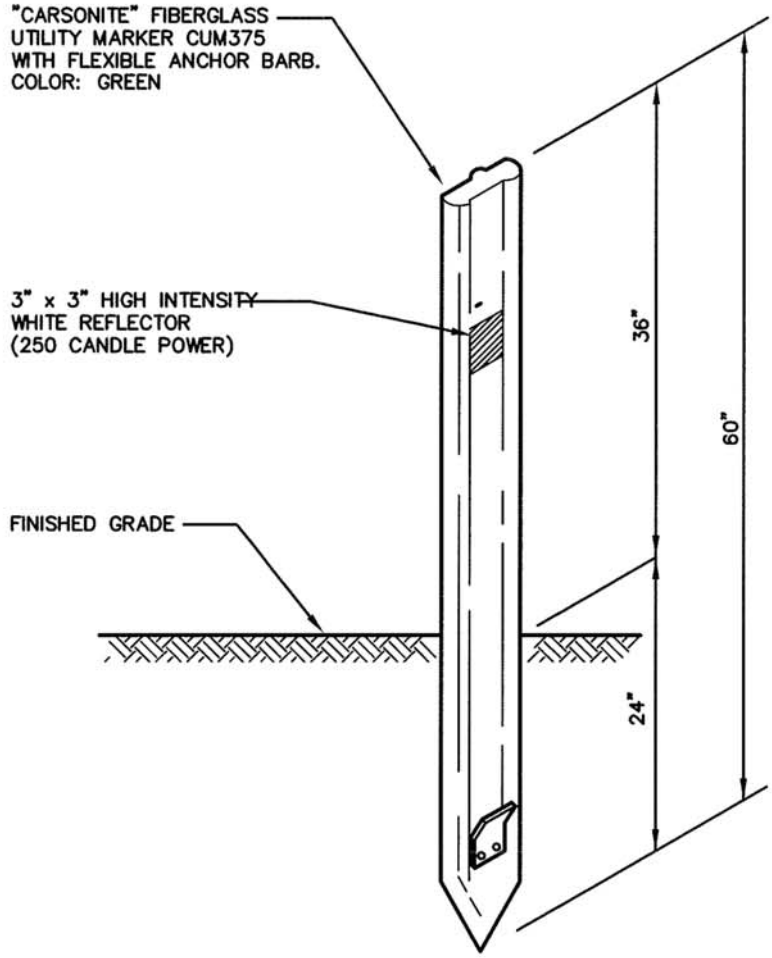
3. EXTEND 6" CLEANOUT TO SURFACE AT PROPERTY LINE (OR OTHER LOCATION AS DETERMINED BY THE DISTRICT).

4. REFER ALSO TO STANDARD SIDE SEWER DETAIL FOR ADDITIONAL REQUIREMENTS.

STANDING SIDE SEWER

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D11



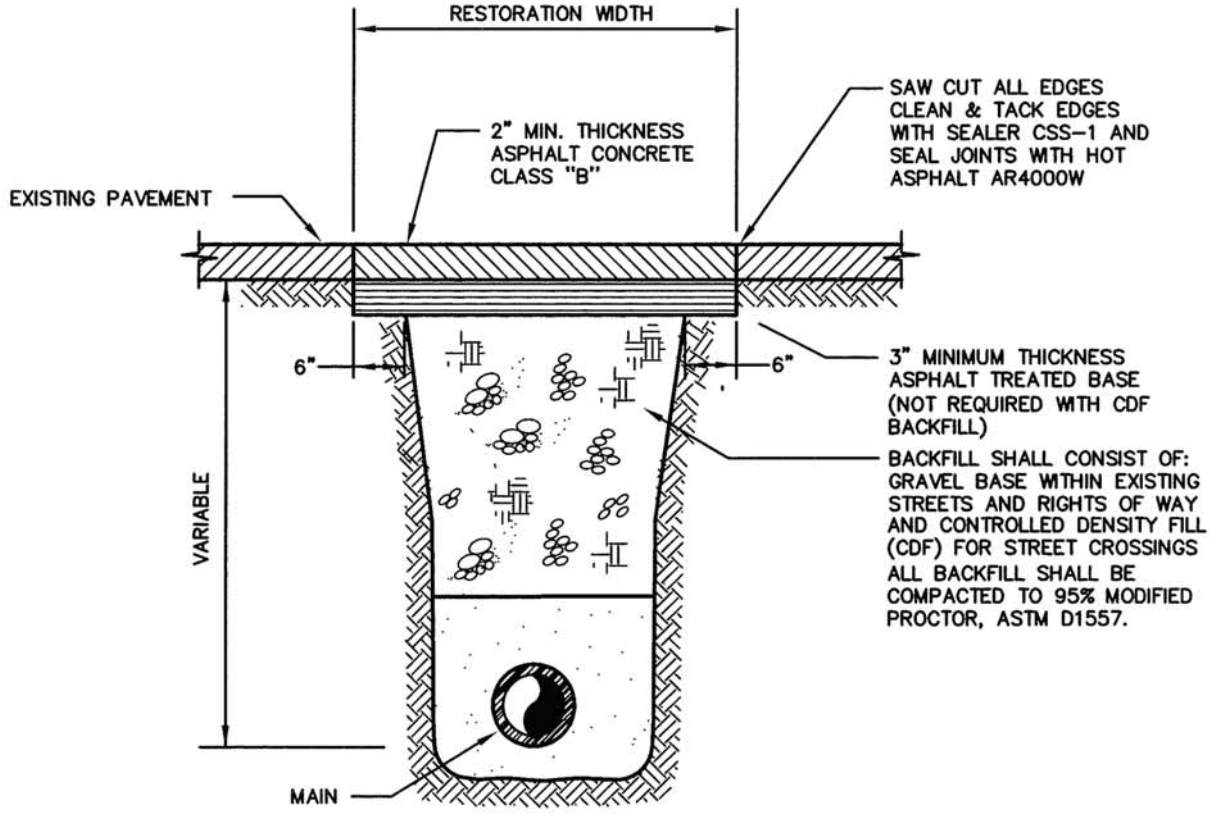
NOTES:

1. A MARKER POST SHALL BE LOCATED ADJACENT TO EACH MANHOLE LOCATED IN EASEMENT AREAS.
2. EACH POST SHALL INCLUDE THE FOLLOWING DECAL: "CAUTION SEWER MANHOLE, BEFORE DIGGING, CALL 811, UTILITY UNDERGROUND LOCATION CENTER."

MANHOLE MARKER

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D12



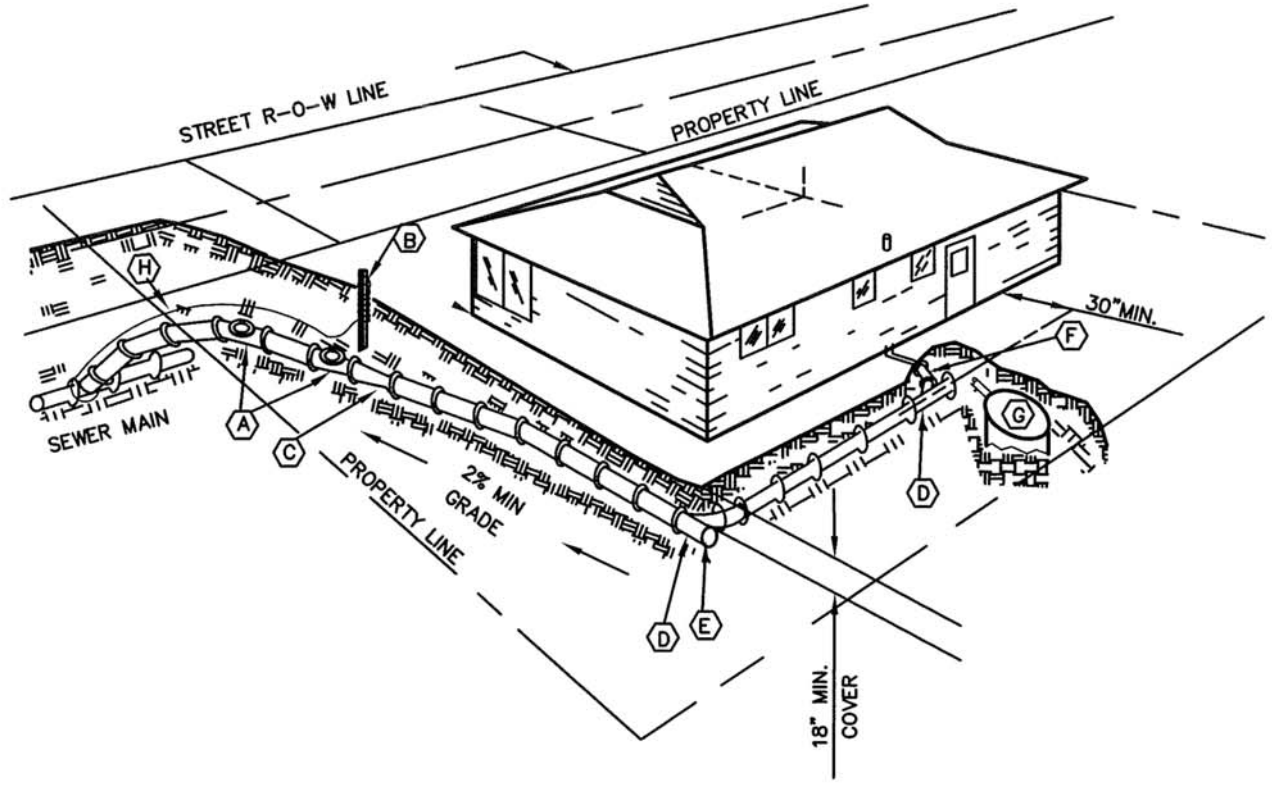
NOTES:

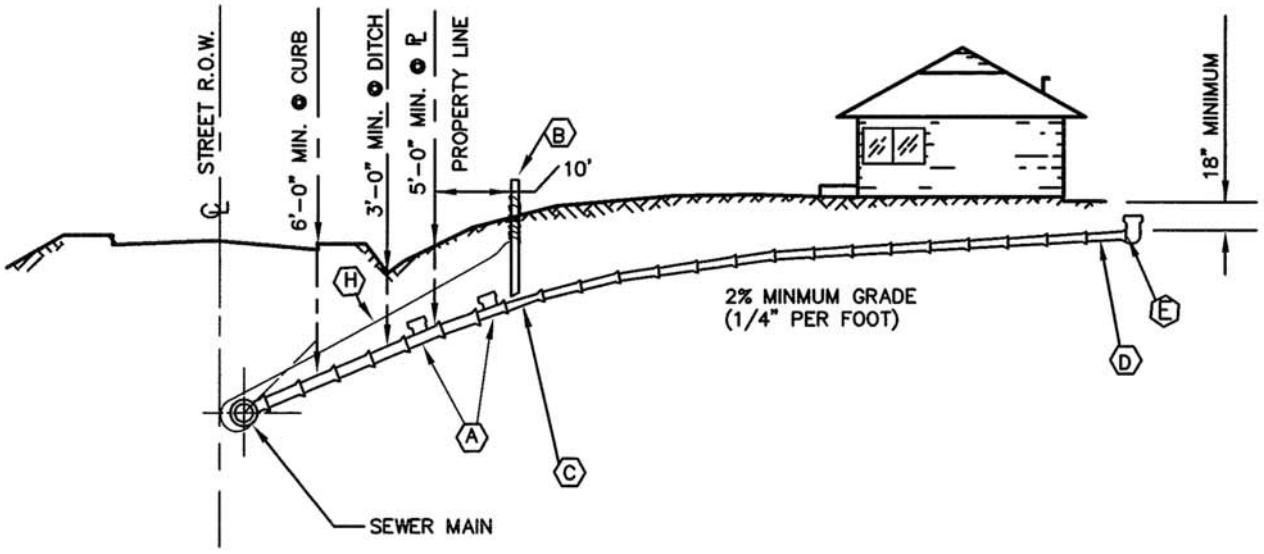
1. ALL ASPHALT STREETS AND DRIVEWAYS SHALL BE TEMPORARILY REPAIRED WITH COLD MIX, EXCEPT CROSSINGS WITH CDF SHALL BE COVERED WITH STEEL PLATES UNTIL THE CDF HAS CURRED TO ALLOW FOR PLACEMENT OF THE ASPHALT.
2. PATCH SHALL BE MACHINE ROLLED FLUSH WITH EXISTING PAVEMENT AND SHALL BE PLACED PER SEC. 5-04 OF THE WA. STATE D.O.T. SPECIFICATIONS.

ASPHALT PAVEMENT REPAIR

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D13





NOTE:
CLEAN OUT (D) SHALL BE 36" TO 48"
FROM FOUNDATION WALL

TYPICAL SIDE SEWER CONNECTION

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D14

A. INSPECTION TEE
B. 2 X 4 SERVICE MARKER
C. APPROVED 6" X 4" REDUCER (SINGLE FAMILY RESIDENCE ONLY)
D. WYE (CLEANOUT) AND 45 DEGREE BEND
E. CLEANOUT WITH APPROVED PLUG. CLEANOUT SHALL BE BROUGHT TO WITHIN 18" OF SURFACE IN UNPAVED AREA OR BROUGHT TO SURFACE IN PAVED AREA WITH CAST-IRON COVER.
F. 45 DEGREE BEND. CONNECT HOUSE SEWER PIPE TO SIDE SEWER WITH APPROVED ADAPTER.
G. EXISTING SEPTIC TANK - CUT AND PLUG INLET LINE, PUMP TANK DRY AND FILL TANK WITH SUITABLE MATERIAL.
H. FURNISH AND INSTALL 3" WIDE GREEN METALLIC MARKER TAPE AT 2' OVER PIPE. LOOP AROUND MAIN AND EXTEND UP TO AND AROUND 2"X4" SERVICE MARKER.

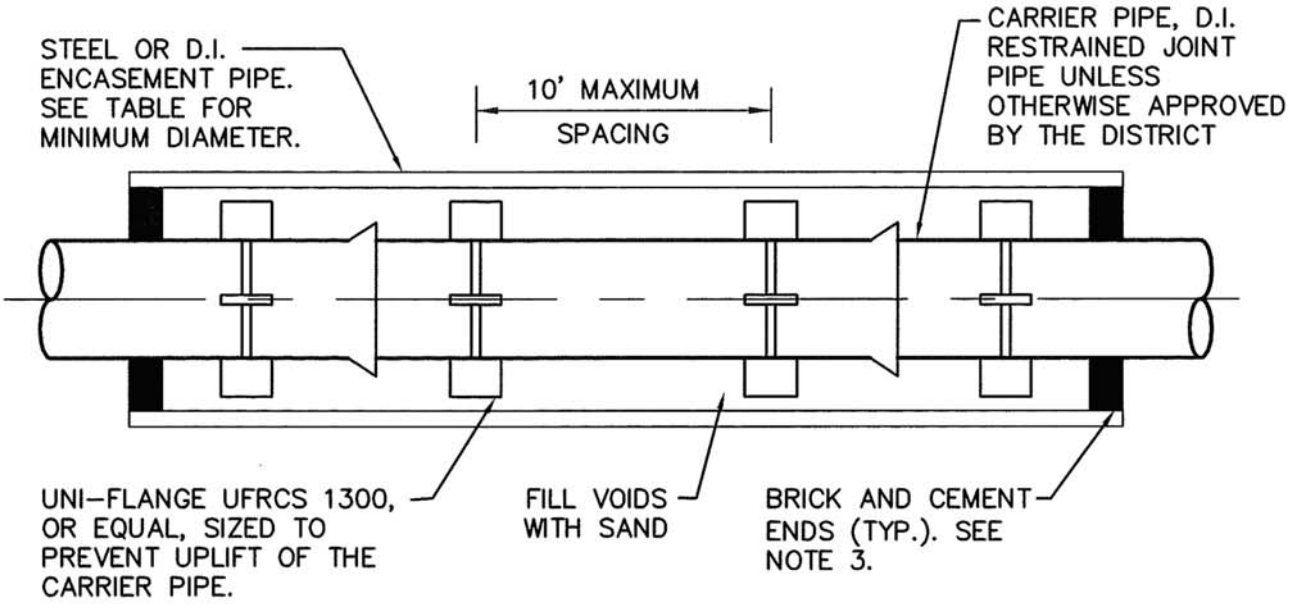
GENERAL NOTES

1. SIDE SEWER PIPE SHALL BE 4" OR LARGER FOR SERVICING SINGLE FAMILY AND 6" FOR SERVICING MULTIPLE (DUPLEXES), COMMERCIAL ESTABLISHMENTS, SCHOOLS, OR ANY BUILDING OTHER THAN SINGLE FAMILY RESIDENCES, DUCTILE IRON OR PVC ASTM 3034, AND SHALL BE INSTALLED AT 2% MIN. GRADE (1/4" FALL PER FOOT). CONSTRUCTION ON PRIVATE PROPERTY MAY BE DONE BY OWNER BUT REQUIRES A PERMIT.
2. ALL PIPE JOINTS SHALL BE RUBBER GASKET TYPE.
3. ALL PIPE SHALL BE BEDDED AND ENCASED WITH CRUSHED SURFACING 1-1/4" BASE COURSE ROCK IN ACCORDANCE WITH SECTION 9-03-9(3) OF THE WSDOT STANDARD SPECIFICATIONS, UNLESS OTHERWISE APPROVED BY THE DISTRICT. BEDDING MATERIAL SHALL BE INSTALLED WITH A MINIMUM OF 3" BELOW THE BOTTOM OF THE PIPE TO 6" ABOVE THE TOP OF THE PIPE UNLESS OTHERWISE APPROVED BY THE DISTRICT. BEDDING WITH SAND OR PEA GRAVEL WILL NOT BE ACCEPTED
4. ON PRIVATE PROPERTY MIN. COVER SHALL BE 18" OVER TOP OF PIPE AT 30" DISTANCE FROM BUILDING.
5. PARALLEL WATER AND SEWER LINES SHALL BE 10' APART HORIZONTALLY WHEREVER POSSIBLE.
6. CLEANOUTS AT STRUCTURE CONNECTION SHALL BE 30" FROM STRUCTURE WALL UNLESS APPROVED BY THE DISTRICT.
7. CLEANOUTS ARE REQUIRED FOR 45° BEND OR ANY COMBINATION OF BENDS EQUAL TO 45° OR GREATER. DISTANCE BETWEEN CLEANOUTS SHALL NOT EXCEED 100'. CLEANOUT SHALL BE A PLUGGED TEE OR A PLUGGED WYE LATERAL.
8. 6" SEWER PIPE IS REQUIRED IN THE STREET RIGHT-OF-WAY AND SHALL HAVE A 2% MIN. GRADE. CONSTRUCTION IN STREET MUST BE DONE BY A STATE LICENSED SIDE SEWER CONTRACTOR AND REQUIRES A RIGHT OF WAY PERMIT FROM THE CITY OR COUNTY.
9. SIDE SEWER SHALL BE INSPECTED BY THE DISTRICT PRIOR TO BACKFILLING. SIDE SEWER SHALL BE PLUGGED & TESTED IN PRESENCE OF DISTRICT INSPECTOR BY FILLING WITH WATER. LEAKAGE RATE SHALL NOT EXCEED 0.31 GAL/HR FOR 4" PIPE & 0.47 GAL/HR FOR 6" PIPE, PER 100' OF PIPE.
10. THE OWNER AND/OR HIS/HER CONTRACTOR HEREBY AGREE TO SAFEGUARD THE WORK DONE UNDER THIS PERMIT IN SUCH A MANNER AS TO PREVENT INJURY AND/OR DAMAGE TO THE PUBLIC. SUCH PRECAUTIONS SHALL INCLUDE THE EMPLOYMENT OF ALL NECESSARY DITCH SAFEGUARDS SUCH AS LANTERNS, BARRICADES, A TRENCH BOX FOR ANY DITCH OVER 4' DEEP AND SAFE ACCESS OR EGRESS THROUGH THE WORKING AREA.
11. BACK-WATER VALVES MAY BE REQUIRED IF DWELLING HAS POSSIBILITY OF SEWAGE BACKING UP INTO THE DWELLING.

SIDE SEWER INFORMATION

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D15



NOTE:
MINIMUM ENCASEMENT INSIDE DIAMETER (I.D.) SHALL BE 24"

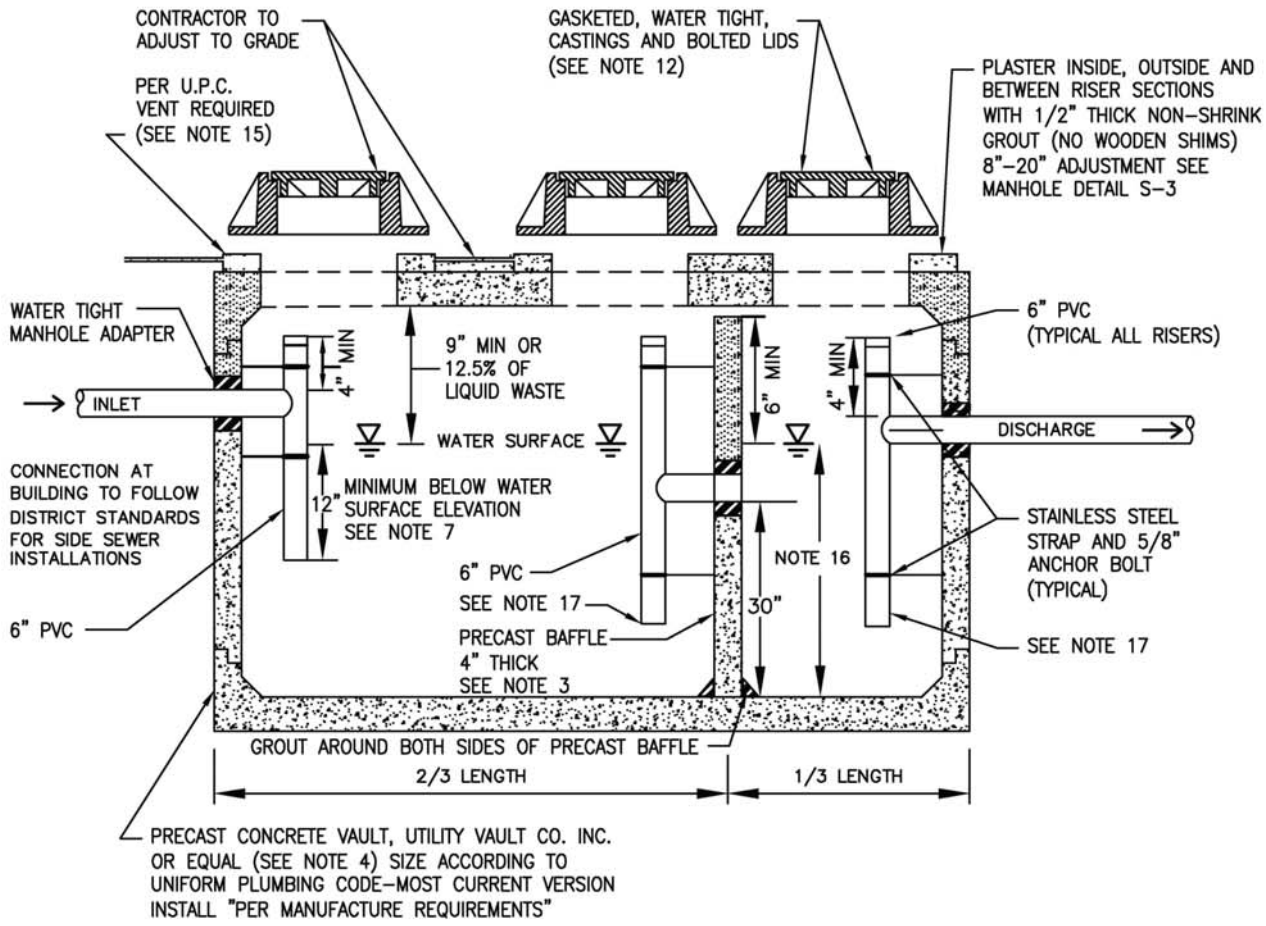
NOTES:

1. CONTRACTOR TO VERIFY LINE AND GRADE PRIOR TO FILLING VOIDS WITH SAND.
2. CARRIER PIPE WITHIN THE LENGTH OF THE ENCASEMENT PIPE SHALL HAVE RESTRAINED JOINTS.
3. REGULATORY AGENCY REQUIREMENTS SHALL SUPERCEDE DISTRICT STANDARDS IF MORE STRINGENT.

ENCASEMENT/CARRIER PIPES

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D16



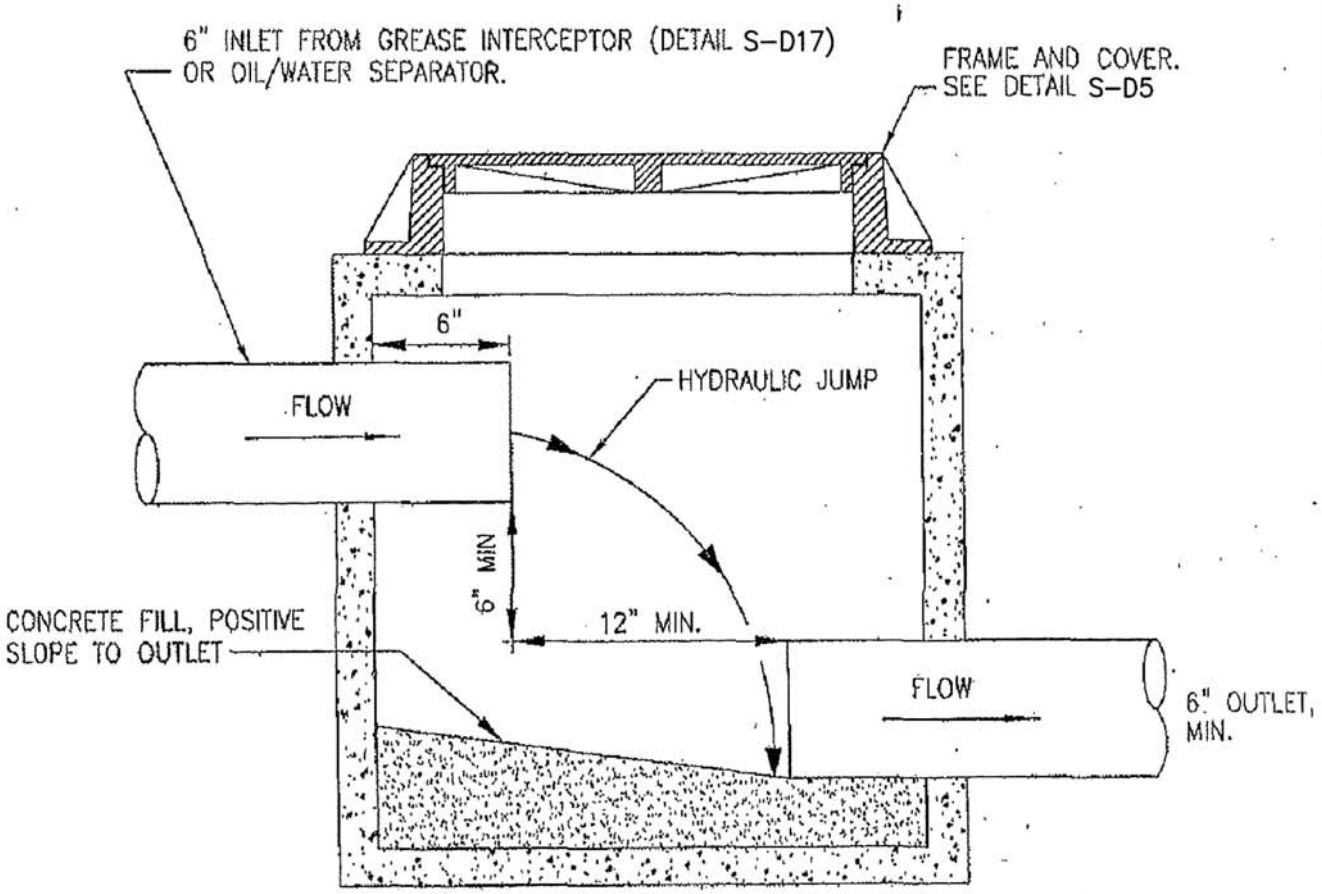
NOTES:

1. GRAY-WATER ONLY. BLACK-WATER SHALL BE CARRIED BY SEPERATE SIDE SEWER.
2. LOCATE INTERCEPTOR WITHIN CLOSE PROXIMITY OF DRIVE FOR ACCESS BY A MAINTENANCE VEHICLE.
3. IF VAULT IS NOT SLOTTED TO ACCEPT PRECAST CONC. BAFFLE THEN PRECAST CONC. SHALL BE HELD IN PLACE BY (2) 3"X3"X3/8" ANGLE (4FT. LONG) ATTACHED TO VAULT WALL WITH (4 EA) 1/2" BOLTS AND NUTS (WITH WASHERS) SPACED 14" O.C. ANGLE AND FASTENERS SHALL BE STAINLESS STEEL.
4. PRECAST VAULT AND BAFFLE SHALL HAVE KNOCKOUTS AT ALL PIPE OPENINGS. IF KNOCKOUTS ARE NOT PRESENT THEN PIPE OPENINGS SHALL BE 2" LARGER THAN PIPE DIAMETER.
5. POSITION PIPE RISERS BELOW ACCESS OPENINGS TO ALLOW CLEAR ACCESS TO RISER AND VAULT CHAMBER FOR SAMPLING & INSPECTION.
6. TOP OF INLET PIPE SHALL BE ONE PIPE DIAMETER HIGHER THAN THE TOP OF THE DISCHARGE PIPE.
7. INLET INSPECTION TEE/RISER MUST EXTEND A MINIMUM OF 12" BELOW THE DESIGNED WATER LEVEL.
8. ALL INTERNAL PIPING (RISER/INSPECTION TEE) SHALL BE A MINIMUM OF 6" PVC PIPE. EACH RISER SHALL BE CONNECTED TO THE WALL OF THE VAULT IN TWO (2) PLACES USING STAILNESS STEEL OR ALUMINUM STRAPS.
9. ALL FITTINGS SHALL BE DESIGNED FOR GREASE RETENTION.
10. CONNECTIONS THROUGH CONCRETE WALLS REQUIRE WATER TIGHT MANHOLE ADAPTERS. SEAL ALL PIPE CONNECTIONS WITH NONSHRINK GROUT.
11. VAULT AND FITTINGS SHALL BE WATER TIGHT.
12. LIDS, FRAMES AND BOLTS SHALL MEET DISTRICT STANDARDS FOR MANHOLE LIDS. MANHOLE ACCESS REQUIRED TO ALL VAULT CHAMBERS.
13. FILL WITH CLEAN WATER PRIOR TO START UP OF SYSTEM.
14. DISCHARGE REQUIRED TO COMPLY WITH DISTRICT DISCHARGE LIMITS.
15. INTERCEPTORS SHALL BE VENTED PER UNIFORM PLUMBING CODE.
16. LIQUID DEPTH SHALL MEET THE UNIFORM PLUMBLING CODE REQUIREMENTS.
17. DISCHARGE AND TRANSITION TEES/RISERS SHALL EXTEND TO. WITHIN 12"-18" OF THE VAULT BOTTOM.

GREASE INTERCEPTOR

S-D17

Mukilteo Water and Wastewater District
STANDARD DETAILS



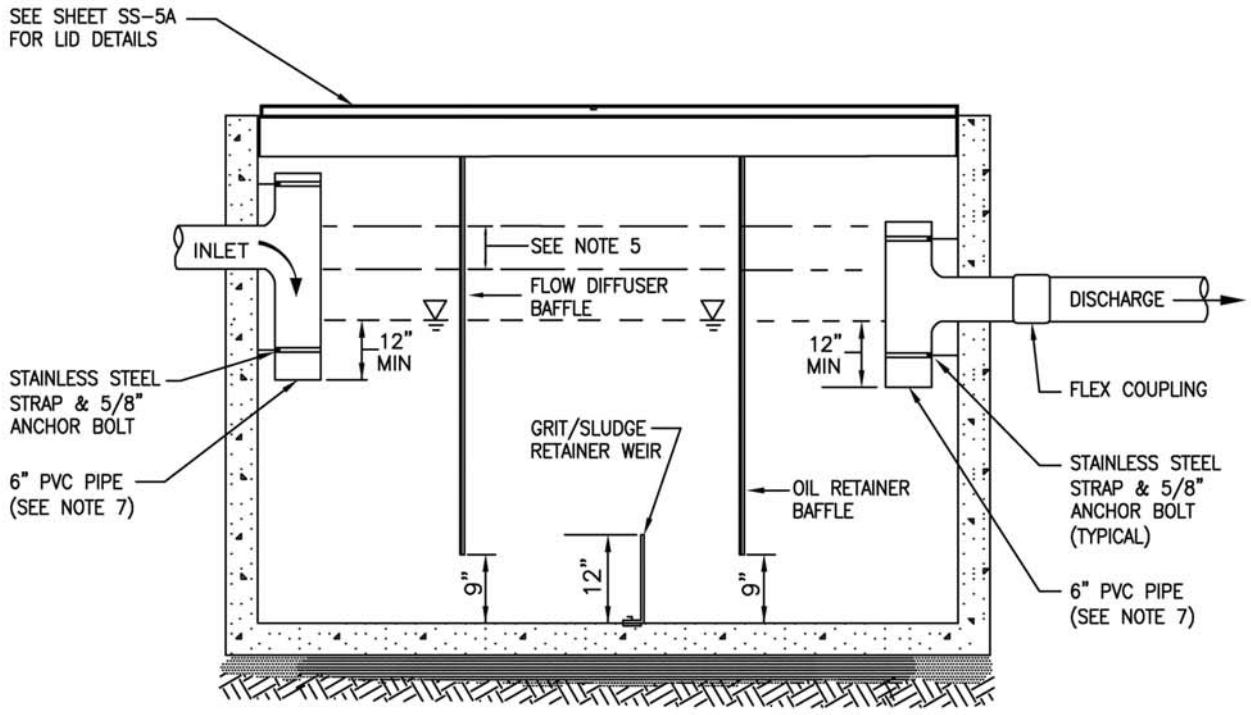
NOTES:

1. COMPLY WITH ALL REGULATORY REQUIREMENTS OF JURISDICTIONAL AUTHORITY.
2. OUTLET PIPE SHALL BE OF EQUAL OR GREATER DIAMETER THAN THE INLET PIPE.
3. STRUCTURE AND FRAME AND COVER SHALL BE H-20 LOAD RATED IF LOCATED IN TRAFFIC AREA.

SAMPLE CHAMBER FOR GREASE INTERCEPTOR & OIL/WATER SEPARATOR

Mukilteo Water and Wastewater District
STANDARD DETAILS

S-D18



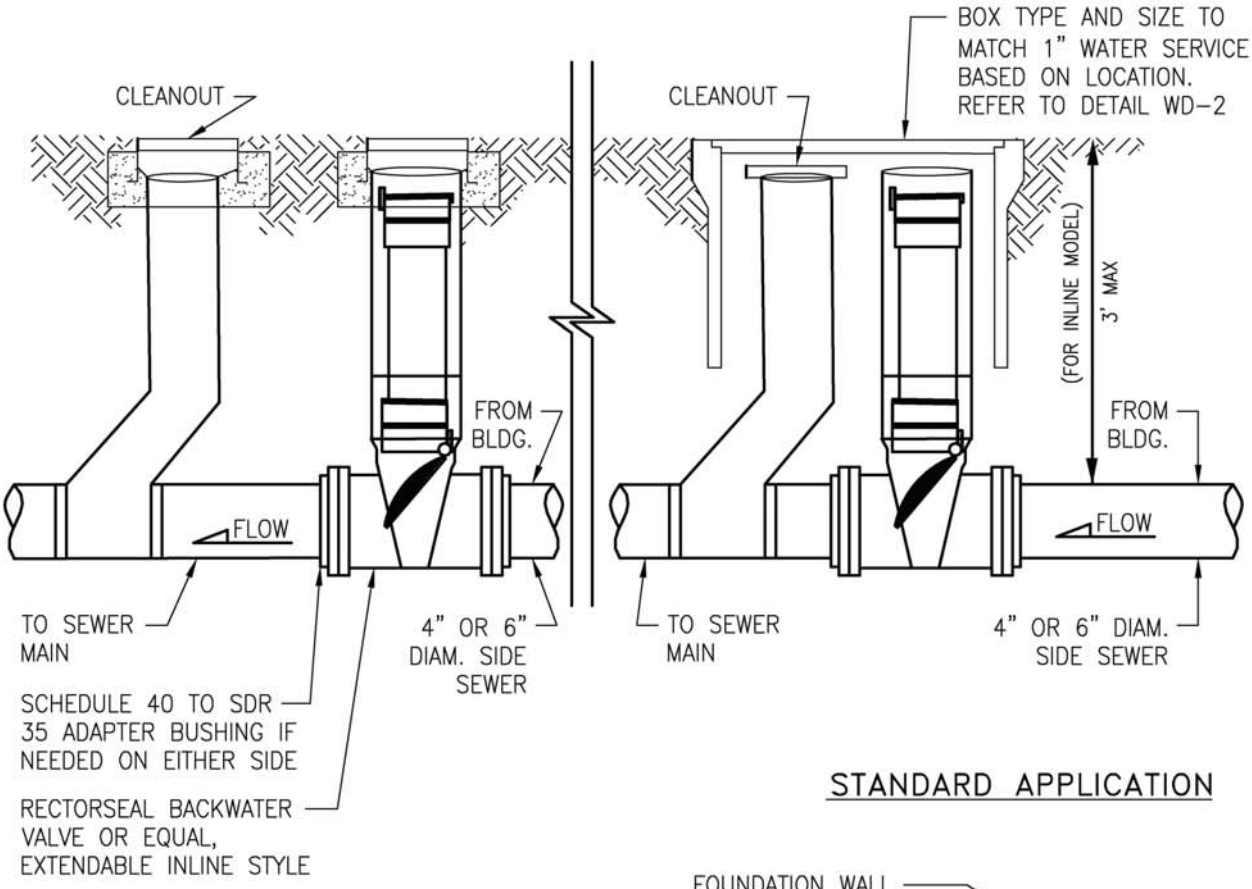
NOTES:

1. GRAY-WATER ONLY. BLACK-WATER SHALL BE CARRIED BY SEPERATE SIDE SEWER.
2. LOCATE SEPARATOR WITHIN CLOSE PROXIMITY OF DRIVE FOR ACCESS BY A MAINTENANCE VEHICLE.
3. PRECAST VAULT AND BAFFLE SHALL HAVE KNOCKOUTS AT ALL PIPE OPENINGS. IF KNOCKOUTS ARE NOT PRESENT THEN PIPE OPENINGS SHALL BE 2" LARGER THAN PIPE DIAMETER.
4. POSITION PIPE RISERS/INSPECTION TEES BELOW ACCESS OPENINGS TO ALLOW CLEAR ACCESS TO RISER & VAULT CHAMBER FOR SAMPLING & INSPECTION.
5. TOP OF INLET PIPE SHALL BE ONE PIPE DIAMETER HIGHER THAN TOP OF DISCHARGE PIPE.
6. INLET & DISCHARGE INSPECTION TEES/RISERS MUST EXTEND A MINIMUM OF 12" BELOW DESIGNED WATER LEVEL.
7. ALL INTERNAL PIPING (RISER/INSPECTION TEE) SHALL BE A MINIMUM OF 6" PVC PIPE. EACH RISER SHALL BE CONNECTED TO THE WALL OF THE VAULT IN TWO (2) PLACES USING STAINLESS STEEL OR ALUMINUM STRAPS.
8. ALL FITTINGS SHALL BE DESIGNED FOR OIL RETENTION.
9. CONNECTIONS THROUGH CONCRETE WALLS REQUIRED WATER TIGHT MANHOLE ADAPTERS. SEAL ALL PIPE CONNECTIONS WITH WATER TIGHT GROUT.
10. VAULT AND FITTINGS SHALL BE WATER TIGHT.
11. LIDS, FRAMES AND BOLTS SHALL MEET DISTRICT STANDARDS FOR MANHOLE LIDS AND/OR CLEANOUTS AS APPLICABLE.
12. FILL WITH CLEAN WATER PRIOR TO START UP OF SYSTEM.
13. DISCHARGE REQUIRED TO COMPLY WITH DISTRICT DISCHARGE LIMITS.
14. INTERCEPTORS SHALL BE VENTED PER THE UNIFORM PLUMBING CODE.
15. ACCESS REQUIRED TO ALL INTERNAL COMPONENTS TO ALLOW FOR MAINTENANCE.

S-D19

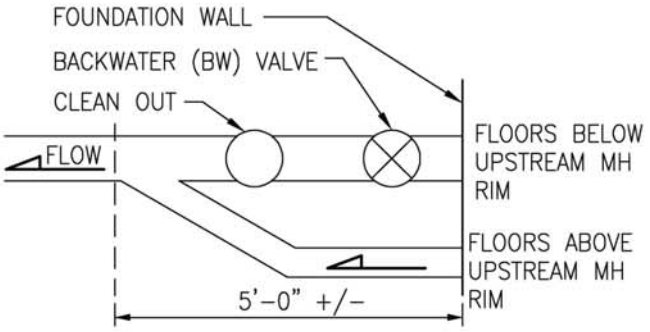
OIL / WATER SEPARATOR

Mukilteo Water and Wastewater District
STANDARD DETAILS



TRAFFIC APPLICATION

STANDARD APPLICATION



BACKWATER VALVE OUTSIDE PLAN VIEW

NOTES:

1. TO BE INSTALLED WHEN FINISH FLOOR ELEVATION IS LOWER THAN THE UPSTREAM MANHOLE RIM ELEVATION

A. ALL ACCESS LIDS SHALL BE BROUGHT TO FINISH GRADE. PROPERTY/BUILDING OWNER SHALL TAKE OWNERSHIP AND RESPONSIBILITY FOR CLEANING AND MAINTAINING.

B. IF PLACED IN CONCRETE, ASPHALT, OR TRAFFIC AREAS; A TRAFFIC BEARING LOCKING CASTING AND LID MARKED "SEWER" IS REQUIRED BY THE DISTRICT.

C. PLASTIC BOXES MARKED "SEWER" ARE ACCEPTABLE IN LANDSCAPE AREAS.

D. A SEPARATE BOX MAY BE USED FOR THE CLEANOUT BASED ON FIELD LOCATIONS.

E. BACKWATER VALVE SIZE TO MATCH PLUMBING SIZE.

S-D20

PRIVATE BACKWATER VALVE ASSEMBLY OUTSIDE INSTALLATION

Mukilteo Water and Wastewater District
STANDARD DETAILS