

SECTION 3 WATER SYSTEMS

3.1 General Requirements

Water systems shall be designed, constructed, and tested in accordance with the current editions of circular WQB 1 - Montana Department of Environmental Quality - Standards for Water Works, the Montana Public Works Standard Specifications, and the City of Whitefish Engineering Standards. Standard Details 21-30 are the water system details that must be included, where applicable, in water system construction drawings.

All water main extensions will require the Design Engineer to submit a written report to the Director of Public Works which addresses the fire and domestic flow requirements. The report shall include data on test results at the nearest hydrant which shows the static pressure at zero flow from the hydrant and the residual pressure with available flow from the hydrant. For residential developments having more than 30 single family dwelling units or that require utilization of a pressure booster pump(s) the report may be required by the Public Works Department to include hydraulic modeling results that show the adequacy to meet fire and domestic flow requirements. The normal operating range of pressure allowed for water system design is 60-100 psi.

The layout of extensions shall provide for the future continuation and/or “looping” of the existing system as determined by the City with particular attention to limit the extent of infrastructure required for each lot.

3.2 Fire Flow.

The amount of fire flow required for structures shall be based on the Uniform Fire Code Appendix III-A. Non-structural utilization of an area shall have the fire flow requirements as determined by the Fire Chief. The minimum fire flow for any structure shall be 1,000 gallons per minute, with a minimum of twenty pounds per square inch (20 psi) residual pressure at any point in the system during flow.

3.3 Water Service Lines.

Structures containing two or more residences under separate ownership, such as townhouses or condominiums, shall have separate service lines, service valves and meters for each residence. Structures containing two or more residences, offices or businesses that are rental units under common ownership may have one service line, valve, and meter for all occupants within a single structure subject to written City approval. Water and sewer services shall have a minimum ten feet of horizontal separation. For additional service line details refer to the standard drawings for single residences and multifamily residences presented in this document.

3.4 **Water System Material Specifications.**

Minimum Pipe Sizes. The minimum diameter of all mains shall be eight (8") inches unless a smaller diameter is approved by the Director of Public Works, except fire hydrant runs less than fifty feet in length may be six (6") inches.

Pipe Material. Water main piping from six (6") to twelve (12") inches in diameter shall be AWWA C-900 DR 18 (235 psi) PVC pipe (formerly listed as Class 150). . All water main piping larger than twelve (12") inches in diameter shall conform to AWWA C-905 Standards.

Gate Valves (MJ x MJ). Gate valves (12" in diameter and under) shall be Mueller Resilient Wedge Gate Valves conforming to AWWA C-509 Standards, or an approved equal.

Butterfly Valves. Butterfly valves shall be Mueller Lineseal Butterfly Valves, or approved equal conforming to AWWA C-504 Standards. All valves over twelve (12") inches in diameter shall be butterfly valves.

Isolation Valves. 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 500 feet. *Note: Valves shall be installed on every branch line at intersections.

Fire Hydrants. Fire hydrants shall be Red Mueller Super Centurion 250 Fire Hydrants (5 - 1/4", 3-way) conforming to AWWA C-502 Standards. The placement of all fire hydrants shall be subject to the approval of the Fire Chief. Unless otherwise approved by the Fire Chief, the hydrants shall be spaced no further apart than one standard City block, which is 360 feet. The Fire Chief reserves the right to require additional fire hydrants if the demand of the structure(s) requires more flow than the minimum spacing provides. In general, hydrant spacing shall not exceed; 360 feet along streets in residential area, 300 feet in commercial areas and 150 to 200 feet in industrial areas. Flange tees or tapping sleeves with flange x mechanical (FL x MJ) valves, with stainless steel bolts, are required on all fire lines. For additional details see Fire Hydrant Standard Drawing No. 23).

Service Fittings. Service fittings shall be Mueller Insta-Tite for IPS PE pipe or 110 Series compression fittings for copper tubing or IPS PE pipe. No fittings shall be allowed from the corporation stop to the curb stop. SS liners are required for compression fittings on PE pipe.

Valve Boxes. Valve boxes shall be Tyler 6860 Series "DD" or East Jordan 8560 Series - Screw Type, #6 Base to be marked "Water".

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.

Corporation Stops. Corporation Stops shall be Mueller B-25008 (3/4" - 2") or B-25009 for PE IPS (3/4" - 1").

Curb Boxes. Curb boxes shall be Mueller H-10314 (.75 and 1 inch stops) or H-10310 with stationary rods (1.5 and 2 inch stops). Extended lengths on all boxes shall be 78 inches minimum. Stationary rods shall be 63 inches standard.

Service Saddles. Service saddles shall be Power Seal 3412AS(3"-12"), Romac model 306 (2" - 12") or Romac Model 305 (10" - 32"). An allowed alternate is Smith Blair Model 372 (4" - 12"). No single or double strap type is allowed on PVC pipe.

Service Pipe. Service pipe up to two (2") in diameter shall be one of the following:

1. Type K Copper (ASTM Specifications B-88-62. "Reference AWWA Standard C800-66, Appendix")
2. Polyethylene Pipe (IPS) SDR 7 - 3/4" and 1"*
3. Polyethylene Tube (CTS) SDR 9 - 1 1/2" and 2"***

*Beveling tool must be used.

**Stainless steel inserts required on all compression type fittings for PE tube. Tracer Wire to be installed on all PE Pipe, with DryConn connections. (See Standard Details 21 & 22).

Service pipe four (4") inches or larger in diameter shall be Class 150 PVC Pipe conforming to AWWA C-900 Standards.

Curb Stop. Curb stops shall be Mueller 300 Ball Curb Valves with Insta-Tite or 110 compression fittings. SS liners are required for 110 compression fittings on PE pipe.

Mechanical Joint Restraint. Megalugs, or similar joint restraining devices, shall be used. Thrust blocks shall be required at all Megalugs and similar mechanical joint restraining devices. (See Standard Details 23 & 30 for Megalug requirements for Fire Hydrants).

Warning Tape. Detectable warning tape shall be a minimum of 5 mils thick, three (3") wide and conform to APWA colors.

Tracer Wire. All mains and services shall be installed with 12 gauge (minimum) insulated solid core tracer wire, Copperhead Yellow Jacket Industries or approved equal. Tracer wire shall be taped to the top of the water main. Breaks, splices or taps shall be DryConn. In addition, tracer wire shall be brought up and tied off at each valve body, curb stop and fire hydrant (See Standard Details 22-24).

Minimum Cover. The minimum cover for all water mains from top of pipe to finish grade shall be six (6) feet unless otherwise approved by the Public Works Director/City Engineer. Unless specifically authorized by utility personnel, the minimum depth of bury for service lines from the main to the premise shall be six (6) feet.

Tapping Sleeves. Tapping sleeves shall be Power Seal Stainless Steel Model 3490 AS (Stainless Steel), Romac SST III or an approved equal. Tapping sleeves shall be installed a minimum of 3 pipe diameters from the nearest joint on the existing pipe to be tapped. Use of size-on-size tapping sleeves requires pre-approved of the Public Works Department .

Ductile Iron Fittings. Ductile iron fittings shall be Class 350 SSB Fittings conforming to AWWA C-153 Standards. Main couplings shall be solid sleeve - MJ/SSB - Ductile iron (Long).

Meter Wells. Meter wells shall be Mueller/McCullough Thermal Coil Meter Box with aluminum bottom insulation and cast iron lid for ¾" and 1" services. Meter wells for services larger than 1" shall be considered on a case-by-case basis depending on meter size and application.

Main Line Tapping Procedures. Contractor to provide, install and test tapping sleeve and valve. City personnel are to be contacted to witness test. City personnel will perform tap and only City personnel shall operate valves on City system. Tapping shall not occur on Fridays or the day before a governmental holiday.

Service Line Tapping Procedures. Contractor to provide and install saddle and corporation stop. City personnel will perform tap and operate all valves. Public Works Department needs 48 hours notification to schedule a tap. Tapping shall not occur on Fridays or the day before a governmental holiday.

Accessibility. Water mains shall be installed in public right-of-way wherever possible. All water facilities shall be designed and constructed so that all such facilities are readily accessible for maintenance and repair. Where mains cannot be installed in ROW a 20-foot wide easement shall be provided with the pipe centerline five feet from one easement edge.

3.5 Backflow Prevention Devices.

Requirements for New Customers. All new customers not previously served by the Water Utility requesting introduction of water service to their premises, shall be required to install a suitable backflow prevention device, approved by the Director of Public Works/City Engineer or

the City Manager or his designate. Backflow prevention devices must be installed in accordance with the latest edition of the Cross Connection Control Manual of the USC Foundation for Cross Connection Control and Hydraulic Research. As required in the Uniform Plumbing Code, an approved Thermal Expansion Tank (along with relief valves) shall be installed whenever a backflow prevention device is present in the system line.

Location. The backflow prevention device shall be installed immediately following the inlet gate valve and preceding the meter, or in accordance with manufacturer's specifications, to facilitate removal for testing, repair or replacement.

Existing Residential Services. The Public Works Department shall have a regular program for installing backflow prevention devices, and necessary piping and valves, in all existing residential services. The cost of the installation shall be borne by the City.

Existing Commercial Services. The Public Works Department shall have a regular program for installing backflow prevention devices, and necessary piping and valves, in all existing commercial services. The cost of the installation shall be the responsibility of the customer.

Size and Type. The size and type of all backflow prevention devices shall be determined by the Public Works Director/City Engineer or his designate based upon the size of service and the degree of hazard that exists or can be expected to exist on the premises served.

Second Backflow Prevention Devices. All installation, maintenance, testing, repair or replacement of backflow prevention devices installed in addition to the devices required by these rules and regulations, shall be the responsibility of, and at the expense of, the customer.

Liability. The backflow prevention devices installed under these Standards are intended for the protection of the potable water supply and distribution system of the City and in no way relieve the customer from liability or requirements to install backflow prevention devices under the Uniform Plumbing code or other Building Codes that may apply.

3.6 Extension of Mains

Customers or Developers who have requested water service in an area not presently served by a City-owned main must extend the existing main across the full frontage of the property being served or developed. Requests for extension by subdividers shall conform to the subdivision rules and regulations and the water master plan where applicable.

Construction. Prior to the start of any construction on main extensions an engineering report, along with necessary plans and specifications for the extension, shall be submitted to the Montana Department of Environmental Quality for review and approval pursuant to ARM 17.38.101, and the rules of the Department. All construction and materials shall conform to applicable City Standards.

3.7 End of Water Main Design.

The end of a water main that may be extended in the future must include a valve, 10' main stub and end cap. Megalugs must be installed on the valve, the end cap and all pipe joints from valve to end cap (See Standard Detail 30).

3.8 Disinfecting and Flushing Water Mains.

1. Continuous Feed Method. The continuous feed method is the preferred method for disinfecting all water mains. Other methods used must comply with the Montana Public Works Standard Specifications and be approved by the Public Works Department.

2. Clearing the Main of Heavily Chlorinated Water. After the applicable retention period, heavily chlorinated water shall not remain in prolonged contact with pipe. In order to prevent damage to the pipe lining or corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the system or is acceptable for domestic use.

Heavily chlorinated water shall be dechlorinated when discharge is to waters of the State of Montana. Dechlorinating methods shall be approved by the Public Works Department.