02713

Water Distribution

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A. Summary

This section contains the design criteria for exterior water distribution systems. Section 15110: Valves contains the valve design criteria, and Section 15140: Domestic Water Piping contains the design criteria for internal water systems.

B. System Design and Performance Requirements

1. Place all water distribution piping a minimum of 10' horizontally and/or 18" vertically from sanitary sewer piping.
2. Bury water distribution piping at least 4' below grade.
3. All work performed within the City of New Haven right-of-way must conform to regional water authority design standards.

C. Submittals

Submit the following design and construction documents to Yale University.

1. Design Documents

a. Submit plan views of all design drawings. Profile views are not required.

b. Before starting construction, submit permits for exterior water main improvements to the regional water authority.

2. Construction Documents

a. Manufacturer specifications must conform to the standards in this section.

b. Before starting construction, forward manufacturer installation procedures and disinfection certificates to Yale University.

c. Provide a list of materials and the names and addresses of the organizations that can readily stock repair parts.

D. Product Standards

1. All water distribution pipe joints must conform to ANSI A21.10 and ANSI A21.11 standards for push-on-joint type, ductile iron pipe.
2. All water distribution pipes for underground use must conform to ANSI A-21.51 and AWWA Class 52 standards with a working pressure of not less than 150 psi, unless otherwise specified. Use cement mortar lining of standard thickness that conforms to ANSI A-21.4 or AWWA C205 standards.
3. Unless otherwise specified, all fittings must withstand a minimum pressure of 150 psi.
4. Fire hydrants must be UL listed and have:
   - A main valve opening of 5.5"
   - Two, 2.5" hose nozzles and one 4.5" pumper nozzle
   - Standard City of New Haven Fire Department threads
   - A left-hand opening nut
   - A working pressure of 175 psi

E. Accessories or Special Features

Install all fire hydrants with a gate valve on the hydrant service main.

F. Preparation

1. In conjunction with Yale University, prepare a shutdown procedure document, before starting construction, that outlines scheduling and notification requirements.
2. Contact the regional water authority when working within the City of New Haven right-of-way. A permit is required when connecting to the regional water authority.

G. Installation Guidelines

1. Mechanically tie all bends, tees, crosses, hydrants, and valves to the straight runs of water distribution pipe, using approved retaining glands and/or threaded rods and nuts.
2. Yale University will consider the use of thrust blocks in lieu of mechanical restraints. Review this design consideration with Yale University before completing the construction document.
3. Provide a uniform bedding for the pipe by placing a 4" of sand or fine gravel in the trench and tamping it. Using a material similar to the bedding, backfill the entire trench width evenly in 6" lifts to 6" above the top of the pipe. Compact the lifts to at least a 95% Standard Proctor density, meeting ASTM D1556 standards at optimum moisture (or as recommended by the soils engineer). Backfill the remaining trench in lifts not to exceed 12" up to the sub-grade height for the surface condition encountered. Compact the lifts to a 95% Standard Proctor density, meeting ASTM D1556 standards at optimum moisture (or as recommended by the soils engineer). Backfilling and compacting above the sub-grade must be determined by the soils engineer or by the recommended paving design for the project.

H. Quality Control

Work on exterior water distribution systems must conform to the following quality control standards.

1. Testing Laboratory

Yale University will retain the services of a qualified, independent testing laboratory to perform soil compaction tests, as directed, during construction.

2. Testing Methodology and Extent

After the trench is partially backfilled, hydrostatically test water distribution piping to 200 psi in accordance with AWWA C-600. Open and close all valves several times during the test. Any drop in pressure requires a visual inspection of all joints.

I. Cleaning and Adjusting

1. Disinfect all tested water distribution systems in accordance with AWWA C-601.
2. Dispose of all wastewater in a sanitary sewer, not in a storm sewer.

J. Startup and Training

The contractor must walk the site with Yale University personnel to verify the location and operation of all valves.