

# CHAPTER 4 WATER

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## **WATER**

### **4.01 General**

- A. The Water System Criteria and Specifications are minimum base level performance, design and construction standards used to maintain uniformity of design within the water utility.
- B. Any extension of the water system must be approved by the City and conform to these guidelines, Department of Health regulations and guidelines, the City of Vader Water System Plan, and Cowlitz/Lewis County Fire District No. 20 requirements to the extent not inconsistent with City criteria.
- C. Proposed plans must show how water shall be supplied and the applicant shall demonstrate whether adequate water pressure and volume shall be maintained in case of fire. An analysis of the system may be required, at the Applicant's cost, if it appears that the system might be inadequate.
- D. Anyone desiring to extend or connect to the City water system must contact the City for a Pre-construction Application form. After the completed application is returned to the City, along with any other information that may be required or requested, staff shall determine the conditions of service for connection to the water system.
- E. Extension of or connection to City water lines outside of the Vader Urban Growth Area (UGA) may be limited under the provisions of the Lewis County Comprehensive Plan. The City shall not allow service outside of the UGA without written permission from the County.

### **4.02 Design Criteria**

- A. The design of any water extension/connection shall conform to these guidelines and all other applicable standards. The layout of extensions shall provide for continuation and/or looping of the existing system. The City has the authority to apply or necessitate items not covered or mentioned in this chapter. .
- B. All pipe, valves, meters, hydrants, fitting and special materials shall be new undamaged and designated for use in potable water systems. All labor, equipment and materials shall be in conformance with the Standard Specifications for Road, Bridge and Municipal Construction, WSDOT and APWA, and the specification of the American Water Works Association, except as modified herein. Materials or additives must be in compliance with NSF Standards 60 and 61 as required in WAC 246-290-220.
- C. Water mains shall be sized to provide adequate Peak Hour Demand (PHD) at a minimum residual pressure of 30 psi and Maximum Day Demand (MDD) plus fire

flows at a minimum residual pressure of at least 20 psi. Specific fire flow requirements shall be determined by the City for each development application. However, the quantity of water required shall in no case be less than 500 gpm at 20psi residual pressure for 30 minutes in residential areas; 750 gpm at 20psi residual pressure for 60 minutes multi-family residential and commercial areas; or 1,000gpm at 20psi residual pressure for 60 minutes in industrial areas.

- D. The minimum water main size shall be six (6) inches in diameter where looped. Dead-end mains shall be a minimum of eight (8) inches in diameter. All mains that may be extended or looped must end with an approved mechanical joint gate valve and 3-foot pipe extension, cap and thrust blocking.
- E. Larger sized mains may be required in specific areas identified in the Vader Water System Plan. The City may also require the installation of larger mains if determined necessary to meet fire protection needs, domestic requirements and/or for future service needs.

#### **4.03 Pipe, Valves and Fittings**

- A. Pipe. All pipe for water mains shall have flexible gasketed joints and shall be PVC or Ductile Iron in accordance with the following specifications:
  - 1. Ductile Iron Pipe: Ductile Iron Pipe shall conform to AWWA C 151 Class 50 or greater if required in accordance with the criteria specified in AWWA C150. Ductile iron pipe shall be cement mortar lined with a bituminous seal coat outside in accordance with AWWA C 104. All pipes shall be joined using rubber gaskets, push-on type or mechanical joint, conforming to AWWA C 111, and be furnished in 18- to 20-foot lengths unless design conditions dictate otherwise.
  - 2. Polyvinyl Chloride (PVC): Six inch and larger PVC pipe shall be AWWA C900, minimum pressure Class 150. All pipe shall be furnished in 18- to 20-foot lengths unless design conditions dictate otherwise and assembled with a non-toxic lubricant.
- B. Fittings. All fittings shall be ductile iron compact fittings conforming to AWWA C153 or, AWWA C110 or C111. All fittings shall be cement mortar lined conforming to AWWA C104. All fittings shall be connected by flanges or mechanical joints. Restraining glands shall be provided on all mechanical joints unless otherwise directed.
- C. Pipe Installation. Pipe installation shall be in accordance with the Standard Specifications, Standard Details and Standard Plans, except as modified herein.
  - 1. Pipe Cover. A minimum of thirty (36) inches of cover over the pipe and, to the extent practical, a maximum of forty-two (42) inches cover is required from the finished or exiting ground surface, whichever is greater, to the top of the pipe for

all installed transmission, distribution and service piping. The City may allow thirty (30) inches of cover where ductile iron piping is utilized.

2. Tracer Tape and Locate Wire. All pipes and services shall be installed with continuous tracer tape placed twelve to eighteen inches under the proposed finished sub grade. The tracer tape shall be of plastic non-biodegradable, metal core, or backing marked "WATER" that can be detected by a standard metal detector. In addition to tracer tape, toning wire shall be installed over all pipe and services. Toning wire shall be UL listed, type UF, 12-gauge solid coated (blue) copper wire, taped to the top of the pipe and laid loose enough to prevent stretching and damage before being brought up and tied off at the valve operating nut or valve box. If the operating nut is not easily accessible from the ground surface, the copper wire shall be tied off at the valve box in such a way that the wire is easily accessible from the ground surface. Two (2) feet of slack shall be provided to allow for connection to the locator. Toning wire shall be tested prior to acceptance of the pipe system. A written notice from the Contractor to the City must be received two (2) business days prior to when testing is required.
3. Connection to Existing Mains. The City shall be responsible for approving the scope of work for connection to existing water mains. The City shall be consulted regarding fittings or couplings required. It shall be the Contractor's responsibility to verify the location and depth of the existing main and the fittings required to make the connections to the existing main. All excavation, connections, piping, tapping valve fittings, services, anchors, blocking, bedding, backfill, compaction, restoration and other labor and materials required shall be furnished and placed by the Contractor. Tapping or connecting to an existing water main shall be done in the presence of a City representative. The City shall be given five (5) business days advance notice of a water main tap or connection to an existing main. Water mains shall not be shut down for taps under most conditions.

#### **4.04 Service Interruption**

- A. The Contractor shall notify the City five (5) business days prior to a utility shutdown. The City, at its discretion, may re-schedule shutdown and a City representative must be present at any utility shutdown. When shut downs require "field verification" of underground conditions, connection points will be exposed by the Contractor and work requirements shall be verified by the Contractor and the City two (2) business days prior to the shutdown notice. Customers involved with or affected by shutdowns will be notified by the Contractor at least forty-eight (48) hours in advance. Shutdowns will not be permitted on Fridays, weekends, or holidays without written authorization from the City.
- B. Shutdowns cannot be scheduled until a Water/Sewer/Stormwater Application has been approved and all applicable fees have been paid in full.

#### 4.05 Hydrants

- A. Fire hydrants shall be installed in accordance with the Standard Specifications and the Standard Details.
1. The center of the lowest outlet of the hydrant shall be no less than 18-inches above finished grade. In addition, all hydrants shall be installed with a minimum of a 36-inch unobstructed radius around the hydrant. Hydrants shall be aligned so that pumper ports face toward the road or most probable route of access, if roads are not available, as determined by the appropriate local fire protection authority.
  2. When necessary, the City shall require hydrants to be protected by two or more posts, 4-inch diameter x 5 feet high made of either reinforced concrete or steel.
  3. Public fire hydrants shall be located within publicly owned easements and rights-of-way.
- B. The City, in conjunction with Cowlitz/Lewis County Fire District No. 20 shall determine the required hydrant spacing. All hydrants shall be installed and placed in a manner that provides accessibility to Police and Fire Services and their equipment as determined by both departments. Unless otherwise required by the City, the following guidelines shall apply for hydrant number and location:
1. In general, hydrants shall be predicated on the location of street intersections wherever possible, and located to minimize the hazard of damage by traffic.
  2. Hydrants shall have an average nominal spacing of 600-feet. In no case shall hydrants be placed farther than 700-feet apart and no building shall be more than 350-feet from the nearest hydrant.
  3. More stringent spacing may be required if needed to meet specific building or fire code requirements.
  4. The spacing distance for hydrants shall be measured along the frontage street(s) and/or accessible side street(s) only. When determining the sufficiency of existing hydrants related to hydrant placement and spacing, hydrants located behind or on parallel streets or alleys, or hydrants with flows less than the minimum fire flows listed in Section 4.03A shall not be considered.
  5. When any portion of a proposed building is in excess of 150 feet from a water supply on a public street or right-of-way, privately owned on-site hydrants shall be required. Such hydrants shall be located per Vader Police, Lewis County Fire District No. 7 and the International Fire Code. The hydrants shall be privately maintained and shall include the appropriate metering and backflow prevention,

as noted in these guidelines. A proposed maintenance schedule shall be submitted to the City for review prior to final approval of the engineering plans.

#### **4.06 Valves**

- A. Valves shall be installed in the distribution system at sufficient intervals to facilitate system repair and maintenance, but in no case shall there be less than one (1) valve every 400 feet in school, commercial or multi-family areas, or 800 feet in residential areas, where customers are being served. Generally, there shall be three (3) valves on each tee and four (4) valves on each cross. Specific requirements for valve spacing shall be made at the plan review stage. All existing valves are to be operated by City employees only.
- B. Gate Valves. Gate valves shall be used on all 2- to 12-inch lines. Resilient seated gate valves shall be manufactured and tested in accordance with AWWA C509 or C515 specifications. They shall be equipped with mechanical joints or flanged ends of Class 125 in accordance with ANSI B16-1. Gate valves, 3-inch and larger, shall be iron body, bronze-mounted, double disc and "O"-ring stem seal. Gate valves smaller than 3-inches shall be 125psi, non-stem rising, wedge disc, all brass or bronze valves with screwed, soldered or flanged ends compatible with the connecting pipe. All valves shall open counterclockwise and, unless otherwise specified, shall be non-rising stem type equipped with standard AWWA 2-inch stem operating nuts. Gate valves shall be Mueller, M & H, Kennedy, Clow R/W or Waterous Series 500.
- C. Butterfly Valves. Butterfly valves shall be used on all lines fourteen (14) inches and larger. Butterfly valves shall conform to AWWA C504, Class 150B, with cast iron short body and O-ring stem seals. When installed, they shall have a position indicator which clearly shows position of the disc. All valves shall be equipped with an underground manual operator with AWWA 2-inch square operating nut and shall open with a counterclockwise rotation. Butterfly valves shall be Mueller, Linseal III, Kennedy, or Allis Chalmers.
- D. Valve Boxes. All valve boxes shall be in accordance with Standard Details.

#### **4.07 Casing**

- A. Steel casing pipe shall be schedule 20 steel or equal. Pipe spacers shall have 8-inch runners. Casting pipe and spacers shall be sized for pipe being installed with a minimum of three (3) spacers per section of pipe. The casing pipe shall then be sand-packed and sealed with flexible end seal material secured with stainless pipe bands.

#### **4.08 Combination Air Valve**

- A. Combination air valves shall be in accordance with the Standard Details. Combination air valves shall be set at high points of water mains. Where possible, pipes are to be graded to prevent the need for a combination air valve.

#### **4.09 Blow-off Assembly**

- A. A blow-off assembly shall be installed on all permanent dead-end runs and at the designated points of low elevation within the distribution system if a fire hydrant is not located in the immediate vicinity. On water mains that may be extended in the future, the valve that operates the blow-off assembly shall be the same size as the main and provided with a saddle block along the last length of the pipe preceding the valve, in lieu of a thrust block at the end. The blow-off assembly shall be installed in the utility right-of-way.

#### **4.10 Backflow Prevention**

- A. All water system connections serving buildings or properties with fire sprinklers, irrigations systems or other potential cross-connections as determined by the City, shall comply with the minimum backflow prevention requirements established by the Department of Health (DOH) and the City of Vader Cross-Connection Control Program.
- B. All assemblies must be installed in accordance with the most recent versions of the City of Vader Cross-Connection Control Program, DOH, UPC, and the PNWS/AWWA Cross-Connection Control Manual. In addition, all assemblies must be inspected and approved by the City's Cross-Connection Specialist (CCS).
- C. In-premise installation of backflow assemblies can be installed only with written permission by the City's CCS or may be mandated along with premises isolation when high health hazards are determined to exist by the CCS. All backflow assemblies (premises or in-premises) must be readily accessible to City personnel during regular working hours of 8:00 a.m. to 4:30 p.m. If there is a change of ownership of an in-premise backflow assembly and/or at any time all requirements are not met, the City has the right to enforce premises isolation and shall follow the procedures established in the City of Vader Cross-Connection Control Plan. The City must be notified within two (2) business days of the completion of a backflow assembly installation. Upon notification, the City's CCS shall then inspect the installation to determine compliance with all applicable requirements.
- D. All backflow assembly installations are also required to be tested by a Washington State DOH-certified Backflow Assembly Tester (BAT) with an annual certificate of accuracy for their testing equipment on file with the City. The test results must be delivered to the City showing the backflow assembly having successfully passed the certified test. The property owner must schedule a backflow test annually thereafter.

The City shall release or issue a Certificate of Occupancy only after all backflow assemblies have passed a certified test. A list of approved testers may be obtained from the Washington Environmental Training Resource Center (WETRC) located in Auburn, Washington.

- E. All costs associated with purchase, installation, inspections, testing, replacement, maintenance, parts and repairs of a backflow assembly are the responsibility of the property owner/user.
- F. Failure on the part of any customer to correct all cross-connections in accordance with these guidelines is sufficient cause for the immediate discontinuance of public water service to the premises.

#### **4.11 Service Connection**

- A. Each customer shall have a separate metered service. Master meters may be allowed for service to a complex under single ownership and where multiple service meters are impractical. Types of facilities where master meters may be allowed shall be in accordance with WAC 246-290-496.
- B. Services shall be installed in accordance with the Standard Details. All service connection sizes used for new development shall be determined by the City and installed by the Developer at the time of mainline construction. After the lines have been constructed, tested and approved, the owner may request a water meter. The City shall install a water meter only after all applicable fees paid and the system inspected and approved. For 1 1/2" or larger meters, the meter and gasket shall be supplied by the Contractor. The City shall lock off the setter after the Contractor has installed the meter.
- C. For new service to an existing parcel or new parcel fronting an existing main, an application must be submitted to the City. Upon approval of the application and payment of all applicable fees, the property owner shall hire a licensed Contractor to tap the main, and install the meter, box, and setter. The City shall supply the water meter and setter.

#### **4.12 Water Main/Sanitary Sewer Crossings**

- A. Transmission and distribution water piping shall be separated at least ten (10) feet horizontally from on-site waste disposal piping, drain fields, and/or gravity sewage pipes and force mains. The Contractor shall maintain a minimum of eighteen (18) inches of vertical separation between sanitary sewers and water main crossings - with the water mains being at the higher elevation.
- B. The longest standard length of water pipe shall be installed so that the joints shall fall equidistant from any sewer crossing. In cases where minimum separation cannot be maintained, it may be necessary to utilize water main-rated pipe for the sewer

line, or to encase the water pipe and/or sewer line in a casing or concrete. No concrete shall be installed unless specifically directed by the City.

- C. Additional guidelines to be considered for parallel and crossing installations of water and sewer lines are the DOH Water System Design Manual, DOE Sewage Works Criteria and the *“Recommended Standards for Water Works.”* – Ten State Standards.

#### **4.13 Irrigation**

All irrigation systems shall be installed with a backflow prevention assembly in accordance with the City of Vader Cross-connection Control Program. Irrigation sprinklers shall be situated so as to not wet any public street or sidewalk.

#### **4.14 Staking**

- A. All surveying and staking shall be performed by a surveying firm licensed in the State of Washington and capable of performing such work.
- B. The minimum staking of waterlines shall be as follows:
  - 1. Stake centerline alignment every one hundred (100) feet with cuts and/or fills to bottom of trench maintaining the minimum required depth of cover over pipe. Centerline cuts are not required when road grade is to finished subgrade elevation.
  - 2. Stake location of all fire hydrants, hydrant flange elevations, tees, water meters, setters and other fixtures with cut or fill to finished grade.

#### **4.15 Construction Requirements**

- A. Pipe placed in the trench shall be sealed with a watertight plug at the end of each day. More frequent use of a watertight plug may be required at the discretion of the City.
- B. Trenching and shoring operations shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Office of Safety and Health Administration (OSHA) Safety Standards. The Contractor shall maintain the presence of a "competent person" as defined by the Washington State Department of Labor and Industries when any trench excavation and backfill work is being done at the project site.
- C. Backfilling shall not commence until the pipe installation has been inspected and approved by the City. Backfilling and surface restoration shall closely follow installation of pipe so that not more than 100 feet is left exposed during construction hours without approval of the City.

- D. Where governmental agencies other than the City have jurisdictions over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction, but in no case shall the backfilling or compaction be to a lower standard than that of the City.

#### **4.16 Street Patching and Restoration**

- A. See Chapter 2 of these guidelines for requirements regarding street patching and trench restoration.

#### **4.17 Hydrostatic Tests**

- A. Prior to the acceptance of work, a hydrostatic and pressure leakage test shall be conducted by the Contractor on all newly-constructed water mains, fire lines, fire hydrants leads and stub-outs in accordance with Standard Specifications, and AWWA C600, unless specified otherwise by the City. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished and operated by the Contractor. Prior to calling the City to witness the pressure test, the Contractor shall have all equipment ready for operation and have successfully performed the test to ensure that the pipe is in satisfactory condition.
- B. Defective material or workmanship discovered, during a hydrostatic field test shall be replaced by the Contractor at no expense to the City. Whenever it is necessary to replace defective material or correct workmanship, the hydrostatic test shall be re-run at the Contractor's expense until a satisfactory test is obtained. Test pressure shall be maintained while the installation is inspected by the City.

#### **4.18 Sterilization and Flushing**

- A. Sterilization of water mains shall be accomplished by the Contractor in accordance with the Standard Specifications. At no time shall chlorinated water from a new main be flushed into a body of water, including lakes, rivers, streams, drainage ways, and all waters where fish or other natural water life can be expected. Any discharge into a City sewer system must be approved in advance and in writing by the City. Sample collection should be scheduled with the City at least two (2) business days in advance. Samples can only be taken on Mondays, Tuesdays and Wednesdays.