

## **CHAPTER 5 - WATER CONSTRUCTION PROCEDURES**

### **5.00 General Requirements**

#### **A. Preconstruction Conference**

No water main construction work shall commence prior to the pre-construction meeting. After completion of construction and submittal of required documents and fees, final acceptance will be given by the City at which time service will be available by application following payment of fees for water meters.

#### **B. Water Quality**

The quality, taste and odor of water drawn from new construction water mains shall be the same as the water in the existing facility classed as acceptable for use by the City. Should the water not be acceptable for use because of taste, required steps as approved by the City shall be accomplished to attain water quality acceptable for use.

### **5.01 Water Meters**

- A.** Commercial water meters sized three-quarter inch (3/4"), one inch (1"), one and one-half inch (1-1/2") or two inch (2") shall be furnished and set by the City. The owner is required to make application and pay meter fees prior to the acceptance of the project. The City will install meters and service will be available as requested by the owner after acceptance by the City. Water meters will be set only after box and setter are at proper finished grade.
- B.** Meters three inches (3") and larger will be installed by the owner as part of the construction project and will be locked off by the City. The three (3") inch and larger meters will be turned on by the City by request from the owner after acceptance by the City.
- C.** In plat and short plats, water meter applications will be processed for meter sets and water turned on after acceptance of the water mainline facility by the City.
- D.** All irrigation meters require the installation of certified backflow devices. Certification must be either City or State approved. All irrigation service shall be by separate connection and tapped off the water main. Deduct or exempt meters shall not be

permitted in new construction.

All irrigation meters will be set and turned on after acceptance of the water system by the City. The City will not accept a water system until all the requirements of the Extension Agreement have been completed and all the fees have been paid.

- E. Adjustments, repairs or replacement of the service line, meter box or setter shall be the responsibility of the property owner.
- F. Any deficient water service brought up to standards by the City as requested by a property owner by application shall be billed by the City on a time and material basis.
- G. Water services are to be single runs from the main line to each meter. Multiple meters on a single service line will only be accepted when all meters serve a single property owner.
- H. Materials and construction shall be in accordance with Section 7-12 of the Standard Specifications and the Standard Details.

## **5.02 Cross Connection Control**

- A. These backflow devices shall be installed in accordance with the requirements of the "Accepted Procedure and Practice in Cross Connection Control" manual, the Uniform Plumbing Code and the Codes.

## **5.03 Connections to Existing Pipelines**

- A. Connections may be made to existing pipes under pressure with a tapping machine by determining the size and type of pipe and installing tapping sleeve to fit complete with tapping gate valve. Where cut-ins are permitted to be made in existing pipes, the work shall be conducted at such a time and in such a manner as to minimize the interruption of service. Cut-in time must be approved by the City. Necessary pipe, fittings and gate valves shall be assembled at the site ready for installation prior to the shutting-off of water in the existing main. Once the water has been shut off, the work shall be performed vigorously and shall not be halted until the line is restored to service. Operation of all water main line valves shall be by the City. The City shall witness all wet taps and cut-in connections and requires forty-eight (48) hours notice and approval by the City.

- B. The Contractor shall have the responsibility of giving at least a forty-eight (48) hour notice to the City and affected customers of intention to disrupt service.
- C. Pipes to be abandoned shall be capped with mechanical couplings.

#### **5.04 Roadway and Railway Crossing**

The Contractor shall use the method which has been designed on the plans and is acceptable to the City and the government or private agency having control of the road. Permits are required and shall be obtained prior to construction approval.

#### **5.05 Trench Excavation**

- A. Clearing and grubbing where required shall be performed within the easement or public right-of-way and as permitted by the property owner and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the developer.
- B. Trenching for water mains shall be completed in accordance with Section 7-10 of the Standard Specifications.
- C. Trenching and shoring operations shall not proceed more than one-hundred (100') feet in advance of pipe laying without written approval of the City.
- D. Where a utility crosses under an existing asbestos cement water main or where a trench alters the bedding of an existing asbestos cement water main, the existing A.C. pipe shall be cut three feet (3') minimum from each side of the trench wall and replaced with a corresponding size ductile iron pipe Class 52. The ductile iron pipe shall be connected to A.C. pipe with transition couplings.
- E. Contractor shall furnish a watertight plug of the appropriate size which shall be installed in the end of water main when work is delayed or stopped at the end of the work shift.

#### **5.06 Pipe in Filled Areas**

Special treatment may be required at the discretion of the City. This treatment may consist of compacting the backfill in six inch (6") layers, careful choice of backfill materials, use of Mechanical Joint Ductile Iron Pipe in short lengths, or such other reasonable method or combinations as may be necessary or as required by the City.

## **5.07 Pipe Installation For Water Mains**

The work necessary to excavate, bed, and backfill water pipelines shall conform to the requirements of Section 7-11 of the Standard Specifications and the Standard Drawings.

A. Pipe and Fittings

Use only Class 52 ductile iron pipe and fittings in accordance with Section 7-11 of the Standard Specifications.

B. Bolts.

Bolts for buried flanged fittings shall be galvanized or zinc coated plated and coated with two coats of bitumastic after installation. Bolts for mechanical joints shall be NSS Corten steel or Ductile iron only.

C. Permissible Deflection of Joints

Wherever it is necessary to deflect pipe from a straight line either in a vertical or horizontal plane, or where long-radius curves are permitted, the amount of deflection allowed shall not exceed the values in the following table:

D. Requires the use of mega lug type restraint fittings at all mechanical joints, with restraint type gaskets (razor gaskets) on two pipe sections before and after the mechanical fitting.

**Maximum Deflection Permitted\*  
 18-Foot Length Pipe**

	Mechanical Joint**		Push-on Joint	
	Maximum Deflection		Maximum Deflection	
	Angle		Angle	
Dia.	Degrees	Deflection	Degrees	Deflection
<u>In.</u>	<u>And minutes</u>	<u>Inches</u>	<u>Degrees</u>	<u>Inches</u>
4	8-18	31	5	18
6	7-07	27	5	18
8	5-21	20	5	18
10	5-21	20	5	18
12	5-21	20	5	18

\* The maximum deflection shall be whichever is less, the table or that recommended by the pipe manufacturer.

\*\* Safe deflection for 150 pounds pressure. For higher pressure, reduce tabulated deflection proportionally 10 percent for each 150 pounds added pressure.

D. Downtime Protection

When stopping work for the day, the contractor shall plug pipe ends to prevent rodents, other small animals, or debris from entering the pipe. Use an inflatable ball as a plug in addition to a tight-woven canvas, securely tied around outside of pipe end.

**5.08 Bedding and Backfill**

Use imported bedding for all water main pipe installed under pavement, curbs, sidewalks, or usable shoulder. Bed and backfill pipe and appurtenances in accordance with Section 7-10 of the Standard Specifications. The Public Works Director may require the use of CDF (controlled density fill) at major road crossings.

**5.09 Hydrostatic Tests**

The contractor shall make pressure and leakage tests on all newly laid pipe and shall be able to demonstrate a “Zero Leakage” rate. If attempts to demonstrate zero leakage can not be

achieved, contractor may choose to test in accordance with section 7-09.3 (23) of the Standard Specifications, furnish all necessary equipment and material, make all taps in the pipe as required, and conduct the tests. The engineer will monitor the tests, the City shall witness the test; if the test does not pass inspection for any reason, additional trips required to witness the test shall be at owner's expense.

A. Correction of Excessive Leakage

Should any test of pipe laid disclose leakage greater than that allowed, locate and repair the defective joints or pipe until the leakage of a subsequent test is within the specified allowance.

B. Isolation of Existing Systems Prior to Testing

Existing water pipelines shall be protected from contamination during the testing process for new construction. Use of special "blind flanges" will be necessary if the line being tested cannot be adequately separated from existing systems. The developer's engineer shall submit shop drawings and proposed procedures to the City prior to installing any special testing device.

## 5.10 Sterilization and Flushing of Water Mains

Pipeline intended to carry potable water shall be sterilized before placing in service. Sterilizing procedures shall conform to AWWA C-60 1 as hereinafter modified or expanded, and Section 7-11.3(12) of the Standard Specifications.

A. Disposal of Sterilizing Water

Dispose of sterilizing water in an approved manner. Do not allow sterilizing water to flow into a waterway without adequate dilution or other satisfactory method of reducing chlorine to a safe level. Dechlorination procedures are to be submitted in writing and approved by the City Engineer prior to flushing system.

## 5.11 Valves for Water Mains

A. Materials and construction shall be in accordance with Section 7-12 of the Standard Specifications and the Standard Details.

B. Valve marker posts shall be reinforced concrete posts, 4" x 4" on one end, 6" x 6" on the

other end, forty-two inches (42") long. Valve marker post shall be painted white hi-gloss Rust-oleum with painted black dimension from marker to valve boxes.

## **5.12 Hydrants**

- A. As per the UFC, fire hydrants shall be located to allow a 36-inch clear space surrounding the hydrant. For example, street lights, sign posts, protective posts, or retaining walls shall be no closer than 36" from the nearest portion of a hydrant. There shall also be no obstructions directly in line with any of the ports of the hydrant.
- B. Fire hydrants shall have nominal 5 1/4-inch main valve opening with 6-inch bottom connection. Public Works Director will specify flanged or mechanical joint inlet connection per conditions of connection. Equip with two 2 1/2-inch NSHT nozzles and one 4 1/2-inch NSHT pumper nozzle. The 1 1/4-inch operating nut to be one piece bronze conforming to ASTM B584. The main valve shall be equipped with O-ring seals and shall open when turned to the left or counterclockwise. Drain ring, seat ring and upper valve plate shall be bronze conforming to ASTM B584. Hydrants shall be of the break-flanged or safety-top type. Hydrants shall conform to AWWA C502, and these specifications. The depth of bury will vary, but shall be a minimum of 3 1/2-feet. All interior ferrous surfaces of the shoe below the main valve shall be seal coating. Maximum working pressure shall be rated at 200 psig. Hydrants shall be red above the ground line. Hydrants shall be "Mueller, A-423 Centurian, City of Stevenson Standard".
- C. Materials and construction shall be in accordance with Section 7-14 of the Standard Specifications and the Standard Details.

## **5.13 Connection Control and Backflow Assemblies**

- A. Installation and Testing

Backflow prevention assemblies shall be installed at the water service connection on the customer side of the meter. Backflow assemblies 3" diameter and larger shall be installed in a vault in accordance with these standards. Backflow prevention assemblies 1" and smaller shall be installed in a Carson Industries Box, series 1324 or an approved equal. 1 2" and 2" assemblies shall be installed in a series 1730 box, or equal.

After installation, all backflow prevention assemblies which are installed, must be tested upon installation by a State of Washington certified tester. The results of the testing shall be

received by the City prior to issuance of "final occupancy".

**B. Backflow Prevention Device Assembly Vaults**

Backflow prevention device assembly vaults shall be constructed in accordance with the standard drawings and requirements of this section. Backflow vaults shall be on private property and located outside of public easements.

**C. Fire Services and Domestic Services**

1. No part of the backflow prevention assembly shall be submerged in water or installed in a location subject to flooding. In a vault or chamber, adequate drainage shall be provided; and test cocks shall be plugged. The plugs shall not be of dissimilar metals.
2. The backflow assembly shall be protected from freezing and other severe weather conditions.
3. All backflow assemblies shall have a minimum 12-inch clearance on the backside, 24-inch clearance on the test-cock side, and 12 inches below the assembly. Adequate clearance (6 inches minimum) must be maintained above gate-valve stem at full extension. Headroom of 6 foot, 0 inches is required in vaults without a full opening top. Access to the device and to any vault or chamber shall remain clear at all times.

**D. Special for Fire Service Only**

1. Fire Service backflow prevention assemblies shall be installed at the property line, or edge of the public water line easement. The fire service from the public main to the backflow assembly shall be privately owned and meet all City's Standard Drawings.
2. Only approved resilient seat indicating valves are allowed on fireline assemblies.
3. Only approved Double Detector Check Valve Assemblies are to be used for system containment on fire line services in the City. The meter on the bypass assembly shall read in cubic feet.
4. Fire Line Flow and Tamper Switches installed, as required by UBC sec. 3803,



must be connected to a monitored Fire Detection System approved by the Fire Marshal. The tamper switches are required on the OS and Y gate valves in the vault, as well as any other indicating control valves on the fire protection system. Electrical inspection and permit is required.

5. The remote reader (if allowed) shall be rigidly mounted on an exterior building wall (near the domestic meter), enclosed in a metal box with a slot opening which allows reading the remote without opening the box, and at an elevation of 5 feet above the ground level.

The remote reader shall have the same number configuration as the metering device itself, and read in cubic feet. All wires to the remote reader shall be enclosed in a heavy plastic or rigid metal conduit. All wiring shall be in conformance with appropriate sections of the National Electric Code.

#### **5.14 Requirements for Water System Vault Installations**

To ensure proper operation and accessibility of all assemblies, the following requirements shall apply to installation of these assemblies, unless otherwise approved by the City. Vaults shall be constructed per the Standard Details.

- A. The vault shall be sealed with Crystal Seal or approved equal on the outside of the vault. Vault penetrations shall be sealed with non shrink grout from the outside. Apply water proof coating over grout. Backfill around vault per the manufacturer's specifications.
- B. Access to be through an H-20 rated standard Bilco door, or approved alternate.
- C. Provide approved ladder if the vault or chamber depth is 5 foot 0 inches or greater and entry is through the vault or chamber roof. Ladders shall include a Model 1 Bilco LadderUP safety post or approved equal.
- D. Adequate drainage for the vault or chamber shall be provided. (Drainage to piped storm systems allowed with check valve or daylighted drain).
- E. Vault must be equipped with a moisture proof light fixture if adequate lighting is not available.
- F. Vault is to have no other use, except for use described by these standards.

- G. Vault shall be installed on undisturbed base or compacted 3/4-0 gravel base.
- H. No piping shall be installed in excess of 3 feet above the vault floor.
- I. Assembly is to be adequately supported from the floor, and suitably restrained from movement. Supports shall consist of steel supports or approved equal; no wood supports shall be used.
- J. All electrical wiring shall be inspected by the Washington State Electrical Inspector (Permit is required).
- K. The assembly shall be readily accessible with adequate room for maintenance.
- L. All new services are to be pressure tested and disinfected by the contractor and proven to be bacteriologically safe from the existing main to the vault.

### **5.15 Pressure Reducing Valve Vaults**

PRV vaults are unique to each situation. The engineer shall detail the vault on the plans and submit for review. The City will review the vault for size and compliance with the general requirements listed under this section.

### **5.16 Appurtenances**

- A. Air and Vacuum Release Valves
  - 1. Air and vacuum release valves shall be APCO - Valve and Primer Corporation, "Heavy-Duty", combination air release valve, or equal.
  - 2. Installation shall be as shown on the Standard Details.
  - 3. Piping and fittings shall be copper or brass. Location of the air release valves as shown on the plans is approximate. The installation shall be set at the high point of the line. Water line must be constructed so the air release valve may be installed in a convenient location.