

**City of Brookings**  
**Water Distribution Design Standards**  
(Brookings Municipal Utilities - BMU)

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**Table of Contents**

**General Requirements ..... 1**

**Submittals ..... 2**

**Valves ..... 3**

**Meters ..... 4**

**Cross-Connection Control and Backflow Prevention ..... 4**

**Water Services ..... 4**

**Manufactured Home Parks ..... 5**

**Water Main Easements and Access ..... 5**

## General Requirements

**Design:** The design for water main distribution facilities shall be in conformance with this chapter. Where design information is not provided herein, the most current edition of the following standards shall be used.

City of Brookings Design Standards, Standard Specifications, and Standard Plates.

Recommended Standards for Water Works, Great Lakes—Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (Ten State Standards).

Requirements and Standards of the South Dakota Department of Environment and Natural Resources.

American Water Works Association Standards.

South Dakota Plumbing Code.

Uniform Plumbing Code.

International Fire Code and referenced NFPA Standards.

**Conflict:** In case of a conflict between the above design standards, the most restrictive requirement shall apply.

**Construction Standards:** Construction standards shall be the current version of the City of Brookings Standard Specifications for Water Main Construction and Standard Plates together with the latest addenda. All details, materials, and water appurtenances shall conform to these standards.

City of Brookings Standard Specifications for Water Main Construction shall be included with Designer's bid package. Specifications can be retrieved from the BMU website <http://www.brookingsutilities.com/>.

**Approved Pipe Materials:** Refer to City of Brookings Standard Specifications for Water Main Construction.

**Water Main Size:** The BMU Engineer shall determine if a water main larger than 8-inches is required for the benefit of the overall water distribution system.

For new development the minimum water main size shall be 8-inches in diameter; with the exception of hydrant leads which shall be a minimum of 6-inches in diameter.

**Minimum Water Main Cover:** Minimum depth of cover for a water main, as measured from the top of the pipe to the finished surface elevation, shall be 6-feet, although 6.5-feet of depth shall be the nominal design depth. Where a vertical adjustment is required in order to pass under another utility, the length of the deeper water main shall be kept to a minimum, bends with restraining glands may be required to achieve the desired vertical offset.

**Water Main Testing:** Disinfection, bacteriological, and hydrostatic tests shall be required in accordance with requirements of the City of Brookings Standard Specifications for Water Main Construction.

Water Main Location: Water mains shall be located to best conform to the layout of the existing facilities. In streets where no pattern has been established, water mains shall generally be located 10-feet to the north or 10-feet to the east of the road centerline. A minimum horizontal separation of 10-feet shall be provided between the water mains and the sanitary sewer mains except as allowed in the Ten States Standards.

Water main extensions shall be installed in public right-of-ways and are not allowed to cross private property without a BMU approved easement width and a hard surfacing width of 8-foot (min) to allow access for BMU maintenance vehicles. Asphalt is the preferred hard surfacing method but 6-inches of compacted gravel may be allowed.

Water mains shall be at least 20-feet away from buildings and located under paved areas whenever possible. Water mains will not be allowed under buildings.

Pipe to Pipe Clearances from Storm Sewer: Typical pipe to pipe clearances between a water main and a storm sewer shall adhere to the following to ensure the water main does not freeze. These are typical pipe to pipe clearances, the BMU Engineer may require additional clearance depending on storm inlet locations, water main flow conditions or other design criteria.

<u>Storm Sewer Size</u> .....	<u>Minimum Clearance (pipe to pipe)</u>
Smaller than 18-inch .....	1.5-feet
18-inch to 24-inch .....	2-feet
27-inch to 36-inch .....	3-feet
Larger than 36-inch .....	BMU Engineer Determined
All sizes of Box Culverts .....	BMU Engineer Determined

## Submittals

Application for Water Main Extension: Application for water main extension must be submitted to the Brookings Municipal Utility (BMU) board for approval. The BMU board meets the 2<sup>nd</sup> Monday of each month, application submittal required a week prior. Application retrieval: <http://www.brookingsutilities.com/>.

Plan Submittals: Designer shall submit plan and profile sheets to the BMU Engineer for review prior to soliciting bids for the Owner. Allow BMU 1-2 weeks for review, depending on project size. Plans shall include, but not limited to, the following:

Plan and profile of water main and services with main and service sizes noted, water main installation notes, etc.

Plan and profile of all existing facility info obtained, including all other proposed facilities; such as sanitary sewer main, storm sewer, sump pump collection system, etc.

Easement locations for drainage or other facilities noted and dimensioned.

City Hall approved road grades.

Lot numbers with block & addition info, street/avenue names, reference business names for driveways and any other pertinent info.

NAVD(88) benchmark(s) on project site, preferably to an 'O' on open on hydrant.

## Fire Hydrants

For arterial streets, collector streets and local streets, fire hydrants shall be spaced not more than 500-feet, 400-feet preferred, along the centerline of the street.

Spacing of hydrants around multiple family, commercial, or manufacturing establishments shall be considered as individual cases and shall be determined by consultation with the local Fire Department.

Hydrants shall be located in the road right-of-way 3-foot (preferred) to 5-feet behind the back of curb and on a lot line whenever possible. Fire hydrants installed within curbside sidewalk shall be located 2-feet behind the back of curb and on a lot line whenever possible.

Fire hydrants shall be installed on the end of all dead-end mains. If the main terminates in a cul-de-sac, the fire hydrant shall be installed to meet clear space requirements as outlined below.

Flushing hydrants installed for testing purposes shall be removed once testing has been completed. If the flushing hydrants will remain in place for the duration of a winter season, they shall be installed behind the proposed curb and gutter, unless otherwise approved by the BMU Engineer.

A minimum of 3-foot clear space shall be maintained around the circumference of the fire hydrants, except as otherwise required or approved by the City Fire Department. Light poles, posts, fences, vehicles, vegetative growth, trash, storage, mailboxes, and other materials or things shall not be placed or kept near fire hydrants in a manner that would prevent such fire hydrants from being immediately visible and/or usable.

When fire hydrants are located outside of the City right-of-way and are subject to impact by motor vehicles; guard posts, curb and gutter, or other approved means shall be provided for hydrant protection.

## Valves

In general, valves on cross connecting mains shall be located so that no single break requires more than 1,000-feet to be out of service. Valves on water main 12-inches in diameter and larger shall be spaced not more than one-quarter mile apart. Valves shall be arranged so that any section can be isolated by closing not more than four valves, with a maximum of 30 residential lots out of service.

Valves shall be located such that they will not intersect with sidewalk crossings or adjacent to driveways.

All valves shall be installed with valve boxes.

Valves shall be placed on all dead-end mains for future extension, unless no services are planned and re-chlorination can be completed without interruption of water service.

Perpendicular connections to existing mains shall be by means of a smith tap and tapping valve.

Valves and curb stops for domestic services shall be installed at least 20-feet away from the building. Curb stops are to be installed near the center of the right-of-way sidewalk.

Valves 12-inches in diameter and greater shall be installed with two restrainer devices.

## **Meters**

Water meters will be furnished and installed by the BMU Water Department. Ownership of the meter will remain with BMU.

Contractor is required to install PVC conduit from the meter setter to the remote reading point as per BMU Metering Department (605.697-8418).

Master meters for main line metering of industrial, commercial, and multifamily residential complexes shall be subject to the approval of the BMU Engineer. Authorization must be obtained from the BMU Engineer to allow the use of a master meter in lieu of individual meters. Metering systems shall be reviewed on an individual basis and shall include such auxiliary equipment as deemed necessary by the BMU Engineer and may be required to provide electrical power, heat, sump pump and adequate ventilation. All master meter assemblies must also be constructed with adequate backflow prevention assemblies as per BMU Engineer.

## **Cross-Connection Control and Backflow Prevention**

The BMU's potable water system shall be protected from all cross connections by a backflow prevention assembly in accordance with the South Dakota Plumbing Code and shall be BMU Engineer approved.

## **Water Services**

Water Service Ownership: Water services are privately owned by the Property Owner from the water main to the home, business or industry, and any maintenance required to the water service shall be at the Property Owner's expense.

Individual Water Service per Residence: A separate water service is required for each residence which has the potential of being sold individually, which shall include but not be limited to, duplexes, four plex's, townhouses, etc.

Apartments and over/under duplexes & triplexes, etc., do not need to be individually metered and do not need a separate water service.

All platted lots of a proposed subdivision are to front on and have a separate water service to a public water main without crossing adjacent properties. Additional water services will be required for each additional principal structure on a given lot.

Residential water services shall be constructed to the property line as a part of the street construction project.

Commercial and industrial water services may be constructed to the property line if the service line size is known.

Water Service Sizing: The criteria for sizing and constructing Water Services for single-family residential homes from the BMU main to the curb stop, valve or building shall be:

Those dwellings that have a plumbing fixture load which requires a demand of 40 Fixture Units (FU) or less are allowed to be sized with a minimum 1-inch service.

Those dwellings that have a plumbing fixture load which requires a demand of greater than 40 FU shall be sized with a minimum 1 1/2-inch service.

Reference Appendix A of the most current edition of the Uniform Plumbing Code for FU allocations to various fixture demands.

Water service sizes shall be detailed within the Construction Drawings for review and approval.

Water Service Location: The water service location shall be determined by the Owner or Engineer, but the water service and water service tap must be installed a minimum of 10-feet from the side property line or ownership line, adjacent to the right-of-way line.

Minimum Water Service Cover: Minimum depth of cover for a water service, as measured from the top of the pipe to the finished surface elevation, shall be 6-feet, although 6.5-feet of depth is the nominal design depth. Where a vertical adjustment is required in order to pass under another utility, the length of the deeper water service shall be kept to a minimum.

Shut off Unused Services: Any unused water services, because of re-plating or etc.; shall be shut off at the BMU main at the expense of the Owner. Services 1-inch to 2-inch shall be shut off at the corporation. Larger services shall require installing a plug in the service tee.

## **Manufactured Home Parks**

New manufactured home parks will be allowed to have individually metered water services if the distribution system within the park is built to meet BMU Standards. Maintenance and access easements granted to BMU for the water main is also required.

If individually metered homes are not desired, a metering structure is required for each water main entrance into the park. If a metering structure is used, the distribution system within the park will be considered private and will not be maintained by BMU.

## **Water Main Easements and Access**

Water Main Easements: Water main easements shall be obtained for all water mains located on private property. Water main easements shall have a minimum width of 20-feet unless larger easement widths are deemed necessary by the BMU Engineer. In addition, temporary construction easements may be required for construction.

The most current version of the water easement forms shall be used and obtained from the BMU Engineer's Office.

Easements shall be shown on the Preliminary Plans, Development Engineering Plans, and CIP Plans. Plans are to show the easement dimensioned from the centerline of the pipe to the outside edge of the easement and labeled "Utility Easement" (preferred) or "Water Main Easement".

Access to Water Mains: Water mains located outside of public right-of-ways shall require easement access and must be accessible by BMU maintenance vehicles. Easement access road topping shall be asphalt (preferred) or compacted gravel, as determined by BMU Engineer. Valve box caps to be installed to final road grade.