

# STANWOOD PUBLIC WORKS STANDARDS

## CHAPTER 4

### **4.000 WATER**

#### **4.010 General**

Any extension of the Stanwood Water System must be approved by the Public Works Department and all extensions must conform to Washington State Department of Health guidelines, North Snohomish County Coordinated Water System Plan, City of Stanwood Comprehensive Water System Plan, and Stanwood Fire Department requirements.

In designing and planning for any development, it is the developer's responsibility to see that adequate water for both domestic use and fire protection is attainable. The developer must show, in the proposed plans, how water will be supplied and whether adequate water pressure and fire flows will be attained in case of fire. A hydraulic analysis of the system will be performed by the City to ensure necessary improvements are being provided.

Anyone who wishes to extend or connect to the City's water system should contact the Public Works Department for a water extension/connection fee estimate. This fee estimate is an estimate of the costs due to the City for a waterline extension or connection.

Prior to the release of any water meters, all Public Works improvements must be completed and approved including granting of right-of-way or easements, and all applicable fees must be paid.

Issuance of building permits for new construction of single family subdivisions shall not occur until final Public Works approval is given. For commercial projects, building permits may be issued upon completion and acceptance of the required fire protection facilities. A construction bond, in accordance with the Stanwood Public Works Standards, will be required for the remaining public works improvements. Certificate of occupancy will not be issued until final Public Works approval is given for all improvements.

#### **4.020 Design Standards**

The design of any water extension/connection shall conform to City Standards and any applicable standards set forth herein.

The layout of extensions shall provide for the future continuation and/or "looping" of the existing system as determined by the City.

The General Notes on the following pages shall be included on any plans dealing with water system design.

#### **4.030 Water Main Construction General Notes**

1. All workmanship and material shall be in accordance with City of Stanwood standards and the most current copy of the State of Washington Standard

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Specifications for Road, Bridge, AWWA Standards, APWA and Municipal Construction.

2. A preconstruction meeting shall be held with the City prior to the start of construction.
3. Water mains shall be ductile iron cement mortar lined thickness Class 52.
4. Gate valves shall be resilient wedge, NRS (Non Rising Stem) with O-ring seals. Valve ends shall be mechanical joint or ANSI flanges. Valves shall conform to AWWA C509 or C515. Gate valves shall be Mueller, M & H, Kennedy, Clow R/W, AVK, or Waterous. Existing valves to be operated by City employees only.
5. Hydrants shall be M & H Reliant Style 929, Mueller Centurion, or Clow F-2500 or Waterous Pacer. Hydrants shall be bagged until system is approved. Hydrants will come complete with Storz adapters.
6. All lines shall be chlorinated and tested in conformance with the above referenced specification (Note 1).
7. All services shall be installed with continuous tracer tape per WSDOT/APWA Standards.
8. Provide traffic control plan(s) as required in accordance with MUTCD.
9. All water mains shall be staked for grades and alignment by an engineering or surveying firm capable of performing such work.
10. All existing cement asbestos pipes shall be handled and disposed of according to State and Federal statutes.
11. Call Underground Locate at 1-800-424-5555 a minimum of 48 hours prior to any excavations.
12. The City will be given 72 hours notice prior to scheduling a shutdown. Where connections require "field verification", connection points will be exposed by contractor and fittings verified 48 hours prior to distributing shutdown notices.
13. At any connection to an existing line where a new valve is not installed, the existing valve must be pressure tested to City standards prior to connection. If an existing valve fails to pass the test, the contractor shall make the necessary provisions to test the new line prior to connection to the existing system or install a new valve.

### **4.040 Main Line**

- A. Water mains shall be sized to provide adequate domestic plus fire flow at minimum residual pressure of 20 psi. The quantity of water required shall not be less than as outlined in the Stanwood Comprehensive Water System Plan, unless adequate fire flow requirement calculations are provided. Maximum allowed velocity will be 8 feet per second.
- B. The minimum water main size shall be 8 inches diameter as long as fire flow requirements can be met. Larger size mains are required in specific areas outlined in the Stanwood Comprehensive Water System Plan. Nothing shall preclude the City from requiring the installation of a larger sized main in areas not addressed in the

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- Comprehensive Water System Plan if the City determines a larger size is needed to meet fire protection requirements or provide future service.
- C. The City Engineer or designated representative shall determine if soil conditions or other protection measures require bonding or polyethylene encasement.
  - D. Where practical, mains shall be looped to increase reliability and fire flow capacity. Dead end 8-inch mains shall not be longer than 400 lineal feet unless approved by the Public Works Director or City Engineer.
  - E. All pipe for water mains shall have flexible gasket joints and shall be Ductile Iron Pipe. Ductile iron pipe shall conform to AWWA C 151 Class 52 and have a cement mortar lining conforming to AWWA C 104. Non-restrained joints shall be push-on type or mechanical joint, conforming to AWWA C 111.
  - F. All fittings for ductile iron pipe shall be ductile iron fittings conforming to AWWA C 153. All shall be cement mortar lined conforming to AWWA C 104. All fittings shall be connected by flanges or mechanical joints.
  - G. The minimum cover for all water mains from top of pipe to finish grade shall be 36 inches and the maximum cover shall be 60 inches, unless otherwise approved.

### **4.050 Connection to Existing Water Main**

The developer's engineer shall be responsible for determining the scope of work for connection to existing water mains.

It shall be the Contractor's responsibility to field verify the location and depth of the existing main and the fittings required to make the connections to the existing mains.

### **4.060 Service Interruption**

The contractor shall give the City a minimum of 72 hours notice of any planned connection to an existing pipeline. This includes all cut-ins and live taps. Notice is required so any disruptions to existing services can be scheduled. The City will notify customers involved or affected of the water service interruption. The contractor shall make every effort to schedule water main construction with a minimum interruption of water service. In certain situations, the City may dictate scheduling of water main shutdowns so as not to impose unnecessary shutdowns during specific periods to existing customers.

### **4.070 Hydrants**

- A. The lead from the service main to the fire hydrant shall be ductile iron cement mortar lined Class 52 no less than 6 inches in diameter up to 50 feet in length. Over 50 feet in length shall be sized to meet the fire flow requirement.
- B. Fire hydrants shall have two, 2½-inch outlets and one 4½ inch pumper port outlet. All outport threads shall be National Standard thread. The valve opening shall be 5¼-inch diameter. The hydrant shall have a positive and automatic barrel drain and shall be of the "safety" or breakaway style. All hydrants shall have Storz fittings. Hydrants shall be M & H Reliant Style 929, Mueller Centurian, Clow F-2500 or Waterous Pacer. All hydrants shall be bagged until system is approved.

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- C. The Public Works Department and Stanwood Fire Department work together to ensure that adequate hydrant spacing and installation are achieved.

Unless otherwise required by the governing authority, the following guidelines shall apply for hydrant number and location.

1. At least one hydrant shall be installed at all intersections.
  2. Hydrant spacing of 600 feet shall be required in all areas servicing single family and duplex residential areas. All single family lots shall be within 300 feet from a fire hydrant, as measured along the path of vehicular access.
  3. Fire hydrants serving any use other than detached single family dwellings or duplex dwelling on individual lots will be located not more than 300 feet on center, and will be located so that at least one hydrant is located within 150 feet of all structures, but not closer than 50 feet, unless approved by the Stanwood Fire Department.
  4. Hydrants located in dead-end areas or cul-de-sacs shall service an area of no more than 120,000 square feet.
- D. For requirements regarding use, size and location of a fire department connection (FDC) and/or post indicator valve, contact Stanwood Water Department. Location of FDC shall be shown on water plans.
- E. Where needed, the Public Works Department or Stanwood Fire Department may require hydrants to be protected by two or more posts, each 4 inches in diameter by 5 feet in height made of either reinforced concrete or steel.
- F. Fire hydrants must be installed, tested, and accepted prior to the issuance of a building permit.

### 4.080 Valves

All valves and fittings shall be ductile iron with ANSI flanges or mechanical joint ends. All existing valves shall be operated by City employees only.

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 valve every 1000 feet. Generally, there shall be a minimum two valves on each tee and three valves on each cross. Specific requirements for valve spacing will be made at the plan review stage.

- A. Gate Valves, 2-inch to 12-inch. The design, materials and workmanship of all gate valves shall conform to AWWA C509 or AWWA C515, latest revision. Gate valves shall be resilient wedge non-rising stem (NRS) with two internal O-ring stem seals. Gate valves shall be Mueller, M & H, Kennedy, Clow R/W, AVK, or Waterous.
- Gate valves shall be used on all 2-inch to 12-inch lines.
- B. All valves larger than 12 inches shall be approved as determined by the Public Works Director. Butterfly valves shall be used on all lines 14 inches or larger, unless the line will be flushed with a polypig.
- C. Valve Box. All valve boxes shall be cast iron per WSDOT/APWA Standards. In areas where valve box falls in road shoulder, the ditch and shoulder shall be graded before placing asphalt or concrete pad.

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- D. Valve Marker Post. Valve marker posts shall be 4-inch x 4-inch reinforced concrete or schedule 40 steel posts 5 feet long stamped with “W” and distance to valve. Post shall be painted with 1 base coat and 2 coats white oil base enamel.

### **4.090 Casing**

Steel casing pipe shall be schedule 20 steel or equal. Pipe spacers shall be Calpico Model PX or equal with at least eight runners. Casing pipe and spacers shall be sized for pipe being installed. Install minimum of three spacers per section of pipe. Cap ends with end seals equal to APS Model Wrap Around End Seal.

### **4.100 Air and Vacuum Release Valve**

Air and vacuum release valves (ARV) shall be per WSDOT Standard Plans. Air and vacuum release valve shall be equal to Apco 145C.

The installation shall be set at the high point of all water mains when required. Where possible, pipes are to be graded to prevent the need for an air release valve.

### **4.110 Blowoff Assembly**

Blowoff assemblies shall be set at the low points of all water mains, unless a fire hydrant is located at the low point.

If a fire hydrant is not located at the end of a dead end main, a blowoff assembly shall be required. On water mains which will be extended in the future, the valve which operates the blowoff assembly shall be the same size as the main and provided with a concrete thrust block. The pressure rating for blowoff assemblies shall be 200 psi.

### **4.120 Sampling Station**

A sampling station, per the standard details, shall be installed in all new developments.

### **4.130 Backflow Prevention**

All water system connections to serve buildings or properties with domestic potable water, fire sprinkler systems, or irrigation systems shall comply with the minimum backflow requirements as established by the Snohomish County Health District and the City of Stanwood.

The installation of all backflow devices is required to protect the existing water system and users from possible contamination.

Public Works shall get the certificate for testing of any backflow prevention device before releasing the certificate of occupancy on any building.

The Stanwood Water Department will monitor the test of the fire line and obtain the certificate for underground piping. The fire line portion of the underground piping will not be tested until the Public Works Department has tested and approved their main up to the fire line.

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### 4.140 Service Connection

- A. All service connections relating to new development shall be installed and tested by the developer at the time of mainline construction. Testing shall include main and service line up to meter setter. After the lines have been constructed, tested, and approved, the owner may apply for a water meter. The City will install a water meter after the application has been made and all applicable fees have been paid. Water meters will be set only after system is inspected and approved.
- B. When water is desired to a parcel fronting an existing main but not served by an existing setter, an application must be made to the City. Upon approval of the application and payment of all applicable fees, the City will tap the main, and install the meter, box, and setter.
- C. Service lines shall be 1 inch IPS high density polyethylene pipe, minimum pressure class 200 psi per WSDOT/APWA Standards. No glued joints will be accepted. Service lines shall be installed 22.5 degrees off the main. Tracer tape and fourteen gauge coated copper wire wrapped around the pipe shall be installed on all service lines.

Service saddle shall be all bronze with stainless steel straps and shall be Romac style 202S or approved equal. All clamps shall have rubber gasket and iron pipe threaded outlets.

Corporation stop shall be all bronze and shall be Ford type F1101, with ribbed insert brass only or approved equal with iron pipe threads conforming to AWWA C 800. Stainless steel inserts shall be used with pack joints and polyethylene pipe.

- D. Master meters will not be allowed for service to more than one per building. An approved backflow prevention system must be installed in conjunction with any master meter.
- E. Individual pressure reducing valves shall be installed at all service connections.

### 4.150 Water Main/Sanitary Sewer Crossings

The contractor shall maintain a minimum of 18 inches of vertical separation between sanitary sewers and water mains. The minimum horizontal separation shall be 10 feet.

The longest standard length of water pipe shall be installed so that the joints will fall equidistant from any sewer crossing. In some cases where minimum separation cannot be maintained, it may be necessary to encase the water pipe and/or sewer service in pipe or concrete. The casing shall extend a minimum of 10 feet on either side of the crossing. No concrete shall be installed unless specifically directed by the City.

### 4.160 Irrigation

All irrigation systems shall be installed with an approved backflow prevention assembly approved by AWWA and the Snohomish County Health District. The minimum required is a double check valve assembly.

Irrigation sprinklers shall be situated so as to not wet any public street or sidewalk.

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### 4.170 Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed as a Professional Engineer or Professional Land Surveyor by the State of Washington.

A preconstruction meeting shall be held with the City prior to commencing staking. All construction staking shall be inspected by the City prior to construction.

The minimum staking of waterlines shall be as directed by the City Engineer or as follows:

- A. Stake centerline alignment every 50 feet with cut or fill to invert of pipe maintaining a minimum cover required over pipe. Cuts are normally not required when road grade has been built to subgrade elevation.
- B. Stake alignment of all fire hydrants, tees, water meters, setters and other fixtures and mark cut or fill to hydrant flange finished grade.

### 4.180 Trench Excavation

- A. Clearing and grubbing where required shall be performed within the easement or public right-of-way as permitted by the City and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the owner or contractor in accordance with the terms of all applicable permits.
- B. Trenches shall be excavated to the line and depth designated by the City to provide a minimum of 36-inches of cover over the pipe. Except for unusual circumstances where approved by the City, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space as allowed by the governing agency. The trench shall be kept free from water until joining is complete. Surface water shall be diverted so as not to enter the trench. The owner shall maintain sufficient pumping equipment on the job to insure that these provisions are carried out.
- C. The contractor shall perform all excavation of every description and whatever substance encountered and boulders, rocks, roots and other obstructions shall be entirely removed or cut out to the width of the trench and to a depth of 6 inches below water main grade. Where materials are removed from below water main grade, the trench shall be backfilled to grade with material satisfactory to the City and thoroughly compacted.
- D. Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe laying without approval of the City, and shall be in conformance with Washington Industrial Safety and health Administration (WISHA) and Office of Safety and Health Administration (OSHA) Safety Standard.
- E. The bottom of the trench shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to make up the joint.

### **4.190 Thrust Blocking**

Location of thrust blocking shall be shown on plans. Thrust block concrete shall be Class 3000 poured against undisturbed earth. A plastic barrier shall be placed between all thrust blocks and fittings.

### **4.200 Backfilling**

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. Selected import backfill material shall be placed and compacted around and under the water mains by hand tools to a height of 6 inches above the top of the water main. The remaining backfill shall be select material and shall be compacted to 95 percent of the maximum density in traveled areas, 90 percent outside traveled areas. The use of native material for backfill shall only be allowed outside of the road section and as approved by the City. Where governmental agencies other than the City have jurisdiction over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction. All trench backfill material placed in any traveled way shall conform with WSDOT/APWA Standards for backfilling the trench.

### **4.210 Street Patching and Restoration**

Requirements regarding street patching and trench restoration shall be per WSDOT/APWA Standards, the Transportation Chapter of these standards, and specific requirements of agency with jurisdiction.

### **4.220 Hydrostatic Tests**

Prior to the acceptance of the work, the installation shall be subjected to a hydrostatic pressure test in accordance with WSDOT/APWA Standards. No main shall be hydrostatically tested until the lines are flushed of chlorine. The main shall be tested between valves. Insofar as possible, no hydrostatic pressure shall be placed against the opposite side of the valve being tested. Test pressure shall be maintained while the entire installation is inspected.

The contractor shall provide all necessary equipment and shall perform all work connected with the tests. Tests shall be made after all connections have been made and the roadway section is constructed to subgrade. This is to include any and all connections as shown on the plan. The contractor shall perform the test to assure that the equipment to be used for the test is adequate and in good operating condition and the air in the line has been released before requesting the City to witness the test.

### **4.230 Disinfection and Flushing**

Disinfection of water mains shall be accomplished by the contractor in accordance with the requirements of WSDOT/APWA Standards and the Snohomish County Health District in a manner satisfactory to the City. 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, drainage ways, and any and all other waters where fish or other natural water life can be expected.

When a chlorine concentration has been established throughout the line, the valves shall be closed and the line left undisturbed for 24 hours. The line shall then be thoroughly flushed to

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a location approved by the City and water samples taken by the City at least 24 hours after flushing and disinfecting for approval by the local health agency. Should the initial treatment result in an unsatisfactory bacteriological test, the original chlorination procedure shall be repeated by the contractor until satisfactory results are obtained. The sample can only be taken on Mondays, Tuesdays, Wednesdays, and Thursdays until noon. Testing and sampling shall take place after all underground utilities are installed and compaction of the roadway section is complete.

Polypigging is required for flushing 12-inch and larger water mains. Mains that are polypigged shall be chlorinated after the pigging process is complete.