



---

# DIVISION 2

## Standards for Water Installation

## Division 2

### Standards for Water Installation

#### Table of Contents

|  |    |
|--|----|
| Standards for Water Installation .....                           | 2  |
| 2-1.000 WATER.....   | 4  |
| 2-1.010 General.....   | 4  |
| 2-1.020 Construction Standards.....                              | 4  |
| 2-1.030 Water Treatment Chemicals .....                          | 4  |
| 2-1.040 Materials in Contact with Drinking Water .....           | 4  |
| 2-2.000 MATERIALS AND INSTALLATION.....                          | 4  |
| 2-2.010 General.....   | 4  |
| 2-2.020 Pipe Material.....                                       | 5  |
| 2-2.025 Pipe Installation.....                                   | 6  |
| 2-2.030 Fittings and Adapters.....                               | 8  |
| 2-2.040 Gate Valves.....   | 8  |
| 2-2.045 Butterfly Valves .....                                   | 8  |
| 2-2.050 Valve Boxes .....  | 9  |
| 2-2.060 Valve Stem Extension .....                               | 9  |
| 2-2.070 Installation of Valves and Fittings.....                 | 9  |
| 2-2.080 Marker Posts.....  | 9  |
| 2-2.090 Standard 5-1/4 Inch Fire Hydrants.....                   | 9  |
| 2-2.095 Fire Hydrant Installation .....                          | 10 |
| 2-2.120 Fire Hydrant Guard Posts .....                           | 10 |
| 2-2.130 Water Service Installations .....                        | 10 |
| 2-2.140 Air and Vacuum Valves.....                               | 11 |
| 2-2.150 Blowoff Assembly .....                                   | 11 |
| 2-2.160 Anchor Rods, Shackle Rods and Restraints .....           | 11 |
| 2-2.170 Water Main Taps or Cut-Ins .....                         | 11 |
| 2-2.180 Blocking .....   | 12 |
| 2-2.190 Typical Procedure for Filling, Flushing and Testing..... | 12 |
| 2-2.200 Sterilization.....                                       | 13 |
| 2-2.210 Pressure Testing .....                                   | 13 |
| 2-2.220 Flushing Water Line .....                                | 14 |
| 2-2.230 Purity Samples .....                                     | 14 |
| 2-2.240 Vertical Bends .....                                     | 14 |
| 2-2.250 Backflow Assemblies.....                                 | 14 |
| 2-3.000 Early Water System Access.....                           | 15 |
| 2-3.020 Construction Meter(s).....                               | 15 |
| 2-3.030 Model Home Meter(s) for Recorded Plats.....              | 16 |
| 2-4.000 Abandoning Existing Water System .....                   | 17 |

## DETAILS

|   |        |
|---|--------|
| Standard Depth Requirements.....                                      | WD-1   |
| Meter Boxes and Lids.....   | WD-2   |
| Open.....   | WD-3   |
| 1" Service.....   | WD-4   |
| Meter Setter 1" Service.....  | WD-4A  |
| Block-Out for Meter Boxes in PCC Driveways.....                       | WD-4B  |
| Pressure Reducing Valve ¾" -2".....                                   | WD-4C  |
| 1 ½" & 2" Service Installation.....                                   | WD-5   |
| 2" Blowoff Assembly (Non-Paved Areas).....                            | WD-6   |
| 2" Blowoff Assembly (Paved Areas).....                                | WD-6A  |
| Fire Hydrant Assembly.....  | WD-7   |
| Hydrant Use Requirements and Approved Locations.....                  | WD-8   |
| Relocate/Replace Existing Fire Hydrant Assembly.....                  | WD-9   |
| Open.....   | WD-10  |
| Thrust Block Details.....   | WD-11  |
| Thrust Blocking for Vertical Bends.....                               | WD-12  |
| Cast Iron Valve Box.....  | WD-13  |
| Valve Stem Extension.....   | WD-14  |
| Valve Box Adjustment.....   | WD-15  |
| Tapping Tee & Valve.....  | WD-16  |
| Hydrant Guard Posts.....  | WD-17  |
| Valve Marker Post.....  | WD-18  |
| 1" Combination Release Air & Vacuum Valve (APCO).....                 | WD-19  |
| 2" Combination Release Air & Vacuum Valve (APCO).....                 | WD-19A |
| 1" Combination Release Air & Vacuum Valve (ARI).....                  | WD-19B |
| 2" Combination Release Air & Vacuum Valve (ARI).....                  | WD-19C |
| Private Fire System Double Check Detector Assembly(profile view)..... | WD-20  |
| Private Fire System Double Check Detector Assembly(plan view).....    | WD-20A |
| Open.....   | WD-21  |
| 3" & 4" Service Installation.....                                     | WD-22  |
| 4" By-Pass Valve.....   | WD-23  |
| Double Check Valve Assembly (DCVA) ¾" to 2".....                      | WD-24  |
| Reduced Pressure Backflow Assembly (RPBA) ¾" to 2".....               | WD-25  |
| Reduced Pressure Backflow Assembly (RPBA) 3" or Larger.....           | WD-26  |
| Above Ground Detector Check Valve Assembly (DCVA) 3" or Larger.....   | WD-27  |
| Reduced Pressure Detector Assembly (RPDA) 3" or Larger.....           | WD-28  |

## **2-1.000 WATER**

### **2-1.010 General**

Any extension of the District's water system shall be completed in accordance with the terms of the agreement and/or contract between the District and the Contractor. Each single family residential lot and commercial building shall be serviced by a single metered water service connection perpendicular to the public main.

All extensions shall conform to State of Washington Department of Health (DOH), District and other local authority requirements. In planning for any development, it shall be the Contractor's responsibility to ensure adequate water can be obtained to satisfy all domestic and fire flow requirements. The Contractor shall coordinate with the District and the local fire authority.

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

The developer may be required to extend water main to the neighboring properties unless approved otherwise by the District, or close dead end loops to the water system.

### **2-1.020 Construction Standards**

All materials, installation and workmanship shall be in accordance with the latest District Standards, the latest edition of the State of Washington's Standard Specifications for Road, Bridge and Municipal Construction as amended by the District, American Water Works Association (AWWA) guidelines, and the governing jurisdictional authority.

### **2-1.030 Water Treatment Chemicals**

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

### **2-1.040 Materials in Contact with Drinking Water**

Any products used to coat, line, seal, or patch water contact surfaces (paint, pipe liners, interior tank coating) or that have substantial water 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

## **2-2.000 MATERIALS AND INSTALLATION**

### **2-2.010 General**

Water mains to be installed shall be ductile iron pipe for all sizes, unless specifically noted or otherwise approved, such as HDPE for use in some trenchless installations under Division 6.

The Contractor shall furnish all material as noted herein and as indicated on the Construction Drawings and as required to complete all work. All materials shall be manufactured with

premium material and comply with all referenced standards. The Contractor shall complete the installation of all furnished materials in accordance with Division 2-1.020 Construction Standards.

**2-2.020 Pipe Material**

- A. Ductile iron pipe shall conform to ANSI/AWWA. C151/A21.51 Standards. The minimum nominal thicknesses shall be as follows:

| Diameter (inches) | Minimum Nominal Thicknesses (inches) | Pipe Class |
|-------------------|--------------------------------------|------------|
| 3                 | 0.31                                 | 53         |
| 4                 | 0.32                                 | 53         |
| 6                 | 0.31                                 | 52*        |
| 8                 | 0.33                                 | 52*        |
| 10                | 0.35                                 | 52         |
| 12                | 0.37                                 | 52         |
| 14                | 0.36                                 | 51         |
| 16                | 0.37                                 | 51         |
| 18                | 0.38                                 | 51         |
| 20                | 0.39                                 | 51         |
| 24                | 0.41                                 | 51         |
| 30                | 0.43                                 | 51         |
| 36                | 0.48                                 | 51         |

\* Note – Class 53 required when pipe requires threaded or special fabricated fittings.

The District may require thickness classes greater than the minimums shown or require zinc coating, and/or poly bags for special circumstances as determined by the District.

- B. Grade of iron shall be 60-42-10. The pipe shall be cement mortar lined with a standard thickness lining and the exterior shall be coated with an asphaltic coating.
- C. Each length shall be plainly marked with the manufacturer's identification, year cast or casting period, thickness and class of pipe. The pipe shall be furnished with mechanical joint (MJ) or push-on joint, conforming to ANSI/AWWA C111/A21.11 Standards, except where otherwise specified for flanged or restrained joints on the Construction Drawings.
- D. Ends of pipe lengths shall be sealed prior to shipping and delivery to site.
- E. Restrained joint pipe shall have a bell and spigot locking mechanism such as TR Flex, Snap Lok, or similar. When a field cut of pipe due to dimensions less than a full stick of pipe is needed, a gasket with a locking mechanism may be used with prior District approval.
- F. The pipe manufacturer shall be able to certify in writing, upon request, that the inspection and all of the tests specified in the applicable AWWA standards for both pipe and gaskets

being supplied have been made, and the results constructed in compliance with that standard.

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

#### **2-2.024 Survey Staking**

Survey line and grade shall be established to successfully install the District's utilities at the correct horizontal and vertical locations. At a minimum, all fittings, valves, hydrants, services and other appurtenances shall have field staking installed under the supervision of a licensed land surveyor to provide sufficient horizontal and vertical control.

#### **2-2.025 Pipe Installation**

- A. Preparation of Trench: The trench shall be excavated to the depth specified on the Construction Drawings. Grades shall be established using approved pipe laying methods to achieve elevation accuracy of 0.10 (+/-) feet. Support of pipe on blocking shall not be permitted.

Prior to pipe installation, all road grades shall be established to within 6-inches of subgrade, or the entire alignment shall be staked with cut elevations. Any part of the bottom of the trench excavated below the uniform required grade shall be corrected by bringing up to grade with Foundation Gravel listed in Section 7 of these standards, and compacted to District standards for compaction.

- B. Extra Depth: Minimum depth of cover shall be required as shown on the Construction Drawings and Standard Details. The District may require depth to be increased to avoid utility conflicts, avoid high points requiring air & vacuum valves, to provide undisturbed soil for adequate thrust blocking support or for other engineering reasons as determined by the District.
- C. Unloading and Stockpiling Pipe, Fittings and Other Materials: It shall be the Contractor's sole responsibility to supervise the delivery, unloading and stockpiling of pipe, fittings and any other necessary materials to safeguard and insure public and private safety. Public and private access to properties shall not be obstructed.

All pipe shall be unloaded from delivery vehicles with mechanical equipment. Dropping of pipe onto the ground or mats shall not be permitted.

- D. Materials Furnished But Not Used: All materials listed on the Construction Drawings and which are not incorporated into the Work shall remain the property of the Contractor unless purchased by the District.
- E. Laying: All pipe, fittings, valves, and fire hydrants shall be carefully lowered into the trench in a manner as to prevent damage to pipe materials and protective coatings and linings. Under no circumstances shall materials be dropped or dumped into the trench.

The pipe and fittings shall be inspected for defects prior to installation. All lumps, blisters and excess coating shall be removed from the bell and spigot end of each pipe, and the outside of the spigot and the inside of the bell shall be wire brushed and wiped clean and dry and free from debris and lubricants before the pipe is placed in the trench.

Every precaution shall be taken to prevent foreign material from entering pipe while it is being installed. After placing a length of pipe in the trench, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. The pipe shall be secured in place with bedding material tamped under it. Precautions shall be taken to prevent dirt from entering the joint space. When pipe laying is not in progress, the open ends of pipe shall be sealed with a sanitary watertight plug or sanitary other means approved by the District. If water is in the trench when work resumes, the seal shall remain in place until the trench is pumped completely dry. The cutting of pipe for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner without damage to the remaining pipe, coating or cement mortar lining so as to leave a smooth end at right angles to the axis of the pipe. Pipe shall be laid with bell ends facing in the direction of the laying, unless otherwise approved by the District. No pipe shall be laid in water, or when, in the opinion of the District, trench conditions are unsuitable.

Wherever it is necessary to deflect pipe from a straight line, the amount of deflection allowed shall not exceed one-half pipe manufacturers' recommendations for mechanical, restrained and push-on joints.

- F. Aggregate, Trenching, Backfill and Restoration: See Division 7.
- G. Mechanical Joints: The socket, plain end of each pipe and gasket shall be cleaned of dirt before jointing and shall be jointed according to manufacturer's recommendations. Bolts shall be tightened alternately at top, bottom and sides so pressure on gasket is even.
- H. Push-on Joints: Jointing shall be performed according to these specifications and the manufacturer's recommendations with special care used in cleaning gasket seat to prevent any dirt or sand from getting between the gasket and pipe. Lubricant to be used on the gasket shall be nontoxic and free from contamination. When a pipe length is cut, the outer edge of the cut shall be filed to a beveled edge to prevent injury to the gasket while joining.
- I. Restrained Joint Pipe: Restrained joints, where called for on the Construction Drawings, shall be installed in accordance with the manufacturer recommendations and per Division 2-2.020.
- J. Trench Dams: See Division 7, Section 3.010 and Standard Detail TBR-4.
- K. Installation on Steep Slopes: See Standard Detail TBR-5.
- L. When metallic pipes are installed in locations of active or abandoned sewer drain fields, the metallic pipe shall be wrapped using American V-Bio Poly Encasement or equal and the pipes bedded and covered with 6" of clean, imported material.

### **2-2.030 Fittings and Adapters**

All fittings shall be short-bodied, ductile iron complying with applicable ANSI/AWWA C110/A21.10 or C153/A21.53 standards for 350 psi working pressure rating for mechanical joint fittings and 250 psi working pressure rating for flanged fittings. All fittings shall be cement mortar lined and either mechanical joint or flanged, as indicated on the Construction Drawings.

Fittings shown on the Construction Drawings for restrained joints shall be either flanged or 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 MEGALUG or MEGAFLANGE, Romac RomaGrip, Star Stargrip 3000, Sigma One Lok, Ford Uni-Flange 1400D or approved equal. All couplings shall be ductile iron mechanical joint long sleeves. If connecting to non-ductile iron pipe, consult with the District.

Water line installed across bridges, culverts, or above large areas of material fill may be required to install EBAA Iron Force Balanced Flex-tend flexible expansion joints or equal.

### **2-2.040 Gate Valves**

All gate valves shall conform to ANSI/AWWA C509 or C515 Standards for resilient-seated gate valves. The valve seating shall be of the Resilient Wedge (R/W) Type Only. The valves shall be iron-bodied, iron disk encapsulated with rubber and bronze or with epoxy coating and a non-rising stem with "o" ring seals. The sealing rubber shall be permanently bonded to the disk to meet ASTM tests for rubber to metal bond ASTM D429. All valves shall be rated for 200 psi or higher depending on system operating pressures. The valves shall open counter-clockwise and be furnished with 2-inch square operating nuts. All surfaces, interior and exterior shall be fusion bonded with epoxy coating and acceptable for potable water.

All valves shall be vertical mounted.

Manufacturers not complying with the above specification or not providing requested product references shall be grounds for rejection of use within the District.

### **2-2.045 Butterfly Valves**

Butterfly valves shall conform to AWWA C504 for flanged and C-111 for MJ, Class 150B or 250B. If the District allows the use of butterfly valves based on design requirements and/or anticipated operating pressure, a flanged 250B valve may require an adaptor for the bolt pattern. No field substitutions, only submitted and approved valves will be allowed. The following listed butterfly valves are acceptable or approved equal.

- Pratt - Groundhog Class 150B
- M & H - Style 4500 Class 150B or 250B
- Mueller - Lineseal III Class 150B
- Mueller - Lineseal XP II Class 250B

### **2-2.050 Valve Boxes**

All valves, unless otherwise specified, shall be furnished as shown of the Construction Drawings and meet the requirements on Standard Detail WD-13.

### **2-2.060 Valve Stem Extension**

This item shall be furnished as shown on Standard Detail WD-14 and the Construction Drawings for all valves with operating nuts below 3 feet from the ground surface. Number and length of extensions shall be determined during construction.

### **2-2.070 Installation of Valves and Fittings**

Valves, fittings, plugs and caps shall be set and jointed to pipe in the manner specified for cleaning, laying and joining pipe. All dead ends on new mains shall be closed with Tyton or MJ plugs or dead-end MJ caps with a blow-off or fire hydrant assembly as shown on the Construction Drawings.

Valve spacing shall not exceed 1000 feet.

### **2-2.080 Marker Posts**

A marker post shall be furnished and installed with each valve that is not located within a paved area. See Standard Detail WD-18.

### **2-2.090 Standard 5-1/4 Inch Fire Hydrants**

Fire hydrants shall have two 2-1/2-inch hose outlets; one 4-1/2-inch pumper outlet (National Standard threads); 5-1/4-inch main valve opening; 1-1/4-inch pentagon operating nut, opening in a counterclockwise direction; and a positive and automatic barrel drain. Fire hydrants shall be approved by the National Board of Fire Underwriters and shall conform to AWWA C502 Standards. Fire hydrants shall be provided with a mechanical joint shoe. Fire hydrants shall be provided with a breaking flange or lugs as shown in the Standard Details. Fire hydrants shall include a 4-inch NST thread Storz adapter. Only the fire hydrants shown on Standard Detail WD-7 shall be accepted.

Only one fire hydrant shall be installed on any dead-end 8-inch main. All dead-end mains that have a fire hydrant greater than 50 feet from a "looped" main shall be 8-inch.

Locate fire hydrant near intersections and at lot corners. Spacing shall not exceed 600 feet and no further than 300 feet from the end of a street or private drive.

Fire hydrants shall be connected to pipelines with 6-inch ductile iron pipe conforming to Division 2-2.020 and 6-inch Auxiliary Gate Valves conforming to Division 2-2.040.

Fire hydrants shall be capable of passing required District test pressure.

## **2-2.095 Fire Hydrant Installation**

Fire hydrants shall be installed as shown on Standard Detail WD-7 and WD-9. Fire hydrants shall be connected to the auxiliary valve using 6-inch ductile iron, Class 52 pipe and with all mechanical joint restraint devices. The pipe shall be furnished and installed by the Contractor. Length of pipe shall be as shown on the Construction Drawings. Length may be changed during construction by the District.

## **2-2.120 Fire Hydrant Guard Posts**

Guard posts shall be installed at locations shown on the Construction Drawings or as changed during construction by the District. See Standard Detail WD-17 for dimensions and location.

## **2-2.130 Water Service Installations**

Service connection material shall comply with the requirements shown on the Construction Drawings and Standard Details.

No water meter boxes are allowed in streets, driveways, sidewalks, under decks or porches or roof overhangs unless approved by the District.

Splices are not allowed on a water service unless approved by the District. Maximum length of a water service from main to meter is 60 feet for 1-inch services and 40 feet for 2-inch services.

1-inch water services installed on 4-inch ductile iron main shall use an approved saddle listed in the water section detail WD-4

The water service from the meter to the structure is the responsibility of the property owner to maintain. Install per jurisdictional authority. Every single family residence, multi-family building, or commercial building shall have its own separate water service and meter unless approved otherwise by the District. Definitions for this purpose are as follows;

Single family residence recognized by the District's utility billing system and defined as a living area of real property which extends from the foundation and can be metered individually, including a duplex, townhouse or vertical condominium.

Multi-family building recognized as such by the District's utility billing system and defined as a multiple unit structure that contains separate individual real property or separate individual dwelling units on floors above the first floor may use a shared meter per building.

Commercial building as defined by the District's utility billing system as a non-residential structure designed and built for commercial users and serviced by a separate single water meter, including recreational vehicle parks, hotels and motels.

### **2-2.140 Air and Vacuum Valves**

Installation shall be at high points in the main, at the locations and size shown on the Construction Drawings or as added/changed during construction by the District. Installation shall be in accordance with the manufacturer's recommendations and the Standard Detail WD-19 or WD-19A. Efforts shall be made by the Designer to minimize the use of Air and Vacuum valves by designing pipe to be laid at a continuous slope rather than following an undulating grade.

### **2-2.150 Blowoff Assembly**

Installation shall be at low points as determined by the District, or dead ends of the mains, at the location and size shown on the Construction Drawings or as added/changed during construction by the District. Installation shall be in accordance with the manufacturer's recommendations and the Standard Detail WD-6 and WD-6A.

### **2-2.160 Anchor Rods, Shackle Rods and Restraints**

Anchor rods, shackle rods and clamps shall be a minimum dimension as specified on the Construction Drawings and meet ASTM A36. Threaded ends shall be a maximum of 12-inches. 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 galvanized) coatings. Alternate coatings shall be submitted to the District for approval.

### **2-2.170 Water Main Taps or Cut-Ins**

For materials, refer to Division 2-2.030 and Standard Detail WD-16.

For all water main taps and cut-ins, the Contractor shall excavate and provide all materials. District forces will make tap, cut-in or connection as shown on the Construction Drawings.

If the exact dimensions of pipe connections are not known, the District may require the Contractor to excavate and expose existing pipelines to verify size and fittings required for the District forces to make the connections.

The Contractor shall provide at least ten (10) business days notice to the District prior to the requested work and shall schedule operations so as to minimize service outages. Prior to scheduling the work, all materials to be used for the tap, cut-in or connection shall be inspected by the District and the contractor shall expose all utilities to verify there will not be conflicts with the proposed water line installation. The District reserves the right to limit the working hours and number of work locations. For connections that require customer outages or for traffic considerations, the District may require night or weekend work. To the extent possible, taps and cut-ins will be scheduled for Tuesday, Wednesday, or Thursday during business hours selected by the District. Work scheduled for other days or hours will be at the discretion or direction of the District.

The Contractor shall provide and use traffic control, and certified flaggers to meet section 1-10 of the Standard Specifications or the standards of the jurisdiction where the work is performed whichever are more stringent. The Contractor shall provide approved shoring, backfill, all restoration, and equipment with an operator for this work.

## **2-2.180 Blocking**

Pipe shall be braced to prevent movement. Concrete shall be placed behind all bends, tees, crosses and blow-off assemblies including when restrained joint pipe is installed, unless the blocking is specifically waived by the District. The thrust blocks shall be installed in such manner as to take the kinetic thrust of the water and the test pressure to be applied to the line. The quantity of concrete shall vary with the size of pipe and soil conditions, and shall be sufficient to substantially cover the rear of the fittings and extend to undisturbed earth to meet bearing area requirements. It shall not, however, cover any part of the joints of the fittings. Concrete mix shall be of stiff consistency, and meet the requirements of the WSDOT Standard Specifications, Division 6-02.3(2) B, Commercial Concrete for 3000-lb concrete. A single sheet that is a minimum of 8 millimeter thick plastic shall be used to cover fittings, bolts, etc., to prevent contact with the concrete, and shall be left accessible and free of concrete. Plugs or valves on pipe ends shall be braced against solid earth with concrete in a manner satisfactory to the District.

The Contractor shall furnish and install all blocking.

If thrust blocking is needed to take immediate thrust, such as in making live connections, the Contractor shall supply and place all bracing, blocking and/or ecology blocks as approved by the District.

## **2-2.190 Typical Procedure for Filling, Flushing and Testing**

After compaction test results have been reviewed and accepted by the District, the new main may be filled. Only District employees may operate valves for all filling, testing and flushing operations. In all instances, the Contractor shall utilize a currently approved and tested Washington State double check valve backflow prevention device to protect the potable water supply when filling, flushing and disinfecting the new water main.

After the main has been filled, the pipe may be pressure tested prior to flushing if the new chlorinated system is not connected to the District's existing system. If connected, the chlorinated water shall be flushed from the main in compliance with Division 2-2.220, Flushing Water Line, prior to the pressure test.

The pressure test shall be performed per Division 2-2.210.

After pressure test has been approved, purity samples will be obtained per Division 2-2.230.

All new mains shall be temporarily blocked, satisfactorily pressure and purity tested, and all disinfection water properly disposed of prior to connecting to the existing mains.

If field fire flow testing is desired the District shall receive a minimum 10 working days notice. All District costs associated with the testing shall be reimbursed to the District. The District may reject the request for field fire flow tests at its sole discretion.

**2-2.200 Sterilization**

As sections of pipe are constructed and before mains are placed in service, they shall be sterilized in conformance with the requirements of AWWA C651. The final method shall be approved by the District. Chlorinated water shall remain in the new system for a minimum of 24 hours.

In the sterilization process, the Contractor shall take particular care when wasting the chlorinated water from the mains to assure that the chlorinated water does no physical or environmental damage to property, streams, storm sewers or any waterways.

**2-2.210 Pressure Testing**

All services shall be open at the corporation stop at the main and tested in conjunction with the main testing.

As soon as pipe is secured against movement under pressure, it may be filled with water by the District. Satisfactory performance of air release valves should be checked while the line is filling. After the line has been filled, the pipe may be pressure tested prior to flushing if the new chlorinated system is not connected to the District’s existing system. If connected, the chlorinated water shall be flushed from the main in compliance with Division 2-2.220, Flushing Water Line, prior to pressure test.

The water line shall be pumped to a minimum test pressure of 250 psi or 1-1/2 times the static water pressure up to a maximum test pressure of 300 psi. The pressure shall be maintained for a period of 1/2 hour or at the direction of the District. During the pressure test, the quantity of water pumped to maintain the pressure shall be recorded and shall not exceed the leakage rate established in the table created by calculations derived from formula located in WSDOT 7-09.3(23), and modified for 1/2 hour test. Note one gallon = 128 ounces.

Footage divided by 1000, multiplied by chart value, multiplied by 128 = allowable loss in ounces.

Allowable leakage (gallons per 1/2 hour per 1000 feet)

| Pressure (psi) | Diameter (inches) |      |      |      |      |      |      |      |      |
|----------------|-------------------|------|------|------|------|------|------|------|------|
|                | 4                 | 6    | 8    | 12   | 16   | 18   | 24   | 30   | 36   |
| 250            | 0.24              | 0.36 | 0.47 | 0.71 | 0.95 | 1.07 | 1.42 | 1.78 | 2.14 |
| 260            | 0.24              | 0.36 | 0.48 | 0.73 | 0.97 | 1.09 | 1.45 | 1.82 | 2.18 |
| 270            | 0.25              | 0.37 | 0.49 | 0.74 | 0.99 | 1.11 | 1.48 | 1.85 | 2.22 |
| 280            | 0.25              | 0.38 | 0.50 | 0.75 | 1.00 | 1.13 | 1.51 | 1.88 | 2.26 |
| 290            | 0.26              | 0.38 | 0.51 | 0.77 | 1.02 | 1.15 | 1.53 | 1.92 | 2.30 |
| 300            | 0.26              | 0.39 | 0.52 | 0.78 | 1.04 | 1.17 | 1.56 | 1.95 | 2.34 |

The pipe will not be accepted until the leakage, as determined by this test, is less than the allowable maximum. The District shall be present when pressure tests are made. Auxiliary hydrant valves shall be open and the fire hydrants tested to the same pressures as the main.

New fire hydrants and connections installed on the existing water mains shall be pressure tested, flushed and sterilized by the Contractor

### **2-2.220 Flushing Water Line**

After the sterilization process has been followed according to Division 2-2.200, the heavily chlorinated water should not remain in prolonged contact with the pipe. In order to prevent damage to the lining or corrosion of the fittings, the heavily chlorinated water shall be flushed from the fittings, valves, and branches until chlorine measurements match the existing distribution system. Only the District shall operate the existing and new tie-in valves. The Contractor shall not, unless otherwise approved by the District, operate any valve on any section of main that has been accepted by the District. The District has established penalties and fines (per District Policy) for operation of District valves without prior approval by the District, and these penalties are strictly enforced. The Contractor shall ensure compliance with all Federal, State, and local jurisdictional water quality standards. The Contractor shall chemically or otherwise treat the chlorinated water in accordance with AWWA Standards to prevent damage to the affected environment, particularly aquatic and fish life of receiving streams. Refer to Division 2-1.020 and 2-1.030.

### **2-2.230 Purity Samples**

Two (2) sets of purity samples shall be obtained at locations specified by the District. Samples can typically be collected Monday through Thursday with results obtained in approximately 3 business days. The Contractor shall install sterile fittings at the identified sample sites. Coordinate sampling with the District representative.

### **2-2.240 Vertical Bends**

Vertical bends shall be used only upon approval of by District and in accordance with the Construction Drawings and Standard Details WD-12. Vertical bends are discouraged when other options are available to adjust vertical elevations.

### **2-2.250 Backflow Assemblies**

Backflow assemblies shall conform to the latest Washington State Department of Health requirements and the District's Cross Connection Control Program policies.

All backflow assemblies under the jurisdiction of the District shall be installed in the public right-of-way or a nearby utility-held easement, at a location immediately downstream of the water meter or immediately downstream of the water service connection if no water meter is present.

- See Standard Detail WD-24 for installation of 2-inch and smaller DCVA backflow assemblies.
- See Standard Detail WD-25 for installation of 2-inch and smaller RPBA backflow assemblies.
- See Standard Detail WD-20, WD-20A for installation of DCVA or DCDA backflow assemblies larger than 2-inch.
- See other details as applicable.

At a minimum, backflow assemblies shall be installed for the following uses:

- Water service connections for:
  - domestic water to facilities identified in WAC 246-290-490 (4) (b) (iii) Table 9 as high-health hazard facilities

- fire systems
- irrigation systems
- All facilities and/or systems where booster pumps or sewer lift stations are to be used.
- All facilities where the highest water use is 30 feet or more above the water meter location.

Temporary placement of a properly operating, spring loaded, single check valve is required when determined by the District in order to use a construction meter and shall be located directly behind any meter designated as a "construction meter".

All permanent backflow assemblies shall be tested by a Washington State certified Backflow Assembly Tester (BAT) upon installation, and at least annually thereafter. All initial backflow assembly testing shall be conducted in the presence of a District cross-connection control specialist.

## **2-3.000 Early Water System Access**

### **2-3.010**

After the water system is completed as detailed under Section 2-2 above, and when the use of the water system prior to project completion is desired for fire protection or other water uses, the District may approve the charging of water mains for early fire protection or water use subject to the following:

- Pressure test completed
- System has been flushed
- Results from purity test have been received and are satisfactory
- All mainline is installed such to provide adequate flows; all valves and all hydrants are operational
- All meter setters and boxes are installed and tested
- Developer of Record and the District have signed the "Early Water System Access Agreement".

If the Developer requests this option and meets the above conditions, the District may activate the water system. At this time, a copy of the above-referenced Agreement will be sent to the appropriate jurisdiction and Fire Marshal.

If a site's only water improvements are for fire protection, Early Water System Access may be denied.

### **2-3.020 Construction Meter(s)**

Construction meters are intended to provide water for construction activities and are not intended as a water source for buildings. The Developer may request construction meter(s) upon execution of the "Early Water System Access Agreement". The District shall review the request for construction meter(s) regarding the number and location. Construction meters shall not be connected directly to building plumbing.

Construction meters may require backflow prevention assemblies which will be determined prior to installation of the meter.

If a site's only remaining work is the meter, the Construction Meter Request may be denied.

**2-3.030 Model Home Meter(s) for Proposed Recorded Plats**

At the sole discretion of the District, a limited number of model homes under construction may be able to obtain water meters and permitted side sewer connections if the water and sewer system is complete and able to provide service. The Developer must have the water and sewer system tested and acceptable to receive or give service in accordance with these standards and:

- Complete the Punchlist except for Plat Recording
- Sign the Early Water or Early Sewer Access Agreement
- Provide easements over the water and sewer system for the District to hold in a format acceptable to the District, which will be returned to the developer once recording is complete
- Provide copies of the building permits issued by the authority
- Provide future legal addresses and billing information on the District's Service Connection Application form.
- Provide \$5,000 deposit cash or assignment)for each set of Model Home connections approved, to be returned at Use and Operations

Once the above items are submitted and approved;

- Purchase both the meter and side sewer permit as a set
- Pay all fees for the meter and side sewer connection

The number of Model Homes allowed to obtain meters and side sewer permits are based on the size of the proposed plat and are limited to:

| <u>Plat Size by Lots</u> | <u>Allowed Connections (up to)</u> |
|--------------------------|------------------------------------|
| 3-9                      | 2                                  |
| 10-25                    | 3                                  |
| 26-50                    | 4                                  |
| 51 & up                  | 5                                  |

The District reserves the right to terminate this option, reduce the allowed connections, or lock off and suspend service if the intent of this allowance is not met. Homes may not be sold to or occupied by, permanent residents, nor anyone living in a model home that has been granted temporary service until official acceptance from the District. Daily use is allowed. If occupancy is granted before plat recording, the District must be notified.

Tampering or removing District meters is not permitted and doing so could revoke the right to obtain meters. The developer is responsible for their agents, builders, and all onsite personnel in this matter.

## **2-4.000 Abandoning Existing Water System**

The portions of the water system that are replaced or no longer needed shall be disconnected from the active water system and abandoned or removed, as directed by the District and the jurisdictional authority. Whichever requirement is more stringent shall apply. At a minimum, all pipe sections that remain in the ground shall be filled with flowable CDF and the ends capped/plugged with fittings containing rubber gaskets that will withstand static pressure. Any pipe, fittings or other removed system components shall be properly disposed of by the Developer/Contractor.