

Edgecombe Water and Sewer District's Water Distribution System Specifications Manual

Section 01

Part 1 General

1.01 Work Included

- A. Water distribution system shall include but not be specifically limited To the installation of water main, fittings, valves, hydrants, services, etc.
- B. Water distribution system shall also include incidental related work Such as clearing and grubbing, trench excavation, dewatering, rock removal, trench stabilization, bedding, select backfill material, backfill, compaction, tie in of existing system, testing, disinfection, etc.
- C. The Contractor shall provide all materials, labor, equipment, tools, etc., And perform all work required and services necessary for and incidental to a complete installation as shown on the drawings and specifications in complete accord with the contract documents or the District's specification manual.
- D. All supplementary or miscellaneous items, equipment, appurtenances, Or devices necessary for or incidental to a complete and functional installation, whether or not shown on the plans or addressed in the specifications, shall be provided and installed as part of the work.

1.02 Submittals

- A. Manufacturers' literature: Submit properly identified manufacturer's Literature including material specifications, test reports maintenance and warranty information, and printed installation instructions for approval of the following: pipe, fittings, hydrants, valves, blow-offs, castings, vaults, etc.
- B. Shop Drawings: Submit shop drawings for approval of all precast Concrete pipes, manholes, vaults, etc. Shop drawings should indicate All relative dimensions, appurtenances, and governing specifications.

1.03 Regulatory Requirements

- A. All materials and construction shall be in accordance with the Permit Issued by and all rules and regulations of the North Carolina Department of Environmental, Health and Natural Resources, Division of Environmental Health.

1.04 Project Record Documents

- A. Contractor shall be responsible for preparing and submitting “As-Built” Drawings of all piping systems in the project including items installed for the contract and pre-existing items. Contractor shall provide tie downs, [two (2) each minimum] for each valve, tee, cross, bend, meter box, etc. Where possible, permanent monuments such as property irons shall be used for tie downs.

1.04 Payments by the District

- A. All contract work engaged in by Edgecombe Water and Sewer Districts Shall be paid based on the contract documents for the given contract. Preferably all payments will be made by quantitative bid amounts based on the piece or unit of work covered. All contract work will be verified by the District through its representative or inspector and by tabulations of unit amounts. Requests for partial payments will be reduced by a 10% retainage until the final payment request. All partial payments will be verified by the unit amount in place. No final payments will be made until all conditions of the contract have been fulfilled and all required information has been submitted.

Part 2 Products

2.01 General

- A. This products sub-section includes materials which may be used in the Work herein described but is not intended to cover every item necessary for completion of the work, nor is it intended that every item described below be included in every project. The intention of this Products Subsection is to denote the quality and type of materials described and required for the performance of the work.
- B. All mains to be maintained by the Edgecombe Water and Sewer Districts shall be installed using materials complying with these standards. Mains to be installed for privately maintained domestic service or fire protection lines on the service side of the meter, master

meter, or fire line backflow preventer shall be installed according to these standards C

2.02 Water Mains (Public and Private)

A. Ductile Iron Pipe (DIP)

- 1 Ductile Iron pipe used for water mains shall be manufactured in accordance with AWWA C150 and C151. The minimum class pipe shall be Pressure Class 350 or as designated on the plans or in the bid schedule. Pipe shall be cement lined and bituminous coated for direct burial in accordance with AWWA C104. Ductile Iron may be used for any sewer main 8 inches in diameter or larger. Pipe shall be either “push on “ or “mechanical joint” type for direct burial manufactured in accordance with AWWA C111.

B. Polyvinyl Chloride (PVC) Pipe (4”-12”)

- 1 PVC pipe used for water mains shall be Pressure Class 200 Manufactured in accordance with AWWA C 900 and shall have bell and spigot type joint connections with integral Bell and Gaskets conforming to ASTM D2672. Gaskets shall conform to ASTM F 477 and shall be rigidly set or cast into pipe bell. Pipes shall be clearly marked with the following minimum information: Manufactures Name, Nominal Inside Diameter, National Sanitation Foundation Certification for use as potable water lines, AWWA C 900 Certification, and class 200 pressure rating.

2.03 Water Service Pipe (3/4”-2”)

A. Type K Soft Copper

1. Copper Tubing for service lines shall be Type K Soft Copper Manufactured in accordance with ASTM B88 and supplied in continuous coils. A maximum of one compression or flared union shall be permitted for service lines 60 ft. or less.

2.04 Cast Iron Fittings

- A. Cast Iron fittings shall be class 350 Ductile Iron castings in accordance With AWWA C110 for Standard Fitting or AWWA C153 for compact fittings.
- B. Unless otherwise noted on the plans, all fittings for direct burial shall Have mechanical joint connections. Unless otherwise noted on the plans, all fittings for vault installations shall have flange connections.

- C. All cast fittings shall have cement-mortar lining in accordance with AWWA C104 and shall be fully bituminous coated for direct burial.

2.05 Hydrant

- A. Hydrants shall be dry-bonnet type manufactured in accordance with AWWA C502 and shall be furnished with 6" mechanical joint inlet and minimum 4 1/2" main valve opening. Acceptable hydrants shall have a bronze seat with a bronze valve seat insert.
- B. Hydrants shall have Pentagon shaped 5 sided operating nut and shall Open turning left (counterclockwise).
- C. Hydrants shall be three way, (except flush and post hydrants) with one Each 4 1/2" pumper nozzle and 2 each 2 1/2" hose nozzles. All nozzles shall have National Standard Threads.
- D. Acceptable manufacturers for hydrants shall be American Darling, Kennedy, Mueller, Waterous, or approved equal.
- E. Post Hydrants and flush hydrants shall be dry barrel, AWWA approved, Conform to items 2.06 B & D above.

2.06 Gate Valve (2" and larger)

A. General

1. Unless otherwise noted on the plans, all gate valves for direct Burial shall have mechanical joint connections except valve connections to tapping tees, which shall have flange connections.
Unless otherwise noted on the plans, all gate valves for vault installations shall have flange connections. Two-inch gate valves may also use threaded connections for brass-to-brass or brass to copper connections.
2. All gate valves shall open turning left (counterclockwise). Valves for direct burial shall have nonrising stems (NRS) With two inch square (4 sided) operating nut. Valves for vault installations shall be either (NRS) or outside stem yoke (OS&Y) with hand wheel operation.
3. All gate valves shall have a minimum rated working pressure Of two hundred (200) psi, four hundred (400) psi minimum test pressure.

- B. Two (2") Inch
 - 1. Two (2") inch gate valves shall be iron body, bronze mounted, Double-disk parallel seated, and fully bituminous coated or epoxy coated.
- C. Three through twelve (3"-12") Inch
 - 1. Unless otherwise noted on plans, all gate valves for three inch Through twelve-inch (3"-12") mains shall be Resilient-Seated type manufactured in accordance with AWWA C509 and shall be fully epoxy coated, twelve- (12) mil minimum dry film thickness.
- D. Sixteen through Forty-eight (16"- 48")
 - 1. Gate Valves shall be iron body, bronze mounted, double-disc Parallel seated, and fully bituminous coated.
 - 2. Gate valves shall have minimum working pressure of one Hundred and fifty (150) psi. three hundred (300) psi. test pressure.

2.07 Butterfly Valve (16" and larger)

- A. Unless otherwise shown on plans, all valves on water mains 16" in Diameter and larger, except tapping valves, shall be rubber seated, butterfly valves manufactured in accordance with AWWA C504. All butterfly valves shall be class 150 B minimum with a rated working pressure of one hundred fifty (150) psi., three hundred psi. minimum test pressure.
- B. Unless otherwise noted on plans, all butterfly valves shall be provided With either mechanical joint or "Victaulic", grooved end connections.
- C. Valves shall have ductile iron bodies and discs with full epoxy Coatings, twelve mils min. in accordance with AWWA C550. Valve seats shall be stainless steel, bronze matting, or resilient material. Resilient seats shall be mechanically attached to the valve disc or body and shall be fully field adjustable by mechanical means. Valve disc shafts shall be stainless steel of either the stub or through-shaft design. Valve shaft bearings shall be heavy-duty bronze.
- D. All butterfly valves shall be provided with a integral manual operator

With a two (2") inch square (4 sided) operating nut, which shall open, turning left (counter clockwise). The valve and operator shall be assembled for installation in a horizontal line with the main valve horizontal and the operator shaft and operating nut aligned vertically. Valve operators shall be worm gear type as manufactured by Philadelphia Gear Works.

2.08 Tapping Sleeve and Valve

- A. Tapping sleeves shall be cast iron mechanical joint with one hundred Fifty (150) psi. minimum working pressure, flanged valve connection, and test tap and plug.
- B. Steel sleeves with equal or greater working pressure may be Substituted for cast iron. Steel sleeves shall be either one hundred (100) percent stainless steel including bolts and nuts or shall have fusion bonded epoxy coating, twelve (12) mil min. dry film thickness.
- C. Matching gate for tapping sleeve shall meet requirements for 2.04 Above, except valve shall be mated to tapping sleeve by manufacturer. Valve shall be provided with flanged connection to tapping sleeve and mechanical connection to the branch line. Valve shall also have proper internal dimensions to allow passage of cutter head for full nominal pipe diameter tap on existing main.

2.09 Check Valve

- A. Check valve shall be iron body, bronze mounted swing type with Ends manufactured in accordance with AWWA C508.
- B. Check valve shall have cast iron clapper with bronze face and bronze Seat ring. Check valve shall provide "full flow", clear passageway for nominal diameter pipe of pipe when fully open.
- C. Valves shall adjustable external lever and weight or lever and spring Operation. Working parts of the valve shall be fully removable through top cover.
- D. Valves shall be rated for one hundred seventy-five (175) psi. minimum Working pressure, three hundred (300) psi. test pressure.
- E. Valve shall be fully bituminous or epoxy coated for use in potable Water systems.
- F. The valve shall be housed in a precast manhole or vault approved by

The director. All locations for check valves shall be as shown on plans or as directed by the director.

2.10 Backflow Protection Assembly

A. General

1. All backflow protection assemblies shall be approved by the Division of Environmental Health of the North Carolina Department of Environment, Health, and Natural Resources and the Foundation for Cross-connection Control and Hydraulic Research at the University of Southern California.
2. All backflow prevention assemblies shall be the detector type Provided with a three quarter (3/4") inch By-pass Meter. By-pass meter shall be manufactured in accordance with AWWA C700 and register units in U.S. Gallons.
3. Gate valves for backflow assemblies on fire sprinkler supply Lines shall be supplied with Outside Stem and Yoke (OS&Y) Operators.

B. Double Check Valve Type

1. Double Check valve type backflow assemblies shall be Manufactured in accordance with AWWA C511.

C. Reduced Pressure Zone Type

1. Reduced pressure zone (or principle) type backflow assemblies Shall be manufactured in accordance with AWWA C512.

D. Every service installed regardless of size shall be required to have a Double Check valve assembly. If the service is deemed to be a hazardous service a Reduced Pressure Zone (RPZ) valve shall be required in accordance with DENR-Public Water Supply Section .0406(b).

E. Gate Valve (cut-off valve)

1. A gate valve shall be installed on the customer side within three feet of the meter box by the customer.

2.11 Air Release Valve

- A. Air release valves shall be two (2") inch Crispin Pressure Air Valves Model P 20 with a vacuum check unit or an approved equal. These valves shall be suitable for pressure operating range of zero (0) to one hundred fifty (150) psi. working pressure and designed to allow air to escape automatically while the main is in service and under pressure.
- B. The valve shall be housed in a precast manhole or vault approved by Director. All locations for air release valves shall be as shown on the plans or as directed by the Director.

2.12 Meter Boxes

- A. All meter boxes for three quarter (3/4") inch through one (1") meters Shall be cast iron body with cast iron lid or an approved equal as designated by the Director.
- B. All meter enclosures for meters larger than one (1") inch shall be Approved by the director on a case-by-case basis.

2.13 Corporations and Curb Stops

- A. Corporations and curb stops shall be brass manufactured in Accordance with AWWA C800.
- B. Corporation Stops shall be Hayes 5040, Mueller H-15175, or Approved equal.
- C. Curb Stops shall be Ford F600, Hayes 5200, Mueller H-15000, or Approved equal.

2.14 Valve Boxes

- A. All valve boxes shall conform to the detail drawing in the back of this Set of specifications.
- B. Valve boxes shall be made of cast iron conforming to ASTM A48, Class 30, shall have an adjustable telescoping feature, and shall be fully bituminous seal coated.
- C. All valve boxes shall be set to grade with a class A (3000psi min.) Concrete pad with two (2') ft. by two (2') ft. by six (6") inch deep dimension enclosing the pipe, either precast or poured in place.

2.15 Steel Encasement Pipe

- A. Steel Encasement pipe shall be welded or seamless, consisting of

“B” steel with a minimum yield strength of thirty-five thousand (35000) psi. and manufactured in accordance with ASTM A139. Pipe thickness shall be as shown on plans or as indicated in the Bid Schedule, but shall be a minimum of one quarter (.25) inch.

- B. All pipes shall be furnished with beveled ends prepared for field Welding of circumferential joints. All burrs at pipe ends shall be removed.
- C. Encasement pipe must be approved by the appropriate governing Agency (NCDOT, Railroad, etc.) prior to ordering.

2.16 Cast in Place Concrete

- A. Cast in place concrete shall be provided in accordance with Section 1000 Portland Cement Concrete Production and Delivery of the NCDOT SSRS.

2.17 Unit Masonry

- A. Where necessary for adjustment of manhole castings or construction Of shallow manholes, non-reinforced brick or concrete block masonry shall be provided in accordance with 830 of the NCDOT SSRS.
- B. Brick, concrete, block, Portland cement, hydrated lime, mortar sand Mortar, and water shall meet or exceed the minimum requirements specified in Section 1040 of the NCDOT SSRS.

2.18 Pre-cast Manholes and Vaults

- A. All pre-cast manholes shall be constructed of Portland cement Concrete sections designed and manufactured in accordance with ASTM C478. Top sections for pre-cast manholes shall be either eccentric cone risers or eccentric flat tops. Flat tops shall be used for shallow installations. Manholes shall be furnished with a minimum inside diameter of four (4') ft.
- B. Pre-cast vaults shall be designed and constructed in accordance with The appropriate AASHTO and ASTM standards. Where vaults may be exposed to vehicular loadings, the vault shall be designed to carry the appropriate loading such as HS-15, HS-20, E-80, HL-93, etc.

Part 3 Execution

3.01 General

- A. All pipes, valves, hydrants, vaults, castings, and other appurtenances shall be kept clean and carefully handled to avoid damage and shall be inspected by the director or his designee prior to installation.
- B. The contractor shall install temporary water tight plug in water mains and services during construction to prevent ground water contamination.

3.02 Trenching

- A. Trench excavation, backfill, and compaction shall be done in accordance with all applicable OSHA standards.

3.03 Pipe Installation

- A. Install pipe, valves, hydrants, fittings, services, and other accessories in accordance with plans, specifications, and detail drawings.
- B. A minimum of three (3') feet of cover shall be provided on all mains installed. Depth of cover shall be increased to four (4') feet at ditch, Creek or river crossings.

3.04 Relationship of Water Mains to Other Utilities

- A. Water Mains shall be laid at least ten (10') feet laterally from sanitary Sewer mains. In cases where local conditions or barriers prevent a 10' lateral separation, the following shall apply:
 - 1. The water and sewer mains shall be laid in separate trenches, with the elevation of the bottom of the water main at least eighteen (18") inches above the top of the sewer: or
 - 2. The water main is laid in the same trench as the sewer with the water main located on one side of the trench on a bench of undisturbed soil and with the elevation of the bottom of the water main at least eighteen (18") inches above the top of the sewer main.
- B. Whenever it is necessary for a water main to cross over a sewer, the Sewer main shall be laid at such an elevation that the bottom of the water main is at least eighteen (18") inches above the top of the sewer main. If local conditions or barriers prevent an 18" separation vertically then both the water and sewer mains shall be constructed of or replaced with ferrous materials and shall have joints that are equidistant from the point of crossing.
- C. Whenever it is necessary for a water main to cross under a sewer

Main, both the sewer and the water main shall be constructed of or replaced with ferrous materials and shall have joints that are equidistant from the point of crossing.

- D. Whenever it is necessary for a water main to cross over or under any Utility other than sewer, a minimum vertical separation of six (6") inches shall be maintained and an approved backfill material shall be as a cushioning material.

3.05 Existing and Proposed Services

- A. A water service shall be provided for every recorded lot, parcel or dwelling, desiring to be served by the District.
- B. Unless otherwise noted on the Plans or as directed by the Director All water services shall be a minimum Three quarter (3/4") inch tap including but not limited to: corporation stop, tapping saddle, 3/4" CTS service piping, approved meter, angle valve, approved backflow preventer, cast iron meter box or approved equal, (2) meter couplins, brass clamping device, and one cubic foot of crushed stone as per the standard water detail drawing in the back of this set of specifications. Tapping saddles shall be of solid brass and shall be required where the main to be tapped is either ductile iron or larger than four (4") inches in diameter. All 3/4" meters shall be furnished by the contractor. No 3/4" meters shall be set by the contractor. The contractor shall provide to the District the number of meters to be installed in a project and District personnel shall set them. All meters larger than 3/4" shall be furnished and installed by the contractor at his expense and to the standards as per the plans or as directed by the Director In all cases the contractor shall make the tap complete less the installation of the 3/4" meters. District personnel shall do initial meter readings and service start-ups. All installations of meter boxes and vaults shall be to finished grade. The contractor shall be responsible for correct as-built drawings that provide two reference points for the tap location on the main, and meter box location.
- C. Service Connections
 1. All house connections shall be laid to the property line or Right-of-way line.
 2. Where an existing service is in place, the contractor shall tie In the existing service to the new main.
 3. Where the property owner is not currently served by the

District, the contractor shall confirm with the Director if a service lateral is to be installed for the future.

4. For services in new subdivisions, taps shall be installed in the center of the lot. In cases where water and sewer taps will be installed a five (5') separation for the water and sewer shall be maintained. Services in cul-de-sacs may be shifted from center to the property line.

3.06 Tie-in To Existing Water System

- A. Prior to actual cutting of an existing main for the installation of a Tapping sleeve, saddle, or tapping sleeve and valve, a pressure test shall be done of the tie in assembly in the presence of District Personnel.
- B. Prior to filling of lines, flushing, chlorination, etc. approval shall be Obtained from the Director or his designated representative in accordance with Section 02&03 of this set of specifications for the testing of Water Distribution System and Disinfection of Water Distribution Systems respectively.
- C. No lines shall be placed into service until the following written Approvals have been issued:
 1. Engineer's Certification that all system components have Been installed in accordance with the plans, specifications, and the DEHNR DWQ approved permit.
 2. A complete and accurate set of as-built drawings which Gives two reference tie down points for all valves, tees, taps, meter boxes, and hydrants. Also there should be reference points for the location of the main in relationship to the centerline of the road or right-of-way and the edge of pavement.
 3. A negative Bacteriological Contamination Report issued by A State Certified Laboratory.

3.07 Testing of Water Distribution System

- A. Water Distribution Systems shall be tested in accordance with Current AWWA Standards and section 02 of this manual.

3.08 Disinfection of Water Distribution System

- A. Water Distribution Systems shall be disinfected by current AWWA and State Standards and section 03 of this manual.

3.09 Cleanup

- A. Prior to release of final payment or acceptance by the District for Ownership and maintenance, all areas disturbed by construction including but not limited to paved areas; vegetated areas; driveways; signs; mail boxes; fences; utilities; on site or off site areas used for access, storage, barrow, or spoil; etc. shall be left in or repaired to as good as or better than existing conditions prior to starting construction.

End Of Section

Section 02
Testing Water Distribution System

Part 1 General

1.01 Work Included

- A. The contractor shall provide all materials, labor, equipment, tools, etc., and All work required and services necessary for and incidental to a complete testing of the installed water distribution system as shown on the drawings and in complete accordance with these documents.
- B. All supplementary or miscellaneous items, equipment, appurtenances, or Devices necessary for or incidental to a complete and functional installation, whether or not shown on the plans or addressed in the specifications, shall be provided and installed as part of the work.

1.02 Method of Payment

- A. Payment for testing water distribution systems shall be considered Incidental to line construction. Payment for any and all testing shall be included in the contract price. No other payments shall be made for testing.

Part 2 Products

2.01 Equipment

- A. Contractor shall be responsible for providing all necessary test equipment Including the following minimum test equipment in proper working order:
 - 1 Pressure gauge with three inch minimum face, two hundred psi minimum operating pressure, and maximum dial graduation increments of one psi (1).
 - 2 By-pass pump with motor, pressure relief valve, shut-off valve, and hoses rated for a minimum of one hundred fifty (150%) percent of required or actual test pressure.

Part 3 Execution

3.01 General

- A. The appointed District representative shall witness all testing.
- B. Prior to pressurization of lines, all trenches shall be backfilled to ground Level and all blocking shall have had sufficient time to acquire a Minimum compressive strength of twenty-five hundred (2500) psi.
- C. Pressure and leakage tests shall be run for a minimum of two (2) hours Measured from the time the pump is turned off. Test may be run concurrently.
- D. Prior to pressurizing systems for tests, air shall be vented from lines at High points using service connections, hydrants, or taps specifically Installed for air release. No additional payment shall be made for taps Installed specifically for testing.
- E. Minimum test pressure will be one hundred fifty (150) psi measured at The lowest section of the line.
- F. Maximum length of mains to be included in a test shall be five Thousand (5000) ft.

3.02 Allowable Leakage

- A. Allowable leakage shall be calculated in accordance with section 4.1.6 Of AWWA C600-87, or latest revision. For convenience, the following excerpts of Section 4.1.6 (Formula and Table) have been included below:
- B. Allowable leakage formula:

$$L = \frac{S \times D^2 \times (P)^2}{133,200}$$

- Where:
- L= allowable leakage in gals./hr
 - S= length of pipe tested in feet
 - D= nominal diameter of the pipe in inches
 - P= average test pressure during the leakage test
In pounds per square inch.

C. Excerpt of Allowable Leakage Table

Avg. Test Pressure Psi.	Allowable Leakage per 1000' of Pipeline (Gallons)											
	Nominal Pipe Diameter in inches											
	3	4	6	8	10	12	14	16	18	20	24	30
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98	2.38	2.98
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84	2.21	2.76
125	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	1.68	2.01	2.52

- D. If the mains being tested contains sections of various diameters, the Allowable leakage shall be the sum of the computed leakage for each size using the above formula.

3.03 Line Acceptance

- A. Line acceptance shall be based upon allowable leakage being less than that listed in the previous table above
- B. Leakage during test shall be measured using either an approved flow recording meter or direct measurement in a clean cylindrical container of known volume.
- C. Leakage amount shall be the actual volume of water required to pump the test section back to the initial test psi. at the start of the test.

3.04 Correction and Retesting

- A. Any sections of water mains, services, or appurtenances that do not pass Minimum test requirements shall be replaced and/or corrected prior to retesting as approved by the Director.
- B. No additional compensation shall be paid to the contractor for correcting

And/or retesting.

END OF SECTION

Section 03 Disinfection of Water Distribution System

Part 1 General

1.01 Work Included

- A. The contractor shall provide all materials, labor, equipment, tools, etc. and Perform all required work and services for and incidental to a complete Disinfection of the Water Distribution System in accordance with this section.

1.02 Regulatory Requirements

- A. Disinfection shall be performed in accordance with rules and regulations of The Public Water Supply Branch of the NCDEHNR Division of Environmental Health.

1.03 Coordination of Sampling and Testing

- A. The contractor shall be responsible for coordination of sampling and Testing. The contractor shall also be responsible for providing tools and manpower necessary for filling, flushing, sampling, etc.

1.04 Method of Payment

- A. Payment for services performed under this section shall be incidental to line construction and payments for such shall be included in the Unit Bid Price for the relevant construction of items in the Bid Schedule. No other payments for testing or sampling shall be made.

Part 2 Products

2.01 Water Required

- A. The water required for filling, flushing, disinfecting, and sampling shall be Furnished by the contractor at his expense. The contractor is required to notify the District when he anticipates the need for water at least 48 hours in advance. Every effort will be made to not waste water.

2.02 Disinfecting Agent

- A. The Disinfecting agent shall be an approved dry chemical compound such as HTH (High Test Hypochlorite).

2.03 Bacteriological Testing

- A. Bacteriological testing services shall be performed by a Laboratory Certified by the State of North Carolina.
- B. All cost associated with sampling shall be paid by the contractor.
- C. Sampling of the residual chlorine content shall be performed in the Presence of the Director or his representative.

Part 3 Execution

3.01 General

- A. All additions or replacements to the water distribution system including Services and fire lines shall be disinfected and shall receive a negative bacteriological test result prior to being placed into service.
- B. Prior to disinfection, the main or portion of main to be disinfected shall Have passed both Hydrostatic and Leakage tests in accordance with this Manual.
- C. The Director or his representative shall be present during the chlorination Process and during sampling.
- D. Any additional service taps necessary for water supply, for injection of Chlorine solution, flushing, sampling, etc., shall be made in accordance with the Standard Tap Detail in the back of this manual with the exception that no meter box will be required. The contractor shall make every effort to use existing lot service taps for these needs. There will be no additional payments if an additional tap is required. Costs should be included in the unit cost.

3.02 Disinfection

- A. All lines and services shall be opened and thoroughly flushed to remove Any sedimentation or other debris that may be in the line. Lines larger than six (6") inch shall be pigged to ensure that the line is clear of any and all debris.
- B. Valves at connections to existing system shall be closed tightly during the Chlorination process. to prevent backflow of the highly chlorinated water into the District Water Supply.
- C. A solution of water containing HTH shall be introduced into the line by

Regulated pumping and by operation of main line and lateral valves and service valves or curb stops. The solution shall be of such concentration that it will render a uniform concentration of not less than one hundred (100) ppm total chlorine content.

- D. The chlorine solution shall remain in contact with the lines for a minimum Of 24 hours. At the end of the 24-hour period the minimum available chlorine content shall be twenty-five (25) ppm.
- E. If the minimum available content is below twenty-five (25) ppm at the end Of the 24-hour period, then all lines shall be flushed and re-chlorinated.
- F. If minimum available chlorine content is equal to or greater than twenty-Five (25) ppm at the end of the 24 hour period, then the lines shall be sufficiently flushed until residual chlorine levels on system additions are equal to levels on the existing system.
- G. Sufficient precautions must be taken by the contractor to ensure that all water flushed is done so in accordance with proper disposal practices, and Any State or Federal Regulations that apply to super chlorinated water. Further the contractor shall take all necessary precautions to protect any adjacent property from damage, and to protect any surface waters in the area.

3.03 Taking of Samples

- A. After flushing has been completed, and the residual chlorine content of the Line being tested is equal to the residual content of the source, samples shall be taken.
- B. Sample containers shall be sterilized, sealed with a tamper resistant seal, And labeled with the following information:
 - 1- Job Name and Contract #
 - 2- Date and Location of Sampling
 - 3- Person taking Sample
- C. A minimum of one sample shall be taken per 1500' of pipe or portion Thereof.

3.04 Testing and Approval

- A. Chosen laboratory shall administer tests on all samples taken to detect Presence of Coliform Bacteria.
- B. If the test for Coliform is found to be positive, additional flushing and Re-chlorination shall be required until a negative coliform test is obtained.
- C. If the test for bacteria is negative the lab shall send a minimum of three (3) Copies of the negative bacteriological report to the Water Services Director. Upon receipt of the test results the Director shall issue written approval for said lines.
- D. No lines shall be placed in service until written approval is issued by the

Engineer that the line has been installed according to plans and has submitted three (3) copies of the approved and verified set of as-builts to the Director.

END OF SECTION

Part 4 Clarifications

4.01 General

- A. The preceding paragraphs are in no way intended to circumvent any State or Federal regulation, law, or guidelines, and does not relieve the contractor from complying with such. The contractor shall be responsible for insuring that any such rules, regulations or guidelines are followed and met.

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