33 1000 WATER SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. The work in this section includes the installation of water system piping, water valves, fire hydrants, and other appurtenances.

1.2 RELATED SECTIONS

A. 31 2200 Earthwork

1.3 QUALITY ASSURANCE

A. All work shall be done in accordance with the jurisdiction having authority.

B. All work shall be performed in accordance with AWWA Specifications, latest addition unless otherwise noted.

1.4 SUBMITTALS

A. The contractor shall submit cut sheets of all products proposed for review to the Engineer via the Architect. Submittals shall include compliance with applicable standards and dimensions and specifications.

1.5 STORAGE AND HANDLING

A. Inspect pipe and appurtenances at delivery and before installation for damage. Reject any damaged items.

B. Protect stored piping and appurtenances from moisture and soil.

C. Any PVC piping is to be stored from direct sunlight.

1.6 COORDINATION

A. Coordinate any utility shutdowns or interruptions with Owner. Notify owner 2 weeks before any scheduled shutdowns and obtain approval before proceeding.

B. All taps of public water system are to be coordinated with the authority having jurisdiction over the public water system.

1.7 SUBMITTALS

A. Submit product data for all pipes, valves, protective enclosures, fire hydrants, fire department connections, post indicator valves, etc. to be used.

1.8 QUALITY ASSURANCE

A. Comply with the specifications and regulations of the authority having jurisdiction over the public water system.

B. All fire protection piping and appurtenances shall be installed and in compliance with NFPA and the applicable fire code requirements.

C. Piping shall bear the markings of the standards it is in compliance with.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The Contractor is to furnish all tools and other equipment necessary to execute the work in an accurate and non-hazardous manner.

B. Backfill material per the requirements of the authority having jurisdiction.

C. Piping, valves, hydrants and other water system appurtenances as indicated on the drawings.

2.2 COPPER TUBE

A. Shall be per the requirements of ASTM B88, Type "K" annealed temper seamless copper tube.

2.3 DUCTILE IRON PIPE (DIP)

A. Shall be pressure class 350 and centrifugally cast in accordance with ANSI A21.5 and AWWA C151.

B. Exterior shall be asphaltic coated in accordance with ANSI/AWWA C151/A21.51.

C. Interior shall be cement-mortar lined in accordance with ANSI/AWWA C104/A21.4.

D. Rubber Gasket joints shall be in accordance with ANSI/AWWA C111/A21.11

E. Fittings shall be push on or mechanical type joints in accordance with ANSI/AWWA C111/A21.11 latest revision.

F. Other reference specification ASTM A716-08.

2.4 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

A. All pipe shall be manufactured in accordance with ASTM D2241and shall be SDR 35 and shall be certified to NSF International Standard No. 61.

B. Joints shall be gasketed, push-on type conforming to ASTM D3139.

C. Lubricant shall be as recommended by the pipe or fitting manufacturer and shall not adversely affect the potable qualities of the water to be distributed by the system.

D. Installation shall be in accordance with ASTM D2321 and specification.

2.5 FIRE HYDRANTS

A. Fire hydrants shall be manufactured to comply with AWWA C502, latest revision and shall be designed for 250 pounds working pressure or as required by authority having jurisdiction.

B. If the authority having jurisdiction does not specify what type of hydrant is to be used then hydrants shall be Mueller Co. Supper Centurion or approved equal.

2.6 GATE VALVES

A. If not specified by the authority having jurisdiction then gate valves one and on half inch and smaller shall be bronze body, solid wedge type, rated with a working pressure of 200 psi, NIBCO or approved equal.

B. All gate valves shall have mechanical joints and a static test pressure of 500 psi.

C. Gate valves two inches and larger shall be Mueller P- 2360 series M&H C500 series or approved equivalent.

2.7 POST INDICATOR VALVES (PIV)

A. All post indicator valves shall have a tamper proof switch or lock as per the authority having jurisdictions requirements.

B. All materials shall be manufactured and tested in accordance with the appropriate ANSI/ASTM standard and shall be UL Listed and FM approved and shall meet the requirements of NFPA.

2.8 WATER METERS, BACKFLOW PREVENTORS, DETECTOR CHECK VALVES

A. All water meter vaults, backflow prevention devices, detector check valves, vaults access lids and associated appurtenances, in addition to the tap that serves them, shall be in compliance with the standards of the authority having jurisdiction and AWWA requirements.

B. Coordinate the installation of these devices with the authority having jurisdiction over the domestic water system and fire protection systems. Any work that is not required to be performed by the authority having jurisdiction is to be inspected before being covered.

2.9 NON-BUILDING MOUNTED FIRE DEPARTMENT CONNECTIONS (FDC)

A. Shall be Siamese type connections or, if required by the jurisdiction having authority, a Storz type connection.

B. Siamese connections shall be capable of providing 250 GPM flow (minimum), per 2-1/2" inlet.

C. Inlet connection shall be brass body with integral drop-clapper inlets and female NPT outlets and shall be provided with plugs and chains, with identification plate.

D. Storz type fire department connections shall be equipped with a 4" outlet with cap and chain in compliance with all applicable NFPA standards.

2.10 PROTECTIVE ENCLOSURES

A. Approved manufactures are Hot Box, Inc. and Watts Industries, Inc. or approved equivalent

B. Are to meet the requirements for freeze protection in the area in which they serve. May be of fiberglass or aluminum construction and adequately insultated.

C. Should contain electric heating equipment to prevent freezing of above ground water piping.

D. Shall be placed on concrete pad and provide drainage for potential leaks.

2.11 CORPORATION COCKS

A. If not specified by the municipality having jurisdiction over the water system, cock shall be a Ford model F600, Hayes Model 5200, or approved equal.

2.12 TAPPING SLEEVES AND VALVES

A. Shall be as approved by the jurisdiction having authority.

B. If not specified by the jurisdiction then sleeves shall be Mueller, mechanical joint, 200 psi, H-615 or approved equal and tapping valves shall be Mueller, mechanical joint, 200 psi, T-2360 series, or approved equal.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to section 31 2200 for Earthwork related to installation of storm sewer.

3.2 WATER SYSTEM CONSTRUCTION-GENERAL

A. Contractor is to engage the services of a registered land surveyor to stake all of the water system locations and elevations for piping, hydrants, valves, etc. per the plans.

B. Piping and appurtenances are to be inspected and tested during construction and prior to backfilling. Any damaged structures, pipe, or other appurtenances are to be removed and replaced with new.

C. Water system pipes and structures are to be properly installed and backfilled before being subjected to loading. Any structures or piping that become damaged or displaced due to loading without adequate backfill shall be removed and replaced or reinstalled.

D. Castings for valves, meter boxes, etc. shall be made integral with the structure and be stable and sturdy under loading.

E. Tops of structures shall be set flush with grade in accordance with the drawings.

F. Valve frames and covers in earth are to have a concrete collar block cast-in-place around it, 18 by 18 by 6 inches deep with top one inch above surrounding grade.

G. Valve frames and covers tops in paved areas are to be flush with grade.

H. Pipes and fittings shall be installed per AWWA C-600

3.3 WATER SYSTEM CONSTRUCTION- GENERAL

A. All existing tie-in and conflicts and pipe sizes are to be verified before beginning construction. Any discrepancies that are discovered between the plans and actual field conditions are to be reported to the engineer immediately and the contractor is to wait for further instruction.

B. Construct pipe in a safe, non-hazardous manner, while minimizing interruptions in service to existing facilities. Any interruption in water service shall be coordinated with the owner and approval obtained. Contractor shall submit to the Owner 1 week prior to any necessary interruption, a plan stipulating how long the service will be interrupted, what areas will be effected and backup plans to provide water and fire protection to the building in the event the interruption takes longer than expected. The Owner must approve the interruption before the Contractor can commence with work.

C. Install piping to specified location and elevations shown on plans.

D. All piping is to be carefully placed into trench. Under no circumstances shall any pipe or fitting be dumped or rolled into the trench or be allowed to drop against the pipe or fitting already in the trench. Contractor is responsible for the replacement and removal of any damaged pipe, fittings or appurtenances.

E. Construct piping to accurate lines and grades avoiding high points. Support as required.

F. At the end of the day the end of the water line under construction is to be plugged to prevent debris from entering the line.

G. Install all piping per manufacturer's recommendations.

H. Notch out bottom of trench for bell and spigot or mechanical joints.

I. Cutting of pipe is to be in accordance with manufacturer's recommendations. The work shall be done in a satisfactory manner to leave a smooth end at right angles to the axis of the pipe and not otherwise damage the pipe or liner.

J. Water line shall be constructed to have a minimum of 48 inches of cover measured from the proposed grade to the top, outside, of the pipe. At locations where water lines cross sanitary sewer lines, 18 inches of clearance is to be maintained between the pipes.

3.4 CONSTRUCTION OF DUCTILE IRON PIPE AND FITTINGS

A. Water mains and fittings shall be installed in accordance with the requirements of AWWA C-600.

3.5 CONSTRUCTION OF PVC PIPE AND FITTINGS

A. Install according to AWWA M23 and ASTM F 645

3.6 THRUST BLOCKING

A. Thrust blocking shall be constructed in conformance with AWWA C600, at a minimum.

B. Concrete for thrust blocks and thrust collars shall have a minimum compressive strength of 3,000 PSI at 28 days.

C. Underground piping laid around curves and at all unsupported changes of direction, all tees, wyes, crosses, plugs and other like fittings shall be solidly and properly blocked with concrete against solid earth to take the reaction of the main pressure and to prevent lateral movement of the pipe or fittings when under pressure. Reaction blocking shall be installed at all locations requiring same and where tie rods and clamps are not called for in the plans.

D. Blocking, unless shown shall be so placed that the pipe and fitting joints will be accessible for repair.

3.7 PROTECTIVE ENCLOSURE INSTALLATION

A. Protective enclosures shall be installed per the manufacturer's recommendations.

B. Enclosure is to sit on concrete pad. Pad is to be approximately 2 inches above grade.

3.8 TESTING

A. After all piping has been placed, each section shall be tested by the Contractor in the presence of the Inspector and tests shall be continued until all leaks have been made tight to the satisfaction of the Inspector. The Contractor shall furnish all necessary equipment and other materials necessary to conduct the test as required.

B. Prior to the pressure test, pipe laid in trenches shall be backfilled adequately to secure the pipe during the test. Any observed leakage shall require corrective measures to pipe lines and/or joints to the satisfaction of the Inspector.

C. Piping shall undergo a hydrostatic pressure test in accordance with AWWA Standard C600, latest revision.

D. Testing shall be in accordance with the jurisdiction having authority over the water system.

3.9 DISINFECTION

A. After leakage testing, and all necessary repairs have been made, the lines shall be flushed clean and then disinfected in strict accordance with AWWA Standard For Disinfecting Water Mains, C651, latest revision.

B. All disinfection procedures shall be coordinated with the Inspector.

C. No water piping system shall be placed in service until written approval is obtained from the jurisdiction having authority over the water system.

D. Follow the specific procedure of the jurisdiction having authority to conduct disinfection.

E. Contractor is responsible for all erosion control during testing.

3.10 PIPE AND VALVE IDENTIFICATION

A. Install mylar detection tape and/or other detectable wire, during backfill operations, above nonferrous pipe or any pipe having more than six (6) feet of cover. Detection tape or wire shall be installed centered, approximately 12 to 18 inches above the pipe.

3.11 PROTECTION

A. Contractor is responsible for protecting adjacent improvements and utilities. Any repair of damaged utilities and/or improvements shall be borne by the contractor.

B. Any piping or appurtenances that become damaged by other construction activity are to be replaced by the Contractor at the Contractor's expense.

3.12 BACKFILL COMPLETION

A. Compact trench backfill as specified in Earthwork section.

B. Construct pavement patch, if applicable, to restore finished surface to like new condition. Construct finish surface to provide smooth transition to existing surface.

C. Areas that were previously grassed are to be restored to their pre-developed state.

3.13 CLEANING

A. All construction debris from storm sewer construction is to be properly disposed of.

B. Additional soil from sewer pipe construction that cannot be used elsewhere on-site is to be disposed of at no cost to the owner.

END OF SECTION 33 1000