Standard Specifications

for

Subdivision Waterline Construction

Consolidated Waterworks District No. 1
Terrebonne Parish, Louisiana

October 1, 2004

DIVISION I

GENERAL CONDITIONS

1.1.0 GENERAL:

1.1.1 It is the intention of these specifications to provide standards for the construction of a water distribution system within Development/Subdivision within Terrebonne Parish, Louisiana.

1.1.2 Where ever a standard specification is referred to, it is intended that the latest revision effective as of the date of plan approval shall apply.

1.1.3 The PROJECT ENGINEER shall consult with the DISTRICT for standards or materials not covered by these specifications.

1.1.4 For purposes of these specifications the following definitions shall apply:

1.1.4.1 Consolidated Waterworks District No. 1 (District): The political subdivision created by a resolution of the Terrebonne Parish Consolidated Government adopted on March 23, 1994 and governed by its Board of Commissioners, and commencing operations on July 1, 1994.

1.1.4.2 Contractor: Any person, group or corporation acting as a unit or an agent thereof, licensed as required by the State of Louisiana, engaging in the construction of a water transmission system to be connected to the public water supply of the District.

1.1.4.3 Owner: The subdivider or developer.

1.1.4.4 Project Engineer: An Engineer, registered in the State of Louisiana, retained by the sub-divider/developer to design and administer the construction of improvements in a subdivision/commercial development.

1.1.4.5 Project Representative: The PROJECT ENGINEER'S representative at the construction site.

1.2.0 PRODUCTS INFORMATION:

1.2.1 Manufacturer's warranty for all material and products to be furnished by the CONTRACTOR and to be incorporated into the completed work shall be furnished to the DISTRICT through the PROJECT ENGINEER.

1.2.2 The manufacturer of all material and products shall furnish complete information as to any special conditions or restrictions to be applied in the use of these items. Should

the manner or method of installation, specified performance or test results as set forth in these specifications be contrary to the manufacturer's recommendations for use of the project, the manufacturer shall at once notify the PROJECT ENGINEER who shall forward same to the DISTRICT for appropriate action. Lack of such notification shall be certification by the CONTRACTOR that specification requirements will be met by the material and products under project conditions.

1.2.3 Data submitted on all material shall include complete maintenance instructions and parts list in sufficient detail to facilitate ordering replacements.

1.2.4 Manufacturer's installation guide shall be followed during construction of pipelines. Before construction begins, three (3) copies of the installation guide shall be submitted to the DISTRICT. One copy bearing the DISTRICT'S approval shall be at the job site of installation and the instructions carried out by the foreman in charge of the crew.

1.3.0 SPECIAL CONSTRUCTION:

1.3.1 Special construction projects, such as submarine crossings, pile crossings, bulkheads, roadway crossings, etc. shall be submitted to the DISTRICT for approval prior to construction.

1.4.0 CHANGES IN PLANS:

1.4.1 Should it be necessary to change the location or elevation of the waterline or any other detail as shown in the drawings after receiving DISTRICT approval, then such change shall be brought to the DISTRICT for approval prior to making the change in the construction.

1.4.2 All change in construction from that shown in the approved drawings shall be shown on the record drawings submitted for the final approval.

1.5.0 RECORD DRAWINGS:

1.5.1 One (1) copy of the test reports, manufacturer's submittals, record drawings and one (1) computer disk of the record drawings, shall be submitted with the PROJECT ENGINEER'S letter requesting final approval and acceptance of the waterline project. Record drawings shall indicate the location and GPS coordinates on the waterline at reasonable intervals and on all valves, hydrants and fittings greater than 45 degrees. The depth at all conflicting utility or ditch crossings shall also be shown.

1.6.0 STORAGE OF MATERIALS:

1.6.1 Materials shall be stored so as to insure the preservation of their quality and fitness for the work, and in such a manner that leaves the material accessible for inspection by the DISTRICT.

DIVISION II

WATER PIPELINE MATERIAL

2.1.0 GENERAL:

2.1.1 Waterline material, as indicated on the plans, shall be Polyvinyl Chloride, bell and spigot type with single rubber gasket seals of the push-on type, or butt fused polyethylene pipe.

2.1.2 All pipe shall be in first class condition at the time it is installed in the work.

2.1.3 All pipe shall be designed for a minimum working pressure of 150 psi, plus a surge pressure of 100 psi and an overall minimum safety factor of 2.5. Design laying conditions shall be Class B, WPCF Manual of Practice No. 9 (Page 212) for a maximum cover as indicated on the plans. Design factors for pipe shall be furnished to the PROJECT ENGINEER.

2.2.0 POLYVINYL CHLORIDE PRESSURE PIPE:

2.2.1 All pipe 12-inches and smaller for the distribution system shall meet or exceed the requirements of ASTM D-1784, "Standard Specifications for Rigid Poly (Vinyl Chloride) compounds; and AWWA Specifications C-900, pressure rating class 150, SDR 18 with design factors as given in paragraph 1(c) herein. Pipe shall be Type I, Grade 1 (12454B) with a hydrostatic design stress of 2000 psi, designated as PVC 1120 or equivalent.

2.2.2 All plastic pipe shall have outside diameters equivalent to the OD of cast iron pipe.

2.2.3 Wall thickness and outside diameter subject to tolerance allowed in AWWA C-900 shall be as shown on the following table:

Nominal Size	Average	OD Tolerance	Wall Thickness Minimum	Tolerance
4"	4.80"	+0.009	0.267	+0.032
6"	6.90"	+0.011	0.383	+0.046
8"	9.05"	+0.015	0.503	+0.060
12"	13.20"	+0.015	0.733	+0.088

2.2.4 Polyvinyl chloride pipe shall be furnished in 20 foot lengths.

2.2.5 Rubber ring gaskets shall conform to ASTM D-1869. Couplings and gaskets shall provide automatic end separation without auxiliary spacing devices.

2.3.0 POLYETHYLENE (PE) PIPE:

2.3.1 All PE pipe and fittings shall be made from virgin resins exhibiting a cell classification of PE 345464C as defined in ASTM D3350 with an established hydrostatic-design-basis (HDB) rating of 1,600 psi at 73°F for water. All PE pipe and fittings shall be manufactured in accordance with AWWA C-906. The pipe shall be Series 4000, pressure Class 160, SDR11, unless specifically stated otherwise. The material shall be listed and approved for potable water in accordance with NSF Standard 61. All PE pipe shall have outside diameters (OD) equivalent to the OD of cast iron pipe.

2.3.2 Pipe joints shall be joined by means of zero leak-rate heat fusion or electrofusion method and shall be installed in strict accordance within the pipe manufacturer's recommendations.

2.4.0 DUCTILE IRON PIPE:

2.4.1 Pipe shall be designed in accordance with ANSI Specifications ANSI/AWWA C150/A21.50, "American National Standard for the Thickness Design of Ductile Iron Pipe". Pipe shall be designed for a working pressure of 150 psi and a minimum surge allowance of 100 psi, trench conditions Type 2, with width of d+2 feet and depth of cover 3 to 8 feet with overall minimum safety factor of 2.5.

2.4.2 Pipe shall be manufactured in accordance with AWWA Specifications ANSI/AWWA C151/A21.51 with minimum wall thickness subject to tolerance allowance allowed in said specification under Class 51 for pipe size indicated.

2.5.0 CAST IRON AND DUCTILE IRON FITTINGS:

2.5.1 Fittings shall be furnished in accordance with ANSI/AWWA C-110-A21.10 or C153-A21.53. Joints shall be of the type called for on the plans and shall be push-on or mechanical joints conforming to ANSI/AWWA C-111-A21.11. Consideration will be given to alternate joint configuration; however, such alternate shall receive approval of the DISTRICT prior to installation.

2.5.2 Fittings 12 inches and smaller shall be rated for 250 psi water working pressure.

2.6.0 LINING AND COATING OF FITTINGS:

2.6.1 All cast iron and ductile iron fittings shall have an inside cement mortar lining conforming with Specification for Cement Lining for Cast Iron Pipe and Fittings ANSI/AWWA C104-A21.4 or manufacturer's standard specifications for seal coated "enameline" type cement lining or equal. Outside coating shall conform with ASA Specifications for Coal-Tar Dip Coating for Cast Iron Pipe and Fittings (A21.5; A21.10), latest revision. Thickness shall be standard thickness.

2.7.0 DUCTILE IRON FITTINGS - SPECIAL COATINGS:

2.7.1 Ductile iron fittings may be lined and coated, in and out, with an approved aminecured epoxy resin. This epoxy resin is molecularly bonded to the metal assuring permanents without flaking and shall be of 12 mil thickness. This lining and coating shall be done by the manufacturer in order to insure uniformity.

2.8.0 P.E. FITTINGS:

2.8.1 Molded fittings shall be manufactured and tested in accordance with ASTM D 3261 and shall be so marked. Molded fittings shall be tested in accordance with AWWA C906.

2.8.2 Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock or molded fittings. Fittings shall be molded or fabricated of the same material and manufacturer as the pipe; and in no case shall have thinner walls than those of the pipe furnished. All custom fabricated fittings shall be pressure rated for the same internal pressure rating as the mating pipe. Fittings shall be of butt fusing design and shall be produced by the same manufacturer as the pipe being bid. Fabricated fittings shall be tested in accordance with AWWA C906.

2.8.3 If required, a sample of each type fitting shall be submitted for the PROJECT ENGINEER'S approval, and his approval must be obtained before purchase of the fittings.

2.9.0 ACCESSORIES:

2.9.1 The supplier of cast iron or ductile iron fittings shall furnish all glands and gaskets as recommended by the manufacturer and approved by the DISTRICT. All bolts and nuts shall be Corten, Teflon coated Corten or stainless steel. No direct payment will be made on these items; the cost of same to be included in weight paid for the fitting.

2.9.2 All tie rods shall be 316 stainless steel. When required, tie rods shall be used to secure all bends, ends of pipe, caps, plugs, etc. and all places where thrusting may produce “blow outs”. These tie rods will be used in conjunction with properly sized bands which will attach circumferentially to the pipe. Hot-dipped galvanized bands shall be coated with an approved bitumastic coating before and after installation.

2.9.3 Adapters between PE pipe and flange fittings shall be made with a Harvey adapter or approved equal.

2.10.0 JOINTS:

2.10.1 Joints of the push-on type shall conform to ASTM Specifications C-111-ASA A21.11.

2.10.2 Mechanical joints shall be in accordance with ASA Specifications A21.11 with Corten, Teflon coated Corten or stainless steel bolts.

2.10.3 Joints of the restrained type shall be U.S. Pipe's TR FLEX restrained joint pipe, American's LOK-RING restrained joint, or CLOW'S Super-Lock joint pipe, or an approved equal.

2.10.4 Retainer glands, when allowed, for ductile iron pipe and PVC pipe 12-inches and smaller shall be EBAA, or NAAPCO glands with stainless steel set screws or approved equal.

2.11.0 FLANGED FITTINGS AND SPECIALS:

2.11.1 Flanged fittings shall conform in dimensions, methods of manufacture and tests to the "Standard Specifications for Cast Iron Pipe and Fittings", as adopted by ANSI Class 125.

2.11.2 All flanges and fittings shall conform in weight, thickness and drilling to the "Standard Specifications for Class 125 Cast Iron Flanges and Flanged Fittings", as adopted by ANSI. All flanges shall be faced and drilled, unless special drilling is required as detailed or specified on the plans. All drilling shall conform to the ANSI standards. Where cap screws or stud bolts are required by the plans or specifications, flanges shall be provided with tapped holes for such cap screws or stud bolts.

2.12.0 TAPPING SLEEVES:

2.12.1 Tapping sleeves shall be the stainless steel sleeve type. The body shall be a full circle band that meet or exceeds the Waterworks Specifications for repair clamps, stainless steel 18-8 type 304 with gridded overlapping virgin neoprene rubber gasket. The flange shall be 304 (18-8) stainless steel or ductile iron AWWA C207 Class D ANSI 150 lb. drilling recessed to accept a standard tapping valve. Taping sleeves shall be Rockwell 662 or approved equal.

2.12.2 Tapping sleeve valves shall be similar to the valves specified in Division IV.

2.12.3 All bolts and nuts shall be Corten, Teflon coated Corten or stainless steel.

2.13.0 TESTS AND INSPECTIONS:

2.13.1 All pipe and fittings shall be inspected and tested at manufacturer's plant during manufacture in accordance with manufacturer's standard test procedures at the manufacturer's expense.

2.13.2 For ductile iron fittings, chemical analysis shall be furnished indicating the use of 80-06-03 metal in accordance with ASTM Specifications A339.

2.13.3 For polyvinyl chloride (PVC) pipe, all pipe and couplings shipped must be accompanied by the manufacturer's certificates of test and conformity to applicable ASTM and AWWA Specifications.

2.13.4 Testing of PE pipe and fittings supplied under this specification shall be in accordance with ASTM D-3350.

2.13.5 A letter shall be submitted to the PROJECT ENGINEER by the PE material manufacturer certifying that materials to be furnished meets or exceeds the requirements of AWWA C-906.

2.13.6 The test reports shall be submitted by the PROJECT ENGINEER to the DISTRICT with the request for final acceptance. These test reports shall certify that material furnished under this contract is in compliance with these specifications.

2.13.7 For polyvinyl chloride pipe, quality control shall randomly select pipe to check SDR requirements. This shall be done by cutting the pipe and measuring the actual wall thickness by the use of a micrometer. Result of check shall be submitted to the Project Representative.

DIVISION III

WATER MAIN CONSTRUCTION AND INSTALLATION

3.1.0 GENERAL:

3.1.1 The construction of water lines includes the furnishing of all material in accordance with these specifications and all labor and equipment required for the installation of pipe, fittings, valves, road crossings, canal crossings, stream crossings, ditch crossings, and all incidental work required for completion of the water line system.

3.1.2 The installation of waterlines shall be in accordance with the manufacturer's pipe handbook and instructions.

3.2.0 DELIVERY OF MATERIAL:

3.2.1 Pipe shall be strung along the line of work in a manner that will not cause it to be a hazard to the public, block traffic or access to property, nor shall it be placed in a drainage ditch.

3.2.2 Protective coated fittings shall be received, stored and transported to a point of installation in a manner that will adequately protect the coating. Damaged coating will be cause for rejection of the fittings.

3.2.3 All pipe shall be removed from the transporting vehicle in a manner recommended by the manufacturer. Pipe removed from the vehicle in a manner not acceptable by the DISTRICT and/or manufacturer will be rejected.

3.3.0 CARE OF WORK AND MATERIAL:

3.3.1 The CONTRACTOR shall at all times handle, transport and install all material with the degree of care required to assure that these materials are in first class condition when installed.

3.4.0 INSPECTION OF MATERIALS:

3.4.1 The CONTRACTOR'S quality control representative shall inspect all materials before they are installed in the work, and shall ascertain that satisfactory test reports have been submitted to the PROJECT ENGINEER covering materials inspected. All material found to be defective shall be immediately removed from the work.

3.4.2 Should hidden or unobserved defects be discovered by the PROJECT ENGINEER after the material is in place or show up during testing, the

CONTRACTOR shall be required to remove the defective material and replace it with satisfactory material. The CONTRACTOR shall be solely responsible for the quality of the material he supplies for installation in the work and shall have the full responsibility of obtaining material meeting the requirements of these specifications.

3.5.0 DEPTH OF LINES:

3.5.1 All water mains shall be laid to line and grade as shown on the plans. In general, a minimum cover of thirty (30") inches and a maximum cover of forty-two (42") inches shall be required from the finished ground surface.

3.5.2 The alignment and/or grade may be altered by the PROJECT ENGINEER or his representative as required because of interference with other pipes or structures and to get below ditch bottoms. In general, a minimum of two (2') foot cover is required in a ditch, or canal crossings and a one (1') foot clearance is required below pipeline crossings. These alterations are within the scope of the contract and shall be provided at no extra cost to the OWNER. In the event of a major alteration resulting in a change in contract price, a change order will be issued prior to the execution of the construction work.

3.6.0 EXCAVATION:

3.6.1 Excavation shall be open cut with vertical sides unless in special cases the PROJECT ENGINEER shall permit sloping sides. The CONTRACTOR shall leave a berm on each side of trench to allow free passage and full working space for the PROJECT ENGINEER or his PROJECT REPRESENTATIVE.

3.6.2 The PROJECT ENGINEER shall have authority at any time to require the CONTRACTOR to discontinue use of any excavating machine or other appliance which in his judgement is not adapted to the situation in which it is being used. He may require last 4 inches in depth of excavation to be done by hand or by such machine as is acceptable to him and may forbid the use of such methods of excavation as seem likely to disturb the subgrade.

3.6.3 The CONTRACTOR shall confine his excavation to the least width that will allow the easy installation of the water main and its appurtenances; this width is here declared to be the distance between parallel vertical planes twelve (12") inches from each side of the outside of the barrel of the pipe unless the PROJECT ENGINEER shall specifically allow a greater or lessor width.

3.6.4 In case excavation is carried below grade as established by the PROJECT ENGINEER, the CONTRACTOR shall fill the bottom of excavation up to grade with suitable material and in a manner acceptable to the PROJECT ENGINEER without compensation for either the excavation or the refilling.

3.6.5 No greater length of trench shall be opened in advance of an installed, but not backfilled water main, than shall seem proper to the PROJECT ENGINEER, who will be guided by the circumstances in each case. The PROJECT ENGINEER, will at the request of the CONTRACTOR lay down a general rule to be followed but the right is reserved to the PROJECT ENGINEER to change this rule at his discretion.

3.6.6 If any stumps, roots, logs or other obstructions are encountered within the bounds of the trench, the obstruction shall be cut out to 6 inches below level of established bottom of the trench. The excess depth shall then be backfilled with good earth or aggregate, well tamped, in two layers.

3.6.7 Where there are large trees along the line of the work, large roots of these trees shall not be cut without authorization from the PROJECT ENGINEER. Wherever practicable trench shall be tunneled under such roots, which may require hand digging.

3.6.8 Excavation and piling of excavated material on lawns shall be done so as to cause the minimum of damage to shrubs and flower beds on lawns. Any damage that may result to shrubs and flower beds shall be the responsibility of the CONTRACTOR at no extra cost to OWNER.

3.6.9 Whenever pipe laying is stopped for the night, or for any other reason, the end of the pipe and openings on specials shall be closely secured with a cap or plug or otherwise to prevent the entrance of water, mud, insects, small animals or other obstructions. Unused openings shall be permanently plugged.

3.7.0 SHEATHING AND BRACING:

3.7.1 The CONTRACTOR must protect the sides of his trench by such shoring or bracing as may be necessary. He will be held fully responsible for all damage to property, pavement or underground structures, that may be caused by settlement or caving of the banks of the trench. No payment will be made for any shoring or bracing as such; its cost must be included in the price bid for laying water mains of such size. Sheathing Left-In-Place shall be done only after consulting with the PROJECT ENGINEER or his PROJECT REPRESENTATIVE.

3.8.0 FOUNDATION AND BEDDING:

3.8.1 Under average conditions, the soil at the bottom of the trench will be found to make a satisfactory foundation for the pipe. The bottom of the trench shall be leveled and pipe laid thereon. Bell holes shall be dug of sufficient size to let the whole length of the pipe barrel to be bedded as required and to allow proper assembling of joints.

3.8.2 When bottom of trench is not satisfactory for foundation, excavation shall be carried below level of established bottom of trench to a solid strata and backfilled to pipe grade with granular backfill material. Such extra excavation and backfill will be paid for at the unit price bid per cubic yard of granular backfill material.

3.9.0 LAYING POLYVINYL-CHLORIDE (PVC) PIPE OR POLYETHYLENE PIPE:

3.9.1 Trench width shall not exceed three (3') feet. The bottom of the trench shall be level to provide a uniform bedding for the pipe. Excavate underneath pipe ends to allow pipe to rest firmly on trench foundation. Provide pumps as necessary to dewater the trench and keep the pipe essentially dry until initial backfilling has been accomplished.

3.9.2 Suitable tools and appliances for the safe and convenient handling and laying of the pipe shall be used.

3.9.3 All pipe shall be carefully examined for defects and may be subjected to extra tests as the PROJECT ENGINEER may deem necessary. If any defective pipe or specials should be discovered after having been laid, it shall be removed and replaced with a sound pipe or special without extra charge for the work or removing and replacing.

3.9.4 Caps, plugs and bends for C900 pipe shall be anchored by means of retainer glands, timber thrust block or tie rods and clamps in accordance with the details shown on the plans or other methods recommended by the manufacturer of the pipe.

3.9.5 Whenever pipe laying is stopped for the night, or for any other reason, the end of the pipe and openings on specials shall be closely secured with a cap or plug or otherwise to prevent the entrance of water, mud, insects, small animals or other obstructions. Unused openings shall be permanently plugged.

3.9.6 A blue, 4 mil, low density polyethylene tape as manufactured by New Source, Inc., Waterloo, Wisconsin, or approved equal shall be installed directly over the top center of the pipe approximately 12-inches above the pipe surface. Careful backfilling shall be required to retain tape in place during backfilling operations.

3.9.7 Tracer wire shall be a single No. 10 AWG, blue coated stranded conductor wire with UL approval direct burial insulation and shall be placed directly on top and center of the water main and service pipe. The tracer wire shall be taped to water pipe at 10-foot intervals.

3.9.8 Each mechanical joint, flanged joint, fitting, valves, restraining rods and bands shall be wrapped with a 6 mil thick polyethylene plastic wrap.

3.10.0 LAYING DUCTILE IRON WATERLINE:

3.10.1 All cast iron and ductile iron waterlines shall be protected by means of an 8 mil thickness polyethylene tube. Tubing shall be furnished and installed with the recommendation of the Cast Iron Pipe Research Association.

3.11.0 CONNECTIONS TO EXISTING WATER MAINS:

3.11.1 Work includes connections to existing water mains. Cutting-in operations shall be planned to cause a minimum of inconvenience to customers on existing mains and shall be done under the rules and regulations of the DISTRICT.

3.11.2 The CONTRACTOR shall not open or close any valve in an existing distribution system nor shall he open or close any valve set under this contract after a line has been placed in service, unless the DISTRICT has authorized him to do so.

3.11.3 Procedure for disinfecting at cut-in points shall be reviewed and approved by the DISTRICT.

3.12.0 THRUST RESISTORS:

3.12.1 All water mains, valves and fittings shall be blocked and/or restrained to resist thrust in conjunction with retainer glands in accordance with the manufacturer's recommendations for the individual pipe used. The cost of all labor and material required for thrust resistors shall be included in the unit price bid per foot for the water mains and fittings complete in place. Any timber used in connection with thrust blocks shall have wood preservative (pressure treatment) per AWDA Treatment C1 using water-borne ACA or CCA preservative with 0.25 percent retention.

3.12.2 Prior to backfilling, the PROJECT ENGINEER shall inspect all blocking techniques to ensure conformance with manufacturer’s recommendations.

3.13.0 PLUGS:

3.13.1 All fittings and discontinuous pipes shall be capped with a suitable MJ plug or cap and properly blocked. PE pipe shall have a fused cap.

3.13.2 All plugs shall be paid for by the pound as fittings unless otherwise shown on the plans. All plugs shall include thrust resistors.

3.14.0 BACKFILLING:

3.14.1 Backfill shall be thoroughly but carefully compacted, under and around the pipe to the spring line. Selected backfilled free of rocks or jagged material shall be carefully compacted over the top of the pipe for a depth of one (1) foot.

3.14.2 Remainder of backfilling shall be completed by filling the trench with earth firmly packed by tamping, rolling or other method approved by the PROJECT ENGINEER, so as to secure as compact a trench as possible.

3.14.3 Backfilling of trench across driveways and streets shall not be delayed pending line tests, but shall be completed immediately after line is placed. If necessary to locate leaks, joints located under this backfill shall be exposed for testing.

3.14.4 All excess excavation shall either remain the property of the OWNER and be placed and rough spread on the adjacent property, or shall become the property of the CONTRACTOR and be hauled away from the site, as directed by the PROJECT ENGINEER.

3.15.0 SAMPLING TAPS:

3.15.1 Sampling taps shall be installed at locations along the water main not to exceed 1,000 feet on centers, or at locations approved on the drawings.

3.15.2 The requirements for a sampling tap are as follows:

3.15.2.1 New brass faucet with no internal or external threads (vendor where these can be purchased is the USA Bluebook at (800) 548-1234 item number 45325 and 45326. No cut off faucets without adequate neck.

3.15.2.2 Faucet is facing downward.

3.15.2.3 Faucet has shut-off handle to enable collector to close valve and flame tap.

3.15.2.4 Faucet must be secured to a stake, 32 - 40 inches above the ground.

3.15.2.5 Faucet must be clean.

3.15.2.6 Sample location must be free of grass, weeds and debris.

3.15.2.7 No sample points in ditches.

3.15.3 After a satisfactory sample test report has been received, the sampling taps shall be removed and plugged at the main.

3.16.0 PRESSURE TESTING:

3.16.1 As the work progresses, all sections of pipe shall be tested to a minimum hydrostatic pressure of 125 pounds per square inch for a minimum period of 4 hours. If after 4 hours, the pressure drop is less than 10 psi, the test is acceptable. If after 4 hours, pressure drops to 10 psi or more, but less than 25 psi, let the test on over night to determine what pressure the line will hold. If the pressure does not drop more than 25 psi, after 24 hours, the test is acceptable. If the pressure does drop more than 25 psi, within 24 hours, the test is not acceptable, and the line will be inspected for leaks and retested. (Any defective work revealed by the test must be repaired by the CONTRACTOR at his expense.) Test pressure shall not be exerted against a valve operated by the District. All test sections shall be sealed with plugs or caps.

3.16.2 There shall be a minimum of leakage in the lines under the stated pressure. Volume of leakage shall be determined from the quantity of water required to bring up the pressure and from direct meter readings on completed lines.

3.16.3 The entire cost of the test, including pumps, gauges, connection pipe, etc., will be made at the CONTRACTOR'S expense.

3.16.4 Potable water shall be used for testing and shall be obtained and paid for by the CONTRACTOR.

3.16.5 All hydrostatic pressure tests shall commence prior to 1:00 P.M. If the CONTRACTOR fails to reach the pressure of 125 psi by 1:00 P.M., the pressure test shall be postponed until the next regular working day.

3.16.6 CONTRACTOR shall submit to the PROJECT ENGINEER and the DISTRICT, a schedule of pressure tests which shall be revised as conditions require. The PROJECT ENGINEER and the DISTRICT shall be notified at least 24 hours in advance of the beginning of any test. It is imperative that testing be done immediately upon completion of each portion of the line. Failure to properly schedule and conduct tests will be sufficient cause for the PROJECT ENGINEER to prohibit the opening up of additional trench until all previously installed pipe and specials have been tested and all backfilling completed and work cleaned up. Work shall proceed in an orderly and expeditiously manner with all parts of the operation completion and cleaned up as the CONTRACTOR proceeds along the line.

3.17.0 STERILIZATION:

3.17.1 Procedure for disinfecting line shall be in accordance with paragraph 12:020-1 through paragraph 12:020-4, Chapter XII (Water Supplies) of the Louisiana State Sanitary Code dated March 20, 1984, or latest revision.

3.17.2 In general, after pressure tests have been made and any repairs found needed have been completed, the main shall be flushed as thoroughly as possible. When the initial flushing has been completed, pipes and all other parts of the system shall be thoroughly disinfected by the use of chlorine or chlorine compounds. The rate of application of chlorine shall be in such proportion to the rate of water entering the pipe or other appurtenances, such that the chlorine applied to the water shall be at least 50 ppm. Chlorinated water shall be retained in the pipe long enough to destroy all non-spore-forming bacteria, normally not less than 24 hours. After the chlorine treated water has been retained for the required time, the chlorine residual at pipe extremities and at other representative points shall be at least 5 ppm. If the residual is less than 5 ppm the disinfection procedure shall be repeated until a 5 ppm residual is obtained as required above.

3.17.3 At the end of 24 hours, the main shall again be thoroughly flushed. When flushing has been completed, the main shall be refilled with system water and allowed to stand for one (1) week. Samples shall then be taken by either a private laboratory or by the DISTRICT'S laboratory. Satisfactory test results are valid for forth-five (45) days from the date of sample collection.

3.17.4 The final inspection shall occur after receipt of satisfactory sample test reports, but within 15 days of sample collection. After an acceptable final inspection, the Development/Subdivision shall be opened to the public system and local service provided.

3.17.5 After the final inspection, the Development/Subdivision shall be submitted to the DISTRICT for acceptance within forty-five (45) days of sample collection.

3.17.6 If the system has not been accepted by the DISTRICT during this forty-five (45) day period, additional flushing, sterilization and sanitary testing may be required at the expense of the OWNER.

3.17.7 Mains containing water that does not meet standards of the DISTRICT shall be again disinfected and retested.

3.17.8 No special payment will be made for disinfecting. The entire cost of water, chemicals, equipment and testing shall be included in the unit price bid for laying pipe.

DIVISION IV

VALVES

4.1.0 GENERAL:

4.1.1 Watermains 12-inch and smaller shall have gate valves.

4.1.2 All valves shall open left (counter clock-wise).

4.1.3 Upon completion of construction, all valves shall be left in the open position.

4.2.0 GATE VALVES:

4.2.1 Gate valves 12-inch or smaller shall be cast iron, resilient wedge, non-rising stem with standard mechanical joint or flanged ends.

4.2.2 Gate valves shall be manufactured to AWWA C-509, Standard Specifications for Gate Valves for ordinary Waterworks Service.

4.2.3 Mueller, A2360 Series or approved equal.

4.2.4 Gate valves for hydrant supply lines shall have flanged by mechanical joint ends.

4.2.5 All interior and exterior cast iron valve bodies shall receive 10 mil fusion epoxy coating in accordance with AWWA C550.

4.3.0 VALVE BOXES:

4.3.1 Valve boxes for all valves shall be B & T Company, Tyler Company, or approved equal two-piece valve box.

4.3.2 Covers for valve boxes shall be round drop covers indicating "water".

4.3.3 All valve boxes shall be supplied with a centering seal.

4.3.4 The top of the installed valve box shall be flush with the surface of the finished property elevation.

4.3.5 All valve boxes shall have a 18-inch by 18-inch by 4-inch square, or 18-inch round plain concrete pad poured around the valve box flush with the level of the ground. Pads may be precast and sealed in place.

DIVISION V

FIRE HYDRANT INSTALLATION

5.1.0 FIRE HYDRANTS:

5.1.1 Fire hydrants shall meet all provisions of the current AWWA Specifications governing fire hydrants. Hydrants shall be of the "Traffic Model or Break Flange Type" so designed when the hydrant is subjected to severe impact, the special break flange ring will shear off at the ground line. Hydrant shall be constructed that it can be extended without the necessity of digging. "O" ring seals shall be used to prevent leakage.

5.1.2 All residential hydrants shall be three-way hydrants with two 2½ inch hose nozzles and one 4½ inch pump nozzle. Commercial hydrants shall have two 4½" pump nozzles. Valve opening shall be 5¼ inch.

5.1.3 Threading shall be National Standard, opening left with a 1-1/2" pentagon operating nut.

5.1.4 End inlet shall be mechanical joint with Corten, Teflon coated Corten or stainless steel bolts and nuts.

5.1.5 The term "bury" is defined as meaning the distance from the ground line to the bottom of the pipe. Average bury is approximately three feet, six inches (3'-6"). Before ordering hydrants, the amount of bury for each hydrant location shall be determined by the CONTRACTOR. The CONTRACTOR shall furnish labor and equipment needed for locating water line and establishing amount of bury.

5.1.6 All fire hydrants shall be water-tight when subjected to a hydraulic pressure test of 300 pounds per square inch. This test shall be applied to each hydrant by the manufacturer of the hydrant and certification that each hydrant has been tested shall be stamped on each hydrant by an approved testing lab.

5.1.7 Hydrants shall be Mueller "Centurian" or approved equal.

5.1.8 One spanner wrench shall be provided for each six (6) hydrants.

5.2.0 INSTALLATION OF FIRE HYDRANTS:

5.2.1 All hydrants shall be constructed in accordance with the drawing entitled "Typical Hydrant Setting".

5.2.2 All fire hydrants shall be connected to the distribution system through a 6-inch feeder valve. In those locations where the fire hydrants are being installed on an existing four-inch (4") main, a 4-inch by 6-inch increaser shall be installed on the tee.

5.2.3 Fire hydrants shall be set on and blocked by pressure treated (See 3.12.1) timber blocks placed on a bed of 6-inches of gravel or limestone. Hydrant shall be held in place by means of galvanized pipe straps, as shown on details or installed using a mechanical joint anchoring coupling. After straps or couplings are in place the hydrant joint and water line joint shall be wrapped with 6 or 8 mil polyethylene film, lapped so as to have two layers of film in each wrapping. Film shall be taped to pipe barrel on each of side of joint. Several holes shall be punched in film to allow drainage.

5.2.4 After wrapping is in place, limestone or gravel shall be used to fill around the inlet of the hydrant to a height of three inches (3") above the drain hole.

5.3.0 TAPPING SLEEVE AND VALVES:

5.3.1 When used, these shall be Mueller mechanical joint ends, or stainless steel tapping sleeve with test plug and stainless steel flange, Ford "SST" or approved equal.

5.3.2 All bolts and nuts used on mechanical joints shall be Corten, Teflon coated Corten or stainless steel.

5.3.3 Each mechanical and each flanged joint shall be wrapped with polyethylene film as specified for hydrant joint.

5.4.0 FIRE HYDRANT EXTENSIONS:

5.4.1 It is anticipated that in some locations the bury of the fire hydrant will be in excess of the standard depth specified. At these locations a fire hydrant extension shall be installed to bring the break-off of the fire hydrant above the ground level. The use of fire hydrant extensions shall be approved by PROJECT ENGINEER prior to ordering.

5.5.0 CUTTING INTO EXISTING LINES:

5.5.1 When it is necessary to install a fire hydrant on an existing water main, when tapping sleeves and valves are not used, the tie-in shall be made by cutting the existing water main and inserting a mechanical joint on other approved tees. The CONTRACTOR shall plan this operation in a manner that will cause a minimum interruption of water service. Cards will be prepared and delivered to residents of the area where water is to be cut off advising them when service will be cut off and the approximate duration of the interruption of service.

5.5.2 Cutting of waterlines shall be done with a hydraulic pipe cutter.

5.5.3 Fittings shall be standardized mechanical joint type and shall conform with AWWA Specifications C-110 for 250 psi working pressure (ASA A-21.10). Inside lining shall be "enamaline" type cement lining or approved equal. Outside coating shall be coal-tar dip (ASA A21.5). Bolts and nuts shall be Corten or stainless steel.

5.5.4 When a cut is made into a water line, excavation shall be kept dry to prevent water from entering pipe and to assist in keeping pipe and fittings clean. HTH or similar chemical for disinfection shall be dusted into each fitting, each piece of pipe and each hydrant as they are installed in the system.

5.6.0 STERILIZATION:

5.6.1 After hydrant installation is completed, water supply valve shall be opened just enough to fill the line and bleed air from line through the hydrant. As soon as water reaches hydrant, supply valve shall be closed and chlorinated water allowed to set in the hydrant supply line for 30 minutes, after which supply valve shall be opened and line flushed through the hydrant.

5.7.0 BACKFILLING AND CLEANING UP:

5.7.1 Excavation for hydrant installation shall be backfilled with best available material obtained from the excavation. Backfilling shall be done in layers not over nine inches (9"), each layer being thoroughly compacted. Before final inspection all hydrant location areas shall be redressed and cleaned-up.

5.8.0 COLOR CODING:

5.8.1 All fire hydrants shall be painted red and bonnet and nozzle caps of the hydrant and nozzle caps shall be color coded according to the measured flow from the hydrant. Color coding shall be as follows:

FLOW RANGE	COLOR CODE
Less than 500 GPM	Red (1210 Rust-O-Leum)
501 - 1,000 GPM	Yellow (659 Rust-O-Leum)
More than 1,000 GPM	Green (1282 Rust-O-Leum)

5.8.2 CONTRACTOR shall coordinate flow testing with fire company representative of DISTRICT where hydrant is being installed.

DIVISION XX

MEASUREMENTS AND PAYMENTS

20.1.0 GENERAL:

20.1.1 General contracts for waterlines are unit price contracts and all quantities are approximate quantities. The CONTRACTOR'S attention is directed to the items of work for which no payment item has been established. All work shown on the drawings and outlined in the specifications is to be completed in all respects, and the cost of all miscellaneous and associated work is to be included in the unit prices bid for the various items that payment items have been established for.

20.1.2 All quantities shall be measured and tabulated by both the PROJECT ENGINEER and CONTRACTOR. Requests for payment and supporting data shall be prepared by the CONTRACTOR and given to the PROJECT ENGINEER sufficiently in advance of payment date to permit thorough checking of all quantities.

20.1.3 CONTRACTOR shall submit a daily report and daily sketch sheet showing lines, fittings, valves, taps, etc., installed with sufficient data to accurately locate these items after trench has been backfilled.

20.1.4 The CONTRACTOR shall furnish the PROJECT ENGINEER whatever assistance is required, laborers, clerks and records that will enable the PROJECT ENGINEER to expeditiously check all estimates and especially the final "Record Drawing" quantities of the project.

PAYMENT ITEMS 1 - 4 WATERLINE PIPE AND FITTINGS

20.2.0 WATER PIPE:

20.2.1 Water pipe will be paid for by the linear foot according to size and type.

20.2.2 Method of Measurement: Water pipe will be measured by the linear foot of pipe placed, tested, sterilized and accepted without deductions for the space occupied by valves, fittings or specials.

20.2.3 Basis of Payment: Water pipe placed and accepted measured as provided above will be paid for at the contract unit price per linear foot for water pipe of the

various sizes, types and classifications, which price and payment shall be complete with thrust resistors, warning tape, tracer wire, plastic wrapping, testing and sterilizing the pipe and adapters; for excavation, backfilling and preparation of bed, compaction and removing surplus earth; and reshaping and dressing the surface; and for the furnishing of all equipment, tools, labor, and incidentals necessary to complete the item in accordance with the plans and specifications.

20.2.4 Payment Item:

Item No. 1 - Various Size Water Pipe

20.3.0 CAST IRON OR DUCTILE IRON FITTINGS:

20.3.1 Cast iron fittings or ductile iron fittings used in waterlines will be paid for by the pound. Adapters and retainers will not be paid for separately but will be included in the unit price bid per linear foot of pipe.

20.3.2 Method of Measurement: Fittings shall be measured in units of pounds of cast iron fittings, installed, tested, sterilized and accepted, and payment for mechanical joint, flange and push-on joint fittings, whether cast iron or ductile iron shall be made on the basis of ASA A21.10 published body weights for mechanical joint fittings exclusive of weight of gaskets and linings, glands and bolts.

20.3.3 Basis of Payment: Cast iron or ductile iron fittings used in waterline construction will be paid for by the pound. Adapters, retainers and plastic wrapping will not be paid for separately but will be included in the unit price bid per linear foot of pipe.

20.3.4 Payment Item:

Item No. 2 - Cast Iron and Ductile Iron Fittings

20.4.0 TIE-IN TO EXISTING MAIN OR VALVE:

20.4.1 Tie-ins to existing mains or valve will be paid for per each. Valves and fittings are measured and paid for under other item. This item will provide payment for removal, if necessary, of any existing fittings and existing timber and/or concrete blocking, for installation of new fittings and the reconnection of all lines as necessary. This price shall also include verification by CONTRACTOR of the existing waterline size. Tie-ins to cast iron or ductile iron pipe shall include cutting-in-sleeves.

20.4.2 Method of Measurement: Connections to existing mains or valves will be measured by an actual count of each connection according to type, size, installed, tested, sterilized and accepted.

20.4.3 Basis of Payment: Connections to existing mains or valves installed and accepted, measured as provided above, will be paid for at the contract unit price per each, which price and payment shall constitute full compensation for furnishing all equipment, tools, labor and incidentals necessary for the completion of the item in accordance with plans and specifications.

20.4.4 Payment Item:

Item No. 3 - Various Types of Tie-ins

20.5.0 CUT AND PLUG EXISTING LINES:

20.5.1 As detailed on the plans, existing lines shall be cut and a plug or cap used to seal open line.

20.5.2 Method of Measurement: Payment for each unit under this item will be for furnishing all labor and materials to disconnect and plug existing lines where shown on the plans or called for in the specifications. The cost of the plug shall be included in unit price bid of cast iron fittings unless otherwise noted on plans.

20.5.3 Basis of Payment: The cutting and plugging of existing lines, measured as provided above will be paid for at the contract unit price bid per each, which price and payment shall constitute full compensation for all the material, equipment, tools, labor and incidental items necessary to complete the item in accordance with the plans and specifications.

20.5.4 Payment Item:

Item No. 4 - Cut and Plug Various Size and Type Lines

PAYMENT ITEM 21 VALVES

20.21.0 VALVES AND VALVE BOXES:

20.21.1 Valves and valve boxes together as a unit will be paid for per each.

20.21.2 Method of Measurement: Valves together with valve boxes, spool or smooth pieces and special foundation when shown on plans and concrete pads, all together as a unit will be measured by an actual count of each size, installed, tested, sterilized and accepted. The unit bid price shall include any necessary joint adaptors for connecting valves into the system.

20.21.3 Basis of Payment: The number of valves with valve boxes and accessories together as a unit, accepted, measured as provided above, will be paid for at the contract unit price per each, which price and payment shall constitute full compensation for furnishing, hauling, installing complete and testing and sterilizing, for excavation and backfilling, and for the furnishing of all equipment, tools, labor and incidentals necessary to complete the item in accordance with plans and specifications.

20.21.4 Payment Item:

Item No. 21 - Various Size Valves and Valve Boxes

PAYMENT ITEM 22 TRACER WIRE HOUSING UNITS

20.22.0 TRACER WIRE HOUSING UNITS:

20.22.1 Tracer Wire Housing Units shall be paid for per each.

20.22.2 Method of Measurement: Tracer Wire Housing Units complete will be measured by an actual count installed and accepted.

20.22.3 Basis of Payment: Payment for each will be for the furnishing of all labor, material and equipment to install the unit complete in accordance with the specifications.

20.22.4 Payment Item:

Item No.22 - Tracer Wire Housing Units

PAYMENT ITEMS 30 - 32 FIRE HYDRANTS, TEES AND EXTENSIONS

20.30.0 FIRE HYDRANT INSTALLATION:

20.30.1 Fire hydrant installation complete will be paid for per each according to the type and size connection provided for in the proposal. Standard burial shall be 3 feet, 6 inches.

20.30.2 Method of Measurement: Fire hydrant installation complete will be measured by the actual count of each fire hydrant, type and size connection installed and accepted. The unit price bid for each shall include the hydrant with boot as called for on the proposal.

20.30.3 Basis of Payment: Fire hydrant installation complete placed and accepted measured as provided above will be paid for at the contract unit price per each, which price and payment shall constitute full compensation for furnishing, hauling, installing completed, testing and sterilizing each hydrant, and for the furnishing of all equipment, tools, labor and incidentals necessary to complete the item in accordance with the plans and specifications.

20.30.4 Payment Item:

Item No. 30 - Various Size and Type Fire Hydrant Installations

20.31.0 FIRE HYDRANT TEE AND VALVE INSTALLATION:

20.31.1 Fire hydrant tee and valve installation will be paid for per each as detailed on the plans including supply pipe up to 4 feet in length. Supply pipe over 4 feet in length will be paid for under Payment Item No. 1 - Water Pipe.

20.31.2 Method of Measurement: Fire hydrant tee and valve installation will be measured by the actual count of each unit installed and accepted. The unit price bid for each shall include the necessary tee, valve and box, up to four (4') feet of supply pipe, the tie-in or connection, all as called for on the proposal, as well as the thrust block anchoring device, gravel pack and/or concrete base where required and polyethylene film.

20.31.3 Basis of Payment: Fire hydrant tee and valve installation placed and accepted measured as provided above will be paid for at the contract unit price bid per each, which price and payment shall constitute full compensation for furnishing, hauling, installing completed, testing and sterilizing each tee, with its associated valve, supply pipe and connection fittings; for excavation, backfilling and dressing and for the furnishing of all equipment, tools, labor and incidentals necessary to complete the item in accordance with the plans and specifications.

20.31.4 Payment Item:

Item No. 31 - Various Size Fire Hydrant Tees and Valves

20.32.0 FIRE HYDRANT EXTENSION:

20.32.1 Extra depth for fire hydrants will be paid for per vertical foot.

20.32.2 Method of Measurement: Extra depth for fire hydrant in excess of standard depth will be measured in increments of six inches (6").

20.32.3 Basis of Payment: Extra depth for fire hydrants in excess of standard depth, measured as provided above, will be paid for at the contract unit price per foot, which price and payment shall constitute full compensation for the furnishing of all equipment, tools, labor and incidentals necessary to complete the item in accordance with the plans and specifications.

20.32.4 Payment Item:

Item No. 32 - Fire Hydrant Extension

PAYMENT ITEMS 36 - 38 PIPE EMBEDMENT

20.36.0 LIMESTONE FOUNDATION:

20.36.1 When required by plans or specifications, standard limestone foundation shall be paid for by the linear foot in place. Unless otherwise shown or specified, limestone foundation for 4-inch through 12-inch waterline normally shall be 4 inches below the pipe and shall extend to the spring line of the pipe. The width of limestone base shall be the width of the trench.

20.36.2 Method of Measurement: Limestone foundation placed in accordance with the plans and accepted will be measured by the linear foot in place. No special payment will be made for additional material necessary to correct unauthorized over-width or over-depth excavation.

20.36.3 Basis of Payment: Limestone foundation in place and accepted, measured as provided above, will be paid for at the contract unit price bid per linear foot of limestone, which price and payment shall constitute full compensation for furnishing, hauling and installing all material and for furnishing all equipment, tools, labor and incidentals necessary to complete the item in accordance with the drawing and specifications.

20.36.4 Payment Item:

Item No. 36 - Limestone Foundation for Various Size Waterlines

20.37.0 FOUNDATION LUMBER:

20.37.1 When required by plans or specifications, foundation lumber shall be paid for by the thousand board feet or fraction thereof.

20.37.2 Method of Measurement: Foundation lumber will be measured by unit of one thousand board feet and fraction thereof as determined by using nominal sizes of lumber furnished.

20.37.3 Basis of Payment: Foundation lumber installed and accepted, measured as provided above, will be paid for at the unit price bid by the CONTRACTOR, which combined price and payment shall constitute full compensation for furnishing, hauling and installing all sheeting and bracing required to be left in place, and for furnishing all equipment, tools, labor, and incidental items necessary to complete the item in accordance with the plans and specifications.

20.37.4 Payment Item:

Item No. 37 - Foundation Lumber

20.38.0 GRANULAR BACKFILL MATERIAL:

20.38.1 This work shall consist of furnishing and placing granular material in accordance with the specifications when called for.

20.38.2 Method of Measurement: Granular material used to backfill trenches for the installation of pipe will be measured by the cubic yard of granular material placed, compacted and accepted. Granular material will be placed only at the direction of the PROJECT ENGINEER. Measurement for granular material will be made by the cubic yard in vehicles at the point of delivery. Yardages in vehicles will be measured at the point of delivery. The CONTRACTOR shall strike off and level the load and the checker or project representative shall inspect each load and check its yardage. Approved vehicle for this purpose may be of any size or type acceptable to the PROJECT ENGINEER provided the body is of such shape that the actual delivered contents may be readily and accurately determined and will remain constant. Unless all approved vehicle on the work are of uniform capacity, each vehicle must bear a plainly legible identification mark, indicating its specified approved vehicle. The Project Representative may reject all loads not hauled in approved vehicles. Two haul tickets shall be given the Project Representative for each load of granular fill used. The ticket shall be signed, the location where used noted on the tickets, and one ticket returned to the CONTRACTOR. Tickets for granular fill hauled to a storage site shall not be signed or honored.

20.38.3 Basis of Payment: Granular material in place, compacted, bladed and accepted; measured as provided above, will be paid for at the contract unit price per cubic yard, truck measurement, of granular material hauled and spread; which price shall constitute full compensation for furnishing, hauling, spreading and compacting of granular fill and or the furnishing of all equipment, tools, labor and incidental items necessary to complete the item in accordance with the drawings and specifications.

20.38.4 Payment Item:

Item No. 38 - Granular Backfill

20.66.0 SHEETING LEFT-IN-PLACE:

20.66.1 Sheeting Left-In-Place along with the bracing and shoring utilized in conjunction therewith will be paid for by the linear foot of trench according to category of depth.

20.66.2 Method of Measurement: Sheeting Left-In-Place at the direction of the PROJECT ENGINEER will be measured by the linear foot of trench as measured along the centerline of the trench.

20.66.3 Basis of Payment: Sheeting Left-In-Place, as directed by the PROJECT ENGINEER, installed and accepted, measured as provided above, will be paid for at the contract unit price bid per linear foot of trench, which price and payment shall constitute full compensation for furnishing, hauling and installing all sheeting required to be left-in-place; furnishing, hauling and installing all bracing and shoring required to meet OSHA requirements; removal of hydraulic or temporary bracing and shoring as backfill progresses; and for furnishing all equipment, tools, labor and incidentals necessary to complete the item in accordance with the drawings and specifications.

20.66.4 Payment Items:

Item No. 66 - Sheeting Left-In-Place