

## **SECTION 8** **WATER MAINS AND SERVICES**

### **8.1 GENERAL**

Water main extensions shall be approved by the Water Department. Prior to initiation of water main construction, an updated set of three prints of plans showing water main extensions shall be submitted to the Water Department for review. The Applicant shall pay the cost of review.

All plans approved by the Water Department shall be valid for one year. At the end of one year, plans for any water main extension not under construction shall be deemed null and void and new plans submitted for review.

The Applicant shall submit four (4) sets of construction shop drawings to the Water Department, detailing the materials to be used during construction and the suppliers of the materials being used. Local contact information for all material suppliers shall be provided in the submittal.

All permits required to perform the work and 24-hour emergency contact shall be received prior to any work being started.

On completion of the water main extension, AutoCAD as-built plans (CD, 3 prints) shall be submitted to the Water Department. The as-built plans shall include locations of service taps in the main, curb stops, gate valves, tees, caps, reducers, hydrants and blow-offs. Tie sheets shall be provided to the Water Department with a minimum of two oblique ties to permanent structures for each curb stop and for each service tap, gate valve, tee, cap, reducer, hydrant and blow-off in the main.

Construction and pressure and disinfection testing of all water main extensions shall be inspected. Inspections shall be contracted for by the Water Department and paid for by the Applicant in full. Inspection of construction and pressure and disinfection testing shall be completed before water main extensions are activated. The Water Department will not accept water main extensions until all work has been completed, all expenses paid and as-built plans submitted.

All public water main piping, valves, hydrants, services and appurtenances included with construction of water main extensions shall become the absolute property of the Orange Water Department and the Applicant shall have no right, title or interest therein after acceptance. The Water Department retains the right of access for maintenance, repair and inspection of water main extensions.

Water mains shall be a minimum of 8-in., looped to prevent dead-ends wherever possible, with isolation valves at water main intersections. Stubs left during construction for future use shall have two valves with roadway boxes. One valve shall be installed at the water main tee and one at the property line.

Liability insurance shall be provided in the minimum amount of \$1,000,000 and the "Orange Water Department" shall be listed as additionally insured.

## 8.2 WATER MAIN REQUIREMENTS

Inspection and Testing. The Applicant shall supply the Water Department with certificates of compliance with water main specifications and certification that each piece of ductile iron pipe has been tested at the foundry for ductility by test methods approved by the Ductile Iron Pipe Research Association.

Handling and Cutting Pipe. Care shall be taken in handling and laying pipe and fittings to avoid damaging any part of the pipe or fittings.

Any fitting or pipe showing a crack and any fitting or pipe which has received a severe blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the job site.

Except as otherwise approved, all cutting shall be done with a machine having rolling wheel cutters, or a mechanical saw. All cut ends shall be examined for possible cracks caused by cutting.

Cut ends shall be carefully chamfered to prevent cutting the gasket when the pipe is laid.

Installing Pipe and Fittings. Each pipe and fitting shall be cleared of all debris, dirt, etc., before being laid and shall be kept clean until accepted in the complete work.

The pipe shall be installed with a minimum cover of 5'0" and a maximum of 7'0". The Superintendent may waive this requirement if necessary.

The deflection of alignment at a joint shall not exceed the appropriate permissible deflection as specified in the following tabulation:

### PIPE DEFLECTION ALLOWANCES

Maximum permissible deflection (inches)\*

<u>Size of pipe</u>	<u>Push-on Joint</u>	<u>Mechanical Joint</u>
4	17	28
6	17	24
8	17	18
10	17	18
12	17	18
14	10	12
16	10	12

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\* Maximum permissible deflection for 18-ft. length; maximum permissible deflections for other lengths shall be in proportion of such lengths to 18 ft.

Temporary Plugs. At all times when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight plugs to keep the interior of water mains clear of dirt, water, animals and other sources of possible contaminations at all times. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has been eliminated.

Pressure and Leakage Tests. A test company approved by the Water Department shall conduct all acceptance tests in the presence of a Water Department representative. Scheduling with the Water Department shall be at least 48 hours in advance of all acceptance tests. All pipelines shall be given combined pressure and leakage tests.

The test shall be conducted as soon as possible after completion of each pipeline section, Hydrant laterals shall be included in all pressure tests. The Applicant shall furnish and install suitable temporary testing plugs or caps; blowoffs and all necessary pressure pumps, pipe connections, meters, gages, and other similar equipment; and all labor required. The Water Department representative shall inspect all pressure gages prior to tests.

Filling and flushing of new mains from existing mains shall be done only at a time, rate and location approved by the Water Department. Operation of existing hydrants and valves shall be by Water Department personnel only. Flushing water shall be handled in an approved manner.

The section of pipe to be tested shall be filled with water of approved quality, and all air shall be expelled from the pipe. If hydrants or blowoffs are not available at high points for releasing air, the Applicant shall make the necessary excavations and do the necessary backfilling and make the necessary taps at such points and shall plug said holes after completion of the test, unless otherwise specified on the approved drawings.

The section under test shall be maintained full of water for a period of 24 hours prior to the combined pressure and leakage test being applied.

The pressure and leakage test shall consist of first raising the water pressure to 200 pounds per square inch, or as directed by the Water Department. While maintaining this pressure for two hours, the Applicant shall make a leakage test by metering the flow of water into the pipe. If the average leakage during the two-hour period exceeds a rate of 0.833 gallons per inch of diameter per mile, the section shall be considered as having failed the test.

If the section fails to pass the pressure and leakage test, the Applicant shall do everything necessary to locate, uncover, and repair or replace the defective pipe, fitting, hydrant or joint. Additional tests and repairs shall be made until the section passes the specified test.

### 8.3 DISINFECTING AND FLUSHING.

The Applicant shall furnish all equipment and materials necessary to do the work of disinfecting, and shall perform the work in accordance with the procedure outlined in the AWWA Standard for Disinfecting Water Mains, Designation C-651 and C-651a as amended to date. The method used shall be that described in Section 5.2 of the AWWA Standard as amended to date.

The dosage shall be such as to produce not less than 10-ppm concentration of free chlorine after a contact period of not less than 24 hours.

Chlorine shall not be left in the mains for more than 48 hours. After treatment, the main shall be flushed with clean water until the residual chlorine content does not exceed current residuals of the Water Department.

During the disinfection period, care shall be exercised to prevent contamination of water in existing mains.

Water used for disinfecting and flushing shall be dechlorinated prior to disposal and shall be disposed of in an approved manner.

After final flushing bacteria samples will be taken, the number and location of the samples to be determined by the Water Department. Hoses may not be used for the collection of samples.

Consecutive sampling shall be repeated for any failure until both samples within each set meet the acceptance criteria described below.

A laboratory certified by the State and approved by the Water Department shall analyze the samples. A State-approved laboratory must receive samples, properly preserved, no more than 8 hours after they are taken from the main. Test results shall demonstrate that all water sampled from the watermain has a total-coliform count of zero.

### 8.4 RESTRAINED JOINTS. A restrained mechanical gland shall be used for all mechanical joints.

## 8.5 HYDRANT CONNECTIONS.

Hydrant connections shall be 6-in minimum and of the mechanical-joint type with a maximum spacing of 500 feet. Ductile-iron restrained joints and anchor tees shall be provided.

## 8.6 SERVICE CONNECTIONS.

Service connections shall consist of a corporation stop, curb stop, curb box, service saddle (for services larger than 1-in.), PE tubing and splicing couplings as necessary. Meter pits shall be required for services as prescribed in Section 5.9 of the Regulations. All service taps must be wet taps done under static pressure. The only dry tap allowed will be a chlorination tap for disinfecting the water main.

## 8.7 GENERAL CONSTRUCTION REQUIREMENTS.

The following General Requirements of construction shall apply.

The Applicant shall notify Dig-Safe prior to the start of construction and shall comply with all Federal, State and Local regulations including but not limited to safety.

The Applicant shall handle groundwater in a manner consistent with all federal, state and local laws, regulations and by-laws as amended to date.

The Applicant shall restore areas disturbed by construction to original pre-construction condition.

The Applicant shall verify the location of underground utilities, including services, with utility owners and shall comply with their requirements for protection of utilities.

The Applicant shall immediately repair any damage to existing utilities (Town owned or otherwise) resulting from his work, at no expense to the Water Department.

Except where otherwise directed, twelve (12) inch minimum clearance shall be provided between the exterior of water mains and other utilities. Where new mains pass under utilities, they shall cross without use of bends. When new mains cross an existing sewer, it shall be done without the use of bends and/or joints.

All fittings shall be backed with concrete thrust blocks as indicated on the standard details. Thrust block sides shall be formed with plywood and bearing areas shall be not less than indicated in the Appendix.

All trenches shall be rolled and/or mechanically tamped to achieve compaction in excess of 95%.

The following standard details are included in the Appendix:

- Water Main Trench Detail
- Gate Valve Detail
- Hydrant Assembly Detail
- Service Connection Detail
- Thrust Block Details