

WATER MAIN EXTENSION DESIGN REQUIREMENTS

This guideline provides minimum requirements for the design of new water main extensions. The Developer is responsible for the design of all water facilities required to serve the proposed project and support the application. The Developer must retain a Professional Engineer licensed in the State of New Jersey to prepare the water system plans. The design must meet all applicable regulations, the Water Main Design Requirements, and policies of New Jersey American Water.

1.0 INTRODUCTION

- 1.1 *Minimum Pipe Size*** - The minimum pipe size shall be designed in accordance with NJDEP Safe Drinking Water Act Rules NJAC 7:10-11 and New Jersey Residential Site Improvement Standards (NJRSIS) NJAC 5:21-5.
- 1.2 *Standard Pipe Sizes*** - Standard pipe sizes of 4", 6", 8", 12" and 16" shall be used.
- 1.3 *Fire Hydrant Lateral Sizes*** - Pipeline laterals to fire hydrants shall be a minimum of 6".
- 1.4 *Design Pressures*** - Pipeline material and joint restraint (also see paragraph 4.1) shall be based upon a minimum anticipated service pressure ranging from 35 to 100 psi at the curb. In some areas of the state pressures may be greater. Your New Jersey American Water Project Manager will provide the anticipated service pressure for your specific project.
- 1.5 *Maximum Fire Flow*** - The design should not include features to meet needed fire flows exceeding 3,500 gpm. Individual (non-public water supply) fire suppression systems should be designed by the property owner to meet needed fire flow over 3,500 gpm.
- 1.6 *Design Fire Flows*** - The static and residual pressure needs of individual on site fire sprinkler systems should be considered in the network design, but they should not drive the design if the pressures are considerably higher than the pressures that would be required for public fire hydrants. In those cases, individual fire booster pumps should be designed to meet individual fire sprinkler system needs.
- 1.7 *Off-site Improvements*** - If there are alternatives of meeting required hydraulic needs of either off-site piping improvements versus pumping improvements, the Water Company will require off-site piping improvements rather than pumping improvements.

- 1.8 Water Storage Tanks and Pump Stations** - For those cases where piping networks cannot meet minimum flow and pressure requirements and where a new pump station and or tank is required or proposed, a separate meeting with the Water Company Project Manager is required to review project requirements.

2.0 PIPING AND NETWORK LAYOUT

- 2.1 Connection to Existing Network** - In accordance with NJAC 7:10 –11.10 (e) and NJRSIS, so far as is practicable, distribution mains shall be laid in a loop system to eliminate dead ends.
- 2.2 Sewer Separation** - Minimum separation shall be maintained for sanitary and industrial sewer lines in accordance with N.J.A.C. 7:10-11.10(e)5. All water mains and sanitary or industrial sewer lines shall be separated by a horizontal distance of 10 feet. At crossings of sewer lines and water mains, the top of the sewer lines shall be at least 18 inches below the bottom of the water main.
- 2.3 Other Utilities** - Water mains cannot be installed in common trenches with other utilities.
- 2.4 Dead-Ends** - Dead ends shall be minimized and, where necessary, they shall be designed with blow-offs.
- 2.5 Blow-Offs** - Blow-offs shall NOT be connected to any sewer manholes, catch basins, or sewer mains.
- 2.6 Valves** - In-line valves shall be installed at every point where pipelines intersect, in every direction.
- 2.7 Air Release Valves** - If required, the pipe network shall include appurtenances to allow for the release of entrapped air during filling and normal operations.
- 2.8 Install in Public Rights of Way** - Pipelines are preferred in dedicated, public rights-of-way. If pipelines cannot be installed in dedicated, public rights-of-way, easements are required.

3.0 PIPE COVER

- 3.1 Minimum Cover** - The minimum pipeline cover requirement shall be 4 feet.
- 3.2 Cover Variances** - If minimum cover requirements cannot be achieved in certain areas, a detailed design must be submitted, reviewed, and accepted by New Jersey American Water to ensure adequate protection from freezing and live loads on the pipeline.

4.0 THRUST RESTRAINT

4.1 Engineer Responsible - The Engineer is responsible for the design of any required thrust restraint systems. A 100-psi surge allowance shall be added to the anticipated service pressure to determine the proper thrust restraint measures.

4.2 Acceptable Systems - Include:

- 1) Adequately sized thrust blocks bearing on **undisturbed** soil.
- 2) A system of wedge action retainer glands on mechanical joint fittings in combination with the use of restrained joint pipe as required on each side of the fitting.
- 3) Adequate lengths of restrained joint pipe.
- 4) Other systems may be acceptable but should be reviewed and approved by the Water Company in concept before final design.

5.0 BEDDING AND BACKFILL

5.1 Select Backfill - A minimum of six inches of stone bedding and twelve inches of cover shall be required for all mains and services. For water mains within an existing Public Right of Way or proposed pavement areas, a minimum of 100% select backfill, which shall be compacted to a minimum of 90% optimum compaction, is required. However, the governing entity that has jurisdiction of the right of way, may require a more stringent specification.

- 1) For water mains outside pavement areas within private easements: It is understood that company recommends the use of 100% select backfill, which shall be compacted to a minimum of 90% optimum compaction unless existing material is adequate.

If any soil is found that is not similar to the material approved for backfill use by the governing entity that has jurisdiction of right of way or if the soil is too wet or has a high organic content or cannot be properly compacted, this soil shall be replaced by 100% select backfill which shall be compacted to a minimum of 90% of optimum compaction. Additionally, New Jersey American Water reserves the right to require 100% select backfill, which shall be compacted to a minimum of 90% or proposed optimum compaction or reject any material it deems unsuitable.

The cost of the select backfill and any unsuitable excavated material from the trench for the main installed under this contract will be at the developer's expense.

It is recommended that the applicant provide letters from the governing entity that has jurisdiction of right of way with this application.

6.0 FIRE HYDRANTS

- 6.1 Location** - Fire hydrant locations and classifications (public or private) must be approved by the local municipality or fire district and spaced to provide necessary fire flow. When feasible, the hydrant should be on the water main's short side unless otherwise approved. (Add link to Hydrant Form)
- 6.2 Public Fire Hydrants** - Public fire hydrants shall be installed, owned, and maintained by the Water Company. Public Hydrants shall be installed behind the curb.
- 6.3 Private Fire Hydrants** - Private fire hydrants shall be considered a separate fire service and shall be subject to the fees that apply to each hydrant based upon the size of the connection to the water main. Private fire hydrants shall be installed, owned, and maintained by the property owner.
- 6.4 Depth of Bury** - The total depth of bury shall be a minimum of 4 feet and shall not exceed 6 feet.

7.0 STANDARD DETAIL DRAWINGS - SERVICES, METERING & BACKFLOW

- 7.1 Design Details** - The standard design of services, meters and backflow prevention can be found at our Company website at [Meter Vault and Backflow Diagrams](#)