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Water Specifications

Construction

CW-1 TRENCH EXCAVATION AND BACKFILL

Trench excavation shall be unclassified. The terms earthwork or excavation include all materials excavated or removed regardless of material characteristics. The Developer shall estimate the kind and extent of materials which will be encountered in the excavation.

All trenches shall be dug to true line and smooth bottom grades. Surface grading, including cut, fill and compaction, shall be accomplished prior to trench excavation. In pavement sections, grading to subgrade may be sufficient for areas to be newly paved. The trench width from the bottom of the trench to the crown of the pipe shall not exceed 40 inches for 15-inch-diameter and smaller pipe. For 18-inch- diameter or larger pipe, the trench width from the bottom of the trench to the crown of the pipe shall not exceed 1.5 times the inside diameter plus 18 inches. If these widths are exceeded, a stronger grade of pipe and/or a higher classification and amount of bedding material shall be furnished, as directed by the District.

Minimum cover over all water lines shall be 36 inches over the top of the pipe for 8- inch mains and smaller; 42" for 10-inch mains; 48 inches over the top of mains 12- inches and larger. Maximum cover shall be 6 feet, unless otherwise authorized by Woodinville Water District. Deeper excavation may be required due to localized breaks in grade or installing the new main under existing culverts or other utilities where necessary.

Where it is necessary to cross sanitary sewer or storm sewer trenches, all trench backfill shall be removed and replaced with mechanically compacted granular material to provide a uniform support for the full length of the pipe.

The Washington State Department of Health and the Washington State Department of Ecology require a minimum 10-foot horizontal separation between all sanitary sewer lines and water lines. Water mains shall be installed a minimum of 18-inches above the sanitary sewer mains. The latest edition of the Washington State Department of Ecology Criteria for Sewage Works Design Manual (the "Orange Manual") Section C 1-9 identifies specific horizontal and vertical separation for construction of water and sewer mains. If unusual circumstances preclude construction within the above-stated minimum separation criteria, the Orange Manual specifies special requirements for construction of water and sewer mains.

A five-foot minimum horizontal separation shall be maintained between all water, Power, telephone, or other utilities. Poles shall have a min. separation of 8' with bases of the poles 2' lower than the proposed water or sewer. The developer shall inform the District if these criteria cannot be met.

The root systems of all trees not to be removed which are located on or near the easements and 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. Low pressure vactoring may be required. No roots larger than 1" shall be cut without approval from the agency in charge.

Piping shall be kept clean and dry from the Factory to installation. Pipe shall have temporary caps that are factory installed and shall remain in place until the pipe is installed in the trench. Pipe without these temporary caps will not be accepted. The contractor shall notify the District's Inspector as to the schedule for pipe delivery. Pipe shall not be unloaded until the Inspector is onsite.

During trenching, installing of pipelines and appurtenances, and the placing of backfill, trenches shall be kept free of water. The Developer shall furnish all equipment necessary to dewater the trench and shall dispose of the water in such a manner as not to cause a nuisance or menace to the public, and in compliance with local jurisdictional requirements. Trench water shall not be pumped or placed into drainage ditches, storm drains without clarifying. All water lines, new or existing, shall be protected against the intrusion of foreign material. A mechanical plug shall be placed in the end of each stick of pipe as pipe laying progresses.

When so directed by the District, the trench shall be extended below the pipeline grades to permit the placing of foundation gravel. All areas of over excavation, to remove unsuitable material, or for any other reason, shall be brought to grade with approved foundation material, and compacted.

Maximum amount of open trench on streets shall be 200 linear feet unless otherwise directed by the road agency. At the end of each day all ditches must be backfilled or covered with steel plates and barricaded with flashing warning lights to prevent people or animals from falling into the trench. In traffic areas, steel plating must be pinned to prevent movement and edges ramped with cold mix asphalt. The contractor shall anticipate materials for steel plating and bracing to create a smooth ride. The District reserves the right to request more complex steel sheeting layouts be designed by a Structural Engineer. Trench shoring shall be required if the excavation is not backfilled. "Steel plates on Roadway" signing and lighted flashing barricades to warn traffic shall be provided. These requirements shall be modified as necessary to conform to local jurisdictions.

All shoring and bracing or sheeting required to perform and protect the trench and to safeguard the employees, shall be designed and furnished by the Developer. No timber bracing, lagging, sheathing, or other lumber shall be left in any excavation except with the permission of the District.

Pipe bedding and initial backfill to 12 inches over the top of the pipe shall be completed before subsequent backfilling operations are started. The initial 12- inches of backfill above the crown of the pipe shall be carefully and evenly placed.

The Developer shall take all necessary precautions to protect the pipe from any damage, movement or shifting. In general, backfilling shall be performed by placing the material so as not to damage the pipe.

Trench backfill materials shall be bank run gravel material or native material. Native material shall require testing by the Developer and approval by the Developer's soils geologist prior to installation.

The Developer shall be responsible for providing the proper size and type of compaction equipment and selecting the proper method of utilizing said equipment to attain the required compaction density. In all cases, equipment shall be selected and used so as to not damage the pipe or other utilities and structures. The maximum loose lift depth when using a jumping jack for compaction shall be 1-foot. The maximum loose lift depth when using a hoe pack for compaction shall be 2-feet. A jumping jack or Pneumatic tamper shall be used to compact backfill around valve boxes.

Compaction testing will be required for all backfilled trenches. A minimum of one testing location shall be chosen for each 100 feet of water main installed unless the local jurisdictional authority requires more frequent testing. A separate test shall be performed for each two (2) feet of depth. Perpendicular trenching in the roadway shall require one test per each or as requested by the local jurisdictional authority. The Developer, or the Contractor, shall contract the services of a qualified and approved geotechnical consultant to perform the compaction testing. All testing (and retesting) shall be at the Developer's expense. Additional testing and construction observation, at the Developer's expense, shall be required if the maximum backfill lists, as specified above, are exceeded. Testing locations shall be chosen by the field inspector. Compaction results shall be furnished daily during construction and all testing completed prior to paving. Recompression and retesting will be required for any tests which do not pass the compaction testing. Test locations shall be identified by station, offset and depth for easy field verification. Larger projects shall include a map of testing locations. Satisfactory compaction tests do not relieve the Contractor of the responsibility to provide trenches which will not fail. Subsurface settlements within the warrantee period will remain the responsibility of the Contractor.

Materials excavated from trenches are not guaranteed to be suitable to meet the standards for trench backfill. Where original excavated material is unsuitable for trench backfill, imported gravel backfill shall be placed. See Section MW-18 for material specifications for imported gravel backfill. The unsuitable material shall be removed by the Developer to a disposal area, in accordance with Jurisdictional requirements.

CW-2 INSTALLATION OF WATER MAINS AND FITTINGS

The trench shall be excavated to the depth required to provide a uniform and continuous bearing and support for the pipe on solid and undisturbed ground at every point between bell holes. Pipe shall be installed with bells uphill. Maximum of ten (10) homes, without fire sprinkler systems, allowed to connect to a 4" water main.

All pipe, fittings, valves and hydrants shall be carefully lowered into the trench in such a way as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall materials be dropped or dumped into trench.

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the ground. Pipe shall be laid with bell ends facing in the direction of laying, unless directed otherwise by the District. 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. 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 (1/2) the pipe manufacturer's recommendations for mechanical and push-on joints and shall be subject to approval by the District.

For connection of push-on joint, the jointing shall be done according to 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 beveled with a file to prevent injury to the gasket during jointing.

For connection of 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 directions. Bolts shall be tightened alternately at top, bottom, and sides so pressure on gasket is even.

The cutting of pipe for installing valve, fitting or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or cement lining and to leave a smooth end at right angles to the axis of the pipe. Cut pipe spools shall be two (2) foot minimum in length.

During pipe installation and at times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug or 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.

CW-3 ASBESTOS/CEMENT WATER PIPE

Asbestos/Cement (AC) water pipe cannot normally be accurately located in the field by standard locating methods. Approximate location of AC mains may be determined by identifying valve locations in the field. Potholing to determine precise locations of AC water pipe shall be required as necessary.

Any work to be performed upon existing asbestos/cement water pipe shall be in conformance with 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, which is included herein by reference, the Puget Sound Clean Air Agency (PSCAA) Asbestos Standards, and Chapter 296-65 of WAC, except as revised herein. Any AC pipe which is removed from service and is not disturbed may be capped and abandoned in place only with the permission from the local jurisdiction. Any exposed and disturbed pipe to be removed from service shall be removed and disposed of at an appropriate waste site. The disturbed pipe may not be relocated in the trench or otherwise disposed of on site. No new or used AC pipe is to be installed in the District. Disposal of any removed materials shall be at an approved off-site facility, in accordance with the above publications. All materials, equipment and safety gear shall be on site prior to cutting, tapping or removing any AC pipe.

The Contractor shall be responsible for obtaining all necessary permits and approvals from the appropriate jurisdiction for work on and disposal of AC pipe.

CW-4 INSTALLATION OF GATE VALVES

Valves shall be installed in the Distribution system at sufficient intervals to facilitate system repair and maintenance, but in no case shall valves be less than one every 1000 feet in residential areas and 800 feet in Commercial/ Industrial areas. Each tee shall have a minimum of two valves each. Crosses shall have a minimum of 3 valves each.

The valves shall be set with the stems vertical. Gate valves must operate easily through the entire rotation of the valve stem from full open to closed. Valves which do not operate smoothly, or which require excessive torque to operate will not be acceptable. The District will be the sole judge as to acceptability. Mechanical joints and flanged fittings shall be tightened per manufacturer recommendations. The valve nut shall be from 18-inches to 24-inches below finished grade. If the valve nut is deeper, a valve nut extension shall be furnished and installed.

CW-5 INSTALLATION OF BUTTERFLY VALVES

The valves shall be installed in the same manner as gate valves. Allow adequate room on either side of the valve to allow full operation.

CW-6 VALVE BOX INSTALLATION

The axis of the valve box shall be common with the axis projected off the valve stem and centered over the operating nut. Valve box chamber shall be sawcut square. Broken, jagged edged or cracked valve boxes will not be accepted. The tops of adjustable valve boxes shall be set flush to the existing or established grade. A jumping jack or Pneumatic tamper shall be used to compact backfill around valve boxes in max. 12" loose lifts. If installed outside of pavement, the valve boxes require a collar. Refer to Water Standard Plan 6 and 6A.

Valve box lids shall be cleaned of debris and asphalt and painted with (2) coats of Safety Blue paint as specified in MW-24.

CW-7 INSTALLATION OF VALVE MARKER POSTS

Valve markers shall be installed for all valves except fire hydrant valves and valves located in paved areas at the location as directed by the District, per Water Standard Plan 23. The markers shall be set to leave 18 inches exposed above ground. The exposed portion of the markers shall be painted with concrete primer and two coats of yellow paint, per Woodinville Water Specifications, MW-24. The valve size and the distance to the valve, rounded off to the nearest foot, shall be on the marker in two-inch-high numbers using die-cut adhesive letters as shown in the Standard Plans.

CW-8 INSTALLATION OR RELOCATION OF FIRE HYDRANTS

Hydrants shall be set plumb and to grade established by the Developer, so that the pumper port is between 18 and 24 inches above final grade. Hydrants shall be backfilled with 1-1/2 inch washed rock under and around the barrel drain. The barrel shall be supported on a concrete bearing block. A concrete pad shall be placed around the hydrant barrel as shown in Water Standard Plan No. 9.

The Developer shall provide a survey to set the concrete pad, per Water Standard Plan 9, so that top of concrete pad is at finish grade. Reasonably level access shall be given for all fire hydrants. This may require installation of retaining walls or rockeries. Handrails or fencing required if wall higher than 18".

The hydrant shall be set to an elevation such that there is a minimum 3-inch clearance from the top of the concrete pad to the bottom of the sidewalk flange, while maintaining the pumper port elevation between 18 inches to 24 inches above the concrete slab.

The Developer shall be responsible to make corrections within the warranty period should there be any changes in fire hydrant clearances due to changes in final grade. The hydrant shall be installed in an area which shall have a 5-foot radius clearance around hydrant per Fire Department regulations.

Maximum allowable bury depth for hydrants shall be 6 feet. For deeper installations, vertical bends shall be used to bring up pipe elevation with a standard 4-foot bury hydrant. See Water Standard Plan 9B.

Fire hydrant laterals shall be minimum 6-inch DI pipe if under 50 feet in length, and minimum 8" DI pipe if greater than 50 feet in length.

Maximum distance for fire hydrant foot valve shall be 50 feet. Fire hydrants shall be a minimum 4' behind vertical curb and 5' behind rolled curb. When working within King County Right-of-Way, fire hydrants shall be set at 10' minimum from the edge of ROW fog line.

The hydrant shall be painted with two coats of safety yellow paint, per Woodinville Water Specifications, MW-24. When shown on the Plans or as directed by the District, a culvert shall be installed in the roadway ditch in front of the hydrant assembly to provide access. Length and diameter shall be as specified. When working within King County Right-of-Way, a sketch showing culvert length, diameter, inverts, material, and end treatment shall be prepared and forwarded through the Inspector to King County for their review and approval prior to installation.

Relocated fire hydrants shall meet the same requirements as new fire hydrants for grade, backfill, blocking and culverting. After relocation, the fire hydrant shall be painted like new. Relocated fire hydrants shall be subject to the same hydrostatic pressure and purity tests as new fire hydrants. A new fire hydrant shall be provided if the existing fire hydrant does not meet the District's current specifications. A new Auxiliary gate valve at the main shall be provided as well if the existing valve does not meet the District's current standards.

CW-9 INSTALLATION OF FIRE HYDRANT GUARD POSTS

When directed by the District, guard posts shall be set with the tops of the posts at the same elevation as the top of the hydrant. The exposed portion of the posts shall be painted with concrete primer and two coats of yellow paint, per Woodinville Water Specifications, MW-24. Guard posts shall not be installed within 10' of a roadway fog line or edge of roadway.

CW-10 INSTALLATION OF AIR RELEASE ASSEMBLIES

The air-release assemblies shall be installed, per Water Standard Plan 11, at the location shown on the plans or as directed by the District. Air-release assemblies shall be located at high points on the water line. To obtain proper installation and operation of the air-release assembly, it is often required that the main line at this point be placed somewhat deeper than the minimum of 3 feet. Contractor should be aware proper installation may require mainline piping deeper than 3 feet. The air vac box shall be backfilled to the bottom of the assembly with either crushed surfacing or drain rock. Air Vac piping and Valve shall be included in pressure testing.

CW-11 INSTALLATION OF BLOW-OFF ASSEMBLIES

The blow-off assemblies shall be installed as shown on the Water Standard Plan 12 at the location as directed by the District. All dead-end mains or laterals shall have a Blow off (or fire hydrant) installed at the end for water quality and flushing purposes.

CW-12 INSTALLATION OF CUSTOMER WATER SERVICES

The services shall be installed as shown on the standard plans. Maximum service length from the main to the residence is 300'. Service tapping shall be with a hole saw and resulting coupon shall be given to the District's Inspector. If multiple services are to be tapped in the same location, minimum of 12" required in between taps.

Meter grouping allowed with special permission from Woodinville Water District.

Services shall be installed in one piece with no splices, unless approved otherwise by Woodinville Water District for special conditions. Under no circumstances will splices be allowed for polyethylene services. Services shall not be crimped. All services shall be visually flow tested after pressure testing and flushing.

CW-13 RECONNECTION OF AN EXISTING SERVICE

Reconnection of an existing service shall be completed per Water Standard Plan 13A. The contractor shall coordinate re-connection of an existing service with the affected property owner. Notification shall be given for water outages, 24 hours in advance and 30 minutes prior to shutoff. It is the responsibility of the contractor to verify that the reconnection is made downstream of any existing private PRV assemblies. The contractor shall be responsible for any leaks that develop from the work performed making the reconnection. The contractor shall also be responsible for the cost of any water lost should the back-side connection develop a leak. Connections at the meter box shall be left open for inspection.

CW-14 CONCRETE THRUST BLOCKING

Concrete for thrust blocks shall be from a "pre-mix" vendor delivered by mixer truck to the site, proportioned to achieve 3,000 psi compressive strength when the line is to be pressurized. Alternatively, site mixed concrete may be allowed provided commercial pre-blended dry bag concrete products are used and mixed so as to achieve the required compressive strength.

Concrete thrust blocking shall be cast in place and have a minimum of 1/4-square-foot bearing against the fitting and 2 square feet of bearing against undisturbed soil and shall be clear of joints to permit taking up or dismantling joint. All poured in place blocking shall have a minimum measurement of 12 inches between the pipe and the undisturbed bank. The Developer shall coordinate with the inspector when preparations for thrust blocks are made to allow onsite inspection before and/or during concrete placement. Thrust Blocks shall be inspected prior to backfill. All blocking configurations and sizes shall be per Water Standard Plans 3 and 4. All blocking as shown on the standards are considered as minimums, and consideration should be given to unusual circumstances and topography.

CW-15 CONSTRUCTION ON STEEP SLOPES

Where construction occurs on slopes 20% or greater, or when directed by the District, the developer shall install concrete pipe anchors and slope retainers, or other approved slope retainers as shown on Water Standard Plan 5.

All water mains installed on slopes of 20% or greater, or within fill slopes shall be restrained joint Class 52 ductile iron pipe.

For water mains constructed on slopes of 20% or greater, one concrete pipe anchor shall be installed for each pipe section.

CW-16 AUGERED OR BORED CASINGS

Casings shall be required as determined by the lead agency for service lines or mains installed under rockeries, retaining walls, state highways, or main thoroughfares.

Water mains installed in casing pipe shall be made by jacking, driving, or augering a steel casing pipe beneath the surface. No open excavation shall be made closer than six feet from the edge of pavement. The diameter of the casing shall be sufficient to allow installation of the water main and to provide allowance for adjustment of the water main to proper line and grade. Wall thickness shall be sufficient to withstand installation force and highway loading and shall not be less than 3/8-inch.

Provisions shall be made to monitor possible cave-ins outside the casing. The voids shall be filled by pumping grout at low pressure. The cutter head shall not protrude more than 1/3rd the diameter of the casing or max 8" to prevent or minimize cave-ins.

After installation and testing of the water main, and with the approval of the inspector, dry sand shall be blown in the casing pipe to fill all voids. Casing ends shall be sealed using rubber end seals and stainless-steel clamps or other District approved method. A temporary blow-off shall be placed at each end of the casing to verify and facilitate sand placement. Calculations shall be performed to show the amount of material installed has filled the interstitial void between the installed water main and the casing.

Restrained mechanical joint pipe shall be installed in all casings. Approved centered restraint type stainless steel casing insulators (Cascade Water Works Manufacturing, Advanced Products & Systems, or District approved equal) shall be used to protect the pipe and adjust it to proper grade. See Water Standard Plan 24 for more information. The water main may be pushed or pulled into the casing pipe, unless MEGALUGS are used for joint restraint, in which case the water main shall be pulled into and through the casing pipe.

All bore pits or related excavations shall be closed at the end of each day. Ditches must be backfilled or covered with steel sheets and, within public or private rights- of-way, barricaded with minimum 5-foot high chain link fencing and flashing warning lights to prevent people or animals from falling into the trench.

The requirements of the roadway agency as contained in the construction permit, or as issued by verbal instructions of the authorized representative of the roadway agency shall be followed by the Developer.

CW-17 FILLING WATER MAINS

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before filling, flushing and testing. Where permanent blocking is not required, the Developer shall furnish and install temporary blocking.

As soon as pipe is adequately secured against movement under pressure, it may be filled with water. All water used for filling and flushing shall be metered to account for lost water. The new main shall be filled slowly. Max fill rate 1 ft/second. A state approved backflow device shall be used to protect the District's existing system from cross contamination during filling and flushing. The backflow device shall be of sufficient size to allow for flushing (2-inch diameter minimum).

All service caps, angle stops, or setter valves shall be open or opened to expel air and tightened or closed after air removed. Fire hydrant valves and fire hydrant auxiliary gate valves shall be opened, and cap removed on the fire hydrant. The cap shall be re-installed and tightened after air is removed. Fire hydrant valves and fire hydrant auxiliary gate valves shall be opened to remove air. Provisions shall be made to flush and remove high concentrations of chlorinated water 24 hours after fill.

CW-18 PIGGING WATER MAINS

The Developer's Contractor shall work with the Developers Engineer to develop a pigging plan for review by the District. The entire pipeline route needs to be pigged including sterile connections. Pigs shall be foam cubes 2" larger than the inside diameter of the main, or foam pigs (See MW-22). 1" temp blow-offs will be required if air will be trapped in the filling process. Temp blow-offs or other exit points shall be designed so pig removal can be accomplished with minimal potential for contamination of the new system. Pigging Plan to be discussed at pre-con meeting. Provide PDF plan prior to the pre-con meeting. Use Standard Plan 10 for more reference.

CW-19 PRESSURE TESTING WATER MAINS AND APPURTENANCES

All pipelines shall be tested prior to acceptance of work. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed, and operated by the Developer. Water feed for the pump shall be from a clean barrel or other container so that the actual amount of "makeup" water can be measured periodically during the test period.

The maximum length of pipe that may be pressure tested at one time is 1,500 LF.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Developer shall furnish and install temporary blocking.

Water supply for filling, testing, and flushing of the new mains will be available from the existing distribution system at no cost for one testing and flushing cycle. However, if water is needed for additional tests, the Developer shall be billed for water used at the current rate of the District. High volume flushing of the system will occur after the permanent full diameter connection is made.

The Developer shall obtain specific permission from the District during the months of June through August before any high-volume flushing will be allowed.

After the pipe is filled and all air expelled, it shall be pumped to a test pressure equal to 150 psi more than the operating pressure, and this pressure shall be maintained for a period of 1/2 hour. In accordance with manufacturer's recommendation, all valves may be limited to a pressure differential equal to the rated pressure of the valve (200 psi minimum), but shall not restrict the test pressure of the main. Mainline testing shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. Hydrant ports shall also be tested to hold static pressure without any visible leaks. Hydrostatic tests shall be performed on every complete section of water main between two valves without back pressure on adjoining sections. Alternatively, pressure may be released in a safe manner beyond the valve being tested. All valves, including fire hydrant auxiliary gate valves shall be tested in this manner.

In addition to the hydrostatic pressure test, a leakage test shall be conducted on the pipeline per AWWA C600 Latest Revision. The leakage test shall be conducted at the same pressure as the hydrostatic pressure test for a period of not less than 1/2 hour. The quantity of water lost from the main shall not exceed the number of gallons per hour determined by the formula:

$$L = \frac{SD(P)^{0.5}}{148,000}$$

L= Allowable Leakage, gallons/hour

S= Length of pipeline tested

D=Nominal diameter of the pipe in inches

P= Avg. test pressure during leakage test, psi

Defective materials or workmanship, discovered as a result of the tests, shall be replaced by the Developer at the Developer's expense. Whenever it is necessary to replace defective material or correct the workmanship, the tests shall be rerun at the Developer's expense until a satisfactory test is obtained.

CW-20 DISINFECTION OF WATER MAINS AND APPURTENANCES

All pipelines shall be disinfected prior to acceptance of work and connections to the existing system. Chlorine shall be applied in one of the following manners, listed in the latest version of AWWA C-651- 14 section 4.3.,4.4 or 4.54.5.

1. Tablet/ Granule Method of Chlorination.
 - a. May only be used if pipe was delivered with factory caps that remain in place until pipe is installed, and no debris or ground water was allowed to enter pipe.
 - b. If ground water or debris is allowed into waterlines using the Tablet/ Granule Method, temporary blow-offs shall be set on all end points immediately and granules flushed out.
2. Continuous Feed Method of Chlorination.
3. Slug Method of Chlorination.

Initial and 24-hour chlorine doses shall be per AWWA C-651-14 latest version.

After the desired chlorine concentration has been obtained throughout the section of line, the water in the line shall be left standing for 24 hours. Unless water temperature is lower than 41 degrees F then 48 hours. Following this, the line shall be thoroughly flushed, and tested for residual chlorine concentration. Three (3) pipe volumes shall be flushed initially. Additional flushing shall continue if residual content is greater than levels found in the existing system. Minimum flushing speeds shall be 2.5 feet per second. Additional flushing will be required after final connection is made if minimum flushing speed not attained. At no time, shall chlorinated water from a new main be flushed into a body of fresh water. This is to include lakes, rivers, streams, and any and all other waters where fish or other natural water life can be expected.

The contractor shall provide all materials and equipment for de-chlorination and shall be responsible to obtain permission for flushing into storm drainage systems or drainage courses. The contractor shall be responsible for all damages resulting from flushing. The contractor shall provide a water tank, if in the opinion of the District, damage may occur, or if approvals have not been obtained for flushing. The contractor may flush into the District's sanitary sewer system only with prior permission. Proper screens must be installed to prevent debris from entering the sanitary sewer system.

Water sampling shall be performed by the District's inspector after the flushing is completed and again 17 hours minimum after the first sample. The line must not be placed in service until a satisfactory bacteriological report has been received.

Only District representatives shall be allowed to operate existing and new tie-in valves. Developer's personnel are expressly forbidden to operate any valve on any section of line which has been accepted by the District.

CW-21 CONNECTION TO EXISTING WATER MAIN/PLACING NEW MAINS IN SERVICE

Wet tap connections shall be installed as shown on the Water Standard plan No. 1. The tapping valve shall be closed and remain closed after tapping.

Cut-in tees and crosses shall be installed as shown on Water Standard Plan No. 1 and the valves on the branches of the tee or cross shall remain closed.

At connections of new piping to existing piping all of the new piping, appurtenances and blocking shall have been installed, disinfected and visually tested. The contractor is required to use a state approved backflow prevention device for filling, testing and flushing of the new water system prior to cutting into the existing line.

The District shall be notified in writing seven (7) working days in advance of all scheduled connections. No cut-in connections or connections of new piping to existing piping will be scheduled on Fridays or Mondays. Shutdowns shall be permitted from 9:00 a.m. to 3:00 p.m., Tuesday through Thursday. Connections shall not be allowed on Holidays or days leading up to or after a Holiday per the District's discretion.

Special circumstances may require shutdowns to be performed after-hours when affecting certain businesses or schools. Such after-hours shutdowns shall be scheduled only upon approval by the District.

All equipment and material necessary to make the connections shall be delivered to the site prior to the start of work. Bolts, flanges, gaskets, couplings and all accessories shall be checked and pre-assembled where possible by the Developer and verified by the District prior to shut down of the water system.

Excavation at the connection point shall be extended a minimum 1' below the pipe, with a deeper sump to prevent contamination when de-watering pipe. The contractor shall not cut into the pipe until authorized by the District's Inspector or representative.

Ditch water must be kept clean or clarified prior to placing in the District's sewer, or in storm drain system. Contractor shall receive prior approval from the Jurisdictional authority to de-water trench into storm drainage.

Before connection or cut-in, the fittings, pipes, valves, and couplings shall be cleaned and sterilized with chlorine solution in the same manner as provided for the pipeline. The cleaning and sterilizing shall be done immediately prior to installation and in the presence of the District. Once the water has been shut off, the Developer shall proceed rapidly and without interruption to complete the connection. Installation of mechanical pipe restraints such as Mega-lugs or field lock gaskets may be necessary to allow a visual test for leakage of all joints or taps under full line pressure prior to backfill.

Short spools and fittings for connections shall be sterile swabbed immediately prior to making the connection and must be witnessed by the District's Inspector. Sterile swabbing shall be performed with a new cleaning pig, mop, or bundled rags to prevent contamination. Cleaning gear shall be capable of reaching all portions of the pipe.

The Contractor shall provide temporary blocking at bends, fittings, and pipe ends as necessary.

After connection to the existing system, the opening of valves shall only be accomplished by the District's authorized representative. The Contractor shall not backfill the connection until after the connection is checked and inspected under normal line pressure. Backfilling and compaction of the trench and installation and maintenance of temporary trench patching shall be in accordance with local jurisdictional requirements.

CW-22 INSTALLATION OF PRESSURE REDUCING STATION

Excavation shall be carried to the proper grade and to a dense undisturbed firm foundation. Grade shall be as shown on drawings, but in no case shall the top slab extend higher than 12 inches below adjoining road grades. The vault shall be carefully placed on a prepared foundation of foundation gravel. The excavation shall be kept free of ground and surface water during installation. The Contractor shall always use caution to prevent floatation of the vault.

Backfill around the structure shall be carefully placed in layers not over 12 inches thick and mechanically compacted. No brush, topsoil, organic material or asphalt shall be used in backfilling. Where original excavated material is unsuitable for backfill, as determined by the Engineer, imported gravel backfill shall be placed. The unsuitable material shall be removed by the Contractor to a disposal site, in accordance with Jurisdictional requirements. The backfill shall be compacted by mechanical compactors to 95% of maximum density, ASTM D1557, to finished grade.

All pipe penetrations shall be cored.

Wrapid Seal or NPC External Joint Wrap shall be required at all pre-cast joints and riser sections.

The Developer/ Contractor shall provide permanent electrical service to the vault

The Developer/ Contractor shall obtain the necessary permits and perform all coordination with the electrical utility or its representative. A redlined electrical "As- Built" drawing shall be submitted to the District for review and inclusion in the project As-Builts. The Redline drawing shall include changes of all phases of the electrical work.

A sump pump to discharge storm drainage and water from the vault shall be provided. See Woodinville Water District Specification, MW-21 for more information. The sump pump line shall include 1-1/2" Schedule 80 PVC pipe, 1- 1/2" Union, 1-1/2" Check Valve, and 1-1/2" 45-degree bends. Line shall be secured to the wall in (2) locations. See Water Standard Plan 26B for more detail. Vault drains that daylight to an open ditch require approval from the appropriate jurisdiction (King County or Cities of Bothell, Kirkland, Redmond, or Woodinville).

Gravity storm drainage only allowed with special permission from the District. If allowed, the vault shall include a 4-inch Schedule 40 PVC drain to daylight. The drain shall be placed at a minimum 2% slope with 12-6 gauge tracer wire. Vault drains that daylight to an open ditch require approval from the appropriate jurisdiction (King County or Cities of Bothell, Kirkland, Redmond or Woodinville).

The piping, vault and metal items shall be painted per Woodinville Water Material Specifications, MW-24. All surfaces shall be clean and dry. No painting shall be done before the prepared surfaces are approved by the Engineer. The pipe shall be empty, and the surfaces shall be free of all moisture and condensation before application begins.

Upon completion of the installation the Contractor shall furnish the services of a technical manufacturer's representative for the pressure relief and pressure reducing valves. The technical representative shall check the installation, test the equipment, place it in operation and train the District's representative.

See Water Standard Plans 26, 26B, and 26C for Pressure Reducing Valve Station details.

CW-23 RESTORATION OF DISTURBED AREAS

Restoration of public and private improvements shall be performed by experienced contractors or by employees of the Developer who are qualified in this type of work.

The Developer shall be responsible to maintain all roadway areas until the permanent repair is accomplished.

The Developer shall limit construction time on each easement to the very minimum possible, including the time required for installation and testing. Restoration work shall follow immediately after pipe testing with due allowance for weather and season of year.

TEMPORARY TRENCH PATCHING

Temporary trench patches shall be Class ½" hot mix asphalt (HMA), and shall conform to Section 5.04 of the WSDOT Specifications. The contractor shall maintain the temporary trench patch until the permanent patch is installed.

ASPHALT PAVEMENT

The existing asphalt concrete shall be cut on a neat line by saw cutting prior to excavation. Before the end of each day the trench shall be backfilled and compacted, and a temporary hot mix patch (2" minimum thickness) shall be placed and maintained in good condition until replaced.

Immediately prior to permanent resurfacing of bituminous surfaced roads, the edges shall be re-trimmed a minimum of 12 inches wider (or as required by the local jurisdiction) than the excavation with straight vertical edges free from irregularities and the temporary patch shall be removed. The City of Woodinville requires transverse patches to be cut back 3 times the width of the trench on each side. Edges of the trimmed surfacing shall be thoroughly tacked with an emulsified asphalt (SS-1) and asphalt concrete shall then be placed and compacted to the grade of the original surface. All asphalt joints shall be sealed with an approved sealer (AR4000). Permanent patch shall be installed within 30 days from the time the excavation was backfilled.

CRUSHED SURFACING

The existing gravel roadway shall be restored by grading the surface to a uniform grade to the width of the roadway prior to construction.

Where ditch sections are disturbed during construction, the ditch shall be restored to the same cross sections as existed prior to construction and shall be restored prior to placement of the crushed surfacing.

The Developer shall spread the crushed surfacing as each load is placed and shall compact the crushed surfacing after the material has been spread.

LANDSCAPED AND IMPROVED AREAS

All improvements and landscaping within the construction area which are damaged, destroyed or the use thereof interfered with due to the operation of the Developer shall be immediately restored to their former conditions by the Developer at the Developer's expense, using the services of a qualified nursery and/or sod installation company, except where noted otherwise. Notice should be given to the property owners along the route of construction by the Developer advising them of the methods to be used to preserve and restore the improvements.

UNIMPROVED AREAS

All areas disturbed by this construction for which no other restoration is specified, and for which there were no private improvements existing prior to construction, shall be seeded for erosion control per the latest edition of the King County Surface Water Manual, Appendix D and WWD Water and Sewer General Provisions, GP-42.